

## **Assessment of SME proposals for CRD IV/CRR**



In July 2011 the European Banking Authority (EBA) received the mandate from the European Commission to analyse, by September 2012, the appropriateness of the current risk weights (RWs) of small and medium-sized enterprise (SME) lending, testing the possibilities for a scenario of a reduction by one third in relation to the current regulation and the impact of this on banking credit and the soundness of the financial system. Additionally, the EBA should analyse the impact of an increase from EUR 1 million to EUR 5 million on the regulatory thresholds for SMEs.

In the first section of this report we illustrate the magnitude of the financial constraints of SMEs, which are often referred to as the ‘backbone’ of the economy because of their fundamental role in providing employment and growth.

Then we present the proposals in the CRD IV/CRR regarding SMEs – a reduction in the RWs and an increase in the Retail threshold – and compare them with the current regime. Subsequently, in sections 3 to 6 we evaluate these proposals.

From a regulatory perspective, a change in RWs in the CRD IV/CRR should reflect the different riskiness in different types of lending and a revaluation of initial prudential assessment risk calibration as done 10 years ago. Currently we do not find enough evidence that could support a reduction of SME RWs as a permanent change in the framework.

Regarding the proposal of increasing the Retail threshold, we find this is a proxy for SMEs which would result in capital alleviation to non-SMEs’ exposures and would not be in line with the aim of the regulatory change. In this regard, replacing the threshold by an actual definition of SME is a potentially better target.

Subsequently, we examine the impact and further aspects of the proposals: the consequences on financial stability and the effectiveness of the measures.

In the last section, we touch upon some other regulatory measures which could be far more promising and effective for SMEs’ access to finance, such as promoting venture capital and private equity, fostering a market for private and public placements for medium-sized enterprises, promoting rating consistency across Europe and making a wider use of guarantees.

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## Executive summary

### The calls for support to SME financing

The current difficulties of small and medium-sized enterprises (SMEs) in accessing finance, especially in some Member States and in the present phase of the economic cycle, are raising widespread concerns, voiced also by the European Parliament.

SMEs are often referred to as the ‘backbone’ of the European economy because of the fundamental role they play in providing employment and sustaining economic growth. However, SMEs tend to face structural financing obstacles, as they are largely dependent on bank financing whereas larger companies have a more diversified source of funding because of their access to capital markets. The dependence on banking loans and the less-diversified sources of income make SMEs more vulnerable to downturns in the economic cycle. Recent European Central Bank (ECB) survey data<sup>1</sup> show that access to finance is perceived as the second most pressing problem for SMEs, after finding customers, which is the main concern for large and smaller companies.

The financial constraints faced by SMEs are viewed as an obstacle to the recovery of the European economy and have triggered several calls for action, also in the area of banking regulation. The EBA understands the rationale for public policies to support SME financing. At the same time, it stresses the importance of choosing the right tools and carefully considering the potential effects of interventions focused on banking regulation.

### The proposals in the legislative package on bank capital requirements (CRD IV/CRR)

On 20 July 2011, the Commission adopted a legislative package to strengthen the regulation of the banking sector, in line with the decisions taken by the G20 Leaders and developed by the Basel Committee on Banking Supervision. The legislative proposal (CRD IV/CRR),

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<sup>1</sup> Survey on the Access to Finance of Small and Medium-Sized Enterprises in the Euro Area October 2011 to March 2012 (ECB, April 2012).

together with the changes already introduced since the beginning of 2012 (so-called CRD III), foresees an overall increase in capital requirements and also a higher quality of own funds. This package constitutes a major step towards creating a sounder and safer financial system.

The tougher capital requirements are particularly focused on capital market activities, trading business or securitisations exposures, which are now facing a much harsher treatment. The methodology for calculating capital charges against traditional lending activities has not been subject to major changes. The major change potentially impacting SME lending would be the introduction of the so-called capital conservation buffer (2.5% of risk-weighted assets, in addition to the current 8% requirement). This new requirement will be phased in from 2016 to 2019. Both the banking industry and the SMEs sector expressed their anxiety about this potentially impactful measure, which is applicable to all exposure classes, and argued that this requirement should be neutralised for SME exposures.

