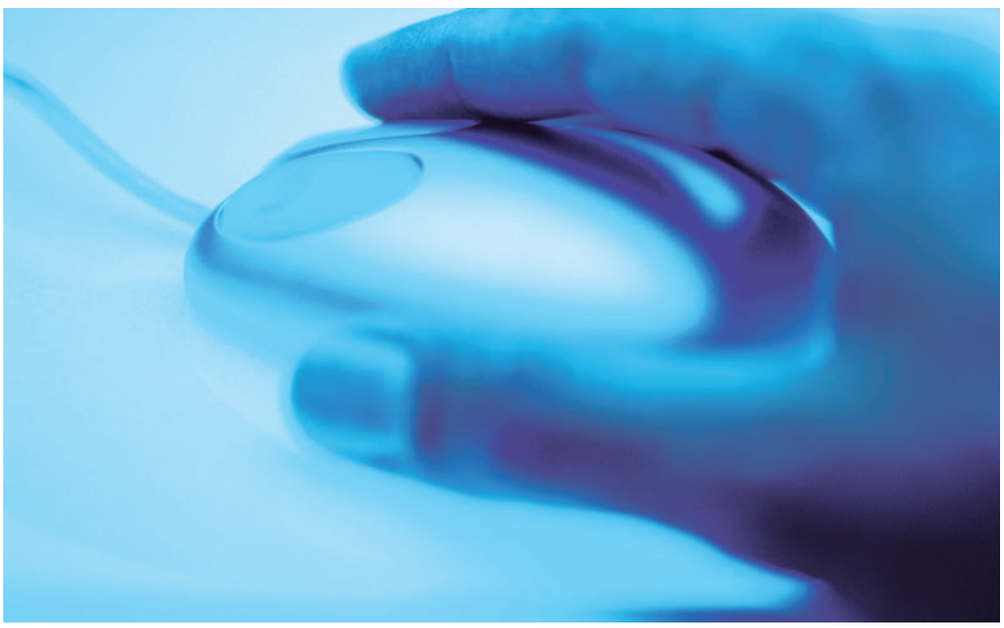
Enterprise publications



2003 Observatory of European SMEs

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SMEs in Europe 2003

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This report has been prepared from information provided by all partners of the European Network for SME Research ENSR (see Annex VIII) and was coordinated by David B. Audretsch (Max Planck Institute), A. Roy Thurik (Erasmus University Rotterdam), Ton Kwaak and Niels Bosma (both EIM Business & Policy Research).

OBSERVATORY OF EUROPEAN SMEs

A series of reports submitted to the Enterprise Directorate-General of the European Commission (see also Annex VIII to this report) by:

KPMG Special Services and EIM Business & Policy Research in the Netherlands

in co-operation with:

European Network for SME Research (ENSR), and Intomart

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The reports can be downloaded or ordered at the website of the European Commission:
http://www.europa.eu.int/comm/enterprise

These are the abbreviations used in this report for the Europe-19

AT	Austria	NL	Netherlands	CY	Cyprus	PL	Poland
BE	Belgium	PT	Portugal	CZ	Czech Republic	SK	Slovakia
DK	Denmark	SE	Sweden	EE	Estonia	SI	Slovenia
DE	Germany	UK	United Kingdom	HU	Hungary	BG	Bulgaria
EL	Greece	EU	European Union	LV	Latvia	RO	Romania
ES	Spain	IS	Iceland	LT	Lithuania	TR	Turkey
FR	France	LI	Liechtenstein	MT	Malta		
FI	Finland	NO	Norway				
IE	Ireland	EEA	European Economic Area				
IT	Italy	CH	Switzerland				
LU	Luxembourg	Europe-19	EEA plus Switzerland				

A great deal of additional information on the European Union is available on the Internet. It can be accessed through the Europa server: http://europa.eu.int.

Cataloguing data can be found at the end of this publication.

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Preface

Enterprises are at the heart of the strategy launched by the European Council in Lisbon in March 2000. Reaching the objective of becoming the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth, creating more and better jobs, and developing greater social cohesion will ultimately depend on the success of enterprises, especially small- and medium-sized ones.

The *Observatory of European SMEs* was established by the Commission in December 1992 in order to improve monitoring of the economic performance of SMEs in Europe. Its task is to provide information on SMEs at the national and European level.

The reports of the *Observatory* provide an overview of the current situation in the SME sector in Europe through statistics on the number of enterprises, on total employment, and on production by size of enterprise. In addition, the *Observatory* reports cover a range of thematic issues.

The *Observatory of European SMEs* covers 19 countries: the 15 countries of the EU, plus Iceland, Liechtenstein, Norway, and Switzerland.

In 2003 and 2004, the following reports are planned:
- Competence Development in SMEs
- SMEs and Access to Finance
- SMEs in Europe 2003
- Highlights from the 2003 Survey
- Internationalisation of SMEs
- SMEs and Co-operation
- The Impact of EU Enlargement on European SMEs
- SMEs and the Liberalisation of Network Industries

The research for the *Observatory* reports is carried out on behalf of the Enterprise Directorate-General of the European Commission by ENSR, the European Network for SME Research, co-ordinated by EIM Business & Policy Research from the Netherlands in a consortium led by KPMG Special Services from the Netherlands.

The *Observatory of European SMEs* is managed in the Enterprise Directorate-General by Unit A-5, 'Competitiveness Analysis and Benchmarking'.

For a description of the activities of the Enterprise DG, see the website of the European Commission: http://europa.eu.int/comm/dgs/enterprise For more information on the Observatory of European SMEs, including how to access or order the reports, see: http://europa.eu.int/comm/enterprise/enterprise_policy/analysis/observatory.htm

Information on previous reports of the Observatory may be found there as well.

Chapter 1
Introduction

Entrepreneurship and SMEs have emerged as the engine of economic and social development throughout the world. The role of entrepreneurship has changed dramatically and fundamentally, so that it is now seen as a requisite ingredient generating employment, economic growth and international competitiveness in the global economy. The purpose of this report is first to explain why the role of SMEs is crucial for international competitiveness and a strong economic performance in Europe, and then to document the role that SMEs play in Europe.

Entrepreneurship and SMEs are related but certainly not identical concepts. Entrepreneurs, for example, are the main drivers of the firm creation process where young and small firms play a role. On the other hand, the entrepreneurial energy of a country, region or industry is often described using phenomena such as firm creation and turbulence (Carree and Thurik, 2003).

The impact that SMEs have on economic performance in Europe is explained in Chapter 2. A careful measurement of the structure and role of SMEs is required to understand the different roles that SMEs play and how these roles are evolving throughout Europe. In particular, a measurement of SME activity in Europe provides (in Section 3.1) what the (static) role of SMEs is in Europe, how the role of SMEs varies across specific countries and how it is benchmarked against the other major areas in the world. How the economic role of SMEs has been changing over time is presented in Section 3.2.

The way in which the measurement of the structure and role of SMEs is set up hinges on two views: first it attempts to illustrate the theory-based results surveyed in Chapter 2. Second, it is in line with the measurements given in earlier versions of the SME Observatory reports 'SMEs in Europe'.

A report about SMEs in Europe would however not be complete if no attention is paid to the current economic setting. The European economy is recovering from an economic downturn. Very little information is available about the roles of SMEs in the business cycle and in particular how do SMEs respond to economic adversity. This issue is dealt with in Chapter 4.

Finally a Synthesis is presented in Chapter 5.

Chapter 2
The role of SMEs in the economy

2.1. Introduction

Robert Solow (1956) was awarded a Nobel Prize in economics for identifying the sources of growth - the factors of capital and labour. These were factors best utilized in large-scale production. Throughout the first three-quarters of the last century, the increasing level of transaction costs (Coase, 1937) incurred in large-scale production dictated increasing enterprise size over time. Certainly, statistical evidence points towards an increasing presence and role of large enterprises in the economy in this period (Caves, 1982; Teece, 1993; Brock and Evans, 1989). This development towards large-scale activity was visible, not just in one country, but in most of the OECD countries. In the same period, the importance of entrepreneurship and small business seemed to be fading. Although it was recognized that the small business sector was in need of protection for both social and political reasons, there were few that made this case on the grounds of economic efficiency.

Romer (1986), Lucas (1988 and 1993) and Krugman (1991) discovered that the traditional production factors of labour and capital are not sufficient to explain growth and that knowledge instead has become the vital factor in endogenous growth models. Knowledge has typically been measured in terms of R&D, human capital and patented inventions (Audretsch and Thurik, 2000 and 2001). Many scholars have predicted that the emergence of knowledge as an important determinant of growth and competitiveness in global markets would render new and small enterprises even more futile. Conventional wisdom would have predicted increased globalisation to present an even more hostile environment to small business (Vernon, 1970). Caves argued that the additional costs of knowledge activity that would be incurred by small businesses in a global economy '*constitute an important reason for expecting that foreign investment will be mainly an activity of large firms*' (Caves, 1982, p. 53). As Chandler (1990, p. 78) concluded: '*to compete globally you have to be big*'. Furthermore, Gomes-Casseres (1997, p. 33) observed that '*students of international business have traditionally believed that success in foreign markets required large size*'. In a world that became dominated by exporting giant enterprises, global markets, global products, global players became the focus of interest. Small enterprises were thought to be at a disadvantage vis-à-vis larger enterprises because of the fixed costs of learning about foreign environments, communicating at long distances, and negotiating with national governments.

Despite these counteracting forces, entrepreneurship has emerged as the engine of economic and social development throughout the world.[1] The role of entrepreneurship has changed dramatically, fundamentally shifting between what Audretsch and Thurik (2001) introduced as the model of the managed economy and that of the entrepreneurial economy. In particular, Audretsch and Thurik (2001) argue that the model of the managed economy is the political, social and economic response to an economy dictated by the forces of large-scale production, reflecting the predominance of the production factors of capital and (unskilled) labour as the sources of competitive advantage. By contrast, the model of the entrepreneurial economy is the political, social and economic response to an economy dictated not just by the dominance of the production factor of knowledge but also by a very different, but complementary, factor they had overlooked: entrepreneurship capital, or the capacity to engage in and generate entrepreneurial activity. It is not simply that knowledge or R&D always spills over due to its mere existence (Audretsch and Keilbach, 2003).

1 See Carree and Thurik (2003) for a survey of literature spanning different strands.

The purpose of this chapter is to explain why the role of SMEs is crucial as a structural component in European industry and for a strong economic performance in Europe. In addition, in Annex I a first analysis is provided linking two different measures of economic performance - GDP growth, and productivity growth - to the presence of SMEs. Thus, just as Solow identified capital and labour as shaping the economic performance of a country, and more recently Romer and others extended growth models to include the factor of knowledge as well, this analysis indicates that entrepreneurship capital also makes a contribution to economic growth. In the current Chapter 2[2] the primary line of thinking is presented in the main text. Evidence and illustrations - mainly at country and/or in industry level - are presented in text boxes.

Recognizing the significance of SMEs is not sufficient either for policy formulation or implementation. Rather, a careful measurement of the structure and role of SMEs is required to understand the different role that SMEs play and how this role is evolving throughout Europe. Such measurement is provided for the European SME sector in Chapter 3 of this report.

2.2. SMEs and their impact in contemporary Europe

2.2.1. The theoretical framework

The theoretical framework linking entrepreneurship and economic growth is provided by the new theories of industry evolution (Jovanovic, 1982; Ericson and Pakes, 1995; Audretsch, 1995; Hopenhayn, 1992; Lambson, 1991 and Klepper, 1996). While traditional theories suggest that entrepreneurship will retard economic growth, these new theories suggest exactly the opposite - that entrepreneurship will stimulate and generate growth. The reason for these theoretical discrepancies lies in the context of the underlying theory. In the traditional theory, new knowledge plays no role; rather, static efficiency, determined largely by the ability to exhaust scale economies supports economic growth. By contrast, the new theories are dynamic in nature and emphasize the role that knowledge plays. Because knowledge is inherently uncertain, asymmetric and associated with high transaction costs, divergences emerge concerning the expected value of new ideas. People therefore have an incentive to leave an enterprise and start a new enterprise in an attempt to commercialise the perceived value of their knowledge. A distinguishing feature of these evolutionary theories is the focus on change as a central phenomenon. Innovative activity, one of the central manifestations of change, is at the heart of much of this work. Entry, growth, survival, and the way enterprises and entire industries change over time are linked to innovation. The dynamic performance of regions and even entire economies is linked to how well the potential from innovation is tapped.

Why are new enterprises started? The traditional, equilibrium-based view is that new enterprises to an industry, whether they are start-ups or enterprises diversifying from other industries, enter when existing enterprises in the industry earn supra-normal profits. By expanding industry supply, entry depresses price and restores profits to their long-run equilibrium level. Thus, in equilibrium-based theories entry serves as a mechanism to discipline existing enterprises. The new theories of industry evolution develop and evaluate alternative characterizations of entry based on innovation and costs of enterprise growth.

2 Parts of this chapter have been derived from: David B. Audretsch, Entrepreneurship: A Survey of the Literature, Prepared for the European Commission, Enterprise Directorate General, Institute for Development Strategies, Indiana University & Centre for Economic Policy Research (CEPR), London, July 2002.

Enterprise start-ups

For example, Audretsch (1995) analyses the factors that influence the rate of new enterprise start-ups. He finds that such start-ups are more likely in industries in which small enterprises account for a greater percentage of the industry's innovations. This suggests that enterprises are started to capitalize on distinctive knowledge about innovation that originates from sources outside of an industry's leaders. This initial condition of not just uncertainty, but greater degree of uncertainty vis-à-vis existing enterprises in the industry is captured in the theory of enterprise selection and industry evolution proposed by Jovanovic (1982). Jovanovic presents a model in which the new enterprises, which he terms entrepreneurs, face costs that are not only random but also differ across enterprises. A central feature of the model is that a new enterprise does not know what its cost function is, that is its relative efficiency, but rather discovers this through the process of learning from its actual post-entry performance. In particular, Jovanovic (1982) assumes that entrepreneurs are unsure about their ability to manage a new-enterprise start-up and therefore their prospects for success. Although entrepreneurs may launch a new enterprise based on a vague sense of expected post-entry performance, they only discover their true ability -- in terms of managerial competence and of having based the enterprise on an idea that is viable on the market -- once their business is established. Those entrepreneurs who discover that their ability exceeds their expectations expand the scale of their business, whereas those discovering that their post-entry performance is less than commensurate with their expectations will contract the scale of output and possibly exit from the industry. Thus, Jovanovic's model is a theory of selection, where efficient enterprises grow and survive and inefficient enterprises decline and fail.

2.2.2. Three new characteristics of SMEs

What emerges from the new evolutionary theories and empirical evidence on the role of entrepreneurial small enterprises is that markets are in motion, with a lot of new enterprises entering the industry and a lot of enterprises exiting the industry. The evolutionary view of entrepreneurship is that new enterprises typically start at a very small scale of output. They are motivated by the desire to appropriate the expected value of new economic knowledge. But, depending upon the extent of scale economies in the industry, the enterprise may not be able to remain viable indefinitely at its start-up size. Rather, if scale economies are anything other than negligible, the new enterprise is likely to have to grow to survive. The temporary survival of new enterprises is presumably supported through the deployment of a strategy of compensating factor differentials that enables the enterprise to discover whether or not it has a viable product.

The empirical evidence supports such an evolutionary view of the role of new enterprises in manufacturing, because the post-entry growth of enterprises that survive tends to be spurred by the extent to which there is a gap between the MES level of output and the size of the enterprise. However, the likelihood of any particular new enterprise surviving tends to decrease as this gap increases. Such new sub optimal scale enterprises are apparently engaged in the selection process. Only those enterprises offering a viable product that can be produced efficiently will grow and ultimately approach or attain the MES level of output. The remainder will stagnate, and depending upon the severity of the other selection mechanism -- the extent of scale economies -- may ultimately be forced to exit the industry. Rather, by serving as agents of change, entrepreneurial firms provide an essential source of new ideas and experimentation that otherwise would remain untapped in the economy. The impact of entrepreneurship is manifested by growth - at the levels of the enterprise, the region and even at the national level.

Knowledge

Entrepreneurship exerts a positive impact on economic performance for a number of reasons. The *first* is that it is a mechanism for knowledge spillovers. Romer (1986), Lucas (1988 and 1992) and Gene M. Grossman and Elhanan Helpman (1991) established that knowledge spillovers are an important mechanism underlying endogenous growth. However, they shed little light on the actual mechanisms by which knowledge is transmitted across enterprises and individuals. The answer to this question is important, because a policy implication commonly drawn from the new economic growth theory is that, as a result of convexities in knowledge and the resultant increasing returns, knowledge factors, such as R&D should be publicly supported. While this may be valid, it is also important to recognize that the mechanisms for spillover transmission may also play a key role and may also serve as a focus for public policy enhancing economic growth and development.

The literature identifying mechanisms actually transmitting knowledge spillovers is sparse and remains underdeveloped. However, one important area where such transmission mechanisms have been identified involves entrepreneurship. Entrepreneurship involves the start-up and growth of new enterprises.

Why should entrepreneurship serve as a mechanism for the spillover of knowledge from the source of origin? At least two major channels or mechanisms for knowledge spillovers have been identified in the literature. Both of these spillover mechanisms revolve around the issue of appropriability of new knowledge. W. Cohen and D. Levinthal (1989) suggest that enterprises develop the capacity to adapt new technology and ideas developed in other enterprises and are therefore able to appropriate some of the returns accruing to investments in new knowledge made externally. This view of spillovers is consistent with the traditional model of the knowledge production function, where the enterprise exists exogenously and then undertakes (knowledge) investments to generate innovative output.

By contrast, Audretsch (1995) proposes shifting the unit of observation away from exogenously assumed enterprises to individuals, such as scientists, engineers or other knowledge workers - those endowed with new economic knowledge. When the focus is shifted away from the enterprise to the individual as the relevant unit of observation, the appropriability issue remains, but the question becomes, *How can economic agents with a given endowment of new knowledge best appropriate the returns from that knowledge?* If the scientist or engineer can pursue the new idea within the organisational structure of the enterprise developing the knowledge and appropriate roughly the expected value of that knowledge, he has no reason to leave the enterprise. On the other hand, if he places a greater value on his ideas than do the decision-making bureaucracy of the enterprise for whom he works, he may choose to start a new enterprise to appropriate the value of his knowledge. Small enterprises can compensate for their lack of R&D through spillovers and spin-offs.

The employee will weigh the alternative of starting his/her own enterprise. If the gap in the expected return accruing from the potential innovation between the inventor and the corporate decision maker is sufficiently large, and if the cost of starting a new enterprise is sufficiently low, the employee may decide to leave the large corporation and establish a new enterprise. Since the knowledge was generated in the established corporation, the new start-up is considered to be a spin-off from the existing enterprise. Such start-ups typically do not have direct access to a large R&D laboratory. Rather, these small enterprises succeed in exploiting the knowledge and experience accrued from the R&D laboratories with their previous employers.

More competition through an increased number of enterprises

A *second* way that entrepreneurship capital exerts a positive influence on economic output is through the increased competition by the increased number of enterprises. Jacobs (1969) and M. Porter (1990) argue that competition is more conducive to knowledge externalities than is local monopoly. It should be emphasised that by local competition Jacobs does not mean competition within product markets as has traditionally been envisioned within the industrial organisation literature. Rather, Jacobs is referring to the competition for the new ideas embodied in economic agents. Not only do an increased number of enterprises provide greater competition for new ideas, but in addition, greater competition across enterprises facilitates the entry of a new enterprise specializing in some particular new product niche. This is because the necessary complementary inputs and services are likely to be available from small specialist niche enterprises but not necessarily from large, vertically integrated producers.

Both Feldman and Audretsch (1999) as well as Glaeser, Kallal, Sheinkman and Schleifer (1992) found empirical evidence supporting the hypothesis that an increase in competition, as measured by the number of enterprises, in a city increases the growth performance of that city.

Entrepreneurship generates variety

A *third* way that entrepreneurship capital generates economic output is by providing diversity among the enterprises. Not only does entrepreneurship capital generate a greater number of enterprises, but it also increases the variety of enterprises in the location. A key assumption made by Hannan and Freeman (1989) in the population ecology literature is that each new organization represents a unique approach. There has been a series of theoretical arguments suggesting that the degree of diversity, as opposed to homogeneity, in a location will influence the growth potential.

Entrepreneurship capital therefore can contribute to output and growth by serving as a conduit for knowledge spillovers, increasing competition, and by injecting diversity. Inclusion of measures of entrepreneurship capital would be expected to be positively related to economic performance.

2.2.3. Performance measures

The new view of entrepreneurship that is based on its role as an agent of change in a knowledge-based economy implies that a positive economic performance should be linked to entrepreneurial activity. This hypothesis has raised two challenges to researchers: (1) What is meant by economic performance and how can it be measured and operationalised? and (2) Over which units of analysis should such a positive relationship between entrepreneurship and economic performance be manifest? In fact, these two issues are not independent from each other. The answer to the second question, the appropriate unit of analysis, has influenced the first question, the performance criteria and measure.

The most prevalent measures of performance have been growth, income, wages, survival, innovation, and productivity. Other performance measures that have been used include profitability, and satisfaction (of the owners and employees). At the unit of observation of the individual, the most typical performance measure has been individual earnings. Typically this involves income generated from a self-owned enterprise. Measures of growth make little sense at the level of the individual. There are several studies, which have focused on survival (typically in self employment or as a small-business owner) as a performance measure. However, since entrepreneurial performance at the level of the individual has not been the subject of much research, it will not be discussed in this Report.

At the level of the enterprise and establishment, the most prevalent performance measure has been growth, typically employment growth. A second common measure of performance at the level of the enterprise has been survival. Other performance measures used at the enterprise/establishment level include profitability, exports, foreign direct investment, levels of employee compensation, innovation, and productivity. While it may seem surprising that profitability has not been used more often there are several explanations. First, measurement is more difficult and it is certainly not common for researchers to obtain access to measures of enterprise profitability. Second, profitability as a performance measure is fraught with accounting difficulties. When comparisons are made across countries, the limitations of profitability as a performance measure become even more glaring.

Using these different performance measures across the different units of analysis, a mountain of empirical evidence has been accumulated in the last two decades providing compelling links between entrepreneurship and performance. This evidence points to a positive and robust relationship between measures of entrepreneurship and economic performance. The positive relationship between entrepreneurship and performance has been found to hold not just for a single measure of performance, but rather across a broad spectrum of performance measures, such as employment creation, growth, enterprise survival, innovation and technological change, productivity increases, and exports. This link has proven to be robust across multiple units of observation, ranging from individuals, to establishments, enterprises, industries, geographic clusters, regions and even countries. Just as importantly, the positive relationships between entrepreneurship and the various measures of economic performance have been found to hold not just in the context of one country, but consistently for different countries in Europe and North America.

Employment generation

It was in the area of job generation that the recent emergence of entrepreneurship was first identified. In 1981 David Birch revealed the startling findings from his long-term study of U.S. job generation. Despite the conventional wisdom prevailing at the time, Birch (1981, p. 8) found that, 'Whatever else they are doing, large enterprises are no longer the major providers of new jobs for Americans.' Instead, he discovered that most new jobs emanated from small enterprises. While his exact methodology and application of the underlying data have been a source of considerable controversy, as have the exact quantitative estimates, his qualitative conclusion that the bulk of new jobs have emanated from small enterprises in the U.S. has been largely substantiated.

More recently, Davis, Haltiwanger and Schuh (1996a and 1996b) correct for the regression to the mean fallacy[3] they claim is inherent in Birch's results in estimating employment generation for the U.S between 1972-1988. While their quantitative results differ from Birch's, their study still indicates that SMEs account for more than their share of new employment. In particular, in their study large enterprises created 53 % of the new jobs but their employment share is 65 %. At the same time, large enterprises destroyed 56 % of the jobs, which is greater than their share of new jobs created. Their measure was static in nature and gave no indication whether this share has been increasing or decreasing over time.

Methodologies similar to Birch's were also used in the European context. In one of the first studies Gallagher and Stewart (1986) and Storey and Johnson (1987) found similar results for the United Kingdom, that small enterprises create most of the new jobs.

More recently Konings (1995) links gross job flows in the United Kingdom to establishment size. He finds that the gross job creation rate is the highest in small establishments and the lowest in large establishments. By contrast, the gross job destruction rate is the lowest in small establishments and the highest in large establishments. Additional evidence at country level is presented in the two boxes.

Evidence at country level

Evidence from Sweden (Heshmati, 2001) also suggests that employment creation is negatively related to firm size based on data from the 1990s. Similarly, Hohti (2000) finds that gross employment creation and destruction are negatively related to firm size in Finland. Using data from Finnish manufacturing between 1980-1994, Hohti (2000) finds that the annual job flow rates, in terms of births and deaths, is similar to that identified by Broesma and Gautier (1997, p. 216) for Dutch manufacturing firms and by Klette and Mathiassen (1996) for Norwegian manufacturing firms. In particular, new establishments have the greatest job creation rates as well as the greatest rates of job destruction. Thus, the evidence from Finland, as well as from Sweden and the Netherlands, suggests entrepreneurial dynamics similar to those found in North America.

Germany as a special case?

