Varieties of Capitalism - Varieties of Degrees?

Undergraduate Education in Germany and the United States Compared

by

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List of Abbreviations

AACU	Association of American Colleges and Universities
AU	Auburn University
B.A.	Bachelor of Arts
BAföG	Bundesausbildungsföderungsgesetz *Federal Education Support Law*
BCG	Boston Consulting Group
BDA	Bundesvereinigung Deutscher Arbeitgeberverbände *Confederation of German Employers' Associations*
BDI	Bundesverband der Deutschen Industrie *Federal Association of German Industry*
BMBF	Bundesministerium für Bildung und Forschung *Federal Ministry of Education and Research*
B.S.	Bachelor of Science
CDU	Christlich Demokratische Union *Christian Democratic Union*
CHE	Centrum für Hochschulentwicklung *Centre for Higher Education*
CME	Coordinated Market Economy
DB	Deutsche Bahn AG
DBB	Deutscher Beamtenbund *German Association of Civil Servants*
DFG	Deutsche Forschungsgemeinschaft *German Research Society*
DHV	Deutscher Hochschullehrerverband *German Association of University Professors and Lecturers*
DIHK	Deutscher Industrie und Handelskammertag *German Chambers of Industry and Commerce*
ECTS	European Credit Transfer and Accumulation System
ERT	European Round Table of Industrialists
EU	European Union
FDP	Freie Demokratische Partei *Free Democratic Party—Liberals*
FH	Fachhochschule *University of Applied Sciences*
FSU	Friedrich-Schiller-Universität Jena *Friedrich Schiller University Jena*
GATS	General Agreement on Trade in Services
GDCh	Gesellschaft Deutscher Chemiker *German Chemical Society*
GDP	Gross Domestic Product
HD	Heidelberger Druckmaschinen AG
HRG	Hochschulrahmengesetz *Federal Higher Education Framework Law*
HRK	Hochschulrektorenkonferenz *German Rectors' Conference*
IHK	Industrie- und Handelskammer *Chamber of Industry and Commerce*
KMK	Kultusministerkonferenz *Standing Conference of the Ministers of Education and Cultural Affairs*
LME	Liberal Market Economy
LMU	Ludwig-Maximilians-Universität *Ludwig Maximilian University Munich*
M.A.	Master of Arts
M.S.	Master of Science
MPG	Max-Planck-Gesellschaft *Max Planck Society*
NCES	National Center for Education Statistics
NSF	National Science Foundation
OECD	Organization for Economic Co-operation and Development

OvGU Otto-von-Guericke-Universität Magdeburg *Otto von Guericke University Magdeburg*
Ph.D. Doctor of Philosophy
RWTH Rheinisch-Westfälische Technische Hochschule *RWTH Aachen University*
SBA Statistisches Bundesamt *German Federal Statistics Office*
SPD Sozialdemokratische Partei Deutschlands *German Social Democratic Party*
UCB University of California Berkeley
UNICE Union of Industrial and Employer's Confederations Europe (renamed to "BUSINESSEUROPE" in 2007)
UAW United Automobile Workers (union)
UW University of Wisconsin - Madison
VCI Verband der Chemischen Industrie *Federation of the Chemical Industry*
VDMA Verband deutscher Maschinen- und Anlagenbau *German Engineering Federation*
VoC Varieties of Capitalism
WTO World Trade Organization

Chapter 1

Introduction

1.1 Research Focus and Thesis Outline

"Education is the economic issue of our time."
(President Barack Obama 2010)

Globalization, new information technology, the switch from industry-dominated to service-dominated economies, as well the creation of complex and advanced products and services have led to an increased focus on education, higher education in particular, as a measure to prepare a highly skilled workforce. Successful completion of higher education is more than ever seen as a necessary prerequisite for success on the labor market. Employers expect and need workers with a great degree of flexibility and the necessary tools for lifelong learning. Policy makers today view education not only as part of the general social policy paradigm, but as a critical economic element for being competitive on the global market. "Education *is* the economic issue of our time" and many industrialized nations around the world have started to reform their higher education systems over the past few years. One important focus of these reforms is 'employability' - preparing graduates for the working world.

"Universities play an increasingly important role in knowledge-based economies. Traditionally, universities were expected to educate students and contribute to 'basic' research, which could be freely used by society. In the last decades, however, they have been expected to contribute more substantially and directly to economic competitiveness" (Leisyte 2012, 1). This is true for economies around the world. However, while the demands on higher education seem to be very similar everywhere, we find quite different systems of higher education with varying ways of teaching and emphases on different types of skills and knowledge. By comparing undergraduate education in Germany and the United States this dissertation will

argue that despite the ongoing internationalization of higher education (e.g. in the form of such reforms as the European *Bologna Process*) higher education systems still show a great degree of national uniqueness and focus on different sets of skills all while adjusting to the new needs of the knowledge economy.

1.1.1 Higher Education and Varieties of Capitalism

One of the most influential strands of literature in comparative political science that has promoted this interrelatedness of the skill production system, the labor market and corporate institutions is the Varieties of Capitalism approach brought forward by Peter Hall and David Soskice in their seminal work *Varieties of Capitalism* (2001). They argue that there are two main groups of capitalist nations, liberal market economies (LMEs) and coordinated market economies (CMEs), each with their own rules and ways of organizing their social and economic activities. Within these groups institutions in the different policy spheres are complementary, so that the structures found in one sphere (e.g. finances, education) complement those found in the corresponding spheres (e.g. corporate governance, labor market). Education is here described as a crucial element in providing employers with skilled workers. "The politics of skills is therefore fundamental to the politics of advanced capitalism" (Culpepper 2007, 612). The Varieties of Capitalism (VoC) approach argues that firms in CMEs such as Germany need employees with specific skills, while employees in LMEs (like the United States) have to acquire general skills for the job market (Hall and Soskice 2001, 25,30).

However, in the past this framework has mainly been used in studies focusing on vocational education (e.g. Culpepper (2007)). The original argument by Hall and Soskice that employers in LMEs rely on workers with general skills while firms in CMEs hire employees with specific skills is based on comparisons of vocational training systems and school based secondary education. Only recently, have scholars started to include higher education systems in their comparisons of CMEs and LMEs (e.g. Powell et al. (2009), Graf (2009), Hoelscher (2012)). With the increasing importance of highly skilled workers, general skills needed by the service sector and the growth of higher education systems, this study argues that the Varieties of Capitalism literature should include higher education in their analyses as a crucial element in skill production and the work started by these first studies needs to be continued. I will thus use the VoC framework for a systematic comparison of German and American undergraduate education and show that the VoC framework can also be applied for the comparison of higher education policy.

The starting point for this study will be recent reforms in German higher

education, as they constitute an interesting puzzle when analyzed from a VoC point of view. Goal of the reforms, greatly influenced by the European *Bologna Process*, was the creation of a "European Higher Education Area" with common degree systems in which students and researchers (just like firms and workers) could move freely between the different member countries. In Germany the public debate about these reforms, even before the *Bologna Process* started, has repeatedly mentioned the United States' higher education system as a role model for improving the quality of universities in Germany. Judging by the overall success of American universities, at first sight replicating the American higher education system in Germany seems to be a reasonable suggestion and many of the reform measures appear to indicate an Americanization of German higher education. The VoC approach, however, would suggest that an American-style higher education system would not provide the skills needed by a coordinated market economy and reforms would thus not be successful. The question is, thus: How do these two pieces fit together? Has German higher education been successfully Americanized, thus showing that the VoC approach is not suitable for higher education? Or have reforms failed from a VoC perspective? My study will show that while the reforms have brought significant changes to the German higher education system, the newly reformed system is still very much German and the characteristics of a CME as described by the VoC literature can still be found. The study is done in two main parts.

First, a careful and systematic comparison of the American and German labor markets and higher education systems will show significant differences not only between the two systems of higher education and labor market institutions, but also between their political, economic, historical, and cultural backgrounds. As the VoC literature has pointed out, these differences are significant in shaping the complementary institutions in each policy sphere and thus should be expected when comparing CMEs and LMEs like Germany and the United States. But recent reforms in higher education and labor market regulations, particularly in CMEs such as Germany, as well as the trend of harmonizing higher education world-wide raises the question of whether the stark differences between CMEs and LMEs as described by the VoC literature will remain or whether there is a convergence between the different systems.

This question constitutes the main part of the puzzle this study aims to solve. Have recent German higher education reforms led to an "Americanization" of German higher education, and more generally, is the traditional German model of coordinated capitalism converging with that of a liberal market economy? By focusing on the introduction of bachelor's degrees in Germany this dissertation will analyze whether there has been a shift towards an American-style undergraduate

education, focusing on general skills as opposed to the more specific skills usually found in CMEs. A detailed comparison of curricula in German and American undergraduate programs will show that while there have been significant changes between the old German *Diplom* degrees and the new bachelor's degrees, American undergraduate degrees are still much more general by focusing on a broad liberal arts curriculum as opposed to the detailed focus on the major subject in German undergraduate programs.

Secondly, an analysis of employer expectations and labor market developments influencing German and American higher education policy will illustrate that German and American employers and policy makers have different ideas about the concept of "general education" in reference to higher education curricula. While in the United States general education usually refers to higher education and its liberal arts curriculum, in Germany this kind of general education is provided in upper-secondary education (*Gymnasium*). German employers and policy makers referring to a more "general" university curriculum mostly indicate a favor for less specialization within the particular subject and a broader scope of the program in terms of additional "soft skills" such as communication or reasoning skills.

Ultimately, this dissertation aims to show that the VoC framework is useful in comparing higher education systems. The comparison of the two systems and their undergraduate programs shows that a full emulation of a liberal higher education system like that of the United States by a CME like Germany will unlikely be entirely successful because of institutional differences not only in the higher education system, but also in the other policy spheres. Policy makers proposing such a convergence thus need to adjust their expectations and proposals to the national structures and institutions in order for reforms to be successful. While changes in the German economy and the labor market have clearly required reforms in the higher education system in order for the German economy to remain competitive, some of the reforms need to be adjusted to match the particular needs of German university graduates and employers. The concluding discussion will point to some of these policy implications.

1.1.2 Thesis Outline

The dissertation will be structured as follows. Chapter 1 will introduce the relevant literature for the research topic that has been sketched above. The first part of the literature review lays out the theoretical basis for the dissertation. Mainly, this section will focus on the Varieties of Capitalism literature, theories on skill production, convergence theories and Institutionalism. Secondly, the research topic relates to

empirical studies on the convergence of market systems, the *Bologna Process* and international higher education developments, higher education reforms in Germany, as well as comparative studies on German and American higher education. The last section in the chapter covers the methodology of this study. Research questions and hypotheses will be discussed in detail and the research design for the different parts of the dissertation will be introduced.

Chapter 2 gives an overview of the German labor market and education system. From a VoC point of view it describes the German model of coordinated capitalism with a focus on the labor market and how recent developments have changed the traditional model. The chapter then goes on to introduce the main pillars of the German education system, mainly secondary schools and the dual system of vocational training. Finally it argues that the changes on the labor market require a new focus on skills and a shift of emphasis towards higher education.

Chapter 3 introduces the main characteristics of the American labor market and skill production system. The first section focuses on labor market regulations and economic developments. The second part then discusses American education and training system. It explains how skills are seen as an integral part of the "American Dream" and which skills are expected by American employers. The chapter will show that the American labor market is much more liberal and flexible than the German one and that American employers expect very broad general skills which are provided by the American higher education system.

Chapter 4 compares the German and American higher education systems. The first section introduces the traditional German higher education system, its history, institutions, degree programs and financing. It will show which historical developments and cultural values influenced the institutional structure of the system and points out the issues that made higher education reforms necessary. Moreover, it provides the basis for the analysis of German higher education reforms and the comparison with the American system. The second section introduces the American higher education system with its history, institutions, degree programs, and financing. This will lay the basis for the comparison of undergraduate education in Germany and the United States.

The reforms of German higher education will then be discussed in detail in Chapter 5. It first introduces the debate about reforms and discusses the different stakeholder positions. A particular focus is given to employer expectations of reforms as the needs of the firm are in the center of the VoC argument. External influences, such as the *Bologna Process*, that pushed for reforms will also be discussed. Lastly, the chapter gives an overview of the revisions of the higher education frame-

work law from 1998 - 2010 and describes the main reform measures such as new degrees, new forms of sponsorship, new financing models and the federal initiative for excellence.

In Chapter 6 the main empirical analysis will be presented. It consists of several parts. First, the curricula of old German *Diplom* programs in chemistry, mechanical engineering and business have been compared with their new bachelor's programs. This comparison was done using such criteria as program length, preparation for the labor market, research skills, soft skills, and internationality. The comparison was followed-up by structured interviews with program directors and professors at each department and the interview results are presented alongside the document analysis. The analysis shows that there is a shift towards broader degrees, mainly by including a focus on soft skills and out-of subject classes. But the main courses in each program remained and there are no grave changes towards an American-style liberal arts education. The most significant changes can be found in the business programs and the least significant changes were found in mechanical engineering. The second part of the chapter focuses on employer experiences with the new degrees, and tries to answer the question of whether the new bachelor's degrees fit into the German labor market. This analysis is based on expert interviews with employers as well as on several large scale surveys that have been done by different institutions over the past years. The section shows that while the general experience of most employers with the new degrees is very positive, there are also still areas in which they see room for improvement.

In order to answer the question of whether higher education reforms in Germany have moved the German system towards an American-style liberal higher education system Chapter 7 presents an analysis of undergraduate programs in chemistry, mechanical engineering and business at three American research universities. The analysis shows that American undergraduate education focuses much more on liberal arts education than the German higher educations system does. The second part of the chapter presents a summary of the main similarities and differences of the two undergraduate systems with interview data from interviews with American and German professors.

After summarizing the study results, Chapter 8 discusses how the results of the research support my initial hypotheses about the relevance of the Varieties of Capitalism approach for higher education, the proposed convergence of higher education systems and the role of employer preferences in skill production systems. Finally it will point to policy implications for German higher education reforms and discuss topics for further research.

1.2 Theoretical Basis and Literature Review

This review of the relevant literature will give an introduction to the central theories of this dissertation as well as to the main empirical studies on higher education reforms in Germany and comparative works on German and American higher education policy. The first section will lay out the theoretical basis that will guide my research. The research topics sketched above have their origin in the Varieties of Capitalism approach and are also situated within the bodies of several other theoretical approaches, such as the policy learning approach and convergence theory, institutionalism, as well as theories on skills production. These approaches account for the differences between countries' policy-making systems and and have been used to explain differences and similarities in various policy fields between countries. They will thus be useful for analyzing the question of a German shift towards a liberal market system.

Similarly important for this work are studies focusing on higher education policy. Research on higher education across disciplines has focused on higher education financing and governance, technology and higher education, higher education reforms, an internationalization of higher education including the *Bologna Process*, the changing relationship between higher education and vocational education, the knowledge economy and higher education, as well as comparisons of different countries' higher education systems. From this abundant pool of research those studies focusing on German higher education reforms, and those comparing higher education policy in LMEs and CMEs, particularly Germany and the United States, are especially relevant for this study.

1.2.1 Varieties of Capitalism

My dissertation focuses on the question of whether and how labor market developments have influenced recent higher education reforms and which role employers have played in these reforms. These questions have come to my attention while reading the Varieties of Capitalism literature whose proponents put firms in the center of political economic analysis. In their view, different economic systems can be categorized by how firms interact with each other, with employees and with other interest groups and market forces. In their seminal work *The Varieties of Capitalism*, which builds on existing literature on differences between capitalist societies (e.g. Shonfield, Porter, Albert) and sets the stage for further research, Hall and Soskice differentiate between two types of economies: liberal market economies (LMEs)

and coordinated market economies (CMEs). They argue that within these groups countries' institutions show similar characteristics.

In liberal market economies, firms act in a competitive market based on formal contracts. The competition is regulated by prices, which result from the interaction of supply and demand of goods and services (Hall and Soskice 2001, 8). Within the financial systems of an LME, firms depend heavily on publicly-available information on their current earnings and profitability in order to secure financing options. There is no close-knit network between companies and financial institutions that allows banks to access insider information, as it exists in CMEs. LMEs usually have a very fluid labor market in which employees frequently change jobs, because the management has unilateral control over the hiring and firing of workers. Therefore, career success depends on the acquisition of general skills, which can be applied not only across companies but also across industry sectors. Another characteristic of LMEs is therefore their education systems, in which general skills, especially those needed in the service sector, are taught. Company-specific skills, if needed, are later acquired in specific in-house-training. Additionally, inter-company relations in LMEs are more flexible and open than in CMEs. There are often some regulations that are set by the governments, such as anti-trust laws, yet coordination between companies and with the government is low in LMEs (Hall and Soskice 2001, 27-31). Examples of countries with a liberal market economy are the United States, Great Britain, and Canada.

Germany, Sweden, and Japan are examples of coordinated market economies. In these countries, the financial system does not rely on profitability and current earnings for the evaluation of firms but on internal company information that is provided by a network of managers in companies and financial institutions, as well as close monitoring by industry associations. These structures allow firms to retain a skilled workforce even in times of economic downturn. Managers are not as powerful as in LMEs. They must cooperate with employee representatives and are bound by worker-protection legislation. Wages are often set by industry-wide wage bargaining and inter-industrial relations are coordinated by active business associations. Employees usually keep their jobs for a long time, since they are less likely to be laid off. Companies in CMEs require employees with specialized industry-specific skills, which are provided by their education and training systems. An employee in a CME decides which industry he or she wants to work in much earlier than an employee in an LME, and then acquires very specialized skills. This acquisition of skills often takes place in post-secondary or vocational education institutions. Thus, vocational training constitutes a significant part of CMEs' education systems. Technological transfer between firms is not achieved by changing employees as in LMEs, but by

an exchange through quasi-public research institutes and in business associations. While most coordination in CMEs is done through corporate structures, the government is usually also involved more in economic matters in CMEs than in LMEs (Hall and Soskice 2001, 22-26).

Studies using this approach have analyzed financial systems, corporate governance, inter-firm relations, industrial relations, skill creation, work organization, welfare states, and innovation[1] (Jackson and Deeg 2006, 12-13). A key claim of the VoC approach is that of institutional complementarity between different policy spheres, meaning that each institution depends on the effectiveness of others. "Where institutions facilitate strategic (or market) coordination in one domain, these support similar forms of coordination in other spheres." (Jackson and Deeg 2006, 23). Thus, change in one area also requires change in the complementary spheres. This question of institutional complementarity and institutional change is one of the most debated topics within the literature. Institutional complementarity explains why some policy measures can lead to successful outcomes in one country but might not be compatible with the institutions of another country. At the same time assuming institutional complementarity also acknowledges the fact that significant institutional change can only be possible in a complete system overhaul where matching changes occur in interdependent policy areas. For my study the argument of institutional complementarity is particularly important for the following aspects: First, it explains why developments on the German labor market made university reforms necessary. Secondly, it emphasizes why it is important that employer expectations are met with higher education reforms. Thirdly, it illustrates why copying American-style undergraduate degrees to a German context will not be successful without adjustments that match German institutions in other areas. And lastly institutional complementarity explains why major reforms are often incremental and slow, because changes have to be implemented by many different institutions and actors.

What is most interesting about the VoC approach for this study is its take on skill production and education systems, in particular, that the dominating skills provided by the education system reflect the need of firms. Proponents of VoC theories argue that firms in LMEs require employees with general skills, while companies in CMEs need workers with industry-specific skills[2]. So far this argument has mainly been applied in studies on vocational training systems (e.g. Crouch, Fine-

[1]The general VoC approach has been widely discussed in the political economy literature over the past decade. While many authors have praised the approach, others have criticized it (e.g. Crouch et al. (2005), Crouch (2005), Jackson and Deeg (2006), Boyer (2005), Streeck and Thelen (2005), Deeg (2005)) and a third group has extended it and developed it further (Hancké, Rhodes, and Thatcher (2007), Hall and Thelen (2009), Amable (2003), Molina and Rhodes (2007)). An extensive overview of the development of the VoC literature can be found in Hancké (2009).

[2]See section on theories on skill production for a detailed definition.

gold, and Sako (1999), Culpepper (2007), Culpepper and Finegold (1999), Thelen (2004)). While some of these authors, such as Culpepper (2007) and Estevez-Abe, Iversen, and Soskice (2001), have pointed out that to really understand the general and specific skill differentiation one also needs to include tertiary education (such as in U.S. community colleges) in a cross-national analysis of different skill production systems; only recently has this been attempted in empirical studies. Yet to date there is no comprehensive study analyzing the different skills produced by the German and American higher education systems and demanded by the respective labor markets by using a VoC framework.

Another important point that needs to be acknowledged is the fact that both types of economies supply and need a mixture of both general and specific skills and these skills are provided in many different ways (Estevez-Abe, Iversen, and Soskice 2001). Additionally, it has only been recognized by a few authors within the VoC literature that even in higher education, which is usually considered as providing general skills, one can find differences between various higher education systems. Differences can be found first in the level of specialization students achieve in their first higher education degree (e.g. American bachelor's degrees, former German *Diplom* degrees, new German bachelor's degrees), secondly in the type of training certain vocations require, and thirdly in the importance of different subjects taught in higher education institutions (e.g. in Germany engineering is very important, in the United States business schools are more important) (Börsch 2007, 188). Estevez-Abe et al. (2001) point out:

> "In the Anglo-Saxon countries university education tends to be very general, and even engineering and business schools provide very broad training that is not linked to particular industries or trades. By contrast, in Japan and most continental European countries, many university degrees are more specialized and there tend to be close linkages between engineering and trade schools to private industry" (Estevez-Abe, Iversen, and Soskice 2001, 172).

Studies analyzing these issues on higher education policy are still very underrepresented in the Varieties of Capitalism literature. Ben Ansell (2008) has criticized the VoC literature for focusing too much on vocational education and excluding higher education in their works. He focusses on the question of why some countries expanded higher education while others did not and asked why some of the reforming countries choose to build mass, partially private systems, whereas others continued to restrict investment to the public sector. He does not find the reasons for these difference in the VoC framework of firm preferences and different coordination patterns, but argues that partisan politics determine outcomes in higher education policy (Ansell 2008, 189-190). Graf (2009) uses the VoC framework to

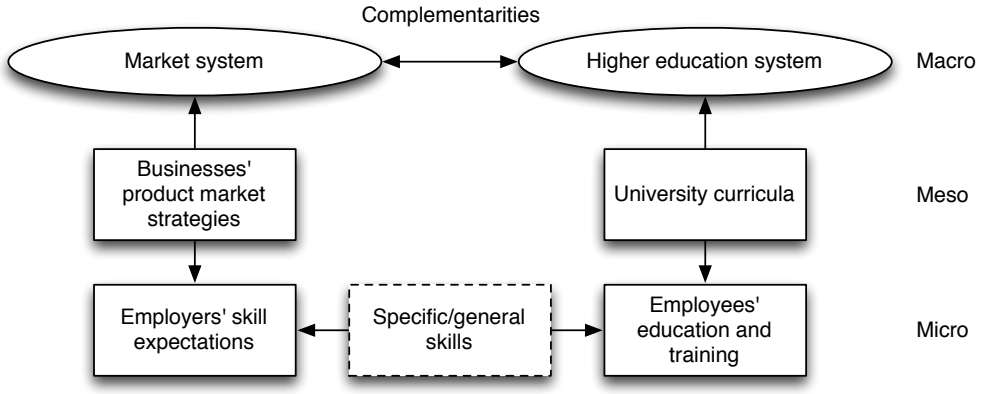
compare internationalization strategies of German and British universities and finds that they follow the VoC categories of market-led strategies in Great Britain, and coordination-based strategies in Germany (Graf 2009). Wentzel (2011) argues that the VoC approach needs to also consider secondary school education and higher education in addition to vocational training. He analyses reforms on all educational levels in Germany and Britain and finds that reform goals in both countries do not correspond to the characteristics of a typical LME or CME education system as sketched by the VoC literature. He argues that this is the case because "similar ideas, beliefs, and convictions [...] propel educational change" (Wentzel 2011, 18). His study aims at explaining "how ideas impact on educational policies and how these policies are transferred, translated and understood in the given national frame" (Wentzel 2011, 19). The study that most closely approaches application of the VoC framework to higher education in the same way as this study intends to do is Hoelscher (2012). He rightly argues that the division of skills into specific vs. general skills in CMEs and LMEs respectively can also be found in higher education. He uses data gathered by the European Union's REFLEX study[3] to show that the skills acquired by university students in Great Britain are broader and more adjusted to the British liberal labor market, while German graduates see themselves as best prepared for specific professions. He can thus show that the assumed complementarities between labor market demands and skill production systems also exist in higher education and argues: "If the assumption of complementarities between higher education and economic system is correct, differences between CMEs and LMEs should be reflected on all three levels: graduate skills, university curricula and employer expectations"[4] (Hoelscher 2012, 6). While Hoelscher focuses on the perceived skills of graduates in his article, this study will analyze university curricula and employer preferences. Hoelscher's theoretical framework (see Figure 1.1) and interpretation of the REFLEX survey data will be a valuable resource for this work.

My study will contribute to this line of research and show that analogous differences between higher education in LMEs and CMEs can be found that have been found in studies on vocational education and training. The American system

[3]The REFLEX ("Research into Employment and professional Flexibility") project is a large-scale international project that focuses on the demands that modern economies place on higher education graduates in 16 countries. More information can be found in Allen and van der Velden (2011) and at `http://reflexproject.org`.

[4]Translation by the author, original: "Wenn die Annahme einer Komplementarität zwischen Hochschul- und Wirtschaftssystem berechtigt ist, sollten sich die Unterschiede zwischen CME und LME auf allen drei Ebenen der Kompetenzen der Absolventen, der Hochschullehre und der Ansprüche der Arbeitgeber widerspiegeln."

Figure 1.1: Higher Education and Market System Complementarities



Source: Adapted from Hoelscher (2012)

mainly offers a general[5] education at the college level and only provides specialized skills in further graduate programs, while traditional German university programs (particularly *Diplom* degrees) have been very specialized[6] and taught subject-specific skills right from the beginning. The introduction of new bachelor's degrees with a broader focus on professional, job-related rather than scientific skills in Germany, however, does not fit into the VoC-characterization of a CME's skill system. This raises several questions that will be considered below.

1.2.2 Theories on Skill Production

A second set of theories that this study will draw on is the wide literature on skill production theories. This literature is mainly based in economics, sociology and education studies and has dealt with the definition and explanation of different types of skills, most importantly in the two categories general vs. specific skills and high vs. low skills. In addition to that it has focused on such issues as the *Berufsprinzip* (occupational principle, i.e. focusing on the skills needed in a certain occupation, rather than by a certain firm), vocationalization of higher education and new skills needed in the knowledge economy. This review will focus on those studies that aim to define or measure different skill types in order to develop a working definition for my own research.

As described above, Hall and Soskice (2001) and the broad VoC literature in general argue that a country's skills production system mainly focuses on either

[5]Bachelor's programs require a broad range of subjects, even those not related to a student's major. They also include training of soft skills that can be used in a variety of jobs.

[6]In former *Diplom* programs a student only focused on one subject and training on non-subject related skills was rare.

general skills or specific skills. Several authors have extended or adjusted these categories for their own studies and arguments.

Estevez-Abe et al. (2001) differentiate further between firm-specific, industry-specific and general skills. According to them firm-specific skills can mainly be used in one specific firm and are acquired by on-the-job training. For employers this kind of training is very profitable because employees learn exactly what they need to know and have no incentives to change to another company. For employees, however, Estevez-Abe et al. argue, acquiring these kind of skills is only profitable if the wages are high enough and the job is very secure (low risk of unemployment) (Estevez-Abe, Iversen, and Soskice 2001, 148-150). Industry-specific skills on the other hand, are skills that can be used in one particular trade. They are mainly acquired in vocational training and are recognized by different employers within the respective field (Estevez-Abe, Iversen, and Soskice 2001, 148). According to Estevez-Abe's argument employees have especially high incentives to invest in industry-specific skills when unemployment benefits are earnings related and they are not required to take up jobs that are not within their field. This offers workers with specific skills enough time and security to look for another job where they can use their industry specific skills (Estevez-Abe, Iversen, and Soskice 2001, 152). When these protections do not exist employees do not have incentives to invest in specific skills. Their returns are higher when they invest in general skills (Estevez-Abe, Iversen, and Soskice 2001, 153). General skills are highly portable and mainly acquired in tertiary education. Industry-specific skills in these systems are acquired by frequently switching jobs within the field of interest (Estevez-Abe, Iversen, and Soskice 2001, 149). Thus, Estevez-Abe et al. argue general skills that can be used in a variety of jobs are the best protection against unemployment in a flexible labor market. While Hall and Soskice base their categories on the needs of employers and argue that the degree of coordination in an economy influences employer preferences for a certain set of skills they are looking for in employees, Estevez-Abe et al. find a connection between the employment regulations, unemployment protection and the incentives for employees and employers to invest in a certain set of skills.

Iversen and Soskice (2001) ask how workers' skill sets affect their preferences for social protection. They argue that skill specificity can be used to explain public policy choices in welfare policy. They define specific skills as being valuable "only to a single firm or a group of firms (whether an industry or a sector), whereas general skills are portable across all firms" (Iversen and Soskice 2001, 876) and find that "human capital can be more or less mobile, and workers who have made heavy investments in asset-specific skills stand a greater risk of losing a substantial portion of their income than do workers who have portable skills. For this reason, workers

with specific skills have a strong incentive to support policies and institutions that protect their jobs and income." (Iversen and Soskice 2001, 889). Thus, they link skill specificity with preferences for social protection and base their definition on the portability of skills among firms. Along the same lines, Cusack et al. (2006) argue that general skills are fully portable across firms, occupations and industry and there is a market-wide wage for them. It is easy to find a new job with general skills because the skills can be applied in any context. Specific skills on the other hand are employable only in a certain firm, industry, or occupation. They are not very portable (Cusack, Iversen, and Rehm 2006, 367). They find: "Skill specificity is high if an individual is in a very specialized occupation, but has relatively low levels of education or skills. It is low if the occupation is not very specialized, while the level of education or skills is high" (Cusack, Iversen, and Rehm 2006, 371). To measure skill specificity in different countries, they assume that "economies with extensive vocational training systems, as opposed to economies relying more on general education, tend to produce more people with highly specific skills" (Cusack, Iversen, and Rehm 2006, 371). Iversen and Stephens (2008) apply the same argumentative logic. They use vocational education attendance as an indicator for the level of specific skills in a country and the scores of the OECD Literacy Test[7] as an indicator for the level of general skills [8] (Iversen and Stephens 2008, 17-18). By using these measures they divide economies into "three worlds of human capital formation." First, the *social democratic regime* in which high levels of spending on day care and preschool, primary and secondary education, higher education, active labor market policy, and vocational training, as well as moderate levels of employment protection lead to high levels of industry-specific and education specific skills as well as high levels of general skills. Second, the *christian democratic regime* shows high levels of firm-specific and industry-specific skills and moderately high levels of general skills. These are supported by high levels of vocational education and employment protection, medium levels of public spending on primary, secondary and tertiary education and low levels of spending on daycare and preschool. And thirdly, the liberal regime is characterized by low levels of spending on day care and preschool; active labor market policy and vocational education; low level of employment protection; and moderate levels of spending on primary, secondary, and tertiary education. Private spending on higher education and daycare can be substantial in some countries. These policies result in low levels of specific skills and low levels of general skills at the bottom, but the levels of general skills at the top are comparable to those in the social democratic regime (Iversen and Stephens 2008, 32). Following this

[7]Organisation for Economic Co-operation and Development /Human Resource Development Canada (OECD/HRDC).2000. *Literacy in the information age: Final Report of the International Adult Literacy Survey.* Paris.

[8]Here North American countries score highest which indicates a high level of general skills.

categorization Germany would fall into the christian democratic regime, while the United States is in the liberal regime. Skill specificity is measured by a combination of spending on education and employment protection and the level of vocational training provided.

Culpepper (2007) also differentiates between specific and general skills but argues that whether a country's education system focuses more on general or more on specific skills depends on whether there are more large firms or more smaller firms in the economy. He argues that small employers prefer investing in specific skills and do not want to support vocational training on the tertiary level, while larger employers prefer more general skills and support tertiary vocational training and a connection to higher education (Culpepper 2007, 616-617). He finds that one difference between countries is whether or not students continue on to tertiary education after high school (secondary school). In his opinion, a tertiary level certificate, vocational or general, presumes enough general skills to get into tertiary education, thus the differences between countries' skill profiles are already formed in secondary education (Culpepper 2007, 619-620), because "students who specialize early in vocational training stop the acquisition of general skills earlier than their peers, who are more likely to be enrolled in general education institutions." (Culpepper 2007, 617). So while he sees broad differences in the focus on general or specific skills, depending on the size of the majority of employers, he also finds that in most countries students are supplied with a mixture of both kinds of skills and even in CMEs students can earn degrees that teach them a significant amount of general skills (Culpepper 2007, 631).

Streeck (2011) argues that all of these approaches that divide skills into general and specific skills are flawed. He finds that they are not paying attention to the varieties within these two categories. In his opinion the skill system of a country largely depends on its historical roots, social traditions and ideologies. By reviewing the history of skills and worker organizations in Anglo-American economies and Germany he finds a variety of definitions and perceptions of "general" and "specific" as well as "high" and "low" skills over time and across countries. For example, in the United States specific skills have been seen as low skills, in Germany on the other hand they are seen as high skills and portable within an industry (Streeck 2011, 7). He concludes that the definition of skills always depends on the social and economic context and that existing dichotomies all miss certain aspects of the role skills play. With this criticism Streeck points to a very important aspect that needs to be considered in comparative political economy: history and social ideas. Perceptions of a particular term (e.g. 'general education') can be very different in various countries. My study will show that this is true for the degree of special-

ization in higher education and for the way employers in Germany and the United States define 'general' skills. Streeck's article also clarifies that there is no one valid definition for skill specificity. Thus, this review intends to give an overview of the different ways skills can be differentiated and finally come to a working definition for this study.

Ansell and Gingrich (2008) follow Streeck's argument that there are different kinds of general and specific skills. They apply the skills debate to higher education and argue that the decline of manufacturing jobs and the rise of the service sector have led to a significant change in the employment structure of industrial nations. "Where once manufacturing, agriculture, and other blue-collar workers accounted for over half the population, they now account for less than one-fifth of the workforce in some states" (Ansell and Gingrich 2008, 2). While some service jobs remain unskilled (taxi-driving, garbage pick-up), many others require higher education degrees (media, health, government, real estate, consulting, finances) (Ansell and Gingrich 2008, 3). Yet, they find differences between different service categories that require different higher education systems and even within the purview of general skills provision there are a variety of complementary labor market outcomes (Ansell and Gingrich 2008, 41).

Another way to talk about skill formation is to differentiate between high skills and low skills. The first of these approaches has its origin in economics: Human Capital Theory. It argues that the quality and skills of workers may have a direct impact on productivity and economic growth (Brown, Green, and Lauder 2001, 5). According to human capital theorists, such as Becker (1964) and Schultz (1971) a country needs to invest in high skills rather than low skills in order to raise its productivity. High skills in this context are defined as those skills that can successfully be used in a global labor market. A person who has these skills can be described as a "'symbolic analyst'- someone engaged in problem-identifying, problem-solving, and strategic-brokering" (Brown, Green, and Lauder 2001, 11). A high skills economy then can be described as an economy where the workforce skills are fully utilized to achieve high productivity across sectors and at the same time produce high wages and relative income equality. In addition, human capitalist theory argues that the shift to the service economy also requires a shift towards high skills (Brown, Green, and Lauder 2001, 65). This however, has been disputed by other scholars such as Brown et al. (2001). They do not find that the shift to the service economy automatically leads to a shift towards high skills, but that it varies greatly between countries. For example, in Germany the service sector is largely composed of professional and skilled workers; in the United States on the

other hand a large proportion of service workers are low skilled (Brown, Green, and Lauder 2001, 18-19).

Brown et al. offer a new approach which they call the "new political economy of skill formation." It has its roots in sociology and in the "new institutionalism." They find that issues of skill formation and economic performance are socially constructed and formed by the social institutions they are taking place in such as schools, universities, and factories. These institutions can be organized in different ways even if capitalism is the overarching economic system. Their approach acknowledges that there are differences in culture, historical experiences, political constellations and the labor market and that these differences also lead to differences in the skill formation system, in productivity, income distribution and life chances. They argue that the "organization of national economies will continue to shape the future direction of skill formation" and they reject the idea of a global convergence (Brown, Green, and Lauder 2001, 30).

A third strand of literature on skills focuses on academic vs. vocational skills. Academic skills are seen here as those broad general skills taught in higher education, where vocational or occupational skills are those specific skills acquired in vocational training. Vocational skills are seen to be more practical and application-oriented, where academic skills are more theoretical and research oriented (Powell and Solga (2010), Streeck (2011)). Studies focusing on these skills often explore the relationship between higher education and vocational training (e.g. Powell and Solga (2010)) or ask which kinds of skills are becoming more important in today's knowledge-based economies (e.g. Mayer and Solga (2008))[9]. While this differentiation initially seems very similar to the VoC general vs. specific skills differentiation, the distinction between academic and vocational skills is particularly significant when studying countries with a strong vocational training system and a strong focus on specific occupations (*Berufsprinzip*), such as Germany. For a complete understanding of recent developments in the German skill system it is important to note that there are variations of 'general' skills and variations of 'specific' skills. As Streeck (2011) has put it: "general skills need not always be high, and high skills not always broad or portable; [...] specific skills are not necessarily low, and low skills not always immobile; and [...] occupational skills in some countries may be as high and broad as academic skills in others, and far from firm or even industry-specific" (Streeck 2011, 27).

To sum up, we can find three main strands of theories on skill production, first those that differentiate between general and specific skills as proposed by the

[9]This also relates to the literature on the 'vocationalization' of higher education. For a discussion see Section 1.2.4 below.

VoC school; secondly human capital theory focusing on high and low skills, and thirdly theories differentiating between academic and vocational skills. My study's main contribution will be to the general vs. specific skills debate; however it will also draw on arguments from the other literature on skill systems, where it seems appropriate. Most of the studies introduced above have come to their definitions of general and specific skills by focusing on vocational education and the portability of skills. My study will use the categories to compare undergraduate education (i.e. bachelor's degrees) in Germany and the United States. I argue that although higher education is always more general than vocational education, one can find a much broader and more general undergraduate curriculum in the United States than in Germany where undergraduate education is more specific. In the context of undergraduate education I define the acquisition of *general* skills to include:

- studying a variety of different subjects in addition to the major
- focusing on a broad overview of a major with a late specialization
- emphasizing soft skills
- enjoying great flexibility in choosing and changing majors
- studying a broad curriculum

Specific skills in higher education can be acquired by:

- focusing on one main subject
- acquiring a deep understanding of the field with early specialization within that subject
- emphasizing research skills over soft skills
- requiring an early choice of a major with little flexibility for switching
- studying a narrow curriculum

These definitions will be helpful for the comparison of undergraduate curricula in Germany and the United States. However, these definitions can only be seen as general guidelines, as there are many skills that fall into an "intermediary category" and often times firms need a mix of skills, where some of them can be general and some specific (Thelen 2004, 13-14).

1.2.3 Institutionalism and Convergence Theories

My dissertation also intends to contribute to the debate about whether the German higher education system is converging with those of liberal market economies such

as the United States and if so what degree of convergence can be found. This question relates to the broader literature on convergence vs. path dependence and the question of institutional change that incorporates two groups of scholars. One group argues that with globalization there will be or has been a convergence of economic and social policy in the industrialized countries, while the other group finds that convergence is unlikely due to inherent institutional, cultural and historical differences that influence policy-making in different countries (path dependence). This study will draw on aspects of both of these bodies of literature. I argue that both are possible at the same time. While the main institutional structures of a country are hard to change, policy changes in individual areas are possible and convergence can occur to a certain extent. Before attempting to outline my own model of institutional change, I will quickly review the literature that it is heavily based on.

Institutionalists are "concerned with both states and social structures" and look at "social sectors, political coalitions, political institutions, and ideological constraints" (Katznelson 1997, 86). They argue that institutions can be understood as rules of transaction between the state, the economy, and civil society. They thus shape and constrain the choices of political actors (Katznelson 1997, 103–104). Hall points out that "those who take this [institutional] approach emphasize institutional differences across nations and their persistence over time. These institutional differences are said to result in distinctive patterns of [...] performance and policy [outcomes]" (Hall 1997, 180). Institutional differences for example are posed by the federal structure of a country (unitary vs. federal system), the interest group structure (pluralist vs. corporatist system), or the electoral system (inclusive vs. exclusive). Within institutionalism there are four different theoretical approaches: rational choice institutionalism, historical institutionalism, sociological institutionalism and discursive institutionalism. All of these approaches intend to explain how and when institutions change and develop.

The difference between the approaches can be found in their definition of "institution" and in their explanations for institutional change and persistence. While the first three have a rather static view of institutions and argue that institutional change is either dependent on rational calculations of actors in a given institutional environment (rational institutionalism), path-dependent constraints (historical institutionalism), or on the norm-appropriate rules (sociological institutionalism), discursive institutionalism draws from these three theories, but additionally takes political discourses and ideas into account when considering "different meanings and

structural contexts in which actors operate during periods of institutional change"[10] (Wentzel 2011, 26).

Within this institutionalist literature, the debate centering around the question of how institutions change can be divided in two main groups of arguments.[11] One set of approaches argues that institutions are path dependent and "sticky" and real change is only possible at "critical junctures," or at exogenous shocks. This theory, also called "punctuated equilibrium theory" states that institutions are static, because they are bound by institutional cultures, strong interests and the rationality of individual decision-makers. This stasis is punctuated by changes in the control of the government, sudden changes in public opinion or unexpected events (Baumgartner and Jones (1993), Hacker (2002), Pierson (2000)).

Another group of authors focuses on incremental change and argues that small steady changes can in the long run lead to significant institutional change (e.g. Streeck, Hall, Thelen). Thelen for example argues that the development of institutions can best be understood as a process in which social and political actors mobilize support for the creation, re-design and continuation of specific institutional arrangements. Institutions are thus changing with adjustments in the political coalitions they are based on (Thelen 2004, 400-401). These authors also argue that change is not always caused by exogenous pressures or shocks, but more often "change is [...] endogenous and in some cases is produced by the very behavior an institution itself generates"[12] (Streeck and Thelen 2005, 19). In this context, Streeck and Thelen (2005) (and others) criticized the Varieties of Capitalism approach for being too static and not providing explanations for institutional change and the increasing convergence between the two market models that appears to be caused by globalization.

However, Hall has reacted to these criticisms by pointing out that while the approach focuses on the continuing institutional complementarities in the two market systems, those factors that guarantee institutional stability, such as common norms and ideas, power relations, and government regulations, can at the same time be causes for institutional change (Hall 2006, 190). He finds two ways in which institutions change. First, institutions can change because actors change their be-

[10]For a more in-depth review of the new institutionalism and discursive institutionalism see DiMaggio and Powell (1991), Hall and Taylor (1996), Hall (1997), Pierson (2004), Hall and Thelen (2009), and Schmidt (2008).

[11]There are many varying perspectives among them and some authors also combine the two approaches. They argue that only a combination of several institutional perspectives can fully explain institutional change, because institutions on the one hand constrain institutional change and on the other hand also "provide principles, practices, and opportunities that actors use creatively as they innovate within these constraints" (Campbell 2004, 8). For a more extensive review of these approaches see Campbell (2004).

[12]For a more detailed review of this approach see Streeck and Thelen (2005).

havior, often by changing cooperative arrangements (Hall 2006, 192-93). Secondly, institutional change can be the result of government initiatives (Hall 2006, 193). In the same way as coalitions stabilize an institutional structure, institutional change depends on actor coalitions and common interests. The two main actors Hall finds important for institutional change in today's market economies are firms and governments (Hall 2006, 193-94). For my study of higher education reforms these political coalitions, particularly between the different governments involved and employers, also appear to be of great importance. A more detailed account of Hall and Thelen's (2009) explanation of institutional change in Varieties of Capitalism and how it can be used to explain the kind of change in German higher education will be given in the concluding chapter.

Within this debate about institutional change, the concept of "convergence" as one particular kind of institutional change has been discussed widely. This type of change is driven by ideas and concepts being transferred from one policy area, country or time period to another. Institutional change is thus created by policy changes. This literature is particularly relevant for answering the question of whether the German higher education system is shifting towards (or converging with) an Anglo-American system of higher education. It will thus be briefly discussed below.

David Marsh defines policy convergence as "the process by which actors borrow policies developed in one setting to develop programmes and policies within another" (cited in Turner and Green 2007, 4). Knill defines convergence similarly as "any increase in the similarity between one or more characteristics of a certain policy (e.g. policy objectives, policy instruments, policy settings) across a given set of political jurisdictions (supranational institutions, states, regions, local authorities) over a given period of time" (Knill 2005, 768). Thus convergence is the result of policy transfer or policy learning. The literature has also identified several factors that promote policy convergence. These are according to Turner and Green (2007): political pressures, competitive pressures, obligations through international law, problem pressures, desire for conformity, and legitimacy pressures.

The process of cross-national policy convergence is not new. Ever since people could travel from one country to another, certain customs and ideas have been adopted from other countries. However, new technology and the process of globalization clearly have made it easier and increased the speed of the process. Growing international exchanges of academics, politicians, businessmen, and others provide many connections between countries within and across policy areas. The more information on a specific issue is provided, the easier is the policy transfer process, which to some extent happens almost automatically (Klein 1997, 1267).

However, cross-national policy transfer is not always successful. Rose argues that "a lesson must allow for the fact that two places [...] are never exactly identical in every respect" (Rose 1993, 22). Since there are only limited possibilities for policy experiments, governments use other countries as their laboratories. Yet, they often forget that the institutional, political and social context of a policy matters substantially (Klein 1997, 1268). Therefore, policy learning can only be completely successful if two countries are institutionally compatible (Klein 1997, 1269).

Hall also found three important factors that determine whether a new policy will be adopted in a country or not. The first factor is *economic viability*, which "refers to the policy's apparent capability to resolve a relevant set of economic problems" and is thus closely related to current economic issues (Hall 1989, 371). According to Hall, new policies are more successfully adopted in countries that are faced with economic problems that are directly addressed by the proposed policy. While Hall refers to the adaption of economic policies, his reasoning also applies to other policy areas, such as higher education policy. The more closely the proposed policy addresses existing problems, the more easily it should be adopted (e.g. in countries with under-financed universities the introduction of tuition fees should be easier).

The second factor, *administrative or structural viability*, describes the institutional circumstances, in which the policy may be adopted or not (Hall 1989, 373). Depending on the biases of the government agencies that are responsible for the implementation of the proposed policy, an introduction may be successful or not. The institutional structure of the state and each country's prior experiences with similar policies influence the success of a new policy (Hall 1989, 373, 11).

Third, the *political viability* of the proposed policy is defined by the orientation of the governing party and of coalitions of social groups towards the new policy (Hall 1989, 375–376). Hall concludes, "a nation's readiness to implement [new] policies may be said to turn on the ability of its government to forge a coalition of social groups that is large enough to sustain them in office and inclined to regard [the new policies] as something that is in their interest" (Hall 1989, 12). This factor takes the diverse interests of social groups into account, which influences policy-making in many ways.

Finally, Hall points to the importance of the ongoing political discourse in each country. The political discourse of a country is defined by a prevailing set of political ideas that refer to the nature of society and economy, the proper role of government, common political ideals, and past policy experiences (Hall 1989, 383). These ideas "define the terms of political debate and provide participants in the

political arena with a discursive repertoire to be used there" (Hall 1989, 384). Thus, a combination of political institutions and political ideas influences the success of policy learning.

I argue[13] that policy change is possible and has occurred in the German higher education system, but the main institutional framework with the typical elements of a CME as described by the VoC literature remains intact. This framework consists of "umbrella institutions", i.e. those institutions that build the institutional frame of a democratic society, such as the governmental system, the financial system, the corporate system, the education system and the welfare system. They are the backbone of a society and major overhauls are rare. Here I adopt the argument of historical institutionalism that these institutions (including the rules and norms regulating a society) are strongly based in the historic and cultural web of society and will remain intact unless there is a critical juncture. This however does not mean that these institutions do not change at all, as Thelen (2004, 8) finds: "In politics, [...] institutional survival often involves active political renegotiation and heavy doses of institutional adaptation, in order to bring institutions inherited from the past into line with changes in the social and political context."

My analysis of new German bachelor's degrees and employer positions will show that while there are some changes in the curriculum and in the way employers think about skills, the coordination patterns and major structures of a typical CME have remained. In my understanding of the VoC literature, the most important difference between LMEs and CMEs is the way communication is organized between and within the different policy spheres. In CMEs the system is based on institutionalized coordination between the different areas. In LMEs on the other hand these activities are mainly left to market forces.

In a metaphorical way one can think of an LME or CME as a house with a roof and the rooms are the different policy spheres. The walls between the rooms are made of different materials (i.e. coordination for CMEs and market-forces for LMEs). The rooms (i.e. policy areas) themselves have different wall-designs (laws, organizations) and furnishings (i.e. policy programs). To make changes within one room is not as difficult as making changes to the entire house. You can easily switch a piece of furniture, but while doing so you make sure that it matches the rest of the decor of the room. If you do a major renovation, for example when a new family moves in (i.e. a new major international development/external influence), including painting the walls and installing new fixtures, you try to make sure that it still goes well with the rest of the style of the house. Tearing down walls and completely

[13]Following Hall (2006), who has made a similar argument in response to critiques of the VoC approach.

redoing the structure of the house will be much more costly and thus is done only at rare occasions. Yet, within the old walls of the house it is possible to modernize and change the old look of the house. It is also possible to take inspiration from neighbors. 'Borrowing ideas' works well as long as the ideas match the existing decor (institutions) and the taste of the homeowners (actors' preferences). While both types of houses (market systems) face the same external elements such as sun and rain (i.e. globalization or the shift to the service economy) the responses to these external pressures can be quite different due to their different structures and personal tastes. For example, while the initial response to the pressures of globalization and an increased international competition might be off-shoring and the downcutting of domestic jobs in LMEs, the response in CMEs might be to invest in higher skills and more specialization in order to compete by offering high quality products. At the same time, learning between the different systems does occur and there is some offshoring and some up-skilling in both groups of countries.

There have been several studies on the convergence of different models of capitalism, particularly on the question of whether the European social-market or coordinated-market economies will converge to the Anglo-Saxon model of liberal market capitalism. These studies focused on recent developments in internal corporate governance and accounting (Lütz and Eberle 2007), in financial markets (Lütz 2000), as well as on the convergence between European and American economic institutions and policies in general (Cohen and Pisani-Ferry (2006) and Whitman (2003)). The driving forces behind this purported convergence are seen as globalization and European integration (Cohen and Pisani-Ferry (2006), Lütz (2000)), as well as in transnationalization and the growing role of multinational corporations (Deeg and Jackson 2007). These studies found that while there is some convergence in most fields of economic policy-making, social policy is particularly resistant to change. Cohen and Pisani for example concluded that "social insurance, pensions, and the provision of public services in education and health care are key areas in which virtually no convergence can be observed" (Cohen and Pisani-Ferry 2006, 32). Others however, have found some convergence in education policy. Ben Ansell in particular argues that globalization has lead to a convergence in education spending. He finds that this is caused by international trade and competition which especially motivates open economies to invest in human capital in order to remain competitive (Ansell 2004). Recent German and European higher education reforms also seem to illustrate that convergence is taking place not only on the level of education financing but also in the structure of education programs and in the organization of higher education. Witte (2006) argues that one of the declared goals of the Bologna Process is convergence and there is some success in reaching that goal but convergence in

this case does not mean complete harmonization. So while higher education systems are becoming more similar they are not moving towards the one and only European model (Witte 2006a, 14). Whether the German labor market and higher education system are converging with an American-style LME model is one of the main questions that will be explored in this study. Before turning to the methods used in this study, the next sections will quickly review existing literature on comparative higher education research.

Within the field of comparative politics, only a few studies have addressed recent challenges for higher education. Most of the research on the topic has been done in the fields of sociology and education studies. Compared to political science or economics studies on welfare or labor market policy, studies on education policy are still fairly underrepresented in comparative politics (Busemeyer 2007, 2). Research on higher education across disciplines has focused on the "internationalization" of higher education, different models of university and student financing, the role of higher education in society (i.e. discrimination, elites, etc.), the development of the knowledge society, the relationship of teaching and research, the relationship between vocational and general education and the "massification" of higher education. Within the German context, proposals for reforms, reform assessment, the acceptance/success of new degrees, student protests and the Americanization of German higher education have been a focus of recent studies.

1.2.4 Higher Education Reform in Germany

As mentioned above, higher education policy has become more important in many industrial nations. The convergence of these policies has been referred to as "Internationalization" (Enders (2004), Hüfner (2003)) and "Europeanization" (Schmidt et al. (2006), de Rudder (2000)) of higher education. According to Enders (2004, 2), "Internationalization" can be seen in the increasing international cooperation between students and professors across the world and in the dynamics of a "convergence of systems in terms of institutional patterns."

The term "Europeanization" refers to the creation of the European Higher Education Area, which is the goal of the European Union's (EU) Bologna declaration of 1999 (Thoben 2002, 1). The main factors of this process are the introduction of the European Credit Transfer System (ECTS), Bachelors and Masters programs replacing different national degrees, and classes being held in English (Thoben 2002, 1-3). However, the trend of a Europeanization of higher education policy also has its limits. As de Rudder (2000) points out, "higher education systems continue to be

a responsibility of national governments (or, like in Germany, state governments), which also have to pay for them."

Since the beginning of the *Bologna Process* and other recent higher education reforms[14] there has been a great amount of research done on the success of these reform measures. Many of these studies evaluate specific reforms in Germany within the European or an international context (e.g. (Witte 2006b), Powell, Bernhard, and Graf (2012a), Nickel (2011), Lenhardt (2002)). Studies such as Alesi et al. (2005) show that the implementation of the Bologna reforms and the particular curricula that have been introduced for new bachelor's and master's programs are still quite different in various European countries. This might be another indicator for the hypothesis that higher education systems need to match labor market conditions of a specific market system.

The first preliminary evaluation of German university reforms, particularly the status of new bachelor's and master's programs was done by Schwarz-Hahn and Rehburg in 2003. At that point only a minority of universities had introduced the new degrees and a substantial evaluation was not possible. The study found that change was taking place slowly and many of the intended reform goals had not yet been met (Schwarz-Hahn and Rehburg 2003, 104). A study prepared by the *Bundesministerium für Bildung und Forschung* (BMBF) reviewed and evaluated the introduction of new study programs in 2009. They found that two thirds of all new freshmen started their university studies in a new bachelor's program in 2007/2008, yet that there were still great differences in the status of reforms between disciplines. They also could not find indicators whether the new programs had really lowered study periods or not (Bargel et al. 2009, 14). They then continued to analyze the results of four student surveys in order to find whether the introduction of bachelor's programs was a success from a student point of view (Bargel et al. 2009, 17-18) and found that graduates with a bachelor's degree expect problems finding a job (Bargel et al. 2009, 84), students find new structures not flexible enough (Bargel et al. 2009, 30), international student mobility could not be increased (Bargel et al. 2009, 54), the organization of classes and teaching quality needs to be improved (Bargel et al. 2009, 63-64), and the majority of students would like a greater focus on soft skills/non-subject related skilled (*überfachliche Qualifikationen*) (Bargel et al. 2009, 78) and on practical skills (Bargel et al. 2009, 90). Thus, there were still many areas in which reforms needed to be continued.

Martin Winter also reviewed interim reform results in 2009. He found that

[14]Reforms such as the introduction of new sponsorship forms, the initiative for excellence in research and the introduction of junior professorships in Germany are often mentioned in the context of the Bologna Process although they are not directly related.

there has been very little resistance to the structural changes of introducing two-tiered study programs. Most universities and departments, even those who initially rejected reforms like engineering programs, had introduced bachelor's and master's programs by 2009 (Winter 2009, 4) but there were still many areas in which reforms had not reached their goals and results varied greatly across disciplines and between different institutions. In 2010 Winter and Anger took a more detailed look at the new study programs and analyzed programs in chemistry, mechanical engineering and social studies. In their study they found: "The reform of study structures in the analyzed departments was mainly a formal reorganization, but no fundamental reform of curricula content or didactics, which could have created study programs of a new quality"[15] (Winter and Anger 2010, 6).

Similar findings were made by authors in a compilation of articles sponsored by the BMBF in 2011. The authors compared the *Bologna Process* in Germany with other European countries, analyzed changes in the curricula and study structures of certain programs, focused on the development of teaching strategies and student competences, looked at changes in the institutional framework and in quality management and finally concluded that there needed to be a better exchange between higher education research and higher education policy in praxis in order to address all these issues successfully. They found "a number of problematic areas" that still needed to be addressed, mainly the danger of over-bureaucratization by the regulations coming with the new degree programs. At the same time the authors concluded that Bologna has stimulated a great amount of changes in German higher education, even in areas not directly related to the introduction of new degree programs and thus, played a valuable role in improving German higher education (Nickel 2011, 17).

The review of these studies shows that while reforms have had a significant impact on the structure and organization of the German higher education system, they are progressing slowly and changes in curricula content seem to be minor. In European comparisons, the literature finds that "despite the more or less worldwide victory of bachelor's and master's degrees national peculiarities remain"[16] (Förster 2007, 3). These findings appear to support the VoC thesis that reform measures need to match the existing institutions.

In addition to focusing on the introduction of bachelor's and master's degrees in Germany research on German higher education has focused on the new relation-

[15]Translation by the author, original: "Die Studienstrukturreform in den untersuchten Einrichtungen war überwiegend eine formale Umstellung, jedoch keine grundlegende inhaltliche oder auch didaktische Reform, die Studiengänge in einer neuen Qualität geschaffen hat."

[16]Translation by the author, original: "Über den mehr oder weniger weltweiten Siegeszug von Bachelor und Master hinaus bleiben diverse nationale Eigenheiten bestehen."

ship between research universities and universities of applied sciences (FHs) (Gülker, Knie, and Simon 2009), the new developments between higher education and vocational training (Powell et al. (2009), Powell et al. (2012), Powell, Bernhard, and Graf (2012b), Powell, Bernhard, and Graf (2012a), Bernhard, Graf, and Powell (2010), Werner, Hollmann, and Schmidt (2008), Nikolai and Ebner (2012), Graf (2013)), the success of the new degrees on the labor market (Bosio and Leonardi (2011), Alesi (2007), Alesi, Schomburg, and Teichler (2010), Institut der deutschen Wirtschaft (2004), Rehburg (2006), Konegen-Grenier (2004), Wissenschaftsrat (2006)), and the development and influence of the knowledge economy and the rise of the service sector (Zantout and Dabir-Alai (2007), Allen and van der Velden (2011)). These studies particularly highlight the importance of higher education for the labor market and for providing graduates with the necessary skills needed for competing in today's economy. They thus support my argument that higher education should be considered in the VoC literature when focusing on skills and the needs of firms. Additionally, this literature focuses on the so-called 'vocationalization' of higher education.

"Historically, vocational education and higher education emerged from opposing traditions, with the university producing systematic scientific knowledge, and vocational education training for specific occupations" (Maclean 2007, 2). However, the literature argues, over the last few decades both systems have grown closer together. The focus of higher education on job-preparation instead of on academic skills is one of the developments mentioned in this context. McLean explains that vocationalization refers to the preparation of individuals for the work environment.

> He finds: "The main goal of vocationalisation is to improve the vocational relevance of education. Usually, vocationalisation means the introduction of practical and/or vocational subjects, industry visits, vocational guidance, and more applied ways of teaching general education subjects" (Maclean 2007, 3).

Studies on this issue range from theoretical discussions (e.g. Maclean and Pavlova (2011), Powell and Solga (2010)) to empirical studies on the development of higher education and vocational training systems run by such organizations as the UNESCO (e.g.UNESCO-UNEVOC (2006), UNESCO-UNEVOC (2013)). Most of these studies argue that a vocationalization of higher education that will be beneficial for the education and training of the workforce needed in today's knowledge economy has already occurred to some extent in the German system (Gellert and Rau 1992). This literature will thus serve as a valuable source for the discussion of the new focus on employability of German bachelor's degrees explored by this study.

1.2.5 Comparative Higher Education Studies: The United States and Germany

While higher education is clearly understudied from a VoC point of view, there have been several studies that have compared higher education in CMEs with those policies in LMEs. Examples are Wentzel's comparison of education reforms in England and Germany (Wentzel 2011), Hoelscher's analysis of higher education profiles in England and Germany (Hoelscher 2012), Graf's comparison of internationalization strategies in German and British higher education (Graf 2009) and Leuze's studies on German and British higher education policy (Leuze (2007) and Leuze (2011)) to name only a few. While some of them included the Netherlands as a second CME (e.g.Witte (2006a)) most of them have focused on Britain as their LME case. Yet, there have been no studies comparing German and American higher education degrees from a VoC perspective.

However, several authors have compared higher education in Germany and the United States from different kinds of perspectives (e.g. Teichler and Wasser (1992), Lenhardt (2005), Schreiterer (2009), Schreiterer (2008), Breinig, Gebhardt, and Ostendorf (2001), Liefner, Schätzl, and Schröder (2004)); others have focused on on how historically the German humboldtonian university has influenced American universities (Ash (2006), Clark (1995), Lenhardt (2005)). Many of them were motivated by the debate about a possible "Americanization" of German higher education policy (e.g. Bach et al. (2003), Donnerstag (2003), Ash (2006), Borghans and Cörvers (2009), Gebhart (2001), Weiler (2003), Powell, Bernhard, and Graf (2012a)). This literature argues that the German (or European) system of higher education is transforming to the American model. These studies focus on developments such as the shift towards English as the main language for research and education (instead of the various national languages) (Borghans and Cörvers 2009), university organization and governance focusing on market competition, as well as financing models and student-professor relationships (e.g. Weiler (2004)). This literature suggests that there is a move of the German higher education system towards a more liberal model such as the American one. Yet, most of them base their arguments on mainly structural changes in the system. A comparison of curricular content and skill orientation will show whether these structural changes have also led to more substantial changes in the content of university curricula.

Three of these studies (McC. Adams (2002), Kühler (2005), and Lenhardt (2005)) stand out as they have given a comprehensive comparative overview of German and American higher education. McC. Adams offers a great amount of background information on the two systems, while Kühler and Lenhardt additionally

focused on the question of whether German university reforms have "Americanized" German higher eduction policy (Kühler 2005) or should focus on the US as a role model (Lenhardt 2005). Kühler compares recent German reform measures with structural elements of the American higher education system and comes to the conclusion that some of the reform measures appear to adapt American practices, but that the American system does not lend itself as a good role model because of significant institutional and cultural differences (Kühler 2005, 543). Lenhardt compares the German and American higher education systems from a historical perspective and finds that both university systems have undergone similar developments in terms of higher education expansion, *Bildungsfreiheit*, differences between higher education institutions, and the role of the state (Lenhardt 2005, 229). While these studies are very complex and show to what extent the German higher education system has been "Americanized," they do not answer the question of why these American influences do not lead to expected results. Moreover, they do not focus on the particular differences between German and American undergraduate degrees and their role in the respective labor markets. My study will focus on these issues. The literature reviewed above will be a valuable resource for my research.

1.3 Methodology

This section will lay out the relevant research questions and hypotheses and their operationalization. The study uses a multi-method approach combining document analyses with expert interviews. The first part of this section will introduce my research questions and hypotheses. Secondly, I will explain the methods used for the comparison and analysis of the new bachelor's programs while the third part focuses on the methods used for the analysis of employer preferences.

1.3.1 Research Questions and Hypotheses

My dissertation will focus on the following research questions and hypotheses.

The first part of the study will cover the changes in undergraduate education after the introduction of bachelor's degrees in Germany and a comparison to American bachelor's degrees. The overall questions are: Is an "Americanization"[17]

[17]In the eyes of German policy-makers and political commentators, an "ideally Americanized" German higher education system would feature tuition payments, autonomous university administration, a tenure-track professorial career system, and tiered degree programs with bachelor's degrees that provide students with a broad general education rather than subject/industry specific skills, as well as professional and research-oriented master's and PhD programs. In my research I will focus more on the shift of the curriculum towards a more general model than on whether it

of German higher education policy underway? In particular, do new German bachelor's programs resemble American bachelor's programs? Have reforms achieved their goals in providing students with more job market-oriented degree programs that provide students with a broad array of general skills?

These questions can be summarized in the following research question:

1. Have the contents of German higher education programs changed with the introduction of bachelor's degrees and do these changes represent a shift towards a "general skills" model resembling the Anglo-American system?

   Hypothesis 1.1

   The introduction of bachelor's programs has caused changes in the structure of the degrees, introduced a broader curriculum, a stronger internationalization and a stronger focus on relevance for the general labor market.

   Hypothesis 1.2

   The changes in the study programs do not represent a significant shift towards a "general skills" model, because there are still significant difference to American degree programs.

   The second part of my dissertation deals with how employers have changed their preferences for the skills they look for in university graduates. Thus, the overall questions are: Do new German bachelor's degrees fit into the German labor market? Have employer expectations been met? Are employers content with the skills graduates have acquired in new German bachelor's programs? If so, does this reflect a shift towards a "general skills" model?

   My second research question can be summarized as:

2. Have German employers' skill preferences changed and are their expectations met by new bachelor's programs?

   Hypothesis 2.1

   With a more flexible labor market, changing work environments and globalization German employers expect university graduates to have a variety of transferrable skills and a stronger focus on international issues in addition to specific knowledge in their discipline.

is truly "American." It could also be seen as a "liberalization" or "modernization." The American higher education system here serves as an example for a liberal market model. I chose the United States over other possible examples, such as Great Britain or Australia, because it has been widely cited in the debate over German reforms as an example of a "successful" higher education system.

Hypothesis 2.2

Though German employers generally accept the new degrees, they have some points of criticism, and the extent to which new bachelor's degrees meet employer expectations varies across disciplines and industries.

My third research question focuses on the differences between liberal market economies and coordinated market economies:

3. Do changes in German employer preferences and in German higher education degrees indicate a convergence of LMEs and CMEs with respect to skill preferences?

   Hypothesis 3

   Even if German employer preferences for university graduates have changed in some aspects, significant differences in the skills expected by employers and taught in undergraduate programs in LMEs and CMEs remain and a complete convergence between the two systems cannot be found.

   Summary

   I propose that globalization is changing the type of jobs offered in Germany, thus the educational system needs to adapt to these changes as well. By analyzing these dynamics in labor market and education policy, I will examine whether the VoC classification of a general skills LME model and a specific skills CME system also applies to higher education. Critics of German higher education reforms noted that new bachelor's programs often are very similar to the former degree programs and thus might still mainly teach specific skills. Recently there has also been criticism from employers about new bachelor graduates not fulfilling employer expectations. This might prove the Varieties of Capitalism argument right in that firms in coordinated market economies require specific skills. On the other hand an analysis of higher education and labor market dynamics might also point to a new form of a coordinated market economy that does not fit the VoC definition. Thus, further research on these questions is needed.

1.3.2 Study Program Analysis

The comparison of old and new German degree programs with American undergraduate degrees constitutes the main empirical contribution of this study. It was

done by combining a qualitative document analysis of study regulations[18] in three different disciplines at nine German and nine American university departments with structured interviews of professors and administrators in these departments.

The cases for analysis were selected as follows. The first decision had to be made on which countries to study. Since the study is meant to contribute to the VoC literature and Germany and the United States are two main examples used by that literature, choosing these two countries for a comparison of LMEs and CMEs seemed a good choice. Furthermore, as outlined in the literature review above, there has been no comprehensive study on German and American higher education from a VoC perspective, while there have been several studies focusing on Germany and Great Britain (Wentzel (2011), Leuze (2007), Leuze (2011), Graf (2009)). Thirdly, I chose the United States as the LME because it has been widely cited in the debate over German reforms as a role model for Germany (see Section 1.2.5 above). A final reason for the choice can be found in my personal background and interests, having lived and studied in both countries for an extended time.

The three subjects, mechanical engineering, chemistry, and business administration, were selected based on their importance for German industry and the German higher education system. While employment in the industrial sectors has decreased rapidly and increased immensely in the service sector during the last decade, the industrial sector still contributes one fourth of the German GDP and many of the new service companies are directly linked to businesses in industry. The leading branches of German industry are the automobile and the mechanical engineering industries, thus fields in which engineers traditionally find work. The third most important branch of German industry is the chemical industry, being the largest chemistry branch in Europe and the chemical sector with the highest exports worldwide (Kaiser 2009). The third subject, business administration, was chosen because it is an "all-round" subject. Employers in all branches have emphasized the importance of business and management skills for university graduates (Rehburg 2006) and it is the most popular major in higher education with about eight percent of all students enrolled in a business program (Bundesministerium für Bildung und Forschung 2008). By choosing these three subjects the analysis also covers the three main groups of academic disciplines - technical sciences, natural sciences and social sciences/humanities.

[18]This term refers to the German documents of *Studien- und Prüfungsordnungen*, which define all rules of a degree program including the curriculum and required exams and have a law-like character. There is no true equivalent to these documents at American universities, though some of the same information can be found in class catalogues, program guidelines and curriculum requirements published on websites.

The departments were chosen by several different criteria. The Center for Higher Education (CHE), an independent think-tank that consults universities as well as government bodies on higher education policy, publishes a very detailed ranking of German higher education degree programs. It is the most comprehensive ranking of its kind and allows users to create their personal ranking by choosing the factors that they want the programs to be ranked by. The departments and programs analyzed here were chosen based on the CHE University Ranking 2009/2010 (Centrum für Hochschulentwicklung and Die Zeit 2009) with emphasis on the following factors: Job-market preparation, practical component, research reputation, research funding and reputation for teaching. For each subject, two of the departments were chosen based on their status as leading departments (within the top 10) in these factors; one program scored higher in the research-related factors while the other one scored higher in the work-related factors. The third program was chosen from the medium range of the ranked departments. Additional factors that were included in the selection process were: Only research universities (not FHs) and only public institutions were chosen[19]. To also include a factor that relates to the regional diversity in the German higher education system and the economy, one department had to be in one of the new states (former East Germany). Finally, in order to generate as much new data as possible, departments that have been analyzed in similar studies such as in Winter and Anger (2010) were excluded from the pool of possible departments[20]. These criteria led to the following departments: For mechanical engineering the programs at RWTH Aachen University (RWTH Aachen), Technical University Munich[21] (TU Munich) and Otto von Guericke University Magdeburg (OvGU Magdeburg) were analyzed. In chemistry I compared *Diplom* and bachelor's regulations at RWTH Aachen University, Ludwig Maximilian University Munich (LMU Munich) and Friedrich Schiller University Jena. In business administration the analysis was done for the departments at the Ludwig Maximilian University Munich, Mannheim University and Friedrich Schiller University Jena.

Similar criteria as for the German departments were used for the selection of American undergraduate programs. In order to have universities as similar as possible to German universities only public research universities (no private institutions, four-year colleges, community colleges, etc.) were considered for the comparison.

[19]This was done mainly in order to allow for the highest possible comparability to American institutions, as among the wide range of American higher education institutions only public research universities have somewhat comparable characteristics to German public research universities.

[20]This applied to Friedrich-Alexander-University Erlangen-Nürnberg, Ruhr-University Bochum, and Technical University Chemnitz.

[21]The university uses the German name in their English publications. A translation would be Technical University Munich, which will be used here for better readability and consistency with other university names.

However, due to limited resources and the great travel distances for interview appointments in the United States, the selection was not done by subject, but by university. In other words, I first selected three universities and then analyzed programs in the three disciplines at those universities.

The analysis was done at the University of California Berkeley (UCB), the University of Wisconsin-Madison (UW) and at Auburn University (AU) in Alabama. All of these are state universities that offer bachelor's, master's and PhD programs and are active in research. The UCB and UW programs typically rank among the first ten universities in the country (with UCB above UW), while Auburn usually falls between 30th and 40th place (US News and World Report 2010). UC Berkeley and UW Madison are highly recognized for their excellent research activities; Auburn University on the other hand focuses very much on its undergraduate education. Both, AU and UW as land grant universities have their roots in the technical and agricultural fields, while UCB was founded by combining a liberal arts college with a technically oriented school. Clearly, this selection is not completely representative of the American higher education system, however it offers a view into three institutions with different backgrounds and in different regions (South, Midwest and West Coast) of the United States.

The method used for the comparison of old and new curricula as well as with American undergraduate curricula is qualitative document analysis. "Document analysis is a systematic procedure for reviewing or evaluating documents — both printed and electronic (computer-based and Internet-transmitted) material. [...] The analytic procedure entails finding, selecting, appraising (making sense of), and synthesising data contained in documents. Document analysis yields data—excerpts, quotations, or entire passages—that are then organised into major themes, categories, and case examples specifically through content analysis" (Bowen 2009, 27-28). According to Bowen this kind of analysis is a cost-effective, efficient method that allows tracking change and development of an organization or program (in this case university curricula) (Bowen 2009, 27-28). Besides being less time-consuming and more cost-efficient than other methods, document analysis is advantageous because documents provide stable and exact data that can be reviewed repeatedly and the data found in documents cannot be influenced by the researcher himself (*lack of obtrusiveness and reactivity*). At the same time the method also has its limitations, mainly, the lack of details in documents that have not been specifically prepared to answer the research question and the lack of availability or access to certain documents (Bowen 2009, 31-32). However, these limitations could be addressed in my study. Since study regulations are publicly available on university websites and additional documents could be provided by department representatives, the problem

of limited access did not arise. The issue of detailed information, particularly on the background and reasons for changes between the old and new programs, has been addressed by interviewing staff responsible for the curricula of each program analyzed in the study. These interviews provided additional background information that could not be gathered from the documents.

The study program analysis was done in several steps. The first step was a comparison of the overall programs offered at each department before and after the introduction of new degrees. This step allowed me to get a sense of which general direction changes were going, for example whether the focus of reforms was more on introducing new research-oriented master's programs or on undergraduate studies or whether there were new interdisciplinary programs. In addition to some new programs nearly all departments introduced consecutive bachelor's and master's programs that were the direct successors to previous Diplom programs. Those programs were then chosen for the detailed comparison of the curricula. The main documents used for the comparison were the oldest available study regulations (*Prüfungs- und Studienordnung*) of Diplom programs and the newest available study regulations of the corresponding bachelor's program at the time the analysis was done (spring/summer 2011). In addition to these documents department websites, class descriptions (often in the form of class catalogues called *Modulhandbücher*), and program brochures were analyzed. The criteria used for the program analysis were derived from my research questions and hypothesis, as well as from reform goals and expectations stated by policy makers and employers[22]. Program documents were compared for information in the following categories:

- program structure
- credits and modules
- types of classes offered
- regular length of program
- student-teacher contact time (weekly semester hours - *Semesterwochenstunden*)
- available student resources (program advisors, internship office, international studies office, etc.)
- goals of the program
- curriculum
- electives vs. required classes

[22] A detailed review of the reform debate and employer expectations can be found in Chapter 5.

- type of exams
- focus on practical skills (*Praxisbezug*)
- focus on research skills
- focus on transferrable skills and rate of non-subject specific classes
- interdisciplinarity
- internationality
- relevance of teaching vs. research

Each document was repeatedly read, information on these categories was collected in a spread sheet for each discipline and differences between old and new programs were highlighted. The results of this analysis are summarized in Chapter 6.1. The same method and criteria were used for the analysis of the American bachelor's programs. Results are presented in Chapter 7.1.

Each comparison was supplemented with one, or in some cases two, interviews of staff responsible for the creation and development of curricula in the departments. The interviews were based on an interview guide but open-ended and problem-centered. Problem-centered interviews have the advantage that in addition to creating broad and detailed data, it is possible to intensify and adapt questions based on the interviewees responses in order to receive as much information on the research topics as possible (Witzel 2000). In addition to being problem-centered, the interviews can also be considered expert interviews, as all persons who were interviewed had a particular expertise on the research questions and the interviews focused on that particular knowledge[23]. The interviews were about one hour long and mostly done in person[24], digitally recorded and transcribed verbatim. Only minor language issues were corrected for readability and frequent repetitions or off-topic accounts were summarized. Each interviewee was asked permission to be cited and permission was granted by all interviewees. A list of interview partners can be found in the appendix.

The interviews were aimed at following up on questions that could not be answered by the initial document analysis. In addition, I discussed general characteristics of the higher education system in Germany and the United States with my interview partners in each country. Secondly, my questions aimed at what kind of skills the undergraduate education tries to teach, whether these skills have changed

[23]See Bogner, Littig, and Menz (2005) for more details on expert interviews.

[24]One interview at the UCB Business School could not be done in person and was done as a phone interview.

over time (in Germany in particular after the last reforms) and what the driving factors for these changes might have been. While the answers to these questions might be very subjective, they offer information on a topic that has not been researched sufficiently and for which no comprehensive empirical data is available yet.

The interview guide focused on the following issues:

- An introduction of the department and the programs
- The reform process (for German programs only)
- Content of the program curricula and objectives
- Structure of the program
- An evaluation of reforms (for German programs only)
- Current developments and changes (for American programs only)

A sample interview guide is attached in the appendix.

A third set of data that will be used to answer the question of whether the changes brought by the introduction of bachelor's degrees in Germany represent a shift towards a "general skills" model resembling the Anglo-American system (research question 1) is the abundant pool of existing studies and statistical data on the introduction of new university degrees in Germany; developments in the three disciplines chemistry, mechanical engineering, and business in particular; as well as studies focusing on a comparison of the German and American higher education systems. Many of them have been reviewed or listed in the section above; only a few main sources shall be mentioned here. First, the German Federal Statistical Office (SBA), the Federal Department for Education and Research (BMBF), the U.S. Department of State's National Center for Education Statistics, and the Organisation for Economic Co-operation and Development (OECD) all provide statistical data on the two countries' higher education systems. Second, several studies have focused on specific aspects of the introduction of new degree programs in Engineering (acatech (2006), Griesbach and Ederleh (1998), Konegen-Grenier and Koppel (2009), Bargel, Multrus, and Schreiber (2007), Fischer and Minks (2008)), Chemistry (Gesellschaft Deutscher Chemiker (1996), Wissenschaftsrat (2008)), and Business Administration (Hennings and Roessler (2012), Kraemer (2009), Mandler and Hanft (2005), Kieser and Küpper (2001)). These studies provide information on the developments of the disciplines in Germany. Thirdly, research institutes and public policy organizations such as the German *Wissenschaftsrat*, the BMBF, the *Hochschulrektorenkonferenz* (HRK), and CHE have published several studies on the success of the Bologna

reforms which also provide valuable data (e.g. Christoph and Roessler (2010), Bundesministerium für Bildung und Forschung (2012), Wissenschaftsrat (2000)).

1.3.3 Employer Preferences and Varieties of Capitalism

The second part of my dissertation asks whether preferences of German employers have changed from specific skills provided by old higher education degrees to more general skills provided by new bachelor's degrees. In order to answer this question the same multi-method approach as for the first part of the study has been applied.

First, I analyzed documents published between 1998 and 2012 on the position of employer preferences for German higher education. These documents included position papers, press releases, speeches, and similar pamphlets published by the main German employer associations such as the *Bundesvereinigung deutscher Arbeitgeberverbände* (BDA), the *Bundesverband der Deutschen Industrie* (BDI), the *Industrie- und Handelskammer* (IHK), the *Verband deutscher Maschinen- und Anlagenbau* (VDMA), *Verein Deutscher Ingenieure*, the *Verband der Chemischen Industrie* (VCI), as well as by the *Stifterverband für die Deutsche Wissenschaft*.

While these statements have been valuable sources, more detailed information could be gathered by interviewing employers in different sectors of the labor market. I interviewed eight human resource managers of businesses hiring graduates of chemistry, engineering and business programs, as well as education policy analysts at the German Confederation of German Employer Associations (BDA), the German Association of the Chemical Industry (VCI), and the German Association of Mechanical Engineering Companies (VDMA). For the selection of interview partners, several of the original "Bachelor Welcome"-signatory companies that fit into the categories of mainly hiring engineering, chemistry or business graduates were contacted. However, many of the contacted companies were either unwilling or unable to schedule an interview during the time frame available. In the end, interviews were done with the following companies (in addition to those with the employer organizations named above):

Deutsche Bahn (DB), Heidelberger Druckmaschinen AG (HD), Berlin-Chemie AG, BASF Services AG, and the Boston Consulting Group[25] (BCG). A list of my interview partners including short company profiles can be found in the appendix.

[25]Unlike my other interview partners, BCG was not available to do a full personal interview with me, but only allowed me to ask one of their HR representatives a few limited questions in a phone interview. However, the conversation still gave me valuable insights.

The interviews were an hour to an hour and a half long and focused on the following subjects:

- Expectations of university graduates
- The reform process
- Experiences with new degrees
- Reform evaluation

In summary these interviews aimed at answering the questions of what kind of skills employers expect from university graduates, whether these expectations have changed over time and whether they are satisfied with the new degrees.

In addition to the data collected by the expert interviews the study uses data and results of several large - N studies that have been conducted by different institutions over the last few years (e.g. Briedis and Minsk (2005), Briedis et al. (2011), Friske (2004),Kimler (2007), Konegen-Grenier (2011) Rehburg (2006)). These studies give a general overview of the success new degrees have had with employers. Two of the most recent studies (Konegen-Grenier (2011) and Briedis et al. (2011)) covered many of the same issues that were raised in my expert interviews, thus they are very helpful in supporting my qualitative accounts with more generalizable quantitative data.

As a reference for employer preferences in LMEs, which according to the VoC literature focus on general skills, documents on American employer expectations of college graduates published by the U.S. Chamber of Commerce, and the Institute for a Competitive Workforce will be valuable resources. Additionally, several recent studies have focused on the demands on American college graduates (e.g. Association of American Colleges and Universities (2002), Hart Research Associates (2010), Karakaya and Karakaya (1996), Adelman (1994)) and provide useful data for the analysis of American employer expectations presented in Chapter 3.

Chapter 2

The German Labor Market and Skills System

As described in the previous chapter, the Varieties of Capitalism literature uses the German political economy as their prime example for a coordinated economy in which actors in the different spheres coordinate their actions in order to maximize success. The authors argue that the labor market of CMEs is much more regulated and rigid than in LMEs and thus provides incentives for firms and employees to invest in a more specific skill set which is provided by the education and training system (Hall and Soskice (2001), Estevez-Abe, Iversen, and Soskice (2001)). This chapter aims to introduce these special characteristics of the German labor market and skills system and will focus on those features that distinguish it from labor markets in liberal market economies, such as the United States. Additionally, it will describe recent changes to the German labor market and argue, that these changes have made reforms of the skills system and a new focus on higher education necessary.

The chapter will first introduce the basic features of the German political economy as described by the literature on the *German Model*. The second part will look at the characteristics of the traditional German labor market, its regulations, the German employment structure and recent changes and challenges the labor market had to face. The third part will then introduce the German education and training system with a particular focus on the vocational training system, which has been the focus of the Varieties of Capitalism literature. Finally, I will summarize the changes in the labor market and challenges to the vocational training system and look at the arising need for new skills.

2.1 Understanding the German Political Economy: "Modell Deutschland"

"Modell Deutschland" or *German Model* stands for the economic system that has led Germany to become one of the biggest and most successful economies in the world after the devastation of World War II. The term was first used by the Social Democrats during the 1976 Bundestag campaign to describe Germany's role model function. Since then it has been mainly used to describe Germany's unique economic system, which is based on a tight cooperation between business associations, trade unions and the government. Green and Paterson describe the *German Model* as a "middle way between the extremes of Anglo-Saxon market and Scandinavian welfare capitalism" (Green and Paterson 2005, 7). Several other different labels have been found for the German political economy: Michel Albert called it the "Rhine Model" of capitalism, Hall and Soskice (2001) described it as a "Coordinated Market Economy" and Esping-Andersen categorized it as a "Conservative Welfare State."

Driven by the question of why Germany performed so much better than other OECD countries during the 1970s' oil crises, several authors (Albert, Shonfield, Katzenstein, Streeck) have tried to distinguish the key elements of the *German Model*. They have characterized the *German Model* as combining the following five elements: First, corporate governance as a stakeholder system instead of a shareholder system, second the German financial system and the important role of banks as credit lenders for companies, third coordinated industrial relations, fourth the German vocational training system that focuses on the creation of industry-specific skills and lastly, the generous German welfare system based on a mixture of employee and employer contributions, as well as taxes. Though it is becoming increasingly important, higher education has been largely neglected by this literature. The focus of this chapter will be on the German labor market and education system and will eventually show, that it is also important to look at higher education as a source of skills for future employees. However, to understand the characteristics of the German political economy, the five elements mentioned above will be shortly reviewed here.

2.1.1 Corporate Governance and the Financial System

German corporate governance differs distinctly from corporate governance in Anglo-American countries such as the United States or the United Kingdom. While businesses in the United States and the Unite Kingdom are generally governed by shareholders and depend highly on stock market developments, German corporate gover-

nance emphasizes mutuality and shared responsibility. Albert describes it as follows: "Shareholders, employers, executives and trade unions alike cooperate in a variety of ways to achieve a unique form of joint management" (Albert 1993, 110). This system of joint management, also called "codetermination", is required by law for firms with 2000 or more employees[1]. Employees influence decision-making in two ways. First, employees elect representatives to works councils that discuss matters such as training, redundancies, methods of payment, schedules, and work patterns with the firm management. At the same time employees are also represented in the management itself. They must have an equal number of seats on supervisory boards as shareholders (although the deciding vote is cast by a shareholder) (Albert 1993, 112).

Another distinct feature of German corporate governance is the influence of banks in company management. Traditionally, most German firms have not been listed on the stock market (this has changed recently). Instead of relying on equity markets for external finance, they have turned to banks for loans (Albert 1993, 108-109). In general, ownership in large German firms is concentrated in the hands of a few long-term shareholders, mostly families and other non-financial firms. Additionally, bank representatives have sat on a wide range of supervisory boards, and thus hold a position that lets them monitor and influence management easily (Deeg 2005, 175). This close-knit network is difficult to break by outside forces; this has protected German businesses from foreign take-overs in the past (Albert 1993, 108-109).

The German financial system has been dominated by large "all-purpose" banks that engage in industrial policy as well as in commercial banking. Supported by a stabilizing monetary policy led by the Bundesbank, the cooperative network between banks and companies gave German industry a competitive advantage and led to constant export surpluses (Beck, Klobes, and Scherrer 2005, 3). Another advantage for the German economy was the almost constantly strong currency. From the 1970s until the creation of the Euro, the Deutsch Mark was very strong in international financial markets. For example, in 1993 the German and Japanese currencies together accounted for 20 percent of the world's central bank reserves (Albert 1993, 129).

However, since the mid-1980s the financial system and the corporate governance model have started to change towards more liberal forms. Firms started to borrow less from banks and thus banks were forced to search for a new long-

[1]This is true for those companies falling under the criteria of the *Mitbestimmungsgesetz*. There are other laws that regulate codetermination in certain sectors (i.e. *Montan-Mitbestimmungsgesetz*) and for smaller companies (C.H. Beck Online Datenbank 2012).

term strategy. Large banks have since focused their financial activities on capital markets and the development of the German securities market. At the same time, large firms embraced the stock market as a new source of financing (Deeg 2005, 179-180). Deeg argues that traditional corporate institutions have remained intact, though a few large firms have become heavily influenced by capital markets. Smaller banks and firms have continued to rely on the traditional cooperative system (Deeg 2005, 183).