The EBA has been mandated by the European Commission to analyse, by September 2012, the appropriateness of the current RWs for Retail SME lending, assessing the possible effects of a reduction by one third in relation to the current regulation and of an increase from EUR 1 million to EUR 5 million on the regulatory thresholds for SMEs.

The EBA is also analysing the European Parliament's proposal to introduce a supporting factor of 0.7619 for the RW of the Retail SMEs and an increase of the threshold to EUR 2 million for the Standardised Approach (SA) and EUR 5 million for the Internal Ratings Based (IRB) Approach. This supporting factor would imply an immediate reduction in capital for SMEs in the SA of 24% from the current level. This factor will, at the end, neutralise the future capital conservation buffer (0.7619 corresponds to the ratio between the current ratio, 8%, and the new one inclusive of the capital conservation buffer, 10.5%) and, therefore, would ensure that a 8% capital requirement would be applied to SME Retail exposures after 2019 when the new requirements are completely phased in.

The EBA has conducted an exercise in order to evaluate the consequences of a change in capital requirements for banks based on different policy alternatives envisaged. As there is no current breakdown for SME or thresholds exposures, these data breakdowns have been provided through estimation on a best-effort basis. These limitations considered, the estimated reduction on capital charges for the SA sample, testing the supporting factor and threshold, would range from 1.3% to 10% of total credit risk capital requirements and from 0.9% to 3.7% in the IRB sample, testing the supporting factor.

## Proposal for a reduction of the risk weights for SME lending

Reducing the prudential RW might seem to be the most direct measure to alleviate somewhat the potential impact of the stricter capital requirements for SMEs. Any proposal for change needs to be assessed on three grounds: (i) *risk sensitivity*, i.e. the appropriateness of lower RWs in view of the risks embedded in such exposures; (ii) *consistency of the overall framework*, i.e. the fairness in the relative risk charges for different types of exposures; and (iii) *effectiveness*, i.e. the likelihood that lower capital requirements would impact banks' behaviour and that the relief would be channelled to the SME sector.

As to the first point, the current regulatory framework already incorporates a discount factor for RWs vis-à-vis SMEs (75% RW for exposures below EUR 1 million). The alleviation of the requirements has been calibrated reflecting two counterbalancing factors: first, individual SMEs are in general riskier than other business counterparties, given their more fragile financial structure; second, exposures to SMEs' portfolios carry a higher granularity and lower concentration risk than exposures to large firms. It is fair to notice that SME exposures were not the initial driver of the financial crisis, but indeed the cyclical nature of the sector calls for great caution, especially in the late phase of an economic cycle.

Based on supervisory authorities' data and Central Balance Sheet Office data we conclude that SMEs are a riskier sector than larger corporate, as the profitability ratio, activity ratio and ability to pay interest expenses are higher in larger corporations (20%, 21% and 31% respectively). Prudential data available at the EBA from IRB banks also show that the probability of default is on average 55% higher for the SME Retail portfolio than in the corporate one and 72% higher than in the entire asset class.

The EBA has collected a number of studies, included those conducted under the sponsorship of associations of SMEs and retail banks. The literature review is not conclusive on the riskiness of SME portfolios. Some studies argue that 'actual' correlations are lower than the regulatory ones, and on the back of these results they claim for a reduction of capital requirements. However, given general modelling assumptions and national clustering of data sources, outputs used in supervisory policy is very questionable: normality of distribution is assumed while crisis shows the need to take care of tail events; national representativeness of data is more than a bank can achieve in diversification. There is a



clear rationale for more conservative regulatory correlation values, which is needed to protect against the important model risk in its calculation.

