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## Effects of the New Capital Requirements of Basel III on the Financing of Small and Medium-sized Enterprises in Austria

**The effects of the implementation of the new framework of capital requirements for financial institutions (Basel III) on the financing of small and medium-sized enterprises in Austria can be analysed in great detail by combining micro-level bank and loan data with individual company data. According to this analysis Austrian banks' lending to the small and medium-sized business sector might be constrained at least during the transition period. This is so, because these companies are mainly financed by small and medium-sized banks, which are more strongly affected by Basel III than banks on average.**

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As the financial crisis starting in 2007 showed, developments in the financial sector and particularly in banking often have a lasting effect on the whole economy. In reaction to the financial crisis and the insight that the existing regulations were insufficient to stabilise the banking system in a systemic crisis, the Basel Committee on Banking Supervision published the new regulatory framework of capital requirements for financial institutions (Basel III) in December 2010. This agreement aims to make the financial system more resilient and stable. The most important changes concern the increase of the capital base, the capital structure and the level of financial institutions' capital buffers. In the EU the new rules (Basel III) are introduced via a change in the EU capital requirements (CRD IV, CRR I). On 20 July 2011 the European Commission presented its first legislative draft. Increased capital requirements for banks in terms of both quantity and quality are at the heart of this draft. The increased capital base is to enable banks to overcome systemic shocks by themselves. The new capital regulations are to be adopted into legislation by the end of 2012 and to be implemented gradually from 2013 until 2019. Besides the new regulation of capital ratios Basel III also envisages the introduction of liquidity coverage ratios and limits to leverage, which are to be implemented during the course of the transition phase.

Due to the major importance of credit markets the proposals of Basel III are of interest not only to the banking sector but, above all, to national economic and monetary policy. Macroeconomic effects on credit financing of non-financial corporations, in particular, are the subject of a highly controversial public debate. It is often feared that the increase of the regulatory capital requirement in the banking sector might impede or even limit the supply of loans to companies, and especially to small and medium-sized businesses.

For small and medium-sized enterprises, in particular, bank financing is of outstanding importance. Due to their limited access to the capital market they largely rely on bank financing. What is more, they often meet the increased capital requirements of Basel III only to a very limited extent. As a rule the capital base of small and medium-sized enterprises is significantly below that of larger companies (this is also true for Austria despite a significant increase of small companies' average capital base during 2003 to 2007).

Due to these framework conditions small and medium-sized enterprises might be particularly affected by the expected tightening of credit standards due to Basel III. This study therefore provides a detailed analysis the potential effects of Basel III on the credit financing of small Austrian companies and draws conclusions for economic policy measures to mitigate the negative consequences of Basel III. The key result of the analysis is that for smaller banks with a below-average capital base there is a strong negative relationship between the level of the capital base and the volume of outstanding business loans. This relationship does not exist for banks with an above-average capital base. A capital base below average tends to have a negative effect on the credit position of the small and medium-sized enterprises they finance.

These results justify worries that Basel III might limit the credit supply to the small and medium-sized business sector at least during the transition phase, mainly because most Austrian banks are suboptimal in size under the new, more capital-oriented regulatory framework. Numerous small and medium-sized banks are (in part substantially) constrained in their options for a nearly optimal diversification of their credit risks by the regional segmentation of their markets. This market segmentation has remained insurmountable for most small and medium-sized banks *inter alia* because of specific institutional factors (e.g., membership in a banking association). As a result these banks often face the concentration of systematic, regional risks in their credit portfolios caused by a (from the perspective of financial risk control) "imbalanced" economic structure of their domestic market (e.g., tourist regions in Western Austria). These banks can only limit their credit risk via a quantitative restriction – determined by their disposable capital – of their lending to the business sector as a whole.

Basel III covers the entire reform package of the Basel Committee on Banking Supervision to enhance the current international banking regulation. During the financial crisis of 2008-09 it became obvious that, relying on the existing regulatory framework (Basel I and Basel II)<sup>1</sup>, the international banking system was unable to withstand a global systemic shock. Not only did numerous banks have a highly insufficient base of common equity, but above all they lacked sufficient liquidity reserves to cope with crisis-induced distortions in money markets. Bank rescue packages and compulsory nationalisations to support the banking sector produced high social costs that are ultimately borne by taxpayers.

The existing banking regulation has not only proved unsuitable to ensure the stability and efficiency of the international financial system, but it also encouraged undesirable developments, which ultimately caused the break-down of international finance. The valuation methods for credit risks according to Basel I and Basel II encouraged capital arbitrage and risk-taking and further reinforced the inherent procyclicality of banks' credit supply. Basel II supports banks' worrying disposition to tend to undervalue credit risks in boom phases and overvalue them in recessions (*Hahn, 2003, 2010*). Nor did Basel II result in substantial changes with respect to minimum standards concerning the quality of banks' risk capital. Common equity was upgraded only slightly, hybrid capital components were favoured strongly.

Therefore, the reform proposals of the Basel Committee on Banking Supervision rightly aim primarily at an improvement of capital quality, the enhanced expansion of anti-cyclical components in the regulatory framework, a stronger focus of the supervision agendas on monitoring and control of systemically relevant banks.

Banks' capital serves primarily to compensate for unexpected operational losses (going concern) and to satisfy claims in case of insolvency (gone concern). In addition, minimum capital requirements are mainly expected to limit the risk of losses from banking. Banks are not permitted to fall below the defined minimum ratio between capital and risk-weighted assets.

<sup>1</sup> Until 2008 Basel I was relevant for the regulatory minimum capital requirement in Austria.

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## Basel III from a macroeconomic perspective

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### Key aspects of Basel III

The financial crisis of 2008-09 revealed the weaknesses of hybrid instruments for strengthening banks' capital base. The capacity of hybrid instruments to absorb losses proved insufficient and in some cases even very limited.

For this reason Basel III placed a stronger emphasis on common equity, which, in the case of banks organised as joint stock companies, is composed of common stocks and retained earnings. Capital components of cooperative banks (Genossenschaftsbanken) have to meet a number of criteria defined by the Basel Committee on Banking Supervision determining the minimum requirements in terms of the capacity to absorb losses and in terms of sustainability (Deutsche Bundesbank, 2011, p. 9).

Table 1: Capital requirements according to Basel II and Basel III

	Common equity	Core capital	Total capital
	In percent of risk-weighted assets		
Basel II			
Minimum requirement	2.0	4.0	8.0
Equivalent under Basel III	1.0	2.0	
Basel III			
Minimum requirement	4.5	6.0	8.0
Capital conservation buffer	2.5		
Total	7.0	8.5	10.5
Counter-cyclical capital buffer	0 to 2.5		

Source: Bank for International Settlements.

From the point of view of business financing those measures concerning the capital base and liquidity protection are of vital interest. Table 1 sketches the differences between Basel II and the proposed regulatory framework of Basel III:

- The minimum requirement with respect to common equity (common stocks and retained earnings) progressively increases from 2 percent (Basel II) to 3.5 percent (2013) and 4.5 percent (2015) of risk-weighted assets.
- In addition, a capital conservation buffer, increasing progressively from 0.625 percent (2015) to 2.5 percent (from 2019 onwards) of risk-weighted assets, will be introduced for common equity from 2015. Falling below the minimum capital conservation buffer will be sanctioned with a complete or partial suspension of dividend payments.
- With respect to core capital (common equity plus supplementary capital) the requirements are raised from 4 percent to 6 percent (2015) and then to 8.5 percent of risk-weighted assets until 2019 as the capital conservation buffer is built up from common equity.
- Formal minimum requirements concerning the total core and supplementary capital will remain at 8 percent of risk-weighted assets. The excess over the share of common equity of 4.5 percent may be composed of certain capital-like hybrid capital instruments (e.g., preference shares). Depending on their loss absorption capacity they are classified either as additional common equity or as supplementary capital, the latter, which bears losses only in the case of liquidation, being included only up to a maximum of 2 percent of risk-weighted assets.
- Additionally a counter-cyclical capital buffer between 0 percent and 2.5 percent is to be stipulated. Further capital buffers are envisaged for systemically relevant banks.