2.1.2 Industrial Relations and Vocational Training

In contrast to other countries, the state has always played a strong role in German industrial relations. German policy has traditionally avoided direct intervention, instead attempting to foster dialogue between the social partners, mainly unions and employer associations. Trade unions and employer associations interact in several different areas: in the labor court system, in the system of collective bargaining, in codetermination, and in vocational training.

For the majority of employees, collective bargaining agreements are negotiated autonomously between trade unions and employer federations at the industry level. The national or regional scope of these agreements depends on the employer associations and unions involved. However, most unions are part of the Confederation of German Trade Unions, which represents unions on the national level. Thus, differences between collective bargaining agreements and wages in different industries are comparatively low. German industrial agreements regulate a large number of different issues: wages, employment security, training and retraining, work organization, and the rights and obligations of trade unions and employer associations. Agreements on these issues are legally binding for all signatories and their members. The government can also declare them binding for all firms regardless of employer association membership (Streeck 1991, 54-55).

Industrial relations are influenced by codetermination, in the same way as corporate governance. All companies with more than four employees are required to have a works council in which employees are represented at the firm level. All workers are entitled to vote or run for office in works council elections. Works councils have the legal right to consultation and co-decision-making on different legally defined issues, such as the hiring and firing of employees and matters related to apprenticeships. Works councils are not allowed to negotiate issues that have already been determined in industrial agreements, however, they are responsible for implementing these agreements on the firm level (Streeck 1991, 55).

Cooperation between employer associations, trade unions, and the government can also be found in the organization of the German vocational training system, as will be discussed below. According to Streeck the vocational training system has been "one of the most important sources for industrial consensus" (Streeck 1991, 56). While trade unions are mainly responsible for the establishment of training profiles and curricula for the recognized occupations, businesses provide in-shop training through apprenticeships and the government regulates vocational schools. By requiring membership, industry and trade chambers eliminate the "free-rider problem". While all companies pay for the training, they also all benefit from it. Apprentices contribute to the system by accepting low wages (Streeck 1992, 33-34). In terms of the VoC argument, this system has on the one hand created a pool of highly skilled workers in their field, however these workers have specialized their skills in one particular occupation which makes it difficult to rehire them in a different field without substantial retraining. While this has not been a problem for the German system in the past, the vocational training system is more recently also faced with new challenges such as growing unemployment and the rise of the service sector (Hassel and Anderson 2008).

2.1.3 Welfare State

The German welfare state consists of four major programs: Pension insurance, unemployment insurance, health insurance, and long-term care insurance. During the heyday of the *German Model* in the 1970s and early 1980s the German social insurance system had its main period of expansion (Streeck and Trampusch 2005). Amid the economic success in the post-war period, the Bismarckian welfare state continued to be an important part in the German social democratic class compromise. Financed jointly by employer as well as employee contributions, it served as a social insurance against the risk of unemployment (Beck, Klobes, and Scherrer 2005, 3).

The German welfare state combines Anglo-American lean benefits for the needy and a contribution-based insurance system of unemployment benefits and pensions that are linked to previous pay. However, the focus over the last decade has been on the latter. The idea that once an employee reaches a certain standard of living that standard should also be maintained during periods of unemployment and retirement has been deeply rooted in German social policy. Thus, there were three different forms of assistance for the unemployed. Only "Social Assistance", the benefit for those who have never paid into the unemployment fund, was a means-tested assistance (Hassel and Williamson 2004, 12).

Until the mid-1980s this welfare state system was seen as one of the most successful systems in the world (Albert (1993), Shonfield (1965)). However, the system was originally designed for an employment model in which the male breadwinner, as the head of the household, could count on more or less permanent employment (Palier and Thelen 2008, 28). New developments, such as the growth of female employment, rising unemployment, and the increase of non-standard (part-time, temporary) jobs, have put high pressures on this system. According to Streeck and Trampusch, it is the nature of the Bismarckian welfare state that depresses the level of employment by inflating labor costs (Streeck and Trampusch 2005).

Similarly, the health care system is increasingly faced with rising costs due to an aging population, technological advances, and general increase in demands for treatment. However, Germany has managed to keep costs relatively low in comparison to other countries such as the United States and it can still offer a universal health care system (Albert 1993, 150-151).

This model allows openness to the global market and has continuously had extremely successful export levels, but combines this openness with strong coordination between the financial system, businesses, employees and a social safety network provided by government structures has led Germany to become the third largest economy in the world, accounting for six percent of world GDP (in 2002) (Siebert 2005, 2). Before taking a closer look at some of the more recent changes to this model, the next part will give a more detailed overview of the traditional German labor market structures and regulations.

2.2 The Traditional German Labor Market and Current Developments

Germany has been used several times as a prime example for a coordinated market economy (CME). The described coordination between different institutions and actors is also reflected in the labor market. The German labor market is characterized by strong collective bargaining agreements, strict regulations concerning hiring and firing of workers, and generous welfare protections that are in a great part co-financed by employers and employees. Up until the 1980s Germany has had almost constant full employment. However this has changed over the last few decades. Longterm unemployment has been a major problem and new forms of short-term contracts and part-time jobs have reduced the job security that once was a staple of the German labor market. This section will shortly review the characteristics of the

traditional German labor market and developments in the 1990s and early 2000s, the period when debates about higher education reforms peaked.

2.2.1 Labor Laws and Social Protection

As described above, unions have traditionally been very strong in Germany[2] and together with employer associations they play an important role in the decision-making processes on German social policy. The right of employees and employers to organize themselves and bargain about wages and working conditions without government interference (*Tarifautonomie*) is guaranteed by the German constitution and specified in the Collective Bargaining Act (1949). In general, bargaining takes place at an industry-wide level in one region between the regional union and employers association. An agreement in one region is usually taken as a goal mark for bargaining in other regions and sometimes also for other industries (Klikauer 2005, 5-10). In general, all members of the employer associations involved in the bargaining process have to abide by the agreement reached. This causes a very high centralization of collective bargaining agreements (Berger 1997, 3). Collective agreements, defined wage rates, wage differentials between skill groups, working times, vacation times and the like (Schettkat 1994, 7). Employees are not only represented on the industry level, but also on the company level in the form of works councils as has been described above.

In international comparisons, Germany is usually cited among those countries with the highest rate of protection for employees considering regulations and benefits. A study by the OECD shows Germany in the upper third of the 20 countries that were studied with respect to job protection as well as length and amount of unemployment benefits (Rühmann 2003, 5). The first "Protection against Dismissal Law" was enacted in 1951. It states that dismissals are to be considered illegal, if they are "socially unjustified" and lack an "important" reason (Berger 1997, 6). Today the general interpretation of the law is that a dismissal is only legal because of urgent requirements in the company's operating procedures (e.g. significant drop in orders, bankruptcy) or because of faulty behavior of the employee. Every dismissal also needs to be approved by the company's works council or it can be taken to court (Rühmann 2003, 7). Dismissal notices have to be given well in advance, depending on employee seniority up to seven months in advance. Certain employees such as pregnant women or those with disabilities enjoy special protections (Bundesministerium für Wirtschaft und Arbeit 2005).

[2]For example in 1991 the union density rate in the US was 15.5 percent, while in Germany it was 36 percent (Visser 2006, 45). The rate of employer organization in Germany during the 1990s was even about 90 percent (Schettkat 1994, 7).

Another peculiarity about German employment contracts is, that in general they are unlimited contracts. Meaning, they do not end, if there is no specific reason for it. Despite recent measures that allow for short term or for short term or fixed term contracts in order to promote the creation of jobs, there are still provisions that prevent firms from constantly renewing and offering short term contracts to one employee. Without a serious reason (e.g. the employee is substituting for a sick employee) a contract can only be limited to two years and can only be renewed three times (Bundesministerium der Justiz 2000).

Besides benefitting from strict employment protections, German employees also enjoy comparatively generous benefits (health insurance, pensions, unemployment insurance) that are regulated by law. Every employee[3] earning less than 75 percent of the contribution ceiling to the pension insurance, is required to be a member of one of the public health insurance funds. In 2014 this was 4462 EUR per month (Bundesministerium für Arbeit und Soziales 2013). General health insurance premiums are also regulated by law (insurance organizations are allowed to raise additional premiums if needed) and are currently set at about 15.5 percent of an employee's income, of which the employer has to pay 7.3 percent (Deutsche Sozialversicherung Europavertretung 2014). All public health insurance funds have to offer a basic health care plan that covers preventive care, in-patient and out-patient care, prescription drugs, and dental care. It also covers care received in other European countries (Matz-Townsend 2011). Public health insurance also includes a sickness benefit, covering 70 percent of the employee's gross income after seven weeks of illness (covered 100 percent by the employer). Additionally, the health insurance provides a maternity benefit for six weeks before and eight weeks after birth. After that, new parents can apply for a maternity benefit provided by the state, covering 67 percent of their former income for 12-14 months (Siebert 2005, 122).

Most employees are also required to contribute to the public pension fund and thereby also earn entitlements for their own pension, once they retire. Contributions to the pension insurance are also split between employees and employers and are currently at about 18.9 percent of the total income (Deutsche Sozialversicherung Europavertretung 2014). The third major insurance benefit is unemployment insurance. As with the other two insurances, it is jointly paid for by employer and employees and contribution rates are currently at three percent of an employee's income (Deutsche Sozialversicherung Europavertretung 2014). After having contributed to the unemployment insurance for at least 12 months an employee acquires the right for unemployment benefits, covering 60 percent of the former income (67 percent for unemployed with children) for a period of 6-12 months (depending on how long you

[3]There are exceptions for students and civil servants.

had been employed before) in the case of a job loss (Bundesministerium für Arbeit und Soziales 2010a). In addition to these insurances employees pay into compulsory long-term care insurance, while employers also cover casualty insurance. Together these five insurance benefits are called "social insurance" and make up a major part of the German welfare state. In addition to these contribution based benefits, the welfare state also offers unemployment assistance and social assistance to longterm unemployed and those who are unable to work. These benefits are paid for by taxes (Bundesministerium für Arbeit und Soziales 2010a).

These characteristics of the German labor market - strong collective bargaining, strict employment protection, generous social insurance and unemployment benefits - have made German employment relationships comparatively stable. Job tenure in Germany has been traditionally long[4]. While finding a job might at times be more complicated than in other countries, it is also harder to lose that job. However, problems with longterm unemployment and international competition have caused a flexibilization and liberalization of regulations in several areas, as will be described below.

2.2.2 The German Economic Structure

The German economy traditionally has been driven by the industrial sector that has provided for the economic miracle after World War II and has made Germany one of the strongest exporting countries worldwide. In 2002, Germany's export share of GDP was 35.5 percent. This accounted for 9.5 percent of all exports worldwide and ranked Germany second only after the United States[5] in world trade. Almost 90 percent of the country's exports are contributed by the technology-based industry and 59 percent of exports stem from four industries: machine building, automobile, chemicals, and electro-technology, while only 10 percent come from the service sector (Siebert 2005, 2-6). Still, recently the industrial sector has been loosing its importance to the service sector. The percentage of employees in industry has decreased from 46.5 percent in 1970, to 36.6 percent in 1990 and only 24.7 percent in 2012. The service sector on the other hand now employs almost three fourths of the German workforce (73.7 percent in 2012) (Bundeszentrale für politische Bildung 2013b, 17). However, many service companies are directly related to industry and

[4]In 2012 the average job tenure in Germany was 11.5 years (Organisation for Economic Cooperation and Development 2014), in the United States it was 4.6 years (United States Bureau of Labor Statistics 2012b).

[5]Ten years later, the picture had changed a bit, because of China's rise in exports. In 2012, Germany ranked third after the United States and China with a share of 8.7 percent in world exports. Germany's export share of GPD, however, continued to rise and in 2012 was 51.1 percent (Bundesministerium für Wirtschaft und Technologie 2013).

provide services for the industrial sector (Kaiser 2009). Also, out of the 20 largest German firms by revenue in 2013, 13 are in industry, while only seven are in the service sector (including four in retail and trading) (Frankfurter Allgemeine Zeitung 2013).

The three industries that have traditionally been mentioned as the key industries for Germany are the automobile industry, the mechanical engineering industry and the chemical industry. The automobile industry is of course known through its world famous brands such as BMW, Daimler and VW. Mechanical engineering only has a few major players, such as Heidelberger Druckmaschinen AG, but is made up of a great number of medium-sized firms that are typical for the German economy overall. However, the mechanical engineering industry is the largest employer employing 924,404 workers in 2013, followed by the automobile industry with 762,748. In terms of revenue, the automobile industry leads with about 34.7 billion EUR in 2013, while the mechanical engineering industry came in at 18.7 billion EUR (Statistisches Bundesamt Deutschland 2014a, 29-30,51-52). The third industry that is often mentioned as one of Germany's key industries is the chemical industry (Kaiser 2009). It does not employ as many people as the automobile industry (308,789 workers in 2013) and has a lower revenue of 11.3 billion EUR in 2013[6] (Statistisches Bundesamt Deutschland 2014a, 25,47). However, it contributes significantly to Germany's exports. In 2012, the chemical industry exported goods valued at 104 billion EUR, coming in third after the automobile industry with almost 190 billion EUR and mechanical engineering with 164 billion EUR in exports (Statistisches Bundesamt Deutschland 2013a, 68). Two of the world's biggest chemical companies - BASF and Bayer - as well as numerous medium-sized companies traditionally contributed to its success. In 2011 it was the world's leader in chemical exports after the United States, Belgium and China and contributed 11.2 percent to the world's chemical exports (Verband der Chemischen Industrie e.V. 2012).

As mentioned above, another characteristic of the German economy is the important role of small and medium-sized firms, the so called *Mittelstand*. In 2010, small and medium sized enterprises made up 99.3 percent of all enterprises in Germany. They employed more than 60 percent of the German workforce and contributed about one third of the total revenue (Statistisches Bundesamt Deutschland 2014b). The *Mittelstand* also provides 80 percent of all apprentices and unlike larger firms, these firms are privately owned and run by the entrepreneur (i.e. they are not a stock company). This group of firms is also very active politically and has been seen as the backbone of the German economy (Siebert 2005, 9-10). Not only big

[6]Coming in fourth after automobiles, mechanical engineering and food production, which only had a slightly higher revenue of 11.9 billion EUR in 2013.

multinational firms, but also many of these medium-sized businesses are acting on the global market and have recently had to react to the effects of globalization and the growing importance of the service sector. How these developments have effected the German labor market will be the topic of the next section.

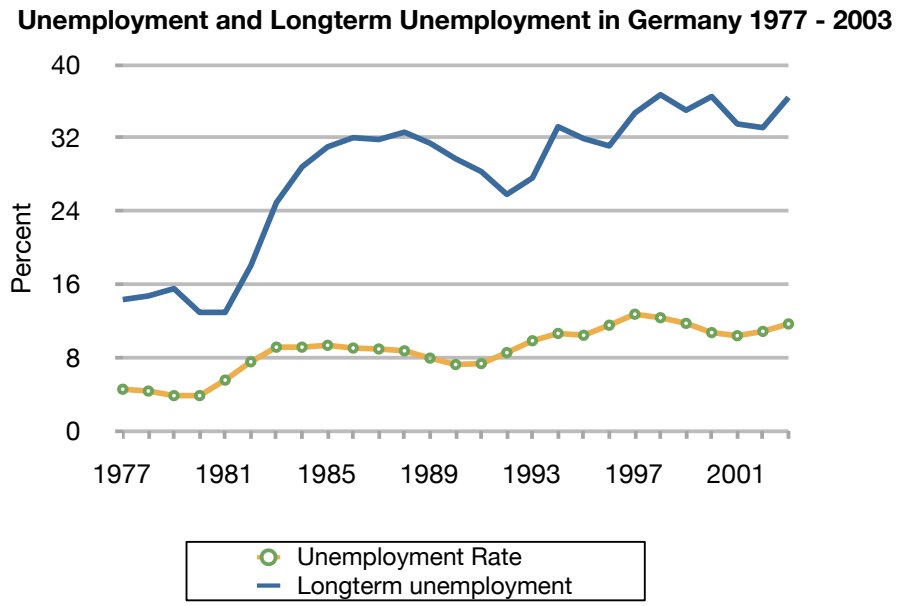
2.2.3 Challenges to the German Model and the Shift to the Service Sector

Over the last decades the labor market described above has changed in several aspects. While the general institutional structures have remained fairly stable, the institutions within the systems had to react to new developments and have changed over time. The main factors that have been mentioned for causing change in the *German Model* are globalization, technological innovation, European integration, and German reunification (e.g. Beck, Klobes, and Scherrer (2005), Hassel (2010), Schmidt (2002), Streeck (1995)). In debates about these developments, the question about a possible convergence of the German coordinated labor market with an American-style liberal labor market (or more broadly economy) is often discussed (e.g. Streeck (2004), Hassel and Williamson (2004), Schmidt (2002), Cohen and Pisani-Ferry (2006), Lütz and Eberle (2007)). Developments such as the increase in low-paying and temporary jobs, the decrease in union membership, the reduction of social insurance benefits and the increasing importance of the service sector might indicate a shift towards a liberal market economy. The following section discusses these developments in the German labor market in the past 20 years. It shows that the German labor market has changed significantly and thus reforms of the education and training system, particularly higher education were needed. The next chapter on the American labor market, however, will show that these developments do not represent an 'Americanization' as the American labor market is still much more liberal than the German one.

The pressure that German reunification put on the German economy cannot be denied. The political solution to the break-down of the East German planned economy was the transfer of essentially all West German economic and social institutions to the East. This put tremendous adjustment pressures on the East German economy and led to prolonged mass unemployment. Between 1990 and 2005 unemployment rates rose from 7.3 percent (for West Germany only) to 13 percent (for reunited Germany) (Bundesagentur für Arbeit 2011, table 2.2.2) and have only recently returned to 6.8 percent in 2012 (Statistisches Bundesamt Deutschland 2013d, 355). What made this development worse is that many of these unemployed

did not return to work quickly and longterm unemployment[7] also rose between 1991 from 28 percent to 36 percent in 2003 and 40.7 percent in 2008 (back to 36 percent in 2013) (Bundesagentur für Arbeit (1999), Bundesagentur für Arbeit (2003), Bundesagentur für Arbeit (2013)). Figure 2.1 shows this increase in unemployment during the 1990s and early 2000s.

Figure 2.1: Unemployment and Longterm Unemployment Rates 1977-2003



Source: Bundesagentur für Arbeit (1999), Bundesagentur für Arbeit (2003), Bundesagentur für Arbeit (2011)

The transfer of institutions from the West to the East also included institutions of the welfare state, which then had to cope with record unemployment and caused immense pressure on public budgets (Streeck 1995, 21-22). The unemployment agency (*Bundesagentur für Arbeit*) that pays unemployment benefits and collects contributions had a budget deficit of 24.4 billion DM in 1993. Total spending for unemployment benefits (and related costs) rose from 93.5 billion DM in 1992 to 109.5 billion DM in 1993. These spending increases were financed by government subsidies (i.e. tax money) and a raise in contributions (i.e. non-wage labor costs) (Bundesministerium für Arbeit und Soziales 2010b, Tab. 8.11 A). Some authors thus argue that the burden of reunification is the main reason for Germany's economic slow-down (Katzenstein (2005, 288), Streeck (1995, 22)) and caused the need for changes. Others noted, however, that "most of Germany's structural and economic

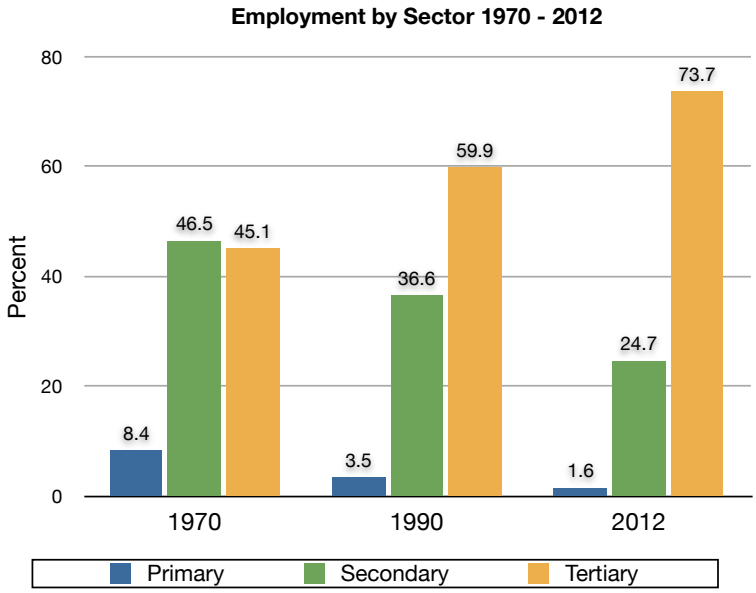
[7]In Germany longterm unemployment is defined as unemployment for more than 12 months. Interestingly in the United States it is only 6 months (Agentur für Gleichstellung im ESF (2013) and Congressional Budget Office (2007)).

problems pre-date unification" (Green and Paterson 2005, 10). These authors find the reason for German economic problems in the inability of the *German Model* to react to the growth of the service sector (e.g.Hassel and Anderson (2008, 26)).

While the German labor market was traditionally dominated by the industrial sector, the service sector has grown consistently over the last two decades. Today, more people work in the service sector than in any other sector and about two thirds of the German GDP is contributed by service firms. The service sector includes such areas as distribution services (trade, traffic, news), business services (leasing, finances, training), personal services (hotels and restaurants, sports, culture, household services), and social services (government, health, education, churches).

Looking at employment numbers, one can see the growing importance of the service sector for the labor market. In 1970 about 45 percent of German employees worked in the services, about 40 years later, in 2007, 72 percent of all employees worked in the services. (In 1991 it was only 59.5 percent.) During the same time employment in the manufacturing sector, that used to be the foundation of the German coordinated market economy decreased by 21 percent (Statistisches Bundesamt Deutschland 2009a, 7). Figure 2.2 shows this development.

Figure 2.2: Employment Rates by Sector



The primary sector refers to the agricultural industry, the secondary sector to the manufacturing industry, and the tertiary to the service industry. Source: Statistisches Bundesamt Deutschland (2009a) and Bundeszentrale für politische Bildung (2013b)

Similarly, the role of the services for the total GDP has increased. In 1970, both manufacturing and services contributed 48 percent to the GDP, in 2007 the

manufacturing sector only produced 30 percent of the GDP, while the services sector produced almost 69 percent of the GDP. This development can also be explained by the outsourcing of formerly internal business services, such as human resources and finances, to external service companies (Statistisches Bundesamt Deutschland 2009a, 8).

There have also been significant changes within the German service sector. Services close to households such as retail sales and the hospitality industry used to dominate the sector. Now the focus is mainly on business-related services such as financing and consulting. Reasons for this development can be found in the fast success of new information and communication technology as well as in the establishment of new service areas such as logistics and leasing (Statistisches Bundesamt Deutschland 2009a, 8). These developments - increased global competition and pressure to adopt neoliberal policies, the financial and structural burden of German reunification and the shift towards the service sector - made changes of the traditional coordinated German labor market necessary as will be described below.

These labor market developments required changes in several different areas of the German political economy. First, the rise in unemployment was countered with changes in the welfare state, particularly in unemployment benefits. Secondly, the need to create more jobs led to the introduction of new forms of short-term and "un-insured" employment, as well as to changes to existing labor regulations. Similarly, these developments have made changes in industrial relations possible. Finally, the growing importance of the service sector has changed the world of work in many aspects, for example in terms of working time, work from home, etc. and has also created the need for a focus on a different, more general set of skills.

To cope with the rise in unemployment the traditional system of unemployment insurance benefits, plus unemployment assistance, plus social assistance,[8] which originally provided for an essentially unlimited time of social subsidies for the unemployed, was significantly reformed with the so-called "Hartz IV" reform. The reform limited the duration of *Arbeitslosengeld*- payments and it combined unemployment assistance and social assistance into one means-tested benefit for everybody who is able to work ("social assistance" is now only available to those unable to work). The new benefit is called *Arbeitslosengeld II* (ALG II), though it does not have very much in common with the traditional *Arbeitslosengeld* (unemploy-

[8]The unemployment insurance benefit (*Arbeitslosengeld*) is a contribution based benefit, that everybody who has paid contributions for at least 12 months is entitled to. It is based on the previous income level. Until 2005, once *Arbeitslosengeld* benefits expired (after 12-18 months), unemployed workers could apply for the tax-based "unemployment assistance" (*Arbeitslosenhilfe*), which was lower than *Arbeitslosengeld*, but still based on the previous income. Those people who still had not found employment after this assistance expired, were then eligible for the means-tested "social assistance" that covered basic needs.

ment benefits). ALG II is not only strictly means-tested and provides a significantly lower income, it also requires recipients to constantly apply for jobs and to accept nearly any job that is offered to them, while in the old system your previous skill level was protected and individuals with an education in a special trade could not be asked to change professions. Also new is that ALG II is not related to the former income, as *Arbeitslosengeld* and *Arbeitlsosenhilfe* were. The reform also included an extension of the definition of one's "working capacity" which now requires about 90 percent of former social assistance recipients to work or actively look for work. The focus has moved from securing a person's income and skill levels towards motivating the long-term unemployed to more quickly move back into employment, while still providing the minimum living wage and thus giving them the means to help themselves (Hassel and Schiller 2010, 31-35).

Besides changing the benefit structure for unemployment benefits, the focus of labor market policy since the late 1980s/90s has been on creating a more flexible labor market. Already in 1985, the Job Promotion Act (*Beschäftigungsförderungsgesetz*), introduced several measures, such as fixed-term contracts, part-time work, job sharing, employee leasing by agencies, a narrower definition of unfair dismissal, lowering the cost of redundancy programs and restricting the use of overtime that were aimed at creating new forms of employment. These new forms deviated from the standard model of full-time employment with social benefits and thus helped in creating more jobs (Mares 1996, 17-18).

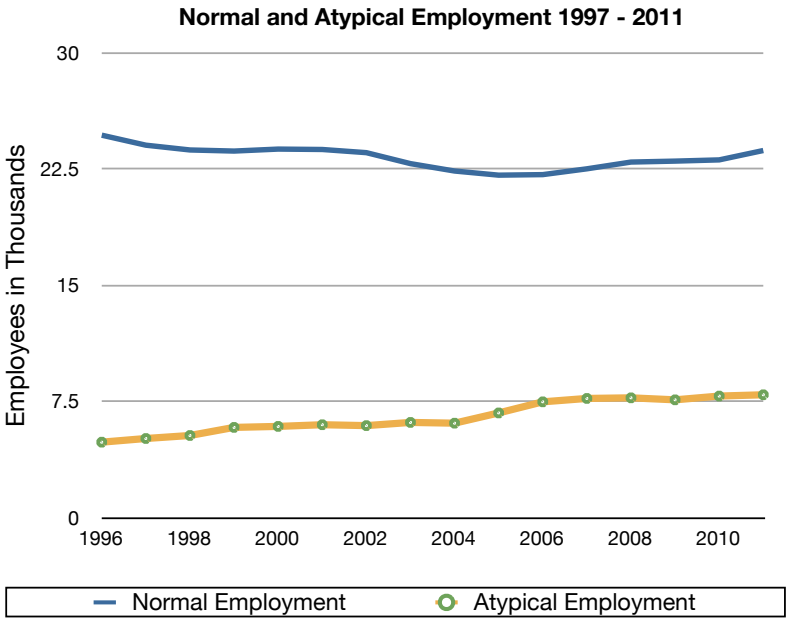
During the 1990s the use of low-paying jobs that were exempt from contributions to the social insurances[9] became increasingly popular. These so-called "Mini-Jobs" allowed employment of under 20 hours (since 1999 under 15 hours) per week and an income of originally 325 EUR, later 400 EUR per month without social insurance contributions and taxes. In 1999 a partial contribution by the employer towards health insurance and public pensions of about 22 percent was introduced, while the employee continued to earn the full 400 EUR[10]. This, however, did not change the popularity of mini-jobs. In 2003 the limit of 15 hours per week was removed, which allowed for more low-paid jobs (Oschmiansky 2010). The structure of employment in Germany has changed quite drastically since reunification. While the number of full-time jobs has decreased by about 20 percent since 1991, there were twice as many part-time employees and two and half times as many "mini-jobbers" in 2007 than in 1991 (Hassel and Schiller 2010, 39). Those full-time jobs that have more recently been added are mainly jobs for temp agencies (*Zeitarbeit*). Those kinds of jobs have increased by 64 percent between 2006 and 2007 alone. Another

[9]This exception was originally introduced in the 1960s to encourage women to take up part-time work, while there was a labor shortage (Oschmiansky 2010).

[10]Currently (2014) the income limit is set at 450 EUR (Minijobzentrale 2014).

development that can be seen over the last two decades is the increase of low-paying jobs. The share of low-payed employees increased from 14.2 percent in 1998 to 21.5 percent in 2007. According to the OECD low-payed jobs are those jobs that pay two-thirds of the median wage (Hassel 2010, 39). In total these atypical employment forms[11] have increased by 86 percent between 1991 and 2011 as shown in Figure 2.3 (Bundeszentrale für politische Bildung 2013a).

Figure 2.3: Development of atypical employment



Source: Bundeszentrale für politische Bildung (2013a)

In addition to creating a low-wage sector, a recurring recommendation by organizations such as the OECD for the promotion of job creation has been to ease employment protection legislation (Organisation for Economic Co-operation and Development 2008). While there have not been any significant changes in legislation, this strict employment protection only exists for those with standard full-time contracts, while those with temporary contracts, working for temping agencies or in a mini-job are not protected by these laws. Thus, these forms of employment have become increasingly popular with employers.

What has helped this development are new collective bargaining agreements and a changing role of unions in industrial relations. "Globalization, in particular the internationalization of companies and of business standards, has forced German managers to adopt more open, international approaches. They have adapted the workings of the traditional corporate governance institutions to their own needs —

[11] This includes part-time jobs up to 20 hours per week, limited-term contracts, low-wage jobs and temporary employment (Bundeszentrale für politische Bildung 2013a).

including the role of employees in codetermination procedures" (Hassel 2010, 103). Because of the looming threat of unemployment, unions have repeatedly backed-down in bargaining rounds agreeing to lower wages, longer working hours and most importantly plant-level agreements that do not necessarily follow the rules of industry-wide collective agreements. Many companies today agree on new work arrangements with their local works councils without informing their regional or federal association and unions do not have the capacity to monitor and fight these violations of collective bargaining agreements. One third of private companies now have plant-level agreements and 15 percent simply violate industry-wide collective bargaining agreements (Hassel 2010, 107-108).

These developments show that the German labor market is moving away from the traditional model of life-long, full-time employment and towards a more flexible labor market with different types of employment, as well as fewer employment and unemployment protections. This new, more flexible labor market also requires a new set of skills. However, before I turn to the issue of what new kinds of skills are needed by the German economy, the next section will shortly introduce the main institutions of the German education and training system.

2.3 The German Education and Training System

One of the factors to which the the success of the German economy, particularly its strong exports over the last three decades, has been attributed to is the German education and training system. It is particular, because it provides many different routes of secondary education, including different types of schools as well as on-the-job vocational training. As with many education terms, it is difficult to translate the names of the different types of schools, as even those translations commonly used do not transfer the entire meaning, thus the German names will be used here. The general term "high school" is used to refer to all secondary schools. This section will give a short overview of the German education system, with a particular focus on the vocational training system that has been so widely discussed by the VoC and *German Model* literature. Since education is the responsibility of the 16 *Länder* governments there are differences in the names of schools and also in terms of the structure of those schools. The overview given here cannot include all these particularities and does not claim to be complete. It is merely meant as a general introduction.

2.3.1 Secondary Schools

The German education system provides several different paths for students. From about age 3 to 6 many children participate in Kindergarten (daycare), however this is not a required part of the education system, though efforts are now being made to focus more on early education (e.g. Fahrun (2013) and Süddeutsche Zeitung (2011)). Compulsory schooling starts with first grade at age 6, when students start primary school (*Grundschule*). Here all students spend four to six years (depending on the state) together, before they can decide which path to follow in secondary education. Traditionally there are three different types of secondary schools: *Hauptschule, Realschule* and *Gymnasium*. More recently the so-called *Gesamtschule* and a combination of *Haupt-* and *Realschule* (with different names in different states, e.g. *Mittelschule*) have become popular. During the last year of primary school, students receive recommendations from their teachers as to which school type they should choose based on academic achievement, potential, and personality characteristics, such as the ability to work independently. *Hauptschule* is recommended to those with the lowest academic achievement and students stay there until grade 9 or 10 after which they enter vocational training. *Realschule* is the school for the majority of students. After grade 10 students can either enter vocational training or transfer to the upper secondary level at the *Gymnasium*. *Gymnasium* focuses on preparing students for higher education and a university career. From grade 5/7 - 10 it provides students with a broad general education comparable to that in an American high school.

After that, from grade 11 - 13 classes are taught at an upper-secondary level, comparable to introductory classes at the American college level. Students now can more freely chose courses[12] and choose two advanced classes in which they will do their major final exams (in addition to several basic exams) at the end of grade thirteen. They will be awarded the Abitur-degree that gives them access to higher education (U.S. Department of Education 1999, 5-9).

Over the last few years several points of criticism have been voiced about this system. One is that the early channelling of students creates social cleavages and makes the integration of immigrant students more difficult. Since the lower *Haupt-* and *Realschulen* have increasingly gained a reputation for low student achievement

[12]Before that only limited classes can be elected, for example foreign languages usually starting in grade five or seven. However, up until 11th grade students are taught in what is called the "Klassenverband" which means that you have all subjects together with the same students. Rather than switching from one teacher and class to the next one by subject, students stay together and only the teachers for the different subjects change. There is also one teacher (usually one with many hours per week, e.g. German, English or Math) who acts as an advisor for the "Klasse" and is responsible for parent meetings, etc.

and social problems, many parents now enroll their children at *Gymnasien* against their teacher's recommendation (U.S. Department of Education 1999, xxiv). Other points of criticism have been under-financing and the lack of more intensive early education (Siebert 2005, 246-247). Traditionally, this school system has prepared the majority of students for some kind of vocational training, with about 69 percent starting an apprenticeship and vocational schooling in 1999 (Bundesinstitut für Berufsbildung 2010). This also explains why the vocational training system has played such a major role in the German skills provision system. The Gymnasium, originally only geared towards an elitist minority, was the only school that provided university entrance qualification, thus the vocational training system had to provide training for the majority of German high school graduates.

2.3.2 The Vocational Training System and its Challenges

While in-firm training has a long tradition in Germany, particularly in the crafts, it was only legally introduced as part of the public education system by the *Berufsbildungsgesetz* (vocational training law) of 1969. The main branch of German vocational training[13] is the "dual system", so-called because training takes place partly in firms and partly in vocational schools. The system relies on the sharing of responsibilities between businesses, governments, and apprentices. While companies provide the equipment, trainers and low apprenticeship wages, the federal states (*Länder*) are responsible for teachers and machinery at vocational schools (*Berufsschulen*).

Apprentices themselves invest in their training by accepting low wages and offering their labor to the companies. While the state provides the legal framework for the system, it is regulated and supervised by the chambers of industry and commerce or of trades. These chambers are para-public institutions, which all employers in a certain industry have to join. They supervise training in individual companies, approve companies to train, and test apprentices at the end of their training. Other important actors are the social partners in the form of unions, works councils and employer associations. They determine the curriculum of the particular training program, together with the Federal Institute for Vocational Training who provide expertise. Changes to occupational content have to be negotiated between these actors. Works councils have the right to codetermination on apprenticeship training at the firm level and can influence such things as hiring and firing of apprentices and

[13]There are also some programs that are entirely taught in vocational schools and programs that are geared towards continuing education.

negotiating apprenticeship contracts. The standard apprenticeship takes between 3-4 years and contracts with the company are usually for the entire time.

In the past, this system of shared responsibilities has guaranteed that apprentices where taught the skills that businesses needed. At the same time unions could ensure that they were still indeed industry-specific and not just firm-specific, so that apprentices can use them more broadly. Additionally, the system does not require intense state intervention, which made it welcome by employers and more efficient (Culpepper and Finegold 1999, 2-5). This system has often been seen as an asset to the German economy and "is considered one of the best in the world, providing excellent facilities for the creation of human capital" (Siebert 2005, 248) by providing young people with on-the job training and formal education, as well as integrating and preparing them for the labor market. Those with a vocational training degree have been the recruitment pool for technological intelligence, middle management, as well as upper management in *Mittelstand* firms (Siebert 2005, 248). This illustrates why the German higher education system has in the past been able to focus on educating academics, scientists and professionals. The vocational training system has covered many vocations (e.g. nursing, banking, science and engineering laboratory assistants, media, design), which in other countries are trained in the higher education system.

Unlike in university programs, there is no formal requirement for starting an apprenticeship program. However, employers have their own standards as to which students they will hire as their apprentices (Heijke and Muysken 2000, 245). Since the type of profession one can learn in a vocational training program ranges from occupations in the crafts, such as carpenter or bricklayer, to technical jobs such as motor-mechanic, mechatronic engineer, or lab assistant to advanced programs such as nursing, medical technology or banking, the pre-requisites for these programs are different according to the field. However, what they all have in common is that similarly to applying for a job, a high school graduate applies directly to the firm for an apprenticeship and is then enrolled in the vocational school closest to the apprenticeship location. Thus, in contrast to university students, apprentices learn early on how to navigate the job market. Traditionally, for the majority of high school graduates there was no need for a university degree. An apprenticeship promised an early income and good job perspectives later on. However, more recently the system has been faced with several struggles. German unification posed the problem of integrating the dual system in East Germany. With many businesses not being economically stable, it was difficult for them to offer enough apprenticeship places (Busemeyer 2009, 134-135).

To cope with this problem, several of the new *Länder* have introduced school-

based vocational training programs and the unemployment agency increased funding for programs that were meant to help disadvantaged youths by preparing them for a later training program in a certain occupation (*Übergangssystem*). These types of programs have become increasingly popular in all regions. Over the last two decades these two new forms of vocational training have gained in importance relative to the traditional dual system and have weakened the overall system that relied on in-firm learning (Baethge, Solga, and Wieck 2007, 21). A third column (besides the dual system and school-based training) of the vocational training system are programs developed for continuing education. Many firms directly provide their employees with training either run by their own education department or in external institutions (often run by the chambers of industry and trade or by the Länder). Training is usually focused on firm- or job-specific skills and in the past these programs were focused on younger employees as the spending on training for employees over 45 is significantly lower (Siebert 2005, 249). With an aging population this branch has become increasingly important and employers now emphasize the need for lifelong learning. While they still use the institutions provided by the vocational training system (e.g. *Fachakademien*), they also increasingly look to universities to provide their employees with additional up-to-date skills (Interview BASF).

Another drawback of the German vocational training system that has been mentioned, is its inflexibility. Being bound by one employer, it for example, has been difficult for apprentices to study and work abroad without loosing time and having to redo the work back in Germany (Busemeyer 2009, 139). This inflexibility has also been problematic for the transformation from a system based in the industrial sector towards one that has to address the needs of a service economy. This switch entails a change in the types of tasks that need to be performed in an economy and thus requires a change in the type of knowledge that is being taught (Baethge, Solga, and Wieck 2007, 11). Strict occupational descriptions and the complex system of coordination between the social partners has made the introduction of new occupational profiles slow (Siebert 2005, 284).

Another challenge is the increase of knowledge intensive jobs and an increase of the average education level, which shifts the focus of education policy and of employers from the middle branch of vocational education towards the more advanced higher education system (Baethge, Solga, and Wieck 2007, 11-12).

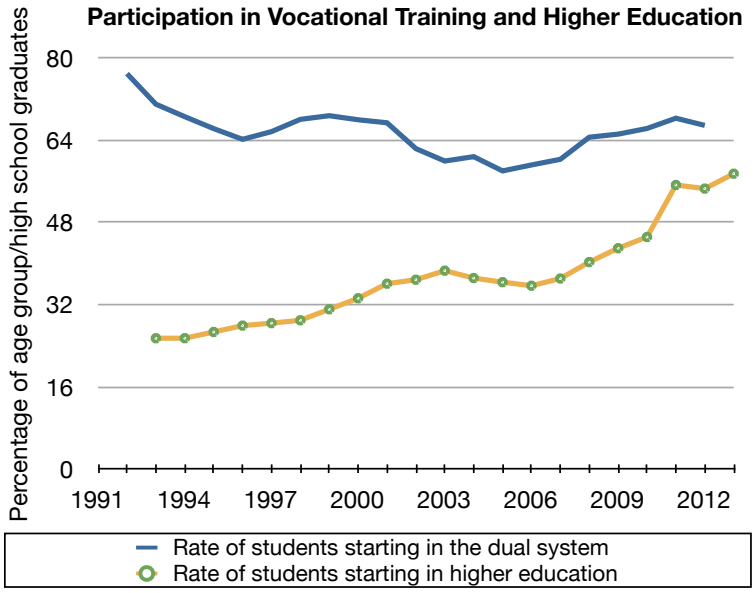
> "It is this trend towards a knowledge society that changes the qualification basis of the dual system [...] and causes the human resources strategies of businesses for many fields that used to be covered by voca-

tional training to focus on graduates of higher education."[14] (Baethge, Solga, and Wieck 2007, 27).

This trend can also be seen by the increasing number of apprenticeship positions going to high school graduates with a *Abitur* instead of those from a *Haupt-* or *Realschule*, as Siebert finds: "Many apprenticeship candidates from the *Realschule* are being replaced by graduates from the *Gymnasium* (particularly among banking and insurance apprenticeships) - at a time when many positions in industry and trade that were formerly assigned to those with an apprenticeship background are now going to university graduates" (Siebert 2005, 248-249).

This development is illustrated in Figure 2.4. Although the vocational training system is still dominating, participation in higher education is steadily increasing, while participation in vocational training decreases. In 2013, more than half of the age group of 18-22 year olds started a university program (Statistisches Bundesamt Deutschland 2013c, 11). Vocational training is still an important part of the German skills system, yet the focus of students and employers alike is shifting towards higher education.

Figure 2.4: Participation in Vocational Training and Higher Education



Source: Baethge, Solga, and Wieck (2007), Bildungsberichterstattung (2012), Bundesinstitut für Berufsbildung (2013), Statistisches Bundesamt Deutschland (2013c). Numbers do not add up to 100 percent because they are based on different reference values.

[14] Translation by the author, original: "Es ist der Trend zur Wissensgesellschaft, der die Qualifikationsbasis des dualen Systems (auch des Schulberufssystems) grundlegend verändert und in vielen Tätigkeitsbereichen, auf die das mittlere Berufsbildungssystems vorbereitet, die Personalrekturierungsstrategien der Unternehmen - neu - eher auf Hoch- und Fachhochschulabsolventen - ausrichtet."

A particular issue here is the traditional separation of the two systems with higher education on one side and vocational education on the other side. Since both systems follow very different institutional structures, it makes it difficult to create bridges between them. Although, combining the more practical experiences gained by vocational training with the theoretical academic knowledge of a higher education degree is seen as a very useful combination by many employers (Interview HD, Interview BASF). Thus, improving the opportunities for vocational training graduates at higher education institutions has been a demand from businesses and unions alike (Busemeyer 2009, 139-140).

This section has shown that the vocational training system has been the main pillar of the German education and training system. It has been seen as a role model by many countries and is accredited with the success of the German economy from the 1950s to the 1980s. In the past, the dual-system was the major system of skills provision for German employers and thus limited the role of the German higher education system, particularly of research universities to the education and training of academics. However, more recently it has had to struggle with the shift to the service sector and has lost its relative importance to higher education, which is becoming increasingly important for German employers. With the labor market adjusting to new developments, there is a need for a new set of skills. In addition to reforms of the vocational training system, it is also important to look at the higher education system to provide these more advanced, but practically applicable skills that the vocational training system appears to be lacking to provide.

2.3.3 The Need for New Skills

When talking about skills, one needs to differentiate between different types of skills. As shown in the literature review above (Chapter 1.2) the two most commonly used categorizations are specific skills vs. general skills and high skills vs. low skills. *Specific skills* then can be divided again into firm-specific skills (i.e. skills acquired by on-the job training that can be used mainly in one firm) and industry-specific skills (provided by vocational training and applicable in one professional field or industry) (Estevez-Abe, Iversen, and Soskice 2001, 148 - 150). *General skills* can be defined as those skills that are highly transferrable between industries and professions and focus on broad universal subjects (e.g. communications skills, languages, analytical thinking). They are usually associated with academic schooling as provided by upper secondary schools and higher education. *High skills* in this context have been defined by human capital theorists as those skills that can successfully be used in a global labor market and involve problem-identifying, problem-solving,

and strategic-brokering (Brown, Green, and Lauder 2001, 11). *Low skills* on the other hand are usually associated with those skills needed for manual labor such as working as a waitress, at an assembly line in a factory or in retail jobs. They have been defined as those skills acquired by lower secondary education and below (McIntosh 2000, 6,11). Though this cannot be entirely generalized many of those skills considered "high skills" by human capitalist theory match the definition of "general skills", while some characteristics of "low skills" can be found in specific, particularly firm-specific, skills.

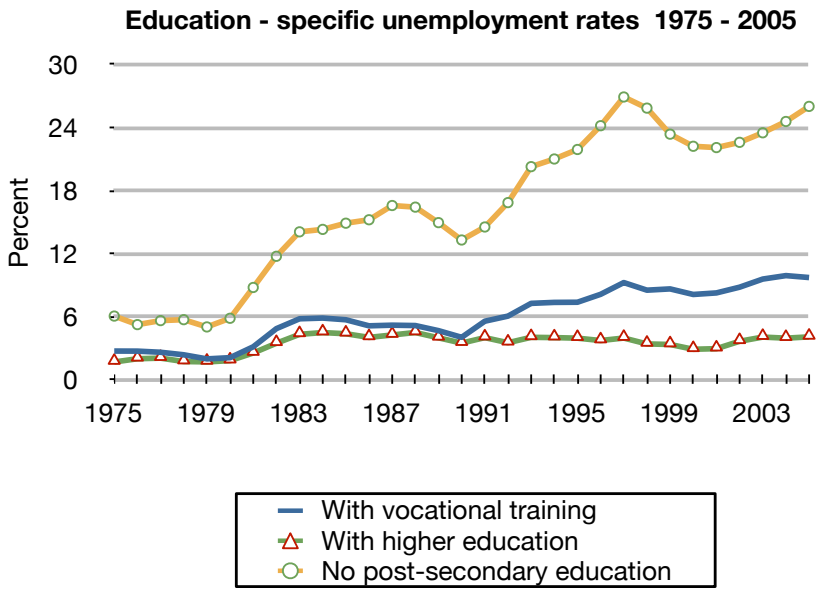
In political debates the growth of the service sector has often been seen as being driven by low-skill jobs. However, studies show that the opposite seems to be true and the importance of skill-intensive services has risen (Buera and Kaboski 2009, 1). While some service jobs remain unskilled (taxi-driving, garbage pick-up), many others require higher education degrees (media, health, government, real estate, consulting, finances) (Ansell and Gingrich 2008, 3). Baethge et al. (2007) explain that while the skills needed in an industrial economy were based on personal experience and difficult to generalize and transfer, those needed in a post-industrial economy are based on systematic explicit knowledge. They conclude: "The shift from the pre- to the post-industrial society – in terms of the dominant types of knowledge – can be described as a change from knowledge based on experience to systematic (theoretical) knowledge"[15] (Baethge, Solga, and Wieck 2007, 74). The European Commission describes the skill development in the service sector as a "broadening of the required skills portfolio at all occupational levels, linked to 'non-routine' tasks. For example, ICT professionals have to develop skills in marketing or management; services workers have to develop customer orientation skills and digital literacy. In many knowledge-intensive sectors, both managerial skills and scientific knowledge are needed. In social care and education, further skills upgrading is needed to improve the quality of services" (Commission of the European Communities 2008, 8). Thus, for an economy that increasingly depends on services advanced general skills, like those provided by higher education are becoming increasingly important.

Not only work in the services, but also many manufacturing jobs today require highly skilled workers, with the general skills that allow them to quickly adapt to new technological changes. These general learning skills are particularly necessary for technology implementation when technical change is either rapid or new technologies are skill-biased (Kirby and Riley 2006, 4). General and high skills are also necessary to prevent unemployment. Looking at unemployment statistics, one can see that those highly educated unemployed with a university degree are more likely to find

[15]Translation by the author, original: "Die Entwicklung von der vor- zur nachindustriellen Erwerbsgesellschaft lässt sich – bezogen auf die dominanten Wissenstypen – als Wandel von Erfahrungswissen zu systematischem (theoretischem) Wissen beschreiben."

a new job in a shorter period of time than those with lower skills. Up until the late 1980s the unemployment rate of those with a university degree and those with vocational training were nearly the same. Both systems prevented unemployment. Yet this has changed recently and vocational training graduates are having a harder time finding new employment than university graduates as shown in Figure 2.5. The skills provided by the vocational training system are not sufficient anymore.

Figure 2.5: Education-specific unemployment rates



Source: Reinberg and Hummel (2007)

Additionally, the ability for lifelong learning, that is enhanced with an existing set of general skills, is one of the most important skills mentioned by employers (Interview BDA) and has also been emphasized by organizations such as the OECD and the EU. They recommend that education and training policy should focus on providing young people with more general and higher skills than in the past. As a study by the European Commission finds: "Low-qualified adults are seven times less likely to participate in lifelong learning than those with high educational attainment" (Commission of the European Communities 2008, 3).

These developments are also true for Germany. With the German labor market becoming more flexible and unemployment benefits declining, it becomes increasingly important to acquire general skills that allow workers to find new jobs and switch fields more easily if needed. As Heijke and Muysken (2000) find: "Generally, technological progress has increased the need for better skilled workers. The rate at which workers have to acquire and apply new skills has increased. This has enhanced the demand for workers with better cognitive skills and is one reason for the increased demand for general education in Germany" (Heijke and Muysken

2000, 244). They also find that, although the dual system of vocational training described above, remains the most important training system for the German labor market, it has lost in relative importance to the higher education system (see Figure 2.4) (Heijke and Muysken 2000, 245).

As described above, the dual system of vocational training has been criticized for being too rigid and not being able to keep up with fast technological changes. As industrial relations become more complex, businesses are increasingly reluctant to invest in apprenticeships and coordination for the creation of new curricula is complicated (Busemeyer 2007). Anderson and Hassel (2008) find: "A skills regime suited for an industrial economy slows or even hampers adjustment to de-industrialization because it continues to provide specific skills ill-suited to service sector employment, and it relies almost exclusively on firms to invest in skills" (Hassel and Anderson 2008, 31).

A projection by the European Commission found that in the 25 European Union countries, "between 2006 and 2020, the proportion of jobs requiring high levels of education attainment should rise from 25.1 percent to 31.3 percent of the total; jobs requiring medium qualifications would also increase slightly, from 48.3 percent to 50.1 percent. This would amount respectively to 38.8 and 52.4 million high-and medium-level job openings. At the same time, the share of jobs requiring low levels of education attainment would decline from 26.2 percent to 18.5 percent, despite 10 million job openings" (Commission of the European Communities 2008, 7). Similar values can be assumed to be true for Germany and indicate that not only the vocational training system (providing medium qualifications) needs to be reformed and adjusted to new demands, higher education is also increasingly important and thus should be a focus of policy makers as well as of the literature comparing skills systems and their relation to different labor markets (e.g. the Varieties of Capitalism literature). Ebner and Nikolai found that "the structural changes on the labor market with an increase in high-quality, research and development intensive products and services leave no room for low-skilled workers"[16] and require an education system that provides high skills (Ebner and Nikolai 2010, 2).

German employers have emphasized that new employees will need to be flexible, have the ability to work in teams, quickly learn new techniques and solve new analytical problems. With an increasing number of smaller firms acting on the global market, language skills and "global competence" are another set of skills that has been mentioned as being increasingly important for German employers (Interview

[16]Translation by the author, original: "Der Strukturwandel auf dem Arbeitsmarkt lässt mit der Zunahme hochwertiger, forschungs- und entwicklungsintensiver Produkte und Dienstleistungen nur noch wenig Raum für Niedriggebildete."

Berlin Chemie, Interview BASF, Interview BDA). While many employers still value the practical experience of graduates from the vocational training system, they also emphasize the need for more general skills. They demand more flexible routes to enter higher education after vocational training and newer dual work-study bachelors degrees are becoming very popular with German employers (Interview HD, Interview BDA). Another factor that becomes increasingly important for German employers is lifelong learning. Ebner and Nikolai find: "Because of the increasing average age of employees in relation to the decreasing half-life of knowledge one single phase of education at the beginning of a lifetime is often not enough. Lifelong learning [...] is becoming increasingly important"[17] (Ebner and Nikolai 2010, 3).

Increasing the permeability between the vocational training system and the higher education system is one way to offer new possibilities for lifelong learning. The rate of new university students with a previous vocational training degree is decreasing. However, the interest in internships within general academic programs as well as in official dual work-study programs is increasing steadily. Vocational academies (*Berufsakademien*) combining general academic education and in-firm praxis-based phases are popular among students and employers (Powell et al. 2012, 413). In addition, the goal of the new bachelor's programs is to provide students with employability, they are thus meant to include vocational elements. This new "vocationalization" of German higher education increases competition between vocational training and higher education but can also lead to a higher degree of permeability between the two systems (Powell et al. 2012, 415).

While in the past, German employers have predominantly depended on the vocational training system to provide their workers with the necessary skills and have mainly cooperated with universities in research and development, higher education has become increasingly important for the education and training of the general workforce. This is also one reason why German employers have played an important role in the reform of the German higher education system, and why the Bologna declaration and recent German higher education reforms put a strong focus on employability issues. The German labor market more generally has undergone substantial changes in the past decades that have been described as a liberalization of the coordinated labor market. A comparison with the American labor market system, presented in the next chapter, however, shows that there are still substantial differences between both systems.

[17]Translation by the author, original: "Das steigende Durchschnittsalter der Beschäftigten in Verbindung mit einer sinkenden Halbwertzeit des Wissens führt dazu, dass eine einzige Bildungsphase am Anfang des Lebens oft nicht mehr ausreicht. Lebensbegleitendes Lernen [...] wird immer wichtiger."

Chapter 3

The American Labor Market and Skills System

3.1 The American Labor Market and Economy

As described above, the Varieties of Capitalism literature uses the United States as one of their prime examples for a liberal market economy. Liberal market economies in their view are characterized by competitive markets that are lead by price competition and use an open financial system. Labor markets are highly flexible and employees frequently change jobs, because government regulation is low and managers have full control over hiring and firing activities. The literature argues that this kind of labor market requires general skills in order to have a successful career.

The following sections will give a brief overview of American labor market institutions, their historical backgrounds, recent developments and how they influence American views about skills. The information presented here serves as a comparison to the highly regulated German labor market (presented in Chapter 2) and will point out the major differences between the German and American systems.

3.1.1 U.S. Labor Market Regulations and the Welfare State

Compared to the German labor market there are very few laws regulating the American labor market and welfare state. Most of the few regulations that do exist have their origin in the New Deal era. The Social Security Act of 1935 introduced unemployment insurance, retirement insurance and welfare insurance for single mothers. At the same time a minimum wage was introduced to guarantee a certain level of income (Rosenbloom, Sundstrom, and National Bureau of Economic Research

2009, 27). Other current labor market and welfare programs are social assistance for low income families, maternity leave, an earned income tax credit and health insurance.

American unemployment insurance is much more restricted than German programs. The federal government only sets a framework legislation, but details such as the length and amount of payments are left to the states. It is financed by employer contributions, which average about 2.5 percent of the taxable wage (Werner 1997, 598). In 2011 the most recent year with available data, unemployment payments on average covered 46 percent of the former income, which was an average of about 300 USD per week. Yet there are great differences in these replacement rates between the states, ranging from 32.9 percent in Alaska to 57.1 percent in Hawaii. Benefits are payed for a maximum of 26 weeks with the option of an additional 13 weeks under severe circumstances (Stone and Chen 2013, 4). Unemployment insurance does not automatically include health insurance coverage. Only very few states offer health insurance programs for unemployed and low income workers (Werner 1997, 594). In praxis, there are several factors that prevent many unemployed workers from being eligible for unemployment benefits. Consequently in the past 25 years only 30-40 percent of unemployed workers in the United States have received benefits. This number was higher during recessions, when federally funded emergency programs covered additional workers, but has currently receded to under 50 percent (Stone and Chen 2013, 3). The low benefits and lack of health insurance force many workers who lose their jobs to quickly accept new employment even if it is in a different field or pays a much lower wage.

The second program introduced with the Social Security Act is retirement insurance (called "social security"). While it is one of the programs that is most highly regarded by the American public all along the political spectrum, compared to European standards social security payments are fairly low and cover only about 40 percent of preretirement income. The system is based on employer and employee contributions of currently 6.2 percent of the taxable income. Self-employed pay the full amount of 12.4 percent (Social Security Administration 2013). Payments are calculated based on former income. For low-income workers retirement payments are on average 56 percent of former income, for medium-income workers 41 percent, and for high-income workers 27 percent (Carpenter 2007, 3). In 2012 the average monthly social security benefit was $1,230. The maximum benefit depends on the retirement age. If one retires at full retirement age (66-67) the maximum benefit (depending on former income) in 2013 is $2,533, retiring earlier reduces benefits, working longer increases them (Social Security Administration 2013). These low coverage rates mean that in most cases private insurance or a company pension scheme is necessary.

Company pension schemes are very common in the United States and these plans are employer-sponsored. Only exceptionally do workers contribute to them (Ebbinghaus 2001, 83). In addition many seniors continue to work part-time to earn additional income after retiring. After full retirement age is reached additional income does not affect retirement benefits (Social Security Administration 2013).

In the European tradition the third insurance that follows unemployment and retirement insurance is usually health insurance. In the United States, however, health insurance has traditionally not been regulated by the federal government, though there have been several attempts to introduce a federal health care plan[1]. There are two federal programs, Medicaid and Medicare, that cover health costs for seniors, the disabled and low-income families, but there is no general public health insurance system. Medicare covers those over 65 (and younger with certain disabilities). It is administered by the Social Security Administration and is an insurance benefit. Medicaid on the other hand is administered by the states and is a means-tested program for low-income pregnant women, children, mothers with young children and disabled. Only about one third of Americans are covered by these programs. All other Americans depend on their employers to provide them with health insurance or on private health insurance plans[2]. In 2005 there were 46.6 million uninsured Americans, which is 15.9 percent of the population. While the law guarantees medical treatment in emergencies, uninsured are expected to privately cover all medical expenses. The most common cause given for personal bankruptcy is medical bills after a hospital stay. Not only do the United States lack a universal health care program, medical costs are also particularly high and, measured by a percentage of the GNP, Americans pay more than any other OECD country for medical costs (Carpenter and Wagner 2007, 1-2).

Currently, the majority of Americans is covered by a private health insurance plan and premiums are shared between employers and employees. However, in 2006 only 61 percent of employers offered health care plans to their employees, as they are not required to provide medical insurance (Carpenter and Wagner 2007, 2). In most cases insurance premiums are jointly paid by employees and employers with employers usually covering the majority of the costs. Several states have introduced or are in the process of introducing laws that require employers to provide health insurance to their employees (Carpenter and Wagner 2007, 7-8). In 2014 President Obama's health care plan has taken effect. The most important changes this reform includes are as follows: 1) It introduces tax credits for those employers and workers who cannot afford insurance premiums and at the same time requires penalty fees

[1] See below for details on President Obama's health care legislation.

[2] There is also a federal plan for military personal and veterans, which covers about four percent of the population.

of those who can afford it but do not chose to sign up for health insurance. 2) It prevents insurance companies from denying coverage to persons with pre-existing conditions. 3) It raises the age until which children can be covered under their parents' insurance to 26. 4) It ends lifetime and yearly dollar limits on coverage (The White House 2013b).

In addition to these insurance benefits American workers are guaranteed a minimum wage. The federal minimum hourly wage is currently set at $7.25, but states and cities can raise it. The average minimum wage, however is only about 30 to 40 percent of the average income (Institut der deutschen Wirtschaft 2011, 7). Furthermore, several programs attempt to reduce poverty and activate unemployed workers by providing them with social assistance benefits and training programs. The biggest social assistance program is called "Temporary Assistance for Needy Families". Again, details such as eligibility criteria and benefit levels for the program are left to the states. But there is a work requirement after being on the program for two years and a total limit of five years for receiving benefits (Schott 2012, 3-4). Similar programs include the Medicaid program, the food stamp program, children and community support services (e.g. child care subsidies), and the Head Start program.

All of these programs are means-tested and benefits are comparatively low. They illustrate the limited American welfare state that focuses on activating workers instead of granting them welfare benefits. The idea of the 'self-made man' who climbs the social ladder by working his way up and by his own strength is deeply rooted in American society. The 'Earned Income Tax Credit' takes up this sentiment and supports low-income families through a 'negative' tax. Under the motto "making work pay" work is meant to be rewarded by providing low-income families not only with a tax break but also with an income subsidy through the tax system (Werner 1997, 599). For example, a family with one child and a joint income of between $9,320 and $22,330 in 2012 would qualify for the maximum credit (i.e. subsidy) of $3,169. At an income higher than $22,330 the tax credit phases out at 15.8 percent and reaches the limit at an income of $42,130 (Internal Revenue Service 2013).

Besides these and a few other tax reductions for families, American workers do not enjoy many family-related benefits. Maternity leave policies are among the most limited in the world (Bernard 2013). The Family and Medical Leave Act of 1993 guarantees a woman the right to 12 weeks of unpaid leave after the birth of a child and employers with fewer than 50 employees are exempt from this rule. To receive this benefit workers must have worked for the company for at least a year and must have logged 12,500 hours within the last 12 months (United States Department of Labor 2013). States are allowed to extend this duration or require

paid leave, but only very few do so[3]. Of course, some larger companies offer more generous leave policies but few reach the amount of paid leave found in Europe. Only about 11 percent of private industry workers receive some paid maternity leave. The federal government, as the largest employer in the United States, does not offer any paid leave (Bernard 2013). Some employers allow parents to combine parental leave with sick days or vacation days, but those are not very generous either as there are no federal laws on vacation time. While the German worker on a full-time contract working five days a week is guaranteed 20 vacation days after having been employed for six months (Präsident des Landesarbeitsgerichts Hamm 2013), the average American employee at a large company is granted 11 days of paid vacation time per year. Federal employees with fewer than three years tenure receive 13 days paid vacation time (20 days for those between two and 15 years and 26 days for those over 15 years employment tenure) and 13 paid sick days. However this is only for employees of the federal government; many employees of smaller employers are granted much less vacation time (Miller, Helmuth, and Farabee-Siers 2009, 6).

While German employees are protected by very detailed legislation that regulates hiring and firing practices, as well as by strong unions and works councils who are involved in those processes, American workers have neither of those protections. The level of employment protection in the United States is the lowest compared to all OECD and G20 countries (Organisation for Economic Co-operation and Development 2013, 84). No general employment protection law exists and work contracts are negotiated on a case by case basis. For most Americans this means that their unlimited contracts can be terminated at any time under 'just cause' reasons. However, discrimination laws, collective labor agreements and case law provide some protections from arbitrary contract terminations (Werner 1997, 595).

In addition, the Worker Adjustment and Retraining Notification Act of 1989 "requires employers to give workers and state and local government officials 60 days' advance notice before a mass layoff or plant closure" (Buttler 1995, 288). The act applies to employers with at least 100 employees and a mass layoff is defined as employment losses of at least 50 employees which consists of at least 33 percent of employment at the site or a loss of 500 employees regardless of proportion to total employment during a 30-day period (Collins 2012, 2). Yet, in the past this legislation appears to have had little effect and surveys have shown that three quarters of companies with layoffs falling under the notification requirements have failed to give their notice 60 days in advance. American employers are not required to consult

[3]California, Connecticut, Hawaii, Maine, Minnesota, New Jersey, Oregon, Rhode Island, Vermont, Washington, Wisconsin, and the District of Columbia have state parental leave legislation (United States Department of Labor 2013).

with worker representatives or pay compensations, but their contributions to the unemployment insurance is determined by the number of layoffs (up to a limit). Many firms however, already pay the highest level of contributions so that laying off one more worker does not make a difference to them (Buttler 1995, 288-289).

Unions as well as many other associations and societies (e.g. employer associations, churches) are not as centralized in the United States as in Germany and other European countries. Their influence is mostly company-based and local. A bargaining agreement between a union and employer or employer association on average covers 160 employees. There is also no concept of general validity of bargaining agreements. Agreements are only valid for union members and do not generally cover all employees in the sector or region. The umbrella organization of American unions, the *American Federation of Labor - Congress of Industrial Organizations* (AFL-CIO), does not lead bargaining negotiations but is much more a representative body for their member unions. It runs one of the most successful political campaign organizations in the United States and supports individual unions in their political efforts (Lösche 1999, 344-345).

These limited regulations and weak influences by unions allow American employers to adjust their needed work volume quickly to market conditions by hiring and firing workers. Employees at the same time need to be highly flexible and adjust to new jobs quickly. While it is comparably easy to find new employment on the American labor market and longterm unemployment rates are low, job changes are often accompanied by losses in salary and benefits (Werner 1997, 595).

Due to these low employment protection standards American workers have been much more mobile than central European employees and job tenure is much lower than in other countries. For example, in 2005 the average job tenure in Germany was 10.7 years, while it was only four years in the United States (Organisation for Economic Co-operation and Development 2007b, 62). This type of mobility is not only caused by a lack of employment protection, the low degree of attachment between employers and employees has been a characteristic of the American labor market since the beginning of the American industrialization and can historically be attributed to the existence of the American frontier, which provided a fall-back option for those who lost their jobs or wanted to try a new life (Rosenbloom, Sundstrom, and National Bureau of Economic Research 2009, 12). Americans have a high degree of willingness to move great distances for a new job. The unregulated American housing market favors this high degree of mobility (Werner 1997, 595).

Hughes and Werwatz explain:

> "The ready mobility of Americans made the country's economy more flexible and resilient, and allowed innovative talent to flow from the four corners of the country to research universities or to areas with emerging industries in need of 'cowboys' looking for opportunity and willing to take risks. American entrepreneurs believe that real failure is giving up on their dream and not trying again. It is not unusual to hear that a Silicon Valley inventor-entrepreneur only became a millionaire on the seventh try, not the first" (Hughes and Werwatz 2006, 18).

3.1.2 U.S. Economic Developments

The early economy of the colonies and the early American Republic was based in farming and cotton production, but during the 19th century America took over the industrial lead from Great Britain. The construction of railroad lines, inventions like the automobile, modern refrigeration techniques, electricity, and assembly line production, as well as the discovery and use of oil and coal supplies were a few of the factors that led to the successful development of American industry and the era of such well-known businessmen as Rockefeller and Carnegie known as the 'Gilded Age' (USHistory.org 2013). The era was led by the belief in a 'laissez-faire' policy with limited government intervention in economic matters which is still characteristic for American economic policy today (Lösche 1999, 76).

For the first half of the 20th century, the success of the American economy was based in manufacturing. "It was American production that overwhelmed the enemy in World War II by the output of its shipyards, defense production, munition plants, and finally, by the successful development of the atomic bomb," but since then the number of employees in manufacturing, mining, agriculture and construction has dropped constantly and given way to the rising service sector (Ginzberg 1994, 4). Key industries that led to the success of the American economy in the 20th century were the automobile industry and the chemical industry (Hughes and Werwatz 2006, 8-9). By the 1950s American products were exported to Europe and the rest of the world and promoted the 'American way of life' everywhere. With industrial infrastructure destroyed in Europe and Japan, the United States grew to the dominant industrial economy in the world and produced 60 percent of the world's manufactured goods (Branson, Giersch, and Peterson 1980, 183).

Yet, after World War II the focus shifted from manufacturing to modern technology and services. The Cold War and the space race competition with the Soviet Union created extensive government programs funding research and development in

areas such as physics, information technology, and engineering. Ginzberg explains: "The large-scale investment that the federal government and the states made at the end of World War II to expand and improve higher education and the nation's research base was one factor that sped this shift toward services, particularly the advanced service sector, which depends on educational levels" (Ginzberg 1994, 4). Another factor that contributed to the rise of the service sector was the availability of large numbers of women for the workforce who were often well-educated for many of the new service jobs. A third factor contributing to the shift to the service sector can be found in the American leadership in the world which helped service industries such as banking and finance, air transportation, communication services, business support services and even fields like health care to assume a dominant international role and make up for the jobs and competitiveness lost in the manufacturing sector (Ginzberg 1994, 4-5).

During the late 1960s and 1970s international trade was booming and U.S. products had to face increased competition from abroad. For example, in 1953 the United States held 24 percent of the world's exports of chemicals, but by 1974 it had lost this leading role to Germany which than held 19 percent of chemical exports while U.S. exports of chemicals had declined to 14 percent (Branson, Giersch, and Peterson 1980, 200). A similar development occurred for exports of machinery and transportation equipment with Germany and Japan posing serious competition to American production (Branson, Giersch, and Peterson 1980, 201). These developments lead to the beginning of American companies moving production abroad and the American labor market shifting its focus towards service jobs. While in 1969 24 percent of the American workforce was employed in the manufacturing sector, that number dropped to 15.5 percent in 1987. At the same time jobs in the service sector grew. In 1969 45 percent worked in the services (including Wholesale, Retail, Finance/Insurance/Real Estate, and "other services"), while in 1987 it was 56.5 percent (Ginzberg 1994, 40). By 2010 employment in the services had risen to 78.8 percent and fallen to 12.4 percent in the goods-producing industries (excluding agriculture). Currently, the industries with the highest employment rates are retail trade, professional and business services, healthcare and social assistance, and state and local government (United States Bureau of Labor Statistics 2012a). This shows the immensely important role of the service sector for the American labor market.

As mentioned above, the Cold War created a reason for focusing American public policy on innovation, research and education. "The largely company-based system supported by government regulations [was transformed] into a major innovation enterprise that characterizes the American economy in the early days of the

twenty-first century" (Hughes and Werwatz 2006, 8). The GI Bill, the expansion of state-based higher education institutions and the space race are only a few factors that supported the American entrepreneurial spirit that survived several economic crises in the 1970s and 1980s and provided the basis for the success stories of many start-up firms in Silicon Valley and other places. Hughes explains, how the financial system supported this development: "At the end of the twentieth century, the United States felt confident in its innovative prowess. Considerably greater R&D spending by the private sector complemented substantial federal funding for research. Venture capital, angel investors, and federal programs focused on small businesses gave America an edge in funding start-up firms" (Hughes and Werwatz 2006, 15). The two most famous clusters of technology firms are *Silicon Valley* south of San Francisco and *Route 128* close to Boston, which emerged in the 1960s. Both regions were built around major research universities, had attracted great amounts of federal Department of Defense (DoD) research funding and fostered the development of major electronics firms. "Silicon Valley was characterized by an abundance of start-up companies, which were often founded by scientists and engineers previously affiliated with larger companies. [...] Unlike the fluid, constantly changing networks of Silicon Valley, Route 128 firms emphasized secrecy, loyalty, and a more traditional hierarchy in the firm" (Hughes and Werwatz 2006, 12). With the reduction of military funding and shifting technologies in the 1990s Route 128 lost its lead in computer technologies to Silicon Valley, which today is still one of the world's leading areas in technology and software development.

Developments in the overall economy also influenced the establishment and role of unions within the American labor market. With the shift to the service sector unions, which had always been weaker in the United States than their European counterparts, lost in importance. By the 1920s labor unions had been established in all of the great industrial sectors; labor union membership peaked during the 1950s and helped the success of the middle class in the post-World-War-II era (Ginzberg 1994, 11-12). Rosenbloom et al. write: "In the aftermath of the War, the power and influence of American industrial unions were at their zenith" (Rosenbloom, Sundstrom, and National Bureau of Economic Research 2009, 28). During this time, especially agreements between the United Auto Workers (UAW) union and the biggest automobile firms had significant spillover effects on wages and working conditions in several industries (Rosenbloom, Sundstrom, and National Bureau of Economic Research 2009, 28). Yet, these effects did not last long.

As mentioned above, union membership peaked after World War II with about 35 percent in 1945, but declined to only 23 percent in 1980, 14 percent in 1998 (Lösche 1999, 345-346) and 11 percent in 2013 (Bureau of Labor Statistics

U.S. Department of Labor 2014, 1). With the decline of manufacturing industries unions have lost their influence and in many cases companies have managed to completely abolish unions in their area with the help of so-called 'union busters' (Lösche 1999, 346-347). Reasons for this development can be found in the shift to the service sector where unionization is much lower than in the manufacturing sector. For example in the banking and insurance industry only two percent of employees are union members (Bureau of Labor Statistics U.S. Department of Labor 2014, Tab.3). Only public employees in state and federal government agencies, universities and schools still have a relatively high rate of unionization, which in 2013 was at 35 percent, five times higher than the membership rate for private-sector workers (6.7 percent) (Bureau of Labor Statistics U.S. Department of Labor 2014, 2). Another reason is the move of production abroad or to the Southern states where legislation is generally much less union friendly. A third reason can be seen in the increase in female employment and the rise of part-time jobs. The temporary employment agency "Manpower" now employs more people than General Motors. But only seven percent of American part-time workers are organized in unions compared to 14 percent of full-time workers (Bureau of Labor Statistics U.S. Department of Labor 2014, Tab.1). Lastly, the conservative political climate that has ruled in many states since the Reagan era has led to the weakening of American labor unions (Lösche 1999, 346-347).

Over the past decade the American economy and labor market has had to overcome several shocks and crises. From the terror attacks in 2001, over the housing meltdown, a severe recession and downturn of the stock market, to unemployment numbers passing the 10 percent mark and fighting two wars, the U.S. economy had to shoulder a great amount of struggle (Jacobsen and Mather 2010, 1). Manufacturing and construction were two fields that were hit particularly hard during the most recent recession, with job losses of 30 and 21 percent respectively between 2007 and 2009 (Jacobsen and Mather 2010, 4). The economy has since been recovering and GDP, trade, and employment numbers are growing again (though more slowly than after former recessions). Still, structural changes, brought on by globalization, such as the shift to the service sector and the loss of many skilled jobs in industry are expected to persist, and the U.S. economy will largely remain service based (Woodward 2013).

With the rise of the service economy and international trade American workers today need to be more flexible than ever. American firms are highly involved in international trade and while some traditional American industries, such as the automobile industry, suffered from global competition others, such as the computer and communications industry, have been very successful in the global market (Seavoy

2006, 305-309). "Over the last decade, corporations with an international presence have undergone a significant transition, committing more resources to global production and shifting to business strategies that are increasingly global in scope" (Hughes and Werwatz 2006, 17). This requires not only great flexibility, but also an education system that provides the necessary skills to compete in a global market.

3.2 The American Education and Training System

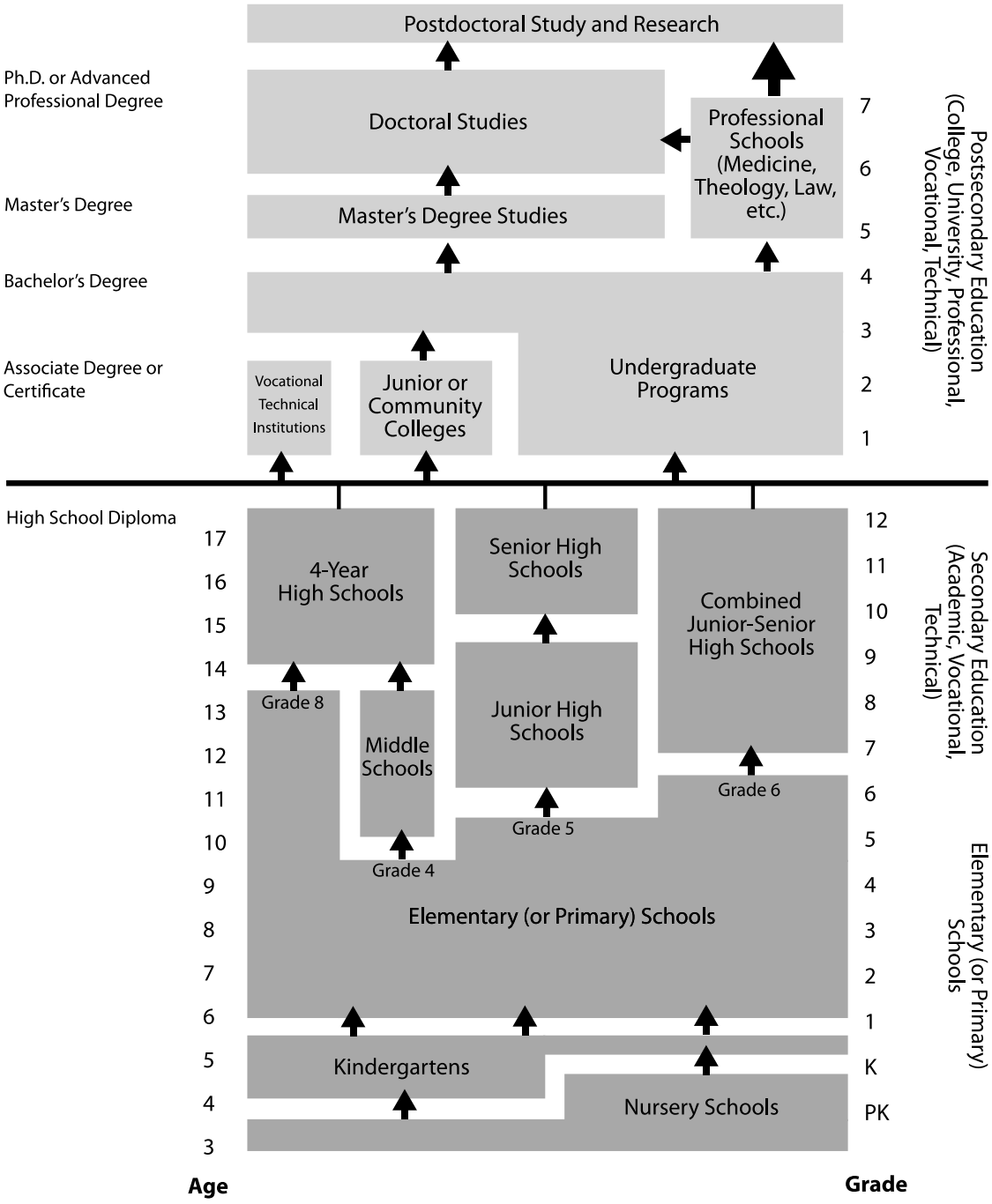
3.2.1 Skills and the American Dream

For Americans skills and talent have always been important ingredients for a successful life as an individual and for the success of the country as a whole. The images of a 'self-made man', who works hard to achieve his goals and the 'city upon a hill' that shines bright to set an example for others are some of the images most often used in American literature and culture (Fluck 1999, 725-726). The same ideals and ideas can also be found in the American education system. The so-called 'success myth' that everybody can climb the social ladder without any class barriers, the belief in the frontier that provides unlimited space for new ideas, inventions, and settlements, as well as the belief in the 'melting pot' where all cultures will be considered equal and melt into one make up the ideal of the 'American Dream' (Fluck 1999, 726) which heavily influences American policy making and the education system in particular.

"The founding documents of the American Republic emphasize the right to life, liberty, and the pursuit of happiness. [...] The pursuit of happiness is entangled with the drive for achievement and mixed with aspirations for a better life" (Hughes and Werwatz 2006, 18 - 19). Today, for many Americans these aspirations of the American Dream are "built around individual success—owning one's own home, sending the children to college, going beyond what one's parents were able to achieve" (Hughes and Werwatz 2006, 20). The American education system provides the basis for these opportunities on different levels.

As in Germany, education policy is regulated by the different states. Thus, there is not *one* true American education system, but several. However, some general characteristics can be found in all states and are illustrated in Figure 3.1.

Figure 3.1: The U.S. Education System



Source: National Center for Education Statistics (1999)

Primary education in the United States starts not only in elementary school, but the focus has recently shifted to early childhood education and in many states mandatory schooling starts at age four (pre-school) or five (Kindergarten) and goes to age eighteen (U.S. Department of Education 2008). Elementary school starts with the first Kindergarten-year and typically lasts until fifth grade when students move to middle school or junior high schools (grade 6-8). High school (grade 9-12) is the main secondary education institution (U.S. Department of Education 2008). Primary and secondary education is provided free of charge in public schools run by the communities, however private schools that charge tuition are also common, especially those run by churches (Avery and Steinisch 1999, 84). A high school diploma is required for the entrance to higher education. High school education provides basic secondary education and students can select between different tracks and class levels, often including vocationally oriented classes (e.g. auto mechanics) and college prep programs, such as the Advanced Placement Program (The US-UK Fulbright Commission (2013), Haycock (2013)).

After graduating from high school students have the choice between different colleges and universities or directly entering the job market. Most students continue with a college education. In 2008 63 percent of all high school graduates directly entered a program at a college or university. However, this has not always been the case; only 16 years earlier in 1992 that number was at 54 percent (The National Center for Higher Education Management Systems 2013). There are several explanations for this rise in college enrollment. One of them is the increasing demand from employers for high general skills. Another explanation is the lack of an institutionalized vocational training system and thus the lack of alternative ways for American youths to acquire the necessary skills for the labor market.

For those who do not want to or cannot afford to enter a college program, the American labor market provides workers with the necessary skills through "a system of informal 'learning by doing'" (L'Hoest 1998, 44). This system worked well in the past when those without a university degree could find a well-paying job in the manufacturing industry with moderate skill requirements. Yet, with changes in technology and work organization "the need for cross-functional competencies and problem-solving skills" as well as the demand for "multi-skilled workers" increased (L'Hoest 1998, 44). Several programs have been introduced at the local, state and federal level in order to create a more formalized vocational training system and provide young Americans with the skills they need for the job market. Some of these programs have existed since the 1960s, but most of them so far have been geared towards assisting those difficult to employ (e.g. the poor, African Americans, inner-city youth) (L'Hoest 1998, 44).

Today vocational education in the United States is provided in several different institutional settings. First, as mentioned above, general high schools offer vocational tracks in certain disciplines. Secondly, some communities have vocational high schools which cooperate with local employers and provide students with vocational training in addition to the general high school curriculum. Third, several states have introduced technical schools and institutes, which offer non-academic training for high school students as well as adults and lead to a certificate (L'Hoest 1998, 104). Lastly, post-secondary vocational training is provided by community colleges, technical colleges (or institutes) and occupational centers.

Most students receiving vocational education at the postsecondary level are enrolled in a community or technical college. They offer programs that are more intense and longer than those at the above mentioned institutions and lead to an associate's degree or sometimes a bachelor's degree. Their requirements are more academic than strictly vocational and they are often focused on sophisticated areas such as electronics or computer-assisted design (L'Hoest 1998, 104). Nearly all public community colleges have arrangements with local 4-year colleges and universities that allow students to transfer to a four-year program after completing certain approved courses. They thus offer a bridge between strictly vocational training and higher education (U.S. Department of Education 2008). "Community colleges were initially seen as low cost, easily accessible stepping stones to a four-year degree" (Hughes and Werwatz 2006, 11).

While the traditional 'on-the-job training' provided firm-specific skills, community colleges now enable students to acquire more generally usable, transferrable skills. One important factor that led to the success of community and technical colleges is that the courses offered appear to be more academic and the colleges are counted as part of the higher education system. This makes them more 'prestigious' and acceptable for the general public, since vocational training in the United States has traditionally been associated with programs for the unemployed or disadvantaged. For employers, community and technical colleges are not only a valid alternative to four-year institutions, because they provide students with the right mixture of general and vocational skills, but also because training is paid for by student tuition and employer involvement is low (Streeck 2011, 11). In sum, the main postsecondary education that prepares the majority of Americans for the job market is covered by the higher education system, which includes a wide range of skill levels from vocational skills to high academic general skills in higher education institutions ranging from two-year community colleges, over four-year colleges to research universities.

3.2.2 American Employer Expectations of College Graduates

This diverse system of higher education allows easy transfer between the different levels including vocational education and thereby promises to allow individuals to step up the ladder of success as suggested by the "American Dream". The flexibility to constantly adjust and learn new things is also one of the main requirements American employers have for their workers. The following section will use data from employer surveys as well as secondary literature to discuss American employer expectations on skills. First I will discuss the particular emphasis on the higher education system as the main source for skilled employees. Secondly, the section will focus on specific expectations of college graduates that have been mentioned repeatedly by employers and in the literature.

According to the Varieties of Capitalism literature American firms seek employees with broad general skills. This assumption is based on the argument that American employers need to be flexible to react to market pressures and need to be able to quickly reposition their employees within the company or fire them if necessary. The discussion of the American labor market above, shows that the U.S. labor market is indeed much less regulated than other central European labor markets, especially the German one. Job tenure is much lower and American employers have the ability to quickly react to changes on the market. With this in mind, it is understandable that American employers focus on college graduates with broad skills and flexibility instead of on those with firm- or industry specific skills.

While the model of "learning-by-doing" has long been practiced successfully and offered well-paying jobs to those without a college degree, recently the focus of employers has shifted towards highly educated college graduates. The following numbers illustrate this shift:

> "[1] 87 percent of 'elite job' holders and 53 percent of 'good job' holders have more than a high school education. [2] From 1973 to 1998, the percentage of managers and business professionals with only a high school diploma fell by nearly 50 percent while those with at least some college rose substantially. [3] From 1998 to 2008, 14.1 million new jobs require[d] a bachelor's degree or at least some postsecondary education, more than double those requiring high school level skills or below. [And 4] College graduates earn 80 percent more than high school graduates [...] over a lifetime" (Association of American Colleges and Universities 2002, 5).

Another recent study commissioned by the Association of American Colleges and Universities (AACU) found that 88 percent of employers agree that today's demands on employees are more complex than ever before and therefore employees today need higher levels of learning and knowledge than in the past (Hart Research

Associates 2010, 5). The study also finds: "Employers believe that colleges can best prepare graduates for long-term career success by helping them develop both a broad range of skills and knowledge and in-depth skills and knowledge in a specific field or major" (Hart Research Associates 2010, 1).

So what types of skills do American employers expect from college graduates? The debate about American employer expectations of college graduates and employees in general has focused on the following topics: First, *basic general skills*, including writing and verbal skills as well as math and science skills have been emphasized. The second focus has been on so-called *interpersonal skills* (Karakaya and Karakaya 1996, 13). Thirdly, the need for *applied skills* (real world knowledge application) and an awareness of global issues has been emphasized by employers. And lastly, the importance of a student's knowledge of the subject area, or what Karakaya and Karakaya call *ascertained skills* has been debated with employers mostly favoring a broad general education over a specialized curriculum.

Karakaya and Karakaya (1996) list writing and verbal skills under their category 'basic skills'. This has also been found to be one of the most important skills expected by employers surveyed in Hart Research Associates (2010). They found that 89 percent of employers expect "the ability to communicate effectively, orally and in writing" (Hart Research Associates 2010, 2). One of my interview partners at the University of Wisconsin also mentioned communication skills as being one of the most requested skills by employers: "So we have employers come and tell us what they want as far as employees, and communication is always number one" (Interview UW Business). Other *basic general skills* that have received significant attention by employers are math and science skills. Manteaw (2009) found: "Math and science have become special interest subjects for businesses in schools. They are generally perceived as high-profile or 'economic subjects', whose actual values are defined in market terms " (Manteaw 2009, 199). Companies like ExxonMobil have started campaigns in order to promote math and science skills and this has also been supported by government initiatives for secondary schools and higher educations. ExxonMobil's website states: "Our strategic focus is on math and science, since they are now – and will increasingly be – the universal languages of the global workplace, and are critical tools for success in today's high-tech world" (cited in Manteaw (2009, 203)). In the eyes of American employers and policymakers these basic skills in reading, writing, math and science are the foremost important skills U.S. schools and universities need to teach their students and 70 percent of employers believe that colleges need to focus more on "concepts and new developments in science and technology" (Hart Research Associates 2010, 1).