In the run-up to the crisis, banks did not show significant credit risk losses or a lack of coverage of credit risk capital requirements. However, the European Commission has approved more than EUR 4.6 trillion of state aid measures to financial institutions, affecting both retail and wholesale banks. It is essential that capital requirements be sufficient in a recession, when losses tend to cluster and it is most difficult to rebuild banks' capital bases.

The EBA also has some concerns about the effects a permanent reduction in the RWs for SME exposures would have on the overall consistency of the framework. In particular, very similar capital charges would apply for unsecured exposures to SMEs and secured exposures to other counterparties.

Finally, the relationship between banks' capital and lending policies is difficult to assess. Data from the ECB Bank Lending Survey (BLS) show that lending constraints are shared by both large and smaller firms, but since 2007 the tightening of lending standards has been stronger for large firms than SMEs. According to the ECB, the reasons for the tightening of lending standards may originate to some extent from banks' capital constraints, but also the bank's liquidity position, the access to market financing and the economic outlook play an important role. Capital is just one driver, and not the most important one, for lending decisions and has more impact on lending to large corporations than to smaller ones.

All these arguments suggest that, while the merits remain hypothetical, **great caution should be exercised in altering the RWs or the threshold for SME Retail exposures to avoid any risk of jeopardising financial stability.** Other measures (section 5 of this document) might be more suitable to support SME lending. However, in case the co-legislators intend to proceed along this route, the EBA would advise to consider alternative measures to provide the same capital alleviation, without incurring some of the shortcomings outlined above. These measures should be applied only to SME Retail exposures and not to the whole Retail exposure class.

A first possibility would be the introduction of a *temporary exemption of the capital conservation buffer, which would be phased in between 2016 and 2019*, given that the supporting factor was originated by the raise in capital requirements caused by this new buffer. This measure would imply the impact of Basel III for SMEs would be neutralised, as the capital conservation buffer would not be applied for these exposures. This would be very

easy to implement as it would also remain neutral with reference to risk management practices. The legislative text should then envisage a review, possibly following a report from the EBA.

A second possibility would be a *regulatory measure that would help to overcome cyclicalities in the supply of finance for SMEs during periods of economic difficulty*. As we are currently in a downturn, a possible alleviation of capital could be admitted, as an instrument that could attenuate the procyclical effects of the capital requirements on SME lending. This capital alleviation would then be removed during the upward swing of the credit cycle. This would provide relief for SME lending when it is most needed, but would not provide incentives for excessive indebtedness during the expansionary phases of the cycle. Once again, the capital alleviation would go up to the full amount of the capital supporting factor, providing the same effect as the measures proposed by the Commission and the European Parliament.

A third possibility would be the *introduction of a 'supporting discount'*, which would not act on RWs, but would be applied at the end of the process of the capital calculation. Hence, it would be easy to identify and its aim would be not to alter the risk assessment, but to promote lending to the SME sector in Europe. The amount of this discount could be calculated in the same way as the savings corresponding to the supporting factor on the stock of SME lending and it should be subject to a calendar of gradual reduction, until it reaches the desired level of capital with Basel III. The reduction in the discount factor could then be realised according to a predetermined calendar or subject to a review clause; in this second case a close monitoring would be needed, so that the measure could be reconsidered as soon as lending to the SME sector starts growing. This would be a measure similar to the supporting factor in the sense it would grant a discount in the current level of capital, but this discount would be temporary and not permanent, and would not distort the internal consistency of the RWs.

All these three possible changes would need to have a separate and clear identification of SME loans.

### **Increase of the threshold for the Retail portfolio**

The European Commission has also asked the EBA to study a possible increase of the threshold used to identify the size of the loans that qualify for the Retail asset class. An increase of the threshold would imply that more exposures, currently located in the Corporate

asset class, would benefit from the less demanding capital charges applied to Retail exposures.