Thus the capital requirement in the form of common equity increases from 2 percent to about 7 percent (including the capital conservation buffer). As a result the regulatory capital requirements will triple compared to the current situation. Capital requirements rise from 8 percent to 10.5 percent of risk-weighted assets (13 percent including the counter-cyclical buffer).

Measures such as the introduction of a leverage limit (from 2018: 33.3 times the core capital), a minimum liquidity coverage ratio and a limit to maturity transformation (net stable funding ratio) supplement the new regulatory framework.

Risk classes and risk-weighting according to the standard approach or the IRB approach (internal ratings-based approach with increasing risk weights that banks can partly determine using their own models), which are key to determining the regulatory risk-weighted assets, largely remain unchanged.

The regulatory framework of Basel III is characterised by a stronger consideration of macro-prudential principles. Negative macroeconomic effects (e.g., credit constraints, more expensive loans) during the transition phase will be countered by a prolonged and gradual phasing in of the new regulatory measures. The extended transition phase is to enable banks to meet the new capital requirements primarily via profits and capital increases without threatening lending to the business and household sectors.

According to the macroeconomic studies of the BIS (2010) and the OECD (Slovik – Cournède, 2011) about the potential aggregate cost of enhancing international banking regulation growth losses are expected to be only moderate: Both studies find that an increase of the regulatory capital results in an average increase of interest rates by about 15 basis points causing a dampening of GDP growth by 0.04 percentage point p.a. in each case (roughly –0.2 percentage point after 5 years). Differences in the estimates of total costs in the studies result from the differing assessment of banks' behaviour: whereas the BIS study assumes that banks follow the minimum capital requirement, the OECD study presumes that banks will observe a risk buffer in addition to the minimum capital requirements. The divergence of the estimates of the macroeconomic costs of the Basel III reform primarily results from these differing assumptions: whereas the BIS study expects annual growth losses of 0.03 to 0.05 percentage point, the OECD identifies a higher negative effect (0.05 to 0.15 percentage point per year on average). The OECD estimates macroeconomic costs for the euro area of about 0.38 percent (Basel III until 2015) to 1.14 percent of GDP (Basel III until 2019).

For Austria the Institute for Advanced Studies (Felderer – Fortin – Breinlinger, 2011) estimated macroeconomic costs of the introduction of Basel III to amount to about 1.2 percent to 2.5 percent of GDP within five years. This includes the assumption of a decline in the loan volume by 10 to 20 percent and a significant increase of credit costs. The Austrian Financial Market Authority (FMA) does not share this view and mentions negligible credit costs of Basel III for the Austrian economy referring to the study of the BIS.

The EU's assessment (European Commission, 2011) focuses on the question whether the increase in financing costs due to Basel III is fully or partly compensated by changes of the capital structure in the business sector (Modigliani-Miller-Theorem). If it is not compensated, this will dampen euro area GDP by a cumulative 0.36 percent in the course of 8 years. In the case of a compensation the cost is negligible.

Thus, two potential negative effects of Basel III for the macroeconomy have to be distinguished:

- price effects due to rising credit costs and
- volume effects due to a decline of the credit supply.

The increase in credit costs expected as a consequence of Basel III is commonly estimated at 0.3 to 0.5 percentage point. These effects are far below the potential impact of the ECB's interest hikes in the case of an economic upswing and the risk premiums that banks charge their non-prime customers. Furthermore, credit costs are tax-deductible from the tax base so that the price effect is of far lesser economic importance than potential negative effects on the credit volume (volume effect).

## Potential macro-economic effects

For this reason this empirical study focuses primarily on the macroeconomically more important volume aspect and the effects of credit constraints, which may be caused by a scarcity of bank capital ("credit crunch" due to "capital crunch").

The relationship between banks' capital and their intermediation behaviour has become an important research topic in the academic literature on banking since the introduction of the first Basel Capital Accord.

In a theoretical article which has meanwhile become a classic *Diamond – Rajan* (2000) show that capital can have a diminishing effect on banks' intermediation. According to this article deposits have the strongest disciplining effect on banks (hard constraint). In the case of malperformance of the bank management rational savers react with an immediate withdrawal of their deposits without negotiating with the management (collective action problem). According to the principle "first come, first serve" depositors are refunded their deposits at face value until the bank's liquidity reserves are used up. If the liquidity reserves of a bank are insufficient for a complete repayment of all deposits, the bank is closed. Shareholders do not have the same threat potential as the depositors to discipline the management. If bank managers perform poorly, shareholders cannot withdraw their capital. Owners only have the option to replace the management or close the bank. In both cases the management has a negotiation advantage vis-à-vis the shareholders which weakens the disciplining potential of the latter (soft constraint). This motivates and corroborates the (theoretical) hypothesis that the efficiency of the intermediation (lending) of banks is dampened by capital, but strengthened by deposits.

This relationship is not invalidated by a government-guaranteed deposit insurance. However, it is weakened to such an extent that the disciplining effect of a bank run becomes negligible. Furthermore, the disciplining of management by depositors is only desirable from a macroeconomic point of view, if only those banks are threatened with a bank run that actually have an inferior management. However, if alleged mismanagement is equally punished by bank runs, the macroeconomic effects are negative. The macroeconomically desirable disciplining effect is lost, because banks with a high intermediation performance are also forced to close as a consequence of bank runs or systemic shocks. Therefore, minimum capital requirements for banks are the first-best solution according to *Diamond – Rajan* (2000) when depositors (can) exercise their monitoring and control function only in a suboptimal way or if systemic shocks cannot be ruled out. In the article of *Diamond – Rajan* (2000) the optimal minimum capital base of banks is determined by the control deficit of the depositors and the macroeconomically desirable resilience of banks to shocks.

Similarly, *Dewatripont – Tirole* (1994) consider minimum capital requirements for banks necessary from a macroeconomic perspective to limit excessive leveraging and risk-taking at the cost of depositors (or to the benefit of the shareholders).

The importance of capital for the efficiency of the intermediation performance, which, from a theoretical point of view, can only be determined in relative terms, helps to understand that in the practice of banking capital is perceived as a "hard constraint" rather than a "soft constraint". The former applies particularly to the regulatory minimum capital requirements, which primarily aim at ensuring the viability of the banking system even under the devastating conditions of systemic shocks (the recent financial crisis showed that the optimum regulatory capital threshold is difficult to determine). In a regulatory framework based on capital standards a credit crunch (credit rationing) in a systemic crisis will hardly be caused by banks with an above-average capital base and the respective (theoretical) corporate governance problems, but mostly by banks with a suboptimal capital base (capital crunch).

Undercapitalised banks try to meet regulatory minimum capital requirements – as a rule – by restructuring their assets and/or deleveraging. In most cases this results in a reduction of the intermediation activity particularly with respect to those sectors whose credit risks are considered above average from the perspective of the super-

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## Capital and intermediation: concept and theory

visory authority and consequently tie up an above-average amount of regulatory capital. These include loans to the private business sector, and in particular to small and medium-sized non-financial enterprises.