The second set of skills that has been repeatedly mentioned by American

employers to be important are *interpersonal skills*. These skills include the ability for critical thinking and reasoning, the skills to solve complex problems, team work skills, leadership skills, as well as the ability to carry out projects independently and communicate effectively with others (Karakaya and Karakaya (1996, 13) and Hart Research Associates (2010, 2)). The AACU finds that employers "expect colleges to graduate students able to perform consistently well, communicate effectively, think analytically, help solve problems, work collegially in diverse teams, and use relevant skills of the profession" (Association of American Colleges and Universities 2002, 5).

Closely related to these interpersonal skills, are *applied skills* or the ability to apply learned knowledge to real-world settings and problems. While community colleges and vocational training programs have a clearer mandate for teaching these hands-on skills, American employers increasingly expect college graduates to have some work experience and support internships as part of the degree programs. According to the Hart study 79 percent of employers emphasize the importance of "the ability to apply knowledge and skills to real-world settings through internships or other hands-on experiences" (Hart Research Associates 2010, 2). In today's globalized economy international skills have also been a focus of employers. College graduates are expected to have an understanding of how global contexts affect their future and current decision making, of which role the United States play in the world, as well as have sufficient language skills and cultural awareness (Hart Research Associates 2010, 2).

One issue that has been debated widely in the United States, in Europe, and in the literature on skills and higher education is the question of whether a broad liberal education or a specialized subject-specific program prepares students best for today's working world. There is no final answer on this question and, as the Varieties of Capitalism literature argues, much of it depends on the specific needs of the labor market, which can be different in various countries.

Karakaya and Karakaya find that for employers hiring graduates of business programs, "ascertained" (=subject specific) skills only rank third in importance after basic skills and interpersonal skills (Karakaya and Karakaya 1996, 13). Mixed results have also been found by the 2010 Hart study: "One in five employers thinks that a focus on broad skills and knowledge is the path to success. A similar proportion think that graduates' greatest chance for success depends on gaining in-depth knowledge and skills" (Hart Research Associates 2010, 6).

Several studies indicate that general skills are more important to American employers and students than specific skills and that ideally there should be a balance

between the two. In a survey of recent college graduates only 13 percent believed "that a more narrow focus on knowledge and skills in a specific field should be the primary focus" (Hart Research Associates 2006, 4) and only 51 percent of employed recent graduates expect to always be working in the same field (Hart Research Associates 2006, 4). Schneider finds similar results: "Only 22 percent of the employers and 13 percent of the recent graduates think that college should provide field-specific preparation alone. With the global economy highly dependent on creativity and innovation, respondents want college to emphasize broad learning and transferable skills" (Schneider 2007, 1). While the majority of employers and graduates reject the notion of focusing college education on one specific field, most of them favor a balance of broad knowledge and specific skills (Hart Research Associates 2006, 4). The following quotes of business executives interviewed by Hart Research Associates (2006, 3-4, 7) illustrate the emphasis on general skills and a balance with subject-specific knowledge:

> "I would like to have both because, while you do want somebody to have specific job knowledge, you also want them to be a well-rounded employee. It's too hard to be one dimensional, especially these days. You have to know how to maneuver, so I think both." - Female, Atlanta Business Executive

> "Sort of 360-degree type people. That's exactly what we're looking for as well. Sometimes we get very technical people who are able to manage budgets and do the technical work, but their social skills just aren't very good, and they end up offending people and so on. It's difficult to have the whole scope of talents needed." - Female, Fairfax Business Executive

> "Everybody 10 years out of college is doing something completely different probably than they went to college for and majored in. I even look back to myself. I got a degree in electrical engineering. Right off the bat I started in software and I moved into sales and then into management; the well-rounded portion of what I got in college is what really served me a lot better than anything I learned in my electrical engineering degree." - Male, Milwaukee Business Executive

> "...I look for people that take accountability, responsibility, and are good team people over anything else. I can teach the technical." - Male, Milwaukee Business Executive

While most employers prefer a balance between general and specific skills, when asked to choose which ones are more important, the majority of American employers emphasizes general skills: "Employers want their employees to use a broader set of skills and have higher levels of learning and knowledge than in the past to meet the increasingly complex demands they will face in the workplace" (Hart Research

Associates 2010, 1). The later analysis of German employer expectations will show that this is one of the major differences between American and German employers, who still focus on subject- or industry-specific skills, despite an increased focus on general skills in Germany.

3.2.3 Summary: Main Differences to the German Labor Market and Training System

The past two chapters have shown that despite similar developments in the economy with a growing service sector and increased international trade, the German and American labor markets are different in many aspects.

First, the German labor market is characterized by a codetermination of employers and employees. Employees are involved in all levels of company management and can participate in such matters as hiring and firing decisions. This type of employee participation is unknown in most American firms. Additionally, unions as well as employer associations still play an important role on the German labor market. They cooperate in industry-wide wage bargaining, organize vocational training programs, and play an important role in influencing social policy. In the United States, unions and their influence on wage bargaining and social policy generally are much weaker than in Germany.

Secondly, employment protection in Germany is much stricter than in the United States. While there are only very limited regulations preventing dismissals in the United States, there are many regulations on contract lengths and dismissal procedures that need to be followed in Germany. This is one reason for the much higher job tenure rates in Germany than in the United States. Similarly, Germans enjoy more generous social insurance benefits, social assistance programs and parental leave benefits than American workers.

Another difference can be found in the structure of the education and training system. The American system (particularly for secondary and tertiary education) is an inclusive system that offers one type of secondary high school to all students and an abundance of post-secondary and tertiary institutions and programs that cover vocational training as well as different levels of higher education. At the same time the system is mainly school-based and does not generally involve employer participation. The German education system, on the other hand, tracks students in different secondary schools, requiring students to decide very early whether they would like to pursue a higher education degree and thus attend the liberal arts *Gymnasium* or learn a profession in the vocational training system and attend *Realschule* or

Hauptschule. The vocational training system, run by the federal states and employers, plays a much greater role in Germany than in the United States and higher education has just recently become more important for the German labor market. These differences in the labor market and training systems are also reflected in the two higher education systems, which will be discussed in the following chapter.

Chapter 4

The German and American Higher Education Systems Compared

4.1 The German Higher Education System

As Chapter 2 has shown, higher education is becoming increasingly important for the education of the German workforce. Thus, this chapter[1] will give an overview of the historical development, the institutional structures, the financing and governance of the traditional German higher education system. It will show which historical developments and cultural values influenced the institutional structure of the system. In particular, the recent reform process of the German higher education system is greatly influenced by the Humboldtian ideal of education, the dominance of research universities, the importance of government in regulating education policy, and the lack of financial resources. Many of these factors are important in understanding the current German higher education system and the reform process and will thus be discussed in detail below.

4.1.1 Historical Developments

While the first German universities were founded in the mid-fourteenth century, the ideological foundation of German higher education was laid when Friedrich Freiherr von Humboldt became the head of the Prussian ministry for education and culture in 1809. His humanistic idealism influenced the founding of the Berlin Friedrich-Wilhelm University and eventually Germany's higher education system as it still exists today (Kühler 2005, 73).

[1] Parts of this chapter are based on the author's unpublished master's thesis, see Neumeister (2007).

Humboldt's main concern was the development of independently thinking students and scientists who would together engage in research and thereby increase their knowledge and pursue the truth. He wanted universities to be places in which an "unceasing process of inquiry" would take place (Humboldt in Clark 1995, 19). The principle of "education through research"[2] was supposed to be combined with the "freedom in teaching and research"[3] (Kühler 2005, 77). This freedom would be guaranteed by the state, which would finance research to protect it from other biased influences. The professors were free to design the curriculum to their needs and often taught what interested them the most. Students at the same time had the freedom to choose whatever subject they would like to study and at which university. They even had the choice not to study at all for a period of time. Research seminars and laboratories provided room for practical learning of research methods for the students and at the same time the professors benefitted from the students' help on their own research (Clark 1995, 20–29).

This intensive way of learning and researching led German universities to world-wide success. "Until about the 1870s the German universities were virtually the only institutions in the world in which a student could obtain training in how to do scientific or scholarly research" (Ben-David, cited in Clark 1995, 20). Up until the first half of the 20th century the German institution of the "research university" served as a role model for many other countries' higher education systems and German professors were internationally "recognized as the leaders in a new world of research-based higher education" (Clark 1995, 20). Thus, by 1900 the Humboldtian ideals had been adjusted to fit modern needs and German universities prospered.

This, however, changed over the second half of the 20th century when Germany lost its leading role in higher education to the United States. World War I (1914–1918) cost many young men their lives and thereby reduced the number of potential students and scientists. The time during the Weimar Republic (1918–1933), with its economic depression and political instabilities, further contributed to the decline of Germany's leading role in research.

The main "watershed," however, came with the rise of Nazism and World War II. Not only did German universities play quite a disreputable role under the Nazi regime, but the loss of hundreds of excellent scientists who emigrated from Germany to flee the Nazi regime and continue their research in free countries such as the United States and Switzerland hurt the reputation and performance of German universities immensely. As Clark notes, "the exodus of talent to [the] American

[2]Translation by the author, original: "Bildung durch Wissenschaft."
[3]Translation by the author, original: "Freiheit in Lehre und Forschung."

system" led to "a German loss" and "an American gain" in international competition for excellence in research and teaching (Clark 1995, 37–38).

After 1945 the main goal in West Germany was to restore the original university system. Even though policy-makers had seen the success of private involvement in higher education in other countries, such as the United States, private institutions have played only a very small role in German higher education. The main governmental control was given back to the states (the *Länder*), but the federal government (the *Bund*) was granted the right to fund research (Kühler 2005, 126–128). Starting in the late 1960s, a huge expansion of the higher education system could be seen in several dimensions. First, the number of students increased immensely. Second, the social spectrum of students in higher education expanded and now included the working class. Third, universities of applied sciences (*Fachhochschulen*–FHs) were introduced as an alternative to universities. And fourth, the federal government started funding more research in non-university research institutions such as the Max Planck Institutes. This expansion continued during the 1970s and was supported by the Social-Democratic government and the student movement which eventually gave students an important role in university governance and shifted higher education away from the "elite" towards the middle-class of German society. A milestone in Social Democratic higher education policy was the elimination of tuition fees (*Hörgeld*) and the passing of the *Bundesausbildungs- und Förderungsgesetz* (BAföG) in 1971, introducing a generous funding program to provide for low-income students' living expenses (Kühler 2005, 130).

While the expansion of higher education led to a more equal system and the inclusion of the middle class, it also caused problems such as overcrowding. Unfortunately, the expansion in student numbers was not accompanied by a proportional increase in instructors. Therefore, lectures instead of seminars became more important for teaching. Oftentimes there were several hundred students in one lecture hall and their relationship to professors was not very intimate (Clark 1995, 44–45). The effects of this one-sided expansion can still be felt today. Scholars found that since the 1965 the student–staff ratio at West German higher education institutions grew almost continuously (McC. Adams 2002, 93). Ben-David judged: "By the mid-60s the German university was a kind of disaster area: over-filled, underfinanced, its future apparently a half-century behind it" (in Kühler 2005, 130).

In East Germany, higher education institutions resumed instruction again in 1945. Due to a more centralized organization by the government, the East German higher education system revitalized more quickly than the West German one. However, the institutions were more specialized and they were regulated centrally, first by the Soviets and later by the East German communist government. Studies had to

promote Marxist–Leninist philosophy and students from workers' or farmers' families were treated preferentially. All curricula were planned centrally and students did not enjoy the freedom of choosing their university and their classes as they did in the West.

However, starting in 1980, students were given more freedom in terms of organizing their studies. In addition, the government made an effort to increase cooperation between universities and industry. This was also done by introducing universities that offered a broad range of general subjects and more specialized, practically-oriented institutions. Thus, by the end of the 1980s this institutional system was almost comparable to the West German one (Kehm 2004, 8–10).

Following unification, East German universities were depoliticized, curricula were changed, universities of applied sciences were introduced and external research institutes had to undergo a rigorous evaluation process after which they were either completely closed or partially integrated with universities or other research institutes. On the one hand, the process of restructuring cost many East German scientists their jobs, but on the other hand, it also offered an opportunity for renewal. Inspired by the general mood of reforms and changes towards a democratic society, the East German system was much more open for experiments and reforms than the rigid West German system and could therefore gain some advantages. The reunification process unquestionably drained resources and energy for necessary reforms in the West that had been debated since the 1980s. The demands of a dual reform process in both parts of the country could not be met. However, the process that the East underwent also gave inspiration to calls for reform in the West (Kehm 2004, 10–12). So by the end of the 1990s a reform of the overall German higher education system was on the agenda and the European *Bologna Process* for the introduction of a common European degree structure gave the necessary impetus to move forward with reforms as will be discussed in the next chapter.

4.1.2 Higher Education Institutions and Governance

In 1989, there were 244 higher education institutions in West Germany. These included universities, theological seminaries, pedagogical universities, arts universities, and *Fachhochschulen* (universities of applied sciences). During the same year, there were 70 higher education institutions in East Germany including multidisciplinary universities, technical universities, specialized universities (e.g. engineering, education, arts, agriculture), medical universities, and political universities (Kehm 2004, 12). Today, more than two decades later, Germany has a total of 428 higher education institutions with about 2.5 million students (Statistisches Bundesamt

Deutschland 2013b). Since most of the students are either studying at universities or *Fachhochschulen*, the traditional higher education system has often been referred to as a "binary system" (Kehm 2004, 12).

According to §2(1) HRG, the German higher education framework law (*Hochschulrahmengesetz*), state-accredited higher education institutions serve "according to their assignment of task for the maintenance and development of the arts and sciences through research, teaching, study, and continuing education in a free, democratic, and social state of law"[4] (Bundesrepublik Deutschland 2005, 4).

Two bodies play an important role in formulating German higher education policy. The first is the *Kultusministerkonferenz* (KMK). It was founded in 1948 and is a voluntary consortium of all state ministers of culture and education who meet regularly to discuss and recommend federal framework legislation in education matters. They mainly decide on comparability standards for degrees and curricula and quality assurance standards for universities. Their decisions need to be made unanimously, which makes the KMK's work quite slow and complicated. The KMK's recommendations then still need to be passed by the state parliaments or approved by the federal government (Stern 2000, 78–79).

The second body that influences higher education policy is the *Hochschulrektorenkonferenz* (HRK). The HRK is the association of German higher education institutions. Currently it has 266 voluntary members, including different kinds of institutions. The HRK represents higher education institutions to politicians and the public and discusses such matters as research, teaching, continuing education, international cooperation, and university administration (Hochschulrektorenkonferenz 2013a).

Further important organizations are the German Association of University Professors and Lecturers (DHV), the German Research Foundation (DFG), and the Science Council (*Wissenschaftsrat*). These organizations all date back to the period of reconstruction and were founded between 1949 and 1952. The DHV represents the interests of university professors and lecturers in education policy debates (Deutscher Hochschullehrerverband 2007). The DFG represents all universities and major research institutions. Its main goal is the promotion of basic research and it is responsible for the distribution of federal research funds (Katzenstein 1987, 77). The Science Council advises the federal government and the state governments in issues concerning higher education and research. It coordinates interests between science and politics and between the federal and the state governments. The council

[4]Translation by the author, original: "entsprechend ihrer Aufgabenstellung der Pflege und der Entwicklung der Wissenschaften und der Künste durch Forschung, Lehre, Studium und Weiterbildung in einem freiheitlichen, demokratischen und sozialen Rechtsstaat."

is under the joint responsibility of the *Bund* and *Länder* and its members are nominated by several research organizations and appointed by the German President (Wissenschaftsrat 2012). These parapublic institutions greatly influence German higher education policy. In addition to these institutions, the *Länder*'s education ministries also play an important role in the financing and governance of German higher education institutions.

In terms of studies and teaching there are seven different types of higher education institutions in Germany: universities and technical universities, pedagogical universities, art universities, theological universities, universities of applied sciences (*Fachhochschulen*), universities of administration (*Verwaltungsfachhochschulen*), and vocational academies (*Berufsakademien*). They all have different foci in their teaching and differ greatly in number and importance. These institutions can be organized into three larger categories: research universities, *Fachhochschulen* (FHs), and *Berufsakademien*.

Research universities include technical universities, pedagogical universities, and theological universities. They are based on the principle of "unity of research and teaching" and have the right to grant doctoral and habilitation degrees. Research universities dominate in the German system of higher education and about two thirds of all students are enrolled at one (Kühler 2005, 152). Technical universities have traditionally focused on engineering and the natural sciences (Clark 1995, 41). Pedagogical universities originated from former teachers' academies and have mainly been integrated into research universities as education departments (McC. Adams 2002, 93). However, six separate pedagogical universities still exist today. The theological universities exist in addition to theology departments of public universities and are run by the churches. Arts and music universities are usually small institutions that prepare students for an artistic profession in design, dance, music, drama, painting, or as music or art teachers (Kühler 2005, 152–154).

Fachhochschulen (FHs), or universities of applied sciences, were introduced in 1970/71 as an alternative to research universities (Kühler 2005, 145). They originated from former vocational colleges for engineering, business, design, agriculture, and social pedagogy. They were introduced in reaction to the scientific and technological progress of the 1960s and 1970s, which caused businesses to demand highly skilled workers with practical and scientific experience. FH programs are more practically-oriented and shorter than those at research universities and they accept students without an *Abitur* if they have done vocational training instead. While the degrees granted are supposed to be equal to a university degree, FHs do not have the right to award doctoral degrees and FH graduates often need to take additional university classes and exams before starting a PhD program. Fur-

thermore, in the past FH degrees have not been accepted for certain positions in civil service[5] and FH professors still receive lower salaries than university professors (Kühler 2005, 155–158). However, they offer an alternative for students who are interested in professional studies and have become increasingly popular among students and employers (McC. Adams 2002, 87).

A third type of higher education institutions that has recently gained importance is the *Berufsakademie*, or vocational academy. *Berufsakademien* combine higher education and vocational training by offering Diplom and now bachelor's programs in cooperation with businesses. These dual study programs are vocationally oriented and include internship phases which cover about half of the entire study time. *Berufsakademien* are organized in various ways in the different *Länder*. In some *Länder*, the programs are run by *Fachhochschulen*, others have special state-run academies or private, but accredited institutions. Degrees from *Berufsakademien* are state accredited and were originally equivalent to an FH-degree. Now all higher education degrees on the same level are considered of equal qualification, which includes degrees from a *Berufsakademien*. *Berufsakademien* have become very popular among students as well as employers. One important advantage for students is that they already have an income roughly equivalent to that of an apprentice during their studies. Employers particularly value students' practical experience in addition to their in-depth theoretical knowledge (Ausbildung Plus 2012). Between 2006 and 2011 the number of dual study programs has doubled and was at about 900 programs in 2011 at the various institutions involved (Wegweiser Duales Studium 2013). This increased interest in higher education combined with practical skills can also be seen in the increasing number of FHs as shown in Table 4.1.

[5]This has changed with the introduction of bachelor's and master's programs.

Table 4.1: German Higher Education Institutions by Type and Sponsorship

Institution	**Institutions**		**Students**	
Year	*2007*	*2012/2013*	*2007*	*2012/2013*
All categories	**383**	**428**	**1,974,932**	**2,499,409**
Research Universities	**116**	**110**	**1,358,490**	**1,611,664**
Public	88	88	1,344,825	1,582,401
Private	13	11	6,775	18,087
Church-run	15	11	6,890	5,030
Pedagogical Universities	**6**	**6**	**21,869**	**24,735**
Theological Seminaries	**15**	**17**	**2,590**	**2,557**
Arts Universities	**57**	**57**	**33,257**	**34,719**
Public	46	46	32,071	33,260
Private	2	3	347	1,069
Church-run	9	8	839	194
Universities of Applied Sciences	**167**	**223**	**518,264**	**792,837**
Public	99	104	461,914	654,087
Private	50	97	39,184	117,513
Church-run	18	22	17,166	20,388
Universities of Administration	**30**	**29**	**29,276**	**32,897**

Sources: Institutions by sponsorship Hochschulrektorenkonferez (2007) and Hochschulrektorenkonferenz (2013b), other institutions and student numbers Statistisches Bundesamt Deutschland (2007) and Statistisches Bundesamt Deutschland (2013b). Numbers in different categories differ slightly by source and do not always add up. *Berufsakademien* are not included in these statistics but partly covered by the numbers for FHs.

Traditionally the German higher education system is dominated by public state-run institutions. However, private institutions do exist and are increasingly becoming popular, especially among *Fachhochschulen* as shown in Table 4.1. Private universities are those institutions that are run and funded by foundations or other private entities, but they often still receive public funding. All higher education institutions that want to offer accredited degrees have to follow regulations set by the federal framework law (HRG). These regulations mainly affect matters such as acceptance policies, curriculum structure, requirements for staff, and goals of the degree programs. This leads to a certain structural unity between public and private institutions (Kühler 2005, 147–148).

Traditional German university governance resembles to some extent struc-

tures of the German political system. Each institution has a university parliament, the so-called senate. The senate is the most important body within the university governance system. It consists of representatives of students and professors, the deans of the different departments, the president, and the chancellor. The senate passes the constitution of a university and elects the president. It also is responsible for all decisions concerning the budget, study programs, examination regulations, and university management. The president[6] is the head of the university. He or she represents the university and is responsible for the implementation of senate decisions. The chancellor is the head of the university administration and thus responsible for all non-academic staff. On the departmental level, the department council (*Fachbereichsrat*) is responsible for organizing matters of each department. It consists of representatives of students and professors and is headed by the dean of the department. Students are represented by two bodies, the student parliament and the student board (*Allgemeiner Studierendenausschuss*). The student parliament is elected by all students and decides on the use of the so-called "social fees" that are collected from students each semester. It discusses current issues and elects the student board. The student board represents the student body vis-á-vis the university management (*Hochschulleitung*), the president, and the general public (uni-assist e.V. 2007).

In addition to universities there are a great number of non-university research institutes. The first government-funded non-university research institutions were founded in the 1870s. The *Physikalisch-Technische Reichsanstalt* (physical technical institute), founded in 1887, and the Kaiser Wilhem Society, founded in 1911, which later became the Max Planck Society (MPG), were some of the most significant ones. Other research institutes include the Frauenhofer Society, the Helmholtz Society and the Gottfried Wilhelm Leibniz Research Association, which combines the so-called "Blue-List Institutes" and the East German Academy of Sciences institutes (McC. Adams 2002, 89).

Most of these non-university institutions conduct mainly applied research, for example, for the health care sector or the military. Yet large-scale research facilities, such as those of the Max Planck Institutes, also produce a significant amount of basic research (McC. Adams 2002, 90). The Max Planck Institutes receive all their funding from public sources and their task is "the pursuit of undirected, fundamental research in selected, primarily scientific, fields" (Clark 1993, 23). Furthermore, they not only extend the job market for academics, but also participate in their education by cooperating with universities. "Virtually all directors of Max Planck Institutes are simultaneously professors at universities" (Clark 1993, 33), and students often

[6]The old German term is *Rektor*, now also often called *Präsident*.

have the opportunity to conduct research for their M.A. theses or dissertations at a non-university institution.

4.1.3 Study Programs and Degrees

The general intent during the rebuilding of German higher education after World War II was to create a degree system in which there would be no differences between degrees earned at one university or another. This was to guarantee the same chances for all university graduates. The original German degree structure of *Diplom* and *Magister* programs has therefore been very uniform across universities (Kühler 2005, 161). Each degree program must undergo a review process by a joint commission of the KMK and HRK, which reviews it for structure and duration and guarantees equal examination regulations (Kühler 2005, 163). Due to recent reforms, there are now two different degree models in Germany: the traditional model and the new two-tier model of bachelor's and master's degrees, with the former being phased out and replaced by the later.

The two traditional German university degrees are *Diplom* and *Magister*, both of which are granted after studying for a period of 4–6 years at a university after high school, taking classes, passing intermediary exams (*Vordiplom* or *Zwischenprüfung*), and writing a substantial research thesis. In general, the difference between the two degrees lies in the number of majors and minors a student takes. In a *Diplom* program, a student is only enrolled in one department with one major, while in a *Magister*-program a student can either have two majors or one major and two minors (Deutsche Welle 2006a). *Diplom* programs are usually found in the natural sciences and engineering, while *Magister* programs are more common in the social studies and humanities. Both of these degrees are comparable to the American Master of Arts or Master of Science and are required for admission to doctoral studies. There is no clear division between undergraduate and graduate education. There also is no clear break between professionally-oriented and academically-oriented students, so that all students learn to use scientific research methods while practical application of knowledge is usually neglected[7] (Clark 1993, 54).

Within these programs, the final examination and the thesis are extremely important. Even though students are graded for their exams and research papers in each class, these grades are traditionally not compiled into a cumulative grade point average, as done in the United States. Only the grade of the final examination and thesis count as the *Diplom* or *Magister* grade (Clark 1993, 55). While

[7]With the exception of professional degrees like medicine, law, and teaching, which include residencies and internships.

most universities have introduced intermediary exams after about 2 years in the program, these exams are only important to be able to continue the program, they have no official degree status (Kühler 2005, 171). These traditional degrees are very much subject-specific and research-oriented and clearly differ from the broader more general American bachelor's degrees. The aim of these programs is to provide students with the subject-specific skills that they would need as scientists as well as as specialists (e.g. lawyers, doctors, engineers).

The traditional German degree system of *Diplom* and *Magister* programs is very peculiar. On the one hand, the *Diplom* has been highly recognized internationally, especially in the natural sciences. On the other hand, the system is so unique that it is hard to transfer to or from other higher education systems. Furthermore, *Diplom* and *Magister* programs have been considered too impractical by employers, because they often do not require internships or other career-oriented activities. These factors have led to repeated calls for a reform of the German degree structure and an introduction of bachelor's and master's programs, following the Anglo-American model (Stallmann 2002).

With the beginning of HRG reforms in 1998 and the *Bologna Process* in 1999 bachelor's and master's programs have been introduced at German universities and the traditional *Diplom* and *Magister* degrees are being phased out. Following European regulations, most German bachelor's programs are three years long and take the higher-level *Abitur* classes into account. The bachelor's degree is considered to be the first degree that allows entry into the job market. A master's degree is required in order to start a doctoral program[8] as well as for many jobs in the civil service (Deutsche Welle 2006b). The programs themselves are modularized, which means that they are structured in certain modules that need to be completed. In addition, a credit system leads to greater comparability between universities, and cumulative grading motivates students to start earning good grades from the beginning of their studies. Grades become especially important when applying for a master's program, since only the best bachelor graduates are accepted into master's programs (Witte 2006b, 21–24). While the new degrees offer many advantages to students, such as a more organized study program and shorter study periods, their introduction has been controversial. The implementation of policy recommendations has shown some shortcomings of the new system, as will be shown below in the discussion of recent reforms.

[8]Some recently introduced graduate programs do accept application from exceptionally high achieving bachelor graduates, also to attract applications from abroad.

4.1.4 Higher Education Financing

The vast majority of German institutions of higher education are public institutions that are funded by federal and state taxes. Only a small, but recently growing number are privately organized and financed. Of a total of 390 higher education institutions only 111 are private and state-accredited, of which only 11 are research universities (Hochschulrektorenkonferenz 2013b). These institutions are either run by companies, such as the VW Auto University, or by foundations, e.g. the Hertie School of Governance. Some of them also receive some funding from the state governments, such as the Witten/Herdecke University in North Rhine–Westphalia.

Public universities are greatly influenced by the state governments in financing and governance. In general they receive three different kinds of funds: *Grundmittel* (basic funds), *Drittmittel* (third-party funds), and *Verwaltungseinnahmen* (administrative income) (Kühler 2005, 190). Basic funds include funds for personnel and material for teaching and research. These funds are provided by the state governments. They are part of the state's budget and thereby are under the control of the state parliament, which can decide on the level, the use, and the control of the university funds. While the universities themselves provide information on how much money they need and can negotiate their budget with the state government, the final decision is made by the *Land*. Universities are also bound by the specific uses defined in the budget bill and cannot use the funds for what they believe they need it most. The principle of complete cover (*Gesamtdeckungsprinzip*), which requires all state income to be used for all state expenses, is still valid in many federal states. It requires public universities as state institutions to return any left-over funds to the general state budget so that they can be used for other purposes (Schütte 2007). While this is a very inflexible system of financing, the funds provided by the state offer a certain stability and are roughly equal for all institutions. However, due to a constantly rising number of students and almost constant budgets, this has lead to equally under-funded institutions in the past (Kühler 2005, 193–194).

In addition to basic funds provided by the states, universities can apply for third-party funding, which is mainly intended for research. These funds are provided by institutions such as the German Research Society, which itself gains 60 percent of its funds from the *Bund* and 40 percent from the *Länder*. State ministries, businesses, and foundations are other sources for research funding. However, the main part of these funds (85 percent) also comes from public sources. Researchers apply for these funds independently from their university and a well-functioning competitive evaluation process exists on this level (McC. Adams 2002, 95).

The third source of funding is university income, officially called "adminis-

trative income." A major part of this income is generated in university hospitals. Yet, since it is also spent there, it does not make a significant difference in the overall university budget. University property and donations are seen as other "income" sources. Unlike in the United States, however, German universities have not traditionally been engaged in alumni donation programs or foundation systems.[9] The funds provided by donations are therefore negligible at most universities. State regulations requiring universities to contribute their income to the state budget or leading to a reduction of state funds by the level of earnings of the university, pose another major problem for the success of third-party funding. This problem was also one of the reasons for major protests against introducing tuition fees. Students and parents were afraid that their money would not be used for the university but would go to fixing the states' budget deficits (Kühler 2005, 199–200).

Private institutions, on the other hand, have long charged tuition fees ranging from 15,000 Euro per completed degree program to 4000 Euro per semester. Opponents of private education claim that these high tuition fees lead to an elite education for wealthier students. They make the point that the German system of scholarships is not nearly as extensive as the American one, and that lower-income students might suffer as a result. Yet, most private universities in Germany do offer scholarships or loans to highly achieving students who could not otherwise afford to attend the university (Verband der Privaten Hochschulen e.V. 2006).

Since so far higher education at public institutions has either been free or newly introduced fees have been very moderate (ca. 500 Euro per semester), German students mainly need to finance their living expenses. These vary depending on which city students study in, but in general are still lower than in the United States due to subsidies for student discounts and student rent. As long as students themselves do not have a significant income, their parents are responsible for their living expenses while they are in school (Pridik 2007).

If their parents are not able to support them sufficiently, students have a right to state funding through the federal BAföG program. The *Bundesausbildungsförderungsgesetz* (Federal Education Support Law—BAföG) was passed in 1971 by the SPD–FDP coalition government with the goal of creating a greater social equality among students. It established a means-tested program of loans and grants for secondary and post-secondary students (Göztepe-Çelebi, Stallmann, and Zimmer 2002). Today one in four university students receives BAföG funding. These loans are paid on a monthly basis and depend on the student's and parents' income and the student's financial assets. Usually only half of the loan amount needs to be paid

[9]Recently German universities are starting to organize their alumni base and are introducing alumni donation programs (e.g. newly founded Alumni office at FU Berlin).

back once the student has a regular job after graduation if all regulations have been followed. Extra payments such as *Auslandsbafög* for exchange semesters abroad often do not need to be paid back at all. While the program is fairly generous and federal and state governments spend a total of about 2.3 billion Euro per year on these grants, it has been abused by many students[10] and therefore the means-testing has become much stricter than in earlier years (Bundesministerium für Bildung und Forschung 2006).

Furthermore, there have also always been foundations in Germany that offer scholarships to talented students. Today there are about forty of these foundations that are related to either parties, unions, churches or particular universities[11] (Bundesverband Deutscher Stiftungen e.V. 2014). Compared to the United States[12], however, this list is still very short and scholarships are not a major source of student income. In 2012, only four percent of all German students financed part of their studies with scholarship funds, while 32 percent received government grants, 63 percent worked, and 87 percent depended partly on their parents (Middendorff et al. 2013, 204). German student financing therefore depends on a mixture of different sources[13].

In order to further a new "scholarship culture" the federal government (then run by a CDU/FDP coalition) initiated a new scholarship program, the so-called *Deutschlandstipendium* in 2011. The scholarship pays 300 EUR a month for highly talented and actively engaged students and can be received in addition to BaföG. Half of the scholarship is provided by the *Bund* and the other half is contributed by private donors, such as alumni, businesses or foundations. Participating universities organize the application process and collect funds from private donors. In 2012 about two thirds of all eligible universities participated and 4000 donors contributed funds (Bundesministerium für Bildung und Forschung 2013b).

This section has shown that many characteristics of the German system of higher education have their historic roots in the 19th century. The dominance of theoretically-oriented research universities is based on the humanistic rejection of utilitarianism and thus still leads to a lower prestige of *Fachhochschulen*. The role

[10] For example, by not indicating personal savings during the application process or by transferring savings to parents or grandparents before applying.

[11] Additionally, the foundation index shows 258 foundations in the categories "Science and Research" ("Wissenschaft und Forschung") and "Education/Training/Student Assistance" ("Bildung/Erziehung/Studentenhilfe"). Many of these however are very small programs with a narrow focus.

[12] According to The Foundation Center (2007), there are 1,154 larger foundations in the United States awarding grants of $10,000 or more. In 2005, they spent about $3.9 billion on education. The fact that there are no comparable numbers available for Germany shows how underdeveloped the foundation system is in Germany even though it has grown significantly in the past ten years.

[13] For U.S. figures, see Table 4.3 (p. 116).

of the state guaranteeing Humboldt's idea of "freedom in research and teaching" is today found in a rigid system of government regulations. However, conditions have changed and many of the characteristics that once distinguished the German higher education system are now obstacles to a modern system of higher education. While universities in the 19th century were small, elite institutions, they have evolved into institutions of mass education. Reforms in the 1970s tried to address some of the problems that were posed by the transition from an elite to a mass system of higher education, but ultimately led to overcrowded and underfunded universities. Thus, further reforms were desperately needed, and since the mid-1990s, policy-makers have been debating ways to improve German higher education again. In the course of that debate they have repeatedly mentioned the American system of higher education as a role model for Germany. In the eyes of a VoC scholar, however, the American system matches the needs of a liberal market economy and would not be suitable for a coordinated market economy like Germany. In order to distinguish the differences between the German and American market system the next section will turn to the American higher education system.

4.2 The American Higher Education System

In the 19th century, American scientists turned to Germany to find a model for the development of research universities in the United States. Today, German policy-makers reference the American system of higher education as a role-model for reforming Germany's higher education system. Flexibility, outstanding conditions for research and teaching, international popularity among scientists and students, well-funded universities, and a system of competition that guarantees high standards on all levels of higher education are some of the elements for which the American system of higher education is renowned. How has American higher education become so successful, what are the cultural and institutional elements that characterize the system, and how does it provide students with the skills needed for the labor market? These questions will be turned to in the following subchapter.

4.2.1 Historical Developments

American higher education was originally based on small liberal arts colleges on the one hand and more utilitarian "Land Grant" colleges that focused on agriculture and engineering on the other hand. The research universities that today are responsible for the popularity and success of American higher education were only founded in the 19th century.

The age of the college, the smallest free-standing unit of higher education, lasted for two and a half centuries from the founding of Harvard College in 1636 to the 1880s (Clark 1995, 118). The curriculum in these small institutions included such liberal arts subjects as classical languages, religious studies, philosophy, and arts. These colleges were not only supposed to be "learning institutions," but places at which students would live and learn to get along socially and morally. After the American Revolution, the college had to undergo a reform from an originally aristocratic institution to a democratic one. The principle that only "educated" people could fully participate in a democratic society led to the early introduction of scholarships and contributed to an early democratization process in American higher education (Kühler 2005, 279–280).

Later on, this ideal also led to the conviction that not only theoretical but also practical subjects, such as engineering and agriculture, should be taught in colleges, and that students from all family backgrounds should be given the chance to study at a college. At this point, the federal government initiated the Morrill Land Grant Colleges Act of 1862. It offered financial incentives to the states to create colleges with a focus on agriculture and engineering, led to the founding of about one hundred public colleges (Schwartz 2007), and "opened the doors of universities to the children of farmers and workers, as well as of the middle and upper classes" (Kerr cited in Kühler 2005, 284). These developments caused an expansion of student numbers and higher education institutions and coincided with the foundation of the first research universities.

In the late nineteenth century Americans had realized the progress made in scientific research at European universities and took the German university reform towards more democratic learning and new scholarly research as an example for their own institutions. About ten thousand American scholars had gone to Europe by the end of the 19th century (Clark 1995, 119). In 1867, Johns Hopkins University, modeled after the University of Berlin, became the first American university to offer a science-based curriculum and graduate research studies. However, in contrast to the German model, this new curriculum was introduced in addition to the liberal arts college education in the form of a second degree (Tighe 2003, 5). The American university thus developed into a two-layer system with the original four years of college education as the "undergraduate" and the new research oriented second layer of "graduate" studies (Clark 1995, 119).

One reason for the late development of the university in the United States was the decentralization of the American higher education system. Education policy was regulated by the states. Therefore each state had its own rules and regulations for

higher education and there were not many unifying forces[14]. Thus, the development of the university model was due mainly to the efforts of highly achieving scientists and college directors who wanted to advance American higher education. A second reason for the late emergence of research universities was the need for sufficient funds. Those only became available after the Civil War in the form of private endowments. In addition, colleges played a very strong role within society, which made it hard to introduce a new higher education institution. Experiments to introduce separate graduate schools without undergraduates failed because there was no public support for these institutions (Clark 1995, 118–120).

There are two reasons that might explain the missing public support for separate graduate schools. On the one hand, the American high school did not fulfill the same function as the German *Gymnasium*. In the United States, high school education was, and still is, much less academically oriented and would not prepare a student for advanced studies. While the *Gymnasium* teaches students advanced knowledge and academic methods, American students only learn this at the college level. So, a college education was needed to process to graduate studies. On the other hand, the college system had already been well established in society. College was just the place that students were meant to go after high school, or as Clark puts it: "Undergraduates [...] were the centerpiece of public expectations of what education beyond high school was all about" (Clark 1995, 121). This sentiment is still true for the beliefs of many Americans today.

Only later between 1900 - 1930 private foundations and sponsors such as Rockefeller and Carnegie invested substantially in research universities and graduate schools. At first, private agencies limited their donations to successful private institutions, but later they also contributed to great state universities, such as the University of Wisconsin, the University of Michigan, and the University of California. Most of these grants and fellowships were awarded according to performance and therefore led to great competition between institutions. This competition developed a system that Geiger has called "the engines of American science" (Geiger 1986, 172).

At the same time, American higher education was the first higher education system to undergo a transformation from elite to mass education. From 1900 to 1940, the portion of a high school class going on to college increased from four to fifteen percent. Graduate student numbers multiplied by a factor of thirteen to seventeen. The number of college professors increased five-fold and the number of institutions offering a Ph.D. tripled (Clark 1995, 128).

[14]This is still true today. While the federal government funds research and offers student grants and loans, the states have the main influence in higher education policy.

In actual numbers, this meant that the number of students enrolled in higher education institutions increased from 237,592 in 1900 to 1,350,905 in 1938. During the same period, the number of higher education institutions grew from 1064 to 2461 (U.S. Census Bureau 1940, 116–119).[15]

This expansion of higher education led to the development of new institutions. In particular, the new "junior" (two-year) colleges were introduced. Junior colleges especially offered an alternative to overcrowded colleges for those people who either did not have the financial means or the will to continue their education at a four-year college. This development was the beginning of a diversification and broadening of the American higher education system with its many different institutions that can be found today (Kühler 2005, 302).

Expansion of the American higher education system continued during World War II and the Cold War when extensive government funding became available for many war-related research areas, such as transportation, communication, treatment of injury and disease, and the development of arms and explosives. During the war "the universities became systematically related to a set of federal mission agencies, in particular, the Department of Defense (DOD) and the new Atomic Energy Commission (AEC), two agencies that were to become principal funders of university applied research" (Clark 1995, 129). The most famous invention in this context is the atomic bomb developed by Berkeley professor Robert Oppenheimer (Tighe 2003, 8).

After World War II the founding of the National Science Foundation (NSF) in 1950 marked the beginning of Cold War investment in scientific research, which led to an expansion in teaching and research programs within the natural sciences as well as in the social sciences (Clark 1995, 129). The GI Bill of 1943 that paid for college for returning soldiers from World War II, the economic boom, and the baby boom in the 1950s were other factors that contributed to the expansion in American higher education (Schindel 2001, 164). Governmental expenditures for university research increased by 60 percent between 1954 and 1958 (Clark 1995, 130).

This period was followed by the "Sputnik shock." After the Soviet Union had successfully launched its satellite *Sputnik* in late 1957, Americans realized that they had lost the race in space technology. This caused politicians to heavily support government funding for research, in particular for the natural sciences, so that in the ten years after 1958, government funding of basic research increased sevenfold. By 1968, more than forty universities were each receiving over $10 million per

[15] As a comparison, in 1902 there were only 53,000 students enrolled in German universities and until 1908, only men were allowed to study at higher education institutions (Deutsches Historisches Museum 1993).

year in federal research funds (Clark 1995, 130). Supported by "federal–university partnership initiatives" and driven by the Cold War competition with the Soviet Union, American universities expanded their faculty and research programs and grew to become the best research institutions in the world during the 1960s and 1970s (Tighe 2003, 13). Today American universities still constantly fill the upper ranks of international university rankings and their popularity among foreign students, researchers and professors is nearly unbroken (see for example Shanghai Jiao Tong University (2013) and Times Higher Education (2013)).

4.2.2 Higher Education Institutions and Governance

The American higher education system is probably one of the most diverse systems in the world. Institutions can be differentiated by their control, by the programs they offer, and by number of students enrolled. There are private and public institutions, and among the private ones there are some for-profit and some non-profit organizations.

In 1970, the Carnegie Commission on Higher Education, part of The Carnegie Foundation, developed a classification of colleges and universities derived from empirical data. Since then, this classification has been widely used for research and policy analysis in the field of higher education. Updates of the classification are published regularly, and its scope is very broad because it includes many different categories that account for the many differences between American higher education institutions (The Carnegie Foundation for the Advancement of Teaching 2010). Using the Carnegie Classification, the National Center for Education Statistics (2011b) found the numbers of different institutions shown in Table 4.2.

According to the Carnegie Classification, doctoral and research universities are those universities that granted at least 20 doctoral degrees in the past year. Master's colleges are those institutions that awarded at least 50 master's, but fewer than 20 doctoral degrees. Those institutions at which bachelor's degrees accounted for at least 10 percent of all undergraduate degrees and that awarded fewer than 50 master's degrees are considered baccalaureate colleges. Other four-year institutions are those that have a special focus or tribal colleges for Native Americans. If the degree granted is an associate's degree, the institution is considered an associate or two-year college (The Carnegie Foundation for the Advancement of Teaching 2010). Table 4.2 shows that the majority of institutions is targeted towards undergraduate education and a mixture of general and vocational education in two-three - year institutions. Two-year institutions such as community colleges and technical schools, are the most rapidly growing sub-sector in American higher education and today

Table 4.2: American Higher Education Institutions by Type and Sponsorship

Institution	Institutions	Students
All categories	**4,589**	**21,016,126**
Public	1,652	15,142,809
Private	2,937	5,873,317
Doctoral/Research Universities	**282**	**5,629,967**
Public	168	4,026,611
Private	114	1,603,356
Master's Colleges and Universities	**646**	**4,319,845**
Public	261	2,654,459
Private	385	1,665,386
Baccalaureate Colleges	**890**	**2,423,721**
Public	203	1,150,190
Private	687	1,273,531
Other 4-year Institutions	**1,046**	**961,718**
Public	46	93,511
Private	1,000	868,207
2-year Colleges /Associate Colleges	**1,725**	**7,680,875**
Public	974	7,218,038
Private	751	462,837

Sources: National Center for Education Statistics (2011b). Institution numbers for Fall 2010, student enrollment numbers for Spring 2011.

account for nearly 40 percent of total U.S. college enrollments. While some of their programs are targeted to prepare students to transfer to a four-year institution, most of them are aimed at career preparation (Calhoun 2000, 55). This illustrates the wide variety and span the American higher education system covers. Ultimately, there is no one and only American system and it is difficult to generalize.

Despite the abundance of different institutions within the American higher education system, only the so-called "research universities" are really comparable to universities in Germany (Fallon 2001, 85). When direct comparisons are made here, they will therefore be drawn between American research universities and German universities.

These different American institutions all stand in competition to each other. This competition is also expressed in regular rankings that are done by several

organizations and news magazines. One of the most influential rankings is done by the magazine *U.S. News & World Report*. It evaluates universities by using fifteen different indicators, ranging from admissions selectivity to financial resources of the university (U.S. News & World Report 2007). These rankings allow students to evaluate which university best fits their needs. Each ranking, however, uses different criteria and sometimes even one and the same organization changes methods of calculating rank positions. Rankings therefore cannot show an absolute measure of the quality of an institution.

As with the general structure of the American higher education system, there are many different ways of organizing a university. However, a few main elements can be found in most institutions: a board of trustees, a president, a university administration, departments, faculty, and students. They all share certain decision-making competencies as described below.

The "board of trustees" is the highest body at most American universities. It represents and leads the university and makes final decisions on financial, administrative, and academic matters. The board usually consists of business representatives, students, professors, politicians and administrators, who elect the president of the university (Kühler 2005, 388–389).

The university president is usually a professor and is elected for nine to ten years.[16] Depending on the size of the university, he or she has assistants and delegates tasks to other administrative levels. The president mainly represents the link between the university community and the board of trustees (Kühler 2005, 391).

The university administration includes many different offices. Their subjects range from undergraduate admission, financial aid, health services, and sports, to campus security, human resources, research funding, and career services. Since American universities are usually campus universities and offer dormitories and other extra-curricular facilities, the administration also includes many non-academic areas that cannot be found at German universities (Kühler 2005, 393–394).

Academically, the department is the main structural unit at American universities. One department usually integrates one field of study, such as Engineering or History. An academic department is led by a department chair, who is responsible for recruiting new faculty members, evaluating current faculty, administrating the teaching schedule, and representing the department in academic and financial matters (Kühler 2005, 396). A department combines undergraduate and graduate studies. Professors teach undergraduate classes and do their research while also

[16]Though there is not always a term limit for university presidents.

teaching graduate students. At the same time, graduate students support their professors in teaching undergraduate classes and with their research. According to Clark, the academic department is therefore the integrating unit that holds the undergraduate and the graduate part of American higher education together (Clark 1995, 155).

Within the department, professors and students work together. As with all elements in American higher education, there are several different faculty positions and career paths for professors at different universities. One can differentiate between the so-called "tenure track" positions, which guarantee a life-long job and "non-tenure track" positions that are limited for a certain time. In addition, there are full-time and part-time faculty positions. In general, an academic career starts with a position as an Assistant Professor, which requires a Ph.D. The next higher position is that of an Associate Professor, which is followed by a Full Professor position. To be promoted, a professor has to undergo an extensive evaluation process, since promotions are not automatically awarded after a certain number of years. However, in everyday life the different positions do not play a great role for students and are not emphasized very much within the departments (Kühler 2005, 400–402).

The student body at American universities can be, or maybe has to be, clearly separated into undergraduate and graduate students. While at most universities undergraduates outnumber graduate students, both play an important role in American university life. Undergraduates dominate the cultural idea of what college and university life is about. The four years after high school are idealized as the "best years of one's life" and alumni play an important role in financing and advertising for a university. Graduate students, on the other hand, are the backbone of university research, and the quality of a university's doctoral programs is one of the most important factors for the competition between universities. Since research is also the most expensive part of a university education, undergraduates usually cross-subsidize graduate work because funds calculated by student numbers are mainly undergraduate based (Clark 1995, 147–150).

4.2.3 American Degree Structure and Student Life

The high school diploma, which is usually granted after 12 years of school at the age of 17 or 18, is the main entrance qualification for any of the different colleges and universities. In addition to the high school diploma, standardized tests, such as the SAT (Scholastic Aptitude Test) or the ACT (American College Testing Program) are used to evaluate students' abilities and for university admission decisions (Kühler 2005, 329). In 2012 61 percent of recent high school graduates enrolled in college; of

those about 60 percent enrolled in a four-year institution (Bureau of Labor Statistics U.S. Department of Labor 2012, 1).

Students who decide to study at a four-year college or a research university will start their studies in a bachelor's program, which is considered "undergraduate study." At the beginning of a bachelor's program students usually have to take general core classes, which are not specific to a certain subject. Only after about two years are students required to choose their major, in which they will take classes for another two years. In a bachelor's program, students earn credits for each class they take and can graduate once they have the required number of credits. In general, there are no comprehensive final exams[17] or a thesis, although some universities and departments offer bachelor's theses for extra credit or an honors degree. Depending on the major or on how many classes have been taken in either the humanities or the natural sciences, the degree granted is a Bachelor of Arts (B.A.) or a Bachelor of Science (B.S.) (Kühler 2005, 330–331). Although bachelor's programs are generally designed as four-year programs, it is not uncommon for students to need up to six years to finish their degrees. For example, among the cohort of first-time, full-time students entering four-year degree programs in 2005, only 39 percent graduated within four years and 60 percent graduated within six years (Akers and Chingos 2013).

For American undergraduate students life is not only about studying. Most American universities are campus universities and provide students with dormitories, cafeterias, gyms, super-markets, student health clinics and an abundance of extra-curricular activities. Sports teams usually play a particularly strong role at American campuses and often they are representing the entire university to the public (Clark 1983, 86). Geiger explains that this focus on student life outside of their classrooms goes back to the 19th century and the "collegiate syndrome" - the belief in American society that college is valued more as an agency of socialization than as an institution of learning (Geiger 1986, 116-117, 139). But these non-academic facilities and activities are not only expected by students as part of their college life, they are are also valued by professors and employers as one of my interview partners explained: "You should be involved in something, you should take a leadership role, you should be part of a club; there could be all sorts of things. [...] That is one thing that they [employers] have mentioned to us in the past that I think we are tackling pretty well, but this is that being well rounded; do you read the Wall Street Journal? Do you know what is going on? That's important in the business" (Interview UW Business School).

[17]In American universities, the term "final exam" refers to exams at the end of each individual course. These types of final exams are very common. However, there is no overall final exam at the end of the curriculum.

After finishing their undergraduate studies, most American students leave school for the job market. In 2010 of those students graduating with a bachelor's degree 75.8 percent were employed full-time and 24.2 percent had a part-time job (Finamore et al. 2013, 4). Some of those students later returned for graduate programs or participated in a graduate program while working. A minority continue their academic studies right after college. Students thereby have a choice between professional programs such as medicine, business, and law, or more academically-oriented Master's and Ph.D. programs.

At most American universities the bachelor's degree is sufficient as an entrance qualification for either program. Usually, the master's programs are more practically-oriented than Ph.D. programs and are supposed to prepare students for a future professional life, although there is still the possibility of starting a Ph.D. program after finishing the master's. In a master's program, students take required and optional graduate classes and finish the program with the comprehensive examination and sometimes a thesis. In a Ph.D. program, students also start with about two years of course work before they begin to do research for their dissertations. Usually, they earn their master's degree along the way and have to pass an examination (comprehensive or preliminary exams) before they can actually start their doctoral studies (Clark 1995, 142 - 146). Graduate research is the strongest column of the American higher education system and contributes significantly to the worldwide prestige of American research universities.

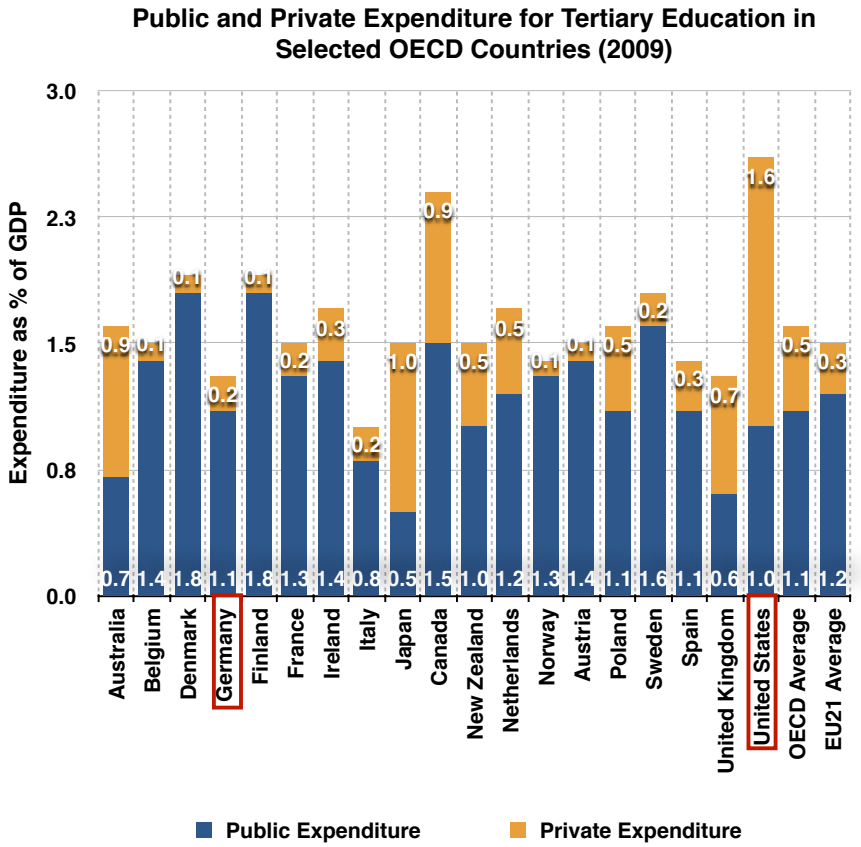
A third column of education American colleges and universities provide is continuing education and adult education. While undergraduate and graduate studies make up the main part of an American university, educating the workforce has always been a mission of higher education in the United States. There is no strict division between purely academic education and vocational or professional education. Nearly all departments offer part-time programs or continuing education classes (recently often offered online), "non-traditional students now make up 73 percent of all enrollment in U.S. colleges and universities, and 40 percent of college students are twenty-five and older" (Schulze-Cleven 2009, 4).

4.2.4 Higher Education Financing

In international comparison, the United States ranks among the highest in tertiary education spending per student and is only topped by Switzerland, which, however, has a very low participation rate in higher education and therefore is not directly comparable to the United States. America also spends about three percent of its GDP on higher education, which is the highest percentage any OECD country spends

on higher education (see Figure 4.1) (Organisation for Economic Co-operation and Development 2006, 198).

Figure 4.1: Expenditure on Higher Education Institutions as a Percentage of GDP in Select OECD Countries (2009)



Source: Bundesministerium für Bildung und Forschung (2013a, Tab.2.1.5)

Factors that can explain the high degree of spending for higher education in the United States are the distinct separation between private and public institutions, the strong competition between institutions, as well as the great autonomy of universities (Busemeyer 2007, 161). As mentioned above, as early as during the mid-19th century, with the founding of the first American research universities, private donations and relations between universities and businesses started playing an important role in American higher education financing. Businessmen such as Cornell, Rockefeller, Carnegie, and Hopkins donated their money for the founding of such outstanding institutions as Cornell University, the University of Chicago, Columbia University, and Johns Hopkins University, respectively (Busemeyer 2007, 169–170).

This involvement of private investment in higher education contributed to the development of an even stronger competition between universities. Each institution

sought to acquire extra funding by having the best professors and offering the best education to students (Busemeyer 2007, 172). This competition for funding, students, and professors is clearly one core element of the American higher education system.

In addition to this private dimension of higher education financing, the American federal government has been involved in higher education since 1787 by giving land to several states as support for founding universities. As discussed earlier, the Morrill Land Grant Act of 1862, the GI Bill of 1943, and the increased federal funding of research since the 1950s are federal initiatives that have played a significant role for American higher education. Up until today federal research funding, in particular, which is granted on a competitive basis, contributes to a strong competition between institutions (Busemeyer 2007, 173–180).

This ongoing competition between private and public institutions of higher education for funding has led to a similar financing situation for both kinds of institutions. Fallon notes that "the financing of higher education in the United States is surprisingly similar for both private and public universities, and everywhere include a mix of funds" (Fallon 2001, 82). This mix usually consists of sources from the federal government, the state government, students, and private donations from charitable foundations, alumni, and businesses.

All American institutions of higher education charge tuition for their programs. On average, public institutions receive 18 percent and private institutions 41 percent of their budget from tuition fees. Specific fees range from $1,200 per year at a community college to $40,000 or more per year in a bachelor's program at leading universities such as Harvard or Stanford (Berkner et al. 2005, 10). The average amount for tuition and fees for a full-time undergraduate student per year was $7,136 in 2010-2011 for a public four-year institution (in-state student) and $22,771 for a private university (National Center for Education Statistics 2011a).

Tuition fees today represent the most significant part of the total university income (an average of 28 percent) (Busemeyer 2007, 189). Public institutions also heavily depend on state funding (35 percent), while private universities usually depend more on private donations (15 percent) and investments (20 percent). Both kinds of institutions, however, receive a similar amount of federal money (10–15 percent) (Busemeyer 2007, 192). One last source of financial income is income earned by services or sales such as in university hospitals or gift shops. This money represents 15–21 percent of both private and public institutions' income (Busemeyer 2007, 195).

A distinct feature of American educational principles is that a college edu-

cation is an investment, not just a cost. While research and the general education of society are seen as public goods and are also heavily supported by government funding programs, professional education is perceived as a private investment. On the one hand, this explains why Americans are willing to pay high tuition rates and on the other hand, it shows why the government still has an interest to support research institutions (Glidden 2001, 130–132). Donnerstag describes this phenomenon as follows: "As far as the overall cultural framework for education is concerned, one may point to self-reliance and self-improvement as central values which are at the heart of American culture and dominate the education of Americans" (Donnerstag 2003, 71). In theory, this ideal of self-reliance seems beneficial. Yet, in practice not everyone is able to afford higher education without any outside help.

Therefore, there are several options for financial support for students. The federal government has introduced different programs that offer scholarships and loans to students. Pell Grants, for example, are scholarships that are directly paid to college students from the government, while Perkins Loans are loans that are paid to students by the universities, but are financed by the government. Stafford Loans are loans offered by private institutions but the government vouches for them (Busemeyer 2007, 196–198).

In addition to federal funding programs for students, state governments offer financial aid programs and reduced tuition, especially for state residents at state universities. Most universities themselves also offer scholarships, tuition waivers, and student employment opportunities. An abundance of scholarships offered by private organizations and businesses complete the spectrum of financial support for students in higher education (Kühler 2005, 360–371).

While German students currently only have to pay tuition fees for certain degrees[18] and mainly need to finance their cost of living, American students need to finance their education with very high tuition fees and their living expenses. Students in both countries rely on a mixture of financial support, though the purposes (i.e. Americans spend much more on tuition) and sources of funds differ. A comparison to German students shows that American students receive much more institutional and private grants than their German counterparts. They also depend more heavily on student loans (see Table 4.3) to cover their tuition fees and living expenses.

The American system of higher education is characterized by a diversification in all of its aspects. The traditional liberal arts colleges and the late development

[18]At the time of writing only Lower Saxony still charged general tuition fees, but had already announced their abolishment by 2014. Most *Länder* collect fees for long-term students and second degrees (Studis Online 2013).

Table 4.3: Sources of Student Income in Germany and the United States

Source of Student Income	Germany	United States
BAföG/Federal and State Government Grants	32%	57%
Institutional Grants and Scholarships*	4%	20%
Student Loans	6%	41%
Student Jobs	63%	72%
Parental Support	87%	not available

Numbers show percentage of students receiving income from these source.

**Only includes institutional grants and scholarships for the U.S., not scholarships from non-university/private organizations*

Sources: Middendorff et al. (2013, 204), Davies (2012, 4), and National Center for Education Statistics (2013, 5-7)

of research universities led to a two-tier degree structure that provides a general undergraduate education and more specified research-oriented graduate studies. The abundance of different institutions offers access to higher education for all groups of students and helped in the transition from an elite to a mass system of higher education. Autonomous institutions have diverse sources of income that are dominated by private contributions. Additionally, students finance their studies and cost of living by a mixture of private and public sources. A diversification and variety can thus be found in all aspects of American higher education.

4.3 Cultural and Institutional Differences in German and American Higher Education

This section will lay out the main cultural, institutional and political differences in German and American higher education. We find a very state-dependent structure of higher education organization and a traditionally isolated position of universities from economical and societal influences in Germany, while the American system shows openness to connections with businesses and societal interest groups, as well as little government regulation. German federalism, corporatism, and party politics highly influence higher education policy making in Germany, while these factors only play a limited role in the United States' higher education policy-making. Culturally, German higher education still reflects Humboldtian ideals. Americans, on the other hand, focus much more on the ideal of equal opportunity and competition. As de Vivanco describes it: "The two systems are the results of two very different cul-

tures" (de Vivanco 2001, 185). These differences are factors that impede a complete Americanization of German higher education.

4.3.1 The Role of the State

The American higher education system is very individualized; universities and colleges act autonomously. The federal and the state governments have only a very limited influence on universities. Most institutions do not receive much more than 50 percent of their budget from state funds, and governments do not directly interfere in the administration and organization of universities (de Vivanco 2001, 185). The system is based on competition between institutions and quality is assured by this competition. Performance is checked regularly, not by the government, but by the universities themselves and by independent associations, such as the American Association of Colleges and Universities (AACU). Professors are evaluated by students each semester, students are continuously graded, and university performance is evaluated in regular rankings (Kühler 2005, 454).

These structural characteristics of the American higher education system resemble those in the United States' political system. The states are responsible for all matters concerning education, while the federal government only manages matters related to constitutional issues (e.g. discrimination, affirmative action) and student and research funding. Any specific regulatory tasks are the responsibility of the states. However, most of these state regulations are valid only for public universities. Private universities are very independent from state regulation and only have to follow basic laws, such as anti-discrimination laws (Altbach, Berdahl, and Gumport 2005, 63). Universities in general are also run much more as businesses than as government institutions. The low degree of government regulation within the higher education system also confirms the Varieties of Capitalism argument that liberal market economies work with little government regulation and competition is led by the market.

The nature of American federalism also leads to a relatively strong role for the states in regulating higher education policy and a weaker role for the federal government. In the political arena, the states are represented by the Senate on the federal level, but the two levels are not as much intertwined as in Germany. Since the Senators are directly elected by the population in each state and not appointed by the state governments, the Senator of a state is not necessarily a member of the states' governing party and therefore does not represent the state party's politics. To some extent, this makes policy-making easier, because the states are only directly involved in federal policy-making for changes of the constitution and the federal government

is only responsible for a few policy areas (e.g. defense, trade, international relations, etc.), while all other areas are left to the states (Peters 2004, 22-23).

To a certain extent, these structural characteristics can also be attributed to American cultural values. As de Vivanco describes it: "In the United States, government involvement is avoided and there is a consensus among the population to reduce government to an absolute minimum" (de Vivanco 2001, 186). Although this judgement might be overstated, since there is no actual consensus on this, Americans, compared to Germans, prefer a small government. They strongly believe in the power of competition, the free market and the duty to self-reliance. This belief in self-reliance for example can be seen in the funding practices of American universities (various sources and competitive application processes for extra funding, no dependance on state) and in the willingness of Americans to pay high tuition for a college education (Kühler 2005, 454).

Germans, on the other hand, strongly believe in the state as a mediator between the different societal interests. The state is supposed to be the last entity to help individuals and create a socially fair infrastructure under the principle of solidarity. Government regulation is not seen as an intrusion into an individual's privacy or against the free forces of the market, but as a support-giving body (de Vivanco 2001, 186).

In Germany, the government thus plays a significant role in higher education. German universities not only greatly depend on federal and state government funding, they also have to follow federal (HRG) and state laws on higher education. Public universities traditionally have had only limited autonomy and the *Länder* have had a significant say in their administration, especially in budgeting and hiring staff[19]. This is a major difference compared to American universities. German universities not only need the approval of the *Land's* education ministry to hire professors, they also need to follow state and federal regulations in several other areas. The federal higher education framework law (HRG) defines universities as "public bodies in state sponsorship." This definition entails that the *Land* has legal supervision (*Rechtsaufsicht*) over universities and in return also has the duty to support universities (*Gewährleistungspflicht*). Thus, universities have to follow the *Land*'s budget plans. The HRG also regulates student admission criteria and gives the federal states the right to determine admission numbers. Additionally, universities need the state's permission to introduce or to abrogate departments and study programs. Examination regulations for each subject also need to be accredited (Kühler 2005, 151-152). The German higher education system is thus much more state-dependent than the American one.

[19]Though this has changed to a certain extent with reforms, see Chapter 5.

Another area in which both systems differ is performance assessment. In contrast to the American system, in Germany performance assessment is not mainly regulated by competition, but also by the states. Traditionally an open performance and result evaluation has not been considered necessary by the states, because all universities were considered equal. This principle of ex ante evaluation can also be seen in the treatment of professors. Once they have successfully passed the long training process and written their habilitation, they are offered tenure and a basic amount of research funding without having to undergo further ongoing evaluations (Kühler 2005, 452-453). However, this attitude has changed over the last decade and recent reforms have introduced performance assessments for institutions and professors.

Additionally, the German political system, most notably German federalism and corporatism, influences policy-making in higher education. The three main policy-making institutions within the German political system are the *Bundestag*, the *Bundesrat*, and the Constitutional Court, the *Verfassungsgericht*. Although the *Bundestag* is the main law-making body, all matters that affect the "material interests" of the states need to be confirmed by the *Bundesrat*. It represents the governments of the states, whose votes are distributed proportionately by the states' population size. *Bundesrat* members are appointed directly by the state government (not elected by the people) and thus represent the interests of the states' majority parties. (Conradt 2005, 188-189)

Depending on the coalitions in each state, the *Bundesrat* might have a different majority party than the *Bundestag* and can block legislation. However, even if there is no "divided government," the interests of the *Länder*-governments and the federal government often differ significantly, so that it is difficult to find compromises. The Constitutional Court has the right to judicial review; it protects the constitution, civil rights, and the rights of the state and the federal governments. It therefore often plays an important role in deciding disputes between the two federal levels (Katzenstein 1987, 16-19).

So far, higher education is still a policy area in which the responsibilities of the federal and the state governments overlap. While the states have always had more control over higher education because of their constitutionally guaranteed jurisdiction over education, the federal government has repeatedly tried to influence higher education policy by setting framework legislation and investing in research. This form of "interlocking politics" brings together divergent interests, but also leads to incremental changes and slow reform processes (Katzenstein 1987, 45). Both federal and *Länder* governments have tried to solve this problem and passed a reform of the federal system in late 2006, which gives more power to the states in higher

education policy. However, so far this reform has not had significant impacts on higher education policy. Most structures remained the same and many issues are now discussed and debated in the forum of the KMK in order to guarantee comparability between higher education in the different states. With respect to recent higher education reforms, the only major differences can be found in terms of tuition fees and in the field of teacher education. But there are for example no significant differences in terms of structuring and designing the new degree programs between the different states (Pasternack 2011).

Another factor that complicated the reform of higher education policy is German corporatism. German interest groups are highly organized and have a great influence on the policy-making process. The business community has been organized in one peak organization since 1870. Unions are also organized in industry-wide associations. Other main interest groups are farmers and doctors, who traditionally have been very influential in policy-making processes by organizing their interests in central organizations (Katzenstein 1987, 23-29). Similar structures can be found in higher education. Higher education institutions are represented by the German Rectors' Conference, professors are organized in the German Association of Professors and Lectures and the German Association of Civil Servants, and students are integrated in the internal university governance structures. Because the German federal government does not have its own agencies to implement policy changes, new programs either need to be implemented by the states or by the various parapublic institutions. Thus, once a new policy is enacted, it still needs to be implemented by these bodies (Katzenstein 1987, 48,58).

4.3.2 Interest Groups in Higher Education

How is higher education policy influenced by different interest groups, political parties, and public opinion in Germany and the United States? This section discusses the role of businesses, students, professors, and political parties in higher education in both countries. It shows that to some extent the interest group structure (especially with businesses) reflects the characteristics of LMEs and CMEs. In the United States we find a close network between higher education institutions and businesses. In Germany, however, the relationship between businesses and universities is rather limited, but concentrates much more on the vocational training system. Additionally, the discussion shows what coalition of interests is necessary for successful reforms in Germany and which factors in public opinion might work against reforms in Germany.

Businesses

The role and interests of businesses in higher education are quite different in Germany and the United States. While in the United States businesses and universities work closely together in many cases, in Germany, cooperation between higher education institutions and businesses can be found mainly at the practically-oriented *Fachhochschulen* and *Berufsakademien* and are scarce at research universities. However, this lack of cooperation in higher education can be attributed to Germany's distinct vocational training system in which employers provide apprenticeships, set standards for specific training programs, and administer schooling in cooperation with the state governments, as described in Chapter 2 (Wood 2001b, 386). Yet, the traditionally weak relationship between universities and businesses seems to be changing.

The competitive pressures of globalization, the European Union's *Bologna Process*, and international education rankings that placed Germany very low have caused businesses to turn their attention to higher education policy. They have realized that the existing vocational education system may no longer be sufficient to meet the needs of German companies in a global economy. The growing popularity of *Fachhochschulen* and *Berufsakademien*, in which practical skills are already given more attention than at research universities, also shows a change of student and business interests. Initiatives, such as "Business University Forum" (*Hochschulforum der Wirtschaft*) – a collaboration of seven higher education institutions, the chamber of commerce, the chamber of trades, and the ministry of economy in Hamburg (Handelskammer Hamburg 2007) – is another example of increased business interest in higher education. Businesses now see it necessary to influence higher education policy beyond their original relations with *Fachhochschulen* and are involved in recent higher education reforms as shown in Chapter 5 (Finegold 1999, 412-413).

In the United States, the connection between universities and businesses is a long-lasting, well-established relationship. There are two factors that might have contributed to this relationship. First, the lack of government regulation and the market-based approach of American higher education allows businesses to influence higher education policy in terms of what skills and knowledge they expect from their future employees and how they can cooperate with colleges and universities to achieve these goals.

A second reason for the close relationship between businesses and higher education in the United States. can be seen in the lack of a developed vocational training system. While there are some apprenticeship programs in the United States, they only provide a narrow range of skills that meet the needs of a particular firm.

"Youth apprenticeships are not geared to provide the same amount of occupational training as in Germany, but rather to provide young people with some exposure to the workplace" (Finegold and Wagner 1999, 134). Businesses in the United States thus focus their attention on higher education institutions. They not only cooperate in terms of study program designs, but also in financing universities, contributing to student funding, and offering career options for college graduates. One factor that led to this cooperative network was the passing of the Bayh–Dole Act of 1980, which authorized universities to patent inventions made through federally-financed research. By doing so, universities could then sell the rights to companies that would produce the products and at the same time support universities financially. This type of cooperation is usually managed by what is called the "technology transfer office" at a university (Tighe 2003, 141-142). As Tighe finds: "Today, [...] every major research university has a technology transfer office and almost all have a sizable record of accomplishments in contracting university based technologies to the private sector" (Tighe 2003, 143). This type of well-established cooperation cannot yet be found in Germany.

Another difference can be found in businesses' support of students. In the United States, businesses provide an abundance of scholarships for students. In Germany, there are also a few scholarships provided by companies. However, the general attitude of companies is still that scholarships "can only be an additional support. [...] State financing is the necessary basis for any further private scholarship offers"[20] (Berliner Zeitung 2005). American businesses also hold much closer relationships with universities' career services offices and directly recruit new employees from colleges and universities. So far this kind of career network cannot be found in Germany (Weiler 2004, 31). Several of my interview partners at American colleges also mentioned that businesses or business organizations frequently give feedback on the specific curriculum of their program which will then be incorporated in new classes (Interview 1 AU ME Department, Interview AU Business Schools, Interview UCB ME Department), as one interviewee explained: "I would say that most of our academic programs have a very strong connection with the business community and there are advisory councils in just about every academic program and for the college of business as a whole" (Interview AU Business School).

This shows that the United States as an LME and Germany as a CME have different forms of influences by business interests in different parts of their education systems. American universities have long benefited greatly from the close cooperation with businesses. In Germany, these benefits are also recently being

[20]Translation by the author, original: "[Stipendien] können nur eine zusätzliche Unterstützung sein. [...] Eine moderne staatliche Studienfinanzierung sei das 'notwendige Fundament für den weiteren Ausbau privater Stipendienangebote,' sagte Hundt."

recognized by universities and businesses. German universities are searching for alternative financing options due to the federal and state governments' limited ability to continue to fully fund higher education. At the same time businesses realize that employees with higher education degrees are important for competing in a globalized economy that increasingly depends on knowledge and are shifting their focus from the traditional vocational training system towards higher education.

Students and Professors

The role of students and professors in higher education policy differs in the United States and Germany. American students and professors strongly identify with their university[21]. This strong identification is caused by the competition between higher education institutions that characterizes the American market-oriented higher education system. In the United States it is extremely important which university a student attends. There are alumni associations and official alumni reunions. Alumni return to their alma mater for sports events, and most importantly, they donate great amounts of money. Busemeyer found that universities are the second most popular institutions (after religious organizations) for private donations. Among the donations, the biggest part is received from alumni (27.5 percent) (Busemeyer 2007, 193-194). American colleges therefore put great efforts into creating a relationship with their students, including their own school colors, slogans and logos. German universities have just recently started these kinds of activities (Meffert and Müller-Böling 2007). To illustrate the different degrees in alumni work and university marketing: While the University of Karlsruhe has collected alumni donations of 40,000 EUR for a new scholarship fund and the TU Berlin 80,000 EUR for a new lecture hall; the University of Minnesota collected 83 million USD from their 50,000 alumni in just one year (Böhringer 2008).

One reason for this lower identification of students with universities may be the comparatively few extracurricular activities that are offered at German universities. As John Schuh noticed: "German institutions are not concerned about what happens to students outside of the classroom." Universities generally do not provide dormitories and there is no significant campus life. There also is less personal interaction between students and faculty outside of class than in the United States

[21] A survey done by the Carnegie Foundation on international attitudes of professors showed that American professors identify much more with their particular institution than German academics do. When asked to what degree their affiliation with their institution is important to them 36 percent of American professors answered "Very important" and 46 percent said "fairly important." In Germany however, only 8 percent of those professors asked felt that their affiliation with their institution was very important, while 35 percent said it was "not too important" and 31 percent believed it is "not at all important" (Altbach 1996, 19).

(Schuh 1996, 40). However, with recent reforms and a growing need for private funding of higher education institutions, this will most likely change and universities may discover that students are willing to contribute to the cost of their education and to the popularity of their institutions once they are offered more services.

The degree of participation in policy-making also differs between the two countries. While American professors and students participate in higher education policy at the institutional level, German professors and students are organized in national associations and play an important role in the policy-making process and policy implementation. German professors are organized in the German Association of Professors and Lecturers (DHV). The DHV "represents the university's political, legal, and economic interests of professors and other academic staff vis-à-vis the government and society"[22] (Deutscher Hochschullehrerverband 2007). German students are similarly well organized. The Free Association of Student Boards is the national organization of all student boards and represents students in policy decisions on the national and European level (freier zusammenschluss von studentInnenschaften 2014). Both peak associations, the DHV and the Free Association of Student Boards, are consulted by the federal and the state governments and even represent German interests at the European level during the Bologna reform process. Their engagement in higher education policy thus reflects the distinctiveness of German corporatism through which interest groups are integrated in the policy-making process on all levels of government. This discussion again shows how higher education is reflected differently in LMEs and CMEs and how German corporatism influences policy-making.

Political Parties and Public Opinion

Similarly to the role of students and professors, the role of political parties in higher education policy differs greatly in the United States and Germany. While there are no fundamental differences between Democrats and Republicans in the United States, German parties disagree on several factors in relation to higher education policy.

In the United States, both parties Democrats and Republicans agree on the major elements of American higher education policy, such as limited government regulation, competition between the diverse institutions of higher education, and high private financial contributions to higher education and research. They do, however, differ to some extent on how to support students in financing their college

[22]Translation by the author, original: "Er vertritt die hochschulpolitischen, rechtlichen und wirtschaftlichen Interessen der Hochschullehrer gegenüber Staat und Gesellschaft."

education (Doyle 2006, 1). While Republicans believe that the government is already spending enough money on higher education and that colleges and universities just need to work more efficiently to lower costs, Democrats are more concerned with helping all students finance higher education and call for a more open access policy to ensure that students from all social backgrounds have the same chances to gain a college degree (Doyle 2006, 6). Compared to the influence on higher education policy of German party politics, these differences between Republicans and Democrats are minor.

The role of parties is quite significant in German higher education policy. Stern notes: "Parties are represented at all political-institutional levels and entangle and integrate the political subdivisions with each other"[23] (Stern 2000, 92). Especially in times of divided government, with one party or coalition dominating the federal government (represented in the *Bundestag*) and another party dominating in the state governments (represented by the *Bundesrat*), ideological party differences on education policy become very important and lead to complicated policy-making processes. In terms of differences on higher education policy between party programs the following factors could be found.

The Christian Democratic Union (CDU) especially "focuses on equity in chances,"[24] or equal opportunity, which in their view can be achieved by a differentiated education system. Another emphasis lies on the support of elite and highly talented students on all levels of education (Stern 2000, 116). The Freie Demokratische Partei (FDP), or the Liberals, ideologically are the closest to the Christian Democrats and especially advocate university autonomy and competition between higher education institutions (Stern 2000, 120). The Social Democrats (SPD) represent the opposite ideological base. Their main focus is justice and equality on all parts of policy-making. This equality is to be created by the state. They demand that higher education should be open for everybody, which also includes financial support for those who could otherwise not afford a university education. Instead of especially supporting elites and highly talented students, the SPD focuses on the advancement of everybody and on a quantitative and qualitative expansion in higher education (Stern 2000, 117-118). The Greens support the SPD in most areas and additionally advocate an integrated education system, which advances students at all levels of education and is open to all groups of society (Stern 2000, 122-124). The Left Party also supports the Social Democrats on higher education policy. They emphasize the importance of free education and the role of the state to provide for this education on all levels (Weeg 2009). These distinct party political differences

[23]Translation by the author, original: "Die Parteien sind dabei auf allen politisch-institutionellen Ebenen vertreten und 'verschränken und verflechten die Gebietskörperschaften miteinander.'"

[24]Translation by the author, original: "Chancengerechtigkeit."

cannot be found in the United States where both parties support the major elements of the higher education system.

As with party politics, public opinion strongly influences policy-making. In the United States a college degree is seen as very valuable and 78 percent of the public believe that a qualified high school graduate should rather go to college than taking a high-paying job. Ideally, the lack of money should thereby not be an obstacle to getting higher education and the majority of the public believes that higher education should be accessible for all, though in realty this is not always true. In addition, studies have found that "the public has consistently supported the idea that a student values a higher education only when he or she is responsible for at least part of the cost" (Doyle 2006, 3).

While Germans do not necessarily see a university degree as an absolute necessity (partly, because there are other options after high school), they generally are quite proud of their universities, students, and professors. Especially professors are highly respected within society. Similarly, a doctorate is still seen as a sign of social status. Benjamin found that "an academic title is in normal social intercourse a key that opens most doors and guarantees respect" (Benjamin 1993, 59). A university degree is, however, not seen as completely necessary as it is in the United States, because the vocational training system offers an alternative to higher education. Germans are also more reluctant than Americans to directly contribute to the cost of higher education[25]. These different values and opinions on university fees relate back to the fundamental difference between LMEs and CMEs. While citizens in CMEs expect the state to provide them with public services, citizens in LMEs cannot expect the same level of state support and thus feel more obligated to privately contribute to them.

4.3.3 The Conception of Education

What is the goal of higher education? Which skills are students meant to acquire? Which institutions are seen as the main institutions in higher education? Which values and ideals influence the concept of education? An analysis of these questions will show how structural differences between the higher education systems of an LME and a CME are reflected in the ideas that influence the conception of higher education. Furthermore, it will show the different historical backgrounds that can impede a successful cross-national policy transfer process.

[25]In an Infratest-Dimap survey of Bavarian residents 72 percent of respondents recently voted for the abolishment of tuition fees (Süddeutsche Zeitung 2013). However, tuition fees do not keep high school graduates from starting a university program, another study found (Baier and Helbig 2011).

Historically, Germany's understanding of higher education is based on the Humboldtian idea of *Bildung* (Education) leading to moral and intellectual improvement (see Chapter 4.1.1 for a more detailed explanation). Today, there are still several factors of Humboldt's concept of education that influence the German higher education system. First, the concept of freedom in teaching and research still leads to very autonomous professors who can decide independently on their research topics and teachings. Similarly, students still enjoy a great amount of freedom in structuring their studies, especially in the traditional degree programs. Within their program of study they are free to choose which classes to take, what professors to do their exams with, when to take a semester off (as an *Urlaubssemester*, not counting towards the official study time) for internships or study abroad programs, and especially about the time of their final exams and graduation (Ostermann 2002, 44). Some of this has changed with the new bachelor's degrees that are more strictly planned, but this lower degree of freedom is also one of main points of criticism from students and professors who still believe in the Humboldtian ideas.

The second integral part of Humboldtian education is the idea of teaching research methods and intellectual skills as opposed to practical, job-oriented skills. Research-oriented universities are still the main focus of higher education in Germany. Even though *Fachhochschulen* offer more practical programs and cooperate with businesses, their general reputation within German society is lower than that of traditional research universities (Kühler 2005, 456). With the vocational training system being the main source for industry-specific applied skills in the past, the goal of higher education in Germany, therefore has not been the acquisition of practical skills for the job market, but much more the subject-related engagement with science and research itself. However, this dominance of theory-orientation at German universities recently has been criticized by businesses and students and is one of the problems that the new degrees are meant to address. The historic focus on Humboldtian ideas explains the difficulties German research universities have in focusing their curricula not only on academic careers, but also on other necessary skills for the German labor market.

American undergraduate programs differ greatly from programs at German research universities. In the United States, students are prepared much more for the general job market instead of for an academic career than in Germany. By taking classes in various different subjects in addition to their major, students acquire general qualifications, which can be used as assets in the job market. Those students who would like to pursue an academic career or want to acquire more specialized professional knowledge can do so in graduate programs (Master's or Ph.D. pro-

grams), which resemble the traditional German research-oriented programs (Kühler 2005, 456-457).

The American ideal of "equal opportunity" and the democratic, inclusive conception of American education greatly influenced the structure of the American higher education system. The attempt to give everybody an equal opportunity through higher education led to the great diversification within the system. The mixture of different institutions with different levels of selectivity and the various practically and theory oriented programs is intended to address everybody's needs and to allow for social mobility. Glidden finds: "In many respects higher education has been the embodiment of the American ideal, particularly as the means by which people can enhance their quality of life" (Glidden 2001, 112). The belief in limited government involvement and a private responsibility for higher education leads to the general acceptance of high tuition fees at universities. This in turn, however, also limits access to higher education and is "a source of economic inequality rather than equality" (Verba and Orren 1985, 12). Thus, those with a higher education degree have it much easier to climb the career ladder and to become social or political leaders than those without higher education. Although Americans believe in the American dream and in equality of opportunity, these ideals are hard to find in reality.

These disparities between the social backgrounds of college students can be seen as the results of an LME's competition-based approach to education. In the same way as the economic market is mainly based on competition and shows limited government regulation, competition between higher education institutions and between students leads to winners and losers in higher education. Those who can afford it invest in higher education and have the chance to succeed, while those without the necessary funds stay behind. Although the federal and state governments, as well as universities and private foundations provide financial aid and a great number of scholarships to prevent a social stratification in higher education, these measures are not effective enough to eliminate it completely (Verba and Orren 1985, 60-62).

In both countries higher education policy is influenced by cultural values and tradition. Humboldt's ideal of a method- and theory-oriented university in which students acquire intellectual as opposed to practical skills is still reflected in the divide between German research universities, the more practically-oriented *Fachhochschulen* and the vocational education system. The inclusive understanding of higher education in the United States, on the other hand, results in a great variety of programs and institutions and emphasizes the ideal of equal opportunity. While this ideal is not always realized in reality, Americans see social disparities

that result through higher education and the lack thereof as a result of competition and try to create more equal opportunities by offering financial aid and scholarships. The American higher education system is thus based on the same principles, which lead to competition and limited government involvement in LMEs in the economy, while German values reinforce the isolation of universities from businesses and the strong focus on the vocational training system as is typical for CMEs. Table 4.4 summarizes the main differences between the two higher education systems.

Table 4.4: Comparison: German and American Higher Education

	Germany	**United States**
Role of the State	- very state-oriented - state funding and regulations	- market-oriented - some state funding
Conception of Education	- early research orientation - independent students - elitist	- practical orientation - service oriented - inclusive
University Performance	- internationally low ranked - low financing - high student–faculty ratio - low graduation rates	- internationally best ranked - high financing - low student– faculty ratio - high graduation rates
Business Cooperation	- low - higher at FHs and vocational academies	- generally high
Party Positions	- right wing parties: competition oriented - left wing parties: equal opportunities	- Republicans: institutional efficiency, lower government support - Democrats: equal opportunities, higher government support
Students and Professors	- low identification with institution - nationally organized - influential in policy-making	- strong identification with institution - influential at institutional level
Public Opinion	- higher education degree prestigious but not the only option - low support for tuition	- college degree essential - strong support for tuition

Chapter 5

German Higher Education Reforms 1998-2010

The last chapters have shown that German universities are overcrowded and underfunded; the traditional German degree structure has led to unstructured programs, resulted in long study periods, and made international credit transfers difficult. Additionally, the great influence of government regulation and a lack of competition have prevented universities from flexibly reacting to new demands of students and economy. Recent reforms have tried to address these problems and the main changes were aimed at a deregulation, diversification, and marketization of the German higher education system.

This chapter[1] gives an overview of reform measures taken between 1998 and 2010. New elements that have been introduced to the German higher education system are analyzed with respect to the question of how they reflect an Americanization of German higher education policy. This analysis shows the limits of a cross-national convergence process and points out which political and cultural factors have prevented a complete emulation of the American system of higher education in Germany. The first section will shortly review the main steps of the *Bologna Process* and how it influenced reform politics in Germany.

Secondly, the reform debate among the different German parties and interest groups will be reviewed. This review will be followed by an analysis of position papers that focuses on the expectations of German employers for higher education reforms. The last section will then give an overview of the changes made to the HRG which introduced a new degree structure, new university sponsorship forms

[1]Parts of this chapter are based on the author's unpublished master's thesis, see Neumeister (2007), as well as on the conference paper van Santen (2010).

and financing models and the junior professorship. It also gives a quick review of the federal initiatives for excellence in research and teaching.

5.1 External Pressures for Reform: Internationalization and the Bologna Process

University reform has been a recurring topic in German politics, but recent reforms constitute the most significant changes since the introduction of *Fachhochschulen* and the expansion of higher education in the 1970s. One major factor leading to the opening of the reform window at the end of the 1990s was international pressure. At that time several international organizations started evaluating higher education systems across the globe and even though organizations like the OECD and the EU did not have direct influence on national policymaking, they had a strong leadership role. Comparisons of international student numbers, showing the popularity of different countries' universities were another factor which led to an increased debate about how German universities could be made more attractive (Buse 2004). Since 1992 the OECD study "Education at a Glance", for example, has regularly published comparative statistics on education. One area in which Germany was repeatedly ranked at the lower end was higher education participation (Leszczensky and Barthelmes 2011, 2). Another field in which the German system lagged behind in international comparisons was higher education financing (Welsh 2002, 9). These direct international comparisons put pressure on German policy makers and universities to keep up with international standards. More generally, internationalization processes such as the increased cooperation between higher education and research institutions across the world, as well as growing international competition among universities, have led to a raised awareness by policy makers of the issues at hand in international comparisons and created pressure to move forward with reforms (Alesi and Kehm 2010, 20-22).