The evidence is less compelling for Germany. For example, Wagner (1995b) used a unique longitudinal data set covering all manufacturing establishments between 1978 and 1993 in the German federal state of Lower Saxony and found that while small enterprises account for most of the gross job creation, they also account for most of the job destruction. This confirms the earlier findings of Michael Fritsch (1993), who uses the Census of Business (Arbeitsstättenzählung) to examine the long-run trends in the role of German SMEs. Fritsch (1993, p. 50) concludes that, 'There is no dramatic job generation by small enterprises in West Germany.' Fritsch finds that, as for other countries, gross job creation and destruction rates tend to decline with enterprise size. What is different about Germany, is that 'net job creation rates and enterprise size are not systematically related'.

There is some evidence suggesting that in the last few years small enterprises in Germany are emerging as the engine of job creation, as in other developed countries. For example, Haid and Weigand (1998) find that family-owned enterprises, which are typically small- and medium-sized, increased employment between 1989-1993, while large management-controlled enterprises decreased employment.

Weigand and Audretsch (1999) use a longitudinal database consisting of enterprise level data for Germany where the enterprises which are tracked over a six-year period, 1991-1996. They split the sample into science-based and non-science based industries. They find that in the science-based industries the large enterprises that are listed experienced a decrease in employment by an average of -0.21 % per year. By contrast, the SMEs (with fewer than 500 employees) experienced an increase in employment by an average of 3.57 % annually. Similarly, those large enterprises, which are not listed experienced an annual decrease in employment of -4.21 %, while the SMEs experienced an increase in employment of 3.17 %.

3 The regression to the mean fallacy is the phenomenon that one may conclude that there is a statistical relationship between size and growth ('small is beautiful'), where in reality there is none. It may lead to an exaggeration of the job creation performance of small enterprises. See e.g. EIM and ENSR, The European Observatory for SMEs, Third Annual Report, Chapter 3, Labour, Appendix 1, The current debate on job creation by enterprise size, Zoetermeer, 1995.

For the non-science industries, Weigand and Audretsch (1999) found that the listed large enterprises experienced a decrease in employment of an annual mean rate of -1.00 %. Similarly, the SMEs also experienced a decrease in employment of an annual mean rate of -3.97 %. For the non-listed enterprises the large enterprises experienced a decrease in employment of -4.60 %. The SMEs experienced a decrease in employment of -1.26 %. Thus, the empirical evidence strongly suggests that downsizing in Germany results in a decrease in employment in (1) large science-based corporations, (2) large non-science based corporations, and (3) small non-science based enterprises. The most striking finding is that strong job growth is exhibited by the remaining fourth category - small- and medium-sized science-based enterprises.

Thus, the weight of the empirical evidence on employment generation is remarkably robust and indicates that the role of entrepreneurship in employment generation in Europe is not inconsistent with the findings for the United States. Small and new enterprises serve as an engine of employment creation on both sides of the Atlantic. However, it should be emphasized that an important qualification of the 'Job Generation' literature, is that it links employment changes of the enterprise to the size and in some cases the age of the enterprise. This means that the performance criterion is not focused on employment changes, but employment changes occurring only at the level of the enterprise. This assumes that there is no externality or spillover from one enterprise to other enterprises. This also holds for the analyses of employment change by SMEs reported by an earlier report in the framework of the Observatory of European SMEs (European Commission, 2002).

Enterprise growth and survival

A different performance measure involves growth and survival. The links between entrepreneurship on the one hand and growth and survival on the other have been found across a number of social science disciplines, including economics, sociology and regional studies. Within economics a series of survey articles by Sutton (1997), Caves (1998) and Geroski (1995) summarises the findings from a plethora of empirical studies examining the relationship between enterprise size and growth within the North American context. The early studies were undertaken using data from the U.S. These studies (Mansfield, 1962; Hall, 1987; Dunne, Roberts and Samuelson, 1989; and Audretsch, 1991) established not only that the likelihood of a new entrant surviving is quite low, but also that the likelihood of survival is positively related to enterprise size and age. A *stylised result* (Geroski, 1995) emerging from this literature is that, when a broad spectrum of enterprise sizes is included in samples of U.S. enterprises, smaller enterprises exhibit systematically higher growth rates than their larger counterparts. The growth advantage of small and new enterprises vis-à-vis large enterprises has been shown to be even greater in high technology industries (Audretsch, 1995).

These so-called stylised results between enterprise size and age on the one hand, and growth and survival on the other hand were subsequently confirmed for a number of European countries. A wave of studies has confirmed these findings for different European countries, including Portugal (Mata, Portugal and Guimaraes, 1994; and Mata, 1994), Germany (Wagner, 1994), Tveteras and Edide (2000) and Klette and Mathiassen (1996) for Norway, and Italy (Audretsch, Santarelli and Vivarelli, 1999). However, the links between enterprise size and growth and enterprise age and growth are somewhat more ambiguous within the European context. While some studies have found no systematic relationship to exist between enterprise size and growth (Wagner, 1992), there are a few studies that have actually found a positive relationship (Burgel, Murray, Fier, Licht and Nerlinger, 1998). Still, most studies have found results in the European context, which are strikingly similar to what has been found in the U.S. (Almus and Nerlinger, 2000; and Harhoff, Stahl and Woywode, 1998). Using a large comprehensive panel data set from the ZEW-foundation Panel (West), 'Gibrat's Law' – stating that percentage firm growth is independent of the initial size of the firm - is rejected for the group of young enterprises belonging to technology intensive branches as well as those operating in non-technology intensive branches (Almus and Nerlinger, 2000), indicating that the smaller enterprises grow faster than their larger counterparts.

Sweden

Heshmati (2001) has examined the relationship between enterprise size, age and growth for a large sample of small enterprises in Sweden between 1993-1998. The results indicate that, in Sweden, enterprise size and age are negatively related to employment growth, which is consistent with the findings for the U.S. However, in terms of sales growth, a positive relationship emerges, suggesting that, at least over this period, larger enterprises generated more growth in terms of sales than in terms of employment.

Germany

Harhoff and Stahl (1995) use a database of around 11 000 enterprises in manufacturing, construction, trade, finance, and services to examine how the post-entry performance of German enterprises varies across different sectors, in terms of the likelihood of survival and growth. In particular, Harhoff and Stahl find evidence that the likelihood of survival is positively related to enterprise size. In addition, enterprise growth is negatively related to enterprise size. Also, the likelihood of survival and growth rates differ systematically across different sectors of the economy.

The results of Harhoff and Stahl (1995) are not consistent with those found in earlier studies, according to the careful survey by Wagner (1992). After reviewing the most important studies, Wagner concludes that, 'Studies using German data tend to show that enterprise size and enterprise growth are uncorrelated.'

Wagner (2001 and 1995a) tracked and analysed the performance of small (and large) enterprises prior to exit. He used a longitudinal database identifying the pre-exit performance of cohorts of enterprises exiting in 1990, 1991 and 1992. One striking result he found was that more than half of the exiting enterprises (between 53 % and 61 %) were founded prior to 1979, making them over 11 years old. He also found that young enterprises, which were classified as being younger than five years old, accounted for about a quarter of all exits, and three-quarters of exiting businesses were from middle-aged enterprises. At the same time he found that the likelihood of survival increases with enterprise size.

Almus and Nerlinger (2000) also use a large panel database to examine how the post-entry performance of new enterprises in Germany varies across sectors. In particular, they find that the growth rates of new enterprises tend to be greater in very high-tech industries than in high-tech industries and other manufacturing industries. This mirrors the results found in the North American context.

Italy and Norway

Using enterprise-level data from Italy, Audretsch, Santarelli and Vivarelli (1999) find that growth rates are negatively related to enterprise size. In addition, they find that the likelihood of survival is greater in the start-up year than in the second year, but subsequently increases over time. Similarly, Tveteras and Eide (2000) provide evidence for Norwegian manufacturing using the estimation technique of a semi-proportional Cox Model that the likelihood of survival is lower for smaller and younger establishments.

Thus, while there is somewhat more ambiguity in the studies linking growth and survival to enterprise size and growth, the results for Europe generally mirror the so-called 'Stylised Results' found within the North American context. These 'Stylised Results' and their verification have attracted considerable attention is the literature. Despite their repetitive nature their testing has led to many different outcomes, which again has led to new insights about the role of minimum efficient scale and other inter industry differences. Generally, results are independent of the exact definition of what is young, small, an enterprise, etc:

1 Growth rates are higher for smaller enterprises
2 Growth rates are higher for younger enterprises
3 Growth rates are even higher for small and young enterprises in technology-intensive industries;
4 The likelihood of survival is lower for smaller enterprises
5 The likelihood of survival is lower for younger enterprises
6 The likelihood of survival is even lower for small and young enterprises in technology-intensive industries.

In addition, based on a panel data set consisting of enterprise-level observations, Scarpetta et al. (2002) provide evidence that there is a lower degree of enterprise turbulence, or what they call 'churning' in Europe than in the U.S. In particular, they identify that the distinguishing features of European SMEs from their American counterparts is that they start up at a larger size, have a higher level of labour productivity and a lower level of employment growth subsequent to entry.

Innovation

Technological change and innovation represent a different dimension of economic performance. Measures of technological change have typically involved one of the three major aspects of the innovative process: (1) a measure of the inputs into the innovative process, such as R&D expenditures, or else the share of the labour force accounted for by employees involved in R&D activities; (2) an intermediate output, such as the number of inventions which have been patented; or (3) a direct measure of innovative output.

These three levels of measuring technological change have not been developed and analysed simultaneously, but have evolved over time, roughly in the order of their presentation. That is, the first attempts to quantify technological change at all generally involved measuring some aspects of *inputs* into the innovative process. Measures of R&D inputs -- first in terms of employment and later in terms of expenditures -- were only introduced on a meaningful basis enabling inter-industry and inter-firm comparisons in the late 1950s and early 1960s (Scherer, 1965). Most of these studies were focused on the R&D activities of U.S. enterprises. Little measurement was done in the European context.

A clear limitation in using R&D activity, as a proxy measure for technological change is that R&D reflects only the resources devoted to producing innovative output, but not the amount of innovative activity actually realized. That is, R&D is an input and not an output in the innovation process.

As systematic data measuring the number of inventions patented were introduced in the mid-1960s, many scholars interpreted this new measure not only as being superior to R&D but also as reflecting innovative output. In fact, the use of patented inventions is not a measure of innovative output, but is rather a type of intermediate output measure. A patent reflects new technical knowledge, but it does not indicate whether this knowledge has a positive economic value. Only those inventions that have been successfully introduced into the market can claim that they are innovations as well.

Besides the fact that many, if not most, patented inventions do not result in an innovation, a second important limitation of patent measures is that they do not capture all of the innovations actually made. In fact, many inventions that result in innovations are not patented.

Thus, even as new and superior sources of patent data have been introduced, the reliability of these data as measures of innovative activity has been severely challenged. It was not before well into the 1970s that systematic attempts were made to provide a direct measure of the innovative output. Thus, it should be emphasized that the conventional wisdom regarding innovation and technological change was based primarily upon the evidence derived from analysing R&D data, which essentially measure inputs into the process of technological change, and patented inventions, which are a measure of intermediate output at best.

One of the earliest important data sources that attempted to directly measure innovation activity was compiled in the United Kingdom -- at the Science Policy Research Unit (SPRU) at the University of Sussex in the United Kingdom (Rothwell, 1989). In the US the Small Business Innovation Data Base provided an important measure of new products introduced into the market (Acs and Audretsch, 1990)

There is substantial evidence that R&D inputs are, in fact, positively related to enterprise size. The plethora of empirical studies relating R&D to enterprise size is most thoroughly reviewed in Acs and Audretsch (1990, Chapter 3), Baldwin and Scott (1987), and Cohen and Levin (1989).

The studies relating patents to enterprise size are considerably less ambiguous. Here the findings unequivocally suggest that small enterprises contribute to patent activity as well as large enterprises (Scherer, 1983). Scherer's results for the U.S. were later confirmed by Bound et al. (1984) in the study mentioned above. Basing their study on 2 852 companies and 4 553 patenting entities, they determined that the small enterprises (with less than $ 10 million in sales) accounted for 4.3 % of the sales from the entire sample, but 5.7 % of the patents.

Such results are not limited to the U.S. Schwalbach and Zimmermann (1991) found that the propensity to patent is lower for the largest enterprises in West Germany than for the small- and medium-sized enterprises included in their sample.

Using the direct measure of innovative output from the U.S. Small Business Administration's Innovation Data Base, Acs and Audretsch (1990) showed that, in fact, the most innovative U.S. enterprises are large corporations. Further, the most innovative American corporations also tended to have large R&D laboratories and be R&D intensive. At first glance, these findings based on direct measures of innovative activity seem to confirm conventional wisdom. However, in the most innovative industries, large enterprises, defined as enterprises with at least

500 employees, contributed more innovations in some instances, while in other industries small enterprises produced more innovations. For example, in computers and process control instruments small enterprises contributed the bulk of the innovations. By contrast in the pharmaceutical preparation and aircraft industries the large enterprises were much more innovative.

Probably the best measure of innovative activity is the total innovation rate, which is defined as the total number of innovations per one thousand employees in each industry. The large-enterprise innovation rate is defined as the number of innovations made by enterprises with at least 500 employees, divided by the number of employees (thousands) in large enterprises. The small-enterprise innovation rate is analogously defined as the number of innovations contributed by enterprises with fewer than 500 employees, divided by the number of employees (thousands) in small enterprises.

The innovation rates, or the number of innovations per thousand employees, have the advantage that they measure large- and small-firm innovative activity relative to the presence of large and small enterprises in any given industry. That is, in making a direct comparison between large- and small-firm innovative activities, the absolute number of innovations contributed by large enterprises and small enterprises is somewhat misleading, since these measures are not standardized by the relative presence of large and small enterprises in each industry. When a direct comparison is made between the innovative activity of large and small enterprises, the innovation rates are presumably a more reliable measure of innovative intensity because they are weighted by the relative presence of small and large enterprises in any given industry. Thus, while large enterprises in manufacturing introduced 2 445 innovations and small enterprises contributed slightly fewer, 1 954, small-firm employment was only half that of large-firm employment, yielding an average small-firm innovation rate in manufacturing of 0.309, compared to a large-firm innovation rate of 0.202 (Acs and Audretsch, 1988 and 1990).

Acs and Audretsch (1987, 1988, and 1990) also found that not only does market structure influence the total amount of innovative activity, but also the relative innovative advantage between large and small enterprises. The differences between the innovation rates of large and small enterprises examined in the previous section can generally be explained by (1) the degree of capital intensity, (2) the extent to which an industry is concentrated, (3) the total innovative intensity, and (4) the extent to which an industry is comprised of small enterprises. In particular, the relative innovative advantage of large enterprises tends to be promoted in industries that are capital-intensive, advertising intensive, concentrated, and highly unionised. By contrast, in industries that are highly innovative and where small enterprises do not have a high employment share, the relative innovative advantage is held by small enterprises.

The most important and careful study to date documenting the role of German SMEs in innovative activity was undertaken by a team of researchers at the Zentrum für Europäische Wirtschaftsforschung (ZEW) led by Harhoff and Licht (1996). They analysed the findings made possible by the Mannheim Innovation Data Base. This database measures the extent of innovative activity in German enterprises between 1990 and 1992. Harhoff and Licht (1996) use the database to identify that 12 % of the research and development expenditures in (West) German enterprises comes from SMEs (defined as having fewer than 500 employees).

Harhoff and Licht (1996) show that the likelihood of an enterprise not innovating decreases with enterprise size. For example, 52 % of enterprises with fewer than 50 employees were not innovative. By contrast, only 15 % of the enterprises with at least 1 000 employees were not innovative. More striking is that the smallest enterprises that do innovate have a greater propensity to be innovative without undertaking formal research and development. While only 3 % of the largest corporations in Germany are innovative without undertaking formal R&D, one-quarter of the innovative enterprises with fewer than 50 employees are innovative without formal R&D.

The study also shows that even fewer SMEs in the five new German Länder are innovative compared with the case in West Germany. Over two-thirds of the smallest SMEs in East Germany are not innovative, and they are less than half as likely to undertake R&D, as are their Western counterparts.

A number of explanations have emerged why smaller enterprises may, in fact, tend to have an innovative advantage, at least in certain industries. Rothwell (1989) suggests that the factors providing small enterprises with the innovative advantage generally emanate from the difference in management structures. For example, Scherer (1991) argues that the bureaucratic organization of large enterprises is not conducive to undertaking risky R&D. The decision to innovate must survive layers of bureaucratic resistance, where an inertia regarding risk results in a bias against undertaking new projects. However, in the small enterprise the decision to innovate is made by relatively few people. Innovative activity may flourish the most in environments free of bureaucratic constraints (Link and Bozeman, 1991). That is, a number of small-firm ventures have benefited from the exodus of researchers

who felt thwarted by the managerial restraints in a larger enterprise. Finally, it has been argued that while the larger enterprises reward the best researchers by promoting them out of research to management positions, the smaller enterprises place innovative activity at the centre of their competitive strategy (Scherer, 1991).

Scherer (1988, pp. 4-5) has summarized the advantages small enterprises may have in innovative activity: 'Smaller enterprises make their impressive contributions to innovation because of several advantages they possess compared to large-size corporations. One important strength is that they are less bureaucratic, without layers of 'abominable no-men' who block daring ventures in a more highly structured organization. Second, and something that is often overlooked, many advances in technology accumulate upon a myriad of detailed inventions involving individual components, materials, and fabrication techniques. The sales possibilities for making such narrow, detailed advances are often too modest to interest giant corporations. An individual entrepreneur's juices will flow over a new product or process with sales prospects in the millions of dollars per year, whereas few large corporations can work up much excitement over such small fish, nor can they accommodate small ventures easily into their organizational structures. Third, it is easier to sustain a fever pitch of excitement in small organization, where the links between challenges, staff, and potential rewards are tight. 'All-nighters' through which tough technical problems are solved expeditiously are common.'

Within a generation, research has produced theories, evidence and new insights that have dramatically changed the prevalent view about the role of entrepreneurship in innovation and technological change. The conventional wisdom held that small enterprises inherently have a deficit of knowledge assets, giving them a clear and distinct disadvantage in generating innovative output. This view was certainly consistent with the early interpretation of the knowledge production function. As Chandler (1990) concluded, 'to compete globally you have to be big.'

More recent scholarship has produced a revised view that identifies entrepreneurial small enterprises as making a crucial contribution to innovative activity and technological change. There are two hypotheses why scholarship about the role of small enterprises has evolved so drastically within such a short period. The first is that, as explained above, the measurement of innovative output and technological change has greatly improved. As long as the main instruments to measuring innovative activity were restricted to inputs into the innovative process, such as expenditures on formal R&D, many or even most of the innovative activities by smaller enterprises simply remained hidden from the radar screen of researchers. With the development of measures focusing on measures of innovative output, the vital contribution of small enterprises became prominent, resulting in the emergence of not just the recognition that small enterprises provide an engine of innovative activity, at least in some industry contexts, but also of new theories to explain and understand how and why small enterprises access knowledge and new ideas. This first hypothesis would suggest that, in fact, small enterprises have always made these types of innovative contributions, but they remained hidden and mostly unobserved to scholars and policy makers.

The alternative hypothesis is that, in fact, the new view towards the innovative capacity of small enterprises emerged not because of measurement improvements, but because the economic and social environment actually changed in such a way as to shift the innovative advantage more towards smaller enterprises. This hypothesis would say that the conventional wisdom about the relative inability of small enterprises to innovate was essentially correct - at least for a historical period of time. Rather, the new view of small enterprises as engines of innovative activity reflect changes in technology, globalisation and other factors that have fundamentally altered the importance and process of innovation and technological change. As Jovanovic (2001, pp. 54-55) concludes, 'The new economy is one in which technologies and products become obsolete at a much faster rate than a few decades ago. It is clear that we are entering the era of the young enterprise. The small enterprise will thus resume a role that, in its importance, is greater than it has been at any time in the last seventy years or so.'

Exports

Performance of success in international markets, such as exports, has been used in several studies. For example, Wagner (1994) employed a longitudinal database consisting of 7 000 manufacturing German enterprises and found that the probability that an enterprise is an exporter increases along with enterprise size. However, an important caveat from his study is that there are many successful exporters among small enterprises, and non-exporters among larger enterprises as well.

The export performance of Italian SMEs has also been compared between those SMEs located within a local cluster and those not located within a cluster. Nicolini (2001) uses gravity model to link SME export performance to geographic location in Italy. She finds SMEs belonging to industrial districts exhibit a stronger export performance, presumably by taking advantage of the competitive advantage generated by the industrial district.

Wages

Even as the positive impact that new and small enterprises have on employment generation became acknowledged, an important qualification and caveat had to be added about the quality of those jobs. Based on the U.S., Brown, Hamilton and Medoff (1990) provided systematic empirical evidence indicating that SMEs pay lower wages and non-wage compensation than do their larger counterparts. Thus, while SMEs might be the engine of employment generation, and even contribute to innovative activity as well, it was not at all clear that the new jobs created were actually better or even at parity. Rather, this strand of literature from labour economics suggested that the jobs created by small businesses were actually inferior in that employee compensation was at lower levels. These findings led some scholars to rethink the merits of promoting entrepreneurship and small business development. If job growth came only at the cost of lower wages, perhaps entrepreneurship did not hold the promise predicted first by Schumpeter and later by Birch.

For example, in their study, Brown, Hamilton and Medoff (1990, pp. 88 and 89) concluded that, 'Workers in large enterprises earn higher wages, and this fact cannot be explained completely by differences in labour quality, industry, working conditions, or union status. Workers in large enterprises also enjoy better benefits and greater job security than their counterparts in small enterprises. When these factors are added together, it appears that workers in large enterprises do have a superior employment package.'

Systematic lower levels of employee compensation have also been found within the European context. A number of studies are contributing to what has now come to constitute a 'Stylised Fact'. Nickell et al. (1994) for instance address the question of why small and new enterprises pay systematically lower levels of employee compensation. Using data from the Netherlands, Lever and Werkhooven (1996) found that an enterprise's competitive strengths have a positive impact on wages. In particular, they found that market concentration increases the impact of a large enterprise's internal factors on wages. Lopez-Sintas and Martinez-Ros (1999) analyse Spanish manufacturing enterprises between 1990-1994 and find that smaller enterprises pay lower wages. However, those enterprises that are innovative pay a wage premium. The effect of the innovative activity on wages was greater in SMEs than in large enterprises.

Audretsch et al. (2001) present a theory suggesting that small enterprises compensate for their size disadvantages by varying the way that productive factors are used and remunerated by their larger counterparts. By engaging in a strategy of compensating factors of production differently than large established enterprises, smaller ones are able to offset, at least to some extent, their size-induced scale disadvantages.

Audretsch (1995) finds considerable evidence that smaller establishments in both the United States and Japan are able to compensate for their size related disadvantages through pursuing a strategy of compensating labour differentials differently than their larger counterparts. There are reasons to expect that a strategy of compensating factor differentials is more difficult to implement in Europe. Not only is protection under unions more widespread in Europe than in either Japan or the United States, but a broad spectrum of legal institutions restricts the ability of individual enterprises to deviate too far from industry norms.

Using a system of simultaneous equations, Audretsch et al. (2001) test the hypothesis that compensating factor differentials are a mechanism enhancing SME performance using a panel database consisting of 7 716 Dutch manufacturing enterprises. They find considerable evidence that, even in a European context, a different remuneration to labour serves, at least to some extent, to compensate for the inherent size disadvantages confronting sub-optimal scale enterprises. The empirical results suggest that the degree to which such a strategy of compensatory factor differentials is implemented depends upon the extent to which the MES level of output exceeds that of the sub-optimal scale enterprise along with the extent to which efficiency declines with decreasing enterprise size. The authors speculate that employees may accept lower wages in SMEs because of the prospects of their wages rising over time. This would be particularly true where employees develop enterprise-specific human capital.

The policy conclusions by Brown, Hamilton and Medoff (1990) that new-enterprise start-ups should be discouraged are based on a static analysis. However, when viewed through a dynamic lens by Audretsch et al. (2001), a different conclusion emerges. One of the most striking results is the positive impact of enterprise age on productivity and employee compensation, even after allowing for the size of the enterprise. Given the strongly confirmed stylised fact linking both enterprise size and age to a negative rate of growth (that is the smaller and younger an enterprise is the faster it will grow), this new finding linking enterprise age to employee compensation and productivity suggests that not only will some of the small and sub-optimal enterprises of today become the large and optimal enterprises of tomorrow, but that there is at least a tendency for the low productivity and

wage of today to become the high productivity and wage of tomorrow. Thus, there is some evidence suggesting that, at least for the case of the Netherlands, not only can policies promoting the start-up and viability of new enterprises be viewed as instruments of competition policy, but that the impact on wages and productivity from such policies is considerably greater in a dynamic context than in a static context.

City and Region

Different literature has focused on the impact of entrepreneurship on subsequent economic performance, which can be found in the regional studies and economic geography literature. Some examples of studies are presented in Annex I.

Country

Only recently have scholars begun to try to find an empirical link between entrepreneurship and performance, measured in terms of growth, at the national level. These investigations at the national level take into account all drivers of growth that SMEs generate, as presented above. However, on the whole, they do not explicitly or separately specify them. For example, Thurik (1999) provided empirical evidence from a 1984-1994 cross-sectional study of the 23 countries that are part of the Organization for Economic Co-operation and Development (OECD), that increased entrepreneurship, as measured by business ownership rates, was associated with higher rates of employment growth at the country level. Similarly, Audretsch et al. (2002) and Carree and Thurik (1999) find that OECD countries exhibiting higher increases in entrepreneurship also have experienced greater rates of growth and lower levels of unemployment.