The econometric analysis of this specific relationship between capital requirements and lending to the business sector based on micro data (data of individual banks and companies) is the focus of the empirical part of this study.

The scope and depth of the micro-econometric analysis of Austrian banks' lending to small and medium-sized companies are primarily determined by the quantity and quality of the existing data. Although the data base of this analysis is of exceptionally high quality (and quantity), it nevertheless permits only a very incomplete representation of the credit-relationship between banks and commercial customers. Privacy protection regulations of banking supervision legislation, in particular, prevent the unlimited access to those individual bank data which would facilitate a comprehensive analysis of credit-relationships between banks and borrowers. For the current analysis outstanding loans and the volume of new loans to small enterprises, the risk-weighted capital ratios according to Basel I and Basel II and the loan structure according to banks' internal or regulatory credit ratings (e.g., weighted according to the standards of Basel I, risk-rated internally according to Basel II) would have been required at the level of individual banks. Using the company data base of the Austrian Kreditschutzverband von 1870 (KSV), an association for the protection of creditors, some companies could partly be matched with their main banks.

Estimation problems result particularly from the fact that data both of individual banks and of individual companies consist (almost) exclusively of unconsolidated financial statements or balance sheets. In applied econometrics such endogeneity problems emerge inter alia, if the dependent and the independent variable mutually influence each other distorting the estimation results and thus make it more difficult or impossible to clarify the causal relationship. The existence of endogeneity is ubiquitous in empirical economic research. It is artificially multiplied by the data compilation systems common in economic statistics (e.g., the design of the National Accounts). The balance sheet mechanics of companies' annual financial statements data that are used i.a. in this study produce those artificial endogeneities e.g., at the company level, which partly extend to macroeconomic data systems. Thus, an artificial endogeneity would result, if changes on the assets side of a bank's balance sheet were explained by changes of the capital ratio according to Basel I or Basel II without additional internal information on the bank's decision-making process. In this case the causal relationship between both activities could not be determined externally, as e.g., a capital-saving restructuring of assets would by definition require an increase of the regulatory risk-weighted capital ratio (assuming that all other factors remain unchanged).

In what follows the analytical constraints due to a lack of data and to endogeneity are mitigated by a specification of the estimation model which conforms as much as possible to the variables. This approach proved superior to other methodological options (such as the use of instrumental variables)<sup>2</sup>.

For an answer to the key research issue of the effect of banks' capital base (primarily according to Basel I) on their lending to small and medium-sized enterprises between 2004 and 2009 without knowing the volume of loans to small enterprises and the level of the regulatory capital ratio (according to Basel I or Basel II) for each bank, the following approximations were chosen:

- By reducing the WIFO-OeNB bank sample to small and medium-sized regional banks (roughly 650 commercial banks belonging to the sector of cooperative banks, the so-called Volksbanken and Raiffeisenbanken, and savings banks with total assets of at most € 2 billion each) it was to be ensured that the bulk of the

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## Lending behaviour of small and medium-sized Austrian banks

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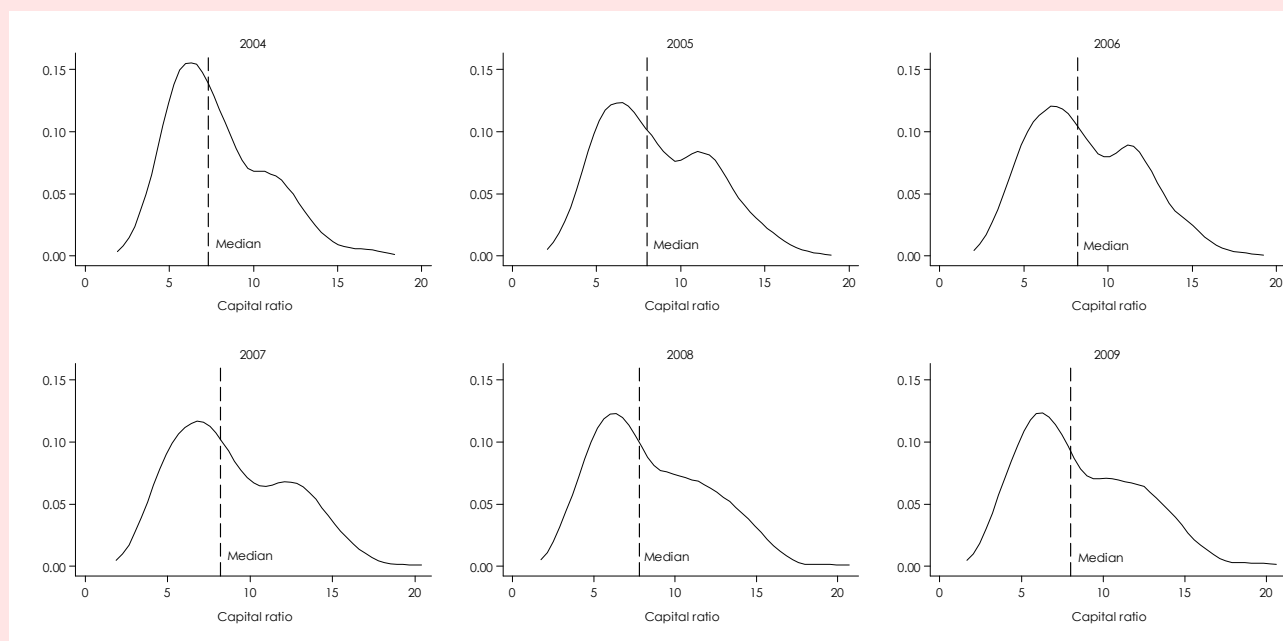
## Methodological and data-related constraints

<sup>2</sup> In practice the methodological superiority of instrumental variable estimators is often diminished by the lack of suitable instrumental variables.

loans these banks reported in their financial statements were provided to small enterprises. Small and medium-sized banks' loan volume accounts for more than 50 percent of all business loans granted by Austrian banks.

- The regulatory capital ratio according to Basel I and Basel II was approximated by common equity (common stocks plus retained earnings) in percent of total assets. For small banks this non-risk-weighted capital ratio is very close to the regulatory capital ratio according to Basel I. Therefore, for instance, the effects of a capital-saving restructuring of assets should be negligible with this capital definition (at the level of the individual bank the unweighted capital ratio is assumed to be at least weakly exogenous). The negative deviations increase with the number of asset options the bank has at its disposal to reduce minimum capital requirements. Large banks have more options. Therefore they show larger negative deviations. The median of the frequency distribution of small and medium-sized regional banks' simple capital ratio between 2004 and 2009 is close to 8 percent (Basel ratio) and this holds for each year during the examination period. Furthermore, the distribution is skewed to the right, as the majority of banks with a capital ratio below 8 percent do not deviate from this benchmark by more than 2 percentage points (Figure 1). Thus, under the regime of Basel I the 8 percent-ratio is a plausible benchmark for the identification of banks that are capitalised sufficiently from a regulatory perspective (or in line with market conditions).
- As an endogenous (dependent) variable the annual absolute change of the volume of loans to non-financial enterprises in relation to total assets of a bank in the previous year sufficiently accurately reflects restructurings between loans to businesses, which had to be fully backed with capital according to Basel I (i.e., a business loan of 100 monetary units would require a capital base of 8 monetary units), and other assets, which (in most cases) required less capital. This is true at least in terms of its sign. With the standardisation in terms of total assets the effect of an asset restructuring is, in principle, taken into account. In the expanded estimation model, which focuses on the analysis of the relationship between the enterprises' capital structure and the capital base of their main banks, this indicator is calculated from the corresponding liability positions (i.e., bank loans) of the respective company.