While German reform debates have frequently referred to the American higher education system as a role model (Schreiterer 2009), one of the main driving forces for reforms, particularly for the introduction of new degree structures, was the European *Bologna Process*. This process was started in 1998 when the education ministers of France, Italy, Germany and the United Kingdom met in Paris and signed the *Sorbonne Joint Declaration* in which they proposed the creation of a common European higher education model. This plan was solidified a year later in Bologna, Italy where the education ministers of 29 European countries signed a common plan for the creation of the *European Higher Education Area*. Each signatory com-

mitted to reform its own system to converge with the general European system of higher education. The main incentive for this project was to "strengthen recognition of qualifications and international competitiveness of European higher education" (The UK HE Europe Unit 2007). While Europe had succeeded in forming a common market for goods and services, member countries noticed that education was also becoming more and more important for economic success. Europe was being faced with strong competition in high-skilled labor not only from the United States but also from countries like China and India. "In short, if Europe want[ed] to retain its competitive edge at the top of the global value-added chain, the education system [had to be] made more flexible, more effective and more easily accessible to a wider range of people" (Schleicher 2006).

The *Bologna Declaration* that resulted from this meeting set a deadline of the year 2010 for the implementation of the following goals. First, the declaration called for the introduction of undergraduate and graduate studies in the form of bachelor's, master's, and doctoral degrees. Additionally, it proclaimed the introduction of comparable certification of degrees, in the form of the "Diploma Supplement," which is a standardized certificate written in English that describes the degree earned. A third goal was the implementation of the European Credit Transfer System (ECTS), which enables students to easily transfer credits between institutions, and which also acknowledges lifelong learning activities in addition to university coursework. Fourth, the elimination of remaining obstacles for the international mobility of scholars and researchers, such as regulations on work authorization, was agreed upon. Lastly, the signatories agreed to develop comparable criteria for the quality assurance of study programs (European Ministers of Education 1999).

At the following ministerial conferences in Prague (2001) and in Berlin (2003) these goals were reviewed and new goals were added. Additional goals included common strategies for life long learning, viewing higher education institutions and students as equal partners in the reform process, increasing the attractiveness of the European Higher Education Area for students from abroad, and strengthening the connection between the European Higher Education Area and the European Research Area (mainly by including doctoral studies as a third study tier) (Rehburg 2006, 34).

Besides creating one common European system of higher education and thus making it more attractive for students from America, Asia, and Africa, one main goal of the process was also to improve the employment possibilities of European graduates in the international labor market (Buse 2004, 27). The issue of "employability" was already mentioned in the original *Bologna Declaration* and has become increasingly important. The term was first used by the European business lobby,

particularly by the European representation of the industry and employer associations UNICE and the round table of European industrialists (ERT). Employability refers to a stronger focus of education policy on the needs of companies and the labor market. More specifically, the idea is that study programs must teach students the necessary skills for the labor market while allowing graduates to continuously adjust and upgrade their skills according to the needs for their employment. To make this possible, education ministers and businesses called for the necessary adjustments to European education policy (Keller 2004, 43)

The implementation of these goals was left to the member countries. Since education is not within the realm of EU legislation and the *Bologna Declaration* was not an internationally binding contract, but merely an agreement among the signatories, there was no legislative control for the implementation of the reforms. Thus, it was originally a fairly unstable process and the success depended on the efforts of each signatory country (Buse 2004, 27). However, the neglect of the agreement by one of the signatory countries would have meant a great loss in reputation and respect within the European community. For Germany, as one of the initiating countries, the public commitment to the Bologna goals created enough international pressure to push forward reforms on the national and state level (Keller 2004, 20).

In 1996, even before the *Bologna Declaration* was signed, the German conference of education ministers (KMK) called for the introduction of bachelor's and master's degrees. In early 1998, the CDU government integrated bachelor's and master's degrees in the HRG as a trial. Additionally, some universities had already introduced bachelor's and master's programs before it was made legal through the revision of the HRG (Keller 2004, 27-28). Thus, university reform had already been on the agenda in Germany and the different interest groups debated various reform options as the next section will show. The *Bologna Process* provided the necessary impetus to come to agreements and go forward with reforms.

5.2 Internal Pressure for Reform: The Stakeholders' Positions and the Political Debate

As with many reforms in Germany, the enactment of higher education reforms was greatly influenced by party politics, interest group pressures, and German federalism. This section will review the different stakeholder positions on German higher education reforms and focus on political parties; professors, students, and universities; as well as the federal and *Länder* governments.

5.2.1 Party Positions

The more conservative parties (CDU and FDP) and the more liberal parties (SPD, Greens, Left Party) diverge the most in their positions on higher education policy. The following summary focuses on party programs and positions from the 1990s that have been analyzed by two studies, Stern (2000) and Buchmann (1999).

The **CDU/CSU** have promoted private institutions, competition between institutions and more autonomy for universities. In one of their programs they stated: "For an increased autonomy of universities we need to create the conditions for strong, transparent, capable performance structures. The state needs to reduce its intervention to basic framework creation."[2] (cited in Buchmann (1999, 187)). These parties see the *Abitur* as the best measure of university qualification, but also advocate entrance possibilities for highly talented apprentices. Additionally, the CDU/CSU demanded further support of *Fachhochschulen*, more cooperation between industry and universities and new financing models for universities. They also saw the introduction of tuition fees as a measure to help solve German universities' financing problems and to improve university performance (Stern 2000, 116 and 126). In terms of study programs the CDU/CSU focused on shortening study times and creating conditions in which "it is possible to finish an employment-qualifying degree within the regular study time" (Buchmann 1999, 171). They favored the introduction of bachelor's and master's degrees and promoted a credit system to keep up with international standards (Buchmann 1999, 187). Overall, the CDU/CSU have focused on higher education as a means for economic success, to keep up with the global knowledge competition and to support elites (Buchmann 1999, 182).

The **FDP** supported the CDU on the above points, as well as promoting private institutions, deregulation and the advancement of highly talented students (Stern 2000, 120–122). They particularly focused on more autonomy for universities and stated in their program that an increased autonomy for universities was needed so that the institutions can better use their scarce resources for a larger offering of courses and activities for students (Buchmann 1999, 196). The FDP originally supported tuition fees only for those students who have passed the regular study time or are getting a second degree. Later in the reform process, however, they also supported general tuition fees for first degrees (Buchmann 1999, 196).

The **SPD**, the **Green Party** (Bündnis 90/Die Grünen), and the **Left Party** (formerly PDS) have traditionally held the opinion that tuition fees would limit

[2]Translation by the author, original: "Zur Stärkung der Autonomie der Hochschulen [...] wollen CDU/CSU [...] die Rahmenbedingungen für starke, handlungsfähige und transparente Leitungsstrukturen auf allen Ebenen schaffen. Der Staat soll seine Eingriffe auf Rahmensetzungen beschränken."

access to higher education and opposed their introduction. All three parties emphasized equal and open access to higher education for all groups of society. In contrast to the CDU/CSU the left-wing parties did not see higher education as a privilege for the elite, but for everybody (Buchmann 1999, 178). The Left Party particularly focused on the creation of a so-called *Gesamthochschule* that eliminates the differences between *Fachhochschulen* and research universities and supported a full equalization of existing FHs and universities in terms of degree recognition and the right to grant doctoral degrees (Buchmann 1999, 200-201). Additionally, the Left Party fought for a 'right of self-determination' (increased autonomy) for students which they wanted to be included in the HRG. The Left Party is the only party that did not support the introduction of bachelor's and master's because they feared the separation between research-oriented and employment-oriented programs (Buchmann 1999, 202-204).

The Green Party focused on more autonomy for universities, while SPD and Left Party supported government regulations for university governance. The Green Party stated in their program: "In order to achieve greater autonomy and fewer state interventions we need clear responsibilities, as well as transparent and democratic structures in universities"[3] (cited in Buchmann (1999, 180)). For the Green Party, higher education institutions have become the main institutions that are needed to prepare a large part of society for the demands of today's labor market (Buchmann 1999, 178).

The SPD did not only emphasize the importance of higher education for economic reasons, but also focused on the role of universities as cultural institutions. They particularly found it important that universities also offer opportunities to fulfill individual education needs without any direct vocational or economic use (Buchmann 1999, 206). The SPD supported the European harmonization of higher education degrees and the introduction of bachelor's and master's degrees in Germany. In their federal program they rejected the introduction of general tuition fees (Buchmann 1999, 209-212). However, some of these attitudes seem to have changed during the course of reforms, particularly in the SPD's *Länder*-chapters, as will be shown in the analysis below.

These party positions strongly influenced the discussion about higher education reforms in Germany and complicated policy-making processes. This influence became especially evident in times of divided government. While the SPD and the Green Party had the majority in the *Bundestag* and the *Bundesrat* from 1998 until

[3]Translation by the author, original: "Größere Autonomie und Zurücknahme staatlichen Einflusses verlangen klare Verantwortlichkeiten, transparente und demokratische Strukturen in den Hochschulen."

2002, several SPD-ruled *Länder* governments lost state elections to the CDU and FDP, so that by 2002 there was a divided government with a Social Democratic and Green Party majority in the *Bundestag* and a majority of Christian Democratic and Liberal majority in the *Bundesrat*.

5.2.2 Professors, Students, and the HRK

As described in Chapter 4.1.2, professors, students, and higher education institutions all have their own organizations to represent them in the policy-making process. University professors, represented by the DHV, were not in favor of reforms, particularly the introduction of new degrees. While the DHV did not reject reforms completely, they wanted the new degrees to be introduced alongside the old ones instead of replacing the *Diplom* and *Magister*. The professors' critique was that the shorter bachelor's programs were too short to fit all necessary content in them. Additionally, professors were worried about the reputation of German university degrees, particularly that of the *Diplom - Ingeneur*. They proposed that departments should be able to decide for themselves which degree programs they would like to offer (Deutscher Hochschulverband 1999). On other issues of the higher education reform professors had less strong opinions, but advocated to keep the differences between FHs and research universities, proposed new admission criteria in addition to the *Abitur* grade, and warned that reforms could only be successful if they were supported by additional funding (Deutscher Hochschulverband 1997). Professors were also wary of the proposed changes to university governance and of the new professorship models, but according to several interview partners this changed with an influx of younger members to the professorate (Interview 1 LMU Chemistry, Interview Mannheim Business).

Students particularly demanded the provision of better teaching and services, such as mentoring and advising, and well-structured study programs. They also supported the demand for an internationalization of higher education, but rejected the introduction of tuition fees because of the fear of social stratification (Hensel 2003). The student organization *fsz* generally welcomed the introduction of the European Credit Transfer System (ECTS) and proposed substituting German grading with ECTS-grades. The *fsz* was pro modularization and hoped that modularization would make studying more flexible, particularly if modules were not bound to a particular semester but allowed for interruptions in order to work or for family reasons. Students were originally skeptical about the introduction of bachelor's and master's degrees. They were afraid that instead of reforming university curricula, the new degrees would be used to shorten programs and limit access to master's

programs. Students did not support the introduction of the new degrees in addition to traditional degrees, but rather advocated for new flexible modularized programs that allowed for a combination of different programs. Students were not generally opposed to calling the new degrees bachelor's and master's but warned that other areas, e.g. the legal recognition and rules for public service employment, had to be adjusted to accept the new degrees (freier zusammenschluss von studentInnenschaften 1998). As for the role of FHs and research universities students favored an equalization of all higher education institutions and wrote: "In the future students should be able to choose between equivalent and compatible study programs and not between types of institutions"[4] (freier zusammenschluss von studentInnenschaften 1998).

The main body that represents higher education institutions as a whole, the HRK, was greatly involved in the reform process. While most political actors were eager to get reforms under way, the HRK was more cautious though in the end they also supported the reforms of the HRG. In 1996 the HRK published their own guidelines for reforms in which they proposed the introduction of a degree system that is more compatible to the anglo-american system in order to attract more foreign students. The HRK was also hoping for shorter study periods and an increase in degree completion rates. They initially thought that these goals could be achieved by reforming existing degrees instead of introducing bachelor's and master's degrees. However, a year later, only a few weeks after the *Länders'* education ministers had declared to introduce new degrees, the HRK no longer questioned the introduction of bachelor's and master's degrees and started publishing their own criteria for the new programs. They demanded the introduction of bachelor's and master's at both FHs and universities, but wanted to keep the old degrees alongside the new ones. (Rehburg 2006, 35-37). On other reform issues the HRK was similarly ambiguous. For example, they originally rejected the idea of introducing tuition fees, because they feared that would lead to funding cuts from the states, but later proposed their own model of student fees (Schilden 2004).

5.2.3 The Federal Government and the Länder

The *Länder* hold the main responsibility for higher education policy. Therefore the federal government and the federal education and science department can only play a limited role in shaping German higher education. However, in recent years the federal eduction department has gained influence. Some of the reasons that have been

[4]Translation by the author, original: "StudentInnen sollen künftig zwischen gleichwertigen und kombinierbaren Studienangeboten und nicht zwischen Hochschultypen wählen können."

mentioned for this growing influence of the federal level in higher education policy are the comprehensive task of integrating East German universities and research institutes into the West German structure, an increasing involvement of international organizations such as the OECD in education policy, as well as Edelgard Buhlman as a young energetic secretary of education (Welsh 2002, 16).

However, with governments changing over the course of the past two decades, positions on higher education also changed according to party preferences. These differences were mainly significant for the issues of introducing tuition fees, new professorship models, and new governance and financing models. For example, When the *Bund* was still under CDU/CSU/FDP control it supported the introduction of tuition fees. However, in 2002, the new government controlled by SPD and Green Party introduced a paragraph to the HRG that would prohibit the *Länder* from raising tuition fees. However, this was challenged by the institutional court and the CDU-governed *Länder* started introducing fees. A few years later, even SPD-ruled *Länder* did not oppose fees anymore (Der Spiegel 2003). Similarly, the introduction of the junior professorship by the SPD/Green government in 2002 was overruled by the constitutional court on the grounds of interfering with *Länder* matters. Most *Länder*, however, introduced the new professorship anyway (Leffers 2004). Even federal initiatives that benefited the *Länder*, such as the "Excellence Initiative" that provided millions of additional research funding for universities, have often been hindered by party politics and arguments about the degree of influence the *Bund* should be granted in higher education policy.

However the *Länder*, represented by the *Bundesrat* and the KMK do not have one voice. As Welsh describes it:

> "The Standing Conference of the State Ministers of Education and Cultural Affairs [KMK] is one of the most heterogeneous institutions among those responsible for policymaking in higher education. Party affiliation, geography, and financial strength are only some of the guiding principles for action. More often than not, coalitions for change (or resistance) form according to issues. Although Länder ministries of the CDU/CSU opposed the public service law in both houses of parliament, with regard to other topics, such as tuition payment and the introduction of new degree programs, the very same actors are often at the forefront of reform " (Welsh 2002, 15).

This multitude of opinions and the interlocking system of German federalism explains why higher education reforms have been slow and often only changed marginal details in the past.

In contrast, both political camps, the two federal levels of government, and most interest groups supported the introduction of new degrees and the *Bologna Process*. Rütgers, as federal Education and Science Minister (CDU) signed the *Bologna Declaration*, but later Bulmahn (SPD) continued to implement the new degrees in the structure of the HRG. On the *Länder* level, the KMK already published basic guidelines on the new degrees in 1997 before the Bologna Declaration was signed and several changes of *Länder* governments did not influence their stand on the changes in the German degree structure. In addition, non-governmental institutions such as the HRK and the *Wissenschaftsrat* supported the process (Keller 2004, 26). Even more important from a VoC perspective, which sees firms in the center of the political economy, the business community also supported reforms and had specific demands which will be discussed in the next section. This unique coalition of actors made change in higher education possible.

5.3 Employer Expectations of Reforms

Since the beginning of reform debates in 1998, businesses have focused on the role of German companies within the international political economy. In one of the first position papers from 1998 the Federation of German Industry (*Bundesverband der deutschen Industrie* - BDI) emphasized the importance of an international perspective in policy-making. They expected more competition for businesses and individuals on the international level and demanded the same on the domestic level (BDI 1998, 7). The BDI demanded an internationalization of universities on all levels and repeatedly referenced higher eduction systems in liberal market economies: "In a highly interconnected world they [universities] need to be open to highly qualified employees, scientists, and foreign students in the same way as, for example, Canada or the United States are and not reject them"[5]. One emphasis in future policies should thus be given to language skills in companies, schools, universities, and government administration (BDI 1998, 10-13).

The business community also recognized the changing role of the working environment and the increasing importance of services, information technology, and knowledge in international markets. The BDI calls it a shift towards a "productive information society"[6]. They describe it as follows: "Not only the organization of work, but also its content will change. More and more employees will work on the

[5]Translation by the author, original: "Sie werden sich darüber hinaus in einer vernetzten Welt hochqualifizierten Arbeitskräften, Wissenschaftlern und ausländischen Studenten genausowenig verschließen wollen wie z.B. die USA und Kanada."

[6]Translation by the author, original: "produktive Informationsgesellschaft."

generation, collection, processing, distribution, and commercialization of information. The pure production of goods will take a back-seat and highly qualified labor will dominate over low-skilled labor"[7] (BDI 1998, 18–19). This revelation explains to some extent why businesses are shifting their focus from the vocational training system towards higher education. In the future they will need highly qualified employees on all levels of production. The information society, thus is characterized by "a growing demand for highly qualified work. More than ever will we need to use our brains instead of our brawn"[8] (BDI 1998, 19). However, businesses found that Germany is comparably slow in adjusting their organization of work (for example work from home, flexible labor laws) and their education system to the new conditions of the labor market. The paper again refers to the United States and demands that the education system not only needs to provide "qualification in the strictest sense, but also needs to teach willingness for change and risk taking, entrepreneurial thinking, and team spirit"[9] (BDI 1998, 24).

The BDI criticizes several specific shortcomings of German higher education: 1) lengthy study periods, 2) a lack of internationality and transparency, 3) missing evaluations in teaching as an instrument for quality control, 4) deficits in cooperation with the business community, and 5) the cumbersome bureaucracy at universities caused by high state intervention (BDI 1998, 31). The BDI therefore demanded more autonomous and less bureaucratic higher education institutions, the establishment of more *Fachhochschulen*, as well as more practically-oriented and shorter study programs at research universities. The BDI thought that programs should be modularized so that learning periods alternate with working periods, which allows for flexible life-long education. Deregulation, higher performance and more competition between institutions, professors, and students are other factors that the BDI wanted to be addressed (BDI 1998, 31). They emphasize the importance of business-like structures in universities and schools for teaching their students entrepreneurial thinking and acting. In addition, they find it particularly important to integrate business and management skills in a variety of university programs to facilitate the founding of new companies (BDI 1998, 31). The BDI also acknowledged that people usually do stay with one employer for their entire life anymore as job tenure rates

[7]Translation by the author, original: "Verändern werden sich nicht nur die Organisationsformen der Arbeit, sondern auch die Arbeitsinhalte. Immer mehr Beschäftigte und Unternehmen werden sich mit der Generierung, Sammlung, Verarbeitung, Verteilung und Vermarktung von Informationen befassen. Die reine Herstellung von Waren wird immer mehr in den Hintergrund treten. Hochqualifizierte Arbeit gewinnt weiter an Gewicht gegenüber einfacher Arbeit."

[8]Translation by the author, original: "Es wird noch viel mehr als bisher 'mit Köpfchen' gearbeitet werden [...] zeichnet sich also gerade die Informationsgesellschaft durch einen wachsenden Bedarf an hochqualifizierter menschlicher Arbeit aus."

[9]Translation by the author, original: "Nicht nur Qualifikation im engeren Sinne, auch Veränderungs- und Wagnisbereitschaft, unternehmerisches Denken und Teamfähigkeit müssen Zielgrößen von Bildung werden."

are decreasing. Thus, "life-long willingness and the ability to learn are much more important than the accumulation of knowledge in early education phases, due to the decreasing half-life of knowledge"[10] (BDI 1998, 28).

A year later, in 1999, Hans-Olaf Henkel, president of the BDI, repeated these expectations of higher education reforms in a speech. He demanded more autonomy and competition for universities, shorter study periods, younger graduates, more applied programs with a practical component, a closer cooperation between universities and businesses, and higher investment in education by the federal government. Henkel concludes that these problems need to be addressed in order to prevent highly qualified young scientists and students from emigrating to countries like the USA and Canada (Henkel 1999).

In 2002 the Conference of German economic ministers, ministers of education and several business organizations, published a joint statement on the improvement of the German higher education system. They again emphasized the importance of education as an economic resource and demanded a closer connection between the job market, vocational training and higher education (Wirtschaftsministerkonferenz 2002, 5). Like the BDI, they demanded more competition and an internationalization of German higher education. They also welcomed the introduction of a two-tiered degree system (Wirtschaftsministerkonferenz 2002, 10).

In 2003 the Confederation of German Employer Organizations (*Bundesvereinigung der Deutschen Arbeitgeberverbände* - BDA) published two detailed position papers in which they summarized their "central opinions and demands on the Bologna Process" (BDA (2003a) and BDA (2003b)): First, in their view, higher education also needed to address the needs of practical work. In addition to subject-specific knowledge, graduates should acquire transferrable multidisciplinary skills. These transferrable skills can range from foreign languages to intercultural skills, presentation techniques and problem solving competencies that can be learned in project work, as well as the ability to continuously learn new concepts (BDA 2003a, 3). They also welcomed a closer cooperation of universities with businesses and a required practical part (for example an internship) in most programs. A second demand by business was the internationalization of degree programs. This does not only include the requirement to take a foreign language class, but also classes taught in a foreign language and exchange semesters that are built into the curriculum and counted towards the final degree. Lastly, employers demanded shorter study periods and younger graduates. By reducing the time to the first degree businesses hoped

[10]Translation by the author, original: "Lebenslange Lernbereitschaft und -fähigkeit sind angesichts stark sinkender Halbwertzeiten des Wissens wichtiger als Wissensanhäufung in frühen Bildungsphasen."

to reduce drop-out rates and offer graduates a chance to receive some on-the-job training before going on to a higher degree (BDA 2003b).

In 2005, about six years after the first new degrees had been introduced at a few universities, the BDI published another position paper. It again welcomed the introduction of bachelor's and master's degrees, but was more critical towards them than in their 1998 paper. The main concern they had was that universities needed to change their curriculum and focus their new degree programs on transferrable skills, internationality, flexibility and a closer relation the working world. They particularly stated that it must be possible to switch disciplines between the bachelor's and master's degrees, e.g. to start a master's in business administration after a bachelor's in engineering. In their opinion, this kind of flexibility was still missing in the first new programs and to them it often seemed as if the bachelor's degree was just a shortened *Diplom*. Industry not only expected a new shorter first higher education degree but also hoped for a greater variety of "routes of education", which would allow graduates to be better qualified for the needs of businesses. The BDI did not support bachelor's programs that were only geared towards leading into a master's program and expected a greater transmissibility between higher education and vocational training (BDI 2005).

All of these position papers show that German firms had a clear picture of their demands on higher education policy. German employers demanded greater flexibility, a broader internationalized curriculum and a focus on general transferrable skills, as well as an emphasis on employability skills and practical experiences. From a VoC perspective these demands seem to indicate a shift towards a liberal higher education system. However, my interviews with employers and employer associations, presented in chapter six, as well as recent employer surveys indicate that German employers do not prefer an American-style liberal arts education, but rather demand more flexibility and broader knowledge within a certain field.

5.4 Reform Measures and their Implementation

The above discussion has shown that reforms of the German higher education system have been pushed forward in several different areas. While the introduction of new degrees, which this study focuses on, is the main change, all reform measures are inter-connected (Rehburg 2006) and it is thus important to understand them as a whole. In addition, including other areas of higher education besides the degree programs will be helpful in answering the question of the proposed "Americanization" of the German system. The following section will shortly review reform measures

passed between 1998 and 2010 and discuss whether they indicate a shift towards an American-style higher education system.

5.4.1 Revisions of the Hochschulrahmengesetz since 1998

In 1998 the SPD-Green federal government started to reform the Federal Framework Law on Higher Education (*Hochschulrahmengesetz* - HRG). The main changes were aimed at deregulation, diversification, and marketization of the system. The first revision, in the form of the fourth amendment to the HRG, introduced a test phase for bachelor's and master's degrees and allowed alternative sponsorship forms for higher education institutions. Article 58 of the HRG now states that higher education institutions are "usually public bodies in state sponsorship," but they "can also be established in other legal forms" and have "the right to self-administration"[11] (Bundesrepublik Deutschland 2005, 17). The fourth amendment also included a revision of state financing regulations, so that Article 5 of the HRG now reads: "Government financing of higher education institutions is dependent on the performance in research and teaching, as well as on the achievements made in the advancement of young scientists"[12] (Bundesrepublik Deutschland 2005, 4).

The fifth amendment of 2002 reformed the structures for academic faculty positions and introduced so-called "junior professorships," a professorial position that does not require a habilitation, but accepts other scholarly work as qualifications[13]. It was followed by the sixth amendment of 2002, which officially introduced bachelor's and master's degrees.

A second reform of the framework law was the deregulation of degree structures and exam regulations. Many articles that regulated the specifics of exams and the structure of study programs were discarded and more autonomy was given to the institutions themselves. Article 70 of the HRG defines that private higher education institutions can be accredited according to state law if they fulfill accreditation requirements (Bundesrepublik Deutschland 2005, 18). These requirements are to be checked by independent agencies such as the Science Council (*Wissenschaftsrat*) (Kühler 2005, 479). During this revision of the HRG, the federal government, then ruled by an SPD-Green coalition, also added an article stating that the first degree

[11] Translation by the author, original: "Die Hochschulen sind in der Regel Körperschaften des öffentlichen Rechts und zugleich staatliche Einrichtungen. Sie können auch in anderer Rechtsform errichtet werden. Sie haben das Recht der Selbstverwaltung im Rahmen der Gesetze."

[12] Translation by the author, original: "Die staatliche Finanzierung der Hochschulen orientiert sich an den in Forschung und Lehre sowie bei der Förderung des wissenschaftlichen Nachwuchses erbrachten Leistungen."

[13] As described above, this part of the HRG was rejected by the Constitutional Court in 2004 and had to be removed on the grounds that it interfered with the rights of the *Länder*.

that qualifies graduates for the labor market has to be free of charge for the students. However, six CDU-ruled *Länder* filed a claim with the German Constitutional Court against this prohibition of tuition fees and won their case. This court decision of 2005 thus made the introduction of tuition fees for the first higher education degree legal (Pritchard 2006, 95).

A seventh amendment of 2004 reformed admission policies and gave universities the right to select sixty percent of their students by their own criteria. In addition to these HRG revisions, the federal government launched a national competition between universities for extra research funding (*Excellenzinitiative*).

5.4.2 Two-tiered Degree Structure

The debate over the introduction of new, two-tiered degrees at German universities is not unique to the Bologna process, but goes back to the 1960s and 1970s when the *Wissenschaftsrat* proposed to introduce two separate degrees: one for all students and one for those who are particularly interested in research. In addition, they suggested part-time programs for working students and a forced expulsion after nine semesters to limit study times. Some of these proposals caused student protests that eventually lead to the 1968 student movement (Keller 2004, 27).

In Germany, the implementation of the Bologna goals started with the reform of the HRG, which introduced bachelor's and master's programs, a credit point system, and quality assurance regulations as a test project in 1998. By 2002, the international pressures of the *Bologna Process* had also convinced Christian Democrats of the usefulness of new degree structures, and bachelor's and master's degrees were defined as new standards (Schwarz-Hahn and Rehburg 2003, 11). The HRG of 2002 defines a bachelor's program as lasting at least three but no more than four years, while a master's program can last one to two years. The bachelor's is intended to be a general first degree qualifying graduates for the labor market and offering the possibility of entering a master's program and later doctoral programs for those students who wish to continue in academia [14]. The law also implements the "Diploma Supplement" and the ECTS as the standard credit system. Additionally, structures for accreditation of new degree programs were created (Bundesrepublik Deutschland 2005, 6-7, 18).

The accreditation of new German degree programs is done by independent agencies. These agencies are themselves also accredited by the so-called "Accred-

[14] Only about 10 percent of all students currently stay in academia with the old degree structure. That is why there are now fewer places offered in master's programs than in bachelor's programs (Stallmann 2002).

iting Council" (*Akkreditierungsrat*). The council consists of 17 members who are representatives of the states, higher education institutions, students, and businesses (Hochschulrektorenkonferenz 2007). By the winter semester 2006/07, a total of 5,188 bachelor's and master's programs had been introduced. This represented 45 percent of all degrees offered. Interestingly, *Fachhochschulen* already offer 69 percent of their programs with bachelor's and master's degrees, while only 39 percent of university programs are offered with the new degrees (Hochschulrektorenkonferenz 2006, 9).[15] This indicates that *Fachhochschulen* were trying to close the gap with universities by quickly implementing the new degrees, which are now completely equal to university degrees.

The reform of the German degree structure clearly shows elements of an Americanization of the German higher education system. The advantages of a two-tier system like the American one, such as flexibility, shorter study periods, and career-orientation, served as a role model for German reforms. However, there are also factors that indicate a European or international trend in terms of convergence in higher education degree structures. In addition, the German reform of degree structures still has significant limits that need to be addressed.

As described above, the introduction of new degrees was mainly motivated by the EU's Bologna Process. Without the necessary external pressure a change in degree structures would not have been implemented as quickly, even with the American system as a role model. Huisman and Kaiser (2002) analyzed recent policy trends in Western European higher education policy. They found that higher education has become increasingly internationalized and certain issues, such as the Bologna Process and private contributions to higher education, play a major role in all European countries examined. One reason they give for this development is that higher education has become a measure of international competition strongly related to economic competition. Countries therefore tend to pay more attention to the policies of their major trading partners. A second reason is the growing importance of supranational (i.e. EU) legislation: "The signing of the Sorbonne and Bologna Declarations and the agreements concerning the European Research Area can be seen as illustrations of such supra-national level developments" (Huisman and Kaiser 2002). Thus, the introduction of bachelor's and master's programs in Germany seems to not only be influenced by the American higher education system. Furthermore, the new programs still show shortcomings that need to be addressed.

As shown above, American bachelor's programs are characterized by general

[15]Six years later in 2013 bachelor's and master's programs made up the majority of all programs: There were 7,477 bachelor's programs and 7,067 master's programs. Together this represented 87 percent of all programs (Hochschulrektorenkonferenz 2013d).

studies, requiring students to not only take courses in their concentration, but also in other areas. German undergraduate programs, on the other hand, still mainly concentrate on one subject, relying on the student's two years of *Abitur* work for general education. For foreign institutions, however, this system is not very transparent. Recent trends of lowering the *Gymnasium* period to 12 years in almost all states, in particular, will make it even more difficult to explain to foreign institutions the difference in length and focus of German undergraduate programs (Kühler 2005, 483).

Moreover, American universities put a tremendous effort into sustaining lower student-faculty ratios and offering more personal interaction between faculty, advisors, and students. As long as this factor is not being addressed in German higher education institutions, the introduction of bachelor's and master's programs will not change the conditions for German students significantly. It might even worsen conditions to some extent, considering that in a structured bachelor's program, students will be required to attend all class sessions, which is not always the case in the old degree systems. This means that, particularly in popular programs, those students who traditionally decided to study for themselves will now need to attend sessions and this could lead to even more crowded classes if the number of instructors is not raised. Requiring internships, a structured schedule, and exchange semesters is also only effective if the departments or institutions can provide students with the necessary guidance to plan and organize their studies and additional activities. The introduction of advisors and career counselors is therefore necessary in addition to the reform of the degree structure. Additionally, the introduction of new degrees also needs to address shortcomings in the quality of teaching. If the new bachelor's programs are intended to be more practically oriented, professors need to change their theory- and research-based teaching approaches. Applied coursework, such as field studies or group projects, however, requires small classes and more time of the professor, which leads back to the issue of decreasing the ratio of students per faculty member.

5.4.3 New Forms of Sponsorship and Governance

Several states took advantage of the new regulation of legal forms for higher education institutions and introduced **new sponsorship models** such as privatized universities (*Stiftungsuniversitäten*) run by foundations and private higher education institutions (*Privatuniversitäten*) run as proprietary companies. These new regulations, passed under a Social Democratic federal government, were to increase the autonomy of higher education institutions and limit the rigid system of regulations

set by the *Länder*. However, as can be expected, not many *Länder* governments want to lose power over higher education, so that the actual implementation of these regulations is still limited.

Privatized universities have been introduced in Lower Saxony, for example. These were originally public state-run universities, but the state then turned all university property (land, buildings, equipment) over to a foundation that was founded to run the university. The foundation can use this property as basic capital with the requirement to sustain or increase it. With the transfer of sponsorship to a foundation, the universities are no longer sub-departments of the state's Science and Education Ministry, but autonomous public corporations (*Körperschaften des öffentlichen Rechts*). In addition to the basic capital, the state also still funds operating expenses and investments. These state funds are not influenced by the level of third-party funding and the state government no longer has access to university funds. The foundation also becomes the employer of all faculty and staff. Governance of the new foundation is divided between the foundations' boards and the universities' executive committees. Many of the newly founded foundation boards include members from businesses and other areas outside of academia (Kühler 2005, 467-468). Thus these universities gained a great degree of autonomy and closer links to businesses.

Although this form of sponsorship is still more state-dependent than the models that can be found in the United States, elements of American governance models, such as external board members and endowments, can clearly be seen. However, this new approach has not been widely implemented yet. Only Lower Saxony, Brandenburg, Hesse, and Bavaria have changed their higher education laws to privatize state universities. In Saxony, attempts to privatize Dresden University failed in the state parliament (Dresdener Universitätsjournal 2007, 6). Lower Saxony successfully transferred five universities to foundations, Hesse and Brandenburg each transferred one (Goethe University in Frankfurt and European University Viadrina in Frankfurt (Oder)), but were faced with difficulties. In Hesse, students protested against the transformation of their university, because they felt left out in the negotiations. Employees also rejected the new sponsorship form at first, but finally agreed after they negotiated an agreement that gave them a job guarantee. In Hesse, the FDP supported the CDU government's plans, while the Left Party rejected it. In Brandenburg, however, it was the CDU (in a coalition government with the SPD) that originally blocked a transformation of the European University Viadrina, by requiring veto powers on financing decisions (Euler and Zoske 2007; van Laak 2006). These difficulties again show how complicated the German policy-making process can be at all levels of government. However, 10 years after the first *Stiftungshochschulen* have been introduced, they are still very dependent on state financing (e.g. Frank-

furt still receives 87 percent of their funding from the state) and only receive very little private funding. Furthermore, some actors are advocating going back to a fully state-dependent model for some of the universities (Schulze 2013).

The new regulations contained in the HRG also made it easier to found private institutions of higher education. Since 1998 the number of private institutions has grown continuously. According to the HRK there were five private universities (with the right to grant PhD degrees) in 1998; in 2002 this number had grown to thirteen universities but has not increased since then. More significant, however, are private *Fachhochschulen*. They have always been more dominant than private universities and their number grew from 33 in 2002 to 50 in 2007, and 98 in 2013. In total there are 112 private higher education institutions and 238 state- or church-run universities and FHs (Kühler 2005, 470; Hochschulrektorenkonferez 2007, Hochschulrektorenkonferenz 2013b).

Similar to privatized universities, private higher education institutions have greater autonomy than public universities. Most of these institutions collect tuition fees, but also offer small classes, international lecturers and students, and alumni as well as career networks. The biggest problems for private institutions, however, lies in financing. Most of them are financed by a mixture of funds. Many of them receive start-up capital from the government according to the "university building law" (*Hochschulbauförderungsgesetz*)[16]. Other sources include private endowments, tuition, donations, and university income (e.g. through hospitals, etc.). However, many of these sources are not guaranteed continuously and major private contributions are still rare in Germany (Kühler 2005, 471).

Despite many new foundations since 1998, private higher education institutions still represent a small minority of all German higher education institutions. Compared to American institutions they are also mainly job oriented and cannot compete with successful private American research universities (Kühler 2005, 472-473). While the increase in numbers of private institutions does show a trend towards private involvement in higher education, which can be seen as an element of Americanization, the institutions themselves and their significance for the higher education system are not comparable to American private universities.

In addition to introducing new forms of sponsorship, the federal government also aimed to steer public institutions towards **new models of governance** and

[16]It states that the federal and state governments are responsible for the provision of structural conditions for research and teaching; original: "Bund und Länder haben bei der Erfüllung der Gemeinschaftsaufgabe darauf hinzuwirken, daß die baulichen Voraussetzungen für ein ausgewogenes Verhältnis von Forschung und Lehre und für eine funktionsgerechte Hochschulstruktur und Neuordnung des Studiums geschaffen werden" (Bundesrepublik Deutschland 1969).

financing that are led by market competition rather than state intervention. The fourth amendment of the HRG introduced performance-oriented financing and abolished all regulations on internal institutional governance. Article 58 and 59 now only define the states' right to pass legislation on higher education and higher education institution's right to self-administration. Thus, it is now left to the *Länder* to decide how much freedom they want to give higher education institutions. As a result there are many different models of governance and financing. However, two common practices, the introduction of boards of trustees and stronger university presidents, can be found in several federal states. The following section will describe these changes.

Fourteen *Länder* have introduced "boards of trustees"[17] after the reform of the HRG. In most states, each body is responsible for a single institution; only Brandenburg introduced a state-wide board of trustees for all institutions (Kühler 2005, 509). Their structure and organization, however, varies from state to state. In Baden-Württemberg they consist of 13 members; six must be drawn from outside the university. Their function is to supervise the universities' chancellors and to give strategic recommendations. In Saxony, on the other hand, boards are more influential and have already been able to carry out reforms of financial controls and accounting methods (Pritchard 2006, 97). According to Kühler, most boards consist of university representatives, state representatives and members from businesses or other non-university organizations. Their term in office is limited to three to five years in most states and they are elected by the higher education institution and the state department of education (Kühler 2005, 509).

However, the introduction of boards of trustees has been quite controversial. Those opposed to the boards (mainly students, professors, and university staff) are afraid that they will dominate the traditional democratic organs of higher education institutions, such as the senate, and think they lack legitimacy and inner knowledge of the institution. They also fear that the boards are not powerful enough to bring about financial change. Supporters of the new boards (university management, CDU politicians, businesses), on the other hand, claim that the boards will establish a connection to society by external representation. They also believe the new structures will reduce the influence of the *Land* and make higher education institutions more independent (Pritchard 2006, 96-98).

The new bodies in German higher education institutions show some similarities to American boards of trustees. Their members include external representatives and in eight states the boards are responsible for electing the head of the university (Kühler 2005, 509). However, their general authorities are much more limited than

[17] *Universitätsräte*, *Hochschulräte*, *Kuratoria*

those of American boards of trustees. Most of them are still heavily dependent on the states, especially financially, and most of them act in a purely advisory capacity (Stifterverband für die Deutsche Wissenschaft 2002, 18).

New models of governance intend to give the university management, and the president in particular, more power over departments and professors, as well as in relationship with the states' ministries of education. In the past the head of a university had been generally weak and had to cooperate with the financially and administratively strong *Land* on the one side, and with independently acting professors on the other side (Winter 2004, 130). Many state laws have included some regulations on the internal management of higher education institutions, while others have left it completely up to the institutions to organize themselves. It is therefore difficult to generalize about the reform of university management structures[18].

Those advocating for stronger presidents hope for more efficiency, institutional autonomy, less administrative work for professors, and a clearer division of authority between the different parties involved. These elements also represent the positive characteristics of American university structures. However, German presidents still do not have the autonomy that American university presidents have. German professors are reluctant to give up some of their authority and students fear that their democratic say within the various university bodies will be overruled by a strong president (Kühler 2005, 512). As with other elements of the German higher education reforms, the intentions for change are there, but attitudes of some stakeholders still need to change in order to make reforms effective. Kühler notes: "Essentially a change of culture within higher education institutions is conceivable and necessary to give the president a chance to actually use the possibilities of an increased institutional autonomy"[19] (Kühler 2005, 513).

[18]In eight states, the management gained control over the distribution of resources, employment, as well as other operative decisions. In four states, the university senate is still more powerful than the university management and has the decision-making power over the budget and resource distribution, as well as a veto-right against the management. The university president's authority also varies from state to state. In some states, the president is responsible for guaranteeing that all faculty members fulfill their tasks according to teaching- and examination regulations and with respect to the mentoring of students (*Aufsichts- und Weisungsrecht*). In others, he or she can only give guidelines concerning institutional policies (*Richtlinienkompetenz*). In a third group of states, the president has both authorities (Stifterverband für die Deutsche Wissenschaft 2002, 20).

[19]Translation by the author, original: "Grundsätzlich ist [...] zugleich ein Kulturwandel an den Hochschulen absehbar und notwendig, damit die Möglichkeiten einer erhöhten institutionellen Autonomie durch den Präsidenten auch wahrgenommen werden können."

5.4.4 New Financing Models

> "So far the principle of equality ruled between universities. Whether in Kiel, Constance, Cottbus, or Cologne: Every professor has the same workload, every department has to accept the same number of students per professor - irrespective of whether it focuses more on research or teaching"[20] (Spiewak 2005).

This principle was broken with the introduction of **performance-based financing** regulations by the fourth amendment to the HRG. These regulations affect the overall financing of higher education institutions and the financing of professors. The specific article in the HRG, however, only defines that the funds are to be provided by the state based on performance and gives no further details as to how this is to be implemented. We therefore, again find various models of financing in the different *Länder*.

Traditionally the states decided on the specific use of state funds within each institution by using itemized budgets. This often led to situations in which universities were lacking funds for one thing, e.g. creating new computer labs, but still had money left over for another, e.g. personnel costs. Instead of being able to shift money between areas, the leftover funds had to be given back to the state, while the institution had to wait for the next fiscal year for more funds for the areas that were underfunded.

One solution to the problem was the introduction of global budgets, where the institutions received a set amount of money and had autonomy for distributing the funds among the different departments and areas (Pritchard 2006, 100). In most states global budgets have been introduced in connection with "Goal Agreements" (*Zielvereinbarungen*). In these agreements the higher education institution and the state agree on performance goals, such as numbers of dissertations, graduation rates, or real estate management, and on the budget needed to achieve these goals. If the goals are achieved, financing is guaranteed by the state for the next year. If goals are not achieved, budget cuts are likely (Kühler 2005, 498).

While this practice does grant more autonomy to higher education institutions, it has not been accepted by all actors. Professors, who would also be paid based on performance, have especially opposed this reform. Specific performance criteria that have been suggested are factors such as results of teaching evalua-

[20] Translation by the author, original: "Bislang herrscht das Regiment der Egalität zwischen den Universitäten. Ob Kiel oder Konstanz, Cottbus oder Köln: Jeder Professor hat das gleiche Stundenpensum, jede Fakultät muss pro Lehrenden die gleiche Anzahl Studenten bewältigen – unabhängig davon, ob sie sich eher der Forschung oder mehr der Lehre widmen."

tions, hours of teaching in addition to required teaching responsibilities; number of directed theses, dissertations, and habilitations; and the number of exams performed. In addition, research activities were suggested as criteria for measuring a professor's performance. This included the management and direction of research groups, acquired third-party funds, presentations at national and international conferences, publications in peer-reviewed journals, editor positions, reviewer positions, and patents. Which criteria are used in particular is left to the states or even to the universities in some states (Kultusministerkonferenz 1999). However, professors in particular feel that their right to freedom in research and teaching, which is granted by the constitution, is being hurt. They argue that by being paid according to their performance in achieving set goals, their freedom is restricted. Other critics also have complained that the new budgets change the role of higher education institutions by turning their motivation into a purely materialistic one (Pritchard 2006, 102). In the end, the implementation of performance-based financing of universities was the responsibility of the states. Depending on which agreements could be negotiated between the different interests that are involved, reforms were implemented in some states and blocked in others. By 2012 all states included some form of perfomance-based financing in their university budgets. However, the degree to which this affects the overall university budget varies greatly. For example, in Bavaria 60 percent of the budget depends on such factors as graduation within the regular study time, third-party funding per professor, PhDs granted, and overall student numbers. In Brandenburg these types of criteria are only relevant for 20 percent of the overall budget, in Lower Saxony, Mecklenburg-Vorpommern, Baden-Würtemberg and Bremen 10 percent and only five percent in Saarland[21] (Fischer, König, and Quaißer 2012).

A second goal of financing reforms is the diversification of higher education funding. As shown above, American institutions are financed by a variety of sources and especially benefit from private contributions such as tuition payments, corporate research funds, and donations. German higher education institutions are still highly dependent on state financing. These state funds, however, are not sufficient any more. First, the expansion of higher education during the 1970s was not accompanied by adequate financial resources for universities. The states had expected an eventual decrease in student numbers and thus did not reconsider their budgets. This decrease, however, never occurred. The developments of the 1990s, with the fiscal demands of reunification, growing unemployment, and an aging society caused additional financial constraints for the states, which required them to restrict education financing (Schmidt 2003, 6-7). Universities, on the other hand, are reluctant

[21] For a complete listing and explanation of financing models in the different states see: Fischer, König, and Quaißer (2012).

to explore other sources of financing, because they fear a reduction in state funds as soon as other sources have been developed. However, some attempts have been made to increase other sources such as third-party research funding, patents, alumni donations, and tuition fees (Kühler 2005, 502).

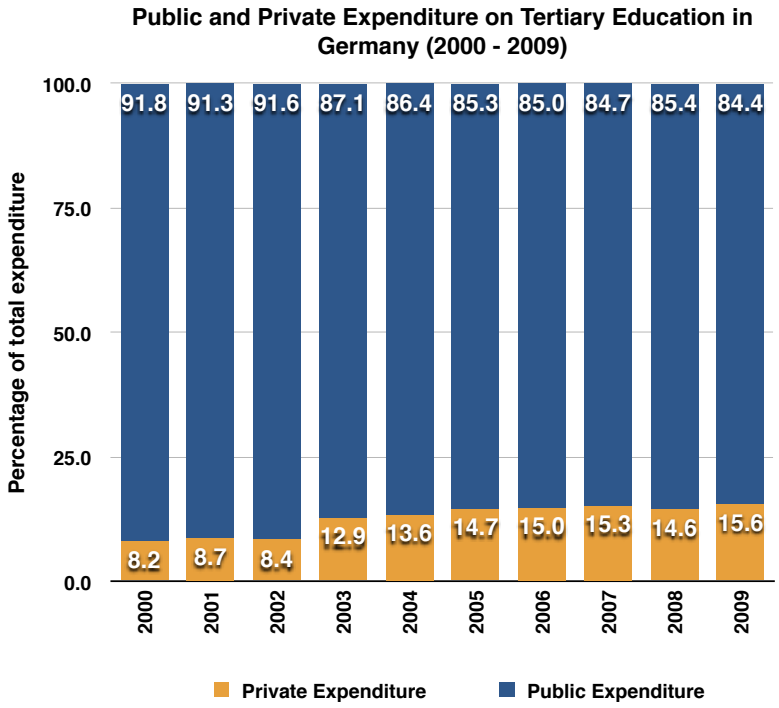
Third-party funds are those funds that are acquired in addition to the basic budget. They can be received by professors or students through grant applications, by specific departments or the entire institution for specific projects. A great part of these third-party funds are provided by the federally-funded German Research Society (DFG). Other sources are the *Bund*, the *Länder*, communities, foundations, international organizations, and corporate grants. The amount of third-party funding received is usually taken as a performance criterion to compare universities and for budget goal agreements (Statistisches Bundesamt Deutschland 2006, 8-10). However, these types of public third-party funds usually only include a 20 percent overhead cost flat rate, while the actual indirect costs of research projects often lie at about 50-70 percent of the project costs (Wissenschaftsrat 2011, 3). Compared to American third-party funding, which is almost equally financed from private and public sources (Busemeyer 2007, 191-192), German third-party funds depend much more on public sources. So far, the reforms have had a slight impact on general private involvement in financing higher education, but as Figure 5.1 shows, public funds still outweigh private funds in German higher education.

The debate about the introduction of performance-based financing of higher education institutions and professors in particular again shows how policy-making in German higher education is influenced by the federalist and corporatist structure of the political system. It also reflects how deeply humanistic values are still rooted in German attitudes. The idea of promoting a higher education system that gives institutions more autonomy and leads to competition driven by market forces clashes with the belief that higher education is a basic right that should be guaranteed by the state. The interest groups subscribing to these views can often block reforms, because they have a voice in the corporatist policy-making process. At the same time, the debate indicates that a policy learning process is taking place and that the traditional principle of equality in results found in CMEs is slowly being replaced by a more competition-oriented approach which resembles those in LMEs.

The debate about the introduction of **tuition fees** can be seen in the same context. The traditional ideal of the state providing free higher education and thus creating "equality of results" as well as "equality of opportunity" has been challenged by the needs of businesses that must compete in a globalized market.

Since this reform measure severely conflicts with traditional German values

Figure 5.1: Public and Private Expenditure on Tertiary Education in Germany (2000 - 2009)



Source: Bundesministerium für Bildung und Forschung (2013a, Tab.2.1.6)

that have shaped higher education policy in the past, it is probably the reform that has most strongly been discussed and in which the policy learning process can be seen very clearly, especially in terms of how Social Democrats changed their position on tuition fees.

At the beginning of the debate in late 1997, the parties' positions were fairly clear: the CDU and FDP supported the introduction of fees as a measure to increase financing of higher education institutions and thus performance. The SPD and the Green Party, on the other hand, opposed tuition fees on the basis of the social inequality they would cause.

When the SPD and Greens gained control of the federal government, Education and Science Minister Edelgard Bulmahn initiated negotiations between the *Länder* to sign an agreement that would prohibit the introduction of tuition fees for the first higher education degree. This way the Minister wanted to avoid a complicated reform of the HRG and possible constitutional issues an amendment to the HRG would cause. However, the *Länder* could not come to a unanimous agreement and the initiative failed (Der Spiegel 2000, 17). Bulmahn thus introduced an article prohibiting tuition fees to the fifth amendment of the HRG by only passing it in the *Bundestag*. The *Bundesrat* had not agreed to the law and requested a mediation

committee, but the *Bundestag* rejected further negotiations and the law was signed by the President in August 2002 (Bundesverfassungsgericht 2005).

Since the CDU-ruled *Länder* in the *Bundesrat* saw their constitutionally-granted sovereignty in financial and education matters infringed upon by the legislation that was passed by the Social Democratic federal government, they took their case to the Constitutional Court. The Court decided that the *Länder* were correct and that the federal government did not have the right to decide on these matters without the *Länder*'s consent (Bundesverfassungsgericht 2005). Soon after the court decision, Bavaria, Baden-Württemberg, and North Rhine-Westphalia passed new higher education laws allowing tuition fees (Pritchard 2006, 95).

Reactions to the court's decision and the implementation of fees in the states mentioned above were mixed. Education Minister Bulmahn criticized the fees, saying they would decrease the number of students and lead to social stratification. When North Rhine-Westphalia decided to introduce tuition fees for all students, including those that receive BAföG, Bulmahn judged: "The introduction of tuition fees in 2007 in the biggest state of the republic will deter students from higher education and will increase the social stratification. The CDU state government is benefiting itself at the expense of students from low-income families [...] This is completely unacceptable"[22] (Bundesministerium für Bildung und Forschung 2005).

Students held a similar opinion and they expressed it in many demonstrations in all major German cities, starting with major national protests in 2003 and continuing with local demonstrations when the various states changed their higher education laws. Berg and Weber, two students, expressed their perspective on higher education reforms in the journal *Aus Politik und Zeitgeschichte*. They criticized the changes that are being made, claiming they undermine democratic principles within universities. Referring to tuition they note: "The introduction of tuition fees also will not lead to improved conditions. The fear that public funding will be cut in the long term has been confirmed by international experiences"[23] (Berg and Weber 2006, 15).

The discussions also show that German students and some politicians still have an aversion to policies that resemble business management practices and free-market capitalism. In terms of new financing and governance models, the opinion is

[22]Translation by the author, original: "Die Einführung von Studiengebühren im größten Bundesland der Republik ab 2007 würde Studierende vom Studium abschrecken und die soziale Schere noch größer werden lassen. Die CDU-Landesregierung bereichere sich an Studenten aus einkommensschwachen Familien [...] Ein solches Verfahren sei völlig inakzeptabel."

[23]Translation by the author, original: "Auch die Einführung von Studiengebühren [...] dient in keiner Weise einer Verbesserung der Hochschuleinnahmen - die Befürchtung, die staatlichen Mittel würden über lange Sicht gekürzt, entspricht internationalen Erfahrungen."

prevalent that these models only concentrate on efficiency and competition and do not fit with higher education institutions, but should rather be kept in the world of economics. For example, Berg and Weber note: "The self-determined reform goals of German science policy are basically the enhancement of 'efficiency' and 'competitiveness' [...] These reform goals are foreign to science"[24] (Berg and Weber 2006, 17). Winkel judges: "It seems to be especially problematic that non-economic aspects easily get lost in a competition defined primarily from an economic perspective. In the long term, these developments can have fatal consequences for a society."[25] He continues: "The earlier we start defending the core values of scientific freedom and democratic sovereignty against economic calculus, [...] the better the results of the reforms will be "[26] (Winkel 2006, 30–31).

Proponents of tuition fees, such as the BDA, saw them as an additional income source for higher education institutions, which would make universities more autonomous from the state. Additionally, they hoped that fees will encourage students to finish their degrees faster and demand services from their institution as customers, which would lead to more competition between institutions. The DHV also welcomed the Constitutional Court decision, and its chairman Kempen (2005) declared: "Professors see tuition fees as an adequate and necessary instrument for higher education financing"[27] However, the DHV emphasizes that the fees will need to be used exclusively for the improvement of learning conditions at universities and that no one will be excluded from higher education for financial reasons (Deutscher Hochschulverband 2005). BDI and the *Deutscher Industrie- und Handelskammertag* (DIHK) also welcomed the possibility of introducing tuition fees and declared that the *Länder* should use this opportunity to provide universities with an additional source of financing (Deutscher Industrie und Handelskammertag (2005), Rogowski (2004)).

Even SPD politicians like Sigmar Gabriel, then the Minister-President of Lower Saxony, acknowledged the fact that tuition fees do not necessarily have to lead to social inequalities and can be a useful source of university income: "We need

[24]Translation by the author, original: "Die selbst gesteckten Reformziele deutscher Wissenschaftspolitik sind demnach im Wesentlichen die Steigerung der 'Effizienz' und 'Wettbewerbsfähigkeit' [...] Diese Reformziele sind wissenschaftsfern."

[25]Translation by the author, original: "Besonders gravierend erscheint das Problem, dass außerökonomische Aspekte in einem primär aus ökonomischer Sicht definierten Wettbewerb leicht verloren gehen können, weil eine solche Entwicklung auf lange Sicht fatale Folgen für eine Gesellschaft haben kann."

[26]Translation by the author, original: "Je früher man aktiv wird, um einen Kernbestand der Wissenschaftsfreiheit und demokratischer Selbstbestimmung gegenüber ökonomischen Kalkülen für alle Seiten sichtbar wetterfest zu machen, [...] desto besser werden die Reformergebnisse sein."

[27]Translation by the author, original: "Die Professoren halten Studiengebühren grundsätzlich für ein geeignetes und notwendiges Instrument der Hochschulfinanzierung."

to acknowledge that there are countries in which the percentage of working class children in higher education is higher than in Germany, despite tuition fees"[28] (Der Spiegel 2003, 24). Other SPD members agreed with Gabriel and argued that it is not fair if alternative practitioners have to pay for their vocational education but doctors do not and that child care costs 500 EUR per month, but higher education is free (Der Spiegel 2003, 25). Another argument for tuition fees is the fact that university graduates earn more than those without a university degree and have better chances in the labor market. They should therefore also bear some of the costs of their education. This argument resembles the American idea that education is an investment.

The change of Social Democratic attitudes towards performance-orientation and private contributions in higher education is an interesting development that can be seen in the broader context of a shift of European Social Democratic governments to a so-called "third way." "For many advanced capitalist nations [...] the 1980s was a decade dominated by the forces of political and economic conservatism. In the 1990s, gradually at first, and gathering pace towards the end of the decade, progressive political parties have climbed their way back into office" (White 2001, x). These new Social Democratic governments, however, were faced with challenges such as the internationalization and expansion of trade, the rise of new information technologies, the "knowledge-based society," as well as with persistently high levels of unemployment and slow economic growth at the domestic level. The new "third way" policies, which can also be seen in Chancellor Schröder's program of the *Neue Mitte* (New Center), thus tried to combine the preservation of social justice with the promotion of better economic and institutional performance by introducing market approaches and stressing efficiency (White 2001, xi). By agreeing to the proposed higher education reforms, the SPD–Green government was accommodating European and international pressures, as well as the "demonstration effect" of the successful American model in the face of poor German performance in international comparison.

Seven *Länder* introduced tuition fees for first degrees after the Constitutional Court decision of 2005. In all of these states the tuition limit was set at 500 EUR per semester and the states offered student loans with student-friendly conditions. Many other states already required tuition fees for second degrees and for long-term students who have not finished their degrees within the regular time of the program (Studis Online 2007). Over the course of the last nine years since 2005 all states that had originally introduced general tuition fees (for first time students), have

[28] Original: Translation by the author, original: "Wir müssen zur Kenntnis nehmen, dass es Länder gibt, in denen der Anteil von Arbeiterkindern an den Hochschulen trotz Studiengebühren höher ist als in Deutschland."

rescinded them or have changed their laws to leave it up to the universities to raise fees. Currently only Lower Saxony still charges general tuition, but has announced to stop charging fees with the beginning of the 2014/2015 winter semester (Studis Online 2013).

Compared to American tuition fees the existing German tuition models are very moderate. Additionally, the political discussion about the introduction of fees shows in which way Americans and Germans culturally differ on the topic of private education financing. In conclusion, a change of paradigm in German higher education financing can be seen. However, it is not a change from public to private financing. Leszczensky finds: "In international comparison, the competition for non-state funding sources is not very pronounced yet [in Germany]"[29] (Leszczensky 2004, 24). Instead, the change lies much more in a shift toward performance orientation as can also be seen by the federal excellence initiative discussed below.

5.4.5 Federal Excellence Initiative

Although Education Minister Bulmahn and Chancellor Schröder officially still rejected the introduction of tuition fees, they could not escape the changing attitudes of Social Democrats recognizing that German higher education institutions needed more funds and performance incentives in order to compete internationally. They thus suggested an initiative to start a national competition between German universities for extra research funding. Bulmahn initiated a program in which universities would apply with projects for excellent graduate schools, "excellence clusters" in which several research institutions work together, and "future concepts" in which an entire institution would present its plans for becoming an internationally recognized elite university. The goal of the competition is the advancement of German research universities and the creation of "lighthouses of science in Germany that radiate internationally"[30] (Bundesministerium für Bildung und Forschung 2007).

The first two rounds of the competition in 2006 and 2007 were funded by 1.9 billion EUR, of which 75 percent were covered by the federal government and the other 25 percent by the *Länder*. Yet, it was again difficult to work out a compromise between the *Bund* and the *Länder* and between the two major parties. The fact that the initiative was started by a Social Democratic government should have made a compromise with the CDU, usually favoring competition in higher education, easier. But party lines are not the only problem in German policy-making. Federalism

[29]Translation by the author, original: "Der Wettbewerb um nichtstaatliche Finanzierungsquellen ist hier im internationalen Vergleich noch nicht sehr ausgeprägt."

[30]Translation by the author, original: "Leuchttürme der Wissenschaft in Deutschland [entstehen], die auch international ausstrahlen."

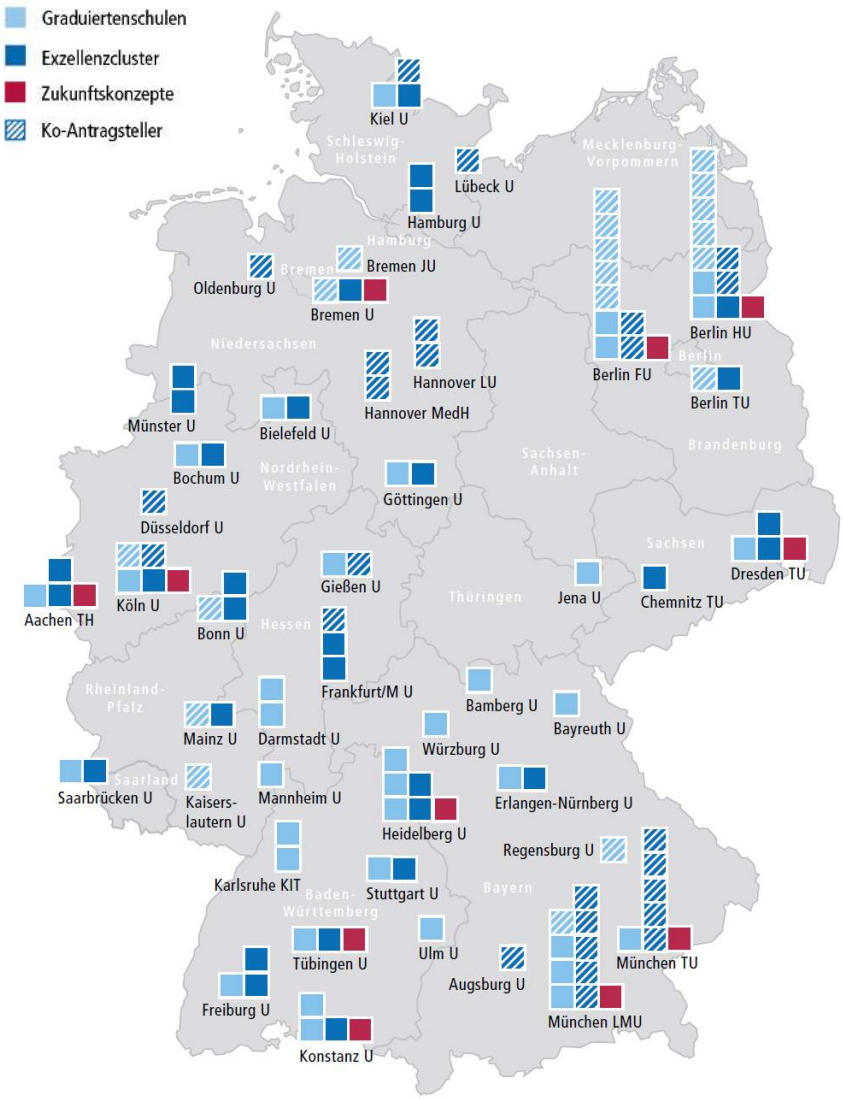
and the influence of the *Länder* in national politics through the *Bundesrat* play a significant role. "Since there could not be 16 winners in a competition," the *Länder* ruled by the CDU voted against it in the final vote stating that they would not be able to contribute their 25 percent of funding. This led to a year-long discussion on whether to start the program at all and on how it would be organized and financed (Spiewak 2006). After another round of negotiations and pressure from all important interest groups the last state finally signed the agreement for the "Excellence Initiative" in June 2005. While universities, professors, students, and business associations all supported the initiative, incremental reform steps were caused by a few *Länder* ministers, who did not want to accept that the *Bund* had made a useful reform proposal from which their own state might not benefit as much as other states (Spiewak 2006).

The competition was originally planned for two rounds in which universities applied to a joint jury of members of the German Research Society and the Science Council. The jury consisted mainly of international researchers who evaluated the proposals and nominated the projects. The first round of the competition ended in October 2006. The jury nominated eighteen graduate schools, which have each received 1 million EUR per year until 2011; seventeen excellence clusters, each receiving 6.5 million EUR per year; and 3 future concepts, receiving 21 million EUR per year. The three universities that have been selected for the best concepts for leading-edge research are the Ludwig Maximilian University Munich, the Technical University Munich, and the University of Karlsruhe. The intention for these universities is to eventually be able to compete with high ranking American universities such as Harvard or Yale. They are therefore also referred to as the new German "elite universities" (Bundesministerium für Bildung und Forschung 2007). In 2009 the CDU/FDP government decided to continue the competition and open a third round of evaluations. The budget was raised to 2.7 billion EUR and the project extended until 2017. Figure 5.2 shows the results of the third round of the competition.

In theory the excellence initiative breaks the traditional paradigm of equality between all institutions. It introduces an open competition and acknowledges differences in university performance (Kühler 2005, 477). Performance-led competition is a core element of the American higher education system. The intent to create this kind of competition in Germany thus supports the thesis that the German higher education policy is being Americanized. In practice, however, competition between institutions of higher education in Germany is still very limited. When asked about their preferences for certain universities when hiring graduates my interview partners replied that there are some outstanding institutions in certain fields but it is

usually not a decisive criterion in hiring decisions. Furthermore, despite a growing popularity of university rankings like the CHE/Zeit ranking, the majority of students still choose their university by other factors, such as the distance to their home town and living expenses (Willich et al. 2011).

Figure 5.2: Third Round of Excellence Initiative



Source: Deutsche Forschungsgemeinschaft 2012

5.5 Summary

This chapter has discussed the difficulties of enacting and implementing reforms in German higher education. Changing the legal framework was difficult, but eventually possible. The new Federal Framework Law promotes international openness by introducing a two-tier degree structure. It encourages diversity in institutional structures and sources of financing and promotes performance-led competition between institutions. Formally, all of these reform measures are elements of the American higher education system. It is therefore apparent that there are tendencies of Americanization within German higher education policy. Yet, there are also limits to this process.

First, it is not clear that the reforms are mainly inspired by American higher education policy. Several factors suggest that it is rather a process of Europeanization and Internationalization of higher education policies. The introduction of Bachelor's and Master's degrees in Germany has to been seen in the context of the European Union's Bologna Process. The declaration for the creation of a European higher education area has so far been signed by 45 countries. The extension of EU student exchange programs such as ERASMUS and a convergence of other legislation concerning higher education (e.g. financial aid regulations) suggest a greater European trend of changes in higher education policy. "The introduction of study programs that can survive in a globalized competition has been approached very slowly in Germany and would not have been implemented without the *Bologna Process*."[31] (Schrammel 2007). Enders and Hüfner even speak of an "internationalization" of higher education policy. They refer to trends, such as the increasing cooperation among professors and students around the world (Enders 2004, 2) and the development away from state-dependent to market-oriented mechanisms in higher education (Hüfner 2003, 145). Thus, German higher education reforms should possibly be seen more in an international than in a specifically American context.

Even if one follows the hypothesis of an Americanization of German higher education policy, several differences between the two systems need to be taken into account. The two different political systems influence higher education policy in different ways. In the United States, the federal government has less direct influence on higher education policy than the German one. The main role the U.S. government plays in higher education policy is in financing research projects through military funds and the NSF, providing student funding, and guaranteeing constitutional rights (i.e. anti-discrimination laws such as affirmative action). While

[31] Translation by the author, original: "Studiengänge zu realisieren, die auch im globalisierten Wettbewerb bestehen könnten, ist in Deutschland sehr zögerlich angegangen worden und wäre ohne den Bologna-Prozess nicht entwickelt worden."

federal research funding is very important for American universities, all further administrative regulation is left to the states. The states themselves, however, are also less influential on higher education finance and governance than the German *Länder*. Competition between universities occurs, but is driven by the diversity of institutions and funding sources, rather than exclusively as the result of government policies as in Germany. Policy changes in the United States are much easier than in Germany, because American federalism does not complicate policy-making processes in higher education. The allocation of tasks between the federal government, the state governments, and the institutions themselves is very clear-cut in this policy area. Additionally, Democrats and Republicans do not differ significantly on higher education policy and potential pressure groups such as students and professors are not as well organized as in Germany and only influence decision-making processes at the level of the university. Businesses also directly interact with universities, instead of pressuring the state or federal governments for changes in higher education. Thus, changes in American higher education policy are enacted and implemented much more easily and are usually driven by market forces.

The German system, however, remains state-dependent even after reforms. Competition is driven primarily by government initiatives and the sources of financing are primarily public sources. The forces of a decentralized state, based on strong catch-all parties and a distinct form of federalism, acting against a centralized society, defined by a corporate structure, are distinct features of the German political system that shape the course of reforms (Katzenstein 1987, 35). The above analysis has shown that higher education policy in Germany is very much influenced by the so-called "interlocking federalism," through which the federal government, the *Länder*, and the interest groups involved have to find compromises in order to enact reform policy.

Higher education is a policy area in which the powers of the federal and the state governments overlap, and neither level of government wants to lose its influence. The importance of this issue area became particularly clear during the first round of reforms of the German federal system (*Föderalismusreform I*) in which *Bund* and *Länder* tried to ease legislative gridlock by redefining the responsibilities of the states and the federal government.

The reforms failed in 2004 because *Bund* and *Länder* could not find a compromise on how to divide powers in education policy. The *Länder* fought for their complete sovereignty in education and wanted the *Bund* to withdraw completely from influencing education policy in any way. The *Bund*, on the other hand, argued that the states needed the federal support, especially in financing university building and research funding. Moreover, it argued that a federal framework leg-

islation was necessary to guarantee an equality of degrees and learning conditions across the country. Successful federal programs, such as the introduction of all-day secondary schools (supported by 4 billion EUR from the federal government) and the internationalization of higher education institutions by introducing new degree structures and supporting exchange programs, had shown that the *Bund* could play an important role in education policy (Spiewak 2004).

German policy-making is not only influenced by the federalist structure, but also by party and interest group politics. During the course of negotiations for the federalism reform, the federal SPD–Green government had recognized the importance of the education issue in election campaigns and used their successes as advertisements in campaigns. This upset CDU-ruled *Länder*-governments, which demanded their "monopoly in education"[32] (Roland Koch, cited in Spiewak 2004). The conflict escalated and finally led to the cancellation of negotiations in the federalism debate in 2004.

The grand coalition since 2005 has revitalized these negotiations and passed changes to the constitution concerning the allocation of powers between the federal and the state governments in 2006. The states gained almost all powers in education. The federal government now can only set framework legislation for university admission and higher education degrees (Scharpf 2006, 10). As shown in the discussion of recent German higher education reforms, these political and institutional factors impede a successful emulation of the American higher education system, and lead to only small changes in higher education policy.

In addition to these political factors, a complete Americanization of higher education policy is prevented by cultural differences. The above analysis has shown that there are some attitudes that seem to have changed during the political discourse on higher education reform or are still in the process of changing. An acceptance of tuition fees by students and even by some Social Democrats, who traditionally have argued that fees would lead to social inequality in higher education, indicates a policy learning process and cultural change. Performance-based financing that creates a competition between institutions and professors is another factor that conflicts with the traditional principle of equality between higher education institutions, but seems to be taking hold in German higher education policy.

However, basic traditional values such as the belief in the Humboldtian research university and the dominant role of professors, as well as the belief in the state as the adequate force for regulating higher education, interfere with a complete emulation of the American higher education system in Germany. An aversion

[32]Translation by the author, original: "Monopol in der Bildung."

to new models of governance and financing still exists among students and professors. Compared to the United States, private contributions and involvement, as well as business cooperation with higher education institutions still remain low in Germany. While Americans are afraid of "big government," Germans are afraid of "big business."

Chapter 6

Comparative Analysis: New German Degrees - New Skills?

6.1 German Curricula before and after Bologna

While the German system traditionally has been much more streamlined and simple than the American higher education system, this has changed significantly with recent higher education reforms, as shown in Chapter 5. The most significant of these reforms was the introduction of bachelor's and master's degrees that replaced the old *Diplom* and *Magister* programs.

The debate about introducing a two-tier degree system in Germany is not new. Already in 1966 the Wissenschaftsrat, an independent think-tank which advises the government on research and education issues, suggested the introduction of a shorter more applied degree in addition to the research-oriented *Diplom*. This was meant to address the rapid increase of the higher education demand, but led to one of the first big student protests and eventually led to the 1968/69 student movement. In the 1970s some individual universities, such as the University of Kassel, introduced a shorter practically oriented *Diplom I* and a research-oriented *Diplom II*. However, this model did not succeed on a large scale. Only two decades later, in the 1990s, the debate rose again, now in the context of an internationalization and Europeanization of German universities. In 1996, the German Conference of Education Ministers (KMK) demanded the introduction of bachelor's and master's degrees, in addition to the traditional degrees, to make German universities more attractive for international students. Two years later, in 1998, before the Bologna declaration was signed, the new degrees were officially allowed by the passage of the forth amendment to the HRG (Keller 2004, 27–28)

During the 2011/2012 summer semester 85 percent of all degree programs offered at German universities and FHs had been changed to the two-tiered system of bachelor's and master's degrees. At research universities 81.8 percent of all programs are now in the bachelor-master-system, while at FHs it is already 97 percent (Hochschulrektorenkonferenz 2011). Universities were initially reluctant to introduce the new degrees (in 2010 they made up only 76 percent, while at FHs it was already 96 percent (Hochschulrektorenkonferenz 2010)). However, feedback and encouragement from the business community as well as the international pressure created by the *Bologna Process* have led to a gradual introduction of the new degrees at most universities.

Part of the reform was also an introduction of a modularized curriculum. Modularization is the creation of issue-based units that can consist of several different classes (e.g. a lecture, discussion, internship). A module can be spread over several semesters, but only one main exam is given to pass the module and receive a final grade. Credits for a module can also be given for passing the module without an exam grade and each module should be at least five ECTS credits, so that modules do not become too small and increase the number of exams for students (Kultusministerkonferenz 2010, Anlage 1). These are the recommendations made by the German Conference of Education Ministers. In practice, however, there are many different modularization systems and modules range from one credit to 36 credits. Many also have exams for each class, thus in some programs the number of exams is greater than the number of modules (Nickel 2011, 61). Modularization was one of the first reform goals and many departments have started by modularizing their old *Diplom* programs and introducing the ECTS credit system, before introducing the new bachelor's programs.

Another part of the Bologna reforms was the introduction of independent accreditation agencies who evaluate new degree programs. These evaluations are done in a peer review process by accreditation agencies. The agencies are themselves accredited by the German Accreditation Council. Currently there are ten accreditation agencies who focus on different subjects or on special local areas (Akkreditierungsrat 2012). The accreditation council is made up of researchers, students, social partners and international experts. The agencies must follow standards set by the European Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), the German Conference of Education Ministers, and the German Accreditation Council. In their accreditation agencies evaluate the following aspects: standards and quality of curricular content, study-ability (i.e. organization) of the program, quality of teaching, relevance for the labor market, and gender equality. Accreditation and re-accreditation are necessary prerequisites

for the creation and continuation of new programs (Bundesministerium für Bildung und Forschung 2012, 10-11). As of March 2014, a total of 4,153 bachelor's programs and 3,805 master's programs had been accredited in Germany (Akkreditierungsrat 2014).

This chapter will present a comparison of old and new degrees in three subjects - engineering, chemistry and business administration at different public German research universities[1]. The analysis was done on the basis of program regulations, class catalogs and other available documents that describe the programs' curriculum and was followed up by personal interviews with professors and study program directors at all departments. This comparison focuses on the declared reform goals of shortening the study periods, creating broader and more practically-oriented programs and internationalizing the curriculum. It thus particularly analyzes the following factors: Structure (length, credits/hours, exams), content (new classes?), goals (What is the overall aim of the program?), practical component (internships, labs, cooperation with businesses) and internationalization (languages, exchange programs). Furthermore the document analysis and the interviews aimed at answering the following questions: What are the main objectives of the new degrees? What did departments intend to change and why? Do the new degrees provide students with a new kind of skills?

6.1.1 Chemistry

The science of chemistry has a long tradition and history in Germany due to the important role of the chemical industry. The chemical industry is represented by the German Association of the Chemical Industry (VCI) and the academic discipline of chemistry is organized in the German Chemical Society (GDCh). Both organizations work closely together and have frequently discussed changes and reforms to the German chemistry curriculum. In the early 1990s student enrollment numbers in chemistry dropped and the GDCh and VCI started talking about updating the old chemistry *Diplom*. These debates culminated at a meeting in Würzburg, where the "Würzburger Denkschrift" was passed (Interview VCI). This new curriculum model included the introduction of a credit system, a shorter, four semesters long, first stage of the degree called "basic studies," a two-semester second stage called "advanced studies,"[2] and a third stage of four semesters in which a student either

[1] An earlier draft of this section was presented in a conference paper, see van Santen (2010).

[2] Traditional Diplom and Magister programs were usually structured into two phases called *Grundstudium* ("basic studies") and *Hauptstudium* ("advanced studies"). Students traditionally had to pass a comprehensive intermediary exam to finish their basic studies as a prerequisite for starting advance studies. The terms "basic studies" and "advanced studies" will be used hereafter to refer to these phases.

chose a research-oriented track to prepare him for a PhD, a practically-oriented track, or a third track that allowed studies in a non-chemistry field, such as business or law (Würzburger Denkschrift). Many of these changes were introduced within the structure of the old *Diplom* degree before the Bologna declaration was passed and before the introduction of bachelor's degrees was made legally possible by the reform of the HRG. Thus, when comparing chemistry *Diplom* degrees and new bachelor's degrees, the structural changes are not often too significant. However, as some of my interview partners mentioned, the introduction of the bachelor's allowed them to implement their changes more freely and gave an impetus to the process that had started from within the discipline, but often had trouble overcoming bureaucratic hurdles (Interview 2 Chemistry LMU Munich and Interview VCI).

Another point that is specific to chemistry in Germany is the fact that it is not only a popular and important field at universities, but it is also well-represented in the vocational training system. The occupational degree of "chemical-technical assistant" (CTA) is one of the more challenging three to four year vocational degrees and graduates are highly regarded and welcomed by businesses (Interview Berlin-Chemie). Before reforms there was a fairly clear division between university chemistry graduates (usually with a PhD) who would work as executive researchers in the chemical labs and CTAs who would assist them and work in production. Since the new bachelors graduates fall in between these two qualifications, there are no clear tasks for them yet and it will be a process of trial and error to find jobs that are fitting for them (Interview VCI). All of my interview partners at chemistry departments mentioned that it is not very common for students to leave with a bachelor's degree. Most of them stay for at least a master's and a PhD is a common degree in German chemistry. These points are important to know when analyzing the new bachelor's degrees.

The Chemistry Department at the *Ludwig Maximilian University Munich* (LMU Munich) was one of the first chemistry departments to introduce a bachelor's program. The switch from *Diplom* to bachelor's was done in several stages. In 2001/2002 the first bachelor's program was introduced. At the same time the *Diplom* was reformed and a modularized curriculum for the *Diplom* was introduced. The comparison here focuses on the old *Diplom* from 1994 and the new bachelor's program from 2010.[3] The old *Diplom* program was a 10-semester program and was divided into 4 semesters of basic studies and 6 semesters of advanced studies. The

[3]Diplomprüfungsordnung für Studierende der Chemie an der Ludwig-Maximilian-Universität München. Zusammenstellung der Vorschriften der Prüfungsordnung vom 14.Februar 1989 und der Änderungssatzung vom 30. August 1994 and Prüfungs- und Studienordnung der Ludwig-Maximilians-Universität München für den Bachelorstudiengang Chemie und Biochemie vom 22. März 2010.

first comprehensive *Diplom* exam was scheduled for the eighth semester and the last semester was reserved for the *Diplom* thesis. The program required a total of 265 weekly credit hours (SWS), about 26 SWS per semester[4].

The new bachelor's degree is 6 semesters long, where the first four semesters are basic studies with all required classes and the last two semesters are intended for specialization and thus also include electives. The bachelor's has a total of 195 SWS (32 per semester). It is modularized and students need to collect a total of 180 ECTS. The curriculum of the new bachelor's program shows several new classes and subjects when compared to the 1994 *Diplom* program. One major change is that the bachelor's requires basic introductory classes in other sciences such as Math, Physics and Biology, while the *Diplom* expects these basic skills and only requires more specialized classes like "Experimental Physics" and "Physical Chemistry". The bachelor's also requires classes in Biochemistry, which before was only offered as an elective. It also offers a new requirement in "Spectroscopy" and several electives that can be taken in other disciplines. In addition it offers methods classes, such as "Methods in Biochemistry" and the study regulations specifically mention the importance of transferrable skills[5], such as languages and social competences. While there is no clear practical component such as an internship, the program offers many labs and intends to teach transferrable skills such as computer programming and foreign languages. When looking at the described goals of the two degrees, one can also see a shift from the specialized, scientific *Diplom* program to the broader more applied bachelor's program.

The *Diplom* regulation states:

> "The *Diplom* exam intends to show whether the candidate has acquired the in-depth knowledge, has an overview of the correlations of the field and the skills to use scientific methods and results necessary for entering the job-market"[6] (Diplom Prüfungsordnung 1994, 2)

[4]In the old degree programs the concept of weekly hours per semester, or *Semesterwochenstunden* was used to describe a student's workload. They are not directly comparable to American-style "credit hours". For example, 1 SWS = 45 minutes of class per week. If a student takes 10 classes in one semester that all meet for 1.5 hours a week (=2 SWS), he earns 20 SWS for that semester. In the new degree programs these SWS standards are replaced by credits according to the European Credit Transfer System (ECTS).

[5]In German the term *Schlüsselqualifikationen* is often used in this context. It literally translates to "key skills", however, it is used to describe skills which can be used in a variety of work environments and are not always subject-related, thus the terms "transferrable skills" and "soft skills" are used here.

[6]Translation by the author, original: "Durch die Diplomprüfung soll festgestellt werden, ob der Kandidat die für den Übergang in die Berufspraxis notwendigen gründlichen Fachkenntnisse erworben hat, die Zusammenhänge seines Faches überblickt und die Fähigkeit besitzt, wissenschaftliche Methoden und Erkenntnisse anzuwenden."

The bachelor's regulation is more detailed and emphasizes the acquisition of basic skills and the importance of acquiring the skills to learn new things:

> "The program intends to teach students experimental methods in chemistry and biochemistry, as well as the basics in biology, physics, and mathematics and thereby the language of each science. By teaching students basic knowledge, observatory skills, technical skills, as well as the ability to work independently, students are given the prerequisites for independent work in a profession or to acquire further academic qualifications such as a master's degree in chemistry, biochemistry, or a related subject"[7] (Bachelor Prüfungs- und Studienordnung 2010, 4)

In terms of internationality, the new bachelor's program offers classes and exams in English and provides students with an English diploma and transcript.

According to my interview partners at the department the main motivation for introducing the bachelor's program was to introduce a broader basic education at the bachelor's level than what was offered in the *Diplom*, while also allowing a more detailed specialization in the masters and PhD and allowing for the new fields of Biochemistry and Material Sciences to have their own degrees, instead of only specializations within the chemistry *Diplom*. The introduction of more math, biology, biochemistry and physics in the bachelor's was one step to achieve that broader basic degree. At the same time, the department wanted to give students a greater degree of choice in their classes. While there are still many required classes in the first few semesters, students can now chose more electives starting earlier (in the 5th semester) than in the *Diplom* (Interview 2 Chemistry LMU Munich).

When asked whether a better preparation for the labor market was one of the goals for the reforms, my interview partners replied that this was not a major concern, because their students had always been successful in securing employment after graduation. Although the bachelor's degree technically qualifies for an entry-level job, the focus is still to prepare students for a research career, and not primarily to optimally prepare them for work in industry (Interview 2 Chemistry LMU Munich). However, the department paid great attention to offering students enough lab time. The introduction of tuition fees that coincided with the curriculum reforms allowed them to offer even more and smaller lab groups than before, which helps students to gain practical experience. The large amount of time students spend in the lab is also

[7] Translation by the author, original: "Das Studium soll in enger Verbindung von Theorie und Praxis mit den experimentellen Methoden der Chemie und Biochemie vertraut machen, daneben aber auch Grundlagen der Biologie,Physik und Mathematik und damit die Sprache der jeweiligen Wissenschaft vermitteln. Der Erwerb von Grundkenntnissen einerseits, die Schulung der Beobachtungsgabe sowie der handwerklichen Fähigkeiten andererseits und die immer stärkere Förderung der Eigenständigkeit mit fortlaufendem Studium sollen die Voraussetzung für selbständige Arbeit in einem Berufsfeld oder die Grundlagen für eine weitere wissenschaftliche Qualifikation in einem Masterstudiengang in Chemie, Biochemie oder einem verwandten Fach schaffen."

a reason why internships in industry are not included in the program and are not as common in chemistry as in other disciplines (though students at the LMU still do some self-organized internships) (Interview 2 Chemistry LMU Munich). While professors seem to feel this is enough preparation for the labor market, students have repeatedly requested the possibility to do a minor in fields like business or law in the bachelor's and there are efforts to introduce additional minor options (Interview 1 Chemistry LMU Munich). This is one of the factors frequently mentioned by employers as an expectation of reforms and would probably increase the possibilities for students to enter the labor market with a bachelor's degree. The stated goals in the study regulations of the bachelor's program also emphasize the importance of these broader skills and the preparation for the job market. So while in practice most professors still see their main purpose in educating their students for an academic research career, the formal prerequisites for a more general and applied degree are available. Table 6.1 summarizes the changes between *Diplom* and bachelor's program. Table B.1 gives an overview of the detailed course requirements.

Table 6.1: Ludwig Maximilian University Munich Chemistry
Diplom and Bachelor of Science Degrees

University and Study Program	**Ludwig Maximilian University Munich Department of Chemistry** ***Diplom Chemistry***	**Ludwig Maximilian University Munich Department of Chemistry** ***Bachelor of Science in Chemistry and Biochemistry***
Curriculum Structure and Content	- program divided into Basic Studies (semesters 1-4) and Advanced Studies (semesters 5-9) - curriculum covers basic and advanced classes in chemistry - intermediary Diplom exams at the end of Basic Studies and comprehensive Diplom exams at the end of Advanced Studies - Diplom thesis 4-6 months *Classes not included in bachelor's program:* Instrumental Methods (lecture) Introduction to Theoretical and Spectroscopic Methods (lecture) Special Methods in Anorganic Chemistry (seminar) Spectroscopic Methods (seminar) Advanced research labs in*:* Anorganic Chemistry, Organic Chemistry, Physical Chemistry	- program divided into Basic Studies (semesters 1-4) and Orientation Studies (semesters 5-6) - curriculum covers basics in chemistry as well as biochemistry, physics, biology, and math - Oral bachelor's exam at the end of Basic Studies, course exams for each module with cumulative final grading - bachelor's thesis 10 weeks *New classes in bachelor's program:* Biology (lecture) Microbiology (lecture + lab) Genetics (lecture) Biochemistry I - II (lecture + lab) Group Theory and Crystallography Spectroscopy and Diffraction I (lecture) Electives in Biology and Biochemistry
Program Objectives	"The Diplom exam intends to show whether the candidate has acquired the in-depth knowledge, has an overview of the correlations of the field and the skills to use scientific methods and results necessary for entering the job-market." (Diplom Prüfungsordnung 1994)	"The program intends to teach students experimental methods in chemistry and bio- chemistry, as well as the basics in biology, physics, and mathematics and thereby the language of each science. By teaching students basic knowledge, observatory skills, technical skills, as well as the ability to work independently, students are given the prerequisites for independent work in a profession or to acquire further academic qualifications such as a master's degree in chemistry, biochemistry, or a related subject." (BS Studienordnung 2010)
Interdisciplinarity and Transferrable Skills	Patent law	- Computer and programming classes - specific soft skills as goal: 1. ability to research, evaluate, structure and densify knowledge and information, 2. overview knowledge in the different areas of the field, 3. networked thinking, 4. organizing and transferring skills, 5. information and media skills, 6. learning and presentation techniques, 7. mediation skills, 8. team and communication skills, also in gender specific contexts, 9. language skills, as well as 10. computer skills
Employability	- labs, no internships in industry required	- lab courses, no internships in industry required - focus on transferrable skills
Internationality	n/a	- classes and exams can be done in English - bachelor's diploma in English
Research Elements	- lab courses - Diplom thesis	- bachelor's thesis - lab courses
Credits	total of 265 SWS	total of 180 ECTS/195 SWS
Contact Time	ca. 26 hours/week	ca. 32 hours/week
Forms of Teaching and Exams	- lectures, labs, discussion sections, seminars - written exams, lab reports, oral Diplom exams	- lectures, labs, discussion sections, seminars - cumulative bachelor's exam - module exams as oral or written exams (incl. multiple - choice) - research papers, lab reports, homework, oral presentations
Program Length	10 semesters	6 semesters

The second program that has been compared is the chemistry program at *RWTH Aachen University* (RWTH Aachen). The documents available were the *Diplom* regulation from 1998/1999[8] and the bachelor's regulation from 2008[9] as well as the bachelor's class catalogue from 2008.[10]

In terms of structure the two programs differ in several points: While the *Diplom* program is a nine semester program, the bachelor's only plans for six semesters. The first four semesters of the *Diplom* are defined as basic studies and end with an intermediary exam ("Vordiplom"), while the last five semesters are the advanced studies and include the work on a substantial research thesis and comprehensive final exams. The bachelor's program does not have this clear distinction, but combines lectures and seminars on one issue in modules that are taken during all six semesters. The sixth semester, however, includes a module for the bachelor's thesis.