In a study for the OECD, Audretsch and Thurik (2002) undertake two separate empirical analyses to identify the impact of changes of entrepreneurship on growth. Each one uses a different measure of entrepreneurship, sample of countries and specification. This provides some sense of robustness across different measures of entrepreneurship, data sets, time periods and specifications. The first analysis uses a database that measures entrepreneurship in terms of the relative share of economic activity accounted for by small enterprises. It links changes in entrepreneurship to growth rates for a panel of 18 OECD countries spanning five years to test the hypothesis that higher rates of entrepreneurship lead to greater subsequent growth rates. The second analysis uses a measure of self-employment as an index of entrepreneurship and links changes in entrepreneurship to unemployment at the country level between 1974 and 1998. The different samples including OECD countries over different time periods reach consistent results - increases in entrepreneurial activity tend to result in higher subsequent growth rates and a reduction of unemployment.

The Global Entrepreneurship Monitor (GEM) Study (Reynolds et al., 2000) also established an empirical link between the degree of entrepreneurial activity and economic growth, as measured by employment, at the country level. Thus, there are not only theoretical arguments but also empirical evidence suggesting that the growth of countries is positively associated with an entrepreneurial ethos.

Several studies (e.g. Audretsch, Carree and Thurik, 2001) show that those countries exhibiting a greater increase in entrepreneurship rates in a certain period also tended to exhibit greater decreases in unemployment rates. This would suggest a negative relationship between entrepreneurial activity and subsequent unemployment. Unemployment is used here because of its importance as a policy goal. A similar relationship between entrepreneurship and growth rates for a broader spectrum of countries, including both OECD and non-OECD countries is shown by the Global Entrepreneurship Monitor (GEM) Study (Reynolds et al., 2000). Reversed causality is a known obstacle establishing the effect of entrepreneurship on unemployment because high levels of unemployment lower the opportunity costs of starting a business. This dual causality has been dealt with in Audretsch, Carree and Thurik (2001) where both a so-called Schumpeter (entrepreneurship influencing unemployment) and a so-called shopkeeper (unemployment influencing entrepreneurship) effect are established.

In Annex II, material collected within the framework of the Observatory of European SMEs is used to investigate the relationship between number of enterprises, growth and productivity.

Chapter 3
Measuring SMEs

The previous section has shown that entrepreneurship and SMEs matter. They play a role in the creation of economic growth. As explained in the introduction of this report, it is imperative for public policy to identify the roles that SMEs are playing in Europe, how those roles are changing over time, and how those roles compare to those played by entrepreneurial activities in other significant parts of the world. To respond to this strategic policy need, this chapter[4] provides an account of the current roles of SMEs in Europe from several different measures and perspectives.

The first issue for a European SME measurement involves what is to be measured. A second issue involves the geographic dimension. It is important to describe the size and structure of SMEs at both the European and the country level. In addition, it is important to provide comparisons with other significant regions in the world. Finally, the third issue involves the time dimension. Some measures are snapshots from a recent year, enabling a cross-sectional comparison. Other measures provide time-based comparisons to analyse how the roles of entrepreneurship and SMEs have changed over time.

Given the contribution by SMEs to economic growth and global competitiveness, to provide an SME measurement, it is essential to address three different questions:

1 What are the economic roles played by SMEs in Europe?
2 What are the economic roles played by SMEs in individual European countries, and how do these roles compare to those played in other significant regions of the globe?
3 How have the economic roles of SMEs changed over time?

The first two questions are addressed by employing a different number of measures characterizing the firm-size distribution, and in particular, the roles of SMEs. These measures include the number of enterprises, employment, turnover, value added, exports, and share of labour costs in value added. It is for these measures only that a comprehensive statistical picture for non-primary private enterprise[5] in Europe-19[6] can be drawn.

3.1. Current size and structure

3.1.1. The European level

Regardless of the measure, one result is striking and needs to be emphasized - not only are most enterprises in Europe small, but they also account for a significant amount of European work experience and economic activity. For example, in 2003 there were more than 19 million enterprises in Europe-19 (Table 3.1), providing a job for almost 140 million people. By contrast, there are only about 40 000 large enterprises in existence, which account for only 0.2 % of all enterprises. So, the vast majority of enterprises in Europe-19 (99.8 %) are SMEs.

Within the group of SMEs, the vast majority (over 90 %) are micro enterprises, employing fewer than 10 persons. Approximately half of these micro enterprises have no employees at all, thus only providing employment and

4 The methodology applied in this Chapter is presented in Annex IV.
5 This report is focusing on private enterprises only and excludes the primary sector (agriculture and fishing).
6 The expression Europe-19 is used in this report to indicate the 15 Member States of the European Union, the three other countries of the European Economic Area (Norway, Liechtenstein and Iceland), together with Switzerland.

income to self employed and family workers; this amounts to roughly 9 million enterprises[7]. On average, a European enterprise provides a job for 7 persons; this measure of enterprise size varies between 3 in micro enterprises and over 1 000 in LSEs. So, the typical European firm is a micro firm. Table 3.1 contains two other measures of average enterprises size, turnover per enterprise and value added per enterprise. Here even greater ratios exist than with respect to the number of persons per enterprise.

Table 3.1: The roles of SMEs, Europe-19, 2003

		SME				LSE	Total
		Micro	Small	Medium-sized	Total		
Number of enterprises	*1 000*	17 820	1 260	180	19 270	40	19 310
Employment	*1 000*	55 040	24 280	18 100	97 420	42 300	139 710
Occupied persons per enterprise		3	19	98	5	1 052	7
Turnover per enterprise	*1 000 Euro*	440	3 610	25 680	890	319 020	1 550
Value added per enterprise	*1 000 Euro*	120	1 180	8 860	280	126 030	540
Share of exports in turnover	*%*	9	13	17	12	23	17
Value added per occupied person	*1 000 Euro*	40	60	90	55	120	75
Share of labour costs in value added	*%*	57	57	55	56	47	52

Note: Micro enterprises: less than 10 occupied persons; small enterprises: between 10 and 50 occupied persons; medium-sized enterprises: between 50 and 250 occupied persons; LSE: 250 or more occupied persons.

Source: Estimated by EIM Business & Policy Research; estimates based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003; due to rounding, totals may differ slightly from constituent parts.

The role of SMEs in exporting is less than that of their larger counterparts. European enterprises export an average of 17 % of turnover. Micro enterprises export the lowest share of turnover, 9 %, while LSE's export the greatest, 23 %. This pattern is apparent in all sectors of industry and all countries[8], and indicates that most small enterprises serve only limited local and regional markets[9].

Smaller enterprises account for a greater role in labour intensive sectors than do larger enterprises.

Table 3.1 also shows that labour productivity increases along with enterprise size. An occupied person in a micro enterprise creates an average of 40 000 Euro of value added, while in LSEs, this amount is three times as high (120 000 Euro). This suggests that larger enterprises create relatively more wealth per employee than do their smaller counterparts. Explanations for these differences may be both productivity and the enterprise distribution across different sectors of the economy. Industry structure also plays a role here. For example, many small enterprises are found in retail trade, which has a lower than average labour productivity. In Figure 3.1, actual labour productivity by size-class is compared with an adjusted value of this measure, which is calculated by assuming the same industry structure for all size-classes[10]. When these adjustments for differences in industry structure are included, a rather different picture emerges, as the differences between small, medium-sized and large enterprises to a large extent disappear; only micro enterprises still lag behind with respect to value added per occupied person. Thus, the economic role of SMEs, as accounted for by labour productivity, is considerably different after adjusting for the sector effect.

This is an important result in view of the policies aimed at increasing overall labour productivity, as there might still be some room for improvement in micro enterprises.

7 Estimate based on data from Eurostat's SME Database.

8 Except for Ireland (see Paragraph 3.1.2) In Ireland, the higher share of exports in SMEs' turnover is a result from the large share of the transport sector (which has a relatively high share of export in turnover) in conjunction with the international orientation due to Ireland's peripheral location.

9 It would be interesting to verify this hypothesis further by analysing the geographical export patterns by size-class. Unfortunately, even though matrices of origin and destination of international trade in goods and services are available, these are not disaggregated by enterprise size-class. Only anecdotic information exists.

10 Adjusted value for size-class s = ΣI wi, total · vai, s/em*i*, s, in which: wi, total: share of industry i in total employment, size-class total; vai,s (emi,s): value added (employment) of size-class s in industry i (so vai,s/emi,s is labour productivity in size-class s of industry i). The analysis has been performed at the level of NACE divisions.

Figure 3.1: Value added per occupied person, Europe-19, 2003

* Assuming the same industry structure for all size-classes.

Source: Estimated by EIM Business & Policy Research; estimates based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003.

The share of labour costs in value added is less for large enterprises than for SMEs. This is consistent with the findings that SMEs exhibit lower levels of labour productivity, at least when the sectoral effect is not taken into account. Low levels of labour productivity result in higher labour costs for SMEs. As with labour productivity, these size-class differences to a large extent disappear when the sectoral distribution of small and large enterprises is taken into account. When such an adjustment is made, micro enterprises come up with a much lower share of labour costs - which is due to the existence of unpaid workers (self employed, family workers).

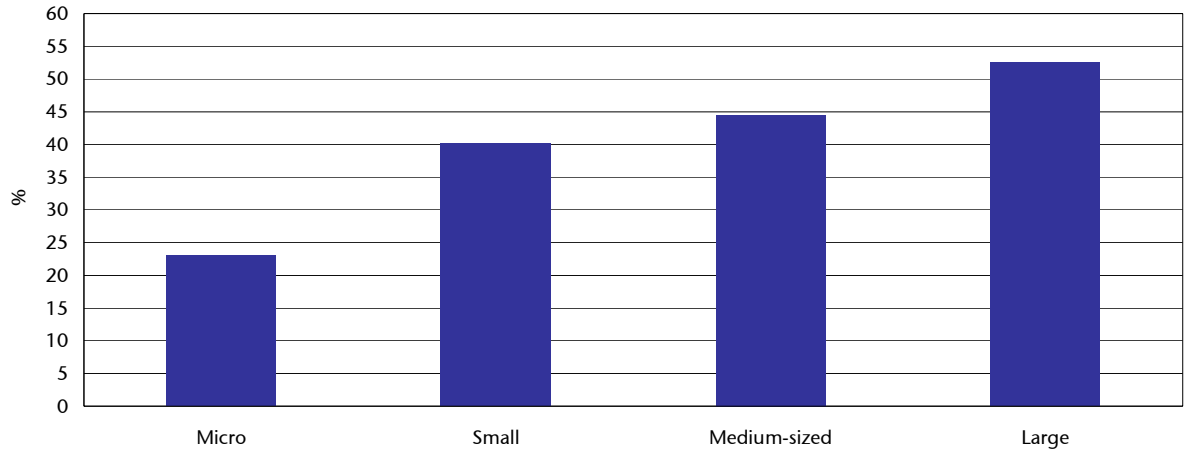
Figure 3.2 shows a proxy measure of profitability, which is the gross operating surplus, and is defined as the difference between gross value added and labour costs[11]. This proxy measure for profitability, the gross operating surplus, is adjusted for the imputed wage of the self employed[12], and subsequently expressed as a percentage of gross value added. This measure therefore corrects for the implicit wage costs of self employed and unpaid family workers. It should be emphasized that the owner is not included in the payroll in self-employed enterprises, and therefore his earnings are not included in the labour costs. As Figure 3.2 indicates, profitability ranges between 40-52 % in small, medium-sized and large enterprises, while for micro enterprises, it is significantly lower at almost 25 %[13]. Here too, sectoral effects play a role; in fact, differences between small, medium-sized and large enterprises tend to disappear when these effects are taken into account, but micro enterprises lag behind the other size-classes whether or not sectoral effects are taken into account.

11 One would like to take depreciation into account separately as well, but this information is not broadly available by industry and size-class.

12 Adjustment for the imputed wage of the self employed is made by assuming the same labour costs per self employed as for wage earners in an industry/size-class; results at the macro level have been obtained by aggregation over industries, countries and size-classes.

13 It should be borne in mind that the profitability measure used here includes depreciation, and small enterprises tend to be less capital-intensive. Excluding depreciation from profitability as defined here would decrease size-class differences with respect to profitability, but differences between size-classes would not be removed completely by taking account of depreciation.

Figure 3.2: Profitability* by size-class, Europe-19, 2003



* Gross operating surplus, adjusted for imputed wages of self employed, as percentage of gross value added.

Source: Estimated by EIM Business & Policy Research; estimates based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003.

Thus, the roles of SMEs at the European level are complex. On the one hand, SMEs are by far the most prevalent form of enterprise, and account for a considerable amount of employment. On the other hand, they tend to exhibit lower levels of productivity and generate, on average, lower levels of profitability. This is particularly true for micro enterprises, as many differences between small, medium-sized and large enterprises are mitigated when sectoral effects are taken into account, but this does not include differences between micro enterprises on the one hand, and the other size-classes on the other.

3.1.2. The country level

Table 3.2 summarises the available statistical data on the size-class structure of non-primary private enterprise in 2003 by country. Countries differ with respect to the average size of their enterprises. For example, the average number of occupied persons per enterprise varies between 2 in Greece, and 12 in the Netherlands. As has been shown in earlier Observatory Reports, in Europe there is a strong correlation between average enterprise size and economic prosperity, as measured by per capita GDP[14]. Closer inspection of Table 3.2 confirms the results of the macro-economic analysis at the Europe-19 level discussed above. In most countries, labour productivity in SMEs is below average. The same holds for profitability. Also SMEs in most countries have a lower tendency to export than LSEs.

14 Also see Carree, M., A. van Stel, R. Thurik and S. Wennekers (2002), Economic development and business ownership: an analysis using data of 23 OECD countries in the period 1976-1996, Small Business Economics 19, 271-290). These authors estimate a quadratic relation between the number of entrepreneurs relative to total population (which they coin 'business ownership', and which is inversely related to average enterprise size), and per capita GDP. For European countries, this relationship is still in its downward sloping part, suggesting a positive correlation between enterprise size and per capita GDP. This relationship has been confirmed directly in earlier Observatory Reports.

Table 3.2: Roles of SMEs in European Countries, 2003

	Number of enterprises	Occupied persons per enterprise	Size-class dominance*	Value added per occupied person, SMEs**	Propensity to export SMEs***	Share value added in turnover, SMEs****
	1 000				%	%
Austria	270	11	Micro	78	-3	-3
Belgium	440	7	Micro	93	-6	-2
Denmark	210	10	SME	93	-3	-1
Finland	220	7	LSE	85	-6	1
France	2 500	8	Micro	76	-7	-4
Germany	3 020	10	LSE	90	-6	5
Greece	770	2	Micro	98	-1	2
Ireland	100	10	SME	50	6	2
Italy	4 490	4	Micro	89	-4	-0
Luxembourg	20	9	SME	101	-1	-1
Netherlands	570	12	LSE	95	-4	-1
Portugal	690	5	SME	74	-2	-6
Spain	2 680	6	Micro	82	-4	-0
Sweden	490	7	Micro	87	-3	-0
United Kingdom	2 230	11	LSE	69	-4	-5
EU-15	18 700	7	Micro	74	-5	-3
Iceland	30	4	LSE	75	-3	-6
Norway	240	7	Micro			
Liechtenstein	4	6	Micro	68	-2	-15
Switzerland	340	8	SME			
Non-EU countries	610	7	SME	71	-2	-11
Europe-19	19 310	7	Micro	74	-4	-4

* A country or sector of industry is said to be micro, small and medium-sized, or LSE dominant if either micro enterprises, small and medium-sized enterprises (taken together) or large-scale enterprises have the largest share in total employment.
** Index, country total = 100.
*** Share of export in turnover (%); SMEs minus country total.
**** Value added as percentage of turnover, SMEs as deviation of country total.

Source: Estimated by EIM Business & Policy Research; estimates based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003; due to rounding, totals may differ slightly from constituent parts. Data by country are provided in Annex IV.

3.1.3. SMEs' role across industrial sectors

The role of SMEs in Europe is not at all constant across industrial sectors as Table 3.3, based on non-primary private enterprise in Europe-19 in 2003, shows[15]. With regard to enterprise size, sectors of industry differ significantly, primarily as a result of the nature of the production processes in these industries. For example, extraction, manufacturing and the energy sector are large-scale industries, and thus are characterized by a greater role for large enterprises. The same holds for the transport and communication sectors; here, however, a sharp distinction should be made between large-scale air and water transport and communication services on the one hand, and small-scale activities e.g. land transport and supporting and auxiliary activities on the other. Business services are on average a large-scale activity, but this sector comprises both large-scale activities like banking and micro-dominant industries like real estate. The other industry groups (construction, trade, hotels and restaurants and personal services) tend to be small-scale activities. This is reflected by a relatively low number of occupied persons per enterprises, and a greater share of SMEs. Of course, large differences between sub-sectors as well as between individual enterprises still exist.

15 Detailed figures by sector of industry and by country are presented in Annex IV.

Table 3.3: Roles of SMEs by sector of industry, Europe-19, 2003

	Number of enterprises (1 000s)	Occupied persons per enterprise	Size-class dominance (*)	Value added per occupied person, SMEs (**)	Profitability of SMEs (***)	Propensity to export SMEs (****)
Extraction (incl. energy) (C+E)	50	38	LSE	112	-1	-2
Manufacturing (D)	2 250	16	SME	81	-3	-12
Construction (F)	2 280	6	Micro	96	0	-1
Wholesale trade (51)	1 510	6	Micro	96	-1	1
Retail distribution (incl. car and repair) (50, 52)	3 740	5	Micro	96	-2	0
Transport, communication (I)	1 040	10	LSE	78	-10	-1
Producer services (J, K)	4 310	6	LSE	69	-10	-2
Personal services (H, N, O)	4 140	5	Micro	83	0	-1
Non-primary private enterprise	19 310	7	Micro	74	-9	-4

* A country or sector of industry is said to be micro, small and medium-sized, or LSE dominant if either micro enterprises, small and medium-sized enterprises (taken together) or large-scale enterprises have the largest share in total employment.
** Index, industry total= 100.
*** Gross operating surplus adjusted for imputed wage of self-employed, as percentage of value added; SMEs minus industry total.
**** Share of export in turnover (%); SMEs minus industry total.

Source: Estimated by EIM Business & Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003.

In the analysis at the European level, SMEs have been characterised as having on average a relatively low tendency to export. This is reflected in the data by industry. Only in wholesale trade, is the share of exports in turnover significantly larger in SMEs than in large enterprises. This is because in wholesale trade, large enterprises are more involved in distribution activities (which is mainly a domestic activity) while small enterprises focus more on (international) trade. So results for wholesale trade merely reflect differences in structure within the sector rather than intrinsic differences between enterprise size classes.

As previously found, at the European level SMEs lag behind large enterprises with respect to labour productivity. This again is confirmed at the industry level: except in some industries where SME presence is limited (notably in extraction, in which SMEs tend to perform only very specialised functions), labour productivity in SMEs - and especially in micro enterprises - is not significantly greater than in LSEs. Similarly, the finding that profitability in SMEs lags behind LSE's profitability is generally confirmed at the industry level.

3.1.4. SMEs in Acceding and Candidate Countries[16]

Developments in the Acceding and Candidate countries have been identified as a priority concern for the EU. This has been the case for the last decade, and it is now even more important in view of their accession. Therefore, this Report presents some information on the size and structure of the Acceding and Candidate Countries in comparison to Europe-19. The Acceding and Candidate Countries are comprised of two groups of countries: ten Central and Eastern European Countries (CEECs), and three Mediterranean countries (Cyprus, Malta, Turkey), which have a very different historical background.

The CEECs are in a process of profound structural change. Once the decisive break with communism was made in the early nineties, SME development has been the cornerstone of economic reform policies pursued by all governments in the region. Many new SMEs have been created as entrepreneurship has been promoted as well as from the privatisation and dissolution of formerly stated-owned enterprises. To some extent, this has mainly been a shift from economic activity in inefficient state-owned enterprises to privately owned firms. The addition to employment and output of these newly created SMEs has, certainly in the first half of the 1990s, been partly offset by output and job losses in the large enterprises. In fact, many new SMEs have been created as 'legalisation' of the unofficial economy that had been active in the 1980s. Both shifts are promising and will lead to a more flexible and dynamic enterprise sector in the Acceding and Candidate Countries. The fact that these countries are proceeding on their way to the Acquis might have a positive impact on their business climate.

16 This report was prepared before 1 May 2004, so the term Acceding Countries is used for the 10 countries that will join the European Union on 1 May 2004, and the term Candidate Countries for Bulgaria, Romania and Turkey.

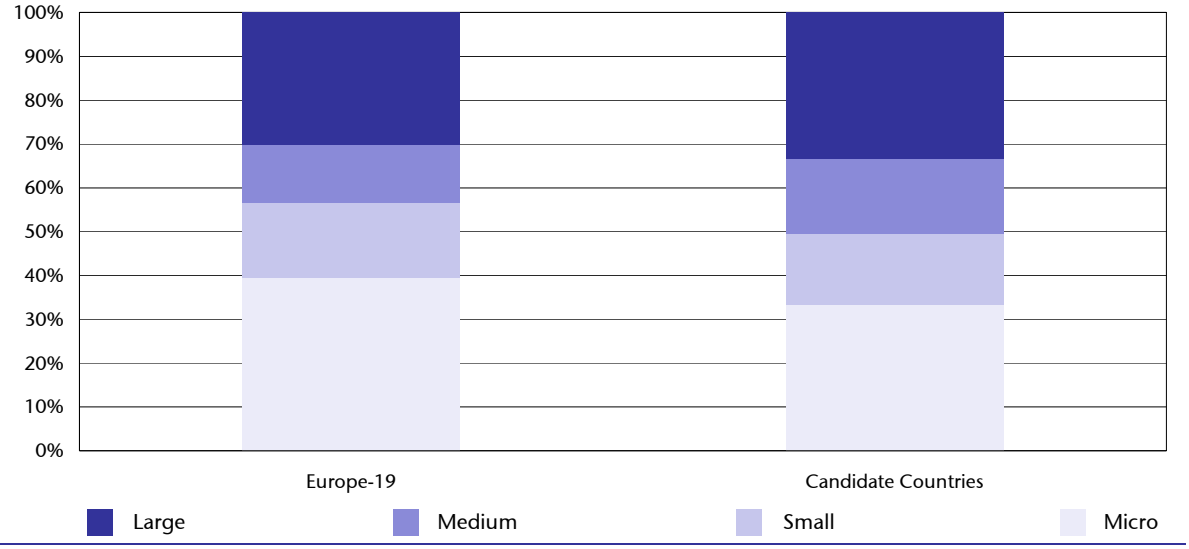
Table 3.4 presents some information with respect to the roles of SMEs based on non-primary private enterprises in the Candidate Countries[17]. In terms of the number of occupied persons, Europe-19 is almost five times as large as the Candidate Countries. However, the associated number of enterprises is three times larger. With regards the size class distribution of the enterprises, the Candidate Countries and Europe-19 are currently quite similar. The average number of occupied persons per enterprise in Candidate Countries is somewhat lower than the Europe-19.

Table 3.4: Roles of SMEs in Acceding and Candidate Countries and Europe-19

		SME				LSE	Total
		Micro	Small	Medium-sized	Total		
Accession countries (2001)							
– Enterprises	*1 000*	5 670	230	50	5 950	10	5 970
– Occupied persons	*1 000*	10 210	4 970	5 350	20 530	10 150	30 670
– Occupied persons/enterprise		2	22	107	3	919	5
– Size-class dominance						Small/Medium-sized	
Europe							
– Enterprises	*1 000*	17 820	1 260	180	19 270	40	19 310
– Occupied persons	*1 000*	55 040	24 280	18 100	97 420	42 300	139 710
– Occupied persons/enterprise		3	19	98	5	1 052	7
– Size-class dominance							Micro

Source: Estimated by EIM Business & Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003, and information from ENSR partners.

Figure 3.3: A comparison of size-class employment shares between Europe-19 and the Acceding and Candidate Countries

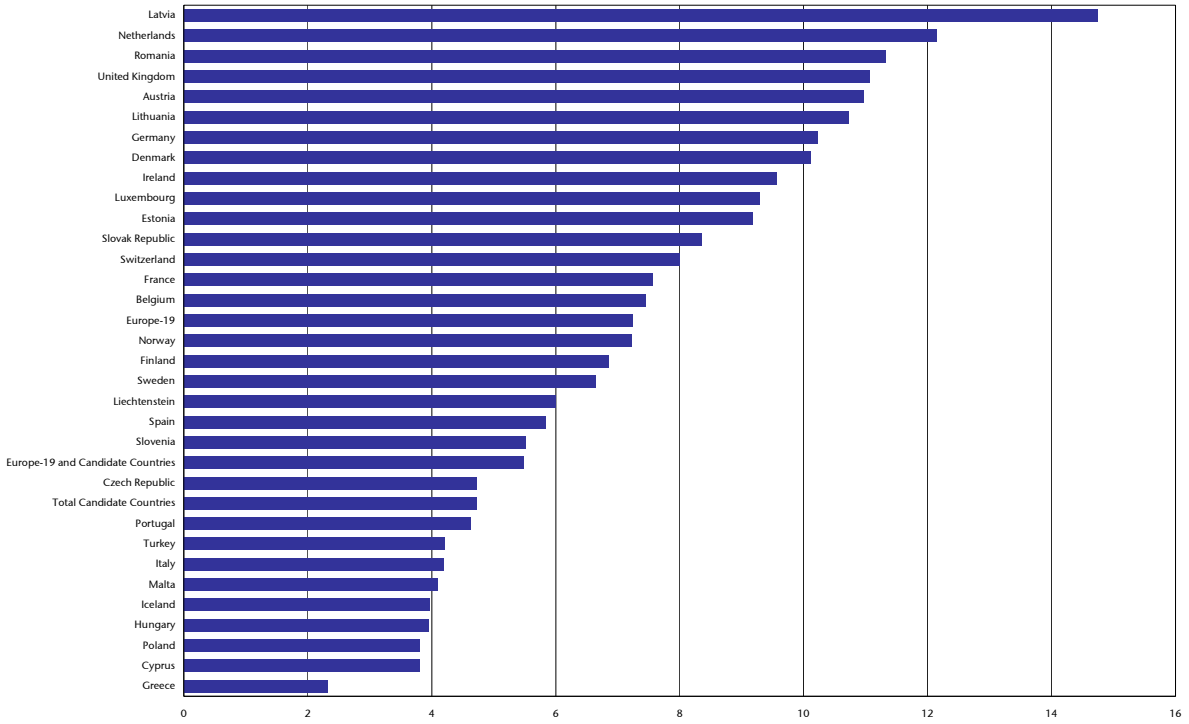


Source: Estimated by EIM Business & Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003, and information from ENSR partners.