Figure 1: Kernel density estimation of the capital ratio of small and medium-sized banks



Source: WIFO-OeNB bank sample.

- Changes of the endogenous variables caused by real economic shocks or cyclical credit demand are reflected by the output gap (the deviation of real GDP from potential output in percent of potential output). Monetary policy shocks or cost-induced changes in credit demand are taken into account via a weighted real interest rate on business loans which is based on inflation expectations. These variables affect the macroeconomic level and are thus strictly exogenous for the individual banks.
- The expanded estimation model includes additional company-related variables, in particular the KSV rating of a company.

Thus, the basic model for the estimations has the following structure (Honda, 2002, Hahn, 2005):

$$(1) \quad \frac{\Delta L_{i,t}}{A_{i,t-1}} = \beta_0 + \sum_{i=1}^n \mu_i + \beta_1 K_{i,t} + \beta_2 \ln A_{i,t} + \beta_3 Y_t + \beta_4 R_t + \varepsilon_{i,t},$$

$$i = 1, 2, \dots, 650, \quad t = 2005, \dots, 2009.$$

$\Delta L_{i,t}$  ... absolute change in business loans of bank  $i$  during the period  $t$ ,  $A_{i,t-1}$  ... total assets of bank  $i$  at the beginning of period  $t$ ,  $K_{i,t}$  ... unweighted capital ratio of bank  $i$  in period  $t$ ,  $Y_t$  ... aggregate output gap,  $R_t$  ... interest rate on business loans in period  $t$  adjusted using inflation expectations of period  $t$ ,  $\mu_i$  ... bank-specific fixed effects of bank  $i$ ,  $\varepsilon_{i,t}$  ... remaining stochastic effects.

$$(2) \quad \frac{\Delta LE_{j,t}}{AE_{j,t-1}} = \beta_0 + \sum_{j=1}^m \nu_j + \beta_1 K_{ij,t} + \beta_2 \ln AE_{j,t} + \beta_3 Y_t + \beta_4 R_t + \ln ZE_{j,t} + \varepsilon_{j,t}.$$

In the expanded estimation approach (2) the endogenous variable is replaced by the corresponding liability or the absolute change of bank liabilities  $\Delta LE_{j,t}$  of the company  $j$  in period  $t$ , standardised with respect to total assets of the company  $j$  at the beginning of period  $t$ ,  $AE_{j,t-1}$ . As additional independent variable the KSV rating of the company  $j$  in period  $t$ ,  $ZE_{j,t}$ , is included in the estimation model;  $\nu_j$  ... company-specific fixed effects of company  $j$ ,  $K_{ij,t}$  ... unweighted capital ratio of the main bank credit financing company  $j$  in period  $t$ .

The econometric estimations of models (1) and (2) are based on a comprehensive, interconnected panel of company and bank data for the period from 2004 until 2009 (Table 2):

## Data base

Table 2: Definitions and variables

Bank regressions	
<i>kmubank</i>	Small and medium-sized banks
<i>regbank</i>	Regional and local banks
<i>ekq</i>	Common stock and retained earnings in percent of total assets
<i>spas</i>	Total assets
<i>lspas</i>	Total assets, logarithm
<i>Δknfu</i>	Loans to non-financial companies, absolute change over previous year
<i>creationb</i>	Absolute change over previous year of loans to non-financial companies in percent of total assets of the previous period
Company regressions	
<i>comsec</i>	Banks organised as joint stock companies, savings banks, cooperative banks, mortgage banks
<i>lksvrat</i>	Rating of the credit protection agency (KSV), logarithm
<i>lspasu</i>	Total assets, logarithm
<i>creationvb</i>	Absolute change on previous year of liabilities in percent of total assets of the previous period
<i>kmu</i>	Companies with turnover below € 10 million
Macro variables	
<i>crisis</i>	Dummy variable for the financial crisis, 2008 = 1 und 2009 = 1
<i>gap</i>	Deviation of real GDP from aggregate potential output in percent of potential output, according to OeNB
<i>realzins1_unter</i>	Interest rate of newly granted company loans (weighted by their volume) less the expected inflation rate based on expectations of Consensus Economics

Source: WIFO-OeNB bank sample, OeNB, KSV 1870.



- Individual bank data of all Austrian credit institutions (more than 800 institutes from the WIFO-OeNB bank sample, mainly balance sheet data),
- Company data (including ratings) of non-financial companies (about 7,000 companies from the KSV 1870 company data base, mainly balance sheet data, turnover, employees, ratings),
- Combination of both data panels via the identification of the main bank(s) of each of the companies in the KSV 1870 company sample.

The estimations of models (1) and (2) have been carried out using panel econometric methods (robust fixed effects estimator). This estimation approach is supported by the corresponding specification tests for panel data models (e.g., Hausman test). The estimation results of model (2) have been adjusted for cluster effects at the NACE 2-digit level.

## Estimation results

Table 3: Results of bank regressions – model (1) (robust estimators)

Endogenous variable: *creationb*

	Excluding marginal effects of the financial crisis		Including marginal effects of the financial crisis	
	<i>regbank</i>	<i>regbank</i>	<i>regbank</i>	<i>regbank</i>
	<i>kmubank</i>	<i>kmubank</i>	<i>kmubank</i>	<i>kmubank</i>
	<i>ekq &lt; 8 percent</i>	<i>ekq &lt; 8 percent</i>	<i>ekq &lt; 8 percent</i>	<i>ekq &lt; 8 percent</i>
Exogenous variables				
<i>lspas</i>	0.0442 (0.000)	0.0259 (0.003)	0.0150 (0.310)	0.0296 (0.026)
<i>gap</i>	0.0080 (0.000)	0.0066 (0.001)	0.0073 (0.000)	0.0068 (0.000)
<i>realzins1_unter</i>	- 0.0169 (0.000)	- 0.0103 (0.016)	- 0.0152 (0.000)	- 0.0107 (0.008)
<i>ekq</i>	- 0.0065 (0.007)	0.0012 (0.320)	- 0.0060 (0.011)	0.0012 (0.289)
<i>crisis</i>			0.0064 (0.001)	- 0.0011 (0.641)
Constant	- 0.1393 (0.027)	- 0.1105 (0.009)	- 0.1230 (0.867)	- 0.1276 (0.042)
Bank-specific fixed effects	Yes	Yes	Yes	Yes
Number of observations	1,499	1,530	1,499	1,530
Number of banks	335	346	335	346
Estimation period		2005 to 2009		

Source: WIFO-OeNB-KSV Panel. Italics in brackets . . . *p*-values.