The *Diplom* program required a total of 200 weekly credit hours (SWS), which included 20 SWS for 'free' electives (no grade needed), while the bachelor's only requires 151 SWS for the six semesters. The study regulations for the *Diplom* already mention a credit point system, but they do not specify the details. The bachelor's program requires the fulfillment of 180 ECTS. In the *Diplom* as well as for bachelor's the majority of classes are required classes. During the basic studies in the *Diplom* program students can choose between either taking "Technical Chemistry" or "Macromolecular Chemistry". The bachelor's program offers one class with four credits (three hours) that can be freely elected from any non-subject related field that is offered at the university, such as languages, computer studies, engineering, or social studies. This class counts towards the program's soft skills requirement. Many students elect a business or language class for this free elective (Interview Chemistry, RWTH Aachen). Students are also allowed to take five additional modules from any field offered at the university. These modules are not counted towards the total GPA in chemistry, but can be listed on the students' transcript by request. In summary, the flexibility of choosing electives in the bachelor's seems to have remained almost the same as in the *Diplom*. However, my interview partner explained that it is more complicated to switch the order of certain classes in the bachelor's program than it

[8]Diplomprüfungsordnung für den Studiengang Chemie and der Rheinisch-Westfälischen Technischen Hochschule Aachen vom 24. Juli 1998 and Vorläufige Studienordnung für den Diplomstudiengang Chemie and der Rheinisch-Westfälischen Technischen Hochschule Aachen (RWTH) in der Fassung vom 21.20.1999.

[9]Prüfungsordnung für den Bachelorstudiengang Chemie der Rheinisch-Westfälischen Technischen Hochschule Aachen in der Fassung der ersten Änderungsordnung vom 21.10.2008 veröffentlicht als Gesamtfassung.

[10]Bachelor-Studiengang Chemie Modulhandbuch in der Fassung vom 29.10.2008.

was in the *Diplom*, because each class is now passed with a final exam that counts as a prerequisite for the next class.

The basic chemistry classes remained the same. However, in the bachelor's time and depth for these classes have been reduced and some classes, such as "Technical Chemistry" and "Macromolecular Chemistry" that where offered as electives in the *Diplom* are now combined into one required module in the bachelor's. Moreover, the bachelor's program offers new classes that were not offered for the *Diplom* program. These classes are mainly geared towards providing students with additional transferrable skills for the job market. These classes are: "Software Applications in Chemistry," "Chemistry in Real World application," "Computational Chemistry," and a teaching module in which third-year students assist first-year students in discussion sections and labs. These additional classes clearly show the intended focus on employability and a strong practical component.

When looking at the declared goals of the two programs more differences can be found. The *Diplom* study regulation states:

"The goal of the *Diplom* program in chemistry is to teach students the necessary subject knowledge, skills and methods to enable them to do scientific work and critically judge scientific results, while considering the requirements of the professional world."[11] (Diplom Studienordnung 1998, 1)

It clearly shows a focus on research and scientific methods, although the requirements of the job-market are also mentioned, one can interpret this as saying that graduates are mainly expected to work in a scientific/academic environment.

The bachelor's regulation, on the other hand, seems to be more open towards other fields of employment for graduates. It states:

> "The bachelor's program offers a broad curriculum that aims at teaching students the basics of chemistry. The [bachelor's] exam intends to show whether the candidate has acquired the skills and basic knowledge in chemistry necessary for the job market."[12] (Bachelor Prüfungsordnung 2008, 3)

[11] Translation by the author, original: "Das Studium der Chemie soll den Studierenden unter Berücksichtigung der Anforderungen in der Berufswelt die erforderlichen fachlichen Kenntnisse, Fähigkeiten und Methoden so vermitteln, daß sie zu wissenschaftlicher Arbeit und kritischer Einordnung der wissenschaftlichen Erkenntnisse und zu verantwortlichem Handeln befähigt werden."

[12] Translation by the author, original: "Das Bachelorstudium soll Kandidatinnen und Kandidaten eine breit angelegte Ausbildung in den Grundlagen der Chemie bieten. Durch die [Bachelor] Prüfung soll festgestellt werden, ob die Kandidatinnen und Kandidaten das für die Berufspraxis erforderliche solide Grundlagenwissen im Bereich der Chemie erworben haben."

In terms of internationality a small shift can be identified. The *Diplom* program regulations already mention the importance of English skills for studying chemistry and students can chose to either write their *Diplom* thesis in English or German. In the bachelor's program all exams can be done in either German or English, but classes are still generally offered in German. Additionally, the transcript and diploma are offered in English and the department offers exchange programs and internships through the ERASMUS program. Table 6.2 summarizes the differences between the *Diplom* and bachelor's programs. Table B.2 gives an overview of the detailed course requirements.

Reforming the chemistry program was not on the agenda in Aachen before the Bologna process started and according to my interview partner "without it, [they] most likely would not have done it"[13] (Interview Chemistry RWTH Aachen). Professors at the department were reluctant to reform something that was working well for the majority. They then decided to use the switch from the *Diplom* to the bachelor's and master's system to emphasize the particular profile of the department that distinguishes them from other chemistry departments. Two of the special fields they offer in Aachen are technical and macromolecular chemistry. In the *Diplom* degree program students chose between one of these special fields; in the bachelor's all students now get at least an introduction to both fields. At the same time the department introduced more labs and smaller discussion groups with the help of the new tuition fees that were introduced at the same time as the new degrees. However, as in Munich, the main focus of the department is still the master's program and bachelor's and master's are offered as consecutive programs. My interview partner explained: "If you put lots of resources and efforts into educating your bachelor's students with a great number of labs, you don't want to loose them then"[14] (Interview Chemistry RWTH Aachen). There is no internship program, but students can do their bachelor's thesis in industry and the department has not had any negative feedback from the business community, in the contrary the great amount of lab time chemistry students at German universities have is internationally recognized as a great advantage of German chemistry graduates (Interview Chemistry RWTH Aachen).

[13]Translation by the author, original: "Jaja, ohne den [Bolognaprozess] hätten wir's mit großer Wahrscheinlichkeit nicht gemacht."

[14]Rough translation by the author, original: "unser Ziel ist es diejenigen, die wir auch mit großem personellen Aufwand in den Praktika ausgebildet haben, herangeführt haben, dann auch zum Master hier zu behalten."

Table 6.2: RWTH Aachen University Chemistry
Diplom and Bachelor of Science Degrees

University and Study Program	**RWTH Aachen University Department of Chemistry *Diplom Chemistry***	**RWTH Aachen University Department of Chemistry *Bachelor of Science in Chemistry***
Curriculum Structure and Content	- program divided into Basic Studies (semesters 1-4) and Advanced Studies (semesters 5-9) - intermediary Diplom exams at the end of Basic Studies and comprehensive Diplom exams at the end of Advanced Studies - curriculum covers basic and advanced classes - Diplom thesis 4-6 months *Classes not included in bachelor's program:* Anorganic Chemistry (IV-VI) Organic Chemistry (IV - VI) Physical Chemistry (III - VI) Advanced Technical Chemistry and Macromolecular Chemistry Structures Toxicology Questions of Law in Production Advanced research labs in: Anorganic Chemistry, Organic Chemistry, Physical Chemistry and Technical or Macromolecular Chemistry	- program structured in modules - exams in each module, grades are accumulated for final grade - curriculum covers basic and few advanced classes - bachelor's thesis 3 months *New classes in bachelor's program:* Software Applications in Chemistry Student Teaching Module Elective (e.g. foreign language) Chemistry in Real World Application Applied Spectroscopy and Instrumental Analytics Computational Chemistry Modern Methods
Program Objectives	"The goal of the Diplom program in Chemistry is to teach students the necessary subject knowledge, skills and methods to enable them to do scientific work and critically judge scientific results, while considering the requirements of the professional world." (Dipl. StO 1999) "A special goal is to teach students the ability to transfer learned principals to new problems. A particular focus is given to the teaching of observation and evaluation of experiment results in chemical laboratories." (Dipl. StO 1999)	"The bachelor's program offers a broad curriculum that aims at teaching students the basics of chemistry. The [bachelor's] exam intends to show whether the candidate has acquired the skills and basic knowledge in chemistry necessary for the job market." (BS PO 2008)
Interdisciplinarity and Transferrable Skills	- free electives - course "Questions of Law in Production"	- 3 soft skill modules: Elective, Software Applications in Chemistry, and Chemistry in Real World Application
Employability	- lab courses - excursion/field trip	- module: Student Teaching - modules: Software Applications in Chemistry, and Chemistry in Real World Application - lab courses
Internationality	- good English skills required - Diplom thesis can be written in English	- exams can be done in English - ERASMUS programs
Research Elements	- Diplom thesis - lab courses	- bachelor's thesis - lab courses
Credits	- total of 200 SWS - credit point system used as trial	- total of 180 ECTS - 20 modules
Contact Time	ca. 22 hours/week	ca. 25 hours/week
Forms of Teaching and Exams	- lectures, discussion sections, labs, seminars, field trips - written exams, oral presentations, oral exams, lab reports, audit credits	- lectures, discussion sections, labs - mainly written exams, multiple-choice possible, but needs to include approach - cumulative final grading
Program Length	9 semesters	6 semesters

Similar to the Chemistry Department at Aachen, the Chemistry Faculty at the *Friedrich Schiller University Jena* (FSU Jena) were reluctant to introduce the new bachelor's and master's programs, because they believed the *Diplom* provided a good education to their students. Only after pressure from the state government and the university administration increased in 2006 did the department start to work on new programs (Interview Chemistry FSU Jena). The latest *Diplom* regulation is from 1999, while the most recent bachelor's regulation is from 2008.[15] The *Diplom* is again 10 semesters long and divided in two phases with an intermediary exam after the sixth semester, while the bachelor's is only six semesters and has no partition in basic and advanced studies. The *Diplom* regulation 1999/2000 had already been reformed according to the "Würzburger Modell" and already includes elements such as a credit system and a modularized curriculum. Thus, in terms of structure the differences between the *Diplom* and bachelor's program are limited. The content and the defined goals however do show differences.

As with the other two chemistry programs that have been compared, the basic chemistry classes that were taught in the *Diplom* have been kept in the bachelor's, but their depth has been reduced. The so-called 'service classes' such as physics and math have been reduced in scope and they do not count towards a student's GPA (Interview Chemistry FSU). However, an additional 'project module', which intends to teach interdisciplinary transferable skills by working on a larger group project, has been introduced in the bachelor's. In some aspects the practical component of the program at Jena seems to have been limited rather than extended in the bachelor's. For example, while the old *Diplom* degree required an excursion to a chemical company, this excursion is not required anymore in the bachelor's (though still available as part of an elective course). On the other hand, the department has traditionally had a very good student-instructor ratio that they have been able to keep up and still offer a great amount of lab time to their students. My interview partner explained, these labs are essential in teaching students the practical skills of a chemist, however they are very expensive for the school, so attendance is mandatory (Interview Chemistry FSU).

The old *Diplom* regulation states, that "the *Diplom* is intended to educate a competent, independent chemist who will promote the development of chemistry as a scientific discipline and have the skills to solve problems in its field of work, work in interdisciplinary teams, and contribute to the continuos development of

[15] Prüfungsordnung für den Diplomstudiengang Chemie vom 7. Dezember 1999, Studienordnung für den Diplomstudiengang Chemie vom 7. Dezember 1999, Prüfungsordnung der Chemisch-Geowissenschaftlichen Fakultät für den Studiengang Chemie mit dem Abschluss Bachelor of Science vom 18. Dezember 2008, and Studienordnung der Chemisch-Geowissenschaftlichen Fakultät für den Studiengang Chemie mit dem Abschluss Bachelor of Science vom 16. Dezember 2008.

the discipline"[16] (Diplom Studienordnung 1999, 4). This description is much more geared towards an academic career. This focus has been continued in the new master's programs that are all research-oriented and consecutive. According to my interview partner they were the main focus of reform efforts (Interview Chemistry FSU Jena).

The goal definition of the bachelor's program emphasizes that the bachelor's degree is meant as a first degree which builds the basis for further training and education and offers the necessary skills for a first job: "It is the aim of the bachelor's degree, as a first job-qualifying degree in chemistry, to prepare the student for an occupational activity/job and provide them with the basic knowledge for further training and education within or outside of the university"[17] (Bachelor Studienordnung 2009, 4). In the eyes of the department, however, the bachelor's is mainly seen as an interface between basic studies and advanced studies that allows students to change directions and specializations before getting their master's degree, while it is theoretically possible, it is not expected that most students leave for the labor market (Interview Chemistry FSU Jena). The study regulations hint at this by stating: "The program [...][provides][...] the prerequisites for research-oriented master's programs [...]. In addition, it qualifies graduates for jobs in the lower to medium qualification level in chemical professions"[18] (Bachelor Studienordnung 2009, 4).

In terms of an international focus, both the *Diplom* and the bachelor's in Jena require foreign language skills as a prerequisite and offer transcripts and diplomas in English. Also, most classes use English literature and proficiency in English is expected.Table 6.3 summarizes the differences between the *Diplom* and bachelor's programs. Table B.3 gives an overview of the detailed course requirements.

[16]Translation by the author, original: "Ziel des Studiums ist die Ausbildung zum kompetenten, kritischen und verantwortungsbewussten Chemiker, der selbständig chemierelevante Aufgaben im Berufsfeld lösen, interdisziplinär zusammenarbeiten und auch an der konstruktiven Weiterentwicklung seines Faches mitwirken kann."

[17]Translation by author, original: "Ziel des Bachelorstudiums als erstem berufsqualifizierendem Abschluss auf dem Gebiet der Chemie ist es, die Studierenden auf die berufliche Tätigkeit vorzubereiten bzw. mit der fachwissenschaftlichen Grundausbildung die Basis für weitere Aus- oder Weiterbildungsabschnitte innerhalb oder außerhalb der Hochschule zu legen."

[18]Translation by the author, original: "Das Studium [...] stellt die qualifizierende Voraussetzung für [...] forschungsorientierte[n] Masterstudiengänge [...]. Ferner qualifizieren sich die Absolventen für berufliche Tätigkeiten auf der unteren bis mittleren Qualifikationsebene der chemischen Fachdisziplinen"

Table 6.3: Friedrich Schiller University Jena Chemistry *Diplom* and Bachelor of Science Degrees

University and Study Program	**Friedrich Schiller University Jena Department of Chemistry** ***Diplom Chemistry***	**Friedrich Schiller University Jena Department of Chemistry** ***Bachelor of Science in Chemistry***
Curriculum Structure and Content	- program divided into Basic Studies (semesters 1-6) and Focus Studies (semesters 7-8, exams and Diplom thesis in semesters 9-10) - curriculum covers basic and advanced classes in chemistry, as well as a language class - intermediary Diplom exams at the end of Basic Studies and comprehensive Diplom exams after Focus Studies - Diplom thesis 6 months *Classes not included in bachelor's program:* Anorganic Chemistry V (lecture, discussion, lab) Organic Chemistry V (lecture, discussion, lab) Physical Chemistry V (lecture, discussion, lab) Photo Chemistry/Spectroscopy Catalysis/Organometallic Chemistry Required Industry Excursion Advanced Labs Language Certificate	- program divided into three study years and curriculum structured in modules - curriculum covers basic and few advanced classes in chemistry - exams in each module, grades are accumulated for final grade - bachelor's thesis 12 weeks - program also offered as part-time program *New classes in bachelor's program:* Project Module
Program Objectives	"The Diplom is intended to educate a competent, independent chemist who will promote the development of chemistry as a scientific discipline and have the skills to solve problems in its field of work, work in interdisciplinary teams, and contribute to the continuos development of the discipline." (Diplom Studienordnung 1999)	"It is the aim of the bachelor's degree, as a first job-qualifying degree in chemistry, to prepare the student for an occupational activity/job and provide them with the basic knowledge for further training and education within or outside of the university" (BS Studienordnung 2009) ``The program [...][provides][...] the prerequisites for research-oriented master's programs [...]. In addition, it qualifies graduates for jobs in the lower to medium qualification level in chemical professions.'' (BS Studienordnung 2009)
Interdisciplinarity and Transferrable Skills	In goal formulation: - learn to collaborate with others - the meaning for Chemistry for the society - know legal regulations - recommended to take 5% of study time in facultative classes, such as languages	- teaching of transferrable skills is integrated into regular classes - focus on academic research methods, including new media and media supported presentation as well as focus on team working skills
Employability	- lab courses - no internships in industry - obligatory field trip to industrial company - computer classes for chemists	- focus on transferrable skills - lab courses - program offered as part-time program for working students
Internationality	- language certificate level II required - Diplom certificate offered in English	English skills required for admission
Research Elements	- Diplom thesis (2 semesters) - lab courses - Diplom specifically mentioned as preparation for PhD	- bachelor's thesis - lab courses
Credits	- total of 300 ECTS (240 SWS) - semesters 7-10 modularized	total of 180 ECTS
Contact Time	ca. 24 hours/week	ca. 30 hours/week
Forms of Teaching and Exams	- lectures, labs, discussion sections, seminars , field trips - written exams (multiple-choice specifically excluded), lab reports, presentations, oral Diplom exams - accumulative credit system	- lectures, labs, discussion sections, - written exams, research papers, presentations, lab reports, oral exams - exams can be done using electronic media
Program Length	10 semesters	6 semesters

This comparison of traditional *Diplom* and new bachelor's programs at three different chemistry departments has shown that all of the compared departments intended to change more in their programs than just the names and the lengths of their study programs. While the main motivation for reforms was not to improve students employability as demanded by employers and policy makers, many of those demands have been addressed by the new curricula. A stronger emphasis on transferrable skills and practical knowledge (at least a continued focus on sufficient lab time) can be found in all three bachelor's programs. However, there are also differences between the departments. Not all departments implemented the reform goals to the same degree. While the emphasis on employability seems to be the strongest at the RWTH Aachen with their particular classes on "transferrable skills" and free electives, the bachelor's program at the LMU Munich seems to resemble American bachelor's programs the most, with their focus on a broad basic education and many electives and required classes in other disciplines. The program at Jena appears to be the program with the fewest changes to the traditional curriculum.

One focus of reforms specific to chemistry was to introduce new research areas, such as biochemistry, material sciences or environmental chemistry to the traditional curriculum. Improving internationality and teaching more transferrable skills were other areas that have been targeted. The emphasis on research and the importance of the PhD in chemistry, however, has not changed significantly and according to my interview partners only very few students leave the program after finishing their bachelor's. One of them even noted: "Your last point - preparation for the job market - is not important. I would say that the university, well, I'm not sure whether you can generalize it, but we [as a department] do not generally go by the labor market situation or teach by their [employer's] needs. We teach as it is tradition in chemistry"[19] (Interview 1 Chemistry LMU Munich).

All three programs compared here are so called "consecutive" programs where the bachelor's and master's are seen as one continuous program. At Aachen and at the LMU Munich it is even possible for students to start taking masters classes even before they have finished their bachelor's and been accepted in the master's program. This shows how much the focus on research is engrained in German chemistry programs.

Another goal of the Bologna reforms was to foster student mobility. However, as one interview partner explains, even among German chemistry programs there are

[19]Translation by the author, original: "Also, der letzte Punkt, Bezug zur Arbeitswelt oder Arbeitsmarkt, ist überhaupt nicht vorhanden. Also, ich würde mal sagen, die Universität oder ich weiß nicht, ob man's generell so sagen kann, aber dass wir eigentlich nicht uns nach den Arbeitsmarktsituationen richten oder auch danach alle nach Bedürfnissen ausbilden, sondern wir bilden aus, so wie es Tradition ist in der Chemie."

great differences in terms of credits and classes which makes switching universities during the bachelor's, but also afterwards difficult (Interview Chemistry RWTH Aachen). My interview partner in Jena sees the same problem: "Everything was meant to become much easier with transferring between universities, but it just has become more difficult. Now it is even impossible to give credit for classes taken in another program within the same state."[20] (Interview Chemistry FSU Jena). Internationally, however students seem to be able to move more, as many are able to spend a semester abroad, while the new masters programs are especially popular with foreign students (Interview 1 Chemistry LMU Munich).

One main critique professors at all three departments have, is that the new system leads to 'learning for the test' instead of an overall understanding of the field that can be tested in one major final exam as was possible in the *Diplom* (Interview Chemistry, RWTH Aachen). As one professor explains: "One of the biggest problems for my conservative chemistry professors is that we cannot test in a complex manner anymore. That's one of the biggest critiques with Bologna that we can only test for each module."[21] (Interview Chemistry FSU Jena).

6.1.2 Mechanical Engineering

Engineering has been one of the disciplines in which resistance against the new degrees has been particularly strong. The German Engineering *Diplom* has been a successful degree, providing German employers with the specialists they need (acatech 2006). As with chemistry, engineering is one of the most important disciplines for the German labor market and engineering graduates are highly sought after by employers. Many engineering departments were afraid that the good reputation of the German engineering *Diplom* would get lost with the introduction of new degrees. Thus many engineering departments have offered the *Diplom* along side the new degrees for as long as they could. In 2003 nine technical universities founded an association - the "TU9 German Institutes of Technology" to strengthen the voice of engineering programs in the reform process. Although they originally demanded to keep the *Diplom* in engineering, they now declare the bachelor's degree in engineering as "employable, but not professional" and the master's degree as the standard university engineering degree (TU9 - German Institutes of Technology 2010).

[20]Translation by the author, original: "Eigentlich sollte alles viel, viel einfacher werden mit der Anerkennung zwischen verschiedenen Universitäten, das ist alles viel schwieriger geworden. Jetzt sogar so innerhalb eines eigenen Bundeslandes, ist es gar nicht mehr möglich sich gegenseitig anzuerkennen. "

[21]Translation by the author, original: "Also, eines der größten Probleme für meine konservativen Chemielehrer, es wird gar nicht mehr komplex geprüft. Das ist das größte, was immer als Vorbehalt gegen Bologna und es wird ja nur noch auf Modul geprüft."

However, even with the general success of the Engineering *Diplom*, employers in engineering had some requests for changes in the engineering curriculum as has been shown in Chapter 5. The analysis below will show that the original resistance towards reforms is reflected in the curriculum of the new bachelor's degrees, but that there are also significant changes, particularly in the area of transferrable skills.

At the *Technical University Munich* (TU Munich) professors have long resisted the trend of introducing a bachelor's degree in mechanical engineering and only started in 2006 to workout a new curriculum for the new degrees (Interview Mechanical Engineering TU Munich). However, the *Diplom*[22] was reformed in 2003 and thus already included a modularized curriculum. It is not possible anymore to start in the *Diplom* program. The bachelor's regulation analyzed here is from 2008.[23]

The *Diplom* program was 10 semesters long and included 18 weeks of internships, a *Diplom* thesis and comprehensive final exams. The *Diplom* had 160 SWS, just counting the hours in classes and not counting the additional time needed for the *Diplom* thesis (about 800h) and two semester projects (500 h). The program was divided into four semesters of basic studies and six semesters of advanced studies. During basic studies students took all core classes, while in the later advanced classes they could chose between several electives and take specialization classes.

When introducing the new bachelor's degree the department took the old *Diplom* degree as their guideline (Interview Mechanical Engineering TU Munich). The bachelor's degree is only six semesters long. It includes a bachelor's thesis and 10 weeks of an internship, eight of which have to be done before the start of the first semester. Similar to the *Diplom* the bachelor's is divided into basic and advanced studies with core classes during the first four semesters and electives during the last two. The bachelor's has 130 hours of classes (SWS). Looking at the content of the program, the curriculum of the bachelor's is almost identical to that of the *Diplom* during the first four semesters, except that the bachelor's requires two additional modules of soft skills. In the advanced studies, one can find differences in terms of the scope and duration of classes. In the *Diplom* students had to take many more classes and do two semester projects in addition to the six-month long *Diplom* thesis and exams. In the bachelor's program the exams are done as cumulative exams (for each class) and the thesis is much shorter (only about 250 hours, the same length of time as a semester project in the *Diplom*).

[22] Studienordnung für den Diplomstudiengang Maschinenwesen [...] der Fakultät für Maschinenwesen an der Technischen Universität München vom 13. Januar 2003, 1. Satzungsänderung vom 9. November 2004.

[23] Fachprüfungs- und Studienordnung für den Bachelorstudiengang Maschinenwesen an der Technischen Universität München vom 26. Juni 2008.

The defined goals for both degree programs are quite similar. Both mention scientific and practical skills that can be used in either research or industry and will allow graduates to fulfill bridge functions between research, development and production. However, the *Diplom* regulation mentions academic research as a possible field of work in addition to other fields and the bachelor's regulation only mentions "different fields in the producing industry". The department intended to keep the research orientation for the bachelor's degree. According to my interview partner, the main focus of the program was not changed because it was successful. "What we are teaching and how we are teaching here is exactly what industry expects from us"[24] (Interview Mechanical Engineering TU Munich). That is why there have only been small changes in the traditional curriculum. At the same time, the introduction of tuition fees allowed the department to offer new classes and programs such as soft skills classes and a new tutoring program in which older students tutor first and second semester students in small groups. The new soft skills classes are required in the bachelor's and the master's degree and are the main difference between the new programs and the *Diplom*.

According to my interview partner, internationality has also always been a great focus in the department. English skills are expected as a prerequisite for the programs and many students take additional language classes. Many students spend time abroad, though this has become more complicated, because the bachelor's program does not offer enough time for study abroad. However, at the master's level the department has two international programs in which students can receive a degree from both the TU Munich and a partner university. Additionally, the importance of interdisciplinary research and teaching has grown over the last decade, which is also reflected by new programs such as "Power Engineering" and "Mechatronics" as well as by the founding of the new "School of Engineering" which offers a basic education for all engineering programs, and then combines the different disciplines under one roof (Interview Mechanical Engineering TU Munich).

While these are all improvements, the department also finds some drawbacks to the new system. For example, it has become much harder to do internships. There are fewer internship positions offered by businesses and there is not enough time for students to do an internship in the bachelor's program. "Most students need to do an additional praxis semester. Otherwise it won't work," my interview partner explained. Another disadvantage of the new degrees is the greater number of exams students must take at the end of each semester. It takes away a great part of the semester breaks and makes it harder for students to work or do internships

[24]Translation by the author, original: "Das, was wir hier ausbilden, ist genau das, was die Industrie von uns verlangt hat und auch wie wir sie bilden."

during their breaks (Interview Mechanical Engineering TU Munich). Table 6.4 gives an overview of the changes between the *Diplom* and bachelor's programs. Table B.4 gives an overview of the detailed course requirements.

Table 6.4: Technical University Munich Mechanical Engineering *Diplom* and Bachelor of Science Degrees

University and Study Program	**Technical University Munich Department of Mechanical Engineering *Diplom Mechanical Engineering***	**Technical University Munich Department of Mechanical Engineering *Bachelor of Science Mechanical Engineering***
Curriculum Structure and Content	- program divided into Basic Studies (semesters 1-4) and Advanced Studies (semesters 5-10) - accumulated intermediary Diplom grade after Basic Studies and accumulated final Diplom grade after Advanced Studies - curriculum covers basic and advanced classes - Diplom thesis 800 hours within 6 months *Classes not included in bachelor's program:* - choice of focus fields - semester research projects - fewer basic classes offered - fewer advanced classes offered	- program modularized and divided into Basic Studies (semesters 1-4) and Advanced Studies (semesters 5-6) - exams in each module, grades are accumulated for final grade - curriculum covers basic and few advanced classes - bachelor's thesis 250 hours within 6 months *New classes in bachelor's program:* - Soft Skills I-II - Physics lab
Program Objectives	- create opportunities for acquiring highest possible qualifications and flexibility - teach academic basics and methods - to prepare for an application-oriented as well as a research-based professional activity in academia and industry - to prepare students to work independently, scientifically, and system-integrative to further Mechanical Engineering as a field (Diplom Studienordnung 2004)	"Goal of the program is to teach students who have a deep-going scientific and engineering knowledge, who can use their knowledge and skills in the different fields of the producing industry and fulfill a bridge function between research and development and industrial production." (Website TUM)
Interdisciplinarity and Transferrable Skills	Department participates in interdisciplinary study programs "Industrial Biotechnology" and "Chemical Engineering"	Department participates in interdisciplinary study programs "Industrial Biotechnology" and "Chemical Engineering"
Employability	- 18 weeks internship in industry - lab courses	- 18 weeks internship in industry (8 weeks before starting the program) - engineering and production labs - general lab courses - guidelines for practical training and internship office
Internationality	exams possible in foreign language	- classes in English - exams and thesis in English possible
Research Elements	- Diplom thesis - 2 semester research projects	bachelor's thesis (6 months)
Credits	total of 300 ECTS/160 SWS	total of 180 ECTS (130 SWS)
Contact Time	ca. 16 SWS hours/week, plus 2 semester projects (ca. 250 hours each), plus Diplom thesis (ca. 800 hours)	ca. 21 hours/week
Forms of Teaching and Exams	- lecture, discussion, labs, internships - written and oral exams - exams possible in foreign language	- lecture, discussion, labs, internships - written exams with possible multiple-choice part
Program Length	10 semesters, including 18 week internship and Diplom thesis	6 semesters including 10 week internship and bachelor's thesis

At *RWTH Aachen University* (RWTH Aachen) reforms started in 2004 and the first students in the new bachelor's program started in 2007. At the time this analysis was done there were two *Diplom* regulations still available, one from 1998 and one from 2003,[25] however both are very similar and only show minor differences in structure. The bachelor's regulation was introduced in 2007 and revised in 2008.[26] Unlike any of the other programs compared here, the program at Aachen is seven semesters long (as opposed to the usual six) and allows students to directly go into a three semester master's program. The combined bachelor's and master's are then the same length as the original *Diplom* program. This shows to some extent the resistance against the new degrees that has been shown by many engineering programs. As my interview partner noted, there would not have been a major reform like this without the external pressure. They have kept updating the curriculum for the *Diplom*, but did not see the need for more substantial reforms, as employer feedback on graduates had always been positive (Interview Mechanical Engineering RWTH Aachen).

However, the faculty was not against all of the Bologna goals, such as including broader general skills in the curriculum. The *Diplom* already allowed 12-18 hours of classes as additional electives that could be taken anywhere on campus, but were not counted towards the final grade. In the bachelor's, students are still allowed to participate in additional classes, but are now also required to take three classes in the social sciences: "Communication and Organization Development", "Business Engineering" and "Quality and Project Management". Additionally, a new class "Simulation Technology" has been introduced in which students work on a week-long project which simulates a real-life design situation in industry and thus teaches many necessary soft skills. "These are all classes that teach students how it works in industry and also in an institute that does industry-related research. And in this aspect, in my opinion, students are better prepared with expertise and through practical components"[27] (Interview Mechanical Engineering RWTH Aachen).

The defined goals of the two programs also show differences. While the *Diplom* focused on teaching the "necessary subject-specific knowledge, scientific methods and skills for doing critical research"[28] (Diplom Studienordnung 2003,

[25]Studienordnung für den Diplomstudiengang Maschinenbau der Rheinisch-Westfälischen Technischen Hochschule Aachen vom 08.09.2003.

[26]Prüfungsordnung für den Bachelorstudiengang Maschinenbau der Rheinisch-Westfälischen Technischen Hochschule Aachen vom 20.09.2007 in der Fassung der ersten Ordnung zur Änderung der Prüfungsordnung vom 10.09.2008 veröffentlicht als Gesamtfassung.

[27]Translation by the author, original: "Das sind Veranstaltungen die den Studierenden beibringen wie in der Industrie gearbeitet wird und auch in einem Institut das industrienah forscht. Und in der Hinsicht sind nach meiner Auffassung die Leute besser vorbereitet fachlich und durch die Praxisanteile."

[28]Translation by the author, original: "die erforderlichen fachlichen Kenntnisse, Fähigkeiten

5671), the bachelor's regulation states: "The bachelor's program intends to provide students with a broad education in the basics of mechanical engineering and provides the prerequisites for later broadening, deepening, and specialization."[29] (Bachelor Studienordnung 2008, 1076). It focuses on providing students with problem solving competencies, transferable skills and interdisciplinarity to allow them to work across fields (RWTH ME Website 2013). Both programs have a strong practical component with the *Diplom* requiring 26 weeks of internships and including a practice semester, while the bachelor's still includes 14 weeks of internships and a semester project. Additionally, my interview partner pointed out that in the bachelor's program classes heavily focus on project work and thus offer more practical experiences than before (Interview Mechanical Engineering RWTH Aachen).

In comparison the *Diplom* has a stronger research-orientation than the bachelor's indicated by the substantial *Diplom* thesis and two research-oriented semester projects. In the second half of the degree, students in the *Diplom* chose a specialized field of study (*Studienrichtung*), while students in the bachelor's chose an occupational field (*Berufsfeld*). Both programs offer classes and exams in English and the department offers exchange programs. While one can see some changes towards a more general curriculum, the department is also very clear about the bachelor's program only being a road towards the master's as their website states: "The bachelor's and master's programs are one unit. The master's degree is the preferred degree that should be aimed for, it is the equivalent to the successful and established *Diplom* degree."[30] (RWTH ME Website 2013) Even though the department emphasizes the importance of the master's degree, they also realize that not all students will stay for a master's degree. That is why the department introduced a seven-semester bachelor's degree, because they did not feel comfortable sending somebody into the job market with less than seven semesters. In the meantime, the department has made good experiences with the longer bachelor's program and students can still change to a four-year master's program. (Interview Mechanical Engineering RWTH Aachen).

Internationality was already a focus at Aachen before the Bologna reforms. English is expected and many students spend a semester abroad at one of the partner universities. Being able to spend a semester abroad was one of the reasons why

und Methoden so vermitteln, dass sie zu wissenschaftlicher Arbeit, zu kritischer Einordnung der wissenschaftlichen Erkenntnisse und zu verantwortlichem Handeln befähigt werden."

[29]Translation by the author, original: "Das Bachelorstudium soll Kandidatinnen und Kandidaten eine breit angelegte Ausbildung in den Grundlagen des Maschinenbaus bieten und soll sicherstellen, dass die Voraussetzungen für spätere Verbreiterungen, Vertiefungen und Spezialisierungen gegeben sind."

[30]Translation by the author, original: "Bachelor- und Masterausbildung sind eine Einheit. Der Master-Abschluss wird als anzustrebender Abschluss angesehen, er entspricht dem bewährten Diplom-Abschluss."

the department opted for a seven-semester bachelor's program. During the reforms there were debates about introducing the master's programs as entirely English programs, which might still be done in the future. This is particularly debated because of competition from universities in the neighboring Netherlands, where classes taught in English are widely available (Interview Mechanical Engineering RWTH Aachen).

Similar to the other departments compared here, students and professors still have some points of criticism with the new degrees. One point is the decreased flexibility, because of the stricter schedule and curriculum. This makes it more complicated to organize study abroad semesters and internships. Another negative result of reforms is the higher density of exams and too many classes to manage in one semester. However, the department is working on a reorganization to remedy some of these points (Interview Mechanical Engineering RWTH Aachen). Table 6.5 gives an overview of the current differences between the *Diplom* and bachelor's programs. Table B.5 lists the detailed course requirements.

Table 6.5: RWTH Aachen University Mechanical Engineering
Diplom and Bachelor of Science Degrees

University and Study Program	**RWTH Aachen University** **Department of Mechanical Engineering** ***Diplom Mechanical Engineering***	**RWTH Aachen University** **Department of Mechanical Engineering** ***Bachelor of Science in Mechanical Engineering***
Curriculum Structure and Content	- program divided into Basic Studies (semesters 1-4) and Advanced Studies (semesters 5-10) - accumulated intermediary Diplom grade after Basic Studies and accumulated final Diplom grade after Advanced Studies - curriculum covers basic and advanced classes - Diplom thesis 4 months *Classes not included in bachelor's program:* - Study Areas/Occupational Fields: Construction and Development Process Engineering Fundamentals of Mechanical Engineering - physical-technical lab - programming class - 2 semester projects (200 hours/3 months each) - internship semester	- program structured in modules - exams in each module, grades are accumulated for final grade - curriculum covers basic and few advanced classes - bachelor's thesis 10 weeks *New classes in bachelor's program:* - Introduction to CAD - Communication and Organization Development - Business Engineering - Quality and Project Management - combined semester for internship and bachelor's thesis
Program Objectives	"The program is meant to teach students the necessary subject-specific knowledge, scientific methods and skills for doing critical research and take responsible actions, considering the developments and requirements of the working world" (Diplom Studienordnung 2003, 5671).	Besides the basic principles, concepts and methods of the field, the program has the goal to teach the following skills: - problem solving competencies: Graduates are able to solve and analyze complex tasks systematically and know which solutions to apply. - soft skills and interdisciplinarity: Graduates are able to communicate technical concepts, processes and results in a team environment. They are able to quickly adjust to language and terms of neighboring fields in order to work across disciplines. Bachelor's and master's program are seen as a unit, the master's degree should be aspired (RWTH website).
Interdisciplinarity and Transferrable Skills	- department offers interdisciplinary programs "Computational Engineering Science" and "Simulation Science" - participates in teaching programs, and offers a Magister - Major in "Technology and Communication" and a Minor in Computer Studies	- department offers interdisciplinary programs "Computational Engineering Science" and "Simulation Science" - participates in teaching programs, and offers a Magister - Major in "Technology and Communication" and a Minor in Computer Studies - required classes in social sciences
Employability	- 26 weeks internship, including 6 weeks before the beginning of the program - Study regulation lists possible fields of employment	- 14 weeks internship + 6 weeks before beginning of the program - Semester project as team project - detailed regulations for internships and support by internship office
Internationality	- classes and exams can be done in English - several departmental exchange programs	- classes and exams can be done in English - several departmental exchange programs - bachelor's thesis can be done in English - diplomas in English
Research Elements	- 2 research projects (a 200 h) - Diplom thesis	- bachelor's thesis - semester project
Credits	total of 178 SWS	- total of 210 ECTS (132 SWS) - 22 required modules
Contact Time	ca. 18 hours/week	ca. 19 hours/ week
Forms of Teaching and Exams	- lecture, discussion, colloquium, seminar, labs, field trips - written and oral exams, homework, audit certificates	- lecture, discussion, lab - mainly written exams, multiple choice possible - bachelor's exams as accumulative exam
Program Length	10 semesters including praxis semester and Diplom thesis	7 semesters, direct entry into master's program (3 semesters) possible

As in the other departments analyzed here, faculty at the *Otto von Guericke University Magdeburg* (OvGU Magdeburg) doubted that it would be possible to educate a "full" engineer in under five years. "That is why we still see the master's degree as the main degree for engineers, while the bachelor's can be an intermediary degree for those who would like to switch fields"[31] (Interview Mechanical Engineering OvGU Magdeburg). However, after it was required by the state government and the university administration, the department first revised the old *Diplom* regulations and then started working on the new bachelor's and master's degrees in 2006.

The comparison here was done on the basis of the 1997 *Diplom* regulation in the 2004 revised version.[32] and the bachelor's regulation from 2008[33] The *Diplom* is 10 semesters long and structured into basic (semesters 1–4) and advanced studies (semesters 5–10). During the first four semesters students take basic core classes; in their advanced studies they can elect one field of specialization. The bachelor's program covers the same topics during the first three semesters as the *Diplom* during basic studies, but not in as much depth. (For example in *Diplom*: Math I,II,III in bachelor's only Math I and II). During the fourth and fifth semester bachelor's students can take electives; the sixth semester includes a semester project, as well as an internship and the bachelor's thesis.

In terms of content the curriculum is similar, but has been reduced in the bachelor's program. The bachelor's also does not seem to include more transferable skills or interdisciplinary skills as was the case with other bachelor's programs in this comparison. To the contrary, they even took out the requirement to take a class in business administration and one in chemistry (originally required in the *Diplom*) for the bachelor's. Yet the requirement to take a "non-technical" elective has been kept. My interview partner at the department explained, that there just was not enough time in six semesters to offer more classes that specifically target these soft skills. However, they feel that most of these skills are already being taught in school and many students still take additional non-required classes, especially in Foreign Languages. Additionally, students are required to do a group project during which many transferrable skills are practiced (Interview Mechanical Engineering OvGU Magdeburg).

Also, the practical component is still fairly strong in the bachelor's, which requires an eight-week-long internship. While the *Diplom* required an entire semester

[31]Translation by the author, original: "Daher sehen wir den Master immer noch als Zielabschluss an. Der Bachelor ist eher eine Zwischenstufe für Leute, die sich danach umorientieren möchten."

[32]Studienordnung für den Studiengang Maschinenbau vom 7. Mai 1997 in der Fassung vom 10. Oktober 2007.

[33]Studienordnung für den Bachelorstudiengang Maschinenbau und für den Bachelorstudiengang Maschinenbau als Dualstudium vom 07.05.2008.

(26 weeks) of internships, the department now also offers a second bachelor's program as a part-time dual-study-work program, in which, students work in a regular job while studying to get their degree at the same time. So instead of introducing one bachelor's program that would be useful for a direct transition to a job or lead to further studies in a master's or PhD program, the department introduced two programs: one very practically oriented dual-program and one program that can be seen as a preparation for a master's degree.

Comparing the declared goals of the programs, one can clearly see the resistance for change, as they are nearly identical.

The *Diplom* regulation states: "The aim of the program is to teach students in-depth expertise in the field of mechanical engineering and the skills needed to independently work with scientific methods, to independently master the variety of tasks in fields related to application, research and teaching and cope with the ever-changing duties and responsibilities demanded in the working world"[34] (Diplom Studienordnung 2007, 3).

The bachelor's regulation has the exact same wording, but adds:

> "The program qualifies for entry into the professional job market. Graduates should acquire the following skills: (1) the ability to abstract and independently recognize and solve problems, (2) a comprehensive understanding of technical relationships based on methodological basis-oriented analyses, (3) lifelong learning skills, and (4) interdisciplinary thinking" [35] (Bachelor Studienordnung 2008, 3).

The first two skills mentioned are already covered by the original declaration of program goals in the *Diplom*, the last two address two of the demands made by employers and by the Bologna declaration. However, when asked about interdisciplinarity, my interview partner explained that this is mainly relevant in the master's programs and even more so for bigger research projects. In the bachelor's program the focus is more on providing students with the basics in their own field (Interview Mechanical Engineering OvGU Magdeburg).

When asked about their focus on internationality, my interview partner men-

[34]Translation by the author, original: "Ziel des Studiums ist es, gründliche Fachkenntnisse und die Fähigkeit zu erwerben, nach wissenschaftlichen Methoden selbständig zu arbeiten, sich in die vielfältigen Aufgaben der auf Anwendung, Forschung oder Lehre bezogenen Tätigkeitsfelder selbständig einzuarbeiten und die häufig wechselnden Aufgaben zu bewältigen, die im späteren Berufsleben auftreten."

[35]Translation by the author, original: "Die Absolventen und die Absolventinnen sollen u. a. folgende Kompetenzen erhalten: - Abstraktionsvermögen und selbstständiges Erkennen von Problemen und Lösungswegen, ganzheitliche Betrachtung von technischen Zusammenhängen basierend auf methodisch grundlagenorientierten Analysen, Befähigung zu lebenslangem Lernen, Interdisziplinarität."

tioned the same problems listed by the other departments analyzed here: The inflexibility and short amount of time makes it harder for students to spend time abroad. However, the department has established exchanges and internships with firms and universities abroad and tries to keep these programs running. Additionally, about 11 percent of their students are international students (Interview Mechanical Engineering OvGU Magdeburg). Table 6.6 summarizes the differences between the *Diplom* and bachelor's programs. Table B.6 gives an overview of the detailed course requirements.

Table 6.6: Otto von Guericke University Magdeburg Mechanical Engineering *Diplom* and Bachelor of Science Degrees

University and Study Program	**Otto von Guerike University Magdeburg Department of Mechanical Engineering** ***Diplom Mechanical Engineering***	**Otto von Guerike University Magdeburg Department of Mechanical Engineering** ***Bachelor of Science in Mechanical Engineering/ Coop Program***
Curriculum Structure and Content	- program divided into Basic Studies (semesters 1-4) and Advanced Studies (semesters 5-10) - accumulated intermediary Diplom grade after Basic Studies and accumulated final Diplom grade after Advanced Studies - curriculum covers basic and advanced classes - Diplom thesis 6 months *Classes not included in bachelor's program:* - Math III-IV Technical Mechanics III-IV - Basics of Business Administration Chemistry - Integrated Product Design (as study area) Second semester research project - Internship Semester	- program structured in modules and focus fields - exams in each module, grades are accumulated for final grade - curriculum covers basic and few advanced classes - bachelor's thesis 3 months *New classes in bachelor's program:* - Measurement and Control Engineering (as required basic class) - Automotive Systems (as focus module)
Program Objectives	"The aim of the program is to teach students in-depth expertise in the field of mechanical engineering and the skills needed to independently work with scientific methods, to independently master the variety of tasks in fields related to ap- plication, research and teaching and cope with the ever-changing duties and responsibilities demanded in the working world" 2004).	- "The aim of the program is to teach students in-depth expertise in the field of mechanical engineering and the skills needed to independently work with scientific methods, to independently master the variety of tasks in fields related to ap- plication, research and teaching and cope with the ever-changing duties and responsibilities demanded in the working world" In addition graduates will have the following skills: - the ability to abstract and independently recognize and solve problems - a comprehensive understanding of technical relationships based on methodological basis-oriented analyses - lifelong learning skills - interdisciplinary thinking (BS Studienordnung 2008)
Interdisciplinarity and Transferrable Skills	n/a	department offers interdisciplinary programs Business Engineering, Mechanical Engineering and Logistics, and Mechatronics
Employability	26 weeks internship	- 8 weeks internship - mentioning of occupational fields in study regulation - cooperation with several local automotive firms and Frauenhofer Institute
Internationality	no details in study regulations on English classes or exams	- no details in study regulations on English classes or exams - exchange program with Ukrainian university (Interview)
Research Elements	- Diplom thesis - 2 semester research projects (ca. 400 hours each)	- bachelor's thesis (15 credits/3 months) - 1 semester research project (6 credits)
Credits	total of 160 SWS	total of 180 ECTS
Contact Time	ca. 16 hours/week	ca. 20 hours/week
Forms of Teaching and Exams	- lectures, discussion sections, labs - oral exams, written exams	- lectures, seminars, discussion sections, colloquia, labs, projects and field trips - accumulative module exams, mainly written exams, oral exams possible, project reports
Program Length	10 semesters including 26 weeks internship and 1 semester Diplom thesis	6 semesters including bachelor's thesis and 8 weeks internship/ 8 semesters for dual coop program

The compared programs in mechanical engineering show many similarities. This comes to no surprise as engineering is one of the disciplines in Germany that has traditionally been strongly organized and has had a traditional structure of the curriculum in the *Diplom* across the different universities, particularly in mechanical engineering (acatech 2006).

What departments seem to struggle most with, is the requirement to offer a bachelor's degree that qualifies for the profession as an engineer. All my interview partners mentioned that there are great doubts that this can be done in six or seven semesters and all three program websites or study regulations mention that the master's degree is seen as the main degree for a successful engineer. This idea is also supported by a project report by the acatech, an organization of technical universities who collaborated with the leading engineering employer associations and summarized the needed requirements for the new degree programs in engineering in their 2006 report. They find that the "goal is the master's degree which is equivalent to the current *Diplom* and builds on the bachelor's as a first degree. At the same time the bachelor's degree [...] should also qualify for entry into the labor market"[36] (acatech 2006, 9). However, in their analysis they also find that "especially this requirement is a challenge for technical colleges and universities. This is because the theory-based preparation for the master's degree needs to be continued, while at the same time practically-oriented skills need to be taught in a minimum of six semesters to qualify a bachelor's graduate for the labor market"[37] (acatech 2006, 9).

Other issues with the new degrees mentioned by my interview partners are the difficulties in organizing study abroad semesters and internships in a short bachelor's program. According to my interviewees it is very complicated to include a study abroad semester in a six-semester program (Interview Mechanical Engineering OvGU Magdeburg) and it is difficult to study abroad between the bachelor's and master's program (where it would make the most sense), because students do not have student status during that interim period (Interviews Mechanical Engineering RWTH Aachen and TU Munich).

Despite these problems described at Munich, Aachen and Magdeburg, in their study of 26 engineering programs acatech found: "Bachelor's and masters's programs

[36]Translation by the author, original: "Das Ziel ist der Abschluss Master, der dem derzeitigen Diplom-Ingenieur gleichwertig ist und auf dem Bachelor als erstem Abschluss aufsetzt. Dabei soll der Bachelor-Abschluss [...] auch zur Berufsfähigkeit qualifizieren."

[37]Translation by the author, original: "Gerade diese Vorgabe stellt für die Technischen Hochschulen und Universitäten die neue Herausforderung dar. Denn die theoriebezogene Hinführung zum Master-Studium muss wie bisher gewährleistet bleiben, während gleichzeitig auf der Basis praxisorientierter Ausbildungsinhalte in mindestens sechs Semestern eine Berufsfähigkeit des Bachelors zu erreichen ist."

are much more strongly involved in partner- and exchange programs than *Diplom* programs, although not consistently at all universities"[38] (acatech 2006, 55).

Organizing internships is another issue that seems to be more problematic than in the *Diplom* programs. One of my interview partners explained: "It has not become easier to find an internship in a bachelor's program, because time is limited. Many companies think 20 weeks is too short. Many would rather have half a year, but that can't be integrated with the schedule"[39] (Interview Mechanical Engineering RWTH Aachen). Another professor argued what makes it complicated are state regulations that are too strict and inflexible and do not allow students to deviate from the regular study plan (Interview Mechanical Engineering OvGU Magdeburg). In the words of the acatech report: "Government regulations cannot create internship positions"[40] (acatech 2006, 53). Furthermore, the acatech authors warn that it is important to continue to support the existing networks between engineering schools and industry, particularly those created by faculty who share joint positions in industry as well as at universities. In the past, professors with industry experience made up about 50 percent of the faculty at engineering departments of most universities. However, with continued cuts in university funding it is increasingly problematic to offer competitive salaries that motivate professors to exchange their industry job for a teaching position (acatech 2006, 58).

Although these problems exist, particularly in mechanical engineering, all programs analyzed here still manage to include a mandatory internship in their bachelor's degree, all offer an internship office or established relationships with companies, and all have faculty who have work experience in industry (Interviews Mechanical Engineering TU Munich, RWTH Aachen, and OvGU Magdeburg). The intent to provide students with as much practical experience as possible and prepare them for the labor market seems evident and important at all departments.

Additionally, all three programs include transferrable skills in their curriculum. Though they are not always specifically mentioned, but rather taught within the regular classes (e.g. at Magdeburg - Interview Mechanical Engineering OvGU Magdeburg), they have been a focus of reforms and represent a change from the old *Diplom* degrees. Non-engineering classes, such as those in business or computer studies are another important change. Despite their reluctance for change

[38]Translation by the author, original: " Bachelor-/Master-Studiengänge sind deutlich stärker in auswärtige Partner- und Austauschprogramme eingebunden als Diplom-Studiengänge, wenn auch nicht durchgängig an allen Hochschulen."

[39]Translation by the author, original: "Das ist auch nicht einfacher geworden im Bachelor ein Praktikum zu finden, weil die Zeit begrenzt ist. Vielen Unternehmen sind die 20 Wochen zu kurz. Viele wollen ein halbes Jahr das lässt sich dann nicht mehr in den Studienplan integrieren."

[40]Translation by the author, original: "Praktikumsplätze sind nicht nach ministeriellen Vorgaben zu erhalten."

and the mentioned problems with the shorter programs, engineering degrees have moved towards a broader model including non-engineering classes and offering students transferrable skills. Yet, compared to American programs they are still very specialized as will be shown in the next chapter.

6.1.3 Business Administration

Business is one of the most popular disciplines at German universities and it is also one of the fields that has been mentioned by employers to be important in a variety of work places. In this comparison I analyzed the programs at the *University of Mannheim*, the *Ludwig Maximilian University Munich*, and at the *Friedrich Schiller University Jena*.

At the *University of Mannheim* the last available *Diplom* program regulation is from 2000,[41] but it has had several revisions until 2008 which are included in the version that has been compared with the new bachelor's regulation from 2008.[42] The *Diplom* was a nine-semester program with the first four semesters as basic studies and the last five semesters as advanced studies. Basic studies were passed with an intermediary exam and included required core classes. During advanced studies, students had to take two more core classes and could then choose two classes in specialized fields of business administration as well as one elective. Electives could be chosen out of a list of classes including subjects such as political sciences, physical technology, sociology, and law and thus offered students an opportunity to take a non-subject related class. The *Diplom* also offered a special focus on "intercultural qualifications" which included classes in geography, history and languages.

While many business departments were quite open to switching their programs to the bachelor-master structure, the faculty at Mannheim was hesitant to change from their *Diplom*. The managing director of the Business School explained: "Our worries were these: We had been number 1 in Germany for years. The *Dipl.Kaufmann* (*Diplom* in Business Administration) was an absolute success product. They say 'never change a winning team', so why should we change the product"[43] (Interview Business Administration University of Mannheim). However, once the reform process had started at the university, the department embraced it

[41] Prüfungsordnung der Universität Mannheim für den Diplomstudiengang Betriebswirtschaftslehre vom 05. März 2000.

[42] Prüfungsordnung der Universität Mannheim für den Bachelorstudiengang Betriebswirtschaftslehre vom 05.12.2008 mit Änderungen bis 9.12.2013.

[43] Translation by the author, original: "Ja die Bedenken waren für uns einfach die: Wir waren schon seit Jahren die Nummer 1 in Deutschland. Der Diplomkaufmann ist ein absolutes Erfolgsprodukt gewesen. 'Never change a winning team' - also warum sollten wir das Produkt ändern?"

and tried to create a completely new program instead of only relabeling their first six semesters (Interview Business Administration University of Mannheim).

The new bachelor's program is six semesters long. The first four semesters are similar to the *Diplom* program with mainly core classes, but includes many new classes such as "Methods in Business Administration", "Schlüsselqualifikationen" (transferrable skills), "Foreign Languages," and "Information Systems." The fifth semester includes a module "International Studies." This can either be taken as an exchange semester abroad or with classes in "international cultural studies." During the sixth semester, any classes that are still missing can be taken and the six-week bachelor's thesis is written. The time for the thesis in the *Diplom* program was four months, thus the thesis was much more substantial. Neither program requires an internship, but both regulations recommend to do a two to three months long internship before the final semester.

Making the study abroad time a requirement was one way the department tried to make their program unique and also to provide students with a special experience that teaches them useful life-skills. Because time in the bachelor's program is limited, some classes had to be simplified and the program is much more structured. Thus, taking away some of the organizing skills students learned in the old program, while putting together their specific study plan. The department tried to make up for that by requiring the study abroad stay during which students learn these skills. In addition, special soft skills classes are required. These classes are being taught as weekend classes by business representatives. They focus on rhetorics and didactics and include such assignments as mock presentations to the company management (Interview Business Administration University of Mannheim). Furthermore, regular classes now also focus more on the use of case studies, group studies and similar activities in order to provide students with opportunities to practice their transferrable skills. While there is no option to take classes in other fields, there are requirements in Law, Economics and Foreign Language, which give students the opportunity to take a class at a different department (Interview Business Administration University of Mannheim).

Unlike in the engineering programs analyzed above, there is no requirement for an internship in the program. However, according to my interview partner, most students (about 90 percent) still do at least one internship voluntarily during their undergraduate time. The department regularly employs honorary professors who also work in industry, which gives students an impression of what working in "real life" is like (Interview Business Administration University of Mannheim).

While some elements of the *Diplom* program have been kept in the bachelor's,

the curriculum has been reformed and more practically oriented classes, that intend to teach transferrable skills, have been introduced, which indicates a shift towards a more general education. The introduction of the "international studies" requirement also complies with reform goals and employer demands. One can see that there is a shift away from the research-oriented *Diplom* to the more applied, broader bachelor's program. The defined goals that can be found in the two documents however, are completely identical:

> "The *Diplom* (Bachelor) examination concludes the scientific study of business administration and grants a degree qualifying a graduate for the labor market. By passing the *Diplom* (Bachelor) exam the candidate shows that he/she understands the interrelations of different issues in his field of study, has the skills to use scientific methods and results and has acquired the in-depth knowledge necessary for entering the professional job market."[44] (Diplom Prüfungsordnung 2000, 1-2 and Bachelorprüfungsordnung 2008, 2).

Both, practical skills for the labor market, as well as skills needed in academic work are being focused on in the program and about 70 percent of bachelor's students continue in a master's program. Of those, about 50 percent stay at the University of Mannheim and 50 percent switch to a different university (Interview, Business Administration, University of Mannheim). Table 6.7 summarizes the differences between the *Diplom* and bachelor's programs and Table B.7 gives and overview over the curriculum of both programs.

When asked about the department's first experiences with the new programs, the managing director was quite positive. He found that in some areas, particularly specializations such as "tax auditing," students do not gain the same amount of expertise as they used to and will need a master's degree. On the other hand, they gain more transferrable skills and are able to spend a semester abroad. Another positive development the department sees is their new ability to freely select their students from the applicants[45], since the department now handles admissions. They had 3300 applications for 400 spots in 2010 and the average *Abitur* grade was 1.9. This means the group of admitted high school students is particularly strong (Interview, Business Administration, University of Mannheim).

[44]Translation by the author, original: "Die Diplomprüfung (Prüfung zum Bachelor) bildet den berufsqualifizierenden Abschluss des wissenschaftlichen Studiums der Betriebswirtschaftslehre. Durch die Diplomprüfung (Bachelorprüfung) soll festgestellt werden, ob der Kandidat/die Kandidatin die Zusammenhänge seines Faches überblickt, die Fähigkeit besitzt, wissenschaftliche Methoden und Erkenntnisse anzuwenden, und die für den Übergang in die Berufspraxis notwendigen gründlichen Fachkenntnisse erworben hat."

[45]Since business administration is such a popular discipline, applications used to be handled by a national agency (*Zentrale Vergabestelle für Studienplätze* - ZVS) that decided about admission to a program in the old system.

Table 6.7: University of Mannheim Business Administration
Diplom and Bachelor of Science Degrees

University and Department	**University of Mannheim** **School of Business** ***Diplom Business Administration (BWL)***	**University of Mannheim** **School of Business** ***Bachelor of Science in Business Administration***
Curriculum Structure and Content	- program divided into Basic Studies (semesters 1-4) and Advanced Studies (semesters 5-9) - accumulated intermediary Diplom grade after Basic Studies and accumulated final Diplom grade after Advanced Studies - curriculum covers basic and advanced classes - Diplom thesis 4 months *Classes not included in bachelor's program:* Insurance Management Auditing Controlling Banking and Finance Logistics Micro-economics III Economic Policy Finance Trade Theory Electives in Social Science and Law	- program structured in modules and focus fields - exams in each module, grades are accumulated for final grade - curriculum covers basic and few advanced classes - bachelor's thesis 6 weeks *New classes in bachelor's program:* Presentation Skills and Rhetoric Judicial Thinking Quantitative Methods Investments and Asset Pricing Foundations of Information Systems Foreign Language Requirement Module "International Studies"
Program Objectives	"The Diplom examination concludes the scientific study of business administration and grants a degree qualifying a graduate for the labor market. By passing the Diplom exam the candidate shows that he/she understands the interrelations of different issues in his field of study, has the skills to use scientific methods and results and has acquired the in-depth knowledge necessary for entering the professional job market." (Prüfungsordnung, 1-2)	"The bachelor examination concludes the scientific study of business administration and grants a degree qualifying a graduate for the labor market. By passing the bachelor exam the candidate shows that he/she understands the interrelations of different issues in his field of study, has the skills to use scientific methods and results and has acquired the in-depth knowledge necessary for entering the professional job market." (Prüfungsordnung, 2)
Interdisciplinarity and Transferrable Skills	- electives available in different disciplines - major "Business Administration with Labor and Civil Law Qualification"	- electives available in different disciplines
Employability	- a three months internship is recommended	- business career center available - student projects done on behalf of companies - frequent recruiting fairs - strong emphasis on extra-curricular activities within Business School
Internationality	- organized exchange programs by business school and university	- foreign language requirement - study abroad semester required
Research Elements	- Diplom thesis - research papers	- bachelor's thesis - research papers
Credits	Total of 140 SWS/credits	180 ECTS
Contact Time	ca. 16 hours/week	15-17 hours/week
Forms of Teaching and Exams	- lectures, discussion sections, seminars - written exams, oral presentations, team projects	- lectures, discussion sections, seminars - written exams, oral presentations, team projects
Program Length	9 semesters	6 semesters

At the *Friedrich Schiller University Jena*, faculty and administration started to talk about reforming their degrees in 2002/2003. First, they changed their 1998 *Diplom* regulation[46] to a modularized structure and starting in 2005 they worked on the new bachelor's degree (Interview, Business Administration FSU Jena). The bachelor's regulation analyzed here is from 2009.[47]

The *Diplom* in Jena was nine semesters long and divided into four semesters of basic studies, which included core classes, and five semesters of advanced studies including several electives and a specialization that could be selected. It also included six months of internships, which could either be done during semester breaks or during an additional praxis semester.

The new bachelor's program does not have the structural differentiation between basic and advanced studies. It is six semesters long and modularized with basic modules (required classes) and specialization modules (electives). It offers an introductory math class before the first semester and does not require an internship, but a "praxis module" in which the student can either do an internship or take job-related classes on different fields of work. In terms of content, the BS offers many new classes that cannot be found in the *Diplom* curriculum, such as methods classes, "International Management", and "E-Commerce". According to my interview partner, the new bachelor's program combines several specialized *Diplom* - programs: Business Administration, Economics, Business Informatics and Business Education. Thus the bachelor's has a broader array of classes than the original *Diplom* in Business Administration. Basic classes cover all of these areas and specialization modules can be selected in one of the areas to create a unique student profile. "Giving students a general broad basic education in business has always been one of our goals. But they also need to be able to specialize in their area of interest" [48] (Interview, Business Administration FSU Jena). Another area in which interdisciplinarity has played a new role is a master's program that is now offered for graduates of science programs (e.g. Chemistry, Physics, Biology). Many of those departments have asked for business classes for their students and while there just were not the resources to offer these classes on the bachelor's level, the Business School

[46]Studienordnung für den Diplomstudiengang Betriebswirtschaftslehre mit dem Abschluss Diplom-Kaufmann bzw. Diplom-Kauffrau an der Friedrich-Schiller-Universität Jena (in der Fassung der Zweiten Änderung) vom 05.01.2004.

[47]Studienordnung der Wirtschaftswissenschaftlichen Fakultät für den Studiengang Wirtschaftswissenschaften (Business and Economics) mit dem Abschluss Bachelor of Science vom 16.12.2009.

[48]Shortened translation by the author, original: "[...] unsere Philosophie an der Fakultät war von Anfang an [...] wir bilden eher Generalisten aus, die zwar eine gewisse Spezialisierungsmöglichkeit haben auch schon im Diplom, indem sie eben zum Beispiel in der BWL zwei Spezialisierungsrichtungen wählen, aber es bleibt dabei, dass sie ein sehr breit angelegtes Grundlagenstudium erhalten und auch im Hauptstudium noch ein nicht-betriebswirtschaftliches Schwerpunktfach zu wählen habe."

can now offer a non-consecutive master's in business for science majors (Interview, Business Administration FSU Jena).

The new undergraduate curriculum also shows signs of an international perspective with several classes focusing on international issues. And students are still encouraged to spend a semester abroad. However, with new classes and each department trying to create their own profile, it has become more difficult to transfer credits for classes taken abroad as it is hard to identify similar classes. So students are more careful when planning their study abroad semesters. Another issue is timing. Students finishing there BS in their 7th semester would often like to go abroad in their 8th semester, but since they have already graduated, but not reenrolled for the master's program they are not students for that period and cannot participate in student exchanges. One way to solve that issue is to do an internship abroad instead of studying at a different university. The department's internship office helps students organize these experiences (Interview Business Administration FSU Jena).

There also is a focus on transferrable skills like languages and computer skills that are taught in special classes, but these classes had already been included in the *Diplom*. What has changed is that there is now also a greater focus on soft skills in regular classes and the department could introduce smaller discussion groups, as well as a new mentoring program in which master's students mentor first semester bachelor's students. MA students receive credit for it and learn skills like leadership skills, while BS students get help navigating their studies (Interview Business Administration FSU Jena).

In terms of the defined goals the two programs are similar, but not identical. The *Diplom* regulation focuses on scientific methods and in-depth knowledge of business studies, economics, and law:

> "The program of Business Administration aims not enable students to recognize microeconomic issues in firms and other organizations, analyze them independently with the use of scientific methods and find solutions. To do that, the program provides students with in-depth knowledge in the areas of Business, Economics and Law as well as with the necessary empirical and analytical methods"[49] (Diplom Studienordnung 2004, 1).

[49]Translation by the author, original: "Das Studium der Betriebswirtschaftslehre soll die Studenten befähigen, einzelwirtschaftliche Probleme in Unternehmungen und anderen Institutionen zu erkennen, sie selbständig und eigenverantwortlich mit wissenschaftlichen Methoden zu analysieren und einer Lösung zuzuführen. Hierzu werden ein umfassendes Wissen aus den Bereichen der Betriebswirtschaftslehre, der Volkswirtschaftslehre und der Rechtswissenschaft sowie Kenntnisse zur Beherrschung empirischer und analytischer Arbeitsmethoden vermittelt."

According to the department's bachelor's program regulation the bachelor's program at Jena "is a research- and job-oriented program, intended to teach students the skills to identify economic issues within companies and other organizations as well as issues on the national and international level. Students are given the skills to independently analyze the issues with adequate methods and offer solutions"[50] (Bachelor Studienordnung 2009, 2).

The intended research-orientation is also shown by the comparatively long phase (two months) for the bachelor's thesis. In comparison, the *Diplom* thesis at Jena was only three months long and in other bachelor's programs it is only six weeks long. Table 6.8 gives an overview of the differences between the *Diplom* and bachelor's programs and Table B.8 summarizes the changes in the curriculum.

While the department was first reluctant to change to the new degrees, mainly because they were missing the staff and financial resources for the switch, students and faculty have been happy with the new programs so far. One problem my interview partner finds with the new degrees is that student mobility (i.e. switching from one university to another) has been hindered because each department is encouraged to create their own particular program. This makes it harder for students to transfer classes because classes are now much more individual than they used to be in the old system. (Interview Business Administration FSU Jena).

[50]Translation by the author, original: "Das forschungsorientierte und berufsqualifizierende Studium der Wirtschaftswissenschaften soll die Studenten befähigen, einzelwirtschaftliche Probleme in Unternehmungen und anderen Institutionen sowie gesamtwirtschaftliche Probleme auf nationaler und internationaler Ebene zu erkennen, sie selbstständig und eigenverantwortlich mit wissenschaftlichen Methoden zu analysieren und einer problemadäquaten Lösung zuzuführen."

Table 6.8: Friedrich Schiller University Jena Business Administration *Diplom* and Bachelor of Science Degrees

University and Department	**Friedrich Schiller University Jena School of Economics and Business Administration *Diplom Business Administration***	**Friedrich Schiller University Jena School of Economics and Business Administration *Bachelor of Science in Business and Economics ("Regelprofil")***
Curriculum Structure and Content	- program divided into Basic Studies (semesters 1-4) and Advanced Studies (semesters 5-9) - accumulated intermediary Diplom grade after Basic Studies and accumulated final Diplom grade after Advanced Studies - curriculum covers basic and advanced classes - Diplom thesis of 3 months - required internship of 6 months *Classes not included in bachelor's program:* Information System Lab Introduction to Business Informatics Entrepreneurship Production and Process Development Crisis Management Planning and Decision-making Flexibility-oriented HR Management	- program structured in modules - exams in each module, grades are accumulated for final grade - curriculum covers basic and few advanced classes - bachelor's thesis of 8 weeks *New classes in bachelor's program:* Module "Job Qualification" Empirical and Experimental Research in Economics New Concentrations (examples): Data, Information and Knowledge Management Algorithms, Data Structures and Information Systems e-commerce Business Cycle and Growth Entrepreneurship, Market Dynamics and Development
Program Objectives	``The program of Business Administration aims at enabling students to recognize microeconomic issues in firms and other organizations, analyze them independently with the use of scientific methods and find solutions. To do that the program provides students with in-depth knowledge in the areas of Business, Economics and Law as well as with the necessary empirical and analytical methods." (Studienordnung, 1)	The bachelor's program ``is a research- and job-oriented program, intended to teach students the skills to identify economic issues within companies and other organizations as well as issues on the national and international level. Students are given the skills to self-dependently analyze the issues with adequate methods and offer solutions" (Studienordnung, 2)
Interdisciplinarity and Transferrable Skills	required computer lab	- Alternative study profiles in Economic and Business Education, in Business Information Systems and in Information and Management Sciences offered in cooperation with other departments - Master's degree Business for Engineers and Scientists
Employability	- required 6 months internship - internship office assists students	- Module "Berufsqualifizierung" includes internship or classes on particular professional fields - Internship office supports students
Internationality	- Foreign language requirement - exchange programs available and highly encouraged	required foreign language module
Research Elements	- Diplom thesis (3 months) - research papers - classes in statistics and analysis	bachelor's thesis (8 weeks)
Credits	144 SWS	180 ECTS
Contact Time	ca. 16 hours/week	15-17 hours/week
Forms of Teaching and Exams	mainly lectures and discussion sections, seminars in advanced studies mainly written exams, some presentations, oral final exams	mainly lectures and discussion sections mainly written exams, some presentations
	9 semesters including 6 months internship and Diplom Thesis	6 semesters

First changes to the curriculum of the *Diplom* at the Business Department at the *Ludwig Maximilian University Munich* (LMU Munich) were made in 1996, when they introduced a credit system and continuos exams for each class. In the early 2000s, the faculty started to debate introducing a bachelor's degree in addition to the established *Diplom*. Unlike at other schools, they were very motivated to introduce the new degrees as they felt it would make their students more competitive internationally. The first bachelor's program was introduced in 2005, only to be recalled by the university administration one year later. The university had decided to set specific regulations concerning the distribution of credits, the required minors, maximum length of the program, etc. and required each department to adjust their programs to those rules. Thus, the current bachelor's program is not the ideal program in the eyes of the faculty but one according to the university rules. Nevertheless, many positive changes have been made (Interview Business Administration LMU Munich).

The *Diplom* (regulation from 1996, with latest revision in 1999[51]) was only eight semesters long with three semesters of basic studies and five semesters of advanced studies including the *Diplom* thesis. The bachelor's program (regulation from 2008[52]) is a six semester program with a modularized structure that includes required and elective modules. The curriculum for the bachelor's degree includes most of the required classes from the *Diplom*, but does not include specializations such as "Business administration of banks and insurance companies" or "Business Administration and Taxes". Both, the *Diplom* and the bachelor's program do not require an internship. Though the bachelor's program offers field specific preparatory classes such as "Hospital Management" or "Tourism" (see class catalog[53]). The regulation also states that the bachelor's program focuses on transferable skills such as presentation techniques, language and computer skills, team skills and organization competences (Bachelor Studienordnung 4). They are being taught in a special module called "*Schlüsselqualifikationen*" (soft skills). While the *Diplom* does not have these practically oriented classes, it allowed students to take classes from other disciplines such as political sciences or sociology. This has been transferred to the bachelor's program, where students are now required to chose a minor out of a catalog of different subjects, mainly in the social sciences.

[51]There is also a newer regulation available from 2003, the document used here however is the older version: Studienordnung für den Diplomstudiengang Betriebswirtschaftslehre an der Ludwig-Maximilians-Universität München vom 28. März 1996 in der Fassung der Änderungssatzung vom 20. Oktober 1999.

[52]Prüfungs- und Studienordnung der Ludwig-Maximilians-Universität München für den Bachelorstudiengang Betriebswirtschaftslehre vom 2. Dezember 2008.

[53]Studienordnung Anlage 1, Teil 1, Modulhandbuch 2008

The bachelor's thesis is two months long, while the *Diplom* thesis took up an entire semester. The bachelor's also shows a stronger international component than the *Diplom*. In the *Diplom* regulation it was only mentioned that English is important and good English skills are expected. In the bachelor's program, on the other hand, many classes relate to international issues, some of them are also taught in English and exams can be done in English. The final bachelor's certificate and transcripts are also offered in English. In addition, the department introduced a new international studies coordinator and offers a "European Masters" that includes studies at three different international universities (Interview Business Administration LMU Munich).

The defined goals of the programs also show some differences. While the *Diplom* regulation only states that the goal of the program is to teach students the necessary skills and knowledge to solve business problems with scientific methods,[54] the bachelor's program regulation is much more detailed and states:

> "The bachelor's program in Business Administration aims to provide students with the necessary skills to recognize, analyze and solve issues and correlations in the field of business studies with scientific methods. Building on a broad basic knowledge in the fields of business, economics, law and statistics, students focus on one specialization to give a first orientation for a possible field of work. The program wants to give students the abilities to enter the job market in the fields of industry, trade, commerce, banking, insurance and other service fields, as well as in research institutes, associations and the public sector of the economy"[55] (Bachelor Studienordnung 2008, 3-4).

Thus, the program intends to prepare students for a variety of jobs in industry or research.

Despite the restrictions posed by the university administration, the Business Department at the LMU Munich introduced many changes to the curriculum when they introduced their new degree programs (see Table 6.9). In addition to the curriculum changes (see Table B.9), the introduction of student fees also allowed

[54]Translation by the author, original: "Das Studium zur Diplom-Kauffrau Univ. bzw. zum Diplom-Kaufmann Univ. soll die Fähigkeit vermitteln, betriebswirtschaftliche Probleme und Zusammenhänge mit wissenschaftlichen Methoden zu erkennen, zu analysieren und zu lösen" (Diplom Studienordnung 1999, 3).

[55]Translation by the author, original: "Der Bachelorstudiengang Betriebswirtschaftslehre soll die Fähigkeit vermitteln, betriebswirtschaftliche Probleme und Zusammenhänge mit wissenschaftlichen Methoden zu erkennen, zu analysieren und zu lösen. Aufbauend auf einem breiten Grundlagenwissen in den Bereichen der Betriebswirtschaftslehre, der Volkswirtschaftslehre, der Rechtswissenschaft und der Statistik erfolgt eine schwerpunktbezogene Vertiefung, um eine Orientierung auf die angestrebten beruflichen Tätigkeitsfelder zu ermöglichen. Das Studium soll auf diese Weise die Eingangsmöglichkeit insbesondere für Berufsfelder in Industrie, Handwerk und Handel, bei Banken, bei Versicherungen und anderen Dienstleistungsunternehmen, in Forschungsinstituten, Verbänden und in der öffentlichen Wirtschaft schaffen."

them to introduce smaller study groups, hire more professors and lecturers and open a student services office. The department also focuses very much on giving students practical experience, by supporting them in finding internships, offering classes taught by entrepreneurs and business men and supporting bachelor's thesis projects done with companies. The only major problem my interview partner finds with the new degrees is that of reduced student mobility due to credit transfer issues as described by other departments (Interview Business Administration LMU Munich).

Table 6.9: Ludwig Maximilian University Munich Business Administration *Diplom* and Bachelor of Science Degrees

University and Department	**Ludwig Maximilian University Munich School of Management *Diplom in Business Administration***	**Ludwig Maximilian University Munich School of Management *Bachelor of Science in Business Administration***
Curriculum Structure and Content	- program divided into Basic Studies (semesters 1-3) and Advanced Studies (semesters 4-8) - accumulated intermediary Diplom grade after Basic Studies and accumulated final Diplom grade after Advanced Studies - curriculum covers basic and advanced classes - Diplom thesis of 4 months *Classes not included in bachelor's program:* - advanced classes in General Business (e.g. Investment Theory, Risk Policy, Entrepreneurship) - advanced classes in General Economics (e.g. Advanced Micro- and Macroeconomics) - fewer choices in business specializations and electives	- program structured in modules - exams in each module, grades are accumulated for final grade - curriculum covers basic and few advanced classes - bachelor's thesis of 8 weeks *New classes in bachelor's program:* - module Soft Skills - electives: Communication Studies, Computer Studies, Methods of Economic Analysis, Applied Economics
Program Objectives	The program's goal is "to teach students the necessary skills and knowledge to solve business problems with scientific methods" (Diplom Studienordnung, 3).	"The bachelor's program in Business Administration aims at providing students with the necessary skills to recognize, analyze and solve issues and correlations in the field of business studies with scientific methods. Building on a broad basic knowledge in the fields of business,economics, law and statistics, students focus on one specialization to give a first orientation for a possible field of work. The program wants to give students the abilities to enter the job market in the fields of industry, trade, commerce, banking, insurances and other service fields, as well as in research institutes, associations and the public sector of the economy" (Bachelor Studienordnung, 3-4).
Interdisciplinarity and Transferrable Skills	Electives in Political Science, Sociology, and Psychology	Transferrable Skills specifically mentioned in program regulations: - ability to research, evaluate and structure knowledge and information - general knowledge on significant fields of the relevant subject - network thinking - organizational and transfer skills - information and media skills - learning and presentation techniques - mediation skills - team and communication skills, including gender-related issues - language skills - computer skills
Employability	Internships not required but recommended	- internships not required - modules on professional fields e.g. 'Tourism' and 'Hospital Management'
Internationality	- English as a prerequisite - International partner universities - International Relations Center	- classes and exams can be held in English - International Relations Center
Research Elements	- Diplom thesis - research papers	- bachelor's thesis - research papers
Credits	144 SWS	180 ECTS
Contact Time	16-22h/week	22h/week
Forms of Teaching and Exams	- Lectures, discussion sections, seminars - Written exams, oral presentations, oral final exams, research papers	- Lectures, discussion sections, seminars, case studies - Written exams,oral presentations, team projects, multiple choice possible, electronic exams possible
Program Length	8 semesters	6 semesters

At all of the three compared programs in business administration the reform goals of adding broader, interdisciplinary skills, with a focus on employability and an international component have been implemented in the new bachelor's programs. However, each program compared here shows a particular profile. What stands out in Mannheim is their required international studies module, through which nearly all students spend a semester abroad, as well as their strict policy in not allowing students to take more than six semesters for the bachelor's degrees. At Jena, the required internship module brings together the new intended focus on employability with research skills needed for further studies. Munich's business program stands out with its special classes on soft skills and their minor in a different social science discipline. The LMU's program seems to be the broadest of the programs compared here.

In comparison to the programs in chemistry and engineering, the new business programs appear to have undergone the most substantial changes in their structure and curriculum and also appear to most resemble American bachelor's programs in business. In most American undergraduate business programs, students take required introductory business classes, required advanced business classes, specialization classes in their particular business major, and a variety of liberal arts classes, such as philosophy, literature, math, and social sciences.

Business and economics were disciplines that embraced the new degrees early on. In 2008 only five percent of those students starting in business, economics and social sciences still started in a traditional *Diplom* program. As a comparison, in engineering it was still 14 percent (Statistisches Bundesamt Deutschland 2009b, 18). Unlike in engineering, there were no major movements to fight the introduction of bachelor's and master's degrees. Some universities and interest groups, such as the Saarland state group of the German Association of Business and Economics Researchers (bdvb), wanted to keep the *Diplom* in addition to the new degrees, because they felt that the four year *Diplom* was still valuable (Kraemer 2009, 1). In general, however, business and economics departments and their organizations are content with the new degrees (Deutscher Führungskräfteverband ULA 2011, 17).

One of their main hopes the reform would bring was an internationalization, as the "Aktionskreis Leistungsträger"[56] explains in one of their position papers:

> "The introduction of bachelor's and master's programs will lead to an internationalization of German universities. It will improve the global competitiveness of German graduates and will contribute to a gain in

[56]The "Aktionskreis Leistungsträger" is a working group of associations in business-related fields, e.g. the German Association of Business and Economics Researchers, the German Association of Bank Employees, and the German Association of University Professors and Lecturers.

> foreign students at German universities"[57] (Aktionskreis Leistungsträger 2002, 33).

Unfortunately this seems to be more problematic than expected.

While all departments analyzed here have put in efforts to increase their internationality, the main critique my interview partners had for the new system was problems with transferring credits for classes that students had taken abroad or even at a different German university. Besides each department trying to offer special classes that are then difficult to transfer to a program without those classes, another problem are new very differentiated program orientations. My interview partner at the LMU Business Department explained:

> "With the bachelor's we have gotten many very differentiated programs, for example special programs in international management, in marketing, information technology based business programs, etc. They all are different in small parts and that makes transferring credits difficult"[58].

6.1.4 Summary

This analysis has compared traditional *Diplom* degrees with their new bachelor's programs. The comparison has shown that all of them have changed more than just the general structure, but there are various degrees of change in curricular content. In all programs, basic introductory classes remained the same, because their content is essential for the degree. Some of them, however, have been shortened.

This comparison focused on the declared reform goals of shortening study periods, introducing a broader curriculum with a greater focus on soft skills, increasing employability by giving students practical experiences, and an internationalization in the form of more study abroad programs, offering classes in foreign languages and preparing students for a global job market. This summary will review the results for each of these categories (also see Table 6.10, page 214).

[57] Translation by the author, original: "Die Einrichtung von Bachelor- und Masterstudiengängen wird zu einer Internationalisierung der deutschen Hochschulen führen, die globale Marktfähigkeit deutscher Absolventen verbessern und dazu beitragen, vermehrt ausländische Studierende für deutsche Hochschulen zu gewinnen."

[58] Translation by the author, original: "Mit dem Bachelor hat man auch viele wahnsinnig differenzierte Studiengänge, gerade in der Betriebswirtschaftslehre. Internationales Management, was weiß ich, marketingorientierte Studiengänge, informationswissensbasierte Betriebswirtschaftslehrestudiengänge, die sich immer wieder in kleinen Teilen unterscheiden und dadurch die Anerkennbarkeit nicht gegeben ist."

1) Shortening the study periods:

Just comparing the old *Diplom* to the new bachelor's programs all departments have reduced the study time for their first degree from originally eight - ten semesters (*Regelstudienzeit*) to six - seven semesters. However, one needs to acknowledge that the two degrees are not of equivalent levels. In order to acquire the same expertise as the one in a *Diplom* program, a student needs to get a master's degree. Counting in the extra 1-2 years for the master's, the study time for a *Diplom*-level degree in some cases has become longer rather than shorter. For example, the Business *Diplom* program at the LMU Munich was an eight-semester program, the combined six-semester bachelor's and four-semester master's now add up to ten semesters. Yet, the first job-qualifiying degree is now achieved in a shorter time. According to the Federal Department for Education and Research, in 2000 the median study time for a degree at a university was at 11.5 semesters; in 2009 the median time for a bachelor's degree was at 5.9 semesters and that for a master's at 4.1 semesters (Bundesministerium für Bildung und Forschung 2012, 1).

2) Soft skills and broader programs:

All programs analyzed here have introduced classes or programs that teach students transferrable skills in their new bachelor's programs. While some programs require their students to take particular classes or modules on soft skills or in non-subject areas such as social sciences for engineers (Mechanical Engineering TU Munich, Mechanical Engineering RWTH Aachen, Business Administration Mannheim, Business Administration FSU Jena, Business Administration LMU Munich, Chemistry RWTH Aachen) other departments try to teach these skills as integrated parts in their regular classes by requiring more tasks such as group projects or presentations (Mechanical Engineering OvGU Magdeburg, Chemistry LMU Munich, Chemistry FSU Jena). Compared to the old *Diplom* programs, the bachelor's programs do focus more on transferrable skills and some offer classes outside of the main subject area and thus are broader than before. However, none of the programs offer the kind of general liberal arts curriculum found at American undergraduate programs. The bachelor's program's analyzed here still very much focus on one discipline and several offer specializations even at the undergraduate level.

3) Employability:

One of the major complaints about the old degree programs, particularly at research universities, was that students do not have enough hands-on experiences and the programs are too theoretical. The Bologna reforms focused on improving students' employability. For the programs analyzed here there are a few changes that can be noticed.

In chemistry, internships in industry are not standard and most programs do not require them. What is more important in chemistry is time spent in the lab, since this is were students learn their experimental skills. All of the programs compared here still focus very much on lab experiences and provide students with plenty of time in the lab. An additional change in the new bachelor's programs is a focus on classes such as law and patent rights, to also give students an understanding in these areas, as they are necessary in the chemical industry.

In engineering, most *Diplom* programs already included long internships in industry and many students also did their *Diplom* theses with a company. This has not changed much, except that internships in the bachelor's programs are now much shorter. What is new in the bachelor's programs are project classes like the one introduced at RWTH Aachen University, where students work on a project given by a company and design a product.

Business programs at research universities have traditionally not required internships, but many students still did them during their semester breaks or took a semester off to do an internship. None of the new bachelor's programs compared here require an internship. However, all my interview partners mentioned that most students do internships in their own time and many also do their bachelor's thesis in a company. In addition, there are now more classes that focus on specific branches of industry and project classes that teach students skills needed in the working world.

4) Internationalization:

Internationalization was a major focus of the Bologna reforms. In particular, the goal was to increase the number of students going abroad and the number of foreign students studying at German universities. Introducing a focus on international issues was an additional goal for some subjects. Mixed results can be found when analyzing data an the development of internationalization of German universities. In my interviews, almost all departments mentioned, that studying abroad had become more complicated for German students. On the one hand, the bachelor's programs were too short and structured so strictly that it is very difficult to spend a semester away. At the same time new specific profiles of programs makes it difficult to find equivalent classes at guest institutions that can be transferred to the home institution. What was supposed to become easier with the ECTS credit system has become more complicated. The HRK has found similar problems: "We especially need the possibility to study at different speeds again, without strict regulations of

study times"[59] said HRK president Hipp, who finds that student mobility is being hindered by the strict regulations the new programs have (ZEIT Online 2012).