17 The data are an update of the data presented in: European Commission, SMEs in Europe, including a first glance at EU candidate countries, Observatory of European SMEs; Report 2002/No. 2, Report submitted to the Enterprise Directorate General by KPMG Special Services, EIM Business & Policy Research, and ENSR; Brussels, 2003, taking into account amongst others recently produced Structural Business Statistics data from Eurostat.

As has been analysed in earlier reports of the Observatory of European SMEs[18], large differences between Candidate Countries exist with respect to average enterprise size (see Figure 3.4). In fact, in Mediterranean countries the mean firm size is relatively low. This would suggest that the roles of SMEs in the Candidate Countries may be similar to that played in the Mediterranean EU-countries such as Greece and Italy. In the CEECs and especially the Baltic countries, the mean enterprise size is considerably larger. In the second half of the 1990s these countries experienced a significant decline in enterprise size, suggesting a process of convergence towards the Europe-19 average enterprise size. The restructuring of the enterprise sector, as indicated above, is the driving force behind this development.

Figure 3.4: Occupied persons per enterprise, Europe-19 countries (2003) and Acceding and Candidate Countries (2001)



Source: Estimated by EIM Business & Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003, and information from ENSR partners.

3.1.5. Comparison with USA and Japan

The previous sections have identified the roles of SMEs in Europe, as well as across individual European countries. It is instructive to benchmark the roles of SMEs in Europe with two of the other major economies, the U.S. and Japan. This comparison is presented in Tables 3.5 and 3.6. The roles of SMEs are strikingly similar when measured in terms of numbers of enterprises. The share of enterprises accounted for each size class is basically the same between the U.S. and Europe. However, when measured in terms of employment, an important difference emerges between the U.S. and Europe. The U.S. has a much lower share of employment in SMEs and a higher share of employment in large enterprises than Europe. This is because many American micro firms are sole proprietors, which mitigates average enterprise size in this size-class, and thus in SMEs. The roles of SMEs in Japan, as measured by employment shares, more closely resembles Europe than the U.S. While an explanation for these differences are beyond the scope of this report, the interpretation may lie in a difference in industry dynamics between Europe and the U.S. It could also be related to the existence of a larger integrated market in the US: in countries with large markets relatively more large companies are found. To the extent that entry and exit of en-

18 European Commission, SMEs in Europe, including a first glance at EU candidate countries, Observatory of European SMEs; Report 2002/No. 2, Report submitted to the Enterprise Directorate General by KPMG Special Services, EIM Business & Policy Research, and ENSR; Brussels, 2003.

terprises is more prevalent in the U.S., more micro enterprises will be in the start-up phase in the U.S., and average enterprise size in that size-class will be lowest in the U.S.

Table 3.5 Enterprises and employment in non-primary private enterprise, USA, Japan and Europe-19

	SME				LSE	Total
	Micro	Small	Medium	Total		
Enterprises USA, 2000						
Number of enterprises (x 1 000)	19 988	1 009	167	21 164	59	21 223
Occupied persons (x 1 000)	27 872	20 061	15 660	63 593	66 042	129 635
Occupied persons per enterprise	1	20	94	3	1 119	6
Enterprises Japan, 2001						
Number of enterprises (x 1 000)	n/a	n/a	n/a	4 690	13	4 703
Occupied persons (x 1 000)*	n/a	n/a	n/a	25 601	12 676	38 277
Occupied persons per enterprise*	n/a	n/a	n/a	5	975	8
Enterprises Europe-19, 2003						
Number of enterprises (x 1 000)	17.820	1 260	180	19.270	40	19 310
Occupied persons (x 1 000)	55 040	24 280	18 100	97 420	42 300	139 710
Occupied persons per enterprise	3	19	98	5	1 052	7

* Regular employees of companies + regular employees of sole proprietor establishments.

Sources: USA: SBA and US Census; Japan: MPHPT, Establishment and Enterprise Census of Japan (2001); Europe-19: Estimated by EIM Business & Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003, and information from ENSR partners.

Table 3.6: Comparison of size class structure (percentage of total) for the number of enterprises and employment, USA, Japan and Europe-19

	SME				LSE**
	Micro	Small	Medium	Total	
Enterprises					
USA, 2000	94 %	5 %	1 %	100 %	0 %
Japan, 2001	n/a	n/a	n/a	100 %	0 %
Europe-19, 2003	92 %	7 %	1 %	100 %	0 %
Occupied persons (employment)					
USA, 2000	22 %	15 %	12 %	49 %	51 %
Japan, 2001*	n/a	n/a	n/a	67 %	33 %
Europe-19, 2003	39 %	17 %	13 %	70 %	30 %

* Regular employees of companies + regular employees of sole proprietor establishments.
** Shares of LSEs in the total number of enterprises are in the order of 0.25 %.

Sources: USA: SBA and US Census; Japan: MPHPT, Establishment and Enterprise Census of Japan (2001); Europe-19: Estimated by EIM Business & Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003, and information from ENSR partners.

3.2. Changes in the performance of SMEs

3.2.1. Changes in the performance of SMEs in Europe-19

The current size and structure of SMEs in Europe, both at the European level and for individual European countries were documented in the previous Section 3.1. As was made clear in Chapter 2, there are compelling reasons, and already evidence from the literature on small business economics, that the role of entrepreneurship and SMEs has been changing over time. Thus, the purpose of this section is to provide some insights as to how the SME sector has been changing over the past fifteen years.

The development of the SME sector based on the non-primary private enterprise data in Europe-19 between 1988 and 2003 is summarised in Table 3.7. Real turnover from non-primary enterprises increased 2.5 % annually over this time period. However, the growth rates in turnover were slightly greater for larger enterprises, 2.7 %, than for SMEs, 2.4 %. By contrast, annual growth in employment was slightly greater in SMEs, 0.2 %, than in large enterprises, 0.1 %.

What are the reasons for SMEs' turnover growth lagging behind LSEs' turnover growth? One issue is the fact that SMEs and LSEs operate in different markets. Generally, LSEs have a higher tendency to export, and as exports have increased faster than domestic sales (6.1 % annually against less than 2 % respectively), this focus gives an advantage to LSEs. Taking this into account would explain some of the differences between size-classes, but certainly does not give a full explanation.

A second reason is that SMEs have increased prices faster than LSEs. Figure 3.4 clearly suggests that the fact that SMEs increased prices faster than LSEs, was the main cause of their sales growth lagging behind LSEs real turnover growth. Annex III - in which the model used is explained in more detail - shows that this negative correlation between real development and relative prices does not occur at the long term macro level only (as in Figure 3.5, which describes developments 1988-2003), but also when yearly time series at Europe-19 level are used, as well as data by sector of industry or by country in the longer term (1988-2003).

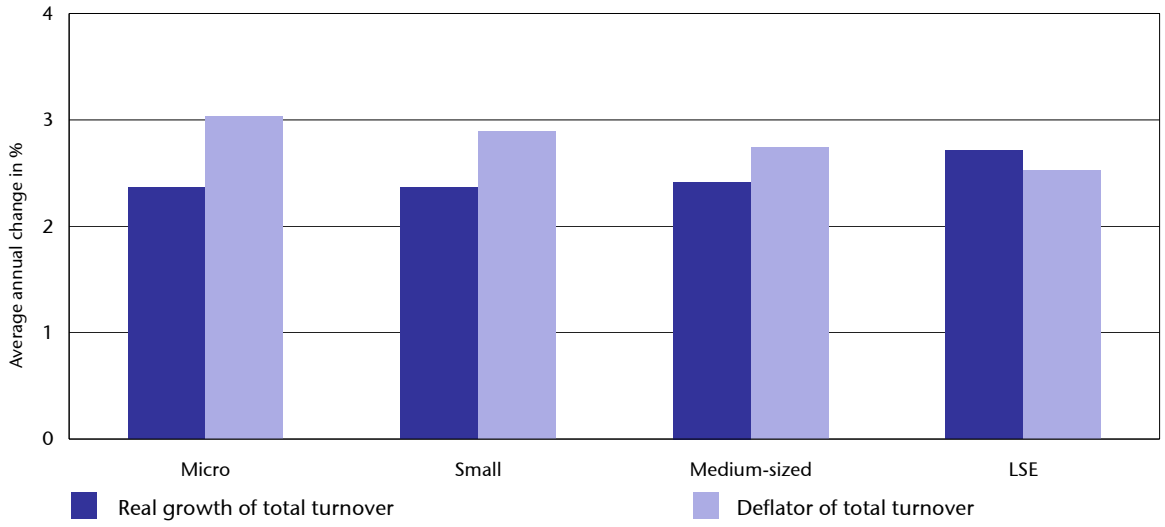
On average, real value added in non-primary private enterprise grew by 2.3 % a year between 1988 and 2003. The size-class pattern of real value added growth is similar to real turnover growth.

Table 3.7: Change in the Roles of SMEs, Europe-19, 1988-2003

	SME				LSE	Total
	Micro	Small	Medium-sized	Total		
	Average annual change in %					
Real turnover						
Domestic sales						
Consumption goods	1.4	1.0	0.5	1.1	0.2	0.8
Investment goods	1.9	1.3	0.8	1.5	0.7	1.2
Intermediate goods	2.7	2.7	2.7	2.7	2.8	2.7
Total	2.1	1.9	1.7	1.9	1.8	1.9
Exports	5.8	5.8	6.2	6.0	6.2	6.1
Total	2.4	2.4	2.4	2.4	2.7	2.5
Real value added	1.9	2.1	2.2	2.1	2.6	2.3
Labour productivity	1.6	2.0	2.4	1.9	2.7	2.2
Employment	0.3	0.1	-0.2	0.2	-0.1	0.1
Enterprises	0.4	0.1	-0.1	0.4	-0.2	0.4
Value added deflator	3.2	3.2	3.0	3.1	2.8	3.0
Labour costs per employee	4.3	4.4	4.4	4.3	4.4	4.4
Real wage rate	1.0	1.1	1.4	1.2	1.6	1.4
Unit labour costs	-0.6	-0.9	-0.9	-0.7	-1.1	-0.8
	Average annual change in %-points					
Profitability	0.2	0.4	0.3	0.3	0.2	0.3

Source: Estimated by EIM Business & Policy Research; estimates based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003.

Figure 3.5: Real growth of total turnover and deflator of total turnover in non-primary private enterprise, Europe-19, 1988-2003



Source: Estimated by EIM Business & Policy Research; estimates based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003.

It is price differentials between SMEs and LSEs that explain to a large extent the SME/LSE growth differential. The question, then, is why do SMEs increase prices faster than LSEs? The first focus is on costs. Given the availability of data, the analysis focuses on the costs of labour. On average, labour costs per employee increased by 4.5 % annually in non-primary private enterprise, with only minor differences between size-classes. Labour productivity increased on average by 2.2 %, and here, large differences between size-classes can be observed. SMEs, and micro enterprises especially, lag behind LSEs as regards labour productivity growth. This seems to be a structural phenomenon, as it can also be observed when sub-periods are distinguished. It was only in the 1991/'93 downturn that labour productivity in medium-sized enterprises grew faster than in LSEs, while in other periods labour productivity growth in micro, small and medium-sized enterprises was significantly lower than in LSEs. A possible explanation for this is that real wages in SMEs increase less than in LSEs (see Table 3.7), which means that other thing being equal, large enterprises have a stronger incentive to replace labour by capital[19]. These results are quite consistent with those presented in Annex II that show that an increase in the number of enterprises - which is of course almost completely equal to changes in the number of SMEs, and especially micro firms - has a negative impact on macro-economic labour productivity.

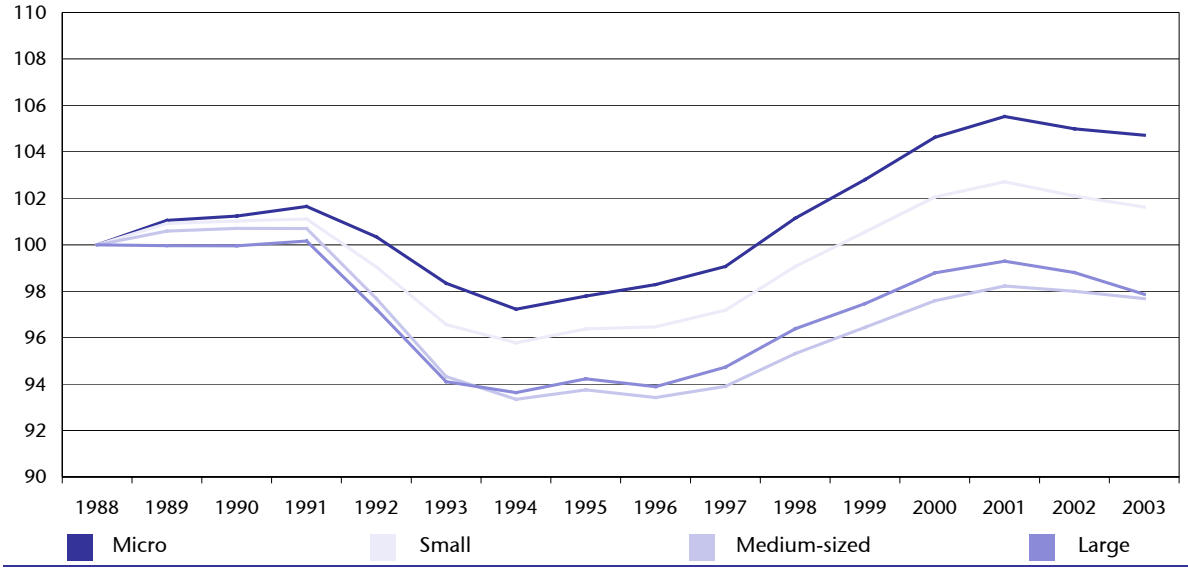
Combining a uniform size-class pattern of wage increases, and small enterprises lagging behind large ones with respect to labour productivity growth, it becomes clear that unit labour costs decrease most in LSEs, and least in micro enterprises; small and medium-sized enterprises are in-between. At a uniform increase of the profit margin over labour costs, this would imply that prices[20] in small enterprises rise faster than in large enterprises. In fact, according to the measure used here, profitability grows even faster in small and medium-sized enterprises than in large enterprises. So both the size-class pattern of labour productivity growth as well as the share of gross operating surplus over labour costs has contributed to the value added deflator rising faster in small enterprises than in large ones

The higher growth in employment contributed by SMEs rather than by large enterprises is shown in Figure 3.6, which depicts the size-class pattern of employment development in Europe-19. It can be clearly seen that employment growth is negatively related to enterprise size. In the 1991/1993 period of slow economic growth, employment decline is smallest in micro enterprises and largest in LSEs. Also, during the recovery from 1994 onwards employment growth was strongest in micro enterprises. The size-class pattern in the current economic slowdown, however, is less clear-cut.

19 The real wage elasticity of labour demand does not differ much between large and small enterprises, witness the few empirical studies that have investigated the issue. See EIM/ENSR, 1997, The Observatory of European SMEs, Fifth Annual Report, pp. 138-139.

20 *I.e.*, the value added deflator.

Figure 3.6: Development of employment by size-class, Europe-19 (index, 1988 = 100)



Source: Estimated by EIM Business & Policy Research; estimates based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003.

3.2.2. Comparison with the USA

Just as comparisons between the static roles of SMEs in Europe with that in the U.S. are instructive, it is also useful to benchmark changes in the roles of SMEs between the two regions. Table 3.8 shows how changes in the size class distribution of employment growth in Europe-19 compare with those in the U.S. Several differences are striking. First, the U.S. exhibited higher employment growth in both periods. In the 1993-1998 period, this growth differential can be observed across all size-classes. By contrast, for the 1998-2001 period, employment growth for U.S. micro enterprises is less than that for the European counterparts.

A second important finding is that in Europe a negative relationship between enterprise size and employment growth exists. Employment grows fastest in micro enterprises and slowest in LSEs. By contrast, in the US employment grew greater in large enterprises and less in micro enterprises. An important qualification is that the degree, to which the positive relationship between enterprise size and growth reflects crossovers across class size boundaries, or the growth of enterprises from smaller size classes into the large firm size class, cannot be determined by these static data.

Table 3.8: Employment growth by size-class, Europe-19 and USA

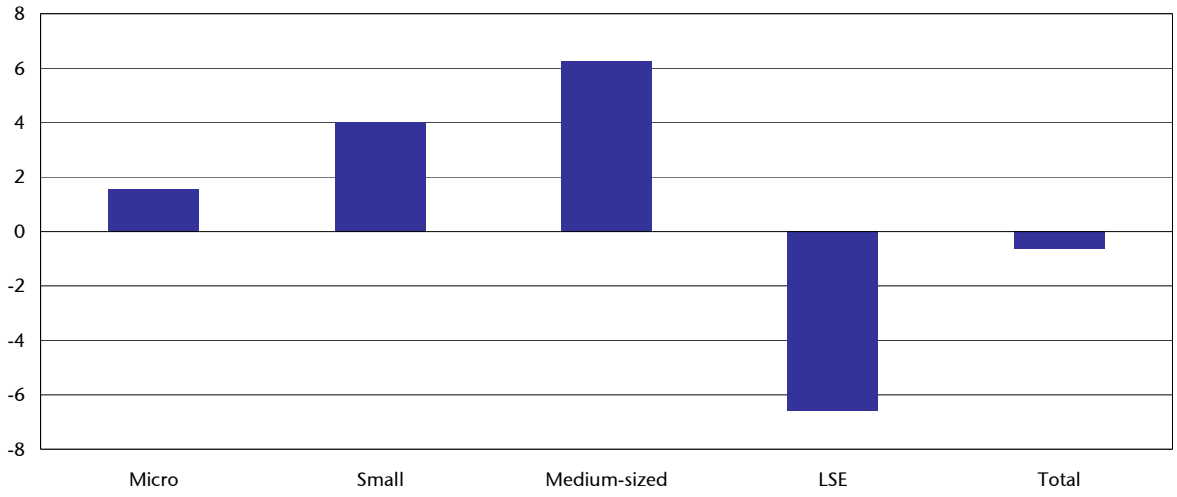
	1993/1998		1998/2001	
	Europe-19	USA	Europe-19	USA
	Average annual change in %			
SMEs				
– Micro	0.6	1.1	1.4	0.3
– Small	0.4	1.9	1.2	1.9
– Medium-sized	0.3	2.2	1.0	2.5
– Total	0.5	1.8	1.3	1.7
LSEs	0.3	3.5	1.0	3.5
All enterprises	0.4	2.7	1.2	2.7

Source: Estimated by EIM Business & Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003. USA data are derived from SBA/Census data.

3.2.3. Acceding and Candidate Countries

Figure 3.7 shows how the roles of SMEs have changed over time in the Acceding and Candidate Countries, by depicting the size-class pattern of employment growth. Changes in the roles of SMEs in those countries are clearly different from the experience in Western Europe. In particular, there has been a striking increase in the roles of small and medium-sized enterprises, a decrease in micro firms, and a significant decrease in LSEs. This reflects the special nature of economic development in these countries, with old, formerly state-owned enterprises being broken up, leading to an increase of the number of small and medium-sized firms and a corresponding employment growth in these size-classes.

Figure 3.7: Employment growth by size-class in the Acceding and Candidate Countries, 1995/2001 (average change in % per year)



Source: Estimated by EIM Business & Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003.

3.2.4. Changes in the performance of SMEs by industry sector

This report has already shown that the size and structure of SMEs varies systematically across industrial sectors. Table 3.9 clearly shows that the performance of SMEs similarly vary across industrial sectors. In some sectors, such as extraction, construction and trade, SMEs have experienced a relatively higher increase in real value added; these sectors have a share of approximately 20 % in total value added from non-primary private enterprise. In the remaining sectors (that count for 80 % of total value added), the growth of SMEs has been more limited compared with LSEs. The general pattern here is that SMEs lag behind large enterprises with respect to labour productivity growth in most sectors of industry; and, as at the macro level, employment increases most (or decreases least) in SMEs in most sectors of industry.

Table 3.9: Changes in real value added, labour productivity and employment by sector of industry and size-class, Europe-19, 1988/2003

	Real value added			Labour productivity			Employment		
	SME	Large	Total	SME	Large	Total	SME	Large	Total
	Average annual change in %								
Extraction (incl. energy); NACE C+E	2.4	2.1	2.2	0.7	-0.6	-0.2	1.6	2.8	2.4
Manufacturing; NACE D	2.1	2.8	2.5	2.7	3.6	3.1	-0.5	-0.8	-0.6
Construction; NACE F	1.3	0.7	1.2	1.1	1.3	1.1	0.2	-0.6	0.1
Wholesale trade; NACE 51	2.3	2.0	2.2	1.6	1.7	1.6	0.7	0.3	0.6
Retail distribution (incl. car and repair); NACE 50, 52	1.6	0.5	1.3	1.6	2.1	1.7	0.0	-1.6	-0.5
Transport, communication; NACE I	2.5	2.6	2.5	1.2	2.1	1.7	1.3	0.5	0.9
Producer services; NACE J, K	2.2	2.7	2.5	1.1	1.5	1.3	1.1	1.3	1.2
Personal services; NACE H, N, O	1.7	2.2	1.9	1.8	3.1	2.1	-0.1	-0.9	-0.3
Total	2.1	2.6	2.3	1.9	2.7	2.2	0.2	-0.1	0.1

Source: Estimated by EIM Business & Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003.

3.2.5. Changes in the performance of SMEs by country

The performance of SMEs vis-à-vis LSEs has varied considerably across individual European countries (Table 3.10). While SMEs have contributed an increase in employment in some countries, such as Luxembourg, Iceland, and Spain, in other countries, such as Belgium, Denmark and Finland, SMEs have actually experienced a decrease in employment.

In many countries SMEs lag behind large enterprises with respect to real value added growth. Also, LSEs tend to perform better than SMEs in improving labour productivity. There is a strong correlation between the SME/LSE differentials for labour productivity and the SME/LSE size-class differential regarding real value added growth. In other words, when SMEs perform better than LSEs with respect to labour productivity growth, then often SMEs also outperform LSEs with respect to real value added growth. For example, in Sweden, labour productivity in SMEs increased by 3 % annually as against 2.7 % in LSEs; at the same time, real value added growth was 1.8 % in SMEs and 1.4 % in LSEs. A similar pattern (but in favour of LSEs) can be observed in Ireland. These results suggest that if a size class experiences relatively strong labour productivity growth in a country - and thus has some cost advantage -, this size-class also shows stronger real value added growth.

Furthermore, it was found at the Europe-19 level that SMEs experienced job growth, while in LSEs, employment decreased. This relatively favourable pattern for SMEs is found in many individual countries as well.

Table 3.10 Changes in the real value added, labour productivity and employment by country and size-class, 1988/2003

	Real value added			Labour productivity			Employment		
	SME	Large	Total	SME	Large	Total	SME	Large	Total
	Average annual change in %								
Austria	1.5	1.3	1.4	1.5	1.2	1.4	0.0	0.1	0.1
Belgium	1.6	1.9	1.7	1.7	2.0	1.8	-0.1	-0.1	-0.1
Denmark	2.4	2.6	2.4	2.6	2.6	2.6	-0.2	0.0	-0.2
Finland	0.7	0.7	0.7	2.2	2.4	2.3	-1.5	-1.6	-1.5
France	1.2	2.2	1.7	1.1	1.4	1.4	0.1	0.7	0.3
Germany	2.1	2.6	2.3	2.1	3.0	2.4	0.0	-0.4	-0.2
Greece	3.3	-3.7	1.9	1.8	-4.3	0.6	1.5	0.6	1.3
Ireland	7.2	8.6	8.1	4.5	5.6	5.3	2.7	2.9	2.7
Italy	1.4	1.7	1.5	1.5	1.9	1.6	-0.1	-0.2	-0.1
Luxembourg	4.4	4.1	4.3	1.7	2.9	2.1	2.6	1.2	2.2
Netherlands	1.6	2.3	1.9	1.1	1.3	1.2	0.5	0.9	0.7
Portugal	2.9	3.2	3.0	2.7	2.8	2.8	0.2	0.4	0.3
Spain	2.6	2.5	2.5	1.3	1.3	1.3	1.2	1.2	1.2
Sweden	1.8	1.4	1.6	3.0	2.7	2.8	-1.2	-1.3	-1.2
United Kingdom	2.4	2.3	2.3	2.6	3.2	2.8	-0.2	-0.9	-0.5
EU-15	*2.1*	*2.5*	*2.3*	*1.9*	*2.6*	*2.2*	*0.1*	*-0.2*	*0.1*
Iceland	1.7	1.3	1.5	0.3	1.2	0.7	1.4	0.2	0.8
Norway	3.0	3.4	3.2	1.7	2.3	1.9	1.3	1.1	1.2
Switzerland (incl. Liechtenstein)	1.2	1.4	1.3	0.6	1.2	0.8	0.6	0.2	0.5
Iceland, Norway, Switzerland	*2.0*	*2.9*	*2.5*	*1.2*	*2.3*	*1.8*	*0.9*	*0.5*	*0.8*
Europe-19	*2.1*	*2.6*	*2.3*	*1.9*	*2.7*	*2.2*	*0.2*	*-0.1*	*0.1*

Source: Estimated by EIM Business & Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003.