### Additional results supplementing the bank regressions

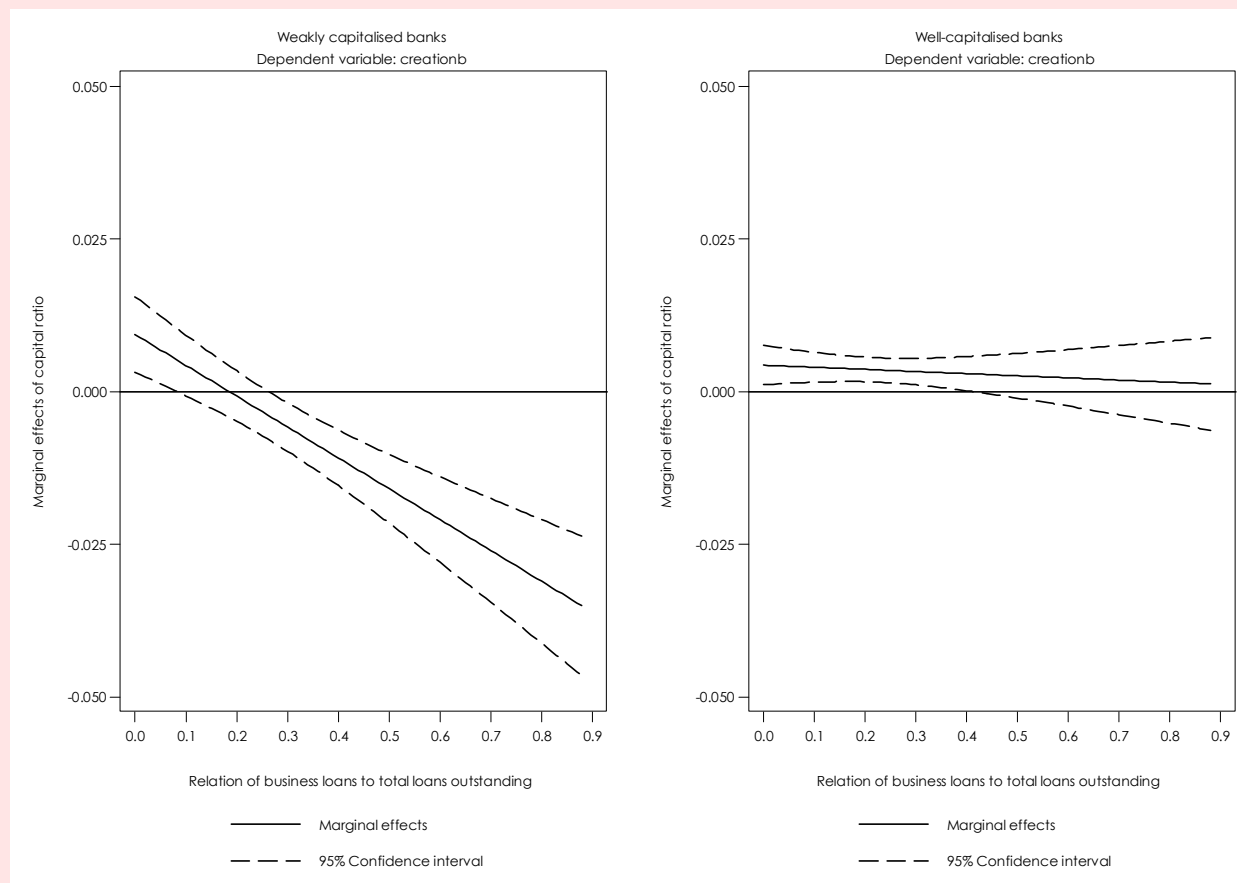
In addition to the bank regressions described here, further specifications were estimated to test the robustness of the results. In one of these specifications the interaction of the capital ratio with the share of business loans in total loans was explicitly taken into account at bank level. The coefficient of capital then depends on outstanding business loans. Figure 2 shows the marginal effect of the capital ratio in relation to the share of business loans in the overall loan portfolio of the previous period on the current change of business loans compared to total assets of the previous period. Panel A presents this relationship for weakly capitalised banks (capital ratio below 8 percent) and Panel B illustrates it for well-capitalised banks (capital ratio above 8 percent). An interaction effect is only observed in the case of weakly capitalised banks and a capital-induced reduction of business loans is essentially determined by the share of business loans in total assets: the larger the involvement of the bank in business lending the larger the decline of loans due to a weak capital base.

The coefficients of the macroeconomic variables in model (1) (bank regressions, Table 3) are highly significant in all cases and correspond to expectations. A positive aggregate output gap causes an increase of demand for business loans. An increase in real credit costs exerts a dampening effect on credit demand. This is true for all small and medium-sized banks, irrespective whether they are weakly (regulatory capital ratio below 8 percent) or strongly (capital ratio above 8 percent) capi-

talised. Only in the case of small and medium-sized banks that have a weak regulatory capital base, however, there is a significant negative impact of a bank's capital base on its lending to companies. If the financial crisis of 2008-09 is taken into account explicitly (dummy variable: crisis), the coefficient of the crisis variable does not indicate any limiting effect on business loans due to this special effect – at least in the case of small and medium-sized banks. As almost 80 percent of small and medium-sized banks' loans are granted by banks, which, according to the current definition, can be regarded as weakly capitalised and are therefore constrained in their lending by scarce capital, the estimation results are particularly important from an economic policy perspective.

Figure 2: Interaction between business loan changes and capital ratio changes

Marginal effects of an increase of capital ratio subject to the relation of business loans to total loans outstanding



Source: WIFO-OeNB bank sample.

The results of model (1) are further substantiated by the estimation results of model (2) (Table 4). In the latter model loans to small and medium-sized companies are explicitly taken into account. In this article results are only presented for those companies which could be matched unequivocally with their main banks (main bank 1 and main bank 2). In addition, the model includes the effect of a company's solvency (measured by the rating of the KSV 1870) on its credit financing. The calculations have been carried out for all company sizes and separately for small and medium-sized companies. Table 4 shows only the results for banks with a weak regulatory capital base (with no restriction to small and medium-sized banks). The results for "main bank 1" as the most important bank of a company are not only based on a larger data set. They are also more meaningful than those of "main bank 2". As expected a less favourable rating of a company limits its credit financing. However, the focus is on the effect of the main bank's capital base on the company's bank loans. As the calculations clearly show, the limitation of lending by main banks with a weak regulatory capital base particularly affects the credit supply to small and

medium-sized companies (Table 4, column 2). The crisis variable in model (2) is highly significant and shows a negative sign. This suggests that companies autonomously reduced their liabilities during the financial crisis of 2008-09 and were not forced to do so by their main banks (in model (1) the influence of the crisis variable is positive). This interpretation is valid, if model (2) is understood as companies' credit demand function. The capital ratio of the main bank in model (2) can be seen as an exogenous variable that only shifts the credit supply function, thus permitting to identify the demand function.

The tests for robustness confirm the negative relationship between the relatively weak capital base of a bank and the constraints on lending<sup>3</sup>.

Table 4: Results of company regressions – model (2) (clusters, NACE 2-digit level)

Endogenous variable: *creationvb*

Exogenous variables	Main bank 1		Main bank 2	
	<i>comsec</i> <i>ekq</i> < 8 percent	<i>comsec</i> <i>ekq</i> < 8 percent <i>kmu</i>	<i>comsec</i> <i>ekq</i> < 8 percent	<i>comsec</i> <i>ekq</i> < 8 percent <i>kmu</i>
<i>lspasu</i>	0.3221 (0.000)	0.3049 (0.001)	0.3099 (0.000)	0.2582 (0.059)
<i>lksvrat</i>	-0.1577 (0.001)	-0.1535 (0.044)	-0.0485 (0.290)	0.0048 (0.985)
<i>gap</i>	0.0204 (0.001)	0.0014 (0.921)	0.0366 (0.000)	0.0380 (0.202)
<i>realzinsl_unter</i>	-0.0495 (0.000)	-0.0160 (0.567)	-0.0853 (0.000)	-0.0926 (0.177)
<i>ekq</i>	-0.0064 (0.062)	-0.0172 (0.007)	-0.0117 (0.051)	0.0140 (0.465)
<i>crisis</i>	-0.0794 (0.000)	-0.0640 (0.001)	-0.0778 (0.000)	-0.0824 (0.156)
Constant	-4.3844 (0.000)	-3.8151 (0.029)	-4.7840 (0.000)	-4.0610 (0.068)
Company-specific fixed effects	Yes	Yes	Yes	Yes
Number of observations	6,426	861	1,514	181
Number of companies	1,826	227	326	38
Number of main banks	82	37	79	20
Estimation period	2005 to 2009			

Source: WIFO-OeNB-KSV Panel. Italics in brackets . . . *p*-values.