Statistics, however, show that the general trend is an increase in study abroad semesters for German students as well as an increase of foreign students studying in Germany. For incoming students the numbers rose from 6.8 percent of all students in 1993 to 12.5 percent in 2005 and 11.5 in 2011 (DAAD and HIS 2012). The percentage of students at research universities spending a semester or more abroad rose from 23 percent in 1998 to 37 percent in 2006 (Heublein, Schreiber, and Hutzsch 2011, 10). Newer studies that include the new bachelor's and master's programs found the percentage of students with any kind of experience abroad (including summer schools, internships, etc.) was at 25 percent in 2007, 27 percent in 2009 and 26 percent in 2011 (at research universities only) (Heublein, Schreiber, and Hutzsch 2011, 11). Since the data collection before 2007 was different than for the new studies the numbers cannot be compared directly, but seem to indicate a recess. Comparing the numbers in bachelor's and master's programs, the study finds that in 2011 only 16 percent of bachelor's students had experiences abroad, while 39 percent of master's students at research universities had lived in a foreign country (Heublein, Schreiber, and Hutzsch 2011, 13). Interestingly, the percentage of bachelor's students with foreign experiences in their 7th and 8th semester (so longer than the regular study time) was at 39 percent in 2009 and 34 percent in 2011 (Heublein, Schreiber, and Hutzsch 2011, 14). These results seem to support the problems in bachelor's programs mentioned by my interview partners. While there is a general positive trend for internationalization, it is problematic for students to spend time abroad during the six-semester bachelor's programs.

[59] Translation by the author, original: "Vor allem brauchen wir wieder ein Studieren in unterschiedlichen Geschwindigkeiten, abseits der starren Vorschriften der Regelstudienzeit."

Table 6.10: Summary of Reform Results in new Bachelor's Programs

Reform Goal	Chemistry	Mechanical Engineering	Business Administration
Shorter Study Periods	- first degree shortened from 5 to 3 years - master's and PhD still common final degrees	- first degree shortened from 5 to 3 years - master's still common final degree	- first degree shortened from 5 to 3 years - more common to leave with bachelor's degree
Soft Skills and Broader Programs	- new focus on soft skills in all programs - no major changes in curriculum, except fewer advanced classes in bachelor's degree - some additional soft skill and project classes	- new focus on soft skills in all programs - no major changes in curriculum, except fewer advanced classes in bachelor's degree - some additional soft skill and project classes	- new focus on soft skills in all programs - changes to curriculum structure and choice of classes in some programs - some additional soft skill and project classes
Employability	- still focus on lab time - new focus on patent law as additional class - some additional classes in computer application - no required internships	- internships often much shorter than in *Diplom* - new project classes	- no required internships, but common among students - bachelor's thesis often combined with research and work in a company - new classes focusing on specific industries
Internationalization	- English requirements in all programs - classes and exams offered in English - time for study abroad more limited than before reforms	- English requirements in almost all programs - classes and exams offered in English - time for study abroad more limited than before reforms	- English/foreign language requirement in all programs - classes and exams offered in English - new focus on international issues/ foreign studies

This leaves us with the question of whether the new degrees provide students with a new set of skills compared to the old *Diplom* programs. In terms of the subject-specific content in chemistry, mechanical engineering and business administration there have not been any significant changes to the core curriculum. In all three disciplines, the first three to four semesters of the bachelor's programs resemble those of the former *Diplom* programs. Some content had to be cut down to address the shorter time available. At the same time, departments have put forth effort to update their curriculum by introducing classes on new fields in the discipline and offering additional classes that focus on transferrable skills and more general content. Law and business classes in chemistry and engineering programs, as well as international studies and social science classes in business programs are a few examples for the broadening of the curriculum. Project classes, communication classes and general soft skills classes show the new focus on transferrable skills.

The focus in most programs, however, still seems to be preparing students for a later master's program. Almost all interview partners mentioned that they expect the majority of students to continue in a consecutive master's program and that they see the master's as the necessary degree for success in the labor market. Particularly in engineering and chemistry, the focus is still on the master's degrees and the bachelor's is only seen as a first step towards a higher degree. In chemistry, it is even the PhD that is seen as the necessary degree for a "full" chemist. Business programs seem to be the most open towards the bachelor's degrees and have also broadened their programs more than the other two disciplines. In conclusion, one can see a shift towards broader and more general degrees, however the degree of change is small. Compared to American undergraduate programs, German bachelor's programs are still very specific. They still mainly focus on one major subject, there is no required liberal arts curriculum and most students continue in a master's program. The differences will become clear by comparing American undergraduate programs in the next chapter.

6.2 New Degrees on the Labor Market: Employer Preferences

As the previous section has shown, German undergraduate degrees have changed in many ways. One main goal of the new degrees was to increase the employability of university graduates. Improving graduates' ability to find jobs outside of the world of academia and to apply their learned knowledge and skills to practical tasks in industry and service jobs was one of the major goals of higher education reforms in

Germany. After looking at the new curricula, this section will now try to answer the question of how the new degrees have performed in the labor market.

How do employers evaluate the new degrees? Where do they see room for improvement? What are their first experiences with graduates of the new programs and what are their expectations? These questions are important to answer in order to be able to evaluate whether employer preferences have changed towards more flexible, general degrees and have been brought up in expert interviews which will be analyzed below. Interviews have been done with eight human resource managers of businesses hiring graduates of chemistry, engineering and business programs, as well as education policy analysts at the German Confederation of German Employer Associations (BDA), the German Association of the Chemical Industry (VCI), and the German Association of Mechanical Engineering Companies (VDMA). For the selection of interview partners, several of the original "Bachelor Welcome"-signatory companies that fit into the categories of mainly hiring engineering, chemistry or business graduates were contacted. However, since few bachelor graduates have gone straight on to the labor market so far, but rather remained in school to continue with a consecutive master's program, many of my interview partners have only had limited experiences with graduates of the new degree programs, especially those coming from "external" university programs and not from company based cooperative programs (i.e. *Berufsakademien*).

Thus, in addition to the data collected by the expert interviews this chapter will use data and results of several large - N studies on the new bachelor's degrees that have been done by different institutions over the last few years. These studies give a general overview of the success the new degrees have had with employers. Two of the most recent studies, Konegen-Grenier (2011) and Briedis et al. (2011), covered many of the same issues that were raised in my expert interviews, thus they are very helpful in supporting my qualitative/narrative accounts with more generalizable quantitative data.

The most recent large-N study on the subject of new bachelor degrees in the labor market was done by the Institute of the German Economy Cologne (IW Köln) and the *Hochschulinformationssystem GmbH (HIS)* in 2010/2011 in cooperation with the *Stifterverband für die Deutsche Wissenschaft*. They surveyed students in old and new degree programs, graduates of old and new degree programs as well as employers in different fields of industry. The employer study was done as an online survey combined with in-depth phone interviews, thus it offers a representative survey in addition to more detailed information.

The analysis of position papers above has shown that employers had several

wishes for the new degrees and the overall university reforms. In summary these were: younger graduates, more practical experiences, better soft skills, broader, more flexible degrees that allow for life-long learning, as well as a greater emphasis on internationality and interdisciplinary learning. These were also the expectations mentioned by my interview partners. The main issues raised by the employer interviews were graduates' age, soft skills vs. detailed subject knowledge, employability and practical experiences, and possibilities for lifelong learning. In all of these areas, employers have new preferences and expect the reforms to address their expectations.

Graduates of the old German university degrees were significantly older than graduates in other countries, for example in 2007 the typical **graduation ages** in countries with three to five year higher education degrees were 20 years in Australia, 21 in the UK, 22 in Austria, Canada, Japan and the United States, 22-23 in the Netherlands and 25-26 in Germany (Organisation for Economic Co-operation and Development 2007a, 424). In 2002 the average age to enter the job market in Germany was 28 years (Statistisches Bundesamt Deutschland 2008, 20). Changing this was one of the requests German employers had. Although the new degrees were introduced to shorten programs to allow students to earn a degree and enter the workforce in three to four years, only few students leave the university with only a bachelor's degree. In 2007/2008 only 18 percent of university graduates and 52 percent of FH graduates went directly into employment after their bachelor's (Konegen-Grenier 2011, 20). This, however, does not seem to be caused by employers' reluctance to hire bachelor graduates but more likely by an information deficit and insecurity of students. Several studies have found that employers generally stick to their "Bachelor Welcome" motto and have been hiring graduates with the new degrees (see below).

When asked specifically about their preferences for younger graduates, however, employers have different opinions on the topic. The analyst at the VDMA, for example, explained that for engineering companies, age was not a major issue and they did not request six semester programs: "I have not seen a company that said, graduates need to be particularly young. They said, they need to be good. Also, they did not say programs can only be six semesters long, they said it would be nice if they can maybe finish in ten semesters instead of thirteen."[60] (Interview VDMA). The HR representatives at Heidelberger Druckmaschinen shared that opinion for

[60]Translation by the author, original: "Also ich habe hier kein Unternehmen erlebt, die gesagt haben, die sollen jung sein. Die haben gesagt, die sollen gut sein. Ich habe auch keinen erlebt, der gesagt hat, die sollen sechs Semester studieren, die haben gesagt, es wäre schön, wenn sie's vielleicht in zehn schaffen, statt in dreizehn."

the engineering graduates they hire. They believe that it does not make sense for graduates to be younger if that means they also know less (Interview HD).

On the contrary, the representative from the chemical industry however said: "We as an industry have always emphasized the importance of shorter study programs - high quality, but shorter study times. Because we saw that in international comparison chemistry graduates in other countries, e.g. in Holland and England were much younger than in Germany. They [the Germans] were possibly better educated, but the age and time factor is an important one" [61] (Interview VCI). At BCG age also plays an important role in some of their jobs, particularly at the entry level. Their consultant teams are always made-up of younger recent graduates and more experienced senior consultants. For them it is important to have a good mixture of younger and older employees (Interview BCG).

Briedis et al. found similarly mixed results when asking their interview partners about the effects of the younger age of graduates: "Six interview partners see the younger age as a particular advantage of the reforms. On the other hand, 17 companies have the impression that the younger age can also have its disadvantages."[62] Missing life experience and problems with older non-academic colleagues were some of the issues mentioned (Briedis et al. 2011, 95). In summary, it seems that most employers welcome the shorter study programs, but only if they do not cut down on the knowledge that is being taught. Also, some branches (e.g. chemistry) emphasized younger graduates more than others (e.g. engineering).

In terms of what kind of **skills** and knowledge university graduates are expected to have, one important shift can be seen. While university graduates were traditionally expected to mainly have specific detail knowledge in their subject and area of specialization, they are now expected to have a broader knowledge of the field and additional non-subject related skills, the so-called "soft skills."

Employers still expect excellent expertise, but this is something that they were not disappointed with in the old programs. While some of my interview partners said they still needed specific subject knowledge (particularly in chemistry), others said that a general broad subject knowledge is sufficient and details can be learned on the job. For example, the representative of Deutsche Bahn said: "Espe-

[61] Translation by the author, original: "Und wir hatten immer schon als Industriezweig auf kurze Studienzeiten wertgelegt, hohe Qualität, aber kurze Studienzeiten, weil wir natürlich auch gesehen haben, dass im internationalen Wettbewerb teilweise die Chemieabsolventen aus anderen Staaten, aus Holland beispielsweise, aus England wesentlich jünger sind als die aus Deutschland. Die sind möglicherweise besser ausgebildet gewesen, aber der Alters-und der Zeitfaktor ist schon ein wichtiger."

[62] Translation by the author, original: "Sechs Interviewpartner sehen das jüngere Alter der Absolventen als besonderen Vorteil der Studienreform. Auf der anderen Seite haben 17 Unternehmen den Eindruck, dass das jüngere Alter manchmal auch von Nachteil ist."

cially electrical engineers still get a two-year training from us, because we have a different technical language than electrical engineers at the university. They need this training before they can go into positions with responsibility, certain programs are required here before you are allowed to fulfill certain functions. Why should these people spend another two years at the university to get a master's, if they then need to do the same thing here again?"[63] (Interview DB). The Berlin-Chemie expert similarly said: "Personality skills are more important than specialized subject knowledge. If a student has the necessary ability to apply their knowledge to new situations, they can always learn more details and new things"[64] (Interview Berlin-Chemie).

One thing all interview partners agreed on was the increasing importance of soft skills and personal flexibility. One of the representatives at HD explained it like this:

> "This doesn't mean that basic subject knowledge has become less important, but it means that in today's world of work where tasks change frequently and you have to adjust to new situations quickly, you need a basic expertise in your field, but you also need the ability to get ready for new work tasks, organizational changes within the company, globalization themes...you have to do something quicker than planned. For that you need more than just subject knowledge"[65] (Interview HD).

HD also looks at how motivated somebody is to do extra-curricular work, volunteer work, etc. as this shows whether somebody is willing to go beyond the required curriculum and because volunteer work is important for shaping somebody's personality. It also teaches many of the needed soft skills such as teamwork and interpersonal skills (Interview HD).

At BASF Services these non-subject related skills are particularly important because of their growing international interdependence.

[63] Translation by author, original: "...gerade die Elektroingenieure kriegen bei uns noch eine zweijährige Einarbeitung, weil wir eine andere Technikspraache haben als die Elektroingenieure an der Uni lernen und damit die in diese verantwortungsvollen Positionen gehen, bei uns bestimmte Programme vorgeschrieben sind, bevor ich bestimmte Funktionen ausüben darf und warum sollen die dann noch zwei Jahre erst mal weiter studieren und einen Master machen und dann bei uns noch zwei Jahre sowieso nochmal das machen."

[64] Translation by the author, original: "Persönliche Faktoren wiegen schwerer als Fachwissen. Wenn Lernfähigkeit vorhanden ist, kann man immer noch spezifisches Wissen dazu lernen."

[65] Translation by author, original: "Das soll nicht bedeuten, dass fachliche Grundlagen unwichtiger geworden sind, aber es soll bedeuten, dass in der heutigen Arbeitswelt, wo Arbeitsaufgaben so häufig wechseln, man sich auf neue Situationen einstellen muss, da braucht man ein fachlich fundiertes Wissen, aber man braucht auch die Fähigkeit, und da gehört eben mehr als das reine Fachwissen dazu, sich auf ständig neue Arbeitsaufgaben, Organisationsänderungen im Unternehmen, Globalisierungsthemen, man muss schneller irgendetwas machen als ursprünglich gedacht, einstellen zu können und bereit dafür zu sein."

> "Teamwork skills, intercultural competences and languages are extremely important. After all, we are working with offices in 53 countries. That's why our employee interviews always focus on how well somebody can find problem solving strategies and how well they can interact socially, besides their technical know-how"[66] (Interview BASF).

At Deutsche Bahn international and intercultural skills are less important than at BASF, because the work is very focused on the German train system. However, this does not mean that non-subject related skills are any less important. Especially teamwork skills, communication skills and economic reasoning are important for engineering graduates starting at DB (Interview DB).

Even for the chemical industry, which has mainly focused on specific subject-related knowledge in the past, soft skills are important. The VCI representative for the chemical industry lists the following skills and explains why they are important:

> "A real must is subject-related expertise, on the highest and the most up-to-date level. Businesses are very demanding in this area [...] Then there are the additional skills, that really can't be called 'soft' anymore, because nowadays they are pretty much hard requirements. Business fluent English is an absolute must. Nobody will be hired without it. [...] An understanding of economic concepts and coherences is important, that's why we advocate teaching business skills also in natural sciences and technical programs [...] Other secondary skills are flexibility and mobility. Large companies are global players and we also have many mid-sized companies that act globally and have production or sales in South America or in China. Employees need to be willing to be mobile [...] And a certain interdisciplinarity is beneficial, [...] because many projects in industry are not one-dimensional anymore, but lie between different areas [...] Teamwork skills are also important, in companies you not only work with chemists but also with scientists and technicians from other disciplines"[67] (Interview VCI).

[66] Summarized translation by the author, original: "Das gilt für die BASF erstmal, was unseren Standort angeht, sind unsere soft skills vor allem, also wir legen sehr starken Fokus auf Teamfähigkeit, alles, was damit zusammen hängt und die interkulturellen Kompetenzen. Hintergrund ist natürlich, dass wir hier ein Standort sind mit 53 verschiedenen Nationen, da muss man erst mal mit klarkommen und deswegen ist es auch Schwerpunkt in Mitarbeitergesprächen, um neben dem fachlichen Teil eben zu schauen, in wie weit diese Menschen für sich selbst Strategien zur Problemlösung, gerade in der sozialen Interaktion, haben und wie sie die angewendet haben. "

[67] Translation by the author, original: "Also, was natürlich unbedingtes Muss ist, sind die Fachkenntnisse und zwar auf dem neusten Stand und auf hohem Niveau. Die Unternehmen sind also da schon sehr anspruchsvoll [...] Gut, dazu kommen heutzutage natürlich sehr stark die Zusatzqualifikationen, die man dann fast nicht mehr als weich bezeichnen kann, sondern die teilweise auch schon richtige harte Anforderungen darstellen. Also, verhandlungssicheres fließendes Englisch ist absolutes Muss, wird niemand eingestellt, der das nicht mitbringt [...] Verständnis für wirtschaftliche Zusammenhänge ist wichtig, deshalb sprechen wir uns auch dafür aus, dass wirtschaftliche Zusammenhänge auch im Studium irgendwie einen Bestandteil darstellen, auch für naturwissenschaftliche und technische Studiengänge sollten auch die wirtschaftlichen Kenntnisse

Similarly, the VDMA policy analyst explains how transferrable skills are important for mechanical engineers:

> "It is not about rhetorical skills, that's a constant misunderstanding. When companies say a graduate needs to be able to communicate, they do not mean that he needs to be good at presentations [...] What he needs to be able to do is [the following:] Because many processes in a firm happen in parallel, not sequentially anymore, but simultaneously, he has much more contact to people outside of his immediate work environment. He needs to be able to talk to a logistician, he has to talk to people outside of his field and has to explain things in a language, so that the logistician who has most likely studied business can understand him. He cannot start using engineering jargon, but has to be able to explain it to him somehow"[68] (Interview VDMA).

In general, the importance of soft skills or transferrable skills has been emphasized from all sides. The BDA explains, why this issue is so important to employers:

> "We wanted to make clear that in the old study programs key skills (or soft skills) were neglected. We had an overemphasis on subject-related skills. We expect from the reform that we will get a good balance between subject-related and soft skills. In this sense bachelor graduates are generalists, [they have] a general education that does not need to make them specialists in three years. The specialization, in our opinion, is done in masters programs after a few years on the job"[69] (Interview BDA).

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gut vermittelt werden [...] Ja, wertvolle Sekundärtugenden sind Bereitschaft zur Veränderung, Mobilität, die großen Unternehmen sind weltweit aufgestellt, wir haben auch viele, kleine Mittelständler, die weltweit aufgestellt sind, die Produktionsstätten in Südamerika und in China haben oder zumindest Vertrieb, sodass also die Leute bereit sein müssen, sich auch mal woanders hin zu orientieren, örtlich gesehen. Eine gewisse Interdisziplinarität ist von Vorteil, [...] weil auch viele Vorhaben heute in der Industrie nicht mehr so eindimensional sind und einseitig ausgerichtet sind, sondern zwischen den klassischen Fächergrenzen liegen [...] Bereitschaft zur Teamarbeit, in Unternehmen arbeitet man eben nicht nur mit anderen Chemikern zusammen, sondern arbeitet auch mit Wissenschaftlern und Techniker aus anderen Qualifikationsrichtungen zusammen."

[68] Translation by the author, original: "Da geht es nicht um irgendwelche Rhetorikfähigkeiten, also das sind auch permanente Missverständnisse, die da erzeugt werden, wenn die Unternehmen sagen, der muss gut kommunizieren können, meinen die nicht, dass der gut präsentieren kann [...], weil ja viele Prozesse im Unternehmen parallelisiert ablaufen, also nicht mehr sequentiell hintereinander geschaltet, sondern synchron, hat der natürlich sehr viel mehr Kontakte zu Schnittstellen [...] Er muss zum einen mit dem Logistiker reden können, er muss mit Fachfremden reden können, dann muss er es in einer Sprache erklären, dass der Logistiker, der wahrscheinlich BWL studiert hat, ihn versteht. Da kann er nicht mit Fachchinesisch Ingenieurtechnik kommen, sondern muss es ihm irgendwie erklären können."

[69] Translation by the author, original: "Was wir damit deutlich machen wollten ist, dass in den alten Studiengängen diese Schlüsselkompetenzen zu kurzgekommen sind und wir eine Überbetonung der Fachkompetenzen hatten und das ist auch das, was wir mit der Bachelor/Master-Reform verknüpfen, dass wir da ein gutes Verhältnis bekommen zwischen fachlichen Kompetenzen und Schlüsselkompetenzen. Und damit sind eigentlich Bachelorabsolventen in dem Sinne Generalisten, eine generalistische Ausbildung, die auch gar nicht in drei Jahren sich wirklich zu Spezialisten in

A study done by the German Chamber of Industry and Trade that surveyed 2135 companies in the fall of 2007 also found that employers emphasize soft skills over subject knowledge: When asked which skills and competencies were most important for new university graduates, 72 percent of employers mentioned teamwork skills, 63 percent the ability to work independently, 60 percent general motivation and commitment (*"Einsatzbereitschaft"*), 59 percent communication skills, and only at the 5th place subject knowledge (52 percent). The authors of the study explain that most employers see subject knowledge as a standard prerequisite and thus do not think it needed to be mentioned, while the listed personal or soft skills are still lacking (Pankow 2008, 5-6).

Similar findings on the importance of transferable skills and flexibility were made by the IW Köln/HIS study. The authors found that two thirds of the surveyed employers found the ability to relate existing knowledge to new issues very important. About half of those companies that already hired bachelor graduates also find the ability to recognize and close knowledge gaps, analytical skills, and general basic knowledge very important. A little less important (43 percent) for bachelor graduates is the ability to apply scientific concepts. HR managers also do not find specific subject knowledge (29 percent) and scientific methods (11 percent) very important for bachelor graduates. It is more important for companies that graduates are able to adapt to new situations and apply their knowledge to new problems, than specialized subject knowledge (Briedis et al. 2011, 89-90).

These changes in expectations for university graduates confirm the hypothesis that with a more flexible labor market, globalization, and changing work environments higher education graduates are expected to be more flexible, need transferrable skills and must have a broader, more general knowledge. The VCI representative explains, that the most dramatic changes are caused by the internationalization of industry, because this influences the way we work in many ways. It requires more mobility and flexibility in terms of time, place and field of work (Interview VCI). Because it is so important to be flexible, it is not necessary to cramp everything into a short bachelor's program. A bachelor's degree needs to give a broad overview and does not need to be highly specialized, the BDA representative explained (Interview BDA). For many employers, personality and the ability to work independently and think outside of the box are becoming more important than a strict curriculum (Interview Berlin-Chemie and Interview HD).

When asked about their first experiences with the skills of new bachelor graduates employers are generally very content. As described above, most employers

einem Thema ausbilden lassen, sondern die Spezialisierung an sich erfolgt dann im Masterbereich aus unserer Sicht. Nach einer ersten Phase der Berufstätigkeit."

find it more important that university graduates are able to apply their knowledge in real life situations and have problem solving skills instead of detailed subject knowledge. According to a 2009 survey, 94 percent of employers who had already hired bachelor graduates are happy or very happy with the expertise/professional competence (*Fachkompetenz*) of those graduates and nine out of ten employers are satisfied with their social competences (Geighardt 2009, 10). Similar results have been found by Briedis et al: The majority of companies are pleased with the expertise and methodological skills of bachelors, as well as with their social and communicative skills (Briedis et al. 2011, 86-87). Detailed subject knowledge, on the other hand, is one area where bachelor graduates seem to be lacking according to the employer survey (Briedis et al. 2011, 92). However, only 29 percent of employers find this to be very important, while two thirds of all employers find the ability to adjust to new fields and to apply knowledge to new issues as the most important skills (Briedis et al. 2011, 89-90).

Besides a new focus on transferrable soft skills, employers also expected an increased **employability** by providing bachelor students with more chances to acquire **practical experience**. The old degrees have been criticized for focusing too much on scientific research skills and specific detail knowledge instead of preparing students for a job outside of academia, which is where the majority of university students works after graduation.

The BDA policy analyst remembered the first debates about the new degrees and recalled: "The big issue was always employability, of course. More than before students should be educated for the needs of the labor market"[70] (Interview BDA). One way to do this is by collecting practical experience in the form of internships or project-based learning. When asked about the new degrees the representative at Berlin-Chemie says: "Closeness to praxis is very relevant for us, because many topics that are taught in theory as part of the curriculum only become relevant through practical application"[71] (Interview Berlin-Chemie). Ideally, a student has done vocational training and then a bachelor's degree. According to Berlin-Chemie, those graduates know best how an industrial firm works. Employment - oriented (*berufsorientiert*) seminars and projects can also be helpful if they are done right (Interview Berlin-Chemie).

[70]Translation by the author, original: "Das große Thema war natürlich immer Beschäftigungsfähigkeit – employability, also sozusagen mehr als bisher die Studierenden an den Erfordernissen des Arbeitsmarktes auszubilden."

[71]Translation by the author, original: "Praxisnähe ist für uns sehr relevant, weil viele Themen, die auch in den Studieninhalten vielleicht theoretisch vermittelt werden eine eigentlich Relevanz erst durch die Praxiserfahrung gewinnen."

The Deutsche Bahn representative also finds practical experience extremely important. The representative said, graduates with a bachelor's degree will need to have done internships or a bachelor's thesis in a company in order to be successful when applying for a job with DB. For DB, practical experience is more important than short study periods (Interview DB). At BCG, they do account for the shorter time available to bachelor graduates, but still expect some internships, particularly from business students. In return, they themselves also offer a variety of paid internships (Interview BCG). One of the HD representatives summarized the importance of practical experience aptly: "Practical knowledge is indispensable"[72] (Interview HD) and BASF supports this: "It just does not work without an internship or some kind of practical experience...Having theoretical knowledge or having researched for 20 years at a university may be great for a general overview, but it's not sufficient for detailed work for us."[73] (Interview BASF).

Increasing employability of university graduates by giving them opportunities to gain practical experience is one of the main expectations employers have had for the new degrees. All of my interview partners emphasized the importance of practical experience and the ability to transfer theoretical knowledge into real-world application. This importance is also confirmed by larger surveys (Briedis et al. 2011). In their phone interviews with employers, Konnegen-Grennier and Briedis noticed that their interview partners very often mentioned practical experience by themselves when talking about other related topics. It is also one of the main critiques employers have about the new bachelor's degrees (Briedis et al. 2011, 88). In the IW Köln/HIS online survey, three fourths of the employers found need for improvements with the new degrees and of those, 62 percent were not satisfied with the length of praxis phases in the programs. It is even more critical to include practical application in the curricula. Three fourths of the surveyed employers see room for improvement in this area[74] (Briedis et al. 2011, 88).

While the general evaluation by employers of bachelor graduates is very positive, 90 percent of companies that have already hired bachelor graduates still see room for improvement, especially in the aspect of practical experience. As shown

[72]Translation by the author, original: "Praxiswissen ist das A und O."

[73]Translation by the author, original: "Also, ohne Praktikum oder irgendwelche Praxis geht's eigentlich nicht...Theoriekenntnisse oder vielleicht 20 Jahre an einer Universität studiert oder geforscht auf einem bestimmten Feld mag sehr schön sein für einen Gesamtblick, aber für die Detailarbeit ist es dann doch nicht das Richtige für uns."

[74]Summarized translation by the author, original: "In der Online-Befragung sahen drei Viertel aller Unternehmen, die Akademiker beschäftigen, einen Nachbesserungsbedarf bei den Bachelorstudiengängen (siehe Tabelle 6 im Abschnitt „Studienqualität"). Von ihnen sind wiederum 62 Prozent mit der Länge der Praxisphasen nicht zufrieden. Noch dringlicher ist für die Unternehmen der Online-Befragung allerdings eine Verbesserung des Praxisbezuges der Lehrinhalte. Diese Auffassung vertreten drei Viertel der Befragten, die einen Nachbesserungsbedarf bei der Bologna-Reform sehen."

above, increasing the employability by giving students the chance to gain job experience is one of the most important expectations employers have for the new degrees, yet apart from those students who receive their degrees in a cooperative work-study program, most employers (74 percent) find that the majority of bachelor's graduates are lacking practical experience and the curricula are missing applied content. At the same time, 67 percent of employers find internships that are integrated in the degree program important or very important (Pankow 2008, 10-11). This has also been emphasized by my interview partners. While many employers understand that there is limited time in the shorter bachelor's programs, they believe that this is one aspect that should not be cut back on[75] (Interview HD). Employers also do not think that there should be too great of a difference between FHs and research universities: "Both should be close to praxis and their education should be closer to the labor market than so far."[76] (Interview BDA). Briedis et al also found: "In the general evaluation of the Bologna reform the short practical phases where seen as the main deficit by our interview partners [...] most of our interview partners found the missing job relation very problematic"[77] (Briedis et al. 2011, 88). Thus, this problem will still need to be addressed by policymakers and universities in the future.

Another important area that has been mentioned by all my interview partners and has been important for employers as well as policy makers from the beginning of the debates over university reforms is the issue of **lifelong learning**. The traditional German education system in combination with a traditionally stable and secure labor market that allowed employees to stay in one job for a significant part of their lives fostered a system in which you would study for one third of your life, work for another third, and enjoy your pension for the last third. This, however, has been changing and employers are looking for employees who update and improve their skills continuously. The new two-tiered degrees, employers are hoping, will allow students to get a basic education in their field, then gain some work experience and after a few years, go back to school to specialize in the area they find to be important. Employers also hope that the new degrees will be open for cooperative work-study programs that allow employees to get another degree or just take a few classes while continuing to work (Interview BDA).

[75]Summarized translation by the author, original: "Da hat man im Bologna-Prozess davon gesprochen, dass man das sehr praxisorientiert und vergleichbar über die Landesgrenzen hinweg vergleichbar gestalten will und das wäre absolut der falsche Weg die Praxis wegfallen zu lassen."

[76]Translation by the author, original: "Wir sehen zwischen den Bachelorabsolventen FH und den Bachelorabsolventen Uni nicht die Unterschiede in der Ausbildung, sondern die sollten beide praxisnah und näher als bisher am Arbeitsmarkt ausgebildet sein."

[77]Translation by the author, original: "Bei der Gesamteinschätzung der Bologna-Reform wurden die zu kurzen Praxisphasen von den Interviewpartnern als größtes Defizit wahrgenommen [...] sah die Mehrheit der Gesprächspartner den fehlenden Praxisbezug als problematisch an."

For the employer association BDA, lifelong learning is one of the main issues for higher education reforms. The policy analyst at the BDA explained their expectations as follows:

> "Keyword: Lifelong Learning. It could be, and even should be, that study times will get longer all-together over our lifetime or our working life, because we will always need learning phases after work phases. Or we need to combine the two, keyword: cooperative studying and working. This means that when we say we want to have shorter study times, we need to add another sentence: We want to shorten the first degree, but all together we need a new structure"[78] (Interview BDA).

She continues:

> "The model we prefer is: bachelor's, work, master's, then work again and maybe more training courses later on. We do not like the consecutive model of doing the master's right after the bachelor's degree. There are exceptions, like teachers for example, but for all other subjects this is our preference"[79] (Interview BDA).

She also points out that degrees are becoming less significant and skills and competences are gaining in importance: "From the employers' view it doesn't always need to be a piece of paper with a stamp on it. What's important, are the competences that someone gains and how he will use them in his field of work. It's about skill oriented learning, output instead of input"[80] (Interview BDA).

The DB representative agrees with these statements:

> "We have always seen chances for lifelong learning in the new two-tiered system. We do not like, what is very popular in Germany, this kind of degree-oriented thinking: I have earned a degree once, I have proven at one point that I can pass this exam, and now I can do anything. Either I have validated this ticket once or not. And if I did, I can rely on it for the next 40 years of my life. So to have a system that already splits the degrees was very charming for us from an employer's view. To be able

[78] Translation by the author, original: "Stichwort: Lebenslanges Lernen. Das es also durchaus so sein kann und vielleicht auch sein sollte, dass die Studienzeiten sich über das Leben gesehen, über das Arbeitsleben gesehen, verlängern, weil wir immer wieder nach Erwerbsphasen Lernphasen einschieben oder sie mit den Erwerbsphasen kombinieren, also Stichwort berufsbegleitendes Lernen oder Studieren. Das heißt, es fehlt noch der Nachsatz oder der zweite Halbsatz, wenn wir sagen, wir wollen die Studienzeiten verkürzen, die Erststudienzeiten wollen wir verkürzen, aber insgesamt bedarf es einer anderen Strukturierung."

[79] Translation by the author, original: "Für uns ist das das erstrebenswerte Modell: Bachelor, Berufstätigkeit, Master und dann wieder Berufstätigkeit und eventuell noch weitere Weiter – und Fortbildungen, aber nicht das konsekutive Modell Bachelor und Master gleich hintereinander. Es gibt Ausnahmen, bei Lehrern etc. im Lehramtsstudium, aber was alle anderen Studiengänge angeht, ist das unsere Präferenz."

[80] Translation by the author, original: "aus Sicht der Unternehmen muss es nicht immer ein Papier mit einem Stempel sein, sondern entscheidend sind die Kompetenzen, die derjenige erwirbt und die er dann in seinem Arbeitsfeld wieder einbringt. Auch da wieder kompetenzorientiertes Lernen, Output statt Input."

> to start with a bachelors, work for five years and then do a masters. I have not only proven myself once, I have not only done one *Diplom*, but the system actually is set up to do more than one degree. That's what we liked"[81] (Interview DB).

Similarly, the VDMA representative sees advantages in the new degree system: "We need lifelong learning, the two-tiered model is much better for that, we need internationally accepted degree, because we also recruit internationally, and the tiered model is much better for that, too"[82] (Interview VDMA).

BASF also finds lifelong learning is becoming increasingly important and expects the new degrees to be helpful for it: "Bologna was a good step towards lifelong learning. To say we split academic learning into to parts: one general and one specific, that was a good idea and that was the first step towards lifelong learning"[83] (Interview BASF). But he also thinks, that a lot still has to change at universities before it will be possible to see universities as institutions for continuous learning: "Try to go to a university or FH at the age of 55 to take a class. That will be difficult"[84] (Interview BASF).

The growing importance of continuous learning can also be explained by changes in the labor market. Because the requirements of the market change so quickly, employees need to be able to keep up with new developments and continue to educate themselves. Since companies like to keep their qualified employees, possibilities and structures for continuous education are becoming increasingly important. "Firms care about their well qualified staff and try to continue to educate them. That's why the role of continuous education programs has become so much

[81]Translation by the author, original: "Für uns war immer ein riesen Thema, was wir hier im Konzern diskutiert haben, was wir immer auch versucht haben, nach außen zu tragen, das Thema lebenslanges Lernen und da haben wir immer die Chancen des gestuften Systems gesehen, nämlich nicht das, was in Deutschland sehr weit verbreitet ist, diese Abschlussorientierung zu haben. Ich habe einmal einen Abschluss gemacht, ich habe zu einem Zeitpunkt irgendwie bewiesen, dass ich so eine Prüfung schreiben kann und damit kann ich alles erreichen und entweder ich habe diese Fahrkarte gelöst oder nicht und darauf ruhe ich mich dann die nächsten 40 Jahre aus. Und insofern, diese Verankerung im System schon zu haben, zu sagen, ich kann hier mit einem Bachelor starten und dann arbeite ich fünf Jahre und dann mache ich einen Master hinterher, das war jetzt gerade für uns, aus Unternehmenssicht, sehr charmant, um eben zu sagen. Hier, ich habe nicht nur einmal an einem Zeitpunkt bewiesen, hier, ich habe hier ein Diplom gemacht oder einen Abschluss, sondern nee, ich verankere gleich in dem System zu sagen, dass da noch mehr kommen kann."

[82]Translation by the author, original: "Wir brauchen lebenslanges Lernen, auch dafür ist ein gestuftes Modell viel besser, wir brauchen international anschlussfähige Studienabschlüsse, weil wir rekrutieren ja auch international, auch dafür ist das gestufte Modell viel besser."

[83]Translation by the author, original: "[...] und ich denke, dieses lebenslange Lernen, da ist Bologna ein guter Schritt hin gewesen, eigentlich zu sagen, wir zerlegen akademisches Lernen in zwei Teile: einen allgemeinen und einen speziellen. Das war eine gute Idee und das war der erste Schritt zum lebenslangen Lernen."

[84]Translation by the author, original: "Gehen Sie mal an eine Universität oder eine Fachhochschule, wenn Sie so 55 sind und versuchen Sie, eine Vorlesung zu belegen. Das wird schwer."

more important. In large firms there are entire departments that work on continuous education programs,"[85] explains the VCI representative (Interview VCI).

The importance of continuous education and the hope that this can be done through masters programs can also be confirmed by surveys. Briedies et. al found that even 29 percent of smaller companies (up to 49 employees) offer their employees the possibility to do a masters degree while working and almost all companies that offer this option also want to support their employees financially for the masters: 79 percent would pay part of the fees, 70 percent guarantee to hold the job for the duration of the program and 67 percent would give their employees time off with pay (Briedis et al. 2011, 21).

Another important focus for many firms is **internationality** and intercultural skills. As the BASF representative explained, these intercultural skills are particularly important for employes working in the management and services areas, as BASF is a global company. But they are also important for chemists in the lab who need to at least speak english fluently to be able to communicate with their colleagues in other countries. The best way to acquire these skills is by studying abroad for one or two semesters (Interview BASF). Berlin-Chemie also finds language skills particularly important and tests English skills in their interviews (Interview Berlin-Chemie). Internationality was also one of the main requirements mentioned by the BCG representative. They expect particularly business graduates to have at least four to six months experience living abroad (Interview BCG).

For employees working at DB languages are not as important as in other companies because they mainly work in Germany. However, according to the DB representative it is important to take a look beyond one's own nose and communication skills in general have become increasingly important (Interview DB).

At Heidelberger Druckmaschinen, a company with branches in more than 170 countries, internationality is extremely important. For them it is not only about languages, but also about knowing about important globalization issues and getting along with other cultures. HD also believes these skills can best be acquired through exchange semesters (Interview HD). The analyst at the BDA agrees with this: "In our view exchange experiences are very important, because companies increasingly act internationally and employees work in international teams. Even mid-sized firms are more and more internationally oriented, and the huge majority of German companies are mid-sized firms"[86] (Interview BDA). While most employers see exchange

[85]Translation by the author, original: "...die Firmen bemühen sich auch um ihre qualifizierten Mitarbeiter und versuchen die auch weiter zu qualifizieren und deswegen hat auch der Stellenwert an Weiterbildungen zugenommen. In den großen Firmen gibt es ganze Abteilungen, die sich mit Weiterbildungsprogrammen usw. beschäftigen."

[86]Translation by the author, original: "Also, aus unserer Sicht ist Auslandserfahrung etwas

semesters as an important experience for bachelor graduates, the shorter programs have made it more difficult for students to spend a semester abroad without loosing time. While the European Credit Transfer System was meant to make studying in other countries and transferring credits easier, new special profiles of bachelor's programs and stricter regulations concerning study times make it more complicated to organize exchange semesters.

Despite the above mentioned issues the new degrees have been accepted quite well by employers. In 2007 only 11 percent of all university graduates graduated with a bachelor's or master's, but of all university graduates hired in that year, 25 percent had a bachelor's degree (Pankow 2008, 5). In 2009 the Institute for the German Economy surveyed almost two thousand companies that employ engineering students. They found that 11 percent of those companies already employed engineering bachelors and of those companies with 250 or more employees 37 percent who employed bachelor's graduates (Konegen-Grenier 2011, 22). Additionally, Briedies, et. al (2011) found that "projected onto the economy as a whole every eighth company currently employs bachelor's graduates. Only looking at companies that generally employ university graduates there are currently bachelor graduates in every fourth company, business students more often than engineers"[87] (Briedis et al. 2011, 86). There are also differences between the different company sizes: Among those companies hiring university graduates, 25 percent of small firms, 37 percent of medium sized firms, and 69 percent of large companies are employing bachelor graduates (Briedis et al. 2011, 99). Between the different sectors, bachelor graduates are hired more often in the services (14 percent) than in industry (10 percent) (Briedis et al. 2011, 98). Graduates with a bachelor's degree in business are most often hired (70 percent), followed by graduates with a bachelor's degree in engineering and computer studies (36 percent) (Briedis et al. 2011, 101).

Although most graduates with a bachelor's degree decide to continue their studies in a master's program, those who decide to enter the labor market are not faced with long periods of unemployment. On the contrary, unemployment rates for bachelor graduates have been as low or lower than those for graduates with traditional degrees. In 2009 the unemployment rate for bachelor graduates from a FH was at 3 percent and for university graduates at 2 percent (Bundesagentur für Arbeit 2012a, 32). Bachelor graduates are also offered a variety of positions,

ganz Wichtiges, weil Unternehmen zunehmend international agieren und Arbeitnehmer eben in internationalen Teams arbeiten. Auch Mittelständler haben zunehmend international orientiert, die riesige Mehrheit deutscher Unternehmen sind ja Mittelständler."

[87]Translation by the author, original: "Hochgerechnet auf die Gesamtwirtschaft beschäftigt gut jedes achte Unternehmen derzeit Bachelorabsolventen. Betrachtet man nur die Unternehmen, die generell Hochschulabsolventen einstellen, so finden sich gegenwärtig in jedem vierten Unternehmen Bachelorabsolventen, Wirtschaftswissenschaftler häufiger als Ingenieure."

18 percent of university bachelor graduates even hold a leadership position one year after graduation (Bundesagentur für Arbeit 2012a, 32). Most graduates of bachelor's programs, however, hold positions as an administrator with assignments and as a project team member with independent tasks (Briedis et al. 2011, 102). In terms of salary, bachelor's graduates can also compete well with those of traditional programs. Of the firms surveyed, 68 percent replied that they would pay *Diplom* and bachelor graduates the same entry level salary (Briedis et al. 2011, 103).

While the general acceptance of bachelor graduates is positive, there are still great differences between the different disciplines and fields of industry. In chemistry, for example, the focus is still on master's and PhD graduates. Many employers in the chemical industry do not know where to employ graduates with a bachelor's degree in chemistry (Winter, Cleuvers, and Anger 2010, 326). The VCI representative explained:

> "We've always been cautious about university chemists with just a bachelor's degree, because we in chemistry have a strong vocational training for technicians and also the chemist and lab assistant programs in companies, especially in large ones, is very challenging. So we have been afraid that a 'pure' bachelor's graduate from a research university would have a difficult time keeping up with this competition. And then, if you also consider the chemical engineers coming from FHs...I have made the prediction that in chemistry a master's degree will still be needed. There are also mainly master's graduates hired"[88] (Interview VCI).

The bachelor's degree in chemistry, however, is seen as a new route for combining vocational and higher education. Employers would see it as a useful additional option for graduates of vocational training programs as skill demands are rising in the mid-level positions (Winter, Cleuvers, and Anger 2010, 327). Applicants with a bachelor's degree from a dual work study program such as those at *Berufsakademie* are also always welcome for their practical experience (Interview Berlin-Chemie).

Employers and representatives of business organizations in engineering have similar concerns about graduates with bachelor's degrees, however there appear to be more positions where they could be useful. While many employers are skeptical

[88] Translation by the author, original: "Universitätschemiker mit reinem Bachelorabschluss haben wir immer mit etwas Zurückhaltung gesehen, weil wir im Bereich Chemie auch eine sehr starke Technikerausbildung haben und auch die Laborantenausbildung und die Chemikantenausbildung in den Chemieunternehmen, zumindest in den großen, ist sehr anspruchsvoll. Sodass wir also die Befürchtung hatten, ein reiner Bachelor von der Uni mit wissenschaftlichen Anspruch, der wird es schwer haben gegen diese Konkurrenz zu bestehen und wenn man dann noch die Chemieingenieure, die von den FHs kommen, noch mitrechnet, da habe ich mal die Prognose abgegeben, dass in Chemie weiterhin ein Masterabschluss erforderlich sein wird. Es werden auch überwiegend Master eingestellt."

about basic university bachelor's degrees in mechanical engineering which are seen as too theoretical, but not specialized enough for a research position, more interdisciplinary programs such as business engineering programs are seen as positive developments. Graduates with bachelor's degrees are also welcomed for mid-level assisting positions, particularly in the *Mittelstand* as these positions have often been filled with overqualified candidates (Winter, Cleuvers, and Anger 2010, 368-69). In addition, bachelor's degrees from FHs and *Berufsakademien* are very welcome by employers, because of their practical experiences (Interview HD)

Graduates with a bachelor's degree in business administration generally have very good job prospects. This might be because business schools were one of the first to reform their programs and have often followed American examples (e.g. introducing MBA degrees before the Bologna reforms) (Interview Business Dept. Mannheim). Additionally, business students have been found to participate in the most internships and study abroad programs among bachelor's students, thus gaining practical and international experience, two of the main requests employers have (Briedis et al. 2011, 11). Compared to bachelor's graduates of other disciplines, graduates with a bachelor's degree in business and economics are most often hired. When asked what discipline their employees received their bachelor's degrees in, 70 percent of firms replied in business and economics, 36 percent in engineering and 24 percent in other science and technology disciplines (Briedis et al. 2011, 101).

6.3 Summary: New Skills?

The first question this chapter has intended to answer was: *Have the contents of German higher education programs changed with the introduction of bachelor's degrees and do these changes represent a shift towards a "general skills" model resembling the Anglo-American system?*

The analysis above has shown that most departments have focused on updating their curriculum for their new degrees. While there have not been any significant changes to the subject-specific content in the chemistry, mechanical engineering and business administration programs (as the basic classes have been kept), departments have introduced new classes focusing on new fields in the discipline, international issues, and transferrable skills. Law and business classes in chemistry and engineering programs, as well as international studies and social science classes in business programs are a few examples for the broadening of the curriculum. Project classes, communication classes and general soft skills classes show the new focus on transferrable skills. Does this indicate a shift towards a general skills model? Despite

the mentioned changes, new German undergraduate programs still very much focus on one discipline and on industry or discipline-specific skills. Thus, while the new programs are broader and more general than the traditional *Diplom* programs, a comparison with American undergraduate degrees will show that they are still far from becoming American-style bachelor's programs. The focus on a specialization in consecutive master's programs and on research skills also shows the uniqueness of German higher education.

The second question this chapter focused on was: *Have German employer preferences concerning skills changed? How have they changed and can employer expectations be met by the new degrees?* The analysis has shown that employers have indeed changed their preferences in terms of what kind of skills they expect from university graduates. In particular, they not only expect an excellent expertise, but also and to some extent even more importantly so, transferrable social and communicative skills. They prefer a broad education in the field of study as opposed to a very specialized one. Most importantly, however, they expect graduates to be able to apply their theoretical knowledge on the job and to have gained some practical experiences during their university years.

Employers have emphasized that the world of work has changed over the last few decades. It has become more fluid, we more often switch positions from one area to another within a company and more often change jobs generally. In addition, businesses today act much more internationally and thus need employees with foreign language skills and cultural open-mindedness. Even in traditional industries like engineering and chemistry, the areas related to services (in a broad sense, e.g. software, logistics, communication) have become increasingly important and require a certain degree of interdisciplinarity. Despite these preference changes, German employers still believe that a solid basic education within the main field of study is important. When talking about more "general" knowledge, most employers see this as more general within their field and not in terms of an American-style liberal arts education. Exceptions to this are additional skills in business and law, as well as foreign languages that employers in all fields find important.

Some of these expectations have been fulfilled in the new degree programs. While the results of the study program analysis cannot be generalized for all German universities, they do offer an insight into how German undergraduate degrees have changed. Overall, we find that although in many programs the curriculum of the first few semesters resembles that of the old degrees, there are also many new classes, particularly focusing on transferrable skills and internationality. Detailed specialization is postponed to the master's programs, which is what employers expect.

Yet, contrary to employer preferences, most of the departments and programs analyzed here focus on consecutive bachelor-master programs and encourage their students to continue in a master's program after finishing their bachelor's degree. This negates the intended flexibility and the possibility to gain valuable work experience before specializing in a particular area. Internships and project-based learning are other areas that are missing in many new bachelor's programs, despite the claim in many study regulations to focus on students' employability.

This focus on employability, flexibility and life-long learning is the main concern for employers. It has repeatedly been mentioned in publications and in my interviews with employers and employer representatives. Opening higher education for graduates of vocational training programs and offering flexible part-time programs and continuous education is one of the areas where employers demand improvements.

How does the above chapter relate to my third research question of *Do changes in German employer preferences indicate a convergence of LMEs and CMEs with respect to skill preferences?*

The Varieties of Capitalism approach argues that employers in coordinated market economies such as Germany require employees with industry-specific skills, while firms in liberal market economies look for employees with general skills. This still appears to be true for German employers.

While employer preferences have changed towards more flexibility and broader skills due to globalization influences and changes in the labor market, they still expect a main focus on industry-specific skills. On the one hand, German employers expect graduates to be flexible and adapt quickly to new demands, which could indicate a shift towards an LME model. On the other hand, German employers still very much think and act within their field of industry. New German bachelor's degrees also still reflect this focus on one discipline. Despite having introduced new classes on transferrable skills and promoting employability, the new programs, particularly at research universities, are focused on preparing students for a consecutive master's program and giving them specific skills in their discipline. The following chapter will point out the differences to the general skills model of the American higher education system in order to clarify whether the German model is converging with the American one.

Chapter 7

German Higher Education Americanized?

7.1 American Undergraduate Curricula

During the debate about German higher education reforms, American universities were repeatedly mentioned as role models for the German system. Although this was mainly based on experiences with elite institutions such as the Ivy League schools, the new degrees were intended to be based on the Anglo-American system of separate undergraduate and graduate degrees. In the end, however, the German bachelor's degree, despite its name, still seems to be a unique degree that only resembles its American counterpart in a few points.

The following section will analyze nine bachelor's programs at three American universities. The same subjects as in the German comparison were analyzed: chemistry, mechanical engineering and business administration. In order to have universities as similar as possible to German universities only public research universities (no private institutions, four-year colleges, community colleges, etc.) were considered for the comparison. The analysis was done at the University of California Berkeley (UCB), the University of Wisconsin Madison (UW) and at Auburn University (AU) in Alabama.[1]

According to the Varieties of Capitalism literature, American education focuses primarily on general skills. In the context of higher education (which in itself is more general than for example vocational training) "general" will be defined here as including skills and topics outside of the major that are important in various fields of study and work. The analysis of American undergraduate curricula will show

[1]For an explanation of the selection of these universities see Chapter 1.

that a typical undergraduate degree includes a university core curriculum (classes required by the university for all undergraduates), a departmental core curriculum, major requirements and electives. The university core curriculum generally focuses on liberal arts classes such as history, English, social sciences and basic natural sciences. Often students only chose their concentration or major after finishing these required classes in their second or third semester. These general structures already show significant differences to German bachelor's degrees.

The detailed analysis of the nine degree programs below was based on the following criteria which correspond with those criteria used for the analysis of German degree programs: degree structure, program length, types of classes offered, organization, student-staff contact time, goals of the program, curricular content, exam formats, required vs. elective classes, internationalization, interdisciplinarity, practical job preparation, research focus, and fraction/percentage of transferrable non-subject skills. The analysis will show that American bachelor's programs differ in many of these categories from their German counterparts.

7.1.1 Chemistry

The **Auburn University** Chemistry Department offers a B.A. and B.S. in Chemistry (as well as a PhD). Their bachelor's programs are four year programs with a total of 120 required credits (13-17 per semester). Classes include lectures and labs. The curriculum, which is approved by the American Chemical Society is structured as follows: During the first year students take English, Calculus, History and Introductory Chemistry. The second year includes core chemistry classes, another math class, Physics, English, and electives. The third year again includes Math, core chemistry classes, Chemical Literature, Social Science and electives. B.A. students also need to take a Foreign Language and a class in the Fine Arts during the third year. The fourth year includes core chemistry classes, Fine Arts, Philosophy, Social Science, and electives. For the B.A. the last year includes a chemistry elective, History, Philosophy, Social Science, and an elective. This includes the university's core classes which make up 30 credits (1/4 of the total credit load). While the B.S. is intended for those students who plan to stay in chemistry research or the chemical industry, the B.A. is offered primarily for pre-medical students or other pre-professional students who want a more general type of undergraduate background. The B.S. also includes a required research project that ends with a thesis.

Students in both programs can participate in the university's coop program, in which students work full-time for a company while earning money and credits for one semester and then come back to school the next semester. However, there are

no required internships or any programs organized by the Chemistry Department. My interview partner explained:

> "...we might in fact actually sacrifice a bit on the practical side in favor of the theoretical training that we give because there are some people who want to get a bachelor's degree in chemistry and immediately go to work in a laboratory, but a lot of that work has to respond to the technological environment in which people will find themselves. Which is certain to vary from one industry, from one business to the next, from one place to another. And with respect to time as well, so people who really have a more basic understanding of chemical principals will be better able to adapt." (Interview AU Chemistry Department).

Thus, the program is more theoretical and research oriented than other programs, e.g. Mechanical Engineering. The program objectives according to the Department Director are:

> "Students who come out of our undergraduate program should first of all have a firm understanding of fundamental principals in chemistry that are both theoretical and practical in nature. Some of them pertain to basic laws that are very deep and have many mathematical expressions to them, they should have a very broad understanding of how matter is put together, how it can be detected and characterized, how it can by synthesized and manipulated, and of course in all these things we would like to see students who have those greater quantitative mastery of these things as possible. [...] Of course, this is a kind of preparation which I think creates opportunities for people who are in chemical laboratories, but also a great variety of fields that impinge upon chemistry; that really is just a very diverse set of possibilities, so people who get bachelor's degrees in chemistry or biochemistry have a great deal of flexibility, if they want to go immediately into a profession or go for further study, or even switching fields" (Interview AU Chemistry Department).

The Chemistry program at the **University of Wisconsin** has a similar curriculum to the one at Auburn. It includes Introductory Chemistry, Math and electives from the core curriculum set by the College of Letters and Sciences (LS) (i.e. History, English, Social Science, Languages, etc) in the first year; core chemistry classes, Physics and LS electives in the second year; core chemistry classes, chemistry electives and LS electives in the third year; and more chemistry electives as well as LS electives in the fourth year. The department offers three undergraduate degrees: the Bachelor of Science and Bachelor of Arts, with the B.A. requiring more fine arts classes than the B.S.; and a Chemistry Course degree. The B.S. and B.A. require a minimum of 120 credits with about 50 credits from the LS electives and the university's General Education requirement. The Chemistry Course degree is entirely set by the Chemistry Department, it lacks the breadth of the B.A. and

B.S. degrees (though students still need to fulfill some general education requirements), but has more comprehensive requirements in chemistry. It finishes with a special degree Bachelor of Science-Chemistry. According to the program goals: "Both curricula qualify the student for a wide variety of opportunities in the chemical industry and related industries, such as petroleum, metals, fibers, plastics, paper, and food, as well as environmental and health-related sciences. Combined with the courses required for teacher certification, either route will qualify the student to teach chemistry in secondary schools" (UW Chemistry website 2012).

The program is very much focused on integrating and preparing undergraduates in research. The department has just recently introduced the position of an undergraduate research counselor, who helps students connect with research groups within the department. Also, all degrees require an independent research project. A thesis is optional, but many students in the honors program do one. One of my interview partners at the department explained: "So, we have forty faculty in our department that do research and we really want students, hopefully in their junior year, to start doing research and to do research their junior and senior year" (Interview 2 UW Chemistry Department). On the other hand, there is no formal program for students to do internships in industry or a coop program and while there are many international students at the department, they do not have a formalized exchange program.

At the **University of California Berkeley**, the Chemistry Department offers a standard four year Bachelor program that has been approved by the American Chemical Society. They offer two different chemistry degrees: a Bachelor of Science in Chemistry, and a Bachelor of Arts in Chemistry. For the B.S. degree students need to fulfill a minimum of 120 credits which includes the university's "breadth requirement" (i.e. liberal arts core classes) and additional breadth requirements set by the College of Chemistry. Students can also choose to select a special concentration (e.g. Materials Chemistry) in their third and fourth year. The department's degree guide states:

> "The Bachelor of Science Degree in Chemistry is intended to prepare students for careers as professional chemists and to serve as a foundation for careers in other fields such as biology and medicine. In addition, there is a Materials Chemistry concentration that is intended for students interested in the application of basic chemical principles to the discovery, design, and characterization of materials" (College of Chemistry University of California Berkeley 2010, 25).

The Bachelor of Arts in Chemistry is offered by the College of Letters and Sciences and thus requires students to fulfill the requirements set by the College of

Letters and Sciences in addition to the major requirements. In comparison to the B.S., the B.A. "includes a greater number of humanities and social science courses and is intended for those interested in careers in teaching, medicine, or other sciences in which a basic understanding of chemical processes is necessary." (College of Chemistry University of California Berkeley 2010, 25). Both degrees have a foreign language requirement and the department has a great number of international students, though there is no formal exchange program organized by the department (but numerous programs through the university).

As in the other programs described above, research is the focus of the degrees and students do many internships, but mainly in research assistant positions and not much in industry. What is notable about the UCB program compared to the other two is its breadth and interdisciplinarity. The described degrees offer a great number of electives that give students the opportunity to gain experiences in other fields as well as many areas within chemistry. In addition to the two Chemistry degrees the department also offers a B.S. in Chemical Biology and there is also a program in Chemical Engineering at the College of Chemistry.

The guide to the UCB chemistry programs states:

> "There are lecture courses in the general areas of inorganic, organic, and physical chemistry, plus many more specialized courses including analytical, nuclear, and biophysical chemistry and chemical biology. Laboratory experience is provided in inorganic and organic synthesis, analytical methods, physical chemical measurements, spectroscopy, biochemical engineering, and chemical methods in nuclear technology. Independent and original work is stressed in the laboratories and modern equipment is available to carry out the work" (College of Chemistry University of California Berkeley 2010, 24).

Table 7.1 summarizes all three chemistry programs and shows similarities and differences between the programs and Table C.1 gives an overview of the detailed curriculum.

Table 7.1: American Undergraduate Chemistry Programs

University and Department	**Auburn University College of Sciences and Mathematics *Bachelor of Science in Chemistry***	**University of Wisconsin Madison Department of Chemistry *Bachelor of Science in Chemistry***	**University of California Berkeley Department of Chemistry *Bachelor of Science in Chemistry***
Curriculum Structure and Content	- program divided in liberal arts core classes, chemistry major, and electives - Bachelor of Arts option available - ca. 1/3 of all classes are non-chemistry classes - curriculum covers basic and few advanced chemistry classes	- program divided in college core curriculum, chemistry core classes, and math and physics core classes - Bachelor of Arts option available - ca. 1/3 of all classes are non-chemistry classes - curriculum covers basic and few advanced chemistry classes - honors program with research and honors thesis offered	- program divided in university core curriculum, college breadth requirement, lower-division chemistry classes, upper-division chemistry classes, and electives in chemistry and allied subjects - Bachelor of Arts option available - ca. 1/3 of all classes are non-chemistry classes - curriculum covers basic and advanced chemistry classes - honors program offered
Program Objectives	graduates should have: - a firm understanding of fundamental principals in chemistry that are both theoretical and practical in nature - ability to use methods used in chemical laboratories - flexibility to use knowledge and skills in different settings (Interview AU Chemistry)	"[The program] will qualify the student for a wide variety of opportunities in the chemical industry and related industries, such as petroleum, metals, fibers, plastics, paper, and food, as well as environmental and health-related sciences. Combined with the courses required for teacher certification, either route will qualify the student to teach chemistry in secondary schools." (UW Chemistry website)	"The Bachelor of Science Degree in Chemistry is intended to prepare students for careers as professional chemists and to serve as a foundation for careers in other fields such as biology and medicine. In addition, there is a Materials Chemistry concentration that is intended for students interested in the application of basic chemical principles to the discovery, design, and characterization of materials." (UCB Chemistry Guide, 25)
Interdisciplinarity and Transferrable Skills	program in Biochemistry offered	program in Chemical Engineering offered	programs in Chemical Engineering and Chemical Biology offered
Employability	coop program offered	no formal internships, but many summer internships	no formal internships, but many summer internships
Internationality	- no formal exchange programs through department, but working on one (2011)	- foreign language requirement - no formal exchange programs	- foreign language requirement - no formal exchange programs
Research Elements	- undergraduate research seminar - bachelor's thesis as honors option	- undergraduate research seminar - bachelor's thesis as honors option - integrating undergraduate research assistants	- undergraduate research internships - bachelor's thesis as honors option
Credits	total of 120 credits	total of 120 credits	total of 120 credits
Contact Time	13-17 hours/week	15-18 hours/week	15-18 hours/week
Forms of Teaching and Exams	- lectures, labs, seminars - written exams, lab reports, presentations	- lectures, labs, seminars - written exams, lab reports, presentations	- lectures, labs, seminars - written exams, lab reports, presentations
Program Length	4-5 years	4-5 years	4-5 years

7.1.2 Mechanical Engineering

At **Auburn University**, the Mechanical Engineering Department is the biggest department on campus with more than 1000 students and 30 professors. In addition to their undergraduate programs, the department also offers master's and PhD programs, as well as distance learning and continuing education courses. The bachelor's program is a four year program that leads to a Bachelor of Science in Mechanical Engineering. The Mechanical Engineering (ME) major requires a total of 128 credits which translates to 15-16 weekly credit hours per semester. The curriculum is accredited by the Accreditation Board for Engineering and Technology (ABET) and follows a fairly standard pattern. During the first year students take introductory engineering classes, the second and third year covers ME core classes such as "Statics and Dynamics" or "Mechanics of Materials" and during the fourth year students participate in a project class called "Comprehensive Design" and can take electives.

In addition to the ME curriculum students also need to take classes from the university core such as classes in the sciences, humanities and social sciences. This liberal arts curriculum makes up about thirty credits and thus constitutes almost one fourth of the entire curriculum. The Undergraduate Program Officer at the Mechanical Engineering department describes the importance of the core curriculum as follows: "...the emphasis is so strong to gain a better appreciation of other vocations and to be more understanding as a global citizen and the value of all these other professions which you would not get if it was all about your major " (Interview 1 AU ME Department). Classes at the department are mainly given in the form of lectures, labs and projects. Most exams are written exams, but some projects require reports and presentations. The AU mechanical engineering program not only focuses on engineering, it also teaches a variety of soft skills. This is clearly stated in the program objectives:

> "The educational objectives of the Mechanical Engineering program are to produce graduates who will be: 1) Engaged in careers where they apply knowledge of the fundamental subject areas of mechanical engineering science to the analysis, design, and manufacture of mechanical devices and systems. 2) Proficient in a broad array of professional skills, including engineering, software tools, oral and written communication, leadership, and teamwork. 3) Aware of the importance of, and engage in the process of lifelong learning through self-study, continuing education courses, and graduate-level education. 4) Knowledgeable in a broad range of contemporary issues, particularly as they impact the mechanical engineering profession" (AU ME website 2010).

Especially the "Comprehensive Design" class is focused on teaching students communication, teamwork and problem solving skills. The engineering department also offers a minor certificate in Business Engineering in which students get exposed to entrepreneurship skills (Interview 2 AU ME Department). In addition to these programs students can participate in the university's coop program, which is very popular among engineering students and about half the class participates in it (Interview 1 AU ME Department).

In general, the program is more focused on preparing students for the job market than for research. While the department offers some research assistant positions to undergraduates and students in the Honors college can do a thesis project, it is not required for everybody and basic research is not a clear focus. The program also does not require their students to take a foreign language class, however, they do have an exchange program with India, and there are international summer internships available through the Global Education Initiative at the Engineering College.

With about 500 undergraduate students, 200 graduate students and 40 faculty members Mechanical Engineering is also a large department at the **University of Wisconsin**. The department offers a four year Bachelor of Science in Mechanical Engineering. During their first year students have not chosen a specific major yet and only take general engineering and non-engineering classes. These classes include Calculus, Statistics, Chemistry, CS Programming, and Technical Communication. In their second year they choose their major and start taking more specific ME core classes in addition to the required liberal arts classes that all undergraduates at UW need to take. The third and fourth year include (in addition to ME core classes and the university core) technical electives, project classes and general electives. As at Auburn, the major requires 128 credits (15-16 per semester) and about 20 of those are to be taken outside of the Engineering School. Classes include lectures, labs and projects, and according to my interview partner at the department the program tries to have a hands-on approach, by offering labs in which students perform their own experiments for almost all ME classes (Interview UW ME Department). They also focus on teaching soft skills, which has been a request by industry who closely work together with the Engineering School in updating the curriculum. The program objectives also focus on these skills and emphasize the importance of practical work experience and lifelong learning skills:

> "The Department of Mechanical Engineering at the University of Wisconsin intends to provide a firm foundation in mathematics, science, and design methodology applied to the disciplines of mechanical engineering in the areas of mechanical, fluid, thermal and manufacturing

> systems. It shall offer the most contemporary and essential tools needed in the breadth and depth of mechanical engineering. The curriculum shall incorporate analytical tools, creative thought and communication skills as offered through courses in the department, college, university, and industrial exchange. The department shall provide students the opportunities to work effectively as individuals and in teams, and provide experience in leadership, management, planning, organization, and real world, hands-on engineering that leads to an appreciation of the business and entrepreneurial aspects of mechanical engineering. It shall provide the broad education necessary for engaging in life-long learning." (UW ME website 2012)

Particularly the focus on such skills as "leadership, management, planning, organization, and real world, hands-on engineering" and "creative thought and communication skills" differs from the research-oriented approach at German engineering departments.

As at Auburn, the department offers a coop program that allows students to receive academic credit while working for a company. The department has a coop office that helps students find coops and internships. They also assist students in finding and organizing international internships and the Engineering School offers an International Studies office to help students gain experiences abroad.

In addition to the focus on preparing students for the job market, the UW ME department also offers undergraduate research positions and an "Honors in Research" program that allows students to participate in a bigger research project and write a senior thesis. While undergraduate research is encouraged, the majority of ME students work in industry after graduating from UW and only a subset continues with graduate school. However, one development that my interview partner at the UW Mechanical Engineering department has noticed, is that master's degrees in engineering seem to become more popular and more important for employers: "I think a trend, I can't give you numbers, but certainly a trend that I hear and see is that more companies, at least for some positions, will no longer hire a bachelor's degree and they're saying master's is the terminal degree. It's just not enough for certain positions and that's increasing with the complexity of technology" (Interview UW ME Department). In this aspect engineering appears to be moving towards the German model.

At **UC Berkeley** students in Mechanical Engineering have the option to choose between the regular four year bachelor degree or a combination B.S.-M.S. degree that can be done in five years. The curriculum for the four year program is similar to that at the other departments described above, as it is also accredited by ABET. However what is noticeable at Berkeley is the very high percentage of

classes in liberal arts that are required by the university and the college. Out of a total of 118-125 credits 45 credits (36 percent) are in the sciences, social studies and humanities. This might be due to Berkeley's historical background as a liberal arts college.

Another peculiarity of the program at Berkeley is that students can receive credit for work experience that they have gained within the field, but outside of the program. Students participate in summer internships which can also be done abroad (Interview UCB ME Department). Preparing students for a successful entrance to the labor market is also one of the program's main objectives and teaching students skills that can be applied in a variety of settings is also a focus as the program objectives state:

> "The objectives of the Mechanical Engineering undergraduate program are to produce graduates who: 1) Vigorously engage in post-baccalaureate endeavors, whether in engineering graduate study, in engineering practice, or in the pursuit of other fields, such as science, law, medicine, business or public policy. 2) Apply their mechanical engineering education to address the full range of technical and societal problems with creativity, imagination, confidence and responsibility. 3) Actively seek out positions of leadership within their profession and their community. 4) Serve as ambassadors for engineering by exhibiting the highest ethical and professional standards, and by communicating the importance and excitement of this dynamic field. 5) Retain the intellectual curiosity that motivates lifelong learning and allows for a flexible response to the rapidly evolving challenges of the 21st century." (ME Berkeley Website 2010)

Again, these program objectives focus on character traits such as "creativity, imagination, confidence and responsibility", which differs from the focus in German programs. The objectives list preparing students for graduate study as one of the first goals and also mentions the importance of other fields besides engineering. This indicates Berkeley's strong research and liberal arts orientation. To gain research experiences, UCB offers an undergraduate research apprenticeship program in which students are matched with professors who work on research projects of their interests. Additionally, the department has an honors research program and every student can do an independent research project for credit. According to my interview partner, about 60 to 65 percent of their undergraduates continue in graduate education and the Berkeley engineering program "generates the the largest percentage of PhD's in mechanical engineering and other engineering fields of any in the country by a long shot" (Interview UCB ME Department). Table 7.2 summarizes all three mechanical engineering programs and shows similarities and differences between the programs and Table C.2 gives an overview of the detailed curriculum.

Table 7.2: American Undergraduate Mechanical Engineering Programs

University and Department	**Auburn University** **Mechanical Engineering Department** ***Bachelor of Mechanical Engineering***	**University of Wisconsin Madison** **Mechanical Engineering Department** ***Bachelor of Science in Mechanical Engineering***	**University of California Berkeley** **Department of Mechanical Engineering** ***Bachelor of Science in Mechanical Engineering***
Curriculum Structure and Content	- program divided in liberal arts core classes, mechanical engineering major, and electives - ca. 1/3 of all classes are non-chemistry classes - curriculum covers basic and few advanced chemistry classes - honors college available	- program divided in engineering core classes, technical electives and liberal studies requirement - ca. 1/3 of all classes are non-chemistry classes - curriculum covers basic and few advanced engineering classes - honors program with research and honors thesis offered	- program divided in university core curriculum, college humanities requirement, lower-division engineering classes, upper-division engineering classes, and electives - ca. 1/3 of all classes are non-chemistry classes - curriculum covers basic and advanced chemistry classes - honors program offered
Program Objectives	"The educational objectives of the Mechanical Engineering program are to produce graduates who will be: - Engaged in careers where they apply knowledge of the fundamental subject areas of mechanical engineering science to the analysis, design, and manufacture of mechanical devices and systems. - Proficient in a broad array of professional skills, including engineering software tools, oral and written communication, leadership, and teamwork. - Aware of the importance of, and engage in the process of lifelong learning through self-study, continuing education courses, and graduate-level education. - Knowledgeable in a broad range of contemporary issues, particularly as they impact the mechanical engineering profession." (AU Mechanical Engineering website)	"The Department of Mechanical Engineering at the University of Wisconsin intends to provide a firm foundation in mathematics, science, and design methodology applied to the disciplines of mechanical engineering in the areas of mechanical, fluid, thermal and manufacturing systems. It shall offer the most contemporary and essential tools needed in the breadth and depth of mechanical engineering. The curriculum shall incorporate analytical tools, creative thought and communication skills as offered through courses in the department, college, university, and industrial exchange. The department shall provide students the opportunities to work effectively as individuals and in teams, and provide experience in leadership, management, planning, organization, and real world, hands-on engineering that leads to an appreciation of the business and entrepreneurial aspects of mechanical engineering. It shall provide the broad education necessary for engaging in life-long learning." (UW Mechanical Engineering website)	"The objectives of the Mechanical Engineering undergraduate program are to produce graduates who: - Vigorously engage in post-baccalaureate endeavors, whether in engineering graduate study, in engineering practice, or in the pursuit of other fields, such as science, law, medicine, business or public policy. - Apply their mechanical engineering education to address the full range of technical and societal problems with creativity, imagination, confidence and responsibility. - Actively seek out positions of leadership within their profession and their community. - Serve as ambassadors for engineering by exhibiting the highest ethical and professional standards, and by communicating the importance and excitement of this dynamic field. - Retain the intellectual curiosity that motivates lifelong learning and allows for a flexible response to the rapidly evolving challenges of the 21st century." (UCB Mechanical Engineering website)
Interdisciplinarity and Transferrable Skills	- cooperation with Department of Industrial and Systems Engineering to offer Minor in Automotive Engineering and Manufacturing - classes outside of engineering	several interdisciplinary programs offered by College of Engineering	joint programs with the Department of Nuclear Engineering and the Department of Materials Science and Engineering
Employability	- Comprehensive Design class - coop program very popular	- coop prorgam - project class	internship programs
Internationality	- exchange program with Indian university - participate in Global Education Initiative for Engineering Majors: Summer Jobs abroad	- international exchange programs - international internships/coops	- international exchange programs - international internships
Research Elements	- project classes - honors college - Research assistantships for undergraduates	Honors in Research Program includes senior thesis	- research assistantships for undergraduates - honors program includes independent research project - senior design project
Credits	total of 128	total of 128	total of 118-125
Contact Time	15-16 hours/week	15-16 hours/week	13-17 hours/week
Forms of Teaching and Exams	- labs, lectures, projects - written exams, lab reports	- labs, lectures, projects - written exams, lab reports	- labs, lectures, projects - written exams, lab reports
Program Length	4-5 years	4-5 years	4-5 years

7.1.3 Business Administration

At the **Auburn University** Business School, undergraduates do not decide on their Business major until their Junior (third) year. The first two years they take what is called the "Pre-Business" curriculum. The program includes about one half business classes and one half classes offered outside of the business school. In addition to introductory business classes, the Pre-Business program includes courses in mathematics, humanities, social sciences and natural sciences. The program is accredited by the Association to Advance Collegiate Schools of Business. The department offers a B.A. and a B.S. in Business Administration with a total of 123 credits. Upper-level business classes include Management, Statistics, Operations, Finance and many electives. The Business program does not require students to take a foreign language, but they encourage stays abroad and offer many programs organized by the business school. About 1/3 of all students study abroad during their college years (Interview AU College of Business).

The objectives of the program are as follows:

> "The College of Business prepares students to become effective and socially responsible managers of business, industrial organizations, and government agencies and responsible citizens and leaders of society. To achieve this goal, the college offers undergraduate programs leading to the bachelor of science in business administration" (Auburn University 2010, 50).

The program is very much focused on preparing students for the job market. According to my interview partner, almost 100 percent of students do internships during the summer months and many also participate in the university's coop program that allows students to work one semester and study the next semester. The curriculum is also influenced by feedback from the business community, as the Associate Dean at the AU College of Business explains:

> "I would say that most of our academic programs have a very strong connection with the business community and there are advisory councils in just about every academic program and for the college of business as a whole. And I would say the business community definitely is another party that would have an opportunity to participate in giving us some feedback about proposed curriculum issues" (Interview AU College of Business).

There are no special research requirements, but students in the honors program can write an honors thesis if they choose to. After graduating, most students continue straight onto the job market, but many return later for an MBA or law degree. Classes are mainly held as lectures and discussion sections, but students also have to do many presentations and projects and the program focuses on teaching

transferable skills such as team working abilities and communication skills. The degree guide states:

> "The Business Administration program is an interdepartmental degree designed to provide maximum course flexibility and a broadbased [*sic*] preparation for future career opportunities. Students are required to demonstrate basic oral and written communication skills, familiarity with technological tools, and an understanding of the interrelationship between the United States and foreign countries with a comprehensive education in business management. The Business Administration program prepares students for entry-level managerial and staff responsibilities in business, government, and non-profit organizations" (Auburn University 2010, 52).

The undergraduate business program at the **University of Wisconsin** is structured similarly to the one at Auburn, but students start with their core business classes in the second year. The pre-business curriculum includes courses in Communications, Math, Economics, Psychology, Literature, Science, Foreign Language, Ethics, Humanities, Social Science, and Statistics. Starting in the second year, students take business core classes in Finance, Marketing, Management and HR, Operations and Management and are required to take two business classes outside of their major. Classes include lectures, discussions and project classes and require written exams, presentations and team projects. About one half of all classes are classes from the university's liberal arts core and the department emphasizes the importance of these general subjects and skills. As the Associate Dean explains:

> "Well if you think about people that you find really interesting, they are able to talk about many different subjects, they are well read, they're engaged, they have opinions, they can make arguments. Those are the kinds of people that you want to work with. And having someone be so narrow that they can't speak about other things, means that they're not going to be as effective as soon as you put them in an environment that's changing because their tooled up for only one thing. If that's the case, the world we live in is changing all the time and if adapting and understanding and developing is a key part of making progress and growing as an individual in your career you just need that background" (Interview UW Business School).

Internationality is another important area in the business program. About 35 percent of students study abroad and students are required to take a foreign language class. The program objectives state that transferrable soft skills are very important: "Our curriculum fosters the development of analytical, consultative, communication, leadership, problem-solving, and decision-making skills. Wisconsin BBA students may choose from 10 majors, two language certificates, two specializations, and a cornucopia of study abroad options" (UW BBA Website 2012).

Another focus that is not uncommon at most American colleges, but was particularly pointed out by my interview partner at the UW business school are extra-curricular activities. He explained, that today it is not only important to fulfill the requirements, but to also be engaged in extra-curricular activities and show commitment to issues and causes outside of your own classes. The program website states:

> "Wisconsin business students are highly engaged. It shows in their active participation in more than two-dozen business student organizations. Student organizations bring in noted speakers, network with industry professionals, conduct community service projects, and in general expand students' knowledge while helping them build close ties to their classmates. The business school boasts a unique resource, the Accenture Leadership Center, which focuses on offering students hands-on opportunities to develop their leadership skills" (UW BBA Website 2012).

The undergraduate business program at the **University of California Berkeley** is structured a little differently than the ones at other universities. It is a two year program that admits students starting at Berkeley and also transfer students from community colleges. Students starting at Berkeley have to apply to the business program in their sophomore year, while for other majors they would just declare their major. In order to be eligible for the business program students need to have fulfilled certain requirements (e.g. a statistics class, an introductory business class, etc.) in their first two years. Once admitted into the program, in their third and fourth year they are required to take ten business core classes: Business Communications, Micro- and Macroeconomic Decisions, Financial Accounting, Managerial Accounting, Finance, Analytic Decision Modeling Using Spreadsheets, Organizational Behavior, Marketing, and Ethics. In addition to that, students can chose from several business electives and also finish their requirements in the university's liberal arts curriculum. The Executive Director for undergraduate programs explains:

> "We do not want to be a mini-MBA program. It is an undergraduate program and for us the foundation of undergraduate education is in liberal arts, because we believe that undergraduate education really is more for competency development rather than for professional or vocational development. Here at this research institution we are very intentional about this not being a vocational program" (Interview UCB Business School).

The program is also a general managerial program, which means there are no majors within the major, as for example at Auburn, where you can specialize in accounting or finance within the business program. Classes are held as lectures,

discussion sections and project classes and while the program is not intended to be vocational, there is a focus on teaching students transferrable skills that can be used in a variety of jobs, encouraging them to do internships and international exchanges as well as organizing career fairs and helping them find a job. The main objective of the program is to "produce a well-rounded future business leader" (Interview UCB Business School) and more general goals of the program are as follows:

> "1) students will be skilled in critical thinking and decision making, as supported by the appropriate use of analytical and quantitative techniques. 2) Students will apply functional area concepts and theories appropriately. 3) Students will be effective communicators who can prepare and deliver oral and written presentations using appropriate technologies. 4) Students will be sensitive to the ethical requirements of business activities. 5) Students will tackle strategic and organizational challenges with innovative solutions" (UCB Business School website 2012).

While research is not a primary focus of the undergraduate program, there is a research apprenticeship program that students can participate in and many students do independent study classes with their professors in areas they are particularly interested in. Another option for students to get involved with faculty is the "DeCAL program" in which students initiate and run their own classes.

Table 7.3 gives an overview of all three business programs and shows similarities and differences between the programs and Table C.3.

Table 7.3: American Undergraduate Business Programs

University and Department	**Auburn University College of Business** ***Bachelor of Science in Business Administration***	**University of Wisconsin Madison School of Business** ***Bachelor of Business Administration* (analysis focus on Management Major)**	**University of California Berkeley Haas School of Business** ***Bachelor of Science in Business***
Curriculum Structure and Content	- Includes a two-year pre-business program and a two-year professional program - ca. 1/4 of all classes are non-business classes - program divided in liberal arts core classes, pre-business classes, business major, and electives	- Includes a two-year pre-business program and a two-year professional program - ca. 1/4 of all classes are non-business classes - program divided in university and college core curriculum, pre-business classes, business major, and business breadth - includes language requirement	- Includes a two-year pre-business program and a two-year professional program - ca. 1/4 of all classes are non-business classes - program divided in university and college core curriculum, pre-business classes, business core, business electives, and non-business electives - includes language requirement
Program Objectives	- to prepare students to become effective and socially responsible managers of business, industrial organizations, and government agencies and responsible citizens and leaders of society - teach basic oral and written communication skills, familiarity with technological tools, and an understanding of the interrelationship between the United States and foreign countries with a comprehensive education in business management	- to foster the development of analytical, consultative, communication, leadership, problem-solving, and decision-making skills - creating a learning environment that responds to the needs of a multicultural society, prepares students for good citizenship in a global economy, and promotes socially responsible and ethical behavior. - The major (management) focuses on the activities of management in organizations - applies to business, government, health care, and other service organizations - prepares students for roles as general managers and administrators at all levels of an organization, rather than roles as technical specialists	- Students will be skilled in critical thinking and decision making, as supported by the appropriate use of analytical and quantitative techniques - Students will apply functional area concepts and theories appropriately - Students will be effective communicators who can prepare and deliver oral and written presentations using appropriate technologies - Students will be sensitive to the ethical requirements of business activities - Students will tackle strategic and organizational challenges with innovative solutions
Interdisciplinarity and Transferrable Skills	Minors in different disciplines available, e.g. Business Engineering- Technology	- double majors within Business School possible - certificates for non-business students offered - Health Care Management Specialization - Supply Chain Management Specialization	offer a summer program: Business for Arts, Science and Engineering
Employability	- Offers a coop program - nearly 100% of students do internships - internship office assists students	- business career center available - student projects done on behalf of companies - frequent recruiting fairs - strong emphasis on extra-curricular activities within Business School	- career center - career fairs - internship advisors
Internationality	- organized exchange programs by business school and university - 1/3 of students do study abroad - no foreign language requirement	- Foreign language requirement - International Business Major - Study abroad programs popular - 1/3 of BBA students study abroad	- Foreign language requirement - exchange programs available and highly encouraged
Research Elements	- no formal research project required - thesis only in honors college - classes in statistics and analysis	- no formal research project required - classes in Statistics and Analysis - Honors program including one year research project is being developed (2012)	- no formal research project required - classes in Statistics and Analysis
Credits	total of 123 credits	min. total of 120 credits	min. total of 120 credits
Contact Time	13 - 17 hours per week	15 - 17 hours per week	ca. 15 hours/week
Forms of Teaching and Exams	- lectures, discussion sections - written exams, oral presentations, team projects	- lectures, discussion sections, project classes - written exams, oral presentations, team projects	- lectures, discussion sections, project classes - written exams, oral presentations, team projects
Program Length	4-5 years	4-5 years	4-5 years

The above analysis of American undergraduate degrees has shown that while the American higher education system is very diverse in terms of its institutions and programs there are also some common characteristics. First, almost all undergraduate programs at American research universities are four year programs. Second, American undergraduate education includes a high percentage of classes in the liberal arts independent of the major and most universities or colleges require certain classes that need to be taken by all undergraduates. Third, while American undergraduate programs also provide the necessary skills for graduate study and thereby a career in research and academia, the main objective for undergraduate education is to give students a well-balanced education that prepares them for a variety of jobs and teaches them how to adjust to different challenges. Lastly, the analysis has shown that in addition to the strictly academic aspects of higher education American undergraduate education also focuses on character building. Soft skills and leadership skills are not only taught in the curriculum, but extra-curricular activities and the life within a college community emphasize these skills. For American employers these non-academic skills are equally as important as subject-specific knowledge. While most American bachelor's programs do not prepare students for a particular profession, they provide them with a broad and extensive skill set needed in different branches of the labor market.

7.2 German vs. American Undergraduate Education: German Curricula Americanized?

The comparison of traditional German *Diplom* degrees with new bachelor's degrees has shown several changes, including shorter (usually 3 year) programs, a focus on transferrable skills, the introduction of job-oriented classes and internship programs, as well as a focus on internationality. But do these changes represent an "Americanization" of German university degrees? Do new German bachelor's degrees resemble American undergraduate degrees? Judging from the analysis presented above, there are some similarities between German and American bachelor degrees, but also a great number of differences. So far the differences still seem to outweigh the similarities between the two systems.

Besides sharing the same name American and new German higher education degrees are similar in their general structure. In both systems the bachelor's degree is the first degree that allows graduates to enter the job market or graduate education. The bachelor's is then followed by a master's and a PhD in both countries. In terms of content they are similar in the way that in both systems students chose

one main subject (a major) that they want to specialize in (though the degree of specialization varies greatly). Also, there are similarities in terms of the content of the basic core curriculum within the different disciplines. For example, students in chemistry all have to take classes in organic and inorganic chemistry; in the same way engineering students all take a class in mechanics or physics; and business students all take an accounting class. Similarly, bachelor's programs in the United States and in Germany both focus on soft skills and on internationality. However, soft skills appear to be more important in the United States, while internationality, particularly language skills, have been a stronger focus in Germany.

While these similarities exist, a direct comparison of American and German bachelor programs, however, shows various differences between the two systems. Many of them can be explained by the different historical and institutional backgrounds and follow the LME vs. CME categorization of the Varieties of Capitalism literature.

The first difference is the length of the programs and the relationship between the different degrees (i.e. are they seen as consecutive units). Most American undergraduate programs are four year programs, however, there are also three year and five year programs and there is no strict regulation on the length of undergraduate programs. Each university, or even each department can decide those matters by themselves. In Germany on the other hand, the federal higher education framework law regulates the length of university programs and most bachelor's programs are three-year programs followed by a two-year master's program. In Germany, the majority of programs are so-called "consecutive" bachelor-master programs, where the master's can be started at the same department right after the bachelor's is finished. In the United States the two degrees are not seen as a sequence, there is a much clearer division between undergraduate and graduate studies that usually involves a completely new application and admissions process. Students also very often change universities between the two stages or work for a few years before returning for graduate school. Although most programs in the United States are officially structured as four-year programs, it is widely accepted for students to take a year or even two years longer, especially if they are working or taking care of their family while studying. As two of my interview partners explained: "I would say in most American universities these days the average amount of time to complete a degree is greater than four years. And for Auburn I'd say it's probably more in the range of four to five years" (Interview AU College of Business). "Six years is much more widely accepted now as a criterion of competition between universities" (Interview AU Chemistry Department).

A second major difference is the focus on general liberal arts education and a much lower degree of specialization that can be found in American programs. American students usually do not chose their major before their second year. During the first two years they focus on fulfilling general requirements in the humanities, social sciences and natural sciences and only in their last years do they have the opportunity to specialize in their area of interests. In Germany, students usually do not have to fulfill requirements outside of their major and only a few programs require some classes, such as foreign languages or business classes that are non-subject related classes. Figures 7.1(a) and 7.1(b) illustrate this difference. The reasons for this difference are manifold. For one, there are different secondary education systems. Many of the classes that students take in their first years at American colleges are taught at German upper-secondary schools that lead to an *Abitur* (the degree needed for university entrance). Thus, they are not needed in German undergraduate programs. As one of my interview partners explained:

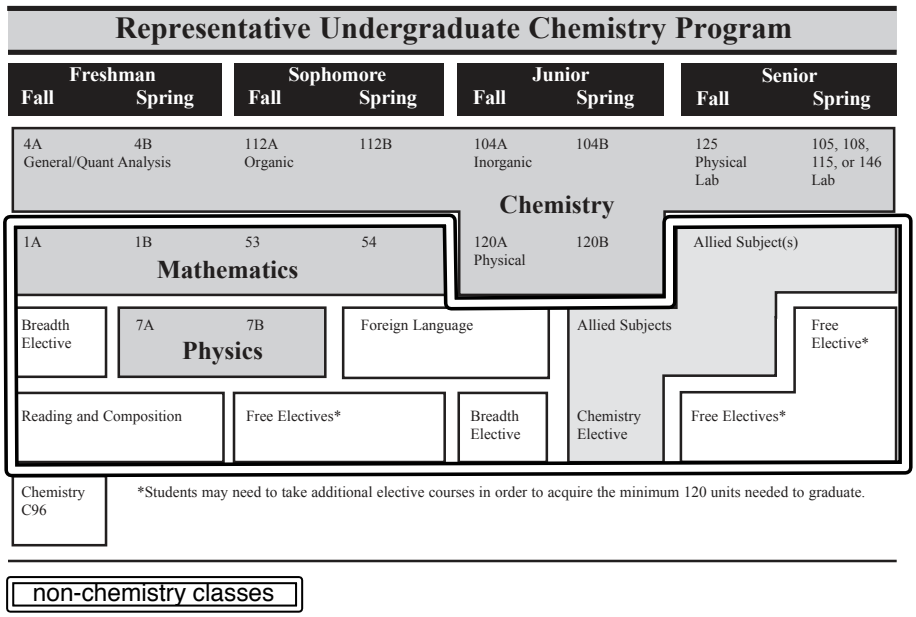
> "I think that the need for it [liberal arts education] in the United States remains because of the great heterogeneity in the quality, the breadth and the depth of secondary education. People's knowledge of history, of political science, their facility in English composition and in written communications skills can vary quite widely and in fact that is part of the historical mission of the land grant institutions" (Interview AU Chemistry Department).