Chapter 4
SMEs' behaviour in the current economic setting

4.1. Introduction

In the previous chapters the impact that SMEs have on economic performance in Europe is explained and a careful measurement of the structures and roles of SMEs is presented, as well as how the economic roles of SMEs have been changing over time.

A report about SMEs in Europe cannot be complete without attention being paid to the current economic setting. The European economy is recovering from an economic downturn. Very little information is known about the roles of SMEs in the business cycle[21] and in particular how SMEs respond to economic shocks. This issue is dealt with in this chapter. The analysis is predominantly based on responses gathered directly from the business owners through the ENSR Enterprise Survey carried out in spring 2003[22].

4.2. Economic fluctuations in the EU, USA and Japan

Swings in economic activity, so-called business cycles, are 'part of business life'. Industries can experience booming years with low unemployment and many job vacancies, while other years are characterised by significant below-capacity production. Business cycles typically consist of alternating booms and recessions. For more than a century, economists have studied business cycles. Burns and Mitchell were the first to identify and analyse business cycles in the sense that many economic indicators (such as employment or GDP) move together.[23]

Business cycles do not have an underlying economic explanation; neo-classical economic theories would predict a full-employment output, without disturbances, based on the assumption of full information and perfect markets. The cycles do occur, however, because there are *disturbances* to the economy. These disturbances may stem from a variety of factors in the economy; both internal disturbances (such as over-investment, speculation) and external shocks (war, epidemics, new technologies, a wave of optimism among consumers etc.).[24]

In Figure 4.1 the growth in GDP in the European Union over the period 1996-2004 is given. As the figure shows, the recession in Europe started in 2000 and in 2003 the first signs of the recovery were seen. Compared with two other major economies, i.e. the United States and Japan, the aggregate fluctuation has been notably different in the past two decades. The European Union GDP growth has been below that of the United States since 1992 - with the exception of the year 2001, which can be attributed to the shock of September 11th. This difference seems to have its roots in higher productivity gains through flexibility, as a result of a more rapid restructuring from an industrial economy to an information economy[25]. In addition the American private sector appears to be more flexible with regards to pursuing new business opportunities by entrepreneurs, and also with respect to labour (market) flexibility. Moreover, business failure seems to be more readily accepted in the US than in Europe[26]. Japan has recovered from the Asia crisis of 1997-1998 and its GDP growth currently moves, along with the US and the EU in an upward trend.

21 One of the few studies in this respect is a recently published study by the Small Business Administration in the United States: Joel Popkin and Company, Small Business During the Business cycle, Small Business Administration Office of Advocacy, Washington, DC, 2003.

22 See Annex VI to this report: The set-up of the ENSR Survey 2003.

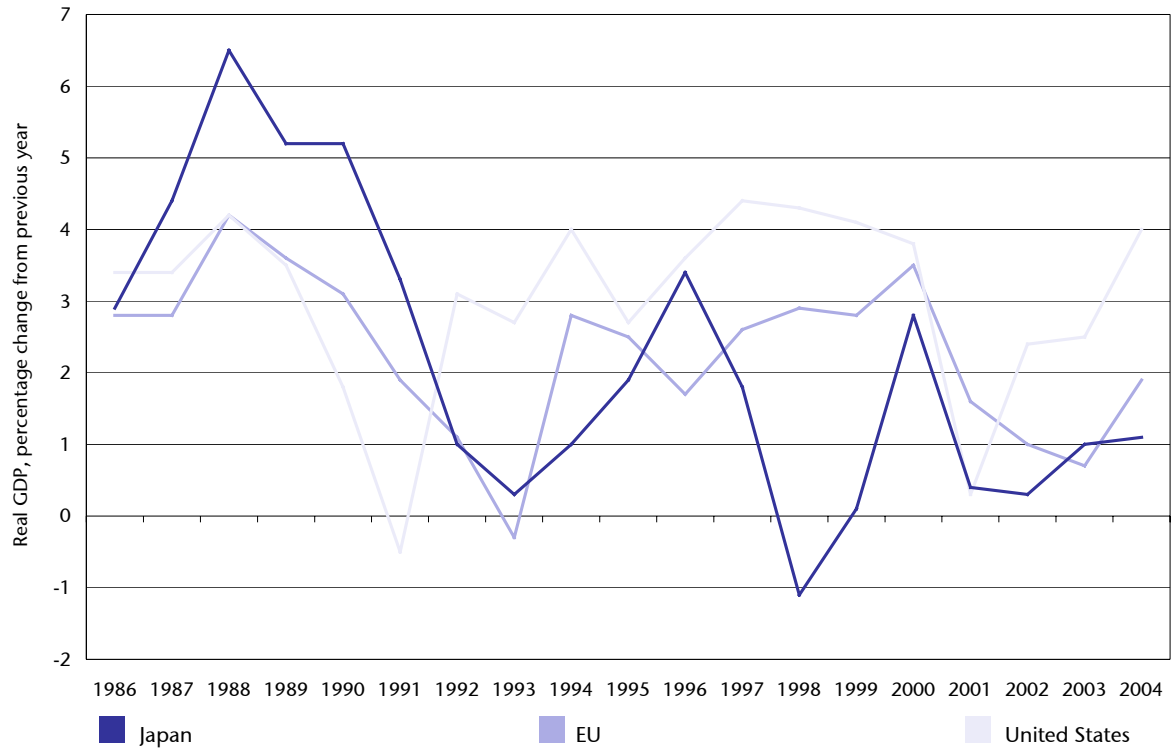
23 Burns, A.F., W.C. Mitchell, Measuring Business Cycles, NBER, New York, 1946.

24 Backus, D.K., P.J. Kehoe, International Evidence on the Historical Properties of Business Cycles, American Economic Review, 82, 864-888, 1992.

25 Acs, Z.J., B. Carlsson and C. Karlsson, The linkages among entrepreneurship, SMEs and the macroeconomy, in Acs, Z.J., B. Carlsson and C. Karlsson (eds.), *Entrepreneurship, Small & Medium-Sized Enterprises and the Macroeconomy*, Cambridge University Press, 1999.

26 See Bosma, N.S., I. Verheul, F. van der Nol and T. Wong, Determinants of entrepreneurship in USA, in D.B. Audretsch, A.R. Thurik, I. Verheul and S. Wennekers (eds.) Entrepreneurship: Determinants and Policy in a European-US Comparison, Kluwer Academic Publishers, Boston/Dordrecht, 2002.

Figure 4.1: Real GDP growth in the European Union, 1986-2004 (2003 and 2004 are forecasts)



Sources: Eurostat and OECD.

4.3. SMEs' behaviour in relation to economic fluctuations in general

Though investigating SME business cycles is a macro-based study, the underlying questions and explanations of observed SME behaviour are on the micro level rather than the macro level. In the existing economic literature, little has been published on the translation of micro entrepreneurial behaviour as a response to (or anticipation of) business cycles into macro SME development in terms of employment and output. For example, the process of entry and exit (churning of business activity) is highly relevant for the development of the SME sector, but so far not linked to existing business cycle indicators.

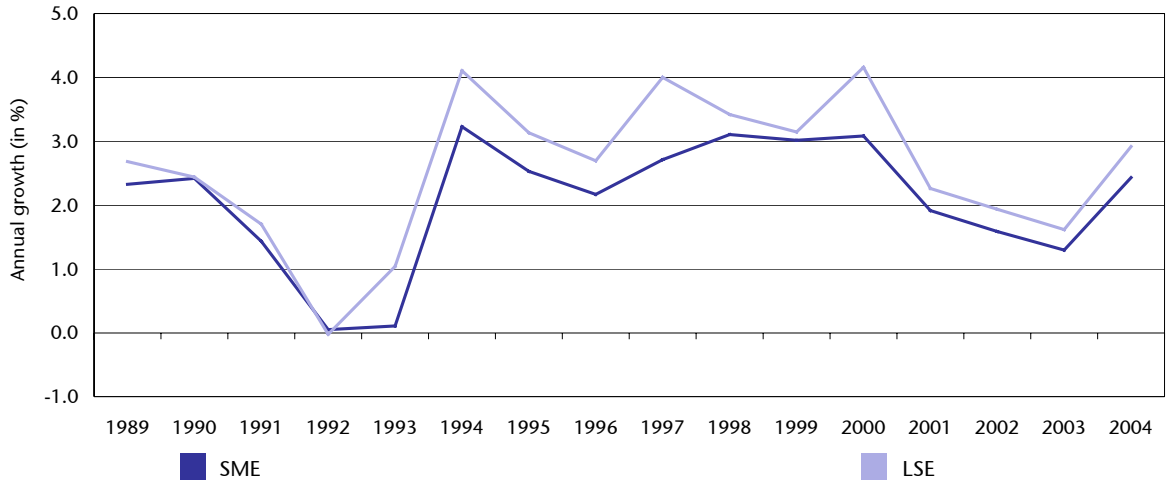
In July 2003, the SBA performed an empirical study on the movement of value added in small business sectors and large business during the overall business cycle in the United States[27]. The study shows that in the United States, during the 1958, 1961 and 1975 expansions, small business lost ground relative to large business. In the 1982 and the 1991 expansions, small business gained in GDP relative to large business. The tentative conclusion is that in recent years small business output gains in importance during expansion.

Within some industries, patterns emerged in the small business to large business GDP ratio reflecting relatively consistent cyclical differences. Industries with strong trend rates of growth, however, show smaller differences in relative cyclical activity by business size. For example, the evidence of noticeable cyclical differences by enterprise size was limited in the finance, insurance and real estate industries. The services showed modest cyclical differences by firm size. In construction, small firms tend to be more affected by downturns compared to large firms, but do slightly better than large firms during an expansion. For manufacturing, transportation, communications and utilities however, it is the other way around. The service-producing sector shows the most notable difference in business size activity along the business cycle.

27 Joel Popkin and Company, Small Business During the Business cycle, Small Business Administration Office of Advocacy, Washington, DC, 2003.

In Figure 4.2 it is seen that for the Europe-19 countries value added growth (as a proxy to size class specific GDP) of SMEs moves together with the annual growth for LSEs since the 1990s28. Closer inspection of the data – based on correlation analysis - reveals that neither SMEs nor LSEs lead or lag with the overall pattern of GDP-growth. Furthermore, fluctuations of both yearly real value added growth and employment growth tend to be somewhat smaller in SMEs than in LSEs.

Figure 4.2: Development of real value added, for SMEs and LSEs in the EU-19 countries, 1989-2004



Sources: Estimated by EIM Business & Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003.

4.4. Reactions of SMEs to the current economic developments

Through the ENSR Enterprises Survey, information has been gathered on how SMEs perceived the economic situation in spring 2003. In addition the enterprises were surveyed on their behaviour. The results are presented in this section.

4.4.1. Assessment of the economic situation by SMEs

In Spring 2003, about 30 % of the SMEs in Europe-19 perceived a (very) good economic climate, another 30 % perceived the climate as (very) poor. As Table 4.1 shows this perception holds for all size classes. A similar pattern was also found for all sectors. However, probably the pattern is different at sub-sector level, as some sub-sectors are more cyclical than others and they also differ in responsiveness toward international economic fluctuation[29]. Due to the limited number of observations at sub-sector level, these results could not be verified on the basis of the ENSR Survey.

28 For the years before 1989, comparable EU data distinguishing size classes are not available.

29 This is in accordance with Geroski and Gregg's finding for the United Kingdom; they find evidence of heterogeneity in the distribution of the effects of a recession within a sector. See Geroski. P.A., P. Gregg, *Coping with recession*, Cambridge University Press, 1997.

Table 4.1: Assessment by SMEs of the current economic situation, by size class, spring 2003

	Micro	Small	Medium
Very good	5 %	5 %	6 %
Good	23 %	24 %	23 %
Average	42 %	42 %	37 %
Poor	22 %	21 %	27 %
Very poor	7 %	7 %	7 %
Don't know/no answer	0 %	1 %	0 %

Source: ENSR Survey 2003.

Effect on turnover of SMEs

Apart from sector-specific characteristics, enterprise-specific characteristics may also influence sensitivity to recession: is there a significant difference between the effects on smaller and large enterprises? Large enterprises may be less flexible than small enterprises but they benefit, among other things, from economies of scale, have more in-company knowledge concerning relevant trends for the near future and probably have more opportunities for financing in the short term.

The ENSR Survey 2003 shows that smaller enterprises are somewhat less affected by the current economic situation than larger enterprises: a negative correlation between enterprise size and the negative effects on turnover due to the economic situation (see Table 4.2). This pattern also emerges in most countries.

Table 4.2: Effect on SMEs of the current economic situation on turnover, by size class, spring 2003

	Micro	Small	Medium-sized
Strong positive effect	2 %	3 %	1 %
Positive effect	14 %	15 %	12 %
No effect	39 %	34 %	31 %
Negative effect	37 %	41 %	44 %
Strong negative effect	6 %	6 %	11 %
Don't know/no answer	0 %	1 %	0 %

Source: ENSR Survey 2003.

4.4.2. SME responses to recessions and contractions

Possible actions

The organisational structure of an enterprise influences its decisions whether or not to make serious changes during downturns. A classification can be made along (i) entrepreneurial, pro-active response; (ii) efficiency-recovery, reactive response; and (iii) no response[30]. Entrepreneurial responses are interpreted by significant changes in the product-market combination. Decisions that pertain to employment and cost-reduction are typical examples of efficiency-recovery responses.

Responses pertaining to employment

In Chapter 3 it was found that the limited labour productivity growth in SMEs is mainly caused by micro enterprises. During downturns, smaller enterprises maintain more employees above the efficient level compared to larger enterprises (labour hoarding)[31]. Micro enterprises especially have fewer opportunities to lay off personnel. Moreover, considering stronger personal ties within the enterprise, business owners are probably also less inclined to discharge personnel, even if they have the chance to do so. About 70 % of the SMEs in Europe-19 claim to maintain the same number of employees (as of Spring 2003) and as Table 4.3 shows there is a clear relation-

30 Michael, S.C., D.K. Robbins, Retrenchment among small manufacturing firms during recession, *Journal of Small Business Management* 36, p. 35-45, 1999.

31 See e.g. the following previous Observatory reports: The Observatory of European SMEs, Chapter: SMEs in Europe, 1996, 1998.

ship between enterprise size and employment decisions in response to the economic situation: 17 % of the micro-enterprise plan to reduce the number of employees, compared to 38 % of the medium-sized enterprises[32]. However, this pattern is not present in every country. The countries that reflect no clear size class pattern are: Austria, Switzerland, Spain, Portugal, Iceland and Ireland. The pattern is present for all sectors excluding business services and personal services (for which no clear pattern can be observed).

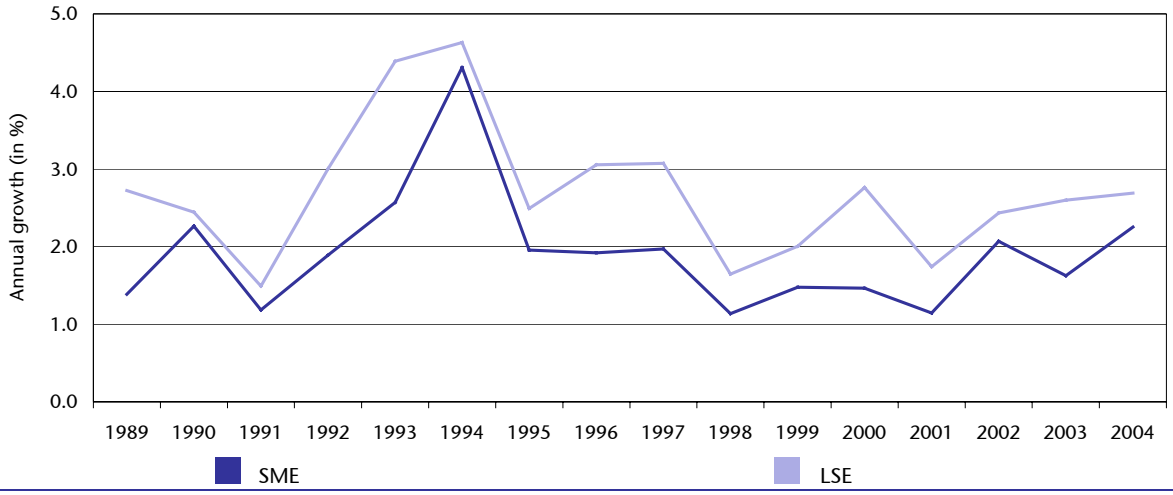
Table 4.3: Effect of the current economic situation on the number of employees, by size class, Spring 2003

	Micro	Small	Medium
Reduce the number of employees	17 %	28 %	38 %
Maintain the same number of employees	71 %	57 %	49 %
Increase the number of employees	10 %	15 %	12 %
Don't know/no answer	2 %	1 %	1 %

Source: ENSR Survey 2003.

The aggregate contributions of SMEs and LSEs to productivity growth were set out in Annex II. To further explain the observed contributions in the business cycle perspective, the following figure sets out the year-to-year developments: Figure 4.3 makes clear that the EU labour productivity growth in the SME sector is consistently below the growth in the LSE sector. This explains the large gap between SME productivity and LSE productivity during slowdowns and the start of the recovery (in for example 1991-1993).

Figure 4.3: Development of labour productivity growth, for SMEs and LSEs in the EU-19 countries, 1989-2004



Sources: Estimated by EIM Business and Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003.

Responses pertaining to investment plans

The economic situation can also influence the investment behaviour of SMEs. About half of them indicated that the most important investments in 2002, took place as planned. Medium-sized enterprises abandoned their investments relatively more than micro and small enterprises. In addition, Table 4.4 also reveals that smaller enterprises may be more inclined to bring forward their investments. This could reflect a relatively high number of small enterprises that see opportunities for investing.

32 Statistically significant at the 95 % level.

Table 4.4: Effect of the current economic situation on (the most important) investment plans, by size class, spring 2003

	Micro	Small	Medium
Abandoned investments	13 %	12 %	6 %
Postponed investments	18 %	24 %	38 %
Brought forward investments	13 %	14 %	7 %
No change in investment plans	55 %	48 %	49 %
Don't know/no answer	1 %	1 %	1 %

Source: ENSR Survey 2003.

Other responses to economic developments

Other actions available to the entrepreneurs are reducing costs and/or reducing prices. From Table 4.5 it appears that cost reductions as well as price reductions are reported more often by medium-sized enterprises than by micro and small enterprises. This supports the proposition that smaller enterprises are less able to use price instruments as a response to economic adversity compared to larger enterprises. In contrasts, almost half of the SMEs claim to consider new markets in response to the economic slowdown. This reaction is particularly apparent for enterprises that have existed for less than five years and enterprises that exported in the previous year.

Table 4.5: Possible actions in response to economic slowdown, by size class, spring 2003

	Micro	Small	Medium
Reduce labour costs	23 %	36 %	40 %
Reduce other costs	46 %	53 %	66 %
Reduce prices	19 %	22 %	28 %
Reduce working hours	11 %	16 %	16 %
Consider new products/markets	42 %	53 %	53 %
Close an establishment/company	5 %	5 %	9 %
Don't know/no answer	17 %	8 %	8 %

Source: ENSR Survey 2003.

4.4.3. A special focus on young high potential SMEs

Looking at the possible actions in Table 4.5, a crucial group of SMEs for many policy makers is the one that considers new products or new product markets, as this is the most entrepreneurial response. In Section 2.2.3 it was highlighted why smaller enterprises may, in fact, tend to have an innovative advantage, at least in certain industries.

The ENSR survey makes it possible to establish other characteristics of this particular group. The group of SMEs that considers new products or markets in response to the economic situation is particularly seen among enterprises that experience an increase of turnover above 25 %. These enterprises also exhibit relatively high investments and are relatively young. This group of enterprises can therefore be seen as the young high potential SMEs.

Defining a specific group of SMEs in the ENSR survey as: younger than 5 years, while considering new markets as a response to economic growth, these 8 % of SMEs in the survey would employ 2 663 people in 2001, and 3 040 people in 2002 (see Table 4.6). Almost half of this group estimated a growth in turnover for 2002, as compared with 2001. In contrast their counterparts would employ 46 400 in 2001 and 45 200 in 2002. For this group, only one third estimated a growth in turnover in 2002.

Of course, one would *a priori* expect younger firms to be more optimistic about their performance than longer established firms. Moreover, it is easier for small enterprises to grow by 50 % than for large firms. However, using Birch rates for employment growth, young enterprises that claim to focus on new markets still distinguish them-

selves from their counterparts very clearly[33]. This is also reflected in Table 4.6. Thus, the outcomes of the ENSR survey indicate support for the often-claimed importance of young and growing enterprise for economic growth.

Table 4.6: Performance of young firms with a focus on new markets

	Enterprises aged up to five years and with a focus on new markets (8 % of the survey)	Counterparts (92 % of the survey)
Employment: 2002 compared to 2001		
Employment 2001 (x 1 000)	2,7	46,4
Employment 2002 (x 1 000)	3,0	45,2
Absolute change (x 1 000)	0,4	-1,2
Average change per enterprise	0,6	-0.2
Relative change	14 %	-2.5 %
Employment: Birch growth rate categories		
Decreasing	10 %	12 %
Stable	61 %	74 %
Growing	21 %	12 %
Fast growing	7 %	2 %
Turnover: 2002 compared to 2001		
Decline: 25 % and higher	5 %	7 %
Growth (more than zero)	45 %	34 %
Growth: 25 % and higher	26 %	5 %

Source: ENSR Survey 2003.

33 Birch growth rates are based on employment growth (in %) and initial size. This implies, for example, that a growth from 100 to 200 employees is valued higher than a growth from 1 to 2 employees in terms of Birch growth rates. Thus, the smaller the enterprise, the stronger the growth required for being classified as a fast growing enterprise.

Chapter 5
Synthesis

This report has provided (1) a conceptual explanation and interpretation of how the economic function of SMEs has been changing in Europe, especially with respect to growth, employment creation and international competitiveness, (2) a measurement of the roles that SMEs play in Europe and how those roles has been changing over time, and (3) an assessment of SMEs behaviour in the current economic setting. There are several apparent contradictions or paradoxes that seem to arise among the conclusions from these different aspects of this report.

5.1. Variations over countries

The first apparent paradox is that, if SMEs are so important for economic growth, as is argued in Chapter 2, why do some of the countries exhibiting the largest share of SMEs, such as the Mediterranean countries, also have lower rates of GDP per capita? By contrast, some of the countries with the highest levels of GDP per capita, such as Austria, the Netherlands and Germany have mean enterprise sizes that are considerably higher than their Mediterranean counterparts. The resolution to this was provided by Carree, van Stel, Thurik and Wennekers (2000), who identify the existence of a U-shaped relationship between the number of entrepreneurs relative to total population (which is a measure of SME presence) and per capita GDP. They point out that while the U.S. is on the upward sloping part of this curve, some European countries are on the downward sloping part. The Candidate Countries have again a very different situation, because they are still in the process of transition towards a true market economy. Therefore they can be found on an even earlier part of the downward slope (Van Stel, Carree and Thurik, 2004). Thus, the exact impact of SMEs on economic growth is not generic, but rather idiosyncratic, in that it is shaped by the level of economic development of the specific country.[34]

5.2. Variations across industries

Another question involves the high variation in the share of economic activity accounted for by SMEs across European countries. The SME Measurement presented in this report also documented how the share of SME activity varies across specific sectors and industries. For example, large firms dominate the extraction, transportation, communications and business services sectors. By contrast, SMEs are more prevalent in manufacturing, while micro enterprises tend to dominate the construction, trade and personal services. When the industry share of economic activity in a country is taken into account, variations in the roles of SMEs across countries become less accentuated.

5.3. Changes over time

Another seeming contradiction is that, if SMEs are gaining in importance, as is emphasized in Chapter 2 of this report, why has their share of economic activity changed so little in a number of European countries? The SME Measurement reveals that the roles of SMEs have evolved considerably in Europe over time. However, this change is complex. On the one hand, the share of enterprises accounted for by SMEs has remained fairly con-

34 From a conceptual point of view Audretsch and Thurik (2001) explain the different roles SMEs play in countries with different levels of economic development. They use fourteen dimensions and distinguish between the model of the entrepreneurial economy (which describes the upward sloping part) and the model of the managed economy which describes the downward sloping part).

stant between 1988 and 2003. By contrast, the number of micro enterprises has increased by 6 % over the last 15 years, while the number of small, medium-sized and large enterprises has remained virtually unchanged. As a result, the mean enterprise size fell from 8 in 1988 to 7 in 2003. In addition, the share of employment accounted for by SMEs has increased over time, while the large firm employment share has fallen. Thus, the overall trend for Europe-19 is an increased role in the economy exhibited by small-scale enterprise over time.