With certain restrictions the estimation results, which are based primarily on the regulatory conditions of Basel I (and to some extent Basel II) permit substantiated qualitative conjectures with respect to the expected effects of Basel III on the credit financing of small enterprises in Austria. Under the regulatory conditions of Basel I 40 percent of all business loans and 80 percent of loans to small enterprises (WIFO-OeNB bank sample) were provided by banks that are constrained in their lending by an insufficient capital base. Even if the constraints are negligible for each individual bank, they are relevant from an economic policy perspective because more than 300 small and medium-sized banks with a focus on financing small and medium-sized enterprises probably face such constraints. Although most of these small banks meet the regulatory minimum capital requirements under Basel I and Basel II with their common equity, the more sophisticated "capital culture" under the regime of Basel III will set significantly higher market-based standards for the quality of the loan portfolio of these banks. Small banks with a sufficient regulatory capital base will be forced by market mechanisms to hold much higher capital, if their loan portfolio is burdened with one-sided or unbalanced risks. The latter is true for the majority of the analysed small and medium-sized Austrian banks which, due to the segmentation of their market, hardly have any other options to diversify their credit risk than to limit the credit volume in line with their available risk capital (common equity).

<sup>3</sup> The results of the tests for robustness are provided on request.

Against this background the results of this study are most likely to represent the lower bound of the potential negative effects of Basel III or to be far below them.

The empirical results support the hypothesis that a tightening of capital requirements for banks is very likely to lead to macroeconomically negative effects on the financing of small and medium-sized companies, particularly during the transition phase until the Austrian banks meet the capital requirements according to Basel III.

Under the structural conditions of the Austrian banking sector the implementation of Basel III will (most probably) result in negative external effects, which may in principle be mitigated by measures of the banks (Coase approach) and/or economic policy (Pigou approach). The objective of these measures is to weaken or suspend the negative relationship between the increase of capital requirements and bank lending.

The most important endogenous adjustment options of the banking sector include cooperation approaches, based on changes of the banks' business models with respect to lending to small enterprises, bank mergers and securitisation. The most important exogenous adjustments brought about by economic policy comprise government subsidisation of loans to small enterprises and/or of banks financing them.

The introduction of Basel III will affect the business models of banks (Härle *et al.*, 2010, BIS, 2010, ACCA, 2011). Banks, focusing on financing small enterprises and aiming to remain competitive, can endogenously limit the potential negative (macroeconomic) effects of these changes of the business models only via cooperation or mergers.

The effects of adjustments of the business models cannot be estimated accurately. Probable changes concern the following fields:

*Information requirements* will change: banks will update their risk models and adjust data quality as well as internal reporting (Härle *et al.*, 2010). Data quality is among the most serious problems in the management of loans to small enterprises: the smaller the business, the less reliable information on this business is available. Small businesses also face less public pressure that might force them to disclose information (no reporting duties).

The information asymmetry between the business and the bank (the entrepreneur has a better knowledge of the company's potentials than outsiders) is particularly pronounced in the case of small and medium-sized enterprises. For companies the costs of providing information will increase. Nevertheless, the risk assessment of small businesses will become better and more accurate in IRB systems.

For cost reasons banks often limit their services to small customers and to customers that offer little potential for cross-selling. Catering to small enterprises may therefore result in increased administrative cost, which is passed on to the customer if permitted by market conditions. This is likely to raise credit cost, but should leave the volume of loans to small and medium-sized enterprises largely unaffected.

*Collateral requirements* for loans will increase not only because of Basel III, but also due to the tightened refinancing conditions for all banks. According to Härle *et al.* (2010) the introduction of Basel III will therefore have a particularly strong effect on non-collateralised lending. This will increase the importance of credit guarantees.

Small and young businesses will be hit particularly hard by increased collateral requirements, because banks will hedge their loans to opaque enterprises (without reporting duty) still more than those to transparent ones (ACCA, 2011). This could enhance the trend towards a volume rationing of loans to small enterprises.

The *risk behaviour of banks* will change: due to the implementation of Basel III banks will probably focus less on investment banking and more on the traditional bank business (BIS, 2010). As a result, large banks in particular could expand their intermediation activities considerably again while reducing their investment business.

However, in doing so, banks will increase their credit positions in favour of less risky borrowers. As long as small enterprises are considered riskier borrowers, this will

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## Options to mitigate negative macro-economic effects

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## Options for the banking sector

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## Change of the business model

dampen the credit supply available to them. The application of improved methods of risk management will tend to mitigate this effect.

Banks will also shift their activities towards fee-based transactions (e.g., factoring; *BIS*, 2010). This, too, might result in a reduced credit supply to small enterprises.

If loans to small enterprises are increasingly securitised, this might result in an increased standardisation of these loans. The consequences of this cannot yet be assessed. Securitisation would increase the credit volume for small and medium-sized companies per unit of capital. However, the standardisation also means that the value of specific information of the bank on the borrower will implicitly diminish. This could enhance the trend towards credit rationing (*ACCA*, 2011).

*Monitoring and control* will be tightened: banks will try to reduce their risks via covenants (clauses and agreements in credit contracts) and to cut their financing costs by reducing maturities (*BIS*, 2010). In financing small enterprises in Austria a roll-over of short-term loans is a very common form of protection against risks. Banks use it to reduce the information asymmetry. The application of credit clauses may render credit negotiations more difficult thus increasing the importance of other forms of financing (factoring, suppliers' credit, etc.) particularly for micro enterprises.

*Hahn* (2007) and *Egger – Hahn* (2010) identify clearly positive effects of mergers of small and medium-sized banks in Austria. The positive synergies include the improved conditions for the strengthening of the capital base. Larger banks operating at the regional level have advantages above all in the composition of their credit portfolios and in their risk management. As the empirical evidence shows concentration in banking systems and markets reduces credit constraints (in terms of volume), even if it causes an increase of the loan refusal rate and of financing costs (e.g., *Carbo-Valverde – Rodriguez-Fernandez – Udell*, 2006, *Park*, 2008, *Canales – Nanda*, 2011). Due to the structure of the Austrian banking sector mergers of smaller banks into larger units contribute most to a mitigation of the intermediation constraints that are caused by suboptimal company-size or a weak capital base of small and medium-sized banks.

#### *Digression: Financing costs of banks and government guarantees for banks*

As *King* (2009) shows in an empirical examination, capital costs of large financial institutions essentially depend on the perceived capital market risks and implicit government guarantees. The increased capital requirements due to the introduction of Basel III are to reduce the potential social costs of banking crises by forcing the banks to have a higher loss-absorbing capital base. If this goes hand in hand with a reduction of the implicit government guarantees, this should have an effect on banks' capital financing costs.

The effect of this mechanism can currently be observed in Denmark: bank insolvency legislation was changed to the disadvantage of holders of senior bonds. In the case of insolvency, these investors can no longer expect their outstanding amounts to be fully preserved. As a consequence refinancing costs of Danish banks increased. However, this also illustrates that in this case ex-ante costs have to be offset against ex-post costs. In this study, by contrast, the increase of refinancing costs due to the introduction of Basel III does not prove a key issue<sup>1</sup>.