Secondly, American undergraduate education was historically started as a general all around education. The first higher education institutions were liberal arts colleges with a focus on subjects such as history, sciences and literature. The focus on one particular subject in the form of a major was only introduced later. In Germany, education has always been fairly specialized and targeted towards learning the skills of one particular profession or discipline, while in the United States the majority of bachelor's programs are not geared towards learning one particular profession, but at providing students with a broad comprehensive professional qualification (*Berufsbefähigung*). This is also widely accepted by businesses who expect to train recent graduates in the tasks needed for the particular job (Witte et al. 2004, 11). German employers on the other hand, do expect an expertise in the industrial/professional field of the job. Even though they have recently called for broader degrees, they do not expect the kind of general education found in anglo-american higher education, but rather mean a broader education within the respective discipline (instead of very early specialization). Thus, new German bachelor's degrees still focus on one subject only.

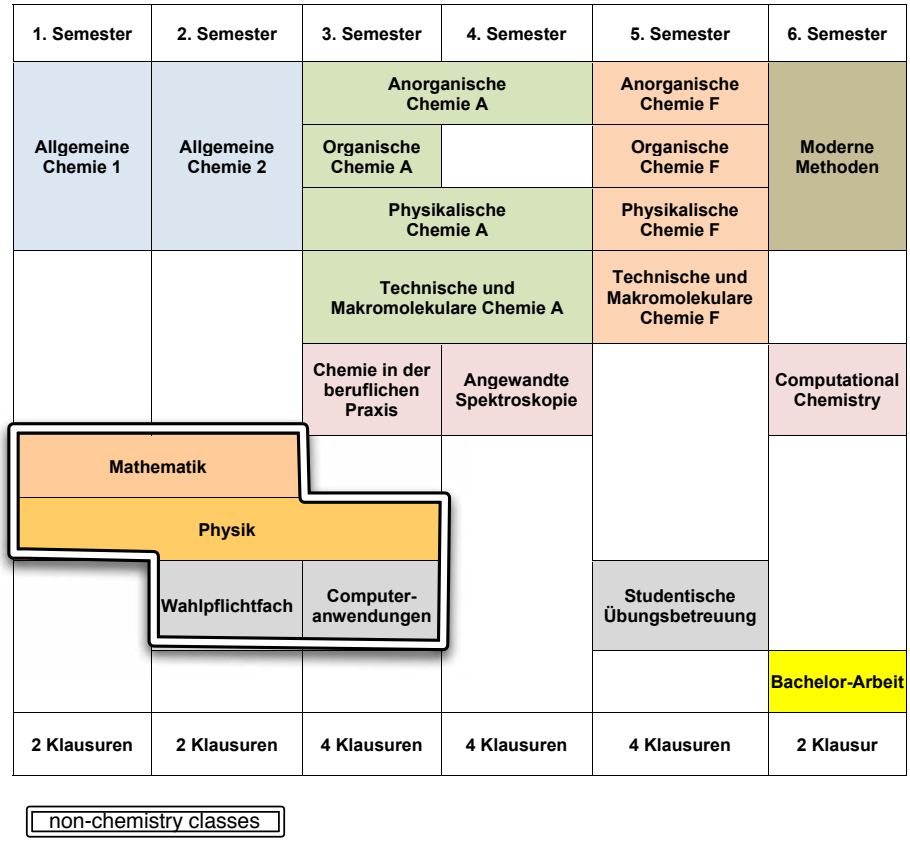
A third major difference can be seen in the flexibility and permeability of the systems. One demand German employers have had for the new degrees and higher

Figure 7.1: Example Chemistry Curricula

(a) UC Berkeley



(b) RWTH Aachen University



Sources: College of Chemistry University of California Berkeley (2010, 24), RWTH Aachen University Chemistry Department Website 2012

education reforms in general was more flexibility and a system that gives credit for training outside of higher education (e.g. vocational training, job experience) and allows coming back for further education after having worked. While there are efforts by universities to offer these more flexible degrees with part-time programs and continuous education programs, they are not widely available and it is still complicated to enter university without an *Abitur*. The American system on the other hand is much more flexible in this respect. Most programs allow part-time studies, offer evening or weekend classes and are involved in continuous education programs that allow lifelong learning (see Chapter 4.2).

Further differences can be found in the way of teaching and particular differences in each discipline. For example, American students in chemistry and engineering have to take more math classes than in German programs. This is most likely because the German *Abitur* requires students to take calculus classes, while it is voluntary at most American high schools. Another example would be more lab time for chemistry students in Germany. One of my American interview partners noted:

> "What I really see as being a big difference is just the amount of laboratory time that they have, how much time are they actually in the laboratory as students, it's relatively small here and again when you think about it of course undergraduates or people who are in university in Europe tend to be specialized. They're not distracted with things that really don't pertain to the chemistry curriculum, and so that's a part of it, but I think that even if we were to adopt a more specialized curriculum here we would still have to make greater reforms with respect to the laboratory experience that people have" (Interview AU Chemistry Department).

A German professor at the University of Wisconsin compared his experiences:

> "Here we have many lectures, and there are some labs. But the lab time is never as intensive as it is in Germany in Chemistry. At least, when I was a student in Germany I was in the lab every day, and that's not the case for students here"[2] (Interview 1 UW Chemistry Department).

Additionally, all German bachelor's programs compared here required a bachelor's thesis, while American undergraduate programs usually do not require a thesis, but often offer them for those students particularly interested in research. Another example for differences in teaching methods can be seen in exams. German exams

[2]Translation by the author, original: "Es gibt viele Vorlesungen, es gibt Labore. Die Laborzeit ist nie so intensiv wie in Deutschland in der Chemie. Also zumindest als ich in Deutschland war, war ich jeden Tag im Labor und habe irgendwelche Sachen gemacht und hier ist es doch viel weniger der Fall."

can often be done as oral exams (as shown in Chapter 6.1), while Americans use written exams more often. In addition, American departments offer more extensive student services, such as internship offices, faculty counselors, or international study offices than German universities.

These differences can be explained by the different cultural and historical backgrounds as well as by institutional differences (see Chapter 4.3). For example, German universities lack the resources provided by tuition fees and private donors, which pay for many of the services provided for American students. The existence of a well-established vocational training system is another factor that explains the stronger focus on research and the early specialization in one discipline, which can still be found in new German bachelor's programs. As Table 7.4 illustrates, American and German undergraduate programs still show many differences. While the American higher education system can serve as a role model for Germany in some aspects, the two systems will likely remain unique in order to meet the different needs of their corresponding labor markets.

Table 7.4: German and American Bachelor's Programs

	United States	Germany
Program Length	- usually 4 years - common for students to need 5-6 years	- usually 3 years - some 4 year programs exist
Bachelor-Master Structure	- non-consecutive programs are the standard - few consecutive programs offered, e.g. in engineering	- mostly consecutive bachelor-master programs offered - additional non-consecutive master's programs offered
Curriculum Focus	- Liberal arts general education - basic classes in major discipline - late specialization - soft skills/extra-curricular skills	- basic classes in major discipline - specialization within discipline - soft skills
Employability	- general employability in the form of transferrable skills and general knowledge - career support services - coop programs common, internships voluntary - curriculum influenced by employer recommendations	- employability in the form of discipline-specific knowledge and skills - internships required in some disciplines - few career support services - low employer influence on curriculum
Research	- bachelor's thesis not common, often voluntary - weak focus on research methods	- bachelor's thesis usually required - strong focus on research methods
Internationality	- foreign language requirements not common in all disciplines - low study abroad participation rate (9% of undergraduates in 2012*) - higher rate of international students (37.5% of undergraduates in 2012*)	- English requirements in almost all programs - classes and exams offered in English - high study abroad participation rate (34% of undergraduates in 2011*) - lower rate of international students (11.3% in 2013*)

*Sources: IIE 2013, DAAD 2011, SBA 2013

Chapter 8

Conclusion: A new German Model?

8.1 Summary of Study Results

One aim of this study was to show that the Varieties of Capitalism (VoC) literature needs to also consider higher education policy when talking about the differences and similarities of education and training systems in different countries. The study could show that the VoC approach has proven to be a useful framework for comparing higher education systems in different countries. The traditional German higher education system with research-oriented and subject-specific degrees corresponds to its coordinated labor market and strong government regulation as described by the literature for coordinated market economies. The diverse higher education system in the United States that provides students with a broad array of general skills at the undergraduate level on the other hand matches the more flexible American labor market as described by the VoC literature as typical for liberal market economies.

More specifically, this study has set out to analyze the question of whether recent German higher education reforms and changes on the labor market represent a shift towards a more liberal market model, resembling that of the United States. It particularly focused on the introduction of new bachelor's degrees in Germany, because they have been introduced with an emphasis on improving university graduates' employability and significantly changed the structure of German higher education. German employers have been active in the debates about higher education reforms and have demanded more flexible, shorter degrees that teach students basic, subject-specific knowledge as well as transferrable skills. These demands for

new skills by some employers (especially those in the services) can be explained by changes in the German economy, such as the growth of the service sector and a liberalization (reduction of social security/employment protection) of the labor market. The growing interest of German employers in higher education indicates that the complementarity between firms' needs in skills and a country's education system proposed by the VoC approach, also applies to higher education. A comparison of the new German undergraduate system and labor market conditions with the American higher education system and labor market has shown that while the German labor market as well as the higher education system have undergone significant changes, the main characteristics of a coordinated market economy remain intact, and the American model is still much broader and more flexible than the German one. Thus, when analyzing higher education policy the VoC arguments (complementarity labor market and education, general vs. specific skills) can be confirmed in most aspects.

The study was done in three steps. First, it analyzed the changes between traditional German *Diplom* degrees and new bachelor's degrees by comparing study programs at nine different departments in three disciplines (chemistry, mechanical engineering, business) before (*Diplom* study programs from 1994 - 2004) and after (bachelor study programs from 2008 - 2010) reforms were implemented. In addition, at each of the selected departments I interviewed experts responsible for the curriculum and study programs. The interviews focused on the original goals for the new degrees as well as on first experiences with the new programs. Secondly, the study analyzed the expectations for reforms and experiences with new bachelor graduates of German employers. This was done as a content analysis of position papers and publications by employer associations published before, during and after reforms, an analysis of recent studies on the acceptance of new degrees, as well as through interviews with employers and employer associations in the three areas mentioned above. The third part then focused on the comparison with the United States and analyzed employer expectations and curriculum content of American undergraduate programs. For this analysis three public research universities were chosen and undergraduate programs in chemistry, mechanical engineering, and business were analyzed and compared to their German counterparts. As with the study on German degrees, the document analysis was complemented by interviews with undergraduate program directors or faculty advisors in each department. To compare the expectations of American employers of college graduates with those expectations by German employers a literature analysis was conducted.

This chapter will summarize the results of these analyses and discuss how these results can be used to answer the research questions posed in Chapter 1. It

will show that the German coordinated market economy - the higher education system and the labor market in particular - has changed in many aspects. However, key elements of a coordinated market economy can still be found, even with these new developments. I thus argue that while the German model is changing and in many areas seems to be moving towards more liberal practices, it has not been "Americanized" and still shows its own unique traits that allow it to compete in a globalized economy. The first section of the chapter will review the results of the study program analysis and the analysis of employer skill preferences. Secondly, theoretical implications of these findings will be discussed. The third section focuses on current and future challenges for the German education and training system, including the relationship between higher education and vocational education and routes to a system that allows for lifelong learning. The final section relates the results to the debate about policy learning and convergence of liberal and coordinated market capitalism.

8.1.1 Study Programs Before and After Reforms

My first set of research questions asked whether the introduction of new degrees in Germany has also led to changes in the content of the curriculum that might indicate a shift towards more general degrees. To answer this question traditional *Diplom* programs were compared with new bachelor's programs in chemistry, engineering and business.

The focus of this comparison was based on the declared reform goals of shortening the study periods, creating broader and more practically-oriented programs and internationalizing the curriculum. I hypothesized that there would be changes in all of these areas. The results however showed that the main changes have been made to the structure of the programs and only few changes to the content. Results also show that there are great differences between the three disciplines and between the different departments in terms of how much the curriculum has changed and how far changes have already been implemented. While the business departments appear to have changed their curriculum the most and have the greatest emphasis on internationalization, chemistry and engineering programs only show minor changes in the curriculum, whereby chemistry has changed more than engineering.

Business departments have welcomed the introduction of new degrees the most and have changed the curriculum most significantly by introducing new classes. At all of the three compared programs in business administration the reform goals of adding broader, interdisciplinary skills, with a focus on employability and an international component have been implemented in the new bachelor's programs.

While some programs (e.g. Jena) intend to be more research-oriented than others, all of them focus on transferrable skills and also added an international component (e.g. a class on international business or a required stay abroad) to their curriculum. In comparison to the programs in chemistry and engineering, the new business programs appear to have undergone the most substantial changes in their structure and curriculum. My interview partners at the universities explained these substantial changes with the need to compete with foreign business schools and the rapidly changing labor market as well as with expectations of employers for graduates of business programs. With the introduction of professional MBA programs in Germany there is also a development of different business program tracks: One that is more focused on research and one that is focused on educating managers and similar professions. The new professional programs are also becoming increasingly important for continuing education, as employers send their employees back to school to earn additional certificates or degrees. According to all interview partners, the focus of the new undergraduate programs in business is more on teaching students transferrable skills (e.g. learning how to study, adaptability, research skills, presentation skills) than teaching them specific subject knowledge. This was seen as an important change compared to the old degrees. However, compared to American undergraduate programs the German programs still teach a significant amount of "hard facts" and most students still intend to continue in a graduate program before entering the labor market. In contrast, in the United States most students go straight into the labor market after their undergraduate degree and only some of them return later for a graduate degree[1].

Most chemistry programs have also undergone substantial changes to the structure of their programs. In terms of content however the changes are not as significant. Chemistry is also a special case in this comparison because the German Chemical Society had already initiated curriculum reforms in 1997-1998 before the Bologna reforms were passed. Their so-called "Würzburger Modell" introduced a two-phase modularized *Diplom* with six semesters of basic studies and four semesters of specialization. It was meant to allow students to first gain basic general chemistry knowledge before choosing a specialization track. With the introduction of the bachelor's degree these structures were kept, but additionally a stronger emphasis on transferrable skills and practical knowledge can be found in all three bachelor's programs that have been analyzed here. However, there are also differences between the departments. Not all departments implemented the reform goals to the same degree. While the emphasis on employability is the strongest at the RWTH Aachen with their particular classes on transferrable skills and free electives, the bachelor's

[1]See Chapter 6 and Chapter 7 for a detailed comparison.

program at the LMU München appears to have become the most general, with many electives and required classes in other disciplines. The program at Jena shows the fewest changes to the traditional curriculum. However, none of the programs analyzed, included a humanities core curriculum that can be found in most American bachelor's programs. All of the three American chemistry programs studied here included required classes in social sciences, communications, English and other natural sciences. However, compared to German programs the American programs had a weaker research component, e.g. none required a final research thesis.

Despite these changes in the curriculum not many German graduates with a bachelor's degree in chemistry go straight onto the labor market (Interview VCI). Most of them continue their studies in a master's program and several of my interview partners mentioned that a PhD is still very necessary in many chemical professions. One problem that graduates with a bachelor's degree in chemistry seem to face is competition from chemical-technical assistants who have a vocational training degree that is very popular with employers in the German chemical industry (Interview VCI). In the United States, on the other hand, most college graduates go straight onto the job market. They mostly find jobs in assistant positions in the chemical industry. According to my American interview partners, however, to be able to work in a job that has more responsibility one also needs a graduate degree in chemistry in the United States (Interview Chemistry UW).

Engineering has been the discipline in which resistance against the new degrees has been particularly strong. Most engineering departments were afraid that the good reputation of the German engineering *Diplom* would get lost with the introduction of new degrees. Thus, many engineering departments have continued to offer the *Diplom* along with the new degrees for as long as possible[2]. In 2003 nine technical universities founded an association, the "TU9 German Institutes of Technology" ,to strengthen the voice of engineering programs in the reform process. From originally demanding to keep the *Diplom* in engineering, they now declare the bachelor's degree in engineering as "employable, but not professional" and the master's degree as the standard university engineering degree (TU9 - German Institutes of Technology 2010). This resistance against the reform can also be seen in the three programs analyzed here. While some departments tried to really change the curriculum in the bachelor's program and added classes that teach transferrable non-technical skills, such as at the TU Munich, all of them also indicate a focus on the more research-oriented master's programs.

[2]In May 2013 the HRK listed only a total of 252 programs that still end with a *Diplom* or *Diplom FH*. Among them there are 60 in engineering and technical sciences (Hochschulrektorenkonferenz 2013c).

The comparison of traditional *Diplom* programs with new bachelor's programs has shown that in many cases the curriculum of the bachelor's program resembles that of the first semesters of the *Diplom.* At the same time, efforts to focus on transferrable skills, practical experience and internationality can also be seen as several programs require classes in non-subject related fields. While there are some significant changes that are intended to teach students more flexible skills, all programs are still very much subject-specific.

In comparison, in American programs about 30 percent of the curriculum focuses on liberal arts content with classes that every student regardless of their major has to take. These classes focus on English, history, social sciences, languages and sciences and are often taken before making a final decision for a major. The majors themselves then often also include classes in other relevant disciplines and a specialization within the field is usually only done during the last semesters and later in a master's program. The new German bachelor's programs analyzed here do not include this kind of broad liberal arts component. Thus, a complete shift towards a general skills model cannot be found.

8.1.2 German Employer Preferences

My second set of research questions asked: Have the preferences of German employers concerning the skills of their employees changed? How have they changed and do the new programs fulfill employers' expectations? Several steps were taken to answer these questions. First, recent developments in the German economy and the labor market were analyzed to show whether the hypothesis that employer preferences have changed due to changes in the labor market and the economic structure is true. Chapter 2 on the German labor market has shown, that there are developments in the labor market that have changed the needs of employers and thus required a reaction in education policy. The most significant changes were the growing importance of the service sector, an increased demand for high skilled labor due to globalization, and a flexibilization of the working world in terms of job security, working times, and social safety networks. These changes in the labor market have required a new set of skills and employers have voiced their need for reforms in education policy.

In a second step, the analysis of German employer positions before and during the *Bologna Process* (1998 - 2006) in Chapter 4 has shown that employers supported the introduction of new degrees. They specifically requested: an internationalization of German universities and degree programs; curricula that teach students the skills needed in an information society, such as critical thinking, information processing

and problem solving skills; shorter study periods and flexible transitions between programs and the different levels of secondary and tertiary education; as well as more autonomous universities and a stronger cooperation between universities and businesses. All of these demands were also considered in the several revisions of the higher education framework law (HRG) and employer support gave an additional impetus to implement the Bologna goals quickly. The support of employers for the introduction of new degrees and their demands for reforms listed above indicate a change in their preferences away from the traditionally strict division of vocational training providing specific technical skills on the one hand and higher education providing subject specific detail knowledge on the other hand towards a more flexible and broader system. However, it was not clear from this analysis to what extent employer preferences have changed towards more general skills and whether the new degrees fulfill employer expectations.

To follow up on these questions several interviews with representatives of employer associations as well as with human resources managers of different German companies were conducted. The results of these interviews can be summarized as follows: First, all interview partners had positive opinions about the Bologna reforms and welcomed the introduction of new degrees. Second, all of them emphasized the importance of being flexible and acquiring skills for life-long learning. In terms of their experiences with the new bachelor's degrees, the results differed between the different industries. Employers in engineering and chemistry argued that it was difficult to find jobs for graduates with a bachelor's degree, because they also had those with a vocational training degree to rely on for the more technical tasks that had to be supervised. They are still unsure what a graduate with a bachelor's degree can do compared to those with a vocational training degree. One aspect they see is missing in current bachelor's programs is practical experience. They find that while bachelor's graduates do not have as much detail knowledge as master's or former *Diplom* graduates, they also lack practical experiences gained by working on the job. In these two disciplines graduates from universities of applied sciences and from *Berufsakademien* seem to have the best chances for a job with a bachelor's degree. In general however, employers looking for university graduates in chemistry or engineering still seem to be looking for graduates with a master's degree, or even a PhD (particularly in chemistry). Another difference I found was between bigger and smaller companies. Bigger companies seemed more open to the new degrees than smaller employers. One reason for this might be that larger companies seem to be better informed about the reforms as they have the resources to keep up with new developments. Another reason I found was that larger companies are more flexible in changing their job structures and creating new jobs for the new bachelor's graduates,

while smaller firms seem to stick to their traditional division between apprentices and university graduates and can often not afford to introduce trainee programs for bachelor's graduates. Coming back to my original question, one can summarize that it depends on the fields of industry as well as on the size and type of the employer to what degree their preferences have changed and whether their expectations of new bachelor's degrees are fulfilled. Employers in engineering and chemistry seem to be more reluctant to hire bachelor graduates, while those in the services have welcomed the new degrees more.

My interviews with employers and employer associations have shown that German employers on the one hand do emphasize the importance of general skills and flexibility in particular, but on the other hand still expect a great amount of specific subject knowledge and some degree of specialization from university graduates. They do not expect the kind of general liberal arts education provided by American college degrees, but rather a broadening of the skills and knowledge within the particular field and with respect to transferrable skills (Interview BDA). Thus, there does not seem to be a direct convergence of the two systems and no clear shift towards the American model of liberal arts education. Instead of shifting from one model to another, German employers have added some new expectations of university graduates to the traditional specialized university education. These new expectations include some non-subject classes in "all-round" subjects such as business administration or specific law classes (for example patent law for chemists) and in languages; international experiences; practical experiences for example through internships; as well as the ability to apply theoretical knowledge to praxis and continue to update existing knowledge and skills. For the new bachelor's degrees employers particularly expect a greater focus on non-subject related, but transferrable skills and do not expect the same detailed and specialized knowledge as from *Diplom* or master's graduates. At the same time, graduates with a bachelor's degree are often compared with those with a vocational training degree and employers repeatedly emphasized the importance of practical experience for bachelor graduates.

This trend of focusing higher education on practical application has also been called the "vocationalization of higher education" (Gellert and Rau 1992). In a country like Germany where vocational education has played a particularly important role, employers focus on combining the advantages of higher education with those of vocational education. They do not want to miss the practical experience apprentices have gained in their training, but also need the more general and higher skills of university graduates. A bachelor's degree, employers were hoping, would combine some of both. In conclusion one can argue that German employers have not completely changed their original preferences for specific skills but have added new demands

(more flexibility, internationality, transferable skills, practical experience) to these skills. While some of the developments are moving towards a more liberal model, the differences between the American and German labor market, as well as between German and American employer expectations as presented in Chapters 4-7 are still significant and a complete convergence of the two models cannot be found.

Thus, the next section will focus on how this can be explained. Can the VoC approach be validated with these results on higher education? How can the institutional changes be explained within the framework of two persisting models of capitalism? And what do the changes mean for the future of the German model of education and training?

8.2 Theoretical Reflections

The above summary of the empirical study results has shown that the results are complex and there is no straightforward shift towards one or the other models of capitalism as suggested by the Varieties of Capitalism literature. Similarly, there is not one single theory fit to explain the changes in German higher education. However, a combination of several approaches can be helpful. The following section will first reflect on the importance of considering higher education policy with a VoC framework. Secondly, it will discuss how historical institutionalism and discursive institutionalism can explain the developments in German higher education. And lastly, the question of convergence between the two systems of capitalism will be discussed.

8.2.1 Varieties of Capitalism and Higher Education

How do the findings on the changes in the German higher education system confirm the Varieties of Capitalism approach? To answer this question, let me quickly review the traditional VoC arguments on skills and institutional complementarity. According to authors such as Hall and Soskice (2001) institutions within each variety of capitalism are complementary to each others. Thus, in reference to skill production, the education system provides the kinds of skills that are needed on the corresponding labor market. The argument for skills is that workers in LMEs require more general skills, because the labor market is more flexible and does not provide employment protection and social safety nets. Jobs are changed more frequently and workers need to be able to adjust to new settings quickly. In CMEs on the other hand, the argument is that stricter employment protection and regulations

that prevent employers from firing workers quickly lead to a labor market that is more stable and allows employees to keep their job for a longer period. Employers then expect industry-specific skills at a level that can be used without long on-the-job-training periods. These arguments have been applied to vocational education and only very recently have studies in the VoC school included higher education as a field of research. I argue that many of the differences defined for skill production in CMEs and LMEs with respect to vocational training can in some version also be found when looking at higher education.

When comparing vocational training systems in CMEs and LMEs the VoC argument is that in LMEs employees with those skills that can be applied across industries are most successful in their careers. Employees thus invest more in these kinds of broad skills. For CMEs, the argument is that employees need more specialized knowledge (specific skills). This is also true in higher education. The comparison in this study has shown that higher education in CMEs and LMEs provides students with different kinds of skills. The traditional German *Diplom* programs have focused on one major subject and most new German bachelor's programs still have that focus on one discipline. Students chose their major before starting their university studies and a change in major often requires completely starting over with a new curriculum.

American bachelor's programs on the other hand are much broader, a major is often only chosen after the second or third semester and specialization only starts in the last one or two semesters. American undergraduate programs focus on a broad liberal arts education, while the goal of German programs is to teach specialized knowledge and help students to become experts in their field.

In vocational education, this expert knowledge is focused on practical skills, while in higher education, even in most of the new degree programs, the main focus is on theoretical knowledge. Like in vocational training courses, the degree of specialization in German undergraduate university programs is much higher than that in American programs.

In addition to my own findings, a recent study by Hoelscher (2012) could support these results. He found that British and German university graduates differ in terms of which competencies they have acquired in their programs and how their studies have prepared them for a future job:

> "German graduates show a much higher subject-specific orientation and competencies, while in Great Britain general competencies dominate. At the same time Germans report much more often that the level as well as the specific discipline of their university program match the needs of

> their later jobs. In Great Britain on the other hand many graduates feel overqualified and their specific discipline plays an inferior role."[3] (Hoelscher 2012, 23).

These findings show that the VoC categorization can be confirmed for higher education in terms of the differentiation between general and specific skills.

A second feature the VoC approach used to differentiate between LMEs and CMEs is that of coordination between the different actors involved in related policies. According to the approach, in LMEs this coordination is mainly left to market forces, such as competition between universities (for students, research funding, reputation/popularity) and between students (for admission and for jobs), as well as in terms of forms of governance and cooperation between higher education institutions and employers. In CMEs there is meant to be a higher degree of cooperation and coordination between the government, employers and higher education institutions. For vocational training this high degree of coordination is obvious as the German vocational training system is based on the cooperation of firms and states in providing students with a dual program of on-the-job training and schooling[4]. In higher education it is not as straightforward.

But compared to the American system a higher degree of coordination and regulation can be found on several levels. First, as shown in Chapter 4, government influence is much stronger in German higher education than in American higher education. Though it has been reduced to a certain extent with recent reforms, federal and state governments are still involved in the hiring and firing of professors, setting tuition rates, financing of research and teaching, and setting rules and regulations for degree programs. Secondly, the review of reform debates in Chapter 5 has shown that German higher education policy is influenced by highly organized interest groups such as employer organizations, unions, student organizations, the German Rector's Conference and advisory bodies such as the *Wissenschaftsrat*. They not only have a great influence on the policy-making process at different levels, but are also often involved in implementing new policies. The degree of coordination between government bodies and these para-public institutions is thus much higher than can be found for American interest groups. Thirdly, in the same way as workers have much greater decision-making power at their workplaces in Germany than in the United States, students and professors at German universities are highly or-

[3] Translation by the author, original: "Deutsche Absolventen weisen sehr viel stärker fachspezifische Orientierungen und Kompetenzen auf, während in Großbritannien eher generelle Kompetenzen vorherrschen. Gleichzeitig berichten die Deutschen sehr viel häufiger, dass sowohl das Niveau als auch die spezifische Fachrichtung ihres Studiums dem späteren Job angemessen sei. In Großbritannien fühlen sich hingegen viele Absolventen überqualifiziert, und das spezifische Studienfach scheint eine eher untergeordnete Rolle zu spielen."

[4] See Chapter 2 for an introduction to the German vocational training system.

ganized and have an influence in the internal university decision-making processes (*Mitbestimmungsrecht*). As a result, the university management is much weaker than at American universities. This shows that the belief in coordination described for CMEs at different policy levels also exists for higher education policy.

A third important aspect of the VoC approach is institutional complementarities. Following the argument that the institutions in one sphere match those in a related policy sphere, this can also be shown for the institutions in the German and American labor markets and higher education systems. First, as Chapter 6 and Chapter 7 have shown, employers in Germany and the United States have different expectations of college graduates. In the United States employers expect a basic well-rounded education in the student's major, in Germany employers still expect a more detail-oriented, specialized knowledge as university graduates need to exceed the theoretical knowledge and skills of apprentices. In both countries however firms emphasize the importance of soft skills and of flexibility. While flexibility is still more important in the United States, where students often find jobs outside of their specific field of study, having to switch jobs and adjusting to new fields during the first few years after graduation is also becoming more common in Germany. Both higher education systems aim at complementing these expectations by providing a broad liberal arts curriculum in addition to the major classes in the United States and a subject-specific curriculum with specializations within the major in Germany. Secondly, the institutional structures of both higher education systems, match the needs of the labor market. Despite recent changes, the German higher education system still has a very simple structure, with research universities and *Fachhochschulen* dominating the system. This simple institutional landscape allows employers to focus on graduates' competencies and program content, while American employers rely much more on university reputation and rankings because the institutional structure of the higher education system is much more diverse, very open and not as regulated as the German system.

Lastly, cultural differences between the two countries support the institutional structures as described by the VoC literature. The American belief in individualism and the idea of the 'American Dream' in which education and hard work can lead to a better life supports the institutional system in which each individual competes with other individuals and the invisible hand of market forces regulates the economy and society. The German belief in solidarity and subsidiarity[5], on the other hand, complements the institutionalized corporatism and coordination between the different stakeholders. These ideas can also be found in the realm of

[5]The principle of subsidiarity is the belief in an organizing mechanism in which matters are taken care of by the lowest capable authority, i.e. policy decisions are first made at the local level.

higher education, and the difference in the emphasis of liberal arts education vs. subject-specific knowledge (*Fachwissen*) exemplifies the different ideological views. While the American liberal arts education allows for flexibility and adaptability, the German emphasis on subject-specific knowledge fits with the belief in success through expert knowledge.

In addition to these institutional features in CMEs and LMEs that are true for higher education as well as vocational education, as illustrated above the recent vocationalization of higher education is another factor that makes the VoC approach relevant for studies of higher education policy. The original focus of the VoC literature on the German vocational training system is understandable, because it was (and still is to some extent) the main pillar to produce the necessary skills for the German industrial economy, while universities provided the needed research and background knowledge. The relevance for the industry dominated labor market was much clearer for vocational training institutions than for higher education. Especially at German research universities, the focus on preparing students for research, even in new bachelor's programs today, is still very strong compared to similar programs at equivalent institutions in an LME like the United States. However, the growing role of *Fachhochschulen*, the introduction of vocational academies (*Berufsakademien*) which offer "a mixture of general higher education and in-firm vocational education and training" (Powell and Solga 2010, 708), and the emphasis of employability skills in university programs all point to an increasing relevance of higher education for the labor market. Additionally, the changing relationship between the vocational training system and higher education suggests benefits of studying both systems instead of focusing only on one of them. As Powell and Solga (2010) found: "They [researchers] mostly overlook the complementary and competitive relationship between higher education and vocational education and training. However, we argue that precisely this relationship is important to understand contemporary dynamics of institutional change in national skill formation systems" (Powell and Solga 2010, 706).

The importance of studying both higher education and vocational training together or at least under equal foci becomes clear considering recent developments in both CMEs and LMEs. While in Germany the importance of higher education has grown, policy-makers in the United States have repeatedly emphasized the importance of vocational education and community colleges are partnering with local businesses to provide these programs (Simon (2012), The White House (2013a)). Similarly, the growing importance of higher education in Germany can be explained by the increasing focus on preparing students for the labor market and embracing the historically important *Beruflichkeit* within the higher education system. To put

it more clearly: "Undeniably, the position of higher education has been strengthened worldwide; however, some argue that this is due to its very embrace of vocationalism [...], reducing the division between academic general and specific vocational training through differentiation and the emphasis on economic benefits of formal education" (Powell and Solga 2010, 708).

Despite the different historical starting points with LMEs traditionally emphasizing higher education and CMEs focusing more on vocational training, both types of countries appear to benefit from a mixture of higher education and vocational training to prepare their students for the labor market. While the emphasis still might be more on higher education and general skills in the United States and vocational training and specific skills in Germany, this study has shown that both are equally important in creating the skills needed for the respective labor markets. Studies within the VoC school should thus include both systems in their research.

8.2.2 Institutional Change and Persistence

This study has shown that changes to the existing institutional structure of the German higher education system are possible. At the same time, the lack of deeper going changes to the German curriculum in new bachelor's programs shows that change often is only possible to a certain degree and happens slowly. Many different aspects influence how and whether change occurs. The Varieties of Capitalism approach has been criticized for being too static and ignoring convergence between the two systems. However, authors within this school have found several ways to explain change and why the different varieties of capitalism still persist despite continuous change in several policy areas. Other useful approaches to explain change without an institutional overhaul are historical and discursive institutionalism. Lastly, to answer the question of convergence between LMEs and CMEs one needs to agree on a definition of convergence.

Hall and Thelen (2009) argue from a VoC perspective that institutions can change as long as they still serve the interests of the actors that use them. So if their interests change then the institutions must change as well, but as long as most actors still benefit from existing rules, institutions will remain stable (Hall and Thelen 2009, 11). They describe three different ways institutional change can occur. In the case of German university reforms all three of them can be found. The first is "reform" or "institutional change explicitly mandated or endorsed by governments" (Hall and Thelen 2009, 20). Reform has influenced the introduction of two-tier degree systems; the new degree structures were mandated by the federal

government. Much of the actual implementation and the development of the content of the programs on the other hand was left to the universities and was not regulated by strict rules. Thus, universities have changed the programs to their liking. The end results in most cases were changes to the structure of the programs (shorter, sometimes different order of classes) with few changes to the actual content of the programs.

A second route of change Hall and Thelen see is "defection" which happens when actors stop following prescribed practices, for example, when firms start dropping out of employer organizations because they don't serve their interests anymore (Hall and Thelen 2009, 18-19). The introduction of the "excellence initiative" by the federal government can be seen as "defection". While the Länder governments have the main responsibility for higher education in terms of financing and regulation, this competition for additional research funding was a way the federal government used to influence higher education by getting around existing rules and directly creating competition between universities.

Lastly, there has been a quiet "reinterpretation" of existing rules and standards and a shift in practices in a "piecemeal fashion from below" (Hall and Thelen 2009, 13). One way this is found is the way German employer preferences have changed, especially in the services, with respect to business graduates. For quite some time employees with an anglo-american style MBA degree have been highly successful on the German labor market and employers who look to hire business graduates have indicated in my interviews, as well as in broader surveys that they prefer new bachelor graduates, as well as MBA graduates, because these graduates meet their interests best. Another change that has occurred in this slow subtle fashion is the internationalization of universities, which started long before the Bologna reforms and slowly grew in importance. A third development that can be seen as "reinterpretation" is the growing importance of private higher education institutions. When the first private business schools opened, there were protests. Yet, slowly private universities have become a common sight in German higher education and some are now among the best institutions in their field.

Hall and Thelen point out that while these three types of change can be very significant they rarely overhaul the entire framework to lead to a complete convergence between LMEs and CMEs. Rather change happens on a continuum of degrees within each framework. "The differences among them [LMEs and CMEs] are in kind rather than degree" (Hall and Thelen 2009, 24). Thus, in answering the question about a convergence between LMEs and CMEs, the question to be asked is not whether there is now more or less focus on general education in Germany than before reforms, but about what kind of general education. The focus in Germany

is not on the kind of liberal arts education that can be found in the United States, but rather on a broader understanding of scientific and industrial fields, a later specialization and an inclusion of non-subject related soft skills. The issue for German employers and policy makers is the *degree* of specialization and not whether or not to specialize at all. While there are changes in the degree of specialization and in the importance of higher education, the main kinds of skills needed in the labor market remain the same and "Countries where firms have traditionally relied on specific, as opposed to general, skills continue to do so" (Hall and Thelen 2009, 24).

The developments shown in this study make clear that there is a combination of continuity and change in German higher education and in the German political economy more generally. While at first sight the changes to the German higher education system look very significant, a closer look indicates that many features remained stable or transferred to the new system. This combination of continuity and change can be explained with arguments taken from historical institutionalism and discursive institutionalism.

Historical institutionalism defines institutions as "a set of shared understandings that affect the way problems are perceived and solutions are sought" (Thelen 1999, 371). "Historical institutionalists argue that institutions emerge from and are sustained by features of the broader political and social context" (Thelen 1999, 384). They argue that institutional change is always limited by the historical developments of the system. In reference to the proposed convergence of different market systems, Thelen argues that in order to understand the modes and mechanisms of institutional change in these systems today, one needs to understand how they have developed and changed in the past. She finds that by doing so, we will find that in addition to change at "critical junctures" institutional change also occurs through the natural political re-negotiation and adaptation institutions are involved in (Thelen 2004, 4, 8).

In higher education reforms this kind of limited change can be found in many areas. Most importantly for this study the new degrees show that the changes were mainly structural, but the curriculum has not changed significantly. The skills taught by the new degrees only changed marginally. Some new classes were added, particularly to address the need for transferrable skills, but the main curriculum has not changed much. Compared to the American curriculum the German one is still much more focused on the major subject and the curriculum is much narrower and more specific. This kind of more specialized higher education is historically rooted. It complements the secondary education system that provides a broad liberal arts education at the *Gymnasium* and matches the German labor market in which employers still expect expert knowledge from university graduates.

With the eyes of a discursive institutionalist the focus of analysis is on political discourse and the development of ideas. To explain institutional change they focus on the interactive processes involved in the exchange of ideas and argue that through this exchange by policymakers and the public, ideas and interests can change and thus overcome institutional obstacles (i.e. cause institutions to adapt) (Schmidt 2008). The scope of this dissertation did not allow a detailed analysis of the political discourse (e.g. in the form of a comprehensive media content analysis) but the reform debate presented in Chapter 5 summarizes the positions of the different stakeholders and shows how discourse has been used to legitimize the policy changes. The debate on the different reform measures, centered around European pressures through the *Bologna Process*, pressures created by the new knowledge-based economy, low international rankings of German universities and the American system as a role model for Germany. While proponents of reforms pointed to the American success story, calling for more competition and deregulation, as well as for two-tiered degrees; opponents emphasized the advantages of the German higher education system without tuition fees and a great degree of freedom for professors and students.

As Schmidt (2002) points out, the political discourse is often framed by the institutional context. Questions that have also been discussed in many other countries such as how to address the growth of the service economy and how to react to globalization and internationalization pressures have been debated in very different ways in the different institutional settings. Thus, even those proposing reforms and promoting the American system as a role model for Germany did not share the exact same ideas about higher education as someone in an LME like the United States or Great Britain might have. University financing is one example, where ideas about the same issue vary significantly between countries. Compared to American policy makers, even German proponents of tuition fees have very different ideas than American policy makers about how tuition fees should be used and whether university education is a public good or a private good. The suggested changes included comparatively low tuition fees and still a strong role of Länder governments in financing and regulating higher education. These moderate suggestions can be attributed to the strong historical roots of social democracy and the principle of subsidiarity which heavily influences German policy making. Similarly, those arguing for the introduction of bachelor's and master's degrees in Germany mainly suggested creating more flexibility for students and employers and a greater focus on employability skills. They did not envision an American-style liberal arts curriculum nor the clear division of research and teaching.

Ideas, ideology and culture play significant roles in policy making and the question of whether the German higher education system and the political economy

more generally have converged with the American model cannot be answered without paying attention to ideas and culture. While this convergence between LMEs and CMEs has been proposed by many authors and studies and on several institutional levels (e.g Bennett (1991), Cohen and Pisani-Ferry (2006), Gordon (2000), Hackel (2001), Lütz and Eberle (2007), Zimmer and Smith (2010)), there are great differences in how convergence is defined. The term 'convergence' can have positive and negative connotations, and it can refer to changes on different levels, i.e. structural change, cultural change and changes in policy content.

In response to the more general convergence between LMEs and CMEs, Hall suggested: It is also a possibility "that coordinated market economies will adapt without liberalizing completely, by adopting reforms that change the character of their economic institutions and steer them onto their own paths of change. Instead of converging with a liberal market model they will change the coordinated market model through institutional reforms"[6] (Hall 2006, 199). For higher education in Germany this type of institutional change appears to occur exactly as Hall describes it.

For the context of higher education reforms convergence has been defined as follows:

> "Aiming at 'convergence' is widely seen as compatible with the simultaneous upholding of 'diversity' -an agreed value of European HE [higher education]- while 'harmonisation' is perceived as threatening this diversity. If convergence increases, diversity is reduced, but never eliminated unless full convergence is reached. The aim of convergence is thus semantically compatible with the maintenance of 'diversity of cultures, languages, national education systems and university autonomy' stressed in the Bologna declaration as a goal and value unto itself" (Witte 2006a, 14).

This definition makes clear that diversity in cultures and ideas has always been valued in the European context and convergence has only been the goal to a certain degree. It also explains how we can speak of convergence without actually referring to a complete harmonization of policies and economic systems. The following section will review the degree of convergence in the areas of skills needed and provided by the education system and the developments in the working world, including employer expectations. Other relevant areas that show a limited convergence

[6] Translation by the author, original: "[...] dass die koordinierten Marktwirtschaften sich anpassen, ohne sich vollständig zu liberalisieren, in dem sie Reformen übernehmen, die den Charakter ihrer ökonomischen Institutionen ändern und sie auf je eigene Anpassungspfade setzen. Statt auf ein liberales Marktmodell zu konvergieren, werden sie das koordinierte Marktmodell durch institutionelle Reformen ändern."

are the organization of higher education (i.e. new forms of university governance) and higher education financing (introduction of tuition fees, global budgets).

One of the main questions of this dissertation was whether German higher education reforms indicate a shift towards a general skills model like that of the United States. The short answer that can be given by summarizing the above comparison of German and American bachelor's degrees would be: No, German higher education is still much more specific than American higher education. However, taking the above definition of convergence as meaning "becoming more similar" (but not necessarily the same) into account and going back to Streeck's arguments about the different mixtures of skills an economy needs, the answer becomes more complex. On the one hand, this study has clearly shown that there are great institutional and cultural differences between LMEs and CMEs, Germany and the United States in particular. On the other hand, the review of recent developments on the German labor market in Chapter 2, the review of the reform debate in Chapter 5 and the role of employer preferences presented in Chapter 6 have also shown areas in which changes towards a more liberal system are evident. These findings confirm Thelen's idea of institutional development, that "elements of stability and change are in fact often inextricably intertwined" (Thelen 2004, 31).

The growing importance of higher education in the German economy is one development that points towards a greater emphasis on general skills than specific skills. Chapter 2 has shown that the number of students entering higher education has risen significantly, while employers in some areas are desperately searching for new apprentices. Similarly, Powell and Solga (2010) have noted: "In post-industrial societies, general and more abstract types of knowledge have gained in importance, while specific and more practical skills seem less valued. Responses to this general trend [...] include shifts toward 'unification' of higher education and vocational training, in terms of institutional structure and 'academic drift' in terms of curricula" (Powell and Solga 2010, 715).

At the same time, there is still a great difference between what is considered "general" in the United States and in Germany and vocational education still plays a tremendous role in the German education and training system. The new focus on employability within higher education could indicate that the change might not be from specific skills to general skills, but from low to high skills. Yet, to consider German vocational training as low skills by international standards would also be wrong. As Streeck has emphasized, in comparison to similar programs offered at American community colleges the skills provided by the German vocational training system are considerably high. The cultural idea that manual labor is not automatically low skilled labor also helps in keeping up the important role of vocational training

and vocationally oriented *Fachhochschulen* (Streeck 2011, 23). Streeck explains the different view in the United States: "A further factor that must not be overlooked is the low social prestige, especially in the United States, not just of manual work as such but also of anything called 'vocational.' In the United States, attending college was and still is widely regarded as an obligatory entry path into the 'middle class,' making it essential for anyone sharing the, equally obligatory, 'American dream' of upward mobility" (Streeck 2011, 24). This stronger emphasis on college education also explains why American universities have become so successful in international comparisons. They are the only valid form of post-secondary education for the majority of Americans and thus have the almost undivided attention of policy makers and employers. In countries like Germany the vocational training system has also always played an essential role in providing the necessary skills for the labor market and universities have to share the attention of policy makers and employers.

The above comparison of German and American bachelor's degrees has shown that there are still great differences in terms of structure and content of the programs. While there are some developments, such as the shorter timeframe, the credit system, and the focus on soft skills and employability that indicate some degree of convergence, there is no complete convergence. The German undergraduate curriculum is still much more focused on specializing in one discipline than American undergraduate programs. And while German employers have asked for more 'general' skills they do not expect bachelor graduates to have the same liberal arts educations as American students do, but want them to be proficient in their specific field of study (see Chapter 6).

How can this limited convergence be explained? Why have some significant structural changes been made, but other more content-oriented changes been limited? Several reasons can be found for these developments. First, as described by historical institutionalism, path dependent institutions are difficult to change. Cultural and ideological factors prevent deeper going reforms in many areas. For example, the German belief that higher education is mainly a public good and should be financed by the state illustrates this. The resistance against introducing tuition fees in many Länder and the withdrawal of fees in several of the states that had originally introduced them shows that some reforms can be reversed based on cultural constraints if the opposition is strong enough. Secondly, institutional complementarity (i.e. making sure that new degrees still fit the labor market) is another factor that limited reforms. And third, external pressures, such as the *Bologna Process* and the discourse on globalization and the knowledge-based economy have pushed policy makers to adopt some structural changes to the German higher education system. Witte explains:

> "Deciding for and switching to a different national degree structure is a costly investment for political bodies as well as HEIs [higher education institutions]. Once the decision is made, it cannot easily be reversed.[...] Therefore, once a certain degree structure is perceived as being predominant, this provides a strong incentive for adopting the same structure. [...] Already, expectations that Europe is moving towards a system of two-cycle degree structures is an important argument used by change agents to convince institutions of implementing the new structure. There is a self-fulfilling dynamic in this: if many actors believe it, the new structures will spread, and this will prove that the decision was right" (Witte 2006a, 44).

Thus, we find that despite such significant reforms as the introduction of new degrees, institutional stability is high in the German higher education system. Convergence with the American liberal system is still quite limited and institutional change in this case can be defined as 'constrained innovation' following Campbell's approach of institutional change. He argues that institutions on the one hand constrain institutional change by limiting the options available to actors and on the other hand they also offer opportunities and practices which actors can use to create innovation within these constraints (Campbell 2004, 8). This mixture of constraints given by existing institutions (and cultural beliefs) on the one hand, and innovation from within the system (as well as through external pressures) on the other hand can also be found for German higher education policy. Powell and Solga explain this phenomenon as follows: "historically-evolved national educational and training systems will most likely react to exogenous pressures in ways largely consistent with their specific cultural and structural characteristics" (Powell and Solga 2010, 711). Thus, even if there are some convergence developments, there will also be a great degree of path dependence.

In conclusion, this study has made the following findings in reference to the debate about the Varieties of Capitalism framework, institutional change and convergence. First, the study confirmed the VoC arguments in terms of skill differences between CMEs and LMEs and with respect to institutional complementarities as well as coordination patters. The comparison of American and German bachelor's degrees could show that the different skill profiles that had been identified for vocational training in LMEs and CMEs by the VoC literature can also be found for higher education. German bachelor's programs are much narrower and more subject specific than their American counterparts. This confirms the VoC approach of differentiating between broad general skills in liberal market economies and narrow specific skills in coordinated market economies. At the same time the study has shown that university programs in both countries address the needs of the respective labor markets. Thus, even with the new degrees the VoC hypothesis of institutional

complementarity between the different policy spheres holds true. While there is a need for more general skills in Germany, specific skills, and most importantly high specific skills are still essential for German employers. Similarly, the study showed that the German higher education system is much more based on regulation and coordination between the different actors than on competition and market forces. In addition to confirming these three features of the VoC framework for higher education, the growing importance of higher education for the skill production in CMEs gives another important reason for studies of the different varieties of capitalism to include higher education in their framework.

Secondly, only a limited degree of convergence between the German and American higher education systems could be found. From a VoC point of view a convergence of higher education systems as intended by the *Bologna Process* only makes sense as long as other institutional spheres (e.g. the labor market) are moving in the same direction. Thus, using the higher education system of LMEs like the United States or Britain as a role model for Germany is only useful when the particular institutional and cultural differences between LMEs and CMEs are considered and reform measures are adjusted to the existing institutional structures and ideologies. This however, does not mean that changes to existing policies have been completely impossible. The combination of historical institutionalism, discursive institutionalism as well as Hall and Thelen's (2009) account of institutional change in Varieties of Capitalism has proven useful in explaining the changes observed within the stable institutional framework of the German higher education system.

8.3 New Challenges for the German Education and Training System

Several publications over the last few years have reviewed the success of the Bologna reforms in Germany (Wernstedt and John-Ohnesorg (2010), Bundesministerium für Bildung und Forschung (2012), Nickel (2011), Bargel et al. (2009), Christoph and Roessler (2010), Winter (2009)). The following section will briefly summarize the common findings of these studies and will then focus on how remaining issues and drawbacks could be addressed. A particular emphasis will be on the question of which elements of the American system would work well for Germany. The second part of this subchapter will then concentrate on the future demands for the German education and training system. Here the focus will be on the importance of understanding higher education and vocational training as a unit in order to address the needs of the German labor market.

8.3.1 Bologna Revisited: Successes and Failures in German University Reforms

The Federal Department for Education and Research (BMBF) writes: "The transition to the two-tiered study structure is on-track and is nearly complete. Today 85 percent of all study programs lead to a bachelor's or master's degree, at *Fachhochschulen* it is even higher, 97 percent. In 2010 for the first time more bachelor's degrees than traditional degrees were granted"[7] (Bundesministerium für Bildung und Forschung 2012, 2). However, while the reforms have been successful in terms of quantity (how many new programs have been introduced), the quality of the new bachelor's and master's programs has been criticized in several aspects.

The *first* aspect that has been criticized by students, administrators and professors alike is the inflexibility of the new format. While the KMK has not given any specific guidelines for the content of new programs, it has passed regulations on the structuring in terms of the credit system, modularization and limits on the number of semesters programs are allowed to have[8]. Many departments have found these regulations too strict and forcing them to overload schedules. Several of my interview partners complained that they did not have enough flexibility in structuring their new programs. Students and professors alike complain about a lack of flexibility in planning their studies, an overwhelming number of exams per semester, and a lack of advising options. A student survey conducted by the Hochschul-Informations-Systems GmbH (HIS) showed that students in bachelor's programs are more disappointed with their study conditions than students in traditional programs (Wernstedt and John-Ohnesorg 2010, 8).

Wernstedt and John-Ohnesorg (2010) found: "The students' overload is not only caused by denser curricula, but also by the badly implemented credit point system and a clear structuring and school-like regimentation [i.e. requiring attendance at all classes, regular homework, etc.] of the new study programs"[9] (Wernstedt and

[7]Translation by the author, original: "Die Umstellung auf die gestufte Studienstruktur verläuft erfolgreich und ist nahezu abgeschlossen. Heute führen 85 Prozent der Studiengänge zu einem Bachelor- oder Masterabschluss, an Fachhochschulen sogar 97 Prozent. Im Prüfungsjahr 2010 wurden erstmals mehr Bachelorabschlüsse als traditionelle universitäre Abschlüsse vergeben."

[8]In 2010 the KMK passed a revised version of its regulations for the accreditation of bachelor's and master's programs which addressed some of these issues. One example is the strict limitation of 5 years for a consecutive bachelor-master program. Exceptions to this rule are now allowed in certain circumstances. An emphasis on the possibility of first gaining work experience and then returning to a master's program was also added (Kultusministerkonferenz 2010). Yet, revising the regulations at each university takes time, especially for those programs that had just been accredited before this revision, and changes might only be implemented with the next accreditation.

[9]Translation by the author, original: "Die Überforderung der Studierenden ergibt sich nicht nur aus inhaltlich verdichteten Studienprogrammen, sondern auch aus dem kaum abgestimmten Einsatz des Leistungspunktesystems und einer deutlichen Verschulung der neuen Studiengänge."

John-Ohnesorg 2010, 10). Another indicator that study conditions need to improve is the growing dropout rate for bachelor's programs. While the dropout rate for traditional *Diplom* and *Magister* programs had decreased between 2008 and 2010 from 27 to 23 percent, the rate for bachelor's programs increased from 25 to 28 percent. The increase is even more significant for bachelor's programs at research universities where 35 percent of a class dropped out before finishing their program in 2008. These numbers do not even include programs like engineering and natural sciences with traditionally high dropout rates (Heublein et al. 2012, 12).

Second, the limitation that consecutive bachelor's and master's programs can only consist of a maximum of ten semesters has been criticized. This limitation not only contributes to the inflexibility already discussed, but also leads to an emphasis on six-semester bachelor's degrees, thus limiting the possibilities for creating valuable programs. In order to provide students with the necessary skills for the job market and truly offer the bachelor's degree as the first degree qualifying for entry into the labor market, more than six semesters are needed in many disciplines. In addition, the bachelor's degree needs to be understood as a basic study program teaching students key competencies, basic knowledge and practical skills (Wernstedt and John-Ohnesorg 2010, 9). Wernstedt and John-Ohnesorg (2010) argue: "The most serious system error in the German Bologna reforms is the five year time limit and the financial allocations for so-called 'consecutive' programs"[10] (Wernstedt and John-Ohnesorg 2010, 25). Particularly research universities, which are often focusing their efforts on their master's programs, need to understand the importance of offering basic (*grundständige*) employment-qualifying undergraduate degrees that allow time for internships and study abroad semesters.

Third, and closely related to number two, focusing on consecutive bachelor-master programs and limiting access to master's programs makes the German education system even more selective and devalues the new bachelor's programs. Bachelor's and master's degrees should be seen as separate programs and students need to be able to enter a master's program after having worked for several years without any problems. The KMK has included this emphasis in their 2010 revision of the *"Strukturvorgaben,"*[11] but not many university departments are thinking of their degrees as separate undergraduate and graduate programs yet. Several of my interview partners at universities, particularly in chemistry and engineering mentioned that they see the bachelor's degree only as a preparatory degree for the master's degree.

[10]Translation by the author, original: "Der gravierendste Systemfehler in der deutschen Bologna-Reform steckt in der fünfjährigen Zeitbeschränkung und den Finanzierungsvorgaben für sogenannte 'konsekutive' Studiengänge."

[11]guidelines for the design of new degree programs

The focus on consecutive programs instead of on separate undergraduate and graduate programs reduces the bachelor's degree to a pre-degree for the master's.

Most graduates with a bachelor's degree (78 percent at research universities and 43 percent at FHs) still continue with a master's program. The goal to have the bachelor's degree become the main degree has not yet been reached (Nickel 2011, 27). If one also considers that the majority of students do not finish their master's programs during the regularly planned four semesters, but need an average of 6.7 semesters at universities and 6.2 semesters at FHs, the goal of reducing the study length also has not been reached (Nickel 2011, 25).

Looking at other countries in the Bologna area shows that the 3+2 model is not the only working model. While 19 countries follow the same three year bachelor's and two year master's system, there are also seven countries in which the standard bachelor's degree takes four years and the master's degree one or two years (Nickel 2011, 43).

Fourth, another goal of the Bologna reforms was to increase student mobility. While students now switch universities more often between bachelor's and master's programs, international mobility for bachelor's students has not increased. Despite the new mobility window between the bachelor's degree and the master's degree only about one fourth (24 percent) of master's students have indicated they have switched universities. Thus, although most students continue in a master's program the majority does not switch universities between bachelor's and master's degrees. However, compared to university changes for traditional *Diplom* and *Magister* programs (12-13 percent) this rate does show an increase in mobility. For bachelor's students the rate was only 10 percent (Nickel 2011, 26). My interview partners explained that changing universities within Germany and spending a semester abroad during a bachelor's program is complicated for several reasons: First, many of the new programs have created their own special profile, so that it is complicated to transfer credits between institutions because some classes are not directly comparable. At the same time, the programs are so strictly planned that taking time off for an exchange semester without receiving full credit for it results in longer study times, which is problematic especially for those students in *Länder* with tuition fees and for making a smooth transition to a master's program (because most programs only start in the fall) (Interview Business Administration, LMU).

International mobility has decreased for the bachelor's programs, particularly at research universities, as most students only spend a semester abroad between bachelor's and master's or once in a master's program (Nickel 2011, 24). If the bachelor's degree is meant to become the main degree it needs to be possible to

spend a semester abroad without losing significant amounts of time. One particular problem is the inflexibility of many departments in giving credit for classes taken abroad. Wernstedt and John-Ohnsorg (2010) argue: "Only if these decisions are made with a certain degree of flexibility can the desired mobility between universities be achieved - here universities need to develop the right kind of sensitivity"[12] (Wernstedt and John-Ohnesorg 2010, 11).

Fifth, increasing employability was one of the main goals for the new bachelor's programs. Yet, the new tight curricula offer only limited space for extra activities such as internships. Several of my interview partners mentioned that with the new bachelor's degree time for internships is very limited, especially during semester breaks which are now, even more than before, spent with exams and papers. New classes on soft skills are improving students' employability, but employers still emphasize the importance of real-life practical experiences. At the 2009 Bologna Conference in Leuven European education ministers also emphasized the importance of skills needed for the work life: "With labour markets increasingly relying on higher skill levels and transversal competences, higher education should equip students with the advanced knowledge, skills and competences they need throughout their professional lives" (Conference of European Ministers Responsible for Higher Education 2009, 3). A study by the Center for Higher Education Development (CHE) found that students in bachelor's programs generally find that the programs prepare them well for the job market, though there are great differences between the disciplines. While bachelor's students in the humanities evaluate the factor 'preparation for the labor market and profession' much more positively than their colleagues in traditional degree programs it is the reverse for bachelor's students in engineering (Nickel 2011, 102).

Additionally, the new degrees need to be accepted by employers and structures created to include the new degrees as valuable qualifications. Recent surveys show that especially bigger companies already accept graduates with new degrees (Institut der deutschen Wirtschaft 2004, 4; Stifterverband für die Deutsche Wissenschaft 2005, 27). The federal government and the state governments have also introduced new job descriptions for graduates of bachelor's and master's programs (Kühler 2005, 485). Yet, in those programs that used to be finished with a state exam, such as education degrees for high school teachers, and degrees in law and medicine, the new degrees either have not been introduced yet, or there are great discrepancies about how they will be accepted by employers (Friedman and Leffers 2005). In the case of high school teachers, for example, the bachelor's, which is

[12]Translation by the author, original: "Nur wenn mit einem gewissen Maß an Flexibilität entschieden wird, kann die gewünschte Mobilität zwischen den Hochschulen erreicht werden – hier müssen viele Hochschulen noch das richtige Fingerspitzengefühl entwickeln."

intended to be the first degree qualifying a student for employment, is not accepted as a qualification to teach high school. A master's degree (plus the traditional 1-2 year internship period) is still required (Deutscher Lehrerverband 2005). Universities, on the other hand, limit the number of students in master's programs and require further qualifications besides a bachelor's degree from their applicants (Witte 2006b, 24). This leaves many bachelor graduates in teaching without the necessary means to start their intended job, waiting for a spot in a master's program. These are issues that still need to be addressed by universities and state governments.

One positive development however is that despite critique by employers on missing internships and practical experience, bachelor graduates do not have more problems finding a job than those with traditional degrees: Only three percent of university graduates and four percent of graduates with a bachelor's degree from an FH are unemployed, which is about the same as for traditional degrees (Nickel 2011, 28).

Sixth, A new solution is needed to provide public universities with more funding for teaching, supplies, student advising, and administrative needs as many of the above mentioned issues can be attributed to a lack of financing and resources. Requiring professors to shoulder the introduction of new degree programs in addition to their research and teaching loads naturally leads to a work overload that results in mediocre programs and a lack of attention for students. Many universities have recognized the issues mentioned above and are in the process of revising their programs. "Yet, the problem remains that the reforms cannot be self-financed. The HRK, quoting the *Wissenschaftsrat*, has argued that a 15 percent increase in teaching staff is needed to successfully implement reforms"[13] (Wernstedt and John-Ohnesorg 2010, 22).

The issues listed above illustrate that a revision of reforms is urgently needed. Going straight back to former practices and old *Diplom* degrees as has been suggested by some policy makers (e.g. in Mecklenburg-Vorpommern it was debated to reintroduce the *Diplom*, North Rhine Westphalia wants to revoke recently gained university autonomy by putting the government back in charge of hiring and firing processes, and several Länder governments had to withdraw from charging student tuition due to pressures by the public), however, does not seem to be the best solution. Many of the issues could be solved by better addressing the needs of students, employers and universities. Most require additional financial resources, but some also require a rethinking of the role of higher education for the economy and society

[13]Translation by the author, original: "Allerdings besteht weiterhin das Problem, dass die Reform nicht kostenneutral durchgeführt werden kann. Erforderlich ist eine um mindestens 15 Prozent erhöhte Lehrkapazität, wie die HRK unter Berufung auf den Wissenschaftsrat dargelegt hat."

in general, as well as of the relationship between professors, students and higher education institutions.

Looking at other countries' implementation of the Bologna reforms and successful systems of higher education such as that of the United States can offer ideas and help find solutions to some of the issues discussed above. So what can Germany learn from the United States? Surely, the American higher education system has its own drawbacks and as discussed above it particularly matches the American labor market and cannot be directly imported to the German system. Yet, some elements and ideas might be helpful in improving German higher education reforms.

While German employers do not expect the kind of liberal arts education American undergraduate education provides, the system of having separate colleges (for undergraduate education) and graduate schools (for further studies) has advantages. First, it gives bachelor's programs and bachelor's students a special value and their own role within the university structure. In Germany it currently seems as if bachelor's students are just those students who have not made it into a master's program. Creating structures that help develop a sense of community among undergraduate students and that also allow them to work with professors and get to know them more than in just their large lecture classes will allow undergraduates to form an identity. These structures could be provided for example by orientation weeks before the program starts, faculty undergraduate advisors who are assigned to each student, administrative undergraduate advisors who help students navigate their studies and other institutions like international offices and internship offices. Also, offering undergraduate students opportunities for involvement in their professors' research allows them to get practical research experience and a better relationship with their teachers. American universities treat students with much more importance and respect than German universities. This does not however mean that American undergraduate programs are strictly regimented or school-like as is often implied by critics of American undergraduate education. According to Weiler "the genius of the American study system on the undergraduate level [...] lies in the particularly successful balance of both elements [control and freedom of choice], and here particularly in the effort to give students the maximum support they need in navigating the curricular freedom. [This is taken very seriously and the task of advising is not] left to some administrative office, but seen as an integral part of professors' duties."[14] (Weiler 2004, 31).

[14]Translation by the author, original: "Der Genius des amerikanischen Studiensystems auf der Ebene der undergraduates, also der ersten vier Jahre des Hochschulstudiums, liegt in der besonders gelungenen Ausgewogenheit zwischen diesen beiden Elementen, und hier wiederum besonders in der Bemühung, den einzelnen Studentinnen und Studenten in der Nutzung der vorhandenen curricularen Freiräume ein Höchstmaß an Beratung und Orientierung angedeihen zu lassen. Wie ernst dies genommen wird, zeigt die an den meisten amerikanischen Universitäten (wiederum privaten

The need to change the way German professors teach and treat their students has also been a point made by my employer interviews. One interviewee mentioned the American system as a role model for this: "What I find particularly good in the United States is the exchange between professors and students, in the form of better accessibility of professors. [...] Not only in the form of a couple of office hours a week [...], but particularly the possibilities for exchanging ideas on the same level. That is really something we can learn from the United States, that the professor has the self-confidence to deal with students as peers"[15] (Interview Berlin-Chemie).

In general, teaching, and particularly undergraduate teaching, needs to be made a higher priority at German universities. American universities can serve as a role model in this respect: "American elite research universities see it as one of their natural tasks to not only offer graduate education, but also undergraduate education. And for those admitted students it's a special attraction and honor to pursue their degrees in proximity to first-class performance in research"[16] (Frackmann 2005, 1). The traditional German research university has its roots in research and science; teaching in Germany originally meant educating future researchers and scientists. This might explain why German universities are struggling more with providing excellent teaching for undergraduate students than American universities. "[In the United States] the university is not primarily a research institution, but an institution of 'higher learning'"[17] (Frackmann 2005, 42). The research component is then added in the form of graduate schools, and there the name (school) again emphasizes the importance of learning (Frackmann 2005, 42). While history cannot be undone and the research function of the German university is of course still very important, focusing more on the teaching role and on preparing students for other

sowohl als öffentlichen) selbstverständliche Prämisse, dass die Wahrnehmung einer so konzipierten Studienorientierung nicht einer Verwaltungsstelle überlassen werden kann, sondern integraler Bestandteil professoraler Pflichten ist."

[15]Shortened translation by the author, original: "Und ein Thema, wo ich sage, was ich aus den USA wiederum sehr gut finde, ist – das muss natürlich finanziert sein- der Austausch zwischen den Dozenten und Studenten in Form von besserer Erreichbarkeit des Dozenten. Einer besseren Möglichkeit sich auszutauschen mit dem Dozenten. Weniger jetzt rein formale Sprechstunden von ein, zwei Stunden die Woche oder ähnlichem, das ist das, wo die FHs durchaus auch besser sind, was die Betreuung dort betrifft. Das finde ich sehr wichtig, aber auch eben der Ansatz, wenn's um die Betreuung geht, nicht einfach vorzugeben, das wird so gemacht, sondern auf einer Ebene des Austausches auch zu agieren. Das ist in der Tat was, was man aus der Grundeinstellung aus den USA mitnehmen kann, was hier wünschenswerter wäre. Ich glaube, dass das ganz wichtig ist. Auch, dass der Dozent auch durchaus das Selbstbewusstsein hat, sich mit dem Studenten auf Augenhöhe auseinanderzusetzen."

[16]Translation by the author, original: "Die amerikanischen Spitzenforschungsuniversitäten sehen es als ihre selbstverständliche Aufgabe an, nicht nur Graduate Education, sondern auch Undergraduate Education anzubieten. Und für die zugelassenen Studierenden ist es eine besondere Attraktion und Auszeichnung, ihre Ausbildung in der Nähe der Spitzenleistungen in der Forschung zu absolvieren."

[17]Translation by the author, original: "Die Universität ist nicht zuerst Forschungsinstitution, sondern Institution des 'higher learning.'"

jobs than those in academia will help German undergraduate programs to succeed. Thinking of two, or maybe three if professional degrees such as education and medical degrees are included, separate institutions instead of just two cycles of the same program (as in consecutive degrees) will help the new bachelor's programs to become more independent and force those responsible for the curriculum to create programs that include all the skills and knowledge necessary for a successful job entry.

At the same time American graduate schools can offer ideas on how to handle admission to master's and doctoral studies. While the focus on such standardized tests as the GRE, LSAT and MCAT that can sometimes lead to commercialized studying for the test (expensive prep classes, practice materials, etc.) is not desirable or necessary for the German system, including faculty recommendation letters and student essays in the applications gives applicants the chance to confer more about their skills and character than what a transcript can show. This is especially helpful for those students who have worked or done volunteer work after finishing their undergraduate education. Paying more attention to these personal applications would also open the door for students from the vocational training track as it would allow them to put emphasis on their non-academic experiences and show how these have prepared them for the academic work ahead of them. American graduate programs do a much better job of integrating students with work experience and many weigh relevant work experience against lower grades in graduate school applications (Interview Mechanical Engineering AU). When I asked my interview partners at German university departments why these personal application items were not used more, the most common response I received was that they do not have the time and resources to read and evaluate them.

Thus, it again boils down to financing. The American model offers a conflicting example in this respect. On the one hand, most American research universities appear to have much more financial resources than German institutions[18], particularly for teaching and administrative overhead costs. On the other hand, American university tuition is among the highest in student fees world-wide, which leads to social discrimination and debt issues. This is obviously not desirable for Germany. Yet, some strategies in terms of funding acquisition and university administration could give ideas for solutions in Germany.

Including students in the financing of their programs is not necessarily a negative way in university financing, although in the German public student fees have a very bad reputation. The most common complaint about student fees is that they are not just, because they discriminate against those who cannot afford them. That is true, of course, if there are no systems that support these students. However, if,

[18]See Chapter 3 and Chapter 4 for comparative numbers.

like at most American research universities, need-blind admission is practiced and scholarships and financial aid are offered to those who cannot afford it (Frackmann 2005, 33), student fees can be a valuable source of income for universities. Several of my interview partners at universities that had recently introduced student tuition mentioned that this money helped them in hiring extra teaching staff and providing mentoring services (Interview Engineering RWTH Aachen, Interview 2 Chemistry LMU, Interview Business Administration LMU, Interview Business Administration Mannheim). For students it also means that they can expect and demand certain services, such as office hours and advising services (Weiler 2004, 32). In the same way as parents pay fees for early childhood education at daycare centers and preschools in Germany a system of sliding scale fees could be beneficial for German universities.

Other sources for financing that so far are not very common at German universities are donations. American universities are very successful in collecting donations from their alumni, businesses, foundations, and other organizations. These donations do not only come in the form of money, but often also as 'infrastructure' donations such as libraries, professorships, computer labs, etc. American universities then often acknowledge these donations by naming the facility or professorship after its generous donors (Frackmann 2005, 34). At the same time the American way of honoring achievements and recognizing excellence in research and teaching creates a sense of pride and community among professors, students and alumni who are then willing to pay some of that pride back in the form of donations. Recognizing "best teachers", "best students", etc. at ceremonies like the yearly graduation ceremonies as well as offering frequent informal luncheon seminars and departmental functions are just a few of the occasions that are helpful for students, professors and administrators alike. It creates competition and a motivation to become successful as well as a sense of belonging to one "family" (Weiler 2004, 27). Another area in which the American system can serve as a role model is professional university administration. While there are currently many changes at German universities and modern management ideas are becoming more important, focusing on the professional education and training of higher education administrators and offering programs in higher education administration and management will be helpful in addressing the various needs of administering a university (Weiler 2004, 30).

The aspects mentioned here are only a few that could be used to improve German higher education and comparing Germany with other countries besides the United States would definitely offer more ideas. While the ideas introduced here seem simple and easily adaptable, it would be naive to believe that they can simply be copied to the German system. Many of them (e.g. tuition fees, advising

services, etc.) have already been introduced to some degree. Yet, what is more important than changing organizational mechanisms is the mentality and beliefs of those involved in the system. As Frackmann put it:

> "While the organizational mechanisms at least from the view point of a naive model copyist can be implemented by political administrative measures or by reorganizing cash flows, this in no way works for the so called cultural elements. They cannot be copied by a 'let there be light' declaration of a political administrative actor"[19] (Frackmann 2005, 36).

What is needed at German universities is a greater openness for change that is just beginning to develop and will need some time to fully unfold.

8.3.2 Higher Education and Vocational Training: Providing the Right Skills for the German Labor Market

This study has shown that the American and German higher education systems as well as their labor markets have different historical backgrounds and differ greatly in their structures and functions. They mainly follow the VoC categories of general skills and a liberal labor market on the one side and specific skills and a coordinated labor market on the other. Yet, at the same time they are both faced with globalization, a growing service sector and an increased importance of the knowledge-based economy. As the American system is more diverse and thus more flexible in addressing various needs and adapting to new requirements, it seems to have handled these developments more successfully[20]. The German system of tertiary education however is still struggling with finding its new role in the knowledge-based economy. This section will focus on the future demands the German vocational training system and the higher education system will face and how they can provide the necessary skills for the new jobs. The first part will shortly review the developments on the labor market, in vocational training and in higher education over the last decades as presented in Chapter 2. The second part will discuss how both systems can meet the needs of employers. The last part will again pick up the main questions of this dissertation and will argue that the discussed changes in the German education system still match the German labor market and confirm the Varieties of Capitalism approach.

[19] Translation by the author, original: "Während sich die Organisationsmechanismen zumindest aus der Sicht des naiven Modellkopisten noch durch politisch-administrative Maßnahmen oder durch die Reorganisation von Finanzströmen implementieren lassen mögen, gilt dies für die so genannten kulturellen Elemente keinesfalls. Sie lassen sich nicht durch das 'es werde Licht' eines politisch- administrativen Akteurs kopieren."

[20] This is not to say that everything is perfect in the United States. There are also issues in several areas, e.g. the role of community colleges, tuition fees, student debt, etc.

The last two to three decades have seen an immense growth in what is called the "knowledge economy." The knowledge economy can be defined as "production and services based on knowledge-intensive activities that contribute to an accelerated pace of techno- logical and scientific advance as well as equally rapid obsolescence. The key components of a knowledge economy include a greater reliance on intellectual capabilities than on physical inputs or natural resources, combined with efforts to integrate improvements in every stage of the production process, from the R&D lab to the factory floor to the interface with customers" (Powell and Snellman 2004, 201). To show these developments Powell and Snellman analyzed the growth of patents as an intangible knowledge capital and show a significant increase (numbers doubled between 1983 and 2001) in patent registration in the United States since the 1980s (Powell and Snellman 2004, 202-3). In addition, they found that the size of the science and engineering workforce could be used as an indicator for growth in human capital and showed that "nonacademic science and engineering (S&E) jobs grew at more than four times the rate of the total U.S. labor force between 1980 and 2000" (Powell and Snellman 2004, 205). Similar developments can be found for the German economy. The number of patent registrations in Germany has risen from 58,839 in 2009 to 61,311 in 2012 (Deutsches Patent- und Markenamt 2013). The number of employees in math, natural sciences and computer sciences in Germany grew by 56 percent between 2003 and 2010 and the demand for employees in these areas has constantly been increasing (Bundesagentur für Arbeit 2012b). Werner et al. find: "Knowledge-based work will increasingly become the relevant form of work in Germany. Employees will be faced with new demands in this respect. Employees will increasingly become managers and supervisors of the work process. Self-reliance, independent work and flexibility are some of the aspects that will become increasingly important demands of employees"[21] (Werner, Hollmann, and Schmidt 2008, 15).

These new jobs do not only require more flexible arrangements than former jobs, they also "tend to favor educated workers over those with less education and skills" (Powell and Snellman 2004, 213). While high-skilled workers are in high demand, low-skilled workers are decreasing in importance on the labor market. Powell and Snellman (2004: 213) explain: "Many technological innovations require workers with complementary skills and knowledge of that technology, which leads to an increase in demand for educated workers. At the same time, low-skilled positions are

[21]Translation by the author, original: "Die Wissensarbeit wird insbesondere in Deutschland zunehmend zur relevanten Form der Arbeit. Auf die Beschäftigten kommen in diesem Zusammenhang neue Anforderungen zu. Die Arbeitnehmer werden verstärkt zu Managern und Kontrolleuren des Arbeitsprozesses. Selbständigkeit, eigenverantwortliche Arbeiten und Flexibilität sind einige Attribute, die einen immer größeren Stellenwert bei den Anforderungen an die Beschäftigten einnehmen."

made redundant by technology, which decreases the need for less-educated workers." In Germany the rise in demand for highly educated workers can be seen in the low rate of unemployment for higher education graduates. While the general unemployment rate in 2005 was at 11.8 percent that for graduates of higher education programs was only at 4.1 percent (Powell et al. 2012, 416). This development is met by an increase in the number of students who start a university education. The percentage of those who started a higher education program (in relation to the same age group, *Studienanfängerquote*) increased from 27 percent in 1995 to 55 percent in 2012 and thus more than doubled (Bundesministerium für Bildung und Forschung 2013a, Tab. 2.5.73)

Although the German vocational training system has been known for providing apprentices with high vocational skills, higher education is clearly gaining in importance for the German labor market. While German employers still heavily rely on the vocational training system, many also demand options for further higher education for vocational training graduates as well as more practically oriented university degrees. Nikolai and Ebner (2012, 242) explain:

> "The structural shift toward knowledge-intensive sectors and, above all, the intensification of knowledge within all sectors has given rise to a significant increase in the demand for academics[22] throughout Europe. According to projections, the demand for academics is increasing considerably more than the demand for employees with VET [vocational education and training] qualifications [...]. Therefore, firms also have an interest in the availability of further educational options for vocationally qualified employees."

Not only has higher education gained in importance, the vocational training system has had its own structural challenges (see Chapter 2) and some argue that with an increasing focus on vocational schooling and a decrease in available apprenticeships the dual system has already become more 'general' and is getting closer to the higher education system (Wentzel 2011, 13). The increased focus on employability and the successful introduction of dual work-study bachelor's programs at *Berufsakademien* simultaneously appears to indicate a 'vocationalization' of higher education. 'Vocationalization' here refers to "reducing the division between academic general and specific vocational training through differentiation and the emphasis on economic benefits of formal education" (Powell and Solga 2010, 708). Several of my interview partners emphasized the usefulness of *Berufsakademien* and the need for flexible routes to switch from vocational education to higher education and vice versa. My interviewee at Berlin Chemie said: "The combination of vocational train-

[22]The authors are using the word 'academic' in the German sense of the word that includes all workers with a higher education degree.

ing and higher education is ideal. These people know how an industrial company works."[23]. Similarly the representative at DB-AG, when asked what needed to be improved, replied:

> "The system needs to change to allow for more work-study programs and thus allow for new forms of higher education institutions. The majority of the people we hire start here as an apprentice and we need to make sure to allow them to also pursue a bachelor's degree. That's why we need new university models to give those who have first decided to pursue practical training the chance to also receive an academic education."[24]

Winter et al. came to the same conclusion in their employer interviews and found that in some cases the new *Berufsakademie* programs take over for traditional apprenticeships, as one of their interview partners explained:

> "This [Berufsakademien] is a positive and successful model. And we find that it is a growing segment in the recruitment of new staff in chemistry, partly at the expense of the classical vocational training model, because the requirements are often shifting upwards in the operations of many companies"[25] (Winter, Cleuvers, and Anger 2010, 301).

With these developments both, vocational education and higher education need to adjust in order to meet the new demands. Since German employers are still very fond of the dual system of vocational training and on the other side German higher education is still quite focused on educating future professors, calling the vocational training system obsolete and putting all pressures on higher education will not be a successful route for adjusting the German education and training system to the needs of the knowledge economy. On the contrary, it will be much more helpful to see both systems as one unit of "professional education and training" and create interfaces between the two systems at several levels. Powell and Solga (2010, 706) noted: "The fallacy of most research on these questions is that it either investigates higher education, such as change in universities, or vocational education and training, often one country or aspect, such as the 'dual system' in Germany.

[23]Translation by the author, original: "Ideal ist die Kombination Berfusausbildung und Studium. Die Leute wissen wie ein Industrieunternehmen funktioniert."

[24]Shortened translation by the author, original: "Das System [muss] sich dahingehend bewegen, berufsbegleitende Studiengänge viel besser zu ermöglichen um damit auch andere Typen von Hochschulen zu ermöglichen. [...] das Gros unserer Leute, die wir jedes Jahr einstellen, die bei uns eine Berufsausbildung beginnen, auch denen [möchten wir] dazu verhelfen einen Bachelorabschluss zu machen, wenigstens einen Teil von diesen Leuten. Und dafür bedarf es eben einfach noch auch anderer Hochschulmodelle, um da auch die Möglichkeiten zu haben, Leuten, die sich eben vorher erst mal entscheiden, eine praktische Ausbildung zu machen, trotzdem noch eine akademische Ausbildung zu ermöglichen."

[25]Translation by the author, original: "Das ist ein positives und erfolgreiches Modell. Und da sehen wir, dass das momentan auch ein wachsendes Segment ist in der Nachwuchssicherung in der Chemie, teilweise zu Lasten der klassischen dualen Berufsausbildung, weil sich die Anforderung nach oben verschiebt in den Tätigkeiten vielfach, in den Unternehmen."

Consequently, such research misconstrues the diversity of organizational forms in skill formation and the myriad ways that these two organizational fields are linked in each country by hybrid organizational forms that span boundaries."

This is not only true for research on these topics, but in practice there is also still a fairly great divide between higher education and vocational training and interfaces between the two are just starting to develop. Several strategies have been suggested to bring vocational training and higher education closer together and to allow both systems to use their potentials. The introduction of shorter bachelor's degrees was a first step towards providing more flexibility and to offer a degree for those who do not want to stay in academia, but want to move on to other jobs. In addition, employers, education policy analysts, and policy makers ask for the following changes in the vocational training system:

First, the permeability between the several systems needs to be increased. For that vocational training programs need to be better attuned to the requirements of the higher education system and the continuing education system (Werner, Hollmann, and Schmidt 2008, 8).

Second, by introducing modules or building blocks in vocational training programs one can create more flexibility in terms of scheduling and curriculum content. It would also allow different tracks according to the academic performance and learning pace of students and make a system with basic and advanced classes possible (Werner, Hollmann, and Schmidt 2008, 8). At the same time it would allow students to spend part of their apprenticeships abroad and create opportunities for international studies. In vocational education it has been particularly difficult for students to gain international experiences. Splitting programs into several stages or blocks would make it easier to spend time abroad between these blocks.

For the higher education system the following reforms have been suggested:

Universities need to introduce flexible criteria that allow entrance to university programs for those with a vocational training degree. While these criteria already exist in some areas, they are often very strict and students need to invest a lot of additional study time in order to receive all needed credits for the degree. These criteria should also give credit to competencies gained by working for a significant time so that somebody with a vocational training degree who has also worked for several years after that could directly enter a master's program or a bachelor's program in a higher semester. Werner, Hollmann, and Schmidt (2008, 71-89) review and suggest several models in which vocational training and higher education can be combined at several levels. They show that the new bachelor's degrees are not

directly competing with vocational training degrees but could offer new options for combining both paths of education.

In addition to more flexible admission criteria for vocational training graduates, the trend of dual work-study university programs appears to be a highly successful strategy for combining higher education with work experience. Several of my employer interview partners mentioned that they prefer graduates from those programs and the increasing number of *Berufsakademien* and work-study programs at FHs and universities shows how popular they are also among students. From 2006 to 2011 the number of dual work-study programs in Germany doubled, the number of companies offering apprenticeships for these programs grew from 18,000 in 2004 to 40,000 in 2011, and the number of students grew from 40,000 to 60,000 in the same time period (Wegweiser Duales Studium 2013). These dual work-study programs "connect an academic study program with a practical apprenticeship in a firm. A special feature is the close curricular and organizational meshing between apprenticeship and university program"[26] (Werner, Hollmann, and Schmidt 2008, 89). Students end their programs with two degrees, a vocational training degree and a bachelor's or master's degree from a university or academy. These dual-programs also allow students to gain international experiences, foreign languages are requirements in almost all of them and many offer exchange programs with international universities or at international branches of the training company (Werner, Hollmann, and Schmidt 2008, 91-92). Increasing these programs further will address the demands by employers and students.

A third focus should be the availability of part-time bachelor's and master's programs that allow employees to pursue an additional degree while working full-time. Even without the support of employer sponsored or supported programs many of these types of programs will become more popular in a fast changing economy. At the same time, universities need to expand their offerings for continuing education, as employers and employees are increasingly interested in university-based continuing education. Over the past two decades continuing education numbers have fallen significantly and only about 27 percent of employees participated in a course in 2009, despite being allowed to take five days off work for continuing education in most *Länder*. One reason for this is that most continuing education is offered by larger companies; small and medium sized companies do not have the capacity for it, even though their employees could benefit from it (Schulze-Cleven 2009, 3-4). Thus, new initiatives, such as the one by the *Stifterverband*, called "Quaternary Educa-

[26]Translation by the author, original: "Sie verbinden ein wissenschaftliches Studium an einer Hochschule oder Akademie mit einer praktischen Ausbildung im Betrieb. Besonderes Merkmal ist die enge inhaltliche und organisatorische Verzahnung von Ausbildung und Studium."

tion" (Stifterverband für die Deutsche Wissenschaft 2013), to establish continuing education programs at universities are needed.

The main goal of all of these strategies is a greater focus on life-long learning. With today's rapidly changing working world and frequent technological innovations repeated learning becomes increasingly important. 'Life-long learning' has become one of the new focal points in professional education, but the flexible structures and range of suitable programs are still lacking, particularly in Germany. Both, the European *Bologna Process* for higher education as well as the *Copenhagen Process* in vocational training, focus on improving the opportunities for continuing education and creating flexibility to allow for learning after the initial education. The European focus on increasing the permeability between the two systems also shows how important the combination of both will be in the future (Powell and Solga 2010, 707). Focusing on these reforms will provide the necessary mix of high specific vocational skills and high general skills which is needed by the new knowledge and service based German economy.

8.4 Conclusion: The German Model and the Limits of Policy Transfer

Going back to the title of this chapter the last question to be answered is: Has the German model of corporatism and coordinated capitalism changed and what does the new model look like? As shown in Chapter 2 the main pillars of the *German Model* are corporate governance as a stakeholder system instead of a shareholder system, the German financial system with an important role of banks as credit lenders for companies, coordinated industrial relations, the German vocational training system that focuses on the creation of industry-specific skills and lastly, the generous German welfare system based on a mixture of employee and employer contributions, as well as taxes.

Higher education has not traditionally been seen as one of the main elements of the German Model, but with its increasingly important role it should be included with the vocational training system. All of these areas have seen some significant changes in the last decade (see Chapter 2). Yet, overall and particularly compared to other countries, the *German Model* is still unique and its main characteristics are still intact. Corporate governance is still based in a stakeholder system much more than in LMEs. Banks still play an important role in business financing. Industrial relations have become looser, but are still much stronger compared to LMEs. The vocational training system is undergoing changes and in some aspects it can be

argued that it has become more general. Yet, it still greatly focuses on industry-specific skills. The welfare state has been scaled back, but it is still quite generous and continues to use a mixture of employer and employee contributions in addition to taxes. Thus, while the *German Model* has become more flexible in many areas it continues to rely on its traditional structures and ideals.