5.4. Concluding remarks

Perhaps the most striking apparent contradiction emerging in this report is that, on the one hand, the static SME measurement shows that productivity is lower in SMEs than in their larger counterparts. This holds especially for micro enterprises: when an adjustment for differences in industrial structure is made, productivity differences between SMEs, and large enterprises, are significantly mitigated, but labour productivity of micro enterprises still lags behind. A similar argument holds for SME profitability. This also means that there still is some room for improvement in micro enterprises. Similarly, the SME share of sales and value added has not increased over time.

On the other hand, SMEs are believed to serve as an engine of economic growth. This proposition is set out in Chapter 2 from a theoretical perspective, supported by results of various empirical studies.

In particular, three mechanisms have been identified in the literature identifying the significant impact of SMEs on increasing the productivity and growth of large enterprises:

- SMEs serve as a vehicle for knowledge spillovers, which may become accessible and commercialised by large enterprises through technology transfer or acquisition
- SMEs increase the amount of competition in the input market, particularly in terms of the competition for new ideas and human capital embodied in knowledge workers
- SMEs increase diversity in the market which can spill over to generate productivity increases in existing enterprises.

Which of these is dominant has yet to be disclosed.

An important implication of the external impact of SMEs is that their contribution to growth is not restricted to the SME sector of the economy, but also spills over to impact non-SME enterprises.

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Annex I
Regional aspects of entrepreneurship

As mentioned in Paragraph 2.2, different literature has focused on the impact of entrepreneurship on subsequent economic performance, which can be found in the regional studies and economic geography literature. The unit of observation for these studies is at the spatial level, either, a city, region, or state. The most common and almost exclusive measure of performance is growth, typically measured in terms of employment growth. These studies have tried to link various measures of entrepreneurial activity, most typically start-up rates, to economic growth. Other measures sometimes used include the relative share of SMEs, and self employment rates.

Audretsch and Fritsch (1996) analysed a database identifying new business start-ups and exits from the social insurance statistics in Germany to examine whether a greater degree of turbulence leads to greater economic growth, as suggested by Schumpeter in his 1 911 treatise. These social insurance statistics are collected for individuals. Each record in the database identifies the establishment at which an individual is employed. The start-up of a new firm is recorded when a new establishment identification appears in the database, which generally indicates the birth of a new enterprise. While there is some evidence for the United States linking a greater degree of turbulence at the regional level to higher rates of growth for regions (Reynolds, 1999), Audretsch and Fritsch (1996) find that the opposite was true for Germany during the 1980s. In both the manufacturing and the service sectors, a high rate of turbulence in a region tends to lead to a lower and not a higher rate of growth. They attribute this negative relationship to the fact that the underlying components - the start-up and death rates - are both negatively related to subsequent economic growth. Those areas with higher start-up rates tend to experience lower growth rates in subsequent years. Most strikingly, the same is also true for the death rates. The German regions experiencing higher death rates also tend to experience lower growth rates in subsequent years. Similar evidence for Germany is found by Fritsch (1997).

Audretsch and Fritsch (1996) conjectured that one possible explanation for the disparity in results between the United States and Germany may lay in the role that innovative activity, and therefore the ability of new firms to ultimately displace the existing enterprises, plays in new-firm start-ups. It may be that innovative activity did not play the same role for the German *Mittelstand* as it does for SMEs in the United States. To the degree that this was true, it may be that regional growth emanates from SMEs only when they serve as agents of change through innovative activity.

The empirical evidence suggested that the German model for growth provided a sharp contrast to that for the United States. While Reynolds (1999) had found that the degree of entrepreneurship was positively related to growth in the United States, a series of studies by Audretsch and Fritsch (1996) and Fritsch (1997) could not identify such a relationship for Germany. However, the results by Audretsch and Fritsch were based on data from the 1980s.

Divergent findings from the 1980s about the relationship between the degree of entrepreneurial activity and economic growth in the United States and Germany posed something of a puzzle. On the one hand, these different results suggested that the relationship between entrepreneurship and growth was fraught with ambiguities. No confirmation could be found for a general pattern across developed countries. On the other hand, it provided evidence for the existence of distinct and different national systems. The empirical evidence clearly suggested that there was more than one way to achieve growth, at least across different countries. Convergence in growth rates seemed to be attainable by maintaining differences in underlying institutions and structures.

However, in a more recent study, Audretsch and Fritsch (2002) find that different results emerge for the 1990s. Those regions with a higher start-up rate exhibit higher growth rates. This would suggest that, in fact, Germany

is changing over time, where the engine of growth is shifting towards entrepreneurship as a source of growth. The results of their 2002 paper suggest an interpretation that differs from their earlier findings. Based on the compelling empirical evidence that the source of growth in Germany has shifted away from the established firms during the 1980s to entrepreneurial firms in the 1990s, it would appear that a process of convergence is taking place between Germany and the United States, where entrepreneurship provides the engine of growth in both countries. Despite remaining institutional differences, the relationship between entrepreneurship and growth is apparently converging in both countries.

The positive relationship between entrepreneurship and growth at the regional level is not limited to Germany in the 1990. For example, Foelster (2000) examines not just the employment impact within new and small firms but on the overall link between increases in self employment and total employment in Sweden between 1976-1995. By using a Layard-Nickell framework, he provides a link between micro behaviour and macroeconomic performance, and shows that increases in self employment shares have had a positive impact on regional employment rates in Sweden.

Hart and Hanvey (1995) link measures of new and small firms to employment generation in the late 1980s for three regions in the United Kingdom. While they find that employment creation came largely from SMEs, they also identify that most of the job losses also came from SMEs.

Callejon and Segarra (1999) use a data set of Spanish manufacturing industries between 1980-1992 to link new-firm birth rates and death rates, which taken together constitute a measure of turbulence, to total factor productivity growth in industries and regions. They adopt a model based on a vintage capital framework in which new entrants embody the edge technologies available and exiting businesses represent marginal obsolete plants. Using a Hall type of production function, which controls for imperfect competition and the extent of scale economies, they find that both new-firm start-up rates and exit rates contribute positively to the growth of total factor productivity in regions as well as industries.

The evidence linking entrepreneurship to growth at the regional level may actually be more compelling in the European context than in the North American context. Only a handful of studies have been undertaken for North America, while the evidence from Europe is considerably more robust and consistent.

Annex II
Empirical evidence linking SMEs to economic performance[35]

The Commission's 2003 *Competitiveness Report* states (page 9 in the executive summary) that 'The natural limits to long run increases in employment rates together with the increased weight of less skilled/lower productivity workers inherent to increases in the overall employment rate (at least in the short run), bring labour productivity developments to the centre stage of a sustainable long-term improvement in living standards. Despite the modest narrowing of the EU gap in standards of living in the period 2001-2002, the fact remains that sustainable long-term increase in living standards and convergence towards US levels will require a strong improvement in the productivity performance of the EU.' The examination of the role of entrepreneurship as a determinant of economic performance is an obvious way to create a better understanding of the role of SMEs in this context. The many ways in which entrepreneurship may affect economic growth have been extensively dealt with in Chapter 2. In fact, there are seven, not entirely independent, intermediary processes. Entrepreneurs may introduce important innovations by entering markets with new products or production processes (Acs and Audretsch, 1990 and 2003). They may increase productivity by increasing competition (Geroski, 1989; Glaeser, Kallal, Schenkman and Shleifer, 1992; Nickel, 1996; Nickel, Nicolatsis and Dryden, 1997). This may go together with turbulence due to start-up and exit behaviour (Reynolds, 1999; Acs and Armington, 2003; Audretsch and Fritsch, 1996). They may enhance our knowledge of what is technically viable and what consumers prefer by introducing variations of existing products and services to the market. The resulting learning process speeds up the discovery of the dominant design for product-market combinations. Knowledge spillovers play an important role in this process (Audretsch and Feldman, 1996; Audretsch and Stephan, 1996; Audretsch and Keilbach, 2003). Lastly, they may be inclined to work longer hours and more efficiently as their income is strongly linked to their working effort.[36]

There have been efforts to investigate empirically the importance of the impact of entrepreneurship on economic performance, especially at the enterprise, region or industry level (e.g. Audretsch, 1995, Audretsch and Fritsch, 2002 and Caves, 1998). However, contributions at the country level (Blanchflower, 2000 and Carree et al., 2002) are limited. See Carree and Thurik (2003) for a survey of studies of the impact of entrepreneurship on growth at various levels of observation. For this study, data at country level for a recent period, collected in the framework of the various editions of the Observatory of European SMEs[37], have been used.

To examine the impact of entrepreneurship on economic performance in Europe, two different performance measures are used: GNP growth and labour productivity growth. In the following paragraphs we investigate whether a change in the number of enterprises has an impact on either measure. The general idea, which has been amply illustrated in the preceding chapter, is that an increase in the number of enterprises is favourable for

35 Assistance of André van Stel (EIM, Zoetermeer and Max Planck Institute, Jena), Viktor Stunnenberg (EIM, Zoetermeer and Max Planck Institute, Jena) and Martin Carree (University of Maastricht) is gratefully acknowledged.

36 See Carree and Thurik (2003) and Audretsch and Thurik (2001) for a more elaborate treatment of the intervening variables between entrepreneurship and growth. See also Acs and Audretsch (2003) and Audretsch and Thurik (2003).

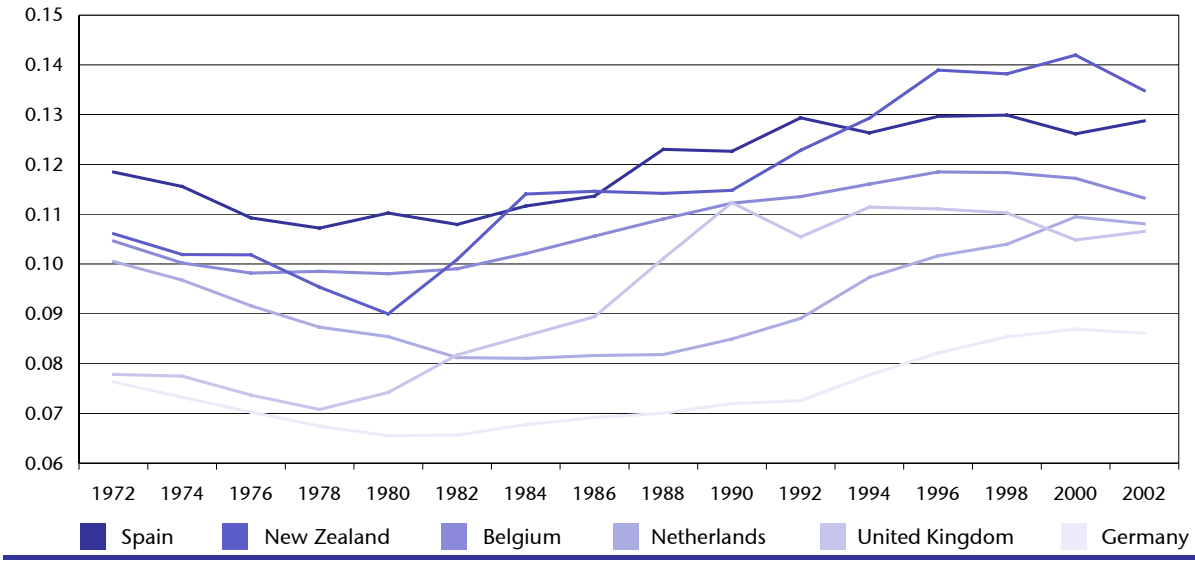
37 See European Commission, SMEs in Europe, including a first glance at EU candidate countries, Observatory of European SMEs; Report 2002/No. 2, Report submitted to the Enterprise Directorate General by KPMG Special Services, EIM Business & Policy Research, and ENSR; Brussels, 2003.

economic performance.[38] We will make use of a simple model in which the change in growth of the number of enterprises (i.e. the change in the growth rate) also plays a role determining economic development. This accelerated growth path may occur when countries with relative low enterprise growth rates move to a high enterprise growth rate path. Countries with high growth rates will be considered 'entrepreneurial economies' and countries with low growth rates will be defined as 'managed economies'. Accelerated growth may occur in the transition phase.

Carree and Thurik (1999), for example, indicate that the presence of small enterprises in manufacturing industries benefits growth for the richest among EU-countries, but not for EU-countries with somewhat lower GDP per capita, like Portugal and Spain. This is in line with the regime shift introduced by Audretsch and Thurik (2001). They argue that there has been a shift from a model of the 'managed economy' towards that of the 'entrepreneurial economy'. As mentioned in Section 2.1 Audretsch and Thurik argue that the model of the 'managed economy' is the political, social and economic response to an economy dictated by the forces of large-scale production, reflecting the predominance of the production factors of capital and (unskilled) labour as the sources of competitive advantage. By contrast, the model of the 'entrepreneurial economy' is the political, social and economic response to an economy dictated not just by the dominance of the production factor of knowledge - which Romer (1990, 1994) and Lucas (1988) identified as replacing the more traditional factors as the source of competitive advantage - but also by a very different, but complementary, factor they had overlooked: entrepreneurship capital, or the capacity to engage in and generate entrepreneurial activity.[39]

The shift from the 'managed economy' to the 'entrepreneurial economy' can best be documented using long time series of entrepreneurship rates per country. These are provided by the Compendia data set of EIM (van Stel, 2003). In Figure II.1 the development of the entrepreneurship rates (=business ownership rates) in a selection of countries taken from van Stel (2003) is depicted. A distinct U-shape can be observed for these countries. The upward trend of the entrepreneurship rate is levelling off in by the end of the last century. It is yet unknown whether this is due to structural effects such as the end of the ICT boom or cyclical determinants.

Figure II.1: Entrepreneurship rates (business owners per workforce) in six OECD countries



Since economic performance, in terms of either GNP growth or labour productivity growth, can both be a cause and a consequence of changes in the number of enterprises, a Granger-causality type of framework appears ap-

38 We realize that it is not only the net increase in the number of enterprises that may enhance performance but also the turbulence in the composition in the number of enterprises. See Bartelsman, Scarpetta and Schivardi (2003), Caves (1998), Fritsch (1996) and Van Stel and Diephuis (2004).

39 It is not simply that knowledge or R&D always spills over due to its mere existence (Audretsch and Keilbach, 2003). See also Acs and Audretsch (2003) and Audretsch and Thurik (2003).

propriate.[40] First, the effect of the percentage change in the number of enterprises in a country in period p (ΔNE_p) and its change (ΔNE_p- ΔNE_{p-1}) on the percentage annual economic growth (ΔGNP_p) is estimated. Similarly, the effect is estimated of these two variables on the percentage labour productivity growth (ΔLP_p). As a third "determinant" the lagged dependent variable (*viz.* either ΔGNP_{p-1} or ΔLP_{p-1}) is used in both these regression equations to correct for reversed causality in the Granger tradition. Second, the impact of economic performance on the percentage change in the number of enterprises is estimated by regressing ΔNE_p on ΔGDP_{p-1} and its change (ΔGDP_{p-1}- ΔGDP_{p-2}). The impact of labour productivity is likewise found through estimating the impact of ΔLP_{p-1} and its change (ΔLP_{p-1}- ΔLP_{p-2}). In both cases the lagged dependent variable (ΔNE_{p-1}) is of course included. Our simple model is in line with earlier literature about the influence of entrepreneurship measures on economic development like Carree et al. (2002), Van Stel, Carree and Thurik (2004) and Audretsch, Carree and Thurik (2001).[41]

An important assumption is that no use is made of lagged exogenous variables in case of estimating the effect of the development in the number of enterprises on economic growth and changes in labour productivity. It is our assumption that enterprise establishment leads to immediate growth. The danger of reversed causality is assumed limited because it is assumed that periods of growth do not immediately lead to new enterprise formation. Perception of growth, deciding to set up shop and the establishment procedure itself justify a lag. This lag is present in the regressions explaining the effect of economic performance on the development of the number of enterprises. In each of the cases, correction for reversed causality is implemented using a lagged dependent variable (*i.e.*, lagged growth rates) as an explanatory variable.

To estimate the regression equations, data are analysed which are provided by the *Observatory of European SMEs*[42, 43]. The Observatory provides data of the number of enterprises (both SME and LSE), real gross value added and employment. These data are available from 1990 through 2001 for all of the fifteen Member States of the European Union (EU 15) together with Iceland, Norway and Switzerland (including Liechtenstein). For our calculations, however, the smallest two countries, Iceland and Luxembourg, are left out. Changes in the number of enterprises, as well as economic growth and labour productivity growth are calculated as percentage change from year to year, starting in 1991. This calculation is made for all years, through 2001, which leaves us with 11 years of observation. Economic growth is measured by real GNP growth and labour productivity is defined as GNP/employment. Changes for the entire period are given in Table II.1.

40 The Granger approach to the question of whether x causes y is to see how much of the current y can be explained by past values of y and then to see whether adding lagged values of x can improve the explanation. y is said to be Granger-caused by x if x helps in the prediction of y, or equivalently if the coefficients on the lagged x's are statistically significant.

41 For earlier work we refer to Storey (1994) and Thurik (1996): Storey (1994) shows that small American and English firms create more employment than large firms. Thurik (1996) shows that small enterprises in the fifteen member countries of the European Union (EU) have a bigger impact on economic growth than their larger counterparts.

42 http://www.eim.nl/observatory_7_and_8/en/stats/2001/var5/4nor.html.

43 European Commission, Observatory of European SMEs; SMEs in Europe, including a first glance at EU Candidate Countries; Report submitted to the Enterprise Directorate General by KPMG Special Services, EIM Business & Policy Research, and ENSR; Brussels, 2002.

Table II.1: Growth rates (%) in the number of enterprises, GDP and labour productivity 1990-2001

	ΔNE	ΔGNP*	ΔLP*
Finland	-17.2	10.9	32.7
Sweden	-9.9	22.0	38.4
Italy	-0.2	14.7	18.2
Austria	0.6	24.2	24.8
Switzerland (incl. Liechtenstein)	2.6	43.2	42.5
United Kingdom	3.6	33.8	36.6
Denmark	3.9	34.8	31.8
France	4.3	17.2	13.0
Portugal	5.0	29.3	28.6
Belgium	5.3	21.0	19.5
Germany	7.9	26.5	29.5
Spain	12.2	34.6	20.2
Iceland	13.0	-10.8	-15.6
Netherlands	13.2	24.1	10.5
Norway	16.5	43.8	26.1
Luxembourg	33.2	82.5	39.7
Greece	38.3	23.2	-3.7
Ireland	42.0	154.4	86.7
Europe 18 (weighted average)	5.8	28.4	26.9

Source: Estimated by EIM Business & Policy Research; based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003, and information from ENSR partners.

From the number of enterprises column in Table II.1 a huge diversity of European countries in terms of net enterprise growth can be observed. The correlation between the average growth rates of the number of enterprises and GNP for the 1991-2001 period is 0.59 (0.64 when excluding Iceland and Luxembourg). This indicates that economic growth and growth in the number of enterprises go hand in hand, however without providing information about the direction of causality. The correlation coefficient of the average growth rates of the number of enterprises and labour productivity is a mere 0.03 (also 0.03 when excluding Iceland and Luxembourg). However, this absence of statistical correlation does not necessarily imply that there is no (Granger-)causality. For example, new firms may on the short term produce well below their minimum efficient scale, reducing productivity, but may on the long term provide important innovative activity increasing a country's overall productivity levels.

The present analyses are restricted to 16 European countries. This results in a dataset of 160 observations (16 countries times 10 years) for the regressions explaining the economic performance measures and 144 observations (16 countries times 9 years) for the regressions explaining the development of the number of enterprises. The estimation results can be found in Tables II.2 and II.3. In both tables we have also added the results when excluding the change in the growth rate as independent variable. This variable usually improves statistical fit and has the expected sign, but is somewhat unconventional to incorporate in growth equations. The results in Table II.2 suggest that both the growth of number of enterprises (Granger) causes economic growth and the reverse. That is, there is a coefficient of about +0.28 for the effect of the percentage of change in the number of enterprises on the percentage economic growth rate (when excluding the 'growth spurt' variable). This effect is halved when the 'growth spurt' variable ($\Delta NE_p - \Delta NE_{p-1}$) is included. The coefficient of this variable tells us that during periods of accelerated growth there is additional economic growth[44]. Possibly, this has to do with a high level of turnaround (churning, turbulence) of enterprises going together with crucial introductions of new products and processes. The autonomous GNP growth is about one per cent per year.[45] Economic growth also appears to cause the growth of the number of enterprises: a flourishing economic environment may lure entrepre-

44 For example, if the number of enterprises continuously grows by, say, 1 %, this in itself implies GDP-growth of approximately 0.14 % (coefficient 0.141 times 1). If this continuous growth rate of the number of enterprises would increase to 2 % annually, this would mean a 0.28 % GDP growth (coefficient 0.141 times 2), and temporarily an additional GDP-growth of 0.25 % (coefficient 0.248 * (2 - 1)).

45 Results should be interpreted with some care since the short period in conjunction with the use of the lagged endogenous variable does not allow for a reliable test of autocorrelation. The use of the lagged dependent variable is necessary to limit the danger of reversed causality. See Audretsch, Carree and Thurik (2001) for further empirical investigation.

neurs into opening new ventures. The coefficient is even slightly higher than that for the impact of the growth rate of the number of enterprises: +0.31 (when excluding the change in GNP growth). We again stress the exemplifying nature of the exercise by noting that the analysis does not take into account other important determinants like gross fixed capital investment, education, etc. However, the results do suggest a potentially very important role of entrepreneurial activity in promoting economic performance.

Table II.2: Regression results of interrelationship between economic growth and growth rate of number of enterprises

	ΔGNP	ΔGNP	ΔNE	ΔNE
Constant	1.01	1.11	-0.05	-0.24
	(0.21)	(0.22)	(0.20)	(0.19)
ΔNE	0.141	0.278		
	(0.081)	(0.070)		
$\Delta NE-\Delta NE_{-1}$	0.248			
	(0.078)			
ΔNE_{-1}			0.482	0.434
			(0.061)	(0.060)
ΔGNP_{-1}	0.596	0.526	0.214	0.311
	(0.067)	(0.066)	(0.066)	(0.058)
$\Delta GNP_{-1}- \Delta GNP_{-2}$			0.189	
			(0.067)	
Adjusted R^2	0.509	0.480	0.564	0.542
N	160	160	144	144

Note: Regression for 16 European countries (the 15 European Union Member States excluding Luxembourg plus Norway and Switzerland (including Liechtenstein) over the period 1991-2001 and 1992-2001, respectively. Standard errors are between brackets. The results are from an ordinary least squares regression.

Table II.3: Regression results of interrelationship between labour productivity growth and growth rate of number of enterprises

	ΔLP	ΔLP	ΔNE	ΔNE
Constant	0.96	1.28	-0.15	-0.24
	(0.22)	(0.21)	(0.24)	(0.23)
ΔNE	-0.289	-0.427		
	(0.072)	(0.063)		
$\Delta NE-\Delta NE_{-1}$	-0.314			
	(0.088)			
ΔNE_{-1}			0.732	0.724
			(0.061)	(0.060)
ΔLP_{-1}	0.613	0.492	0.235	0.280
	(0.066)	(0.060)	(0.077)	(0.070)
$\Delta LP_{-1}- \Delta LP_{-2}$			0.096	
			(0.072)	
Adjusted R^2	0.476	0.437	0.508	0.505
N	160	160	144	144

Note: Regression for 16 European countries (the 15 European Union Member States excluding Luxembourg plus Norway and Switzerland (including Liechtenstein) over the period 1991-2001 and 1992-2001, respectively. Standard errors are between brackets. The results are from an ordinary least squares regression.

From Table II.3 it can be concluded that enterprise growth has a (short-term) negative effect on labour productivity growth. The elasticity is about -0.43. This elasticity drops to about -0.29 when the 'growth spurt' variable is taken into account. Apparently, in the short run net enterprise formation does not contribute to productivity growth because many new enterprises usually operate under the minimum efficient scale. This effect intensifies during periods of accelerated growth in the number of enterprises because then probably entering enterprises are exceptionally small. It is important to note that despite a drop in labour productivity new enterprises will

contribute to the rejuvenation of industries and to fighting unemployment.[46] In addition, additional exercises showed that the (negative) correlation between labour productivity growth and net enterprise growth decreases with increasing time span (ΔLP_p has correlation coefficients of -0.45, -0.25 and -0.09 with ΔNE_p, ΔNE_{p-1} and ΔNE_{p-2}, respectively). This suggests that the cohort of surviving new firms grow relatively quickly in labour productivity terms. The effect of growing labour productivity on the growth rate of the number of enterprises is clearly positive (coefficient of about +0.28). Possibly, economies in which large firms are downsizing to increase efficiency indirectly create entrepreneurial opportunities.

The increased number of entrants in the 'entrepreneurial economy' versus that in the 'managed economy' has important consequences both for the short and for the long term. In the short term, the increased numbers of enterprises lead to higher employment, but to lower average labour productivity. However, the employment effect appears to outweigh the productivity effect since the short-term effect on economic growth is positive. In the long term, the average productivity of the previously entered cohorts of enterprises will have increased, limiting the average productivity loss. In addition, the levels of employment and of the introduction of new products and production processes will exceed those under a 'managed economy' regime.