<sup>1</sup> As a rule banks will ration their credit supply if facing insufficient regulatory capital. However, in this case banks abstain from raising credit costs significantly, because borrowers with a high business risk are not deterred by higher credit costs, whereas those with a relatively reliable business performance (and low variance of expected payments) are. In this case banks are interested above all in riskless projects, because they do not share any company performance beyond the repayment of the loan (*Stiglitz – Weiss*, 1981, *Cumming – Johan*, 2009).

Under Basel III, too, bank loans will remain the most important form of finance for small and medium-sized enterprises. Securitisations are advantageous for banks, because regulatory capital can be optimised, when only the most junior tranche has to be retained. Although securitisations have lost some of their appeal due to

## Mergers

## Securitisation

the recent financial crisis and due to misuse, they are undoubtedly powerful instruments to optimise and diversify risks, if proper account is taken of the fact that risks can only be diversified in each case, but not eliminated.

Securitisations offer clear advantages especially for small enterprises and for particularly small banks. Small enterprises obtain better access to capital. A potential rationing can thus be avoided. A drawback consists in the fact that, as mentioned above, the securitisation requires standardised loan contracts, which might have a negative effect on more opaque companies.

Securitisations may help to dampen the negative effects of a regulatory or operational scarcity of capital in small banks, because due to the sale of receivables to other investors the latter need less capital in the case of securitisations. At the same time the securitisation results in a significant geographic diversification of the default risk of small banks' loans. Further, through securitisations small and regional banks gain access to the capital market from which they are largely excluded.

Securitisations of business loans are often organised by the government. In Germany the KfW Bankengruppe, a state-owned development bank, plays a key part in the programme "Promise" helping banks to securitise loans to small and medium-sized enterprises. Securitisations are often complex transactions, which can only be implemented by large institutes or government agencies. Only they have the credibility allowing them to efficiently pool credit risks and offer them in the capital market. The European Investment Fund (EIF) supports securitisations in its member countries.

Economic policy has the option to strengthen banks' capital base and thus make the negative relationship between higher capital requirements and lending disappear. As this empirical study shows there is no negative relationship between capital accumulation and loans to the business sector for well-capitalised banks (capital ratio above the median of the WIFO-OeNB bank sample). This solution is desirable from a macroeconomic perspective, but it can entail high adjustment costs. It could most easily be implemented via mergers of small banks.

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## Economic policy options

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### Strengthening banks' capital base

Table 5: Capital conservation buffer and constraints on dividend payments

Capital conservation buffer exceeding the ratio of common equity and retained earnings In percent of risk-weighted assets	Prohibition of dividend payments As a percentage of the bank's earnings
≤ 0.625	100
> 0.625 und ≤ 1.25	80
> 1.25 und ≤ 1.875	60
> 1.875 und ≤ 2.5	40
> 2.5	0

Source: Deutsche Bundesbank (2011).

Basel III already envisages an implicit buffer for those banks that do not meet the capital requirements. Although the capital conservation buffer is designed for crises, it can also serve to cushion the transition from Basel II to Basel III far beyond 2019 for individual banks. The capital conservation buffer of 2.5 percent of risk-weighted assets, which has to be provided in the form of common equity, enables banks to continue working with the required minimum ratio of 4.5 percent without any limitations to current operations. However, in this situation banks are subject to restrictions with respect to the distribution of profits and other discretionary payments (Table 5). This is to ensure that profits are used to build up common equity. The introduction of the capital conservation buffer thus also mitigates the negative consequences of Basel III for small banks.

The proposal to relax capital requirements for loans to small enterprises is pushed primarily in Germany and in Austria. Berg – Uzik (2011) suggest reducing the risk-weights in the standard approach from 75 percent to 50 percent for loans to small enterprises amounting to up to € 1 million, and from 100 percent to 70 percent for loans to medium-sized enterprises (turnover below € 250 million) while leaving those of large enterprises (turnover above € 250 million) unchanged at 100 percent. For

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### Relaxation of capital requirements for loans to small enterprises

the advanced IRB approach they equally suggest a corresponding change of the risk-weighting.

Their calculations are based on an analysis of asset correlation (vulnerability to systemic risks) of loans to medium-sized enterprises, for which they identify a low concentration of risks. The actual asset correlation is 30 percent to 50 percent lower according to *Berg – Uzik* (2011) than implied by regulations. However, as they do not regard the capital conservation buffer as a regulation to dampen capital requirements, they derive seemingly excessive capital requirements for German banks, although their analysis is accurate.

Besides asset correlation, arguments for reduced risk coverage also have to take default probabilities into account. Most studies on default risks conclude that the individual default risk declines with the age and the size of a company. Many small and medium-sized enterprises (young and small) would then represent higher default risks from a banking perspective. Yet, as studies for Sweden (*Jacobson – Lindé – Roszbach*, 2005) show, this implication is not necessarily justified, because portfolios of loans to small enterprises as well as portfolios of retail credits do not differ significantly from portfolios of business loans (large enterprises). In this context structures may differ substantially across countries. According to *Cardone-Riportella – Trujillo-Ponce – Briozzo* (2011), for instance, the average default probability of small and medium-sized enterprises (which affects the rating) in Spain was more than 100 percent above the average of 2005-2007 in 2009.

A relaxation of capital requirements for loans to small enterprises provides stronger incentives for the banking system to engage more actively in their function of financing small enterprises, which is important from a macroeconomic perspective. Nevertheless, the capital standards should not cause a one-sided privileging of loans to small enterprises over those to large companies or individuals, because this might also have undesirable effects on the allocation of funds (implicit barriers for small companies to grow beyond certain limits). In fact the loan volume is distributed unevenly between small and medium-sized enterprises, the share of larger enterprises being much higher than that of micro ventures. Larger small enterprises are found primarily in manufacturing. Manufacturing but also business services are highly cyclical industries (*Hözl – Kaniovski – Reinstaller*, 2011).

Whereas the effectiveness of this measure is corroborated by the existing calculations, an excessive relaxation may be unfavourable from a macroeconomic point of view. Further analyses of the default risk of loans to small and medium-sized enterprises at the individual level and the level of loan portfolios at small and large banks are recommended<sup>4</sup>.

It is often assumed that small banks prefer to finance small companies and large banks predominantly finance large enterprises. This is suggested by statistics, because, for reasons of risk management, small banks cannot finance large companies. However, empirical studies on the USA and on Germany (*Marsch – Schmieder – Forster-van Aerssen*, 2007) fail to derive any statistically significant relationship. Yet, there is a number of arguments according to which large banks have an advantage in financing small companies by applying standardised mechanisms that require hard information, whereas small banks are favoured in processing imprecise information (relationship banking). Larger banks then prefer to finance larger, more transparent small enterprises. In the USA large banks demand smaller margins and interest spreads than small banks, because they pass their cost advantages on to their customers.

Basel II was conceived above all for large, systemically relevant banks. Therefore, a relaxation of capital requirements for smaller banks might be considered to ensure relationship banking with small companies.

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### Relaxation of the capital requirements for small banks

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<sup>4</sup> The study of the Institute for Advanced Studies (*Felderer – Fortin – Breinlinger*, 2011) might provide new evidence on this issue.

However, this option might entail macroeconomic costs: if the capital requirement is lowered, small banks can take more risks in all business segments and cause undesirable developments at the regional level by misallocating funds. As a temporary regulation the establishment of the counter-cyclical capital buffer in the form of common equity could be endowed with similar sanctions as the capital conservation buffer. This would be equivalent to an implicit extension of the transition period for the implementation of Basel III for weakly capitalised banks.