For the higher education system this study was able to show that German higher education is in the process of significant changes, all while preserving some of its historical traditions and institutions. The introduction of bachelor's and master's degrees to replace the former *Diplom* and *Magister* programs was one of the most significant reforms in German higher education. While the new degrees have not brought many changes in the content of the curriculum and German undergraduate education is still much more specific and not as broad as the liberal arts education found in the United States, they have changed the structure of the higher education system. Other reforms, such as the introduction of tuition fees, more university autonomy, and the initiative for excellence in research have also had an impact on the modernization of the German higher education system. Modernization here refers to reacting to the current needs of the economy and to the pressures of globalization. The new degrees offer not only international compatibility, they also open up new ways for combined vocational and university education. They offer a more applied view on academic education and the new focus on employability has brought the importance of higher education for jobs outside of the academic labor market onto the agenda of research universities. While the implementation of reforms (e.g. credit system, modules, exam density) in many programs is still problematic, the basic structures to allow for flexibility and mobility have been created. Now they still need to be used in the right way. Students need to have the courage to leave universities with a bachelor's degree. Employers in general are welcoming graduates of bachelor's programs and surveys show that they do not have a harder time finding jobs than graduates of the traditional programs (see Chapter 6). Only once the bachelor's degree has been accepted as a full degree by students, professors and employers will the new degrees be able to show their full potential.

The study also showed that education and economic needs are closely related. As U.S. President Barack Obama (2010) stated, education is the number one economic issue of our time. Knowledge as opposed to labor or capital has become the most important input factor in our current economy. For the German system this means that a focus on all levels of education, starting with early childhood education, primary and secondary education, and continuing on in a combination of vocational and higher education will be essential for the German economy to continue to succeed on the global market. The dual vocational education system

has been a strong pillar in the success of German coordinated market capitalism. Thus, it was important for the VoC literature to focus on it. Yet, with the growing importance of higher education for the training of today's workforce, VoC studies focusing on the needs of firms should include higher education as a research topic. Recent reforms lend themselves as an excellent case for further studies on the issues of convergence, policy transfer, and path dependence, as well as on the internationalization and growth of the knowledge economy. The VoC approach continues to prove to be a valuable framework for these types of analyses.

The comparison of the German higher education system with the American higher education system has shown that in addition to general internationalization trends many of the reform measures include elements that are taken from the American context. The effort to make higher education institutions more autonomous, introducing business-like structures of governance and competition, and the focus on institutional performance and private contributions to higher education are all factors that clearly define the American higher education system.

Yet, while formal reform measures might indicate an Americanization of German higher education, the implementation of these new laws lacks the depth of their American counterparts. German bachelor's programs in particular are still very much influenced by the former curricula used in *Diplom* and *Magister* programs and continue to be quite different from their American equivalents. Furthermore, we can see a reform backlash in some areas, such as the abolishment of tuition fees in *Länder* that had just recently introduced them, calls for a reintroduction of *Diplom* degrees or the debate about reinstating more state control in university governance in North-Rhine Westphalia.

These developments illustrate the argument of historical institutionalism that while institutional change is possible, it occurs mainly within existing historical structures. As described by Katzenstein, Germany's interdependent federal system leads to incremental policy change. He explains the slowness of reforms in Germany with the institutional structures that are defined by a decentralized state facing a centralized society (Katzenstein 1987, 4)[27].

The most significant characteristic of the German decentralized state is its strong federalism. The *Länder* not only have primary powers in such important policy areas as education, cultural affairs, law enforcement, environment, and the organization of local government, they also play an important role in the federal policy-making process. This kind of federalism, in which a bargaining process be-

[27]While this publication is quite dated, the author comes to the same conclusions in a more recent text (Katzenstein 2005, 289-291).

tween the involved parties is institutionalized, differs greatly from that in the United States where tasks are clearly allocated between states and the federal government (Smith 1992, 42). While in the United States education is clearly regulated by the states, in Germany it is an issue area in which the federal government's and the state governments' powers overlap. This decentralized political system faces a centralized society in which key interest groups organize in umbrella associations instead of bargaining for their individual benefits. The entire system is based on cooperation and coordination between the opposing powers. German political institutions create a policy network that links state and society as well as different levels of government and encompasses political opponents. "Such interdependence makes large-scale departures from established policies an improbable occurrence" (Katzenstein 1987, 35). Writing on the higher education reforms in the 1970s, Katzenstein already noted:

> "The process of policy formulation and implementation with regard to university reform reflects the dependence of the federal government on the other actors. The decentralization of the policy process is more evident in this policy sector than in any other previously analyzed" (Katzenstein 1987, 310).

Helga Welsh summarizes the dilemma as follows:

> "In order to be successful, three policy levels have to act in harmony: the federal, the Land, and the higher education institutions. The Länder are under pressure from the federal level and individual universities. They see too much federal involvement as undermining their role and have a heightened sense of mistrust toward the universities. Policy implementation — and thus the implementation of reforms — is dependent on the cooperation of all levels" (Welsh 2002, 7).

And she concludes: "Recent changes in the system of higher education are characterized by incremental steps that reshape the existing institutions and, maybe even more importantly, are intended to introduce new ways of thinking [...]. Current policies emphasize performance based on competition, evaluation, incentive structures, and differentiation. Thus, reform is once again closely tied to value change" (Welsh 2002, 17-18). This change in values, however, is progressing slowly and traditional German attitudes towards higher education policy are still very dominant. In addition to the political factors mentioned above, these values prevent a rapid implementation of Anglo-American practices in Germany.

Some of these differences in values and ideas were shown in the analysis of German and American undergraduate programs and by comparing employer expectations in both countries. While German employers originally demanded more

"general" undergraduate degrees, a closer analysis showed that the term "general" has different meanings in Germany and the United States as is reflected in the undergraduate curricula. In the United States undergraduate education focuses on shaping a "well-educated person" (Interview Business Administration AU, Interview Mechanical Engineering AU, Interview Chemistry UC Berkeley). The particular study major comes second to a well rounded education in social studies, languages and the arts. In Germany on the other hand the particular field of study is very significant and 'more general' refers to less specialization within that field. Even though German higher education degrees (and vocational training as some argue) have become more general in the German sense (i.e. greater focus on soft skills, including languages and relevant non-subject classes), they still do not resemble American bachelor's degrees, which are based on a liberal arts curriculum.

While these findings confirm the differences between LMEs and CMEs as proposed by the VoC literature, they they do not indicate that the concept of policy transfer is obsolete. Though there is no complete convergence between the German and American system (or LMEs and CMEs more generally), there are elements of each system that have been adopted in the other. Evaluating policies in other countries and areas will continue to be a useful tactic for policy reform. Education policy in particular has been a field in which it is valuable to find ideas for improvements in other countries. As Powell and Solga (2010, 714) found:

> "Countries such as France, Germany, Great Britain and the USA have been world champion exporters of educational models [...]. On the import side, the 'international argument' – that other countries' systems should be emulated – continues its key role in educational reforms, independent of immediate relevance or even applicability."

More generally Pierson finds that "policy learning is [...] likely to play a different role at different stages of the policy-making process. Learning effects are most apparent in the identification of particular policy alternatives, since this is when detailed knowledge is most crucial" (Pierson 1994, 42). The new ideas then still must be adapted to fit the existing institutional and cultural context. This process can also be seen in Germany. By comparing their own system to the American and other higher education systems, policy makers have identified the problems of their own model and have found new solutions, such as performance-based financing, the introduction of tuition fees and the internationalization of the German degree structure.

A change in attitudes towards some aspects in higher education policy can also be seen to a certain degree in Germany. For example, students and Social Democrats, who traditionally have argued that fees would lead to social inequality,

are slowly accepting the need for tuition fees and performance-based financing that creates a competition between institutions and professors, although this conflicts with the traditional principle of equality between higher education institutions. I propose that these changes in attitude are mainly driven by the realization that reforms in German higher education are necessary in order to be able to compete globally. The political debate about higher education reform has highlighted the urgent need for additional funding sources and higher performances, while an international comparison has shown that the introduction of these measures does not necessarily lead to social inequality. These factors initiated a policy learning process in Germany. However, whether this process is mainly driven by a comparison with the American system or by a general trend of an internationalization of higher education policy remains unclear at this point. The American system has clearly posed a role model, but the process was also supported by the international trend of a convergence in higher education policy and the European *Bologna Process* in particular.

By comparing the American and the German higher education systems and analyzing the institutional and cultural factors that influence German higher education reforms, this study has demonstrated the possibilities and limits of cross-national convergence. While I have shown that Germans can learn by studying American policy, I would like to end this thesis with Katzenstein's ideas from an American perspective:

> "We should study [...] German policy not merely to learn what we can borrow, for foreign lessons are rarely well suited to fit a different national context. Instead, through the analysis of public policy we can illuminate the distinctive strengths and limitations of foreign political structures and thus, by inference, of our own" (Katzenstein 1987, 5).

Appendix A

List of Sources for Study Program Analysis

A.1 German Study Programs

A.1.1 RWTH Aachen University

Chemistry Department

- Diplom Studienordnung vom 21.10.1999
- Diplom Prüfungsordnung vom 24.7.1998
- Bachelor Prüfungsordnung vom 21.10.2008
- Bachelor Modulhandbuch vom 29.10.2000 mit Änderungen vom 7.8.2008
- Department website: `http://www.chemie.rwth-aachen.de`

Mechanical Engineering Department

- Diplom Prüfungsordnung 18. November 1998
- Diplom Studienordnung vom 8.9.2003
- Bachelor Prüfungsordnung vom 20.09.2007, in der Fassung vom 10.09.2009
- Bachelor Studienpläne vom 18.10.2011
- Department website: `http://www.maschinenbau.rwth-aachen.de`

A.1.2 Friedrich Schiller University Jena

Chemistry Department

- Diplom Studienordnung vom 7.12.1999
- Diplom Prüfungsordnung vom 7.12.1999

- Bachelor Prüfungsordnung vom 18.12.2008
- Bachelor Studienordnung vom 5.5.2009
- Bachelor Studienplan vom 16.12.2008
- Brochure Bachelor in Chemistry
- Department website: `http://www.uni-jena.de/Chemie_Geowissenschaften.html`

Department of Business and Economics

- Diplom Studienordnung vom 5.1.2004
- Diplom Prüfungsordnung vom 10.6.1998
- Bachelor Studienordnung vom 16.12.2009
- Bachelor Prüfungsordnung vom 16.12.2009
- Bachelor Modulkatalog vom 29.3.2010
- Department website: `http://www.wiwiss.uni-jena.de/Home.html`

A.1.3 Otto von Guericke University Magdeburg

Mechanical Engineering Department

- Diplom Studienordnung vom 7.Mai 1997 in der Fassung vom 10.10.2007
- Diplom Prüfungsordnung vom 7.Mai 1997 in der Fassung vom 10.10.2007
- Bachelor Studienordnung vom 7.5.2008
- Bachelor Prüfungsordnung vom 2.7.2008
- Department website: `http://www.fmb.ovgu.de`

A.1.4 University of Mannheim

School of Business

- Diplom Prüfungsordnung vom 5.3.2000 mit Änderungen bis 3.12.2008
- Bachelor Prüfungsordnung vom 5.12.2008 mit Änderungen bis 9.12.2013
- Grundstudiumsführer der Fachschaft BWL 2006
- Hauptstudiumsführer der Fachschaft BWL 2007
- Department website: `http://www.bwl.uni-mannheim.de`

A.1.5 Ludwig Maximilian University Munich

Munich School of Management

- Diplom Studienordnung vom 18.März 1996 mit Änderung vom 20.10.1999
- Diplom Prüfungsordnung vom 28.März 1996 mit Änderung vom 20.10.1999
- Bachelor Prüfungsordnung und Studienordnung vom 2.12.2008
- Department website: `http://www.bwl.uni-muenchen.de/index.html`

Department of Chemistry and Pharmacy

- Diplom Prüfungsordnung vom 14.2.1989 mit Änderung vom 30.8.1994
- Bachelor Prüfungs- und Studienordnung vom 22. März 2010
- Department website: `http://www.cup.uni-muenchen.de`

A.1.6 Technical University Munich

Department of Mechanical Engineering

- Studienordnung für den Diplomstudiengang Maschinenwesen vom 13. Januar 2003, 1. Satzungsänderung vom 9. November 2004
- Bachelor Fachprüfungs- und Studienordnung vom 26.Juni 2008 mit Anlagen und Änderung vom 8.3.2010
- Department website: `http://www.mw.tum.de/index.php?lang=en`

A.2 American Study Programs

A.2.1 Auburn University

Department of Chemistry and Biochemistry

- AU Chemistry Curriculum Bachelor of Science Option Fall 2011
- Department website `http://www.auburn.edu/cosam/departments/chemistry/`

College of Business

- Business Administration Curriculum Requirements 2011-2012
- College of Business Bulletin 2007-2008
- Department website: `http://business.auburn.edu`

Department of Mechanical Engineering

- AU Mechanical Engineering Student Handbook 2007
- Department website: `http://www.eng.auburn.edu/mech/`

A.2.2 University of California Berkeley

College of Chemistry

- Guide to Undergraduate Studies in Chemistry, Chemical Engineering and Chemical Biology
- Department website: `http://chemistry.berkeley.edu`

School of Business

- Business Administration Degree Requirements Fall 2011
- Department website: `http://www.haas.berkeley.edu`

Department of Mechanical Engineering

- College of Engineering: A Guide to Undergraduate and Graduate Study 2010-2011
- Department website `http://www.me.berkeley.edu`

A.2.3 University of Wisconsin - Madison

Department of Chemistry

- UW Chemistry Undergraduate Advisor Handout 2011
- Department website: `http://www.chem.wisc.edu`

School of Business

- UW School of Business Degree Requirements 2012
- Department website: `http://bus.wisc.edu`

Department of Mechanical Engineering

- UW Mechanical Engineering Curriculum Flowchart 2010
- Department website: `http://www.engr.wisc.edu/me.html`

Appendix B

Course Requirements German Study Programs

B.1 Chemistry

Table B.1: Ludwig Maximilian University Munich Course Requirements in *Diplom* and Bachelor of Science Degrees in Chemistry

Ludwig Maximilian University Munich **Department of Chemistry** ***Course Requirements Diplom Chemistry***	**Ludwig Maximilian University Munich** **Department of Chemistry** ***Course Requirements Bachelor of Science in Chemistry and Biochemistry***
Basic Studies (semesters 1-4): *Required classes:* Anorganic Experimental Chemistry (lecture + colloquium) Organic Experimental Chemistry (lecture + colloquium) Organic Chemistry II (lecture + colloquium) Experimental Physics I-II (lecture) Physical Chemistry I (lecture + discussion) Introduction to Math for the Natural Sciences (lecture + discussion) Law for Chemists (lecture) Instrumental Methods (lecture) Introduction to Theoretical and Spectroscopic Methods (lecture) *Required lab courses:* Introductory Lab (lab, lecture + discussion) Physical Lab Anorganic-chemical Lab I + II (lab, lecture + seminar) Organic-chemical Lab Physical-chemical Lab *Intermediary Diplom exams* **Advanced Studies (semesters 5-10):** *Required classes:* Advanced Anorganic Chemistry I-IV (lecture) Advanced Organic Chemistry I-III (lecture) Physical Chemistry III (lecture + discussion) Advanced Physical Chemistry I-II (lecture) Biochemistry (lecture) Toxicology (lecture) Special Methods in Anorganic Chemistry (seminar) Spectroscopic Methods (seminar) *Required lab courses:* Organic-chemical Lab II (lab + seminar) Anorganic-chemical Lab III Advanced Anorganic-chemical Research Lab Advanced Organic-chemical Research Lab Advanced Physical-chemical Research Lab *Electives:* Two lectures and one lab *Colloquia (attendance recommended)*: Anorganic-chemical Colloquium Organic-chemical Colloquium Physical-chemical Colloquium Biochemical Colloquium *Oral Diplom exams* *Diplom thesis*	**Basic Studies (semesters 1-4):** *Required modules:* Anorganic Chemistry I-III (lecture + discussion) Organic Chemistry I-II (lecture + discussion) Physics I-II (lecture + discussion) Physical Chemistry I (lecture + discussion) Math for Chemists I-II (lecture + discussion) Biology (lecture) Microbiology (lecture) Genetics (lecture) Biochemistry I - II (lecture) Group Theory and Crystallography Spectroscopy and Diffraction I (lecture) *Required lab courses:* Introductory Lab (lab + lecture) Microbiological Lab Anorganic-chemical Lab I + II (with seminar) Physical Lab Organic-chemical Lab I Physical-chemical Lab I Biochemical Lab *Oral bachelor's exam* **Orientation Studies (semesters 5-6):** *Required Classes:* Toxicology (lecture) Law for Chemists (lecture) *Electives (choice of 29 credits in lectures and 3 labs):* Anorganic Chemistry IV-VI (lecture) Organic Chemistry III-V (lecture) Physical Chemisty III-V (lecture) Spectroscopy and Diffraction II (lecture) Biochemisty III - IV (lecture) Biology: Elective I-III (lecture) Biology Lab Biochemistry Elective I-II (lecture) Biochemistry Lab Chemistry Elective I-II (lecture) Chemistry Elective Lab Anorganic-chemical Lab III Organic-chemical Lab II Physical-chemical Lab II Biochemical lab II *Exams in each module accumulated for final grading* *Bachelor's thesis*

Table B.2: RWTH Aachen University Course Requirements in *Diplom* and Bachelor of Science Degrees in Chemistry

RWTH Aachen University **Department of Chemistry** ***Course Requirements Diplom Chemistry***	**RWTH Aachen University** **Department of Chemistry** ***Course Requirements Bachelor of Science in Chemistry***
Basic Studies (semesters 1-4) *Required lectures and discussion sections:* Math (Calculus I, II) Physics (I,II) General Chemistry Anorganic Chemistry (Introduction, I, II) Organic Chemistry (I, II) Physical Chemistry (I, II, Theory of Chemical Bonds) Introduction to Technical Chemistry and Macromolecular Chemistry *Lab courses:* Physical Lab Anorganic-chemical Lab Organic-chemical Lab Physical-chemical Lab *Free electives (20 SWS)* - can be taken in any field offered at the university - participation and exams not required *Intermediary Diplom exams* **Advanced Studies (semesters 5-9)** *Required lectures and discussion sections*: Anorganic Chemistry (III-IV) Organic Chemistry (III - VI) Physical Chemistry (III - VI) Technical Chemistry and Macromolecular Chemistry Structures Toxicology Questions of Law in Production *Advanced lab courses:* Anorganic-chemical Lab II Organic-chemical Lab II Physical-chemical Lab II Technical-chemical and Macromolecular-chemical Lab *Electives:* Anorganic Chemistry VIa or VIb (lectures) Technical Chemistry II - IV or Macromolecular Chemistry II - IV (lectures) Technical Chemistry Lab II + Research Lab or Macromolecular Chemistry Lab II + Research Lab Anorganic-chemical Research Lab Organic-chemical Research Lab Physical-chemical Research Lab *Comprehensive Diplom exams* *Diplom thesis*	**Required Modules (semesters 1-6)** General Chemistry 1, includes: - Anorganic Chemistry (lecture + discussion) - Physical Chemistry a (lecture + discussion) - Lab General and Analytic Chemistry I General Chemistry 2, includes: - Physical Chemistry b (lecture + discussion) - Organic Chemistry (lecture) - Lab General and Analytic Chemistry II Physics, includes: - Physics I+II (lectures) - Physical-chemical Lab Math, includes: - Calculus I + II (lecture + discussion) Anorganic Chemistry A, includes: - Anorganic Chemistry I +I (lecture + discussion) - Anorganic-chemical Lab Organic Chemistry A, includes: - Organic Chemistry I + II (lecture + discussion) Physical Chemistry A, includes: - Physical Chemistry I-II (lecture + discussion) - Physical-chemical Lab Technical and Macromolecular Chemistry A, includes: - Technical and Macromolecular Chemistry I (lecture + discussion) - Technical and Macromolecular Chemistry II (lecture + discussion) - Technical-chemical and Macromolecular-chemical Lab Anorganic Chemistry F, includes: - Anorganic Chemistry III (lecture + discussion) - Anorganic-chemical Lab II Organic Chemistry F, includes: - Organic Chemistry III (lecture) - Organic-chemical Lab II Physical Chemistry F, includes: - Theory of Chemical Bonds (lecture + discussion) - Physical-chemical Lab II Technical and Macromolecular Chemistry F, includes: - Technical Chemistry F (lecture) - Macromolecular Chemistry F (lecture) Soft Skills: Software Applications in Chemistry Student Teaching Module Elective (e.g. foreign language) Chemistry in Real World Application Applied Spectroscopy and Instrumental Analytics Computational Chemistry Modern Methods in Anorganic Chemistry, Organic Chemistry, and Physical Chemistry *Exams in each module accumulated for final grading* *Bachelor's thesis*

Table B.3: Friedrich Schiller University Jena Course Requirements in *Diplom* and Bachelor of Science Degrees in Chemistry

Friedrich Schiller University Jena **Department of Chemistry** ***Course Requirements Diplom Chemistry***	**Friedrich Schiller University Jena** **Department of Chemistry** ***Course Requirements Bachelor of Science in Chemistry***
Basic Studies (semesters 1-6): *Required classes:* General Chemistry (lecture) Anorganic Chemistry I - IV (lecture + discussion) Organic Chemistry I-IV (lecture + discussion) Physical Chemistry I-IV (lecture + discussion) Math I-II (lecture + discussion) Physics I-II (lecture + discussion) Technical Chemistry I-II (lecture + discussion) Analytical Chemistry I-II (lecture + discussion) Toxicology (lecture) Law for Chemists (lecture) Field trip *Lab courses:* Physical lab Anorganic-chemical lab I-II Organic-chemical lab II Physical-chemical lab II-IV Technical-chemical lab *Elective* (one lecture + lab) *Intermediary Diplom exam* **Focus Studies in Chemistry* (semesters 7-8):** *Required classes:* Anorganic Chemistry V (lecture, discussion, lab) Organic Chemistry V (lecture, discussion, lab) Physical Chemistry V (lecture, discussion, lab) Field trip *Two elective fields (including 2 lectures + 2 labs in each field):* Bioinorganic Chemistry/Bioorganic Chemistry Glass Chemistry/Material Chemistry Macromolecular Chemistry Theoretical Chemistry/Computational Chemistry Technical Chemistry Photo Chemistry/Spectroscopy Catalysis/Organometallic Chemistry *Second Focus Field is Environmental Chemistry *Oral Diplom exam* **Semesters 9-10:** Diplom thesis + defense Advanced Seminar/Colloquium Language certificate level II (e.g. English for Chemists)	**First Year Modules (semesters 1-2):** General Chemistry + Anorganic Chemistry I (lecture, seminar, lab) Anorganic Chemistry II (lecture, seminar, lab) Organic Chemistry I (lecture, seminar) Math (lecture, discussion) Physics (lecture, discussion, lab) Physical Chemistry I (lecture, seminar) Toxicology and Law for Chemists (lecture) **Second Year Modules (semesters 3-4):** Analytic Chemistry I (lecture, seminar, lab) Anorganic Chemistry III-IV (lecture + lecture,lab) Organic Chemistry II-III (lecture, seminar, lab) Physical Chemistry II-III (lecture, seminar, lab) **Third Year Modules (semesters 5-6):** Analytic Chemistry II-III (lecture, seminar, lab + seminar) Organic Chemistry IV (lecture, seminar) Physical Chemistry IV (lecture, seminar, lab, excursion) Technical Chemistry I-II (lecture, seminar, lab, excursion) Elective I-II (lecture, seminar, lab) Project Module (lab) Bachelor's thesis + defense *Electives offered:* Analytical Chemistry Bioinorganic Chemistry Bioorganic Chemistry Glass Chemistry/Material Chemistry Macromolecular Chemistry Theoretical Chemistry/Quantum Chemistry Environmental Chemistry

B.2 Mechanical Engineering

Table B.4: Technical University Munich Course Requirements in *Diplom* and Bachelor of Science Degrees in Mechanical Engineering

Technical University Munich **Department of Mechanical Engineering** ***Course Requirements Diplom Mechanical Engineering***	**Technical University Munich** **Department of Mechanical Engineering** ***Course Requirements Bachelor of Science Mechanical Engineering***
Basic Studies (semesters 1-4): *Required classes:* Higher Math I-IV Experimental Physics Chemistry for Engineers Technical Mechanics I-III Thermodynamics I Heat Transfer Phenomenons Fluid Mechanics I Technical Electricity I-II Control Engineering Material Sciences Machine Elements and Introduction to CAD Information Technology I-II Business Administration Basics of Product Development Basics of Production *Intermediary Diplom exams as cumulative exams (studienbegleitend)* **Advanced Studies (semester 5-10):** *Choice of 2 focus fields:* - each focus field includes 1 basic class, 4 advanced classes, minor classes and lab courses - list of ca. 30 fields, e.g. Thermodynamics, Production Systems, Nuclear Technology, Motor Vehicles, Logistics, etc. *Choice of 3 basic classes (two covered by focus field):* Mechanics Fluid Mechanics II Methods of Product Development Methods of Firm Management Model Building and Simulation Heat and Substance Transfer *Choice of 13 advanced classes:* - 4 in each focus field + 4 additional - list of ca. 180 classes ranging from engineering classes to business administration and medical subjects *Choice of 4 lab courses:* - includes those covered by focus fields - list of ca. 80 lab courses *Choice of 4 minor classes:* - includes those covered by focus fields - list of ca. 180 classes ranging from engineering classes to business administration and medical subjects *Two semester research projects* *Internship in industry (18 weeks)* *Comprehensive Diplom exams as cumulative exams (studienbegleitend)* *Diplom thesis (ca. 800 hours within 6 months)*	**Basic Studies (semesters 1-4):** *Required classes :* Math I-III Physics I-II Chemistry for Engineers I Technical Mechanics I-III Thermodynamics I Heat Transfer Phenomenons Machine Drawing I-II Fluid Mechanics I Technical Electricity I-II Control Engineering Material Sciences I-II Machine Elements I-II Information Technology I-II Business Administration Basics of Product Development and Production Soft Skills I-II Physics lab **Advanced Studies (semesters 5-6):** *Choice of 1 module in "Basics" (5 ECTS):* Mechanics Methods of Product Development Heat and Substance Transfer *Choice of 4 modules "Advanced" (20 ECTS):* Automation Technology Production Technologies Gas Dynamics Basics of Fluid Mechanics Synthetic Materials and Technology Lightweight Construction Material Flow and Logistics Mechatronic Equipment Technology Modern Methods in Control Engineering Numeric Methods for Engineers Product Ergonomics *Choice of 2 modules "Minor" (6 ECTS):* - list of ca. 130 classes ranging from engineering classes (e.g. aerospace engineering, automotive software, etc.) to business administration and medical subjects (e.g. Biomedical Engineering, Mechanics of the Ear, *Choice of 2 lab courses (8 ECTS):* - list of ca. 70 classes *Internship in industry (18 weeks, 8 weeks before starting the program)* *Exams in each module accumulated for final grading* *Bachelor's thesis (ca. 250 hours within 6 months)*

Table B.5: RWTH Aachen University Course Requirements in *Diplom* and Bachelor of Science Degrees in Mechanical Engineering

RWTH Aachen University **Department of Mechanical Engineering** ***Course Requirements Diplom Mechanical Engineering***	**RWTH Aachen University** **Department of Mechanical Engineering** ***Course Requirements Bachelor of Science in Mechanical Engineering***
Basic Studies (semesters 1-4): *Required classes*: Chemistry Physics Higher Math I-III Numerical Math Introduction to Mechanical Engineering Mechanics I-III Electrical Engineering Material Sciences I-II Thermodynamics I-II Machine Design I-II Machine Elements I-II Computer Studies in Mechanical Engineering - non-technical elective - programming class - physical-technological lab *Intermediary Diplom exams as cumulative exams (studienbegleitend)* **Advanced Studies (semesters 5-10):** *Choice of Study Area* - includes 6 required classes, three technical electives, and one non-technical elective) in one of these fields: Production Technology Construction and Development Process Engineering Synthetics and Textile Technology Traffic Engineering Fundamentals of Mechanical Engineering *Two semester projects (200 hours/3 months each)* *Internship semester* *Diplom thesis (4 months)*	**Semesters 1-4:** 6 week internship required for admission *Required modules:* - 22 required modules (incl. lectures, labs and discussion) in the fields of: *Fundamentals of Engineering Sciences* Introduction to Mechanical Engineering Mechanics I-III Material Sciences I-II Machine Design I-III Introduction to CAD Thermodynamics I-II Fluid Mechanics I Heat and Substance Transfer I *Fundamentals of Math and Science* Math I-III Numerical Math Chemistry Physics *Fundamentals of System Science* Computer Studies in Mechanical Engineering Measurement Engineering Lab Simulation Technology Control Engineering *Fundamentals of Social Science* Communication and Organization Development Business Engineering Quality and Project Management **Semesters 5-7:** *Choice of one Occupational Field* - includes 6-8 modules in these fields: Production Technology Mechanical Engineering Design Energy and Process Technoloy Synthetics and Textile Technology Traffic Engineering *One research project (6 weeks within 3 months of receiving the topic)* *Internship (14 weeks)* *Bachelor's thesis (10 weeks, ca. 50 pages)* *Exams in each module accumulated for final grading*

Table B.6: Otto von Guericke University Magdeburg Course Requirements in *Diplom* and Bachelor of Science Degrees in Mechanical Engineering

Otto von Guerike University Magdeburg **Department of Mechanical Engineering** ***Course Requirements Diplom Mechanical Engineering***	**Otto von Guerike University Magdeburg** **Department of Mechanical Engineering** ***Course Requirements Bachelor of Science in Mechanical Engineering***
Basic Studies (semesters 1-4): *Required classes:* Math I-IV Technical Mechanics I-IV Design Manufacturing Technology Physics Material Engineering Computer Studies Basics Technical Thermodynamics Machine Elements Electrical Engineering Fluid Mechanics I Basics of Business Administration Chemistry *Intermediary Diplom exams as cumulative exams (studienbegleitend)* **Advanced Studies (semesters 5-10):** *Choice of Study Area* - includes 33-40 SWS required classes, ca. 30 SWS technical electives, and 4 SWS non-technical elective in one of these fields: General Mechanical Engineering Applied Mechanics Manufacturing Technology Material Engineering Integrated Product Design *Required classes for Study Area General Mechanical Engineering:* Measurement and Control Engineering Mechanical Engineering Design Mechatronics Machine Dynamics Technical Mechanics V Automation Technology Factory Management Industrial Science Measuring Engineering lab Electives in General Mechanical Engineering (total of 22 SWS) Mechanical Engineering lab Technical Elective Non-technical Elective *Internship Semester* *Two semester research projects (ca. 400 hours/3 months each)* *Diplom thesis and defense (4-6 months/one semester)* *Diplom exams as cumulative exams (studienbegleitend)*	**Basic Studies (semesters 1-3):** *Required classes:* Math I-II Technical Mechanics I-II Physics Computer Studies for Engineers Fluid Mechanics and Thermodynamics Material Engineering Design Machine Elements Manufacturing Technology Electrical Engineering Measurement and Control Engineering **Advanced Studies (semesters 4-6):** *Choice of 2 Focus Modules:* - includes 4 classes and labs in each of these fields: Mechanics Manufacturing Technology Product Development Automotive Systems Material Engineering *Research project (6 credits)* *Non-technical elective* *Internship in industry (12 weeks, 4 weeks before the beginning of the program)* *Bachelor's thesis (15 credits/3 months)*

B.3 Business Administration

Table B.7: Mannheim University Course Requirements in *Diplom* and Bachelor of Science Degrees in Business Administration

University of Mannheim **School of Business** ***Course Requirements Diplom Business Administration***	**University of Mannheim** **School of Business** ***Course Requirements Bachelor of Science in Business Administration***
Basic Studies (semesters 1-4): *Required classes:* Commercial Accounting Math Business Informatics Basics of Business Administration Basics of Economics Civil and Corporate Law Statistics *Intermediary Diplom exam as cumulative exams (studienbegleitend)* **Advanced Studies (semesters 5-9):** *General Business (choice of 5 classes):* Marketing Production Finance Business Management Management Accounting Financial Reporting *General Economics (choice of 3 classes):* Micro-economics III Economic Policy Finance Trade Theory *Choice of 2 Business Specializations:* Banking and Finance Corporate Taxation Industrial Management International Management Logistics Marketing Public Management Organization Organization and Information Systems Human Resources and Ergonomics Insurance Management Auditing Controlling *One Elective:* Labour and Social Law Chemical Technology Finance Mathematics Physical Technology Political Science Psychology for Business Students Sociology Administrative and International Law Statistics Taxation Law Economic Geography Economic and Social History Economic and Social Politics Civil Law, in particular Commercial Law *Internship of 3 months recommended* *Diplom thesis (4 months)* *Diplom exam as cumulative exams (studienbegleitend)*	**1st semester:** Strategic and International Management Introduction to Financial Accounting Mathematics of Finance Quantitative Methods Analysis Basics of Economics Presentation Skills and Rhetoric **2nd semester:** Marketing I Investments and Asset Pricing Foundations of Information Systems Judicial Thinking Basics of Statistics Foreign Language Skills I **3rd semester:** Basics of Management Accounting Financial Accounting and Business Taxation Corporate Finance and Risk Management Operations Management Civil and Corporate Law I Foreign Language Skills II **4th semester:** Operations Management Organization and Human Resource Management Microeconomics A Civil and Corporate Law II **5th semester:** *Module "International Studies:"* - can be fulfilled in form of a study abroad semester - if taken at Mannheim, it includes 1 lecture and 3-5 seminars in two of the following Issue Fields: Language in Intercultural Contexts Communicative Competence Cultural Theory and Globalization Intercultural Encounters and (Post-)Colonial Constellations Comparative Cultural Analysis: Language, Literature and Media - includes 10 credits in classes on European Economic Issues - includes Foreign Language Skills III - includes Business Ethics **6th semester:** Marketing II International Financial Accounting & Business Taxation Integrated Information Systems Bachelor's thesis (6 weeks) - Modules generally include one lecture and one discussion section, except for "International Studies" module (see above) - each module is passed with an exam or research paper *Exam grades in each module accumulated for final grading*

Table B.8: Friedrich Schiller University Jena Course Requirements in *Diplom* and Bachelor of Science Degrees in Business Administration

Friedrich Schiller University Jena **School of Economics and Business Administration** ***Course Requirements Diplom Business Administration***	**Friedrich Schiller University Jena** **School of Economics and Business Administration** ***Course Requirements Bachelor of Science in Business and Economics ("Regelprofil")***
Basic Studies (semesters 1-4): Basics of Business Administration I-II Basics of Economics I-II Statistics I-II Civil Law I-II Accounting and Billing Cost and Activity Accounting Math for Business I-II Introduction to Business Informatics Introduction to Economic and Social History Foreign Language Information System Lab *Choice of 1 Concentration (one basic class, 2SWS):* Economic and Social History Statistics Business Informatics Law Finance Business and Economics Education Intercultural Business Communication Innovation Economics **Advanced Studies (semesters 5-9):** *General Business (choice of 20 SWS):* Entrepreneurship Production and Process Development Marketing Management Strategic and International Management Crisis Management Flexibility-oriented HR Management Controlling and Capital Market Accounting and International Standards Planning and Decision-making Current Issues in Business Administration *General Economics (14 SWS):* Economic Policy Economic Theory Finance *Choice of 2 Business Specializations:* Controlling and Accounting Marketing and Trade Production and Industry Business Taxation and Auditing Human Resources and Organization Finance, Banking and Risk-management International Management Management Analysis *Choice of 1 Concentration:* Economic and Social History Statistics Business Informatics Law Finance Business and Economics Education Intercultural Business Communication Innovation Economics *Foreign language certificate (6 SWS)* *Required internship (6 months)* *Diplom thesis (3 months)* *Oral and written comprehensive Diplom exams in the 2 chosen business specializations*	**First and Second Year:** *Required Basic Modules:* Operations Management Basics of Marketing Management Math for Economists; Investment, Financing and Capital Market Organization, Controlling and Human Resource Management Auditing Accounting and Controlling Management Planing and Decision-Making Microeconomics Macroeconomics Market, Competition and Regulation Introduction to Economics Finance Empirical and Experimental Research in Economics Basics of Economic Policy Statistics Integrated Data Processing Introduction to Business Informatics Foreign Languages for Business and Economics Students Civil Law for Business and Economics **Third Year:** *Choice of 4 Concentration Modules and 1 Seminar:* Operations Management Strategic Marketing Managerial Finance Organizations, Leadership and Human Resource Management Taxes and Auditing International Management Management Science Innovation Economics Business Cycle and Growth Entrepreneurship, Market Dynamics and Development Finance Quantitative Economic Theory Economics of Global Structural Change Statistics and Risk Analysis Data, Information and Knowledge Management Algorithms, Data Structures and Information Systems e-commerce Economic and Social History Vocational and Continuous Education Basics of Intercultural Business Communication *Required Module "Job Qualification:"* includes internship and/or classes on particular professional fields *Bachelor's thesis (8 weeks)* *Exam grades in each module accumulated for final grading*

Table B.9: Ludwig Maximilian University Munich Course Requirements in *Diplom* and Bachelor of Science Degrees in Business Administration

Ludwig Maximilian University Munich **School of Management** ***Course Requirements Diplom in Business Administration***	**Ludwig Maximilian University Munich** **School of Management** ***Course Requirements Bachelor of Science in Business Administration***
Basic Studies (semesters 1-3): *Required classes (lecture+discussion for most classes):* Pre-business classes: Math, Accounting, Information Management Basics of Business Administration Basics of Economics Law Statistics Production and Organization/Leadership and Marketing* Investment and Financing/Internal and External Accounting* Microeconomics* Macroeconomic* Civil and Business Law* Descriptive and Inductive Statistics* * = accumulated grades make up intermediary Diplom grade/exam **Advanced Studies (semesters 4-8):** *General Business (lecture+discussion or seminar for each class):* Business Decision-Making Basics of Entrepreneurship Decision-Making Processes and Leadership Structures External Accounting Company Financing Competition and Strategy Investment Theory Marketing Management Risk Policy Structures and Systems of Corporate Accounting Corporate Organization *General Economics (lecture+discussion or seminar):* Microeconomics Macroeconomics Economic Policy Money, Credit and Currency *Choice of 2 Business Specializations (lecture+discussion or seminar):* Vocational Education and Training Banking and Finance Insurance Management Business Information and Communication Corporate Taxation Empirical Research and Quantitative Corporate Planning Innovation Management International Markets Financing and Capital Markets Marketing Production and Controlling Strategic Management Auditing *Choice of 1 Elective (lecture+discussion or seminar):* International Trade Civil Law; Corporate Law Econometrics Organization and Industrial Psychology Political Science; Sociology Statistics Strategic Decision-Making Economy and Society of Japan Economic and Social History Business and Social Education Transformation and Development *Diplom thesis (4 months)* *Final Diplom exam consists of accumulated grades of all classes in Advanced Studies, oral exams in both Business Specializations, and Diplom thesis*	**Required Modules:** - mainly taken in semesters 1-4 - a module can include several lectures: Basics of Business Administration Investment and Financing Internal and External Accounting Math and Statistics Microeconomics Macroeconomics Civil and Corporate Law Management and Marketing Investment and Financing Production and Organization Accounting Business Informatics Empirical Economics General Business Administration Financing and Economic Policy Soft Skills **Electives:** - mainly taken in semesters 4-6 - a module can include several lectures, discussion sections and seminars - choice of one module from each cluster Cluster 1 (21 ECTS): Strategy, Innovation and Marketing Accounting and Financing Cluster 2 (21 ECTS): Market-oriented Business Administration Financing-oriented Business Administration Cluster 3 (Minor - 15 ECTS): Economy and Society of Japan Organization and Industrial Psychology Computer Studies Corporate Law Civil Law Methods of Economic Analysis Applied Economics Human Resources Education and Management Statistics Communication Studies *Bachelor's thesis (8 weeks)* *Exam grades in each module accumulated for final grading*

Appendix C

Course Requirements American Study Programs

C.1 Chemistry

Table C.1: Course Requirements American Chemistry Programs

Auburn University **College of Sciences and Mathematics** ***Course Requirements Bachelor of Science in Chemistry***	**University of Wisconsin Madison** **Department of Chemistry** ***Course Requirements Bachelor of Science in Chemistry***	**University of California Berkeley** **Department of Chemistry** ***Course Requirements Bachelor of Science in Chemistry***
First Year: General Chemistry I - II Chemistry Lab I - II English Comp I - II Calculus I - II Principles of Biology Organismal Biology **Second Year:** Organic Chemistry I-II Organic Lab I - I Calculus III Linear Differential Equations Engineering Physics I-II Analytical Chemistry Analytical Lab Core Literature I Elective I **Third Year:** Biochemistry I - II Biochemistry Lab I-II Physical Chemistry I-II Physical Chemistry Lab I-II Topics in Linear Algebra Chemical Literature Core Literature II Elective II **Fourth Year:** Inorganic Chemistry I-II Inorganic Chemistry Lab I-II Chemistry Elective I + II Chemistry Undergrad Research Computational Chemistry Instrumental Analysis Instrumental Analysis Lab Core History I-II Core Humanities Core Fine Arts Core Social Science Elective III - includes university and college core curriculum - Bachelor of Arts option also available	**4-year program:** *Required Chemistry Courses:* General Chemistry (choice of 2 classes) Analytical Chemistry Inorganic Chemistry Organic Chemistry (3 classes) Physical Chemistry I-II + Labs Chemistry Elective (5 credits) Chemistry Lab Elective (3 credits) *Required Math and Physics Courses:* Calculus I-II (required) Calculus Functions of Several Variables (recommended) Linear Algebra and Differential Equations (recommended) Physics I-II + Lab *College of Letter & Science Requirements:* Communication A (3 credits) Communication B (3 credits) Quantitative Reasoning A (3 credits) Quantitative Reasoning B (3 credits) Ethnic Studies (3 credits) Humanities (12 credits) Social Science (12 credits) Natural Science (12 credits) - department also offers a Chemistry Course Degree which requires fewer liberal arts credits but more advanced chemistry classes - an honors program is offered and requires advanced classes, two semesters of research, an honors thesis and symposium, as well as as an overall GPA of 3.3	**1st and 2nd year:** *University Requirements:* Entry-level Writing American History and Institutions American Cultures *Lower Division Chemistry Courses:* Freshman Seminar in Chemistry General Chemistry and Quantitative Analysis I-II Organic Chemistry I-II Math (4 classes) Physics (2 classes) *College Breadth Requirement (15 credits):* Reading and Composition Humanities and Social Science *Foreign Language Requirement* **3rd and 4th year:** *Upper Division Courses:* Advanced Inorganic Chemistry I-II Physical Chemistry I-II + Lab Instrumental Methods in Analytical Chemistry Inorganic Synthesis and Reactions Organic Chemistry: Advanced Laboratory Methods Chemical Methods in Nuclear Technology *Chemistry and Allied Subject Electives* - choice of 15 credits - list of ca. 25 classes in Chemistry, Engineering, Biology Computer Science, Education, Economics, Maths, Physics, and Public Health - Undergraduate research for credit offered - an honors program is offered and requires advanced classes and an overall GPA of 3.3

C.2 Mechanical Engineering

Table C.2: Course Requirements American Mechanical Engineering Programs

Auburn University **Mechanical Engineering Department** ***Course Requirements Bachelor of Mechanical Engineering***	**University of Wisconsin Madison** **Mechanical Engineering Department** ***Course Requirements Bachelor of Science in Mechanical Engineering***	**University of California Berkeley** **Department of Mechanical Engineering** ***Course Requirements Bachelor of Science in Mechanical Engineering***
First Year: Engineering Orientation Introduction to Engineering Introduction to Computing for E & S Fundamentals of Chemistry I Fundamentals of Chemistry I Lab Calculus I-II Engineering Physics I English Composition I-II Core History I-II **Second Year:** Statics and Dynamics Engineering Physics II Calculus III Linear Differential Equations Kinematics & Dynamics of Machines Computer Aided Engineering Thermodynamics I Introduction to Materials Science Topics in Linear Algebra Mech. Engr. Progress Assessment I **Third Year:** Thermodynamics II Fluid Mechanics Mechanics of Materials Concepts in Design & Manufacturing Design & Manufacturing Lab Fundamentals of Electrical Engineering Heat Transfer Measurement and Instrumentation System Dynamics and Controls Machine Design Engineering Economics Mech. Engr. Progress Assessment II **Fourth Year:** Comprehensive Design I-II Technical Elective I-III World Literature I-II Social Science Core Ethics Core Fine Arts Free Elective - Automotive Engineering and Manufacturing minor offered - coop program offered - curriculum includes university core curriculum - honors college offered	**First Year:** Introduction to Engineering General Chemistry I-II Calculus I-II ME Graphics Technical Communication Statics **Second Year:** Dynamics Mechanics of Materials + Lab Calculus III Linear Differential Equations Thermodynamics I Material Science Intro to Programming General Physics Liberal Studies Elective I-II **Third Year:** Fluids Heat Transfer Circuits Power Conversion Dynamic Systems Measurements Lab Geometric Modeling Manufacturing Process Technical Writing Technical Elective Liberal Studies Elective III **Fourth Year:** Energy Lab Machine Elements Competitive Manufacturing Design Project Technical Electives II-V Liberal Studies Elective IV-V - curriculum includes university core curriculum - coop program offered - honors program with honors thesis offered	**First Year:** General Chemistry General Chemistry and Quantitative Analysis Introduction to Computer Programming Engineering Design and Analysis Calculus I-II Physics for Scientists and Engineers Reading and Composition Course A + B **Second Year:** Graphic Communication in Engineering Multivariable Calculus Linear Algebra and Differential Equations Thermodynamics Introduction to Solid Mechanics Physics for Scientists and Engineers Additional Humanities/Social Sciences Courses **Third Year:** Electronic Techniques for Engineering Engineering Mechanics II Fluid Mechanics Mechanical Behavior of Engineering Materials Heat Transfer Dynamic Systems and Feedback Technical Electives Additional Humanities/Social Sciences Courses **Fourth Year:** Experimentation and Measurement Mechanical Engineering Design Mechanical Engineering Laboratory Technical Electives Upper Division Electives - curriculum includes college requirements in humanities and social sciences - additional core requirements by the university/campus: Entry-level Writing, American History and Institutions, American Cultures - internship program offered - honors program with independent research program offered - several undergraduate minors offered - Department also offers a five year combined BS/MS program

C.3 Business Administration

Table C.3: Course Requirements American Business Administration Programs

Auburn University **College of Business** ***Course Requirements Bachelor of Science in Business Administration***	**University of Wisconsin Madison** **School of Business** ***Course Requirements Bachelor of Business Administration - Management Major***	**University of California Berkeley** **Haas School of Business** ***Course Requirements Bachelor of Science in Business***
Includes a two-year Pre-Business program and a two-year professional program **1st year:** Calculus with Business Application I-II English Composition I-II Core History I-II Core Science I-II Contemporary Issues in Business Administration Free Elective **2nd year:** Microeconomics Macroeconomics Core Social Science I Principals of Accounting World Literature I-II Ethics or Business Ethics Business Law Elective **3rd year:** Core Fine Arts Statistics for Business and Economics Intro to Management Info Systems Principals of Management Operations: Management of Business Processes Principals of Marketing Principals of Finance Business Elective Management Elective Free Elective **4th year:** Strategic Management Accounting or Finance Elective Marketing or Supply Chain Management Elective 4 Business Electives International Business Electives 2 Free Elective - 1/4 of all classes are non-business classes - Electives can be chosen from 3000-5000 level courses in indicated fields and specific lists of business electives - Free electives can be chosen from university wide course listings - 9 minors offered, e.g. Accountancy, Aviation Management, Finance, International Business	Includes a two-year Pre-Business program and a two-year professional program **1st and 2nd year:** *Pre-Business:* Communications A Calculus Economics Psychology *Communications:* Communications A + B Literature *Liberal Studies:* Communications B Literature Science Foreign Language Ethics Ethnic Studies Social Science Advanced Calculus/Statistics *Business Preparatory:* Statistics General Business Accounting and Information Systems Economics **3rd and 4th year:** *Business Core:* Finance Marketing Management and Human Resources Operations and Technology Management *Business Major:* - can choose among 10 majors, e.g. Management, Entrepreneurship, Health Care Management, Information Systems: - majors include ca. 12 credits in required classes and electives *Business Breadth:* General Business: Business Law Two courses outside of the chosen major - includes university core curriculum and liberal arts requirements - includes foreign language requirement	Includes a two-year Pre-Business program and a two-year professional program **1st and 2nd year:** *University and College Core Classes/Haas Breadth Requirements:* Writing American History and Institutions American Cultures Reading and Composition Quantitative Reasoning Foreign Language Arts and Literature Biology History Philosophy Physical Science Social and Behavioral Sciences *Business Prerequisites:* Principles of Business Calculus (2 semesters) Introduction to Economics Introductory Probability and Statistics English/Reading and Composition Requirement - admission to business program in third year **3rd and 4th year:** *Upper-Division Core Courses (30 units):* Business Communication Microeconomics Analysis for Business Decisions Macroeconomic Analysis for Business Decisions Introduction to Financial Accounting Introduction to Managerial Accounting Introduction to Finance Analytic Decision Modeling Using Spreadsheets Introduction to Organizational Behavior The Social, Political and Ethical Environment of Business *Upper-Division Business Administration Electives:* - choice of 8 units - list of ca. 50 courses to choose from *Upper-Division Non-Business Electives:* - choice of 12 units - can be chosen university wide - includes university core curriculum and liberal arts requirements - includes foreign language requirement

Appendix D

Interview Partners

D.1 Universities

This section lists all interviewees at university departments. If not noted otherwise, all interviews were done in person using an open-ended interview guide and took 1-2 hours. All participants gave consent to list their names here. The positions listed are the positions held at the time of the interview. Former positions are listed if they are relevant to the interview content.

D.1.1 Germany

RWTH Aachen University

Department of Mechanical Engineering. – Dr. Gero Bornefeld, Junior Manager (*Referent*) at Interdisciplinary Forums RWTH Aachen, 2002-2008: Junior Manager (*Referent*) Department of Mechanical Engineering and Research Associate Center for Learning and Knowledge Management. Interview date: September 8, 2010.

Department of Chemistry. – Prof. Dr. Marcel Liauw, Academic Advisor. Interview date: September 10, 2010.

Friedrich Schiller University Jena

Department of Business Administration . – Prof. Dr. Holger Reinisch, Dean of Studies. Interview date: January 17, 2011.

Department of Chemistry. – Prof. Dr. Volker Woest, Dean of Studies. Interview date: January 17, 2011.

Otto von Guericke University Magdeburg

Department of Mechanical Engineering. – Prof. Dr.-Ing. habil. Prof. h.c. Bernhard Karpuschewski, Academic Advisor and Director of Institute of Manufacturing Technology and Quality Management. Interview date: September 20, 2010.

University of Mannheim

Business School. – Dr. Ingo Bayer, Managing Director. Interview date: September 9, 2010.

Ludwig Maximilian University Munich

School of Management. – Dr. Andrea Boos, Academic Director. Interview date: September 16, 2010.

Department of Chemistry. – Prof. Dr. Manfred Heuschmann, Dean of Studies. Interview date: September 15, 2010. – Dr. Thomas Engel, Academic Advisor. Interview Date: September 16,2010.

Technical University Munich

Department of Mechanical Engineering. – Dr. Thomas Wagner, Assistant to the Dean (*Referent*). Interview date: September 15, 2010.

Bavarian State Institute for University Research and Planning (IHF). – Dr. Johanna Witte, Staff Scientist, 2000 - 2007 Personal Assistant (*Referentin*) to the Director of the Center for Higher Education Development (CHE), 2002-2006 PhD Center for Higher Education Policy Studies, University Twente. Interview date: September 17, 2010. *Expert interview.*

D.1.2 United States

Auburn University

College of Business. – Prof. Gary Waters, Associate Dean of Undergraduate Programs. Interview date: November 22, 2010.

Department of Chemistry. – Prof. J.V. Ortiz, Chairman. Interview date: November 22, 2010.

Department of Mechanical Engineering. – Prof. Sushil Bhavnan, Undergraduate Program Officer. Interview date: November 18, 2011. – Prof. Jeffrey Suhling, Department Chair, Interview date: November 23, 2010.

University of California - Berkeley

School of Business. – Prof. Erika Walker, Executive Director Undergraduate Program. Interview date: June 8th, 2011. *Phone interview.*

Department of Chemistry. – Prof. Heino Nitsche, Faculty Advisor, 1997 - 1998 Section Chair, Gesellschaft Deutscher Chemiker, 1993 - 1998 Professor of Radiochemistry, Technical University Dresden, 1980: Dr.rer.nat. Free University Berlin. Interview date: April 11, 2011.

Department of Mechanical Engineering. – Prof. David Dornfeld, Department Chair. Interview date: April 13, 2011.

University of Wisconsin - Madison

School of Business. – Prof. Ken Kavajecz, Associate Dean for the Master's and Undergraduate Programs. Interview date: February 21, 2011.

Department of Chemistry. – Prof. Frank Keutsch, Faculty Advisor, 1997 Diplom Technical University Munich. Interview date: December 8, 2010. – Dr. Jeanine M. Batterton, Undergraduate Advisor, Interview date: December 13, 2010.

Department of Mechanical Engineering. Prof. Frank Pfefferkorn, Undergraduate Faculty Advisor. Interview date: June 30, 2011.

D.2 Employers

This section lists all interviewees at firms. If not noted otherwise, all interviews were done in person using an open-ended interview guide and took 1-2 hours. All participants gave consent to list their names here. The positions listed are the positions held at the time of the interview. Former positions are listed if they are relevant to the interview content.

Deutsche Bahn AG. – Heidi Palm, Director Human Resources and Recruiting. Interview date: January 18, 2011.

Heidelberger Druckmaschinen AG. – Rainer Schmidt, Human Resources and Vocational Training. – Andreas Bluhm, Human Resources Development and Director Dual University Programs (*Berufsakademien*). Interview date: January 19, 2011. *Group interview.*

Berlin-Chemie AG. – Uwe Heyer, Assistant Director Human Resources. Interview date: January 11, 2011.

BASF Services Europe. – Daniel Krüger-Willing, Director Human Resources. – Daniel Cieslak, Recruiting Services. Interview date January 10, 2011. *Group interview.*

Boston Consulting Group. – Ms. Petzold, Consultant Recruitment Munich. Interview date: December 16, 2010. *Spontaneous unscripted phone interview.*

Bundesvereinigung Deutscher Arbeitgeberverbände. – Dr. Irene Seling, Higher Education Policy Expert (*Referentin*). Interview date: January 13, 2011.

Verband der Chemischen Industrie e.V.. – Dr. Gerd Romanowski, Policy Expert Science, Technology and Environment (*Referent*). Interview date January 25, 2011.

Verband Deutscher Maschinen- und Anlagenbau e.V.. – Carola Feller, Policy Expert Education Policy (*Referentin*). Interview date: January 25, 2011.

Appendix E

Example Interview Guides

This section lists three examples of interview guides. The first one gives an example for interviews at German university departments, the second one for employer interviews and interviews with employer associations and the third one is an example for interviews with American university officials. For each of these categories the interview guides followed the same structure and main themes. The questions mainly remained identical for each organization, but were slightly adjust for department or company specific details.

E.1 Interviewleitfaden, Studiendekan Fakultät Chemie, LMU München

Vorstellung

Dieses Interview führe ich mit Ihnen im Rahmen meiner Dissertation. Meine Doktorarbeit behandelt den Einfluss von Arbeitsmarktentwicklungen auf die deutsche Hochschulpolitik und im speziellen auf die Einführung der neuen Bachelorstudiengänge. Die übergreifende Fragestellung ist dabei, ob neuere Entwicklungen auf dem Arbeitsmarkt im Zusammenhang mit den Hochschulreformen einen Entwicklung hin zu einer liberalen Marktwirtschaft im Stil von anglo-amerikanischen Ländern (insbesondere der USA) darstellen.

Dazu gehört auch, dass ich herausfinden möchte, inwiefern die Reformen, die deutschen Studiengänge strukturell und inhaltlich verändert haben. Dafür habe ich an jeweils drei Fachbereichen in den Fächern Maschinenbau, Chemie und BWL die alten Diplom- Studienordnungen mit den neuen Bachelor- Studienordnungen verglichen. In unserem Gespräch möchte ich zum einen gern auf spezifische Fragen zu den Veränderungen der Studiengänge an ihrem Fachbereich und zum anderen auf den Reformprozess und die weiteren Entwicklungen am Fachbereich und an der Universität im Allgemeinen eingehen.

Zu Beginn:

- Könnten Sie sich bitte kurz vorstellen und mir sagen, in welcher Funktion sie tätig sind und in welchem Rahmen sie mit der Umstellung von den alten auf die neuen Studiengänge zu tun haben bzw. hatten?
- Könnten Sie den Fachbereich kurz vorstellen? Wie viele Studenten studieren hier? Wie viele Studiengänge werden angeboten? Gibt es Besonderheiten?

Reformen

Als nächstes möchte ich ihnen gern einige Fragen zum Reformprozess stellen.

- Wann wurde die Reform der Studiengangstruktur bei Ihnen am Fachbereich erstmals konkret diskutiert?
- Woher kamen die Anstöße für die Reform? (War es die allgemeine Diskussion um den Bologna-Prozess oder gab es schon früher Anstöße aus der Wirtschaft oder aus anderen Quellen?)
- Von 1998 bis jetzt wie war die Einstellung der Professoren, Mitarbeiter und Studierenden am Fachbereich zu den Reformvorschlägen? Eher positiv oder eher negativ?
  - Was waren die Gründe für diese Einstellungen?
  - Welche Vorteile sah man an den neuen Studiengängen und welche Risiken?
  - Hat sich dies über die Zeit verändert?
- Welche Risiken und Möglichkeiten sah man für die folgenden Punkte:
  - Gestaltung des Curriculums und der Lehre
  - Beziehungen zwischen den Hochschularten
- Ihrer Meinung nach, wodurch, bzw. durch welche Akteuere (Arbeitgeber, Politiker, Bundesregierung, Landesregierung, EU, Studierende, Professoren) wurde der Reformprozess grundlegend bestimmt?
- Welche Rolle haben dabei die einzelnen Fachbereiche gespielt?
- Könnten sie den Ablauf der Reform bei Ihnen am Fachbereich beschreiben? Was wurde, wann eingeführt bzw. verändert?
- Wer waren denn die Hauptakteure, die sich an ihrem Fachbereich um die Einführung der neuen Studiengänge gekümmert haben? Wie war das organisiert?
- Gab es neben den Studiengängen noch andere Veränderungen, die im Laufe der Reformen durchgeführt wurden? Wurden neue Einrichtungen gegründet, neue Programme eingeführt (Austauschprogramme, Career Service Office, Studienberatung, Praktikantenbüro)?

Studieninhalte

Der nächste Fragenabschnitt betrifft die Inhalte der neuen Studiengänge.

- Gab es an ihrem Fachbereich Diskussionen über die Veränderung von Studieninhalten? Seit wann gab es diese Überlegungen und warum?
- Wurden diese Vorschläge mit der Umstellung auf das Bachelor-Master System umgesetzt?
- Welche inhaltlichen Veränderungen zwischen dem Diplom und dem Bachelor sehen sie als am wichtigsten an?
- Würden Sie sagen, dass sich die grundsätzlichen Ziele eines universitären Erststudiums verändert haben?
- Schätzen Sie den neuen Bachelor-Studiengang eher als forschungsorientiert oder eher als praxisorientiert ein?
- Hat sich die Bedeutung der Lehre verändert? (Angebot von Tutorien, Praktika)
- Wie schätzen sie die Wahlmöglichkeiten der Studenten ein? Hatten sie im Diplom eine größere Wahlmöglichkeit zwischen verschiedenen Kursen oder im Bachelor?
- Gab es bereites im Diplom Veranstaltungen in fachfremden Disziplinen?
- Gibt es ein industrielles Pflichtpraktikum? In welchem Umfang? Warum nicht?
- Die Berufsfähigkeit, bzw. Employability wurde ja in den Diskussionen um die Einführung der Bachelor-Studiengänge besonders groß geschrieben. Worin sehen sie Veränderungen, die zu einer höheren Employability von Bachelor-Absolventen im Vergleich zu Diplom-Absolventen führen?
- Ein Punkt, der in diesem Zusammenhang oft genannt wird, ist die Vermittlung von Soft Skills oder Schlüsselqualifikationen. Wie werden diese in ihrem Studiengang vermittelt?
- Gibt es Kooperationen mit Unternehmen in denen die Studenten ihre Praktika ableisten können? Allgemeine Kooperationen? Seit wann gibt es diese Kooperationen und wie wirken sie sich auf die Studiengänge aus?
- Ein weiterer Punkt, der mit der Reform umgesetzt werden sollte, ist eine stärkere Internationalität. Wie sehen sie diese umgesetzt? (Kurse auf Englisch, Austauschprogramme)
- Interdisziplinarität ist ein weiterer Fokus der Reformen, wie wird diese an ihrem Fachbereich umgesetzt?

Studiengang-Struktur

Als nächstes möchte ich gern über die Struktur der neuen Studiengänge im Vergleich zum Diplomstudium reden.

- Inwiefern hat sich der Aufbau der Studiengänge verändert? (Wann wird was unterrichtet?)
- Könnten Sie das System der Modularisierung beschreiben? Was zählt zu einem Modul und wie viele Module müssen im Bachelor-Studiengang absolviert werden?
- Wie vergleicht sich dieser Umfang zum Umfang der alten Diplom-Studiengänge?
- Welche Lehrformen gibt es? Hat sich bei den angebotenen Lehrformen etwas verändert seit der Reform? Werden im Bachelor z.B. mehr Übungen angeboten? Warum/Warum nicht?
- Welche Prüfungsformen gibt es und hat sich hier etwas verändert?
- Wie hat sich die reale Studiendauer verändert? Wie lange haben Diplomstudenten wirklich studiert und wie lange brauchen Bachelor-Studenten an ihrem Fachbereich im Durchschnitt? Schaffen sie die 6 Semester?
- Gibt es neue Regelungen bezüglich Anwesenheitspflicht und aktiver Mitarbeit? Wie bewerten Sie diese Regelungen? Sind sie für die Studenten von Vorteil oder eher von Nachteil?
- Welche Angebote gibt es zur Beratung von Studenten hinsichtlich der Studien- und Karriereplanung? Werden sie gut genutzt?

Fachbereich-Spezifische Fragen

Als nächstes würde ich Ihnen gern einige Fragen stellen, die sich im Laufe meiner Analyse der Studiendokumente ergeben haben. (teilweise Verständnisfragen, Hintergrundfragen)

- Mir liegen die Diplom Studien- und Prüfungsordnungen von 1989 und 1994 und 2002 vor. Warum wurde 2002 noch eine neue Diplom-Ordnung eingeführt, obwohl absehbar war, dass auf BA-MA umgestellt wird?
- Gibt es im Bachelor auch Wahlfächer außerhalb der Naturwissenschaften?
- Hat die Fakultät Auslandsprogramme und Kooperationen mit anderen Fachbereichen?
- Werden Betriebspraktika angeboten, bzw. von den Studenten selbst organisiert?

Reform Bewertung

Zum Schluss würde ich ihnen gern noch zur Bewertung der Reformen einige Fragen stellen.

- Wie würden sie die allgemeine Einstellung der Studenten zu den neuen Studiengängen an ihrem Fachbereich bewerten? Sind sie zufrieden?
- Gibt es bereits erste Rückmeldungen von Absolventen der neuen Bachelor-Studiengänge? Welche Erfahrungen haben sie gemacht? In welchen Bereichen haben sie Arbeit gefunden?
- Geht ein Großteil der Bachelor-Absolventen direkt auf den Arbeitsmarkt oder bleiben die meisten gleich für den Master? Diejenigen, die den Master machen bleiben sie hier oder gehen sie an eine andere Universität?
- Haben Sie auch Studierende, die aus der Arbeitswelt wieder zurück an die Universität kommen für ein aufbauendes Masterstudium? Ist der Anteil dieser Studenten gestiegen seit der Einführung der Bachelor- und Masterstudiengänge?
- Haben sie auch Rückmeldungen der Arbeitgeber bekommen? Stehen sie in Kontakt zu Firmen?
- Würden Sie die Einführung der Bachelor- und Masterstudiengänge eher als erfolgreich oder eher als gescheitert bezeichnen?
- Welche Bedeutung messen sie den Hochschulreformen der letzten 10 Jahre bei? Haben sie das deutsche Hochschulsystem grundlegend verändert? In welchen Bereichen/Aspekten?
- Wo sehen sie weiteren Reformbedarf?
- Gibt es noch Punkte, die ich nicht angesprochen habe, die sie noch wichtig finden?

E.2 Interviewleitfaden, Leiterin Personalmarketing und Nachwuchsgewinnung, Deutsche Bahn

Vorstellung

Dieses Interview führe ich mit Ihnen im Rahmen meiner Dissertation. Meine Doktorarbeit behandelt den Einfluss von Arbeitsmarktentwicklungen auf die deutsche Hochschulpolitik und im speziellen auf die Einführung der neuen Bachelorstudiengänge. Die übergreifende Fragestellung ist dabei, ob neuere Entwicklungen auf dem Arbeitsmarkt im Zusammenhang mit den Hochschulreformen eine Entwicklung hin zu einer liberalen Marktwirtschaft im Stil von anglo-amerikanischen Ländern (insbesondere der USA) darstellen. Die Rolle der Arbeitgeber bei den Reformen und ihre Erwartungen an Hochschulabsolventen sind dabei zentrale Punkte meiner Fragestellung. In diesem Gespräch möchte ich auf folgende Punkte eingehen: Als erstes möchte ich mit Ihnen über Ihre Erwartungen an Hochschulabsolventen reden. Der zweite Teil des Gesprächs wird den Reformprozess beleuchten und zum Schluss würde ich gern über die aktuelle Situation von Absolventen der neuen Studiengänge in Ihrem Unternehmen und über Ihre Einschätzung bzw. Bewertung der Reformen reden.

Zu Beginn:

- Könnten Sie sich selbst bitte kurz vorstellen und mir sagen, in welcher Funktion Sie hier tätig sind, wie lange Sie schon hier arbeiten und was in Ihren Aufgabenbereich fällt?
- Könnten Sie als nächstes bitte das Unternehmen kurz vorstellen und auch darauf eingehen, aus welchen Fächern sie bevorzugt Hochschulabsolventen einstellen?

Erwartungen an Hochschulabsolventen

- Welche Kompetenzen erwarten Sie von Hochschulabsolventen?
- Haben sich diese Erwartungen in den letzten Jahren verändert? Sind neue Fähigkeiten hinzugekommen?
- Welche Kompetenzen sind für Ihr Unternehmen dabei am wichtigsten?
- Wie wichtig sind Ihnen wissenschaftliche Methoden?
- Wie wichtig sind Ihnen praktische Erfahrungen der Absolventen? Wie sollten diese erworben werden?
  - Ist es wichtig, dass Praxiserfahrungen im "richtigen" Fach gesammelt werden oder ist es wichtiger, dass der Absolvent überhaupt schon einmal gearbeitet hat?
- Ein Schwerpunkt der neuen Studiengänge ist die Betonung der Schlüsselkompetenzen, der sogenannten "Soft Skills". Welche dieser Kompetenzen sind ihnen besonders wichtig?
- Wenn Sie entscheiden müssten zwischen fachspezifischen Kenntnissen und allgemeinen Kompetenzen, welche schätzen Sie für die heutige Arbeitswelt als wichtiger ein?
- Ein weiterer Schwerpunkt war die Erhöhung der Internationalität. In welchem Rahmen sollten Studierende Ihrer Meinung nach internationale Erfahrungen sammeln?
- Gibt es bestimmte Kompetenzen, die Sie von bestimmten Fachgruppen erwarten, z.B. von den Ingenieuren oder den Wirtschaftswissenschaftlern?
- Erwarten Sie von Absolventen der Natur- oder Ingenieurwissenschaften Kenntnisse in weiteren Fächern?
- Ist es Ihnen wichtig von welcher Universität ein Absolvent seinen Abschluss hat?

Reformprozess

- Wann wurden bei Ihnen zum ersten Mal Defizite in der Hochschulbildung und ein Reformbedarf diskutiert?

- Welche Probleme/Defizite sahen Sie an den alten Diplomstudiengängen?
- Hat ihr Unternehmen selbst Anstöße für Reformen gegeben? Wenn ja, in welchem Rahmen?
- Wie würden Sie den Reformprozess der letzten zehn Jahre skizzieren? Woher kamen die Anstöße und inwiefern hatte die Wirtschaft einen Einfluss auf die Ausgestaltung der neuen Studiengänge?
- Welche Forderungen/Wünsche hatte Ihr Unternehmen für die neuen Studiengänge?
- Wie lief die Diskussion über die Reformen innerhalb Ihres Unternehmens ab? Gab es befürworter und Gegner der neuen Studiengänge? Was waren ihre Argumente?
- Fühlen bzw. fühlten Sie sich ausreichend über die Reformen und die neuen Studiengänge informiert?
- Wie wurde die Einführung der neuen Studiengänge bei Ihnen im Unternehmen umgesetzt?
- In welcher Form fand/findet die Auseinandersetzung mit dem Thema statt (Arbeitsgruppen, Leitlinien, Infoveranstaltungen)?
- Welche Personen sind in Ihrem Unternehmen hauptsächlich mit der Umsetzung befasst?

Bachelor Welcome - Erklärung

- Ihr Unternehmen hat bereits 2004 die erste "Bachelor-Welcome" Erklärung unterschrieben? Warum haben sie sich damals zu den neuen Bachelorstudiengängen bekannt?
- Woher kam die Initiative für die Erklärung?
- Welche konkrete Bedeutung hatte die Erklärung für die Personalpolitik ihres Unternehmens?
- Spielte Druck von Außen eine Rolle für die Unterstützung der Erklärung und die Bekennung zu den neuen Studiengängen? Wenn ja, woher kam der Druck?
- Wie schätzen Sie die Rolle des BDA und des BDI bei den Reformen ein?
- Welche weiteren Akteure schätzen sie als wichtige Kräfte für die Einführung der neuen Studiengänge ein?
- Waren die Unternehmen/Arbeitgeber eine treibende Kraft bei den Reformen?

Bachelor und Master im Unternehmen - aktuelle Situation

- Gibt es bereits Bachelor- und Masterabsolventen in Ihrem Unternehmen?
- Haben Sie Zahlen wie viele und in welchen Bereichen diese eingestellt sind?

- Werden mehr Bachelor- oder mehr Masterabsolventen eingestellt?
- Sind dies überwiegend Absolventen deutscher oder ausländischer Studiengänge?
- Betreiben sie im Hinblick auf Bachelor- und Masterabsolventen eine bestimmte Personalpolitik, die sie kurz umreißen können?
- Wie werden Bachelor- und Masterabsolventen im Vergleich zu Diplomabsolventen bei Ihnen eingestuft?
- Gibt es besondere Weiterbildungsprogramme für Bachelorabsolventen? Sind diese im Vergleich zu denen für Absolventen mit traditionellen Abschlüssen unterschiedlich?
- Können Sie bereits abschätzen wie gut oder schlecht Bachelorabsolventen im Unternehmen integriert werden können? Wo gibt es eventuell Probleme?

Reform Bewertung

- Wie bewerten Sie die Reformen? Waren sie erfolgreich?
- Welche weiteren Veränderungen wünschen Sie sich?
- Wie schätzen Sie das zukünftige Verhältnis von Fachhochschulen und Universitäten ein? Ist es für Sie wichtig, ob ein Absolvent von einer Uni oder einer FH kommt?
- Wo sehen sie die stärksten Veränderungen im Berufsleben, auf die die Hochschulpolitik reagieren muss?
- Gibt es noch Punkte, die ich nicht angesprochen habe, die Sie noch als wichtig befinden?

E.3 Interview Guide for Mechanical Engineering, University of California Berkeley

Introduction

I am doing this interview with you as part of my dissertation project. My dissertation starts at the debate about a possible "Americanization" of German higher education policy. The European Bologna process started when 29 education ministers signed an agreement to harmonize European higher education degrees, and to introduce a credit transfer system and common accreditation standards. Most European countries, including Germany, responded by introducing a Bachelor's and Master's system resembling Anglo-american degree systems. At the same time, many states in Germany introduced tuition fees and the federal government started an initiative to increase competition among universities. In the public debate these developments have been seen as a move towards a more liberal American-style higher education system.

My dissertation focuses particularly on the new German Bachelor's degrees and asks whether they really resemble American programs or not. I am comparing undergraduate programs in Engineering, Chemistry, and Business and conducting expert interviews with people responsible for setting and implementing policies in each field. My analysis will explore the Varieties of Capitalism literature that argues that liberal market economies like the US and coordinated market economies like Germany have different education systems because they also have very different labor markets and institutions in each country are complementary. Thus, I also focus on how the two systems of undergraduate education relate to the relevant labor market.

The interview will be structured as follows: First, I would like to ask you some questions about the structure of the program. The second section will focus on the curriculum and the objectives of the degree, the third part will be on connections to the labor market and the last block of questions will focus on current developments and issues in your department and your perspectives for the future of the undergraduate program.

In general, I do not plan on quoting long passages of the transcript, but rather I will summarize the interview for specific information on my questions and compare them to answers by other interviewees. If you don't mind I would like to list your name in my reference list of interview partners. Do you have any questions before we start?

To start:

- Could you please introduce yourself and tell me in which position you are working, how long you have been at the department and how you are involved in decision- making about the undergraduate program?
- Could you please quickly introduce the department? How many students study here? How many programs do you have? Are there any special things about the program here at Auburn?

Program structure

Next, I would like to ask you some questions about the structure of the program and the curriculum.

- Could you explain the major structure of the program? When are which classes taken and why?
- Which kinds of classes make up the majority of classes (Required or Electives)?
- Who sets the curriculum?
- What are the prerequisites for entering the program and how is credit granted for high school AP classes?
- What kind of resources are available for students to help them navigate and plan their studies?

- Do most students follow the suggested curriculum or do they change the order of classes?
- Are most classes offered each semester? Is it easy to change the standard order?
- Do many students change majors and if so, is that complicated? Can you get credit for classes taken in other majors?
- How difficult is it to transfer from another school to your department? Or from here to another school?
- Is attendance required at most classes? Is it part of the grade?
- How does grading work? What plays into your final graduation grade? Is this grade important in the future? How does it matter?
- What is the graduation rate? And how long do most students need to graduate?

Program Content and Objectives

The next block of questions will focus on the contents of the program.

- What are the main objectives of the program? What are students supposed to learn?
- And more generally, what would you see as the main goal of American undergraduate education?
- Is there a university core curriculum and what does it include? Does the department require any classes that are not directly related to engineering, e.g. in the Humanities and Social Sciences? Why is that important to you?
- Are there any classes in which students learn research methods? Which ones are they?
- Are students encouraged to participate in research projects? How?
- What are the main types of classes used for teaching in the program (lecture, lab, seminar, discussion)?
- What are the main types of exams used? (written, oral, essay, research papers, presentations, project reports)

Focus on the Labor Market vs. Focus on Research

- In Germany an important goal when introducing new bachelor's degrees was to improve the employability of graduates. How does success of graduates in the labor market play a role here? And how does the program prepare students for the labor market?
- Part of an improved "employability" in the German context are so-called "soft skills" which I like to call transferable skills, so skills that can be used in a

variety settings, such as presentation skills, writing skills, languages, etc. Is this of any significance in your program?

- Do you offer any kind of internship programs in which students can gain practical experiences?
- Do you have cooperations with businesses and firms? Or do students find their jobs on their own?
- Are businesses in any way involved in setting the curriculum?
- Do you think a bachelor's degree qualifies a student for a successful career as an engineer? Or will they need further education after their undergraduate studies?
- Where do you see the focus of the undergraduate engineering programs: in preparing students for the labor market or for research? Or are the two things equally important?
- What do most students do after graduation? Do they go onto the job market or do they continue with graduate school?

Current Developments and Future Outlook

- Have there been any significant changes in the curriculum over the last 10 years? If so, what has changed?
- What other recent changes do you see in undergraduate education in mechanical engineering?
- How do you think globalization has effected higher education and undergraduate education in general?
- Is internationalization a focus in your department? If so, how is this reflected in your engineering programs?
  - How many international students do you have?
  - How many of your students study abroad? What kind of programs do you offer?
  - Why is there no foreign language requirement for the mechanical engineering major?
- One recent focus in German higher education is interdisciplinarity in research as well as in teaching. Is this important here, too? How is it reflected in your programs?
- When you think of German engineers, how would you describe them and where do you see differences to American engineers?
  - If you don't have any personal experiences, what do you think the general perception of German engineers is?

  - Do you think the Diplom is a trademark for German Engineering? (Does it make a difference for you if someone has a Dipl. Ing or a Masters in Engineering?)

- Is the Bologna Process being discussed at your department? Do you think it will have any influences on American higher education?
- What issues are currently being discussed at your department in terms of changing or improving undergraduate education?
- Are there any other issues that you think are important for my project that I haven't touched yet?
- Do you have any questions?

Appendix F

Employer Profiles

I interviewed eight human resource managers of businesses hiring graduates of chemistry, engineering and business programs, as well as education policy analysts at the German Confederation of German Employer Associations (BDA), the German Association of the Chemical Industry (VCI), and the German Association of Mechanical Engineering Companies (VDMA). For the selection of interview partners, several of the original "Bachelor Welcome"-signatory companies that fit into the categories of mainly hiring engineering, chemistry or business graduates were contacted. However, many of the contacted companies were either unwilling or unable to schedule an interview during the time frame available. In the end, interviews were done with the following companies:

Deutsche Bahn. The Deutsche Bahn group (DB) offers mobility and logistics services in over 130 countries worldwide. The company's core business however is the railway in Germany. They have about 295,000 employees, with 193,000 of them in Germany (Deutsche Bahn 2012). DB has been very active in the debate over higher education reforms and was one of the first signatories of the "Bachelor Welcome" declaration. Their main target group is engineering students and they offer a variety of cooperative degree programs and vocational training programs.

Heidelberger Druckmaschinen AG. Heidelberger Druckmaschinen AG (HD) is the leading company in the print media industry worldwide. They develop and produce printing machines and offer technical services to their costumers. Thus, they mainly hire engineering graduates, but also target graduates from business programs. They have production and development sites in seven countries and sales and services in 170 countries, so they have a broad international focus. In 2011 their workforce was at about 16,000 employees (Heidelberger Druckmaschinen AG 2012). Similarly to the DB Group HD has been active in formulating their positions on education issues, they were a signatory of the original "Bachelor Welcome" - declaration and they offer cooperative bachelor programs as well as vocational training.

Berlin-Chemie AG. Berlin-Chemie AG is a smaller pharmaceuticals company based in Berlin with sites in 31 different countries and a total of about 4300 employees. Their main target groups are chemistry and pharmacy students, as well as graduates from business programs. They offer cooperative bachelor programs and and a variety of vocational training programs.

BASF Services Europe. BASF is one of the largest chemical companies in the world, with 111,000 employees in 2012 and sites in over 80 countries (BASF 2012). The BASF Services Europe headquartered in Berlin was founded in 2005 and handles all financial and human resources services for the 180 BASF sites in 25 European countries (BASF Services Europe GmbH 2012). So while the company itself is a major employer of chemistry as well as engineering graduates, the services division mainly hires graduates from business programs. The company is a signatory of the 2008 "More Bachelors and Masters Welcome" and also offers several bachelor programs and vocational training programs.

Boston Consulting Group. Boston Consulting Group (BCG) is one of the largest consulting groups worldwide, with a branch in Germany since 1975. They hire graduates of all disciplines, but their main target group is business graduates. They, too, have been active in supporting higher education reforms and are generally very engaged in supporting educational programs and offer extensive continuous education programs for their employees (The Boston Consulting Group 2014). Unlike my other interview partners, none of BCG's staff members were available for a personal interview with me, but only allowed me to ask a few limited questions in a phone conversation. However, the conversation still gave me valuable insights.

Bundesvereinigung Deutscher Arbeitgeberverbände. The Bundesvereinigung Deutscher Arbeitgeberverbände (BDA), or the Confederation of German Employer Organisations, is the head organization of German employer associations. It represents business interests in the field of social policy (including education) on the national, European and international level and is standing member in many committees at the German parliament (Bundestag). It thus is the main voice for businesses on issues such as labor law, social security and education. It represents approximately two million companies with about 80 percent of all German employees (BDA 2012, 9). The BDA has been the leading voice for businesses in the debate over higher education reforms and has organized the "Bachelor Welcome" initiative.

Verband Deutscher Maschinen- und Anlagenbau e.V.. The Verband Deutscher Maschinen- und Anlagenbau (VDMA), or German Engineering Federation, represents about 3,100 mainly small and medium sized companies in the engineering industry, with mechanical engineering being it's core field. It represents the industry nationally and internationally on issues such as labor market policy, education, tax policy, research policy or trade policy. The organization represented engineering businesses during the debate over the Bologna reforms and has worked together with universities and the HRK to create the new bachelor's and master's programs (Verband Deutscher Maschienen- und Anlagenbau 2014).

Verband der Chemischen Industrie e.V.. The Verband der Chemischen Industrie (VCI) or Federation of the Chemical Industry, is the leading business organization of the chemical industry. It represents about 90 percent of German chemical companies on issues such as environmental policy, education, research, taxation and trade policy (Verband der Chemischen Industrie e.V. 2013). Together with the GDCh, the academic chemistry association, it has promoted changes in German chemistry degree programs as early as the beginning of the 1990s and was a leading force in introducing the "Würzburger Modell" which was followed by the Bologna reforms.

Appendix G

Dissertation Summary

German policy makers and scholars have repeatedly referred to the United States' higher education system as a model for improving the quality of universities in Germany. Starting at this debate about a potential "Americanization" of German higher education policy this dissertation focuses on the introduction of new bachelor's programs at German universities and analyzes whether these new degrees resemble their American counterparts.

The theoretical basis for this study is the "Varieties of Capitalism" (VoC) approach by Hall and Soskice, which argues that firms in coordinated market economies (CMEs) such as Germany need employees with specific skills, while employees in liberal market economies (LMEs) like the United States have to acquire general skills for the job market. Assuming that new German bachelor's degrees are aimed at providing graduates with more general skills, the question of whether the introduction of these new degrees represents a convergence with American higher education policy and whether this indicates a shift towards a more liberal American-style market economy constitutes the main part of this study.

Research Questions and Methods

The dissertation focuses on three main research questions. The first question asks: "Have the contents of German higher education programs changed with the introduction of bachelor's degrees and do these changes represent a shift towards a 'general skills' model resembling the Anglo-American system?" The second question relates to the role of employer preferences and the issue of whether new German bachelor's degrees fit on the German labor market. It asks: "Have German employers' skill preferences changed and are their expectations met by new bachelor's programs?" The last research question focuses on the differences between liberal market economies and coordinated market economies and asks: "Do changes in German employer preferences and in German higher education degrees indicate a convergence of LMEs and CMEs with respect to skill preferences?"

To answer these questions the study uses a multi-method approach. For the comparison of old and new German degree programs with American undergraduate

degrees the study combines a qualitative document analysis of study regulations in three different disciplines (chemistry, mechanical engineering and business administration) at nine German and nine American university departments with structured interviews of professors and administrators in these departments. The same approach is used for the analysis of employers' skill preferences. First, I analyzed documents (such as position papers, press releases, or speeches) published between 1998 and 2012 on the position of employer preferences for German higher education. This analysis was then followed up by expert interviews with representatives of employer associations and businesses.

Results and Implications

The results of these analyses can be summarized as follows: First, the study shows that the VoC approach is a useful framework for comparing higher education systems in different countries. The differences in skills, coordination patterns and institutional complementarities proposed by the approach for vocational training and the labor markets in LMEs and CMEs can also be found when comparing higher education in Germany and the United States. Second, the comparison of traditional *Diplom* programs with new bachelor's programs has shown that in many cases the curriculum of the bachelor's program resembles that of the first semesters of the *Diplom* and only a few new classes focusing on transferrable skills and employability have been introduced. While there are some significant changes that are intended to teach students more flexible skills, all programs are still very much subject-specific. Third, the comparison of German and American undergraduate programs shows that both systems are still very unique and only a limited convergence has occurred. Fourth, German employers have not completely changed their original preferences for specific skills but have added new demands (more flexibility, internationality, transferable skills, practical experience) to these skills. While some of the developments in higher education and in the German labor market are moving towards a more liberal model, the differences between the United States and Germany as presented in Chapters 4-7 are still significant and a complete convergence of the two models cannot be found. Lastly, the dissertation discusses the growing importance of higher education for the German labor market and its changing relationship with the vocational training system. The study argues that focusing on a combination of high specific vocational skills and high general skills and creating a greater permeability between the vocational training and higher education system will be essential for providing German firms with the necessary skills for competing in a global knowledge-based economy.

Appendix H

Curriculum Vitae

Anna van Santen

Education

Since October 2008: **Hertie School of Governance and Free University Berlin**
PhD in Governance and Political Science, Advisor: Prof. Anke Hassel
Dissertation topic: "Varieties of Capitalism - Varieties of Degrees? Undergraduate Education in Germany and the United States Compared"

2006 - 2007: **Marquette University, Milwaukee, USA**
Master of Arts in Political Science
Thesis topic: "German University Reform Made in America?"
Fulbright Visiting Scholar

2003 - 2006: **Free Universtiy Berlin**
Magister in North American Studies, Political Science and Economics
Exchange semester (2005/2006) at Universidad de Salamanca, Spain
Transfer to Marquette University July 2006

Academic Experience and Internships

Since September 2009: **University of Wisconsin - Madison, USA**
Visiting Researcher at Department of Political Science

2008 - 2009: **Hertie School of Governance, Berlin**
Research Associate for Prof. Anke Hassel

2007-2008: **German Institute for International and Security Affairs (SWP), Berlin**
Intern and Research Assistant in the Research Unit "The Americas"

2007-2008: **John-F.-Kennedy-Institute at Free University Berlin**
Teaching Assistant for Prof. Irwin Collier

Scholarships and Awards

2009 - 20013: Dissertation Fellowship from Friedrich-Ebert-Foundation

2006 - 2007: Student Exchange Scholarship from the German Fulbright Commission

Since 2007: Member of the American National Political Science Honors Society

2005 - 2006: Erasmus – Scholarship from the Free University Berlin

Conference Papers and Talks

van Santen, Anna. 2010. "Labor Market Factors Influencing Higher Education Policy in Germany and the United States." Talk at the European Politics Workshop, Political Science Department, University of Wisconsin - Madison, April 29, 2010.

van Santen, Anna. 2010. "Varieties of Capitalism and Higher Education Policy: The Case of new German Bachelor's Degrees." Paper presented at the 3rd ECPR Graduate Conference European Consortium for Political Research August 30 - September 1, 2010 Dublin City University, Dublin.

van Santen, Anna. 2011. "New Skills for the Knowledge Economy: Industry Expectations of Undergraduate Education in Germany and the United States." Proposal accepted at the 69th Annual National Conference of the Midwest Political Science Association, March 31 - April 3, 2011, Chicago.

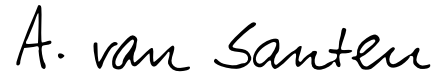
van Santen, Anna. 2012. "Varieties of Capitalism - Varieties of Degrees?: German and American Undergraduate Education Compared." Paper prepared for the SASE 24th Annual Conference, June 28-30, 2012, Massachusetts Institute of Technology, Cambridge.

Author's Declaration

I hereby certify that I am the sole author of this thesis. I assure that I independently completed this work on the basis of the resources and aids listed.

I confirm that where I have consulted and/or quoted the published work of others, this is always clearly attributed and the sources are given to the best of my knowledge.

This dissertation has not been accepted or rejected during the course of any other doctoral program and has not been published.



Anna van Santen *Berlin, March 12, 2014*

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