46 Caves (1998) and Audretsch, Carree and Thurik (2001).

Annex III

A comprehensive database of the size and structure of non-primary private enterprise, Europe-19, 1988-2003

III.1. Introduction

One of the cornerstones of the statistical information used in the Observatory of European SMEs is Eurostat's Structural Business Statistics (SBS). This database contains harmonised information for each EU country on the number of enterprises, employment, turnover, value added and labour costs, by industry (two digit NACE classification) and size-class. These data relate to 2001. For the other countries, only 1993-data are available, which are taken from the SME Database.

In some respects, however, sources do not provide all of the information required for a comprehensive statistical picture of the enterprise sector in each country, disaggregated by industry and size-class:

- Firstly, in some countries, data was incomplete and estimates had to be made. This will be described in IV.2. of this Annex.
- Secondly, in many case information up to 2001 is available, but this information is not always easily comparable with data presented earlier. To solve this problem, additional estimates had to be made to describe developments between 1988 and 2001. These additional estimates are described in IV.3. of this Annex.
- Thirdly, in order to obtain estimates about developments in recent years (2002-2003), an accounting scheme has been developed which calculates developments with respect to all the variables used in this chapter - number of enterprises, employment, turnover, value added and labour costs - by industry and size-class for each country. The structure of this accounting scheme as well as the way it is actually applied, are also discussed in section 3 of this Annex.

This Annex pertains first of all to the major statistical database used in the Observatory project. Initially, however, this Annex discusses the classification of industries and the concept of enterprise size.

III.2. Definitions

III.2.1. Industrial classification

All data presented in this report relating to SMEs are based on non-primary private enterprise; excluded from the analysis are:

- State-owned enterprises ('private');
- Agriculture, forestry and fishing ('non-primary').

Throughout much of this report, the sectors of industry comprising non-primary private enterprise are classified as follows (using the NACE Rev.1 industrial classification): Ex-traction (including energy and metal processing; NACE C, E); manufacturing (NACE D); construction (NACE F); wholesale trade (NACE 51); retail distribution

(NACE 50, 52); transport and communication (NACE I); producer services (NACE J, K); personal services (NACE H, N, O). In some cases, a complete disaggregation into two digit NACE-divisions is presented.

III.2.2. Enterprise size

There is no unique, scientifically based definition of what constitutes an SME, since no clear analytical concept for this exists. For example, enterprises are sometimes classified according to their balance sheet, or LSEs are simply defined as the largest *x%* of the enterprises in an industry with SMEs being the remaining enterprises in that industry. From a policy point of view, one would perhaps like to classify large enterprises as those enterprises, which are able in some way - to dominate markets. This aspect is actually taken into account in the definition of SMEs recommended by the European Commission for the implementation of policy measures by looking at turnover and/or the balance sheet, and the economic independence of the enterprise, next to the number of occupied persons of an enterprise.

In the Observatory project, the number of occupied persons is used as the criterion for the classification of enterprises by size-class. The reason for using the number of occupied persons as the sole classification criterion lies in the availability of data. The appropriate size-class classification of enterprises depends on the particular goal of the analysis. Thus, disaggregation into multiple size-bands would be desirable. The source data used in this report provide the opportunity to distinguish the following size-classes for all industries and countries:

- Micro enterprises (0-9 occupied persons) which can be further subdivided into those with no employees at all (thus providing only a job for the entrepreneur), and the remaining enterprises in this size-band;
- Small enterprises, which employ 10-49 occupied persons;
- Medium sized enterprises, employing between 50 and 249 occupied persons;
- Large enterprises, providing a job to 250 or more occupied persons.

III.3. A comprehensive statistical database of European enterprises, 2001

III.3.1. Introduction

For each country for which data are available, Eurostat's Structural Business Statistics provides a fairly detailed database of non-primary private enterprise, disaggregated by sector of industry and size-class in 2001. However, to provide a comprehensive picture by country, industry and size-class, a number of additional estimates had to be made. These additional estimates have been made at a low level of aggregation, that is:

- By two digit NACE division;
- By the size-classes outlined above.

However, in the Observatory project data are normally reported at a much higher level of aggregation. The disaggregation during the estimation process was done to ensure that all available information from various sources could be used.

During the construction of the database, it became clear that for some industries - and in the case of some countries, for the whole economy - data on value added and labour costs were missing. This section discusses how these problems were resolved

III.3.2. Estimating missing data on value added

The estimation started with an inventory by the ENSR-partners as to what information on value added by industry and size-class was available. However, in many cases no data were available, and so, industry data on value added from national accounts had to be used. These were distributed over size-classes according to available turnover data and observed size-class differences regarding the turnover/value added ratio in other countries.

At each stage consistency-checks with the SBS data have been performed.

III.3.3. Estimating missing data on labour costs

Data on labour costs are not always available in the industrial/size-class detail desired, and therefore, additional estimates had to be made. Starting from value added, the procedure was as follows:

- At the industry level, national accounts data on the share of labour costs in total value added were taken, so labour costs could be calculated at the industrial level;
- Next, labour costs by industry were distributed over size-classes according to the size-class distribution of value added and size-class differences in the ratio of labour costs and value added in other countries.

III.4. Estimating developments 1988-2001

III.4.1. Introduction

As described above, the Observatory of European SMEs has at its disposal a comprehensive database concerning the size and structure of non-primary private enterprise in 19 countries. However, available statistical information does not allow the analysis of trends. Therefore, additional estimates have been performed. Estimations were done in two stages:

- Developments during the 1988-2001 periods were estimated on the basis of available statistical information. This is explained in Section 3.2 of this Annex;
- For recent years, no comprehensive information on the size-class structure of non-primary private enterprise is available. Therefore, other techniques have to be used, which are explained in Section 3.3.

III.4.2. Developments 1988-2001

The data from the SME Database for 1988, 1990, 1993 and 1997 and Structural Business Statistics for 2001 are not fully comparable. This is a result of the introduction of new sources of information by Eurostat and thus of improved measurement methods. Also the transition to the NACE Rev. 1 nomenclature instead of the NACE 1970 classification adds to this incomparability. Finally, contrary to the SME Database, enterprises are classified on the basis of occupied persons instead of employees. The introduction of new sources of information has in particular affected the number of enterprises counted; the number of very small enterprises has especially been influenced. Nevertheless, the comparability of various ratios such as average enterprise size, turnover per enterprise and labour productivity does not seem to be strongly affected by the introduction of new sources. This follows from the observation that these ratios might be viewed as estimates from a large sample of the total population of enterprises, disaggregated by industry and size-class and, therefore, they might well be assumed to be unbiased estimates in 1988, 1990, 1993 and 1997. Thus, basically, the following steps have been performed in estimating developments between 1988 and 1996:

- Estimation of the growth in the number of enterprises;
- Estimating the development of employment, directly applying data on average enterprise size as given by the SBS data;
- Estimating the development of turnover and value added, directly applying data on (apparent) labour productivity from the source data.

The last two steps are obvious, and will not be elaborated upon. In this section, special attention will be paid to the estimation of the growth in the number of enterprises as well as some additional problems, which had to be solved:

- In the original database for 1988, different size-classes were used, they were not compatible with the one used in the present report;
- The estimation of the development in labour costs. Since labour costs is a new variable in the SME database, no developments of labour costs could be derived from that source and other methods had to be used.

Estimation of the development of the number of enterprises

It appears that the difference in the number of enterprises between 1988, 1990, 1993 and 1997, as revealed by the SME database, does not coincide with the development in the number of self employed, as registered by Eurostat's Labour Force Survey (LFS). For example, from the SBS data a lower number of enterprises in 1990 (as compared with 1988) was recorded for Denmark and Portugal, while the number of entrepreneurs actually increased. On the other hand, according to the SME database, the number of enterprises in Norway and Sweden increased sharply between 1990 and 1992, while the number businessmen (and women) declined. Many such changes can be regarded as the result of using other, better sources of information in the SME database, instead of reflecting trends in economic development.

Since the LFS is conducted on a regular, comparable basis, it can be combined with data from the SBS data to estimate the development in the number of enterprises by industry and size-class in those countries for which the SBS data has changed its basic source of information. Generally, it has been assumed that the smaller the enterprises are the more appropriate it is to estimate growth in the number of enterprises by the development of self-employment. Larger enterprises are presumably better observed by the SBS data than smaller enterprises.

Further disaggregation in the database for 1988

The database on the European enterprise sector in 1988 has the same industrial detail as the database for 1992, but is less detailed with respect to size-classes. Especially the size-bands 20-49 and 50-99, and 200-249 and 250-499, were not distinguished separately, but these are necessary for the definition of small, medium sized and large enter-prises. Therefore, to estimate developments between 1988 and 1990, additional disaggregation in the 1988 database had to be performed. The following procedure was used:

- Disaggregating the number of enterprises was done by estimating a function describing the size-class distribution of enterprises. Mathematical aggregation over the desired size-bands then gives the share of 20-49 and 50-99 in the 20-99 size-band, and the division between 200-249 and 250-499 in the 200-499 band, respectively.
- The same function can also be used to calculate average enterprise size in the newly introduced size-classes. From this, the number of enterprises and employment can be calculated.
- Regarding turnover and value added, it was assumed that differences with respect to (apparent) labour productivity between the newly introduced size-classes were the same as in 1990. From this assumption, available data on turnover and value added in the 20-99 and 200-499 size-classes, and estimated employment in the newly introduced size-bands, a further disaggregation of turnover and value added could be performed.

Estimation of the development of labour costs

The Fourth Report of Eurostat's 'Enterprises in Europe' (the main publication of results from the SME database) was the first to include data on labour costs; therefore, the SME database cannot be used as a source for estimating developments of labour costs. Instead, changes in labour costs by industry and size-class have been estimated using data on:

- The development of employment by industry and size-class;
- Changes in labour costs per employee. According to the availability of data, either macro-economic data or data disaggregated by industry have been used.

As a matter of fact, this is the same approach as taken in the SME in Europe Accounting Scheme, which is used to estimate trends in the post-2001 period for EU-countries and Iceland, and post-1993 for the other countries.

III.4.3. Estimations of developments 2002-2003

Since statistical sources only provide information on developments between 1988 and 2001 - as indicated in the section above - additional tools are needed to analyse trends in most recent years. The instrument used is called SEAS: the SME in Europe Accounting Scheme. This accounting scheme is designed:

- To link developments of turnover and value added by industry and size- class to macro-economic developments;
- To derive the development of employment by industry and size-class from the development of value added and changes in wages and prices;
- To estimate changes in labour costs, taking into account changes in employment and wage costs;
- To estimate changes in the number of enterprises from turnover development and the general economic climate.

These calculations have been performed for all countries. So, SEAS actually consists of 18 independent country models.

A first version of SEAS was developed within the framework of the First Annual Report of the Observatory of European SMEs. Since then, it has been extended gradually to absorb the increasing coverage of variables (value added and labour costs were added since 1993) and countries (6 countries were added (Switzerland and Liechtenstein were taken together)).

Estimation of the development of real turnover

The development of turnover by industry and size-class in SEAS is derived in three steps:
- First, macro-economic demand indicators are transformed into final demand by industry and macro-economic category;
- Secondly, by means of a multi-industry input-output model, output of intermediate goods and services, and thus total output, is calculated;
- Finally, for each sales category, turnover by industry and size-class is arrived at (the database on turnover by industry, size-class and sales category is shortly described below).

Thus, the first step in SEAS is the calculation of developments by industry of sales for each final demand category. The following categories of final sales are distinguished:
- Consumption goods. Sales of consumption goods and services are calculated as follows. First, macro-economic private consumption demand is broken down into goods categories. For each country, at least two goods categories are distinguished: food and non-food. This breakdown is performed using long-term revealed demand elasticities. Information on the share of these categories in total sales of consumption goods and services enable SEAS to calculate potential sales in each industry. Finally, an elasticity between potential sales and actual sales - which is usually smaller than that due to imports increasing faster than sales of domestic suppliers - enables the model to calculate actual output by industry.
- Investment goods. Basically, the same procedure is used as with consumption goods. However, the distribution over equipment and buildings is exogenous. Furthermore, the elasticity of actual sales with respect to potential sales is, in many cases, lower than for consumption goods and services - as a result of the fact that international specialisation is more feasible for capital goods compared with consumption goods and services.
- Exports. Export growth, as published by the European Commission, is used as the explanatory variable, and directly linked to sales abroad by industry by means of a constant elasticity for each industry. Averaged over industries, this elasticity is equal to one.

Output of intermediate goods and services by industry is modelled by means of an input-output model for each country. With sales of intermediate goods and services, import penetration is also allowed for. So, potential sales of intermediate goods are calculated using a traditional Leontief matrix.

Stock building - which is part of gross production as well - is directly linked to the growth of sales.

At this stage, sales by industry and sales category are known. Using this information, the development of turnover by industry, size-class and sales category can be calculated. For each industry and sales category, it is assumed that:
- On average, turnover growth equals sales growth;
- Smaller enterprises are more vulnerable to import penetration than larger enterprises. Since the difference between actual and potential sales in the industry models described above result from import penetration, in case actual sales grow less than potential sales, this will have the most serious impact in smaller enterprises. Of course, the converse holds as well. Note, however, that these effects are very small.

All calculations are performed for two-digit NACE Rev. 1 divisions.

Base-year information on turnover by industry, size-class and macro-economic category.

Data on turnover by industry, size-class and macro-economic category are not directly available, and thus, have to be estimated. Basically, the following procedure has been applied. For each country and industry, from input-output data and national accounts, the distribution of output over macro economic sales category is known.

Turnover includes, next to output, the purchase value of merchandise. It is assumed that the ratio between these is the same within each size-class within an industry. So, total turnover can be assigned to each sales category for each size-class using the distribution of sales over categories for each industry.

This procedure provides a first-round estimate of the distribution of turnover over categories. For a number of countries, the distribution of turnover over exports and domestic sales is known. This information is used to adjust these first-round estimates.

Estimation of the development of real value added.

The estimated development of real value added is arrived at in two steps:
- Firstly, real value added growth by industry is arrived at by applying the industry sub-model of SEAS;
- Secondly, size-class differences regarding value added growth within an industry as set equal to the differences regarding turnover growth.

Estimation of the development of employment and labour costs.

The development of turnover and value added were basically modelled in a top-down fashion: starting from macro-economic demand indicators. First sales by industry and sales category were calculated, and finally, turnover growth by industry and size-class was arrived at. Employment, however, is modelled in a bottom-up manner. This is because there are essential differences in how small and large enterprises '*hire and fire*' their employees.

First, because of the existence of threshold labour, lack of information, etc., SMEs are assumed to be relatively slow in reacting to production changes. Secondly, because of the large share of labour costs in total costs of small and medium sized enterprises, the wage elasticity of employment in small and medium sized enterprises is larger than the same in LSEs. Finally, autonomous labour saving technological progress is slower in SMEs than in LSEs.

Employment growth by industry and size-class depends upon:
- Real value added growth. Here, using a lagged adjustment of actual to desired employment, it is assumed that SMEs react more slowly to demand shocks than do large enterprises;
- The real wage rate. Nominal wage development is exogenous; real wages are calculated by deflating this with the value added deflator;
- A (negative) constant term, reflecting autonomous labour saving technological progress.

Estimation of development of the number of enterprises

It has been assumed that average enterprise size (in terms of occupied persons) is constant in each country/industry/size-class.

Estimation of development of prices

Prices of sales and turnover are calculated by taking into account all relevant costs for enterprises, that is:
- Costs of intermediate consumption (both produced domestically and abroad);
- Costs of labour.

This is compared with the development of macro-economic prices, such as the private consumption deflator and the deflator of exports. Adjustments are made to make calculated prices consistent with the latter set of macro-economic data.

The price of value added is calculated in the industrial sub-models according to the definition of value added. The deflator of value added by size-class is estimated in the same way as real value added growth by industry and size-class.

Applying SEAS

In principle, SEAS can be run using its exogenous variables only - macro-economic demand growth, wages, population growth and unemployment in each country - as inputs. However, the system has been benchmarked by updating it with statistical information whenever possible. For example, information on the export performance of industries from 'Industrial Trends' has been used to benchmark growth of exports. Also, data from the LFS on employment and the number of self-employed are used to calibrate the development of employment and growth in the number of enterprises. By so doing, the business cycle in each country is also taken into account. With respect to employment, information from 'European Economy' has been taken into account to estimate developments in broad industries.

So, the design and use of SEAS are such that knowledge about the way the economy functions, as well as statistical information about actual economic developments have been integrated such that an estimate of SMEs development between 1996 and the pre-sent can be provided for each country.

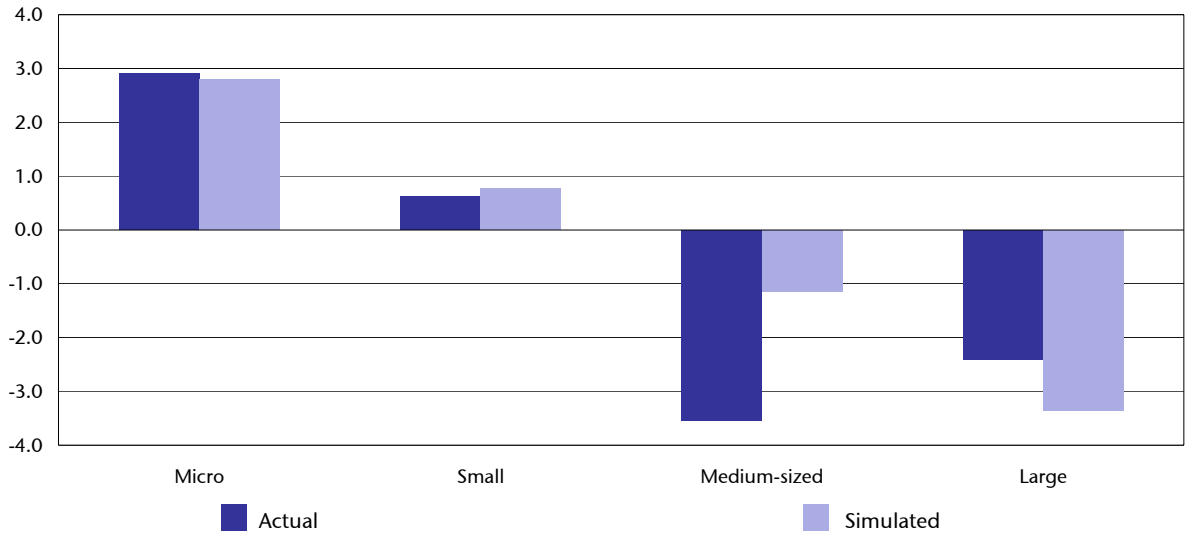
Tracking performance of SEAS

Full data on the development of non-primary private enterprise for 1988-2001 are available for EU-countries. It has been checked whether a purely endogenous simulation of SEAS for these countries results in estimated data on the size-class pattern of economic development that resembles the actual size-class pattern. The box below summarises results on the variable 'employment'. All results have been set as deviations from size-class total, as model use is such that figures for total non-primary private enterprise are simulated anyway. Simulation results are shown in two ways: graphically, by showing how actual and estimated growth differential (compound growth 1988-2001, in %) of the individual size-class and size-class total differ, and by means of a regression analysis, in which the actual growth differential is regressed with the estimated growth differential[47].

It appears that SEAS estimates the growth differential for micro and small enterprises at the EU level very well, as the actual and simulated growth differential do not differ more than 0.2 % (over 11 years). For medium-sized and large enterprises, the difference between actual and simulated growth is somewhat larger, at 2.4 % and 1 %, respectively. In all cases, the sign of the growth differential is correctly simulated. Regression results seem reasonable at the industry level. At the country level, regression results are worse. This is especially the result of bad simulation results for Greece, Ireland and Luxembourg.

Notwithstanding these problems, simulation results seem robust enough to use SEAS to estimate developments 2002-2003 and arrive at estimates of the size and structure of non-primary private enterprise, given the fact that available statistical information (though sometimes scattered) is used as well.

Figure III.1: Actual and simulated size-class pattern of employment growth, EU, 1988-2001



47 Regression: actual= α ·estimated + β. In case of a perfect fit, $\alpha = 1$, and $\beta = 0$. In case of a good fit, the estimated α and β should come close to these values.

Table III.1: Regression results on real value added growth

Simple regressions by industry (NACE sections)						
Micro	Actual=	1.14	* Estimated +	-0.57	R^2=	0.95
Small	Actual=	1.03	* Estimated +	+0.36	R^2=	0.933
Medium-sized	Actual=	1.03	* Estimated +	+0.41	R^2=	0.918
Large	Actual=	0.86	* Estimated +	+0.47	R^2=	0.887
Simple regressions by country						
Micro	Actual=	0.15	* Estimated +	+2.77	R^2=	0.073
Small	Actual=	0.98	* Estimated +	-0.11	R^2=	0.42
Medium-sized	Actual=	0.65	* Estimated +	-2.67	R^2=	0.15
Large	Actual=	0.82	* Estimated +	-1.86	R^2=	0.489

Harmonized data on the number of enterprises and employment in Candidate Countries, 1995-2001

Within the framework of this Report, estimates of the size and structure of non-primary private enterprise in the Candidate Countries have been prepared. It relates to data about the number of enterprises and employment, by sector of industry (NACE-sections) and enterprise size-class. Regarding sector of industry, in most cases the following disaggregation has been used:

- NACE C: Mining and quarrying (whenever possible, estimates have been made at a lower level of aggregation, i.e. at NACE CA, CB);
- NACE D: Manufacturing (whenever possible, estimates have been made at a lower level of aggregation, i.e. at NACE sections DA-DN);
- NACE E: Electricity, gas and water supply;
- NACE F: Construction;
- NACE G: Wholesale and retail distribution;
- NACE H: Hotels and restaurants;
- NACE I: Transport and communication;
- NACE J: Financial intermediation;
- NACE K: Real estate, renting and business activities;
- NACE N: Health and social work;
- NACE O: Other community, social and personal service activities.

Sometimes, a full 2 digit NACE-classification has been available.

Enterprise size has been defined in terms of the number of occupied persons. The following classification is used:

- Micro enterprises (0-9 occupied persons)
- Small enterprises (10-49 occupied persons)
- Medium-sized enterprises (50-249 occupied persons)
- Large enterprises (LSEs; 250 or more occupied persons).

'Enterprises' are defined as economically independent units, which are economically active. 'Employment' has been defined as all occupied persons, including the self-employed (and other unpaid family workers). Employment is defined as occupied persons, *i.e.* the sum of the number of employees and the number of self-employed, unpaid family workers and the like. So, the concept of both enterprises and employment is similar to the concepts used of Europe-19 countries. It should be noted that, whenever interpreting data on the size and structure of non-primary private enterprise in CEECs, official statistics tend to overstate the number of actively operating SMEs, and levels of employment in the SME sector. As research indicates, a clear gap exists between the number of registered enterprises and the number estimated to be actually functioning. Figures regarding 1995 vary from 44% in Latvia to three out of four registered enterprises actively operating in Slovenia[48]. However, in close co-operation with informants, these inactive enterprises have been removed from the figures.

The basic methodology has been as follows. EIM has identified sources of basic information in Candidate Countries. EIM then requested these sources to present available data, using a shopping list defining the information

48 Source: Eurostat, quoted in Bateman: Neoliberalism, SME development and the role of business support centres, Small Business Economics 14: 275-298, 2000.

required, and asking sources to identify to what extent they could meet these requirements. These data were subsequently forwarded to EIM and processed centrally. Data processing then included a number of steps:

- Checking the data supplied for aggregation consistency and logical consistency regarding size-class bands (for example, average enterprises size in micro enterprises should indeed be less than 9). If mistakes were found, they were fed back to the original sources to correct them, and in most cases, this proved to be possible. If this was not possible (for example, if data on enterprises and employment were from different sources) errors have been taken for granted; this occurred only in a few minor cases, and does not affect the overall quality of the data in a significant manner. These checks have also been performed after subsequent steps.
- Next, additional estimates had to be prepared. Two kinds of problems were solved: adjustments from the size-class classification in the original data, and problems with missing data. Generally, the were no problems regarding data availability regarding the number of enterprises, but significant blocks of missing data occurred with respect to employment. This holds especially for the number of self-employed. For these variables, rough estimates have been derived from the number of enterprises. In some cases, no size-class distribution of employment by industry was available, and in these cases, more advanced estimation methods had to be used.
- Finally, estimates for missing years in the series 1995-2001 have been prepared. This has been done either by means of (linear) interpolation or on the basis of available data on employment.

In the final stage, results were calibrated against available SBS-data, to assure consistency with these data for 2001.

Though the data have been estimated carefully from the available sources, there are some remaining uncertainties that should be taken into account when using the database:

1 Although estimates have been made at a rather low level of aggregation, this does not mean that they should be used at that level. This disaggregation has only been made for estimation purposes, i.e. to provide the opportunity to incorporate various sorts of data and to check against various inconsistencies (like average enterprise size being within size-bands) at an appropriate level.
2 Although informants have been asked to state carefully the definitions and sources of the data they presented (especially with a view to confine the data to active enterprises in private enterprise), there is no 100% guarantee that there is no such pollution in the data. This was beyond the scope of this sub-project, which aimed to give a first survey on the opportunities to collect data on the size and structure of non-primary enterprise in Candidate Countries.