Being excluded from the capital market, small and medium-sized enterprises primarily finance themselves via bank loans. Strengthening the capital market would only benefit very few and highly specialised small enterprises with a high growth potential. In the USA, too, bank loans are the most important form of finance for small enterprises: according to *Berger – Udell (1998)* private equity contributes only about 5 percent to financing small enterprises. This means that the differences between advanced economies are significantly smaller in financing small enterprises than in financing large enterprises.

In Austria the capital base of small and medium-sized companies has improved considerably in recent decades. Even in the economic crisis they managed to maintain or even increase their capital ratio (*Voithofer, 2011*). A higher capital ratio makes credit financing easier. Equity financing is vital for the implementation of investment projects, particularly for growth-oriented companies that have little collateral at their disposal. Alternative forms of financing, such as factoring or leasing are attractive especially for opaque small enterprises to offset bottlenecks in traditional credit financing.

The attractiveness of alternative forms of finance is dampened by the preferential tax treatment of bank loans (deductibility of interest payments), so that companies often prefer loans to other forms of finance.

In order to mitigate the negative effect of increasing capital requirements due to Basel III on lending to small enterprises public loans can be provided and credit risks may be underwritten via guarantees, as offered to small and medium-sized enterprises by Austria Wirtschaftsservice Gesellschaft mbH (aws) and the ERP fund. According to an estimation by the European Commission 1.8 million small European companies benefit from credit guarantees in some form. If credit guarantees are provided carefully and in line with the directives on government subsidies, they can create substantial leverage and facilitate additionalities (increase of the available loan volume) at low cost – if the reduced risk is taken into account in the implementation of Basel III. As *Cardone-Riportella – Trujillo-Ponce – Briozzo (2011)* show, guarantees might become more "valuable" for banks and companies under Basel III.

European guarantee instruments (Competitiveness and Innovation Framework Programme of the European Union – CIP) are made available to selected financial institutions by the European Investment Fund (EIF). In Austria these guarantees come to the benefit of small and medium-sized enterprises via the aws.

In Austria the aws also provides national credit guarantees, which, according to a decision by the federal government, are granted at the federal level. The programmes focus primarily on companies with long-term investment projects (various target groups). However, the aws also supports equity financing of companies with specific promotion instruments (e.g., medium-sized enterprise fund, double equity), and the ERP Fund provides loans to companies with ambitious investment projects (e.g., business location, innovative modernisation, expansion or environmental investment, internationalisation) at low interest rates and long maturities.

Empirical analyses permit to gauge the effects of changes in banks' capital requirements due to the introduction of Basel III on lending by small and medium-sized Austrian regional banks to small and medium-sized non-financial enterprises. Small and medium-sized banks focus on financing small enterprises and are therefore particularly suitable for this analysis. The study thus establishes an empirically founded basis for the assessment of the potential effects of Basel III on financing small and medium-sized enterprises in Austria.

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**Stronger focus on alternative forms of finance for small enterprises**

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**Measures of subsidies policy**

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**Conclusion**



For weakly-capitalised smaller banks (i.e., with a capital base below average) there is a statistically negative relationship between the capital ratio and lending to small enterprises. This relationship does not hold for small and medium-sized banks with a capital base above average. On average below-average capitalised main banks of small companies' exert a negative influence on the companies' bank-based financing.

Therefore, the implementation of Basel III might constrain Austrian banks' lending to the small and medium-sized enterprise sector, at least during the transition phase. The limiting effect of banks' capital ratio on business financing is most likely to be related to the size of most Austrian banks, which is suboptimal under the new even more capital-oriented regulatory framework. In regionally segmented markets many small and medium-sized banks are unable to diversify their credit risks in an optimal way. For most small and medium-sized banks these market limitations are still insurmountable due, inter alia, to specific institutional factors (e.g., membership in a bank association). This imbalanced economic structure of the domestic market (e.g., tourist regions in Western Austria) often causes a systematic, regionally-induced risk concentration in banks' loan portfolio. These institutes can limit their credit risks only by rationing business loans in general – in accordance with their capital.

The most important endogenous banking options to mitigate the negative effects of Basel III on financing Austrian small enterprises include cooperation approaches based on changes in the business models and/or bank mergers. The tightening of information and collateral requirements as well as criteria for risk assessment due to Basel III will result in tightened lending standards of universal banks. Bank mergers to reduce the supply shortage owing to a suboptimal bank-size and to strengthen the capital base of the Austrian banking sector are macroeconomically desirable endogenous reactions to mitigate the negative effects of Basel III.

By facilitating (and subsidising) the securitisation of business loans by selling receivables to other investors the effects of smaller banks' regulatory or operational lack of capital can be reduced. At the same time the securitisation causes a noticeable geographic diversification of the default risk of small banks' loans. Furthermore, securitisation helps small and regional banks gain access to the capital market, from which they are largely excluded.

The most important exogenous economic policy options to dampen the negative effects of Basel III on credit financing of small and medium-sized enterprises include government subsidies for such loans and/or for banks financing small enterprises as well as government loans and guarantees as provided to small Austrian enterprises by the Austria Wirtschaftsservice Gesellschaft mbH and the ERP fund.

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## *Effects of the New Capital Requirements of Basel III on the Financing of Small and Medium-sized Enterprises in Austria – Summary*

The study's main feature consists in econometric estimations aiming at an approximate quantification of the effects of capital requirements for banks on the lending of small and medium sized Austrian regional banks to small and medium-sized non-financial enterprises (SMEs). Small and medium-sized banks focus on financing SMEs and therefore lend themselves to a detailed analysis of the effects of changes in banking regulation on credit financing in this business sector, which is particularly important for the Austrian economy. The study thus establishes an empirically based framework for the assessment of the potential effects of Basel III on the financing of SMEs in Austria.

The empirical analysis of the lending behaviour of Austrian small to medium-sized regional banks during the period from 2004 until 2009 shows that smaller banks with a weak (i.e., below average) capital basis are highly likely to exhibit a statistically significant negative relationship between the level of their capital and their lending to SMEs. This relationship does not exist for small and medium-sized banks with a capital basis above average. The analysis of company data also reveals that a below average capitalisation of the SMEs' main banks negatively affects their bank financing on average.

These results justify worries that Basel III might restrict Austrian banks' lending to SMEs, at least during the transition phase. The limiting effect of banks' capital on their lending to the business sector is most probably due to the fact that the majority of Austrian banks are sub-optimal in size under the new, even more capital-oriented regulatory framework. Due to the regional segmentation of their markets numerous small and medium-sized banks are (in part substantially) constrained in their options for a near-optimal diversification of their credit risks. This market segmentation has remained insurmountable for most small and medium-sized banks i.a., because of specific institutional factors (e.g., membership in a banking association). As a result these banks often face the concentration of systematic, regional risks in their credit portfolios caused by a (from the perspective of financial risk control) "imbalanced" economic structure of their domestic market (e.g., tourist regions in Western Austria). These banks can only limit their credit risk via a quantitative restriction – determined by their disposable capital – of their lending to the business sector as a whole.

On the basis of these empirical results the options for banks (endogenous) and economic policy (exogenous) to mitigate the negative impact of Basel III on the financing of SMEs in Austria are discussed and assessed from a macroeconomic perspective. The most important endogenous adjustments by banks include cooperative solutions of SME lending based on changes in the business models, securitisation and/or bank mergers. Key exogenous economic policy adjustments are state subsidisation of loans to SMEs and/or state subsidisation of banks financing SMEs.

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