For these reasons, only data at a fairly high level of aggregation (*i.e.*, by country or by size-class) have been presented.

Annex IV

Detailed figures by sector of industry and country

Table IV.1: Size and structure of non-primary private enterprise by sector of industry, Europe-19, 2003

NACE divisions	Number of enterprises (1 000s)	Occupied persons per enterprise	Size-class dominance*	Value added per occupied person, SMEs**	Profitability of SMEs***	Propensity to export SMEs****	Share value added in turnover, SMEs *****
Mining of coal & lignite; extraction of peat (10)	1	99	LSE	170	15	-10	-11
Extraction of crude petroleum & natural gas (11)	1	127	LSE	189	6	-7	8
Mining of metal ores (13)	0	46	LSE	39	0	2	15
Other mining & quarrying (14)	20	13	SME	93	2	-2	2
Manuf. of food products & beverages (15)	310	15	SME	77	-4	-6	-1
Manuf. of tobacco products (16)	0	161	LSE	150	-10	-5	14
Manuf. of textiles (17)	100	16	SME	98	1	-4	0
Manuf. of wearing apparel (18)	150	10	SME	94	-1	-1	0
Manuf. of leather and leather products (19)	60	12	SME	95	-2	-1	0
Manuf. of wood and wood products (20)	160	8	Micro	92	-1	-3	0
Manuf. of pulp, paper & paper products (21)	20	37	LSE	74	-9	-10	0
Publishing, printing & reproduction of recorded media (22)	210	11	SME	90	-5	-5	-1
Manuf. of coke, refined petroleum and nuclear fuel (23)	2	97	LSE	78	-1	-11	5
Manuf. of chemicals, chemical products and man-made fibres (24)	40	54	LSE	83	-5	-10	-1
Manuf. of rubber and plastic products (25)	60	28	SME	92	2	-10	0
Manuf. of other non-metallic mineral products (26)	90	16	SME	87	-1	-8	-1
Manuf. of basic metals (27)	20	54	LSE	81	0	-12	-1
Manuf. of fabricated metal products (28)	380	12	SME	96	0	-3	1
Manuf. of machinery and equipment, n.e.c. (29)	180	22	SME	91	0	-13	2
Manuf. of office machinery & computers (30)	10	27	LSE	77	0	-26	6
Manuf. of electrical machinery (31)	60	28	LSE	82	0	-15	1
Manuf. of radio, television &communication equipment (32)	30	35	LSE	64	-11	-22	9
Manuf. of medical, precision & optical instruments (33)	90	13	SME	85	-3	-10	2
Manuf. of motor vehicles, trailers & semi-trailers (34)	20	102	LSE	76	2	-31	9
Manuf. of other transport equipment (35)	20	35	LSE	71	-3	-27	2
Manuf. of furniture; manufacturing n.e.c. (36)	230	9	SME	100	11	-1	2

Table IV.1: Size and structure of non-primary private enterprise by sector of industry, Europe-19, 2003 (continued)

NACE divisions	Number of enterprises (1 000s)	Occupied persons per enterprise	Size-class dominance *	Value added per occupied person, SMEs **	Profitability of SMEs ***	Propensity to export SMEs ****	Share value added in turnover, SMEs *****
Recycling (37)	10	9	Micro	97	3	0	0
Electricity, gas, steam & hot water (40)	20	68	LSE	170	-5	-2	0
Collection, purification & distribution of water (41)	10	27	LSE	93	9	-2	1
Construction (45)	2 280	6	Micro	96	0	-1	2
Sale, maintenance & repair of motor vehicles & motorcycles (50)	680	6	Micro	95	-2	0	0
Wholesale & commission trade, except of motor vehicles & motorcycles (51)	1 510	6	Micro	96	-1	1	0
Retail trade, repair of household goods (52)	3 070	5	Micro	93	-2	0	1
Hotels and restaurants (55)	1 450	6	Micro	97	-1	0	-1
Land transport; transport via pipelines (60)	810	6	Micro	88	2	-2	-5
Water transport (61)	20	12	LSE	96	1	-4	3
Air transport (62)	4	124	LSE	164	5	-14	-14
Supporting & auxiliary transport activities; activities of travel agents (63)	170	14	SME	93	-3	-2	-3
Post & telecommunication (64)	40	66	LSE	88	-8	0	-19
Financial intermediation (65)	70	51	LSE	174	-5	-1	-5
Insurance & pension funding (66)	10	85	LSE	253	18	-3	16
Activities auxiliary to financial intermediation (67)	300	3	Micro	51	11	-5	3
Real estate activities (70)	760	3	Micro	102	-1	0	0
Renting of machinery & equipment (71)	130	5	Micro	102	5	-1	-1
Computer & related activities (72)	410	6	Micro	89	-1	-3	-1
Research & development (73)	40	13	LSE	122	3	-2	-4
Other business activities (74)	2 580	6	LSE	114	1	-2	0
Health and social work (85)	1 340	6	Micro	83	11	-1	3
Sewage & refuse disposal, sanitation & similar services (90)	20	16	LSE	76	2	-2	-5
Activities of membership organizations n.e.c. (91)	30	5	SME	86	-9	0	-4
Recreational, cultural & sporting activities (92)	540	4	Micro	65	-9	0	3
Other service activities (93)	750	3	Micro	79	0	1	-3
Non-primary private enterprise	19 310	7	Micro	74	-9	-4	-4

* A country or sector of industry is said to be micro, small and medium-sized, or LSE dominant if either micro enterprises, small and medium-sized enterprises (taken together) or large scale enterprises have the largest share in total employment.
** Index, industry total= 100.
*** Gross operating surplus adjusted for imputed wage of self-employed, as percentage of value added; SMEs minus industry total.
**** Share of export in turnover (%); SMEs minus industry total.
***** Value added as percentage of turnover, SMEs minus industry total.

This series of tables provide information by country and size class of enterprsie on:
- the number of enterprises;
- the number of occupied persons; and
- average enterprise size (number of occupied persons per enterprise)

The numbers presented should be threatened with care as they are shown here at a more precise level than elsewhere in the Observatory of European SMEs 2003.

For example the number of medium enterprises in Europe-19 is estimated to be 184 863. In this annex numbers are given in thousands, so this shows as 185. Whereas elsewhere figures are rounded to 10 000, so the same number appears as 180. This might be confusing at first sight.

Table IV.2: Enterprises Europe 19, 2003, number of enterprises (x 1 000)

	Micro	Small	Medium-sized	SME	Large	Total
Austria	233	30	5	267	1	268
Belgium	408	25	4	437	1	438
Denmark	180	21	4	205	1	206
Finland	207	12	2	221	1	222
France	2 326	144	25	2 495	6	2 501
Germany	2 656	307	44	3 008	11	3 019
Greece	752	16	2	771	0	771
Ireland	83	12	2	97	0	97
Italy	4 290	177	19	4 486	3	4 489
Luxembourg	21	3	1	24	0	24
Netherlands	517	43	9	570	3	572
Portugal	648	39	6	693	1	694
Spain	2 499	156	19	2 674	3	2 677
Sweden	454	27	4	485	1	486
United Kingdom	1 996	200	31	2 226	8	2 234
EU-15	**17 272**	**1 211**	**176**	**18 659**	**39**	**18 698**
Iceland	28	1	0	29	0	29
Norway	218	17	3	238	1	238
Switzerland (incl. Liechtenstein)	306	32	6	343	1	344
Europe-19	**17 824**	**1 261**	**185**	**19 270**	**40**	**19 310**

Source: Estimated by EIM Business & Policy Research; estimates based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003; due to rounding, totals may differ slightly from constituting parts.

Table IV.3: Enterprises Europe 19, 2003, occupied persons (x 1 000)

	Micro	Small	Medium-sized	SME	Large	Total
Austria	1 094	555	462	2 111	826	2 938
Belgium	1 310	535	422	2 267	997	3 264
Denmark	744	417	352	1 512	570	2 082
Finland	526	232	225	983	540	1 523
France	7 024	3 039	2 550	12 614	6 318	18 932
Germany	10 488	5 553	3 961	20 002	10 882	30 884
Greece	1013	302	230	1 545	239	1 785
Ireland	234	218	196	648	281	929
Italy	10 702	3 178	1 855	15 735	3 099	18 834
Luxembourg	55	55	55	165	61	225
Netherlands	2 205	1 245	1 084	4 533	2 417	6 951
Portugal	1 201	743	589	2 533	678	3 210
Spain	7 901	3 069	1 799	12 769	2 868	15 637
Sweden	1 240	516	438	2 194	1 035	3 228
United Kingdom	7 933	3 664	3 044	14 641	10 089	24 730
EU-15	**53 669**	**23 320**	**17 261**	**94 251**	**40 902**	**135 152**
Iceland	32	22	10	64	51	116
Norway	694	325	251	1 271	451	1 722
Switzerland (incl. Liechtenstein)	642	607	582	1 832	893	2 725
Europe-19	**55 038**	**24 275**	**18 105**	**97 417**	**42 297**	**139 714**

Source: Estimated by EIM Business & Policy Research; estimates based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003; due to rounding, totals may differ slightly from constituting parts.

Table IV.4: Enterprises Europe 19, 2003, occupied persons per enterprise

	Micro	Small	Medium-sized	SME	Large	Total
Austria	5	19	101	8	871	11
Belgium	3	21	104	5	1 115	7
Denmark	4	20	97	7	814	10
Finland	3	20	102	4	932	7
France	3	21	102	5	1 123	8
Germany	4	18	90	7	1 001	10
Greece	1	19	99	2	646	2
Ireland	3	19	94	7	691	10
Italy	2	18	97	4	1 013	4
Luxembourg	3	21	103	7	710	9
Netherlands	4	29	118	8	955	12
Portugal	2	19	96	4	760	5
Spain	3	20	97	5	931	6
Sweden	3	19	100	5	1 062	7
United Kingdom	4	18	99	7	1 328	11
EU-15	**3**	**19**	**98**	**5**	**1 059**	**7**
Iceland	1	21	78	2	624	4
Norway	3	19	99	5	885	7
Switzerland (incl. Liechtenstein)	2	19	101	5	890	8
Europe-19	**3**	**19**	**98**	**5**	**1 052**	**7**

Source: Estimated by EIM Business & Policy Research; estimates based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003; due to rounding, totals may differ slightly from constituting parts.

Annex V
Demand for goods and services from different origins

Buyers can choose between foreign and domestic supply. They have preference for both, and both are substitutes. So, they optimise some utility function $U=U(v_{foreign}, v_{dom})$, under an appropriate income restriction. Here, U is total utility, $v_{foreign}$ is the amount of foreign products, and v_{dom} is a composite domestic good. Domestic goods and services are supplied by enterprises from various size-classes; their supplies are not perfect substitutes[49]. This is described by assuming $v_{dom}= V_{dom}(v_s;$ s= micro, small, medium-sized, large). If both U and V are well behaved, the problem can be solved in two steps: first choose between domestic and foreign origin, and next - total domestic supply being given - between the type of domestic firm.

As regards sales by domestic enterprises, the problem then comes down to maximizing the sub-utility function V_{dom}, subject to the restriction:

(1) $$p_{v,\,dom} \cdot v_{dom} = \Sigma_S\, p_{v,\,dom,\,s} \cdot v_{dom,\,s}$$

Assuming V_{dom} to be Constant Elasticity of Substitution (CES) function, the following demand functions can be derived:

(2) $$ln\,(v_{dom,\,s} / v_{dom}) = \text{constant} - \sigma \cdot ln(p_{v,\,dom,\,s} / p_{v,\,dom})$$

Here, σ ($\sigma>0$) denotes the elasticity of substitution between various size-classes. Equation (2) can be re-written, using the time-difference operator $\Delta x= x_t - x_{t-1}$, and the fact that by approximation, $\Delta ln\,(x) \approx (x_t - x_{t-1})/_{xt-1} = x^{\%}$, as follows:

(3) $$v^{\%}_{dom,\,s} - v^{\%}_{dom} = -\sigma \cdot (p^{\%}_{v,\,dom\,s} - p^{\%}_{v,\,dom})$$

Total domestic demand v_{dom} already has been determined in the first optimisation step, and is therefore exogenous in this problem. Also prices are exogenous. So, according to (3), real turnover from size-class *s* lags behind total demand if prices increase more than average ($p^{\%}_{v,\,dom,\,s} - p^{\%}_{v,\,dom} > 0$, so $v^{\%}_{dom,\,s} < v^{\%}_{dom}$), and increases faster than total demand if prices increase less than average ($p^{\%}_{v,\,dom,\,s} - p^{\%}_{v,\,dom} < 0$, so $v^{\%}_{dom,\,s} > v^{\%}_{dom}$).

(3) has been tested against the available data at the Europe-19 level, either disaggregated over time (yearly observations aggregated over countries and sectors of industry), disaggregated over sectors of industry (average change 1988-2003) or disaggregated by country (average change 1988-2003). Estimation results (using Ordinary Least Squares) were as follows (leaving out the 'dom' subscript):

– Yearly data 1989-2003, Europe-19, total of industries:

$$v^{\%}_{s} - v^{\%} = \underset{(t=4.7)}{-0.63} \cdot (p^{\%}_{v,\,s} - p^{\%}_{v}) \quad \underset{(t=0.7)}{-0.02} \qquad R^2= 0.28,\ n= 4 \cdot 15= 60$$

49 If they were, buyers would simply use the cheapest supplier. The assumption of limited substitution is inspired by the consideration that firms from different size-classes have different attributes, like different geographical distance from its customers.

These results have been plotted in Figure V.1.

– Average growth 1988-2003, Europe-19, by sector of industry (NACE (sub-sections):

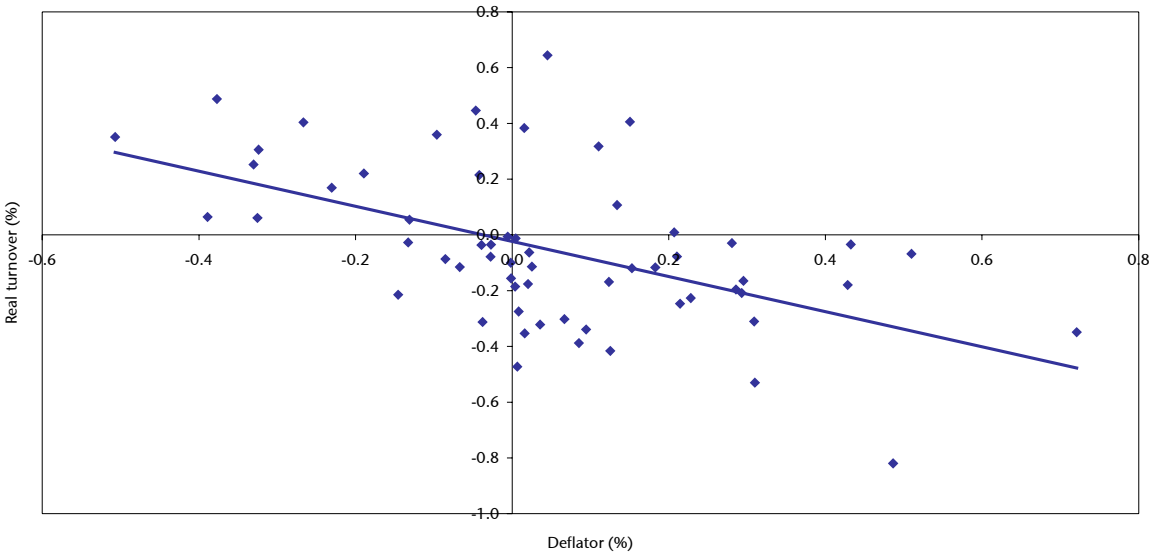
$$v^{\%}_{s} - v^{\%} = \underset{(t=4.2)}{-0.41} \cdot (p^{\%}_{v,s} - p^{\%}_{v}) \underset{(t=1.7)}{-0.06} \qquad R^2 = 0.15 \quad n = 4 \cdot 26 = 104$$

– Average growth 1988-2003, total of industries, by country:

$$v^{\%}_{s} - v^{\%} = \underset{(t=3.7)}{-0.44} \cdot (p^{\%}_{v,s} - p^{\%}_{v}) \underset{(t=1.4)}{-0.06} \qquad R^2 = 0.17 \quad n = 4 \cdot 18 = 72$$

Values of R^2 indicate that the explanatory power of the estimations is far from perfect. As can be seen from the t-statistics, estimates for σ are significantly different from zero, and have the correct sign. It is clear that the price setting by firms from various size-classes does affect their real sales growth. This model is therefore useful in explaining the size-class pattern of real turnover growth.

Figure V.1: Scatter plot real turnover and its deflator, both in deviation from their means, Europe-19, yearly observations 1989-2003



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Annex VI
Set-up and structure of Survey

VI.1. Introduction

The ENSR Enterprise Survey 2003 is designed to make uniform data on SMEs available from nineteen European countries. This enables the Observatory of European SMEs, in addition to using Eurostat and other secondary data, to make comparative analyses based on recent and comparable SME data. Data have been collected from enterprises in each of the 19 countries covered, i.e. the 18 Member States of the EEA and Switzerland.

Interviews were conducted using the CATI-system of Intomart. CATI stands for Computer Assisted Telephone Interviewing. The overall design and implementation of the stratification, the questionnaire and the fieldwork were done in close collaboration between staff from EIM Business & Policy Research in the Netherlands, partners in the ENSR network and Intomart.

In this annex the sample size and stratification plan of the ENSR Enterprise Survey 2003 are described. This will foster a proper use and interpretation of the data that have been collected. The 2003 ENSR Survey of SMEs was carried out from April-August 2003.

VI.2. Sample size

The size of the sample was determined by considering the need to report on dichotomous variables at country and size class level, with reasonable accuracy and confidence. Statistical theory shows for dichotomous variables that if sample errors are not to exceed ± 10 %, at a confidence level of 95 % a total sample size of about 90 is needed for that level. This applies to estimates at the country-size class level combined. As three size classes are distinguished in nineteen countries, the minimum required sample size can be calculated as 3 * 19 * 90 = 5 130 interviews. Estimates at the country or size class level separately are of course much more precise at the same level of confidence, as there are many more respondents at these levels.

To allow additional analyses, i.e. by various subgroups to be distinguished in the group of sampled enterprises, the planning did not aim at 5 130 interviews but at about 50 % more: 7 745 interviews. Actually even 7 837 completed interviews were obtained.

VI.3. Stratification plan

Interviewing 7 745 SMEs means covering about 0.04 % of all SMEs. A simple random sample would imply that in total only about 65 medium-sized enterprises (spread over nineteen countries and seven sectors) could be expected in the sample. Obviously this would be insufficient to reach any valid conclusion about the group. Therefore a disproportionately stratified sample is used; this means interviewing less than a proportional number of smaller enterprises and more than a proportional number of larger enterprises. Consequently, observations from the survey must be weighted in order to arrive at representative results.

The stratification of the ENSR Enterprise Survey 2003 is defined in terms of industry (i), enterprise size (s), and country (c). The stratification aims to minimise the standard deviation of the weights used in raising sample results to population levels, taking account of the fact that, in many cases, data by country and/or by enterprise

size class or by sector of industry are presented. In order to guarantee a sufficient number of observations for these subsets of the European enterprise population, the following constraints A to E have been imposed:

A. In each country/size class combination: at least 100 observations.
B. In each industry/size class combination: at least 100 observations.
C. In each country/industry combination: at least 35 observations.
D. In each individual industry/size class/country combination: at least 2 observations.
E. In each individual industry/size class/country combination: an upper limit of 10 % of the stock of enterprises.

Restriction E supersedes the other restrictions if conflicts arise. So if 100 observations at the country/size class level (restriction A) would exceed 10 % of the stock of enterprises, the 10 % was set as an upper limit.

The stratification plan that resulted from this procedure is presented in Table VI.1, by country and size class (for all sectors).

Table VI.1 Stratification plan: country by size class (for all sectors)

Country	Micro (0-9)	Small (10-49)	Med.-sized (50-249)	Total
Austria	107	100	99	306
Belgium	172	99	99	370
Denmark	139	99	100	338
Finland	103	101	99	303
France	461	100	100	661
Germany	493	100	100	693
Greece	162	100	100	362
Iceland	99	97	13	209
Ireland	100	101	100	301
Italy	607	99	100	806
Liechtenstein	139	22	3	164
Luxembourg	100	101	45	246
Netherlands	132	101	100	333
Norway	134	100	99	333
Portugal	164	99	101	364
Spain	363	100	100	563
Sweden	153	99	100	352
Switzerland	116	99	99	314
United Kingdom	527	100	100	727
Total	4 271	1 817	1 657	7 745

Source: Sample optimisation developed by EIM.

The stratification procedure results in a sample of 4 271 micro firms, 1 817 small firms and 1 657 medium-sized firms (see Table VI.1). Although there are many more micro firms than larger firms in this sample, the differences in sample size between the three distinguished size classes are much smaller than the corresponding differences in the population. In other words, micro enterprises are still underrepresented in our sample, while small and especially medium-sized enterprises are over represented.

Disproportionate stratifications have also been made regarding country. The sample size ranges from 164 for Liechtenstein to 806 for Italy. Again, while the sample size is larger for large countries, small countries are over-represented in the survey. Without this overrepresentation, it would not be possible to make valid statements concerning the smaller countries.

The overrepresentation of certain countries, sectors and size classes is corrected by weighting the survey results. Therefore, all percentages in text, tables and figures in this report refer to weighted results.

Annex VII
Performance along size class and phase of the business cycle

Table VII.1 Size-class pattern of economic growth in non-primary private enterprise by sub-period, Europe-19

	SME				LSE	Total
	Micro	Small	Medium-sized	Total		
	Average annual change in %; size classes as deviation from 'total'					
Real turnover						
1988/1991	0.1	-0.0	-0.1	-0.0	0.0	2.5
1991/1993	-0.4	-0.1	0.1	-0.2	0.3	0.1
1993/2001	-0.1	-0.2	-0.1	-0.2	0.2	3.1
2001/2003	-0.2	-0.2	-0.1	-0.2	0.2	2.5
1988/2003	-0.1	-0.1	-0.1	-0.1	0.2	2.5
Value added deflator						
1988/1991	-0.1	0.1	0.1	0.0	-0.0	5.0
1991/1993	0.9	0.7	-0.0	0.6	-0.6	3.5
1993/2001	0.0	0.1	0.0	0.0	-0.1	2.3
2001/2003	0.8	0.4	-0.1	0.4	-0.4	2.3
1988/2003	0.2	0.2	0.0	0.2	-0.2	3.0
Real value added						
1988/1991	0.1	-0.1	-0.3	-0.1	0.1	2.2
1991/1993	-0.6	-0.1	0.2	-0.2	0.2	0.3
1993/2001	-0.5	-0.3	-0.1	-0.3	0.3	3.0
2001/2003	-0.3	-0.1	-0.1	-0.2	0.2	1.6
1988/2003	-0.4	-0.2	-0.1	-0.2	0.3	2.3
Labour costs per employee						
1988/1991	-0.3	-0.0	0.1	-0.1	0.1	7.1
1991/1993	0.1	0.1	0.0	0.1	-0.1	5.1
1993/2001	-0.3	-0.0	0.1	-0.1	0.1	3.6
2001/2003	-0.3	-0.1	0.0	-0.1	0.1	3.6
1988/2003	-0.3	-0.0	0.1	-0.1	0.1	4.5
Real wage rate						
1988/1991	-0.4	0.1	0.4	0.0	-0.0	4.8
1991/1993	0.7	0.2	-0.2	0.3	-0.3	4.8
1993/2001	0.2	0.2	0.2	0.2	-0.2	0.5
2001/2003	-0.0	0.1	0.1	0.1	-0.1	2.0
1988/2003	0.1	0.2	0.2	0.1	-0.2	2.1

Table VII.1 Size-class pattern of economic growth in non-primary private enterprise by sub-period, Europe-19 (continued)

	SME				LSE	Total
	Micro	Small	Medium-sized	Total		
	Average annual change in %; size classes as deviation from 'total'					
Unit labour costs						
1988/1991	-0.2	0.3	0.6	0.2	-0.4	3.0
1991/1993	2.1	0.4	-1.2	0.8	-1.2	2.0
1993/2001	0.8	0.5	0.0	0.5	-0.6	-1.7
2001/2003	0.4	0.2	0.4	0.3	-0.5	-0.1
1988/2003	0.7	0.4	0.0	0.5	-0.6	-0.1
Labour productivity						
1988/1991	-0.2	-0.2	-0.2	-0.2	0.4	1.8
1991/1993	-1.4	-0.2	1.1	-0.5	0.9	2.8
1993/2001	-0.6	-0.3	0.2	-0.3	0.4	2.3
2001/2003	-0.4	-0.1	-0.3	-0.3	0.4	2.1
1988/2003	-0.6	-0.2	0.1	-0.3	0.5	2.2
Employment						
1988/1991	0.2	0.1	-0.1	0.1	-0.3	0.3
1991/1993	0.8	0.1	-0.8	0.3	-0.7	-2.4
1993/2001	0.1	0.0	-0.2	0.0	-0.1	0.8
2001/2003	0.1	-0.0	0.2	0.1	-0.2	-0.5
1988/2003	0.2	0.0	-0.2	0.1	-0.2	0.1

Source: Estimated by EIM Business and Policy Research; estimates based on Eurostat's Structural Business Statistics and Eurostat's SME Database; also based on European Economy, Supplement A, May 2003, and OECD: Economic Outlook, No. 71, June 2003.

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