As a matter of fact, an increase of the threshold would provide an alleviation of capital charges also for exposures to counterparties different from SMEs, thus missing the target to create the right incentives to SME lending.

It would be technically preferable to use **the size of the firm, instead of the size of the loans, as a criterion for the mapping of exposures to Retail or Corporate asset classes**:

- The population targeted would then be exactly the one wanted. From a risk perspective, this would align the actual credit risk with capital requirements, as the risk is more related to the size of the firm than to the size of the exposure.
- This would also help to track banks' SME exposures in the future. This is precisely the difficulty SME lending studies face, as banks' financial and solvency information does not separately identify SME exposures.
- Finally, it could help to give a differential prudential treatment to SMEs depending on their size (small SMEs in the Retail asset class and medium-sized SMEs in the Corporate asset class) which would help to better recalibrate the framework in the future, identifying precisely the riskiness of these sub-portfolios.

If a new definition of SMEs has to be introduced in the legislation, it would be desirable to align it with the credit risk management practices, commonly based on turnover or balance sheet totals, which are financial magnitudes, rather than on the number of employees.

### Other alternatives

Finally, the effectiveness of any capital measure to improve SME lending remains uncertain unless it is explicitly linked to such development. If a SME capital relief is granted, a bank could translate this alleviation into more lending, but it could also translate this reduction into a less urgent need to accumulate additional capital through retained earnings or raising new equity, pay more dividends or compensation or increase other type of lending. Therefore, it is not guaranteed that capital alleviation would prompt banks to ease credit.

The Commission's Action plan for SMEs covers a wide range of initiatives and regulatory measures which would be far more promising and effective in promoting SME lending, such as promoting venture capital, improving SME access to capital markets, promoting ratings for SMEs or enforcing late payment regulation.

These measures, which are very relevant to help SMEs' general access to finance, would in particular promote SME creditworthiness and access of smaller firms to banking finance.

- Promoting **venture capital and private equity** would have a direct positive effect on SME funding, especially for smaller firms, and additionally it would have an indirect positive effect as an increase in the capital base of smaller firms would improve their credit quality and make them more attractive for banks' lending.
- Also, promoting the **use of consistent ratings** across small and medium-sized firms in the European Union could have a beneficial effect on their access to finance, as good-rated SME included in the Corporate asset class could directly benefit from lower capital requirements.
- At the same time, a more widespread use of rating across European companies would help to foster **securitisation and private placement of bonds**, which could be a major step in medium-sized companies' financing.
- Additionally, **combating late payments** is crucial for the endurance of SMEs. In a downturn, larger companies tend to delay their payment to the smaller ones; and there is still a significant section of the public sector which also fails to pay promptly. This lack of ability to receive their payment undermines SMEs' access to bank finance.
- Finally, the Capital Requirements Directive (CRD) provides an ample spectrum of guarantee recognition, which is one of the main differences from the previous banking capital regulation. Guarantees from the government of publicly sponsored institutions have been proven a very effective way of promoting lending to SMEs and could be structured in such a way as to have a minimal impact on government finances. Other alternative could be explored, in order to make a wider **use of guarantees**. Initiatives such as mutual guarantee schemes, which are already working in some European countries, could be fostered in the European market.

## 1. Importance of access to finance for SMEs

SMEs are often referred to as the 'backbone' of the European economy given the fundamental role they play in providing employment and creating economic growth. In 2010, there were almost 20.8 million SMEs in the European Union (EU), of which more than 90% were micro-firms. Altogether, these SMEs provided more than two thirds of all employment opportunities in the private sector in the EU-27 (87.5 million) and 58.4% of the total gross value added (GVA) produced by private businesses.<sup>2</sup>

Recent European Central Bank survey data<sup>3</sup> show that **access to finance is the second most pressing perceived problem for SMEs** (cited by 17% of SMEs), after finding customers, which is a main concern for 27% of them, and followed by costs of production or labour and availability of skilled staff or experienced managers (cited by 14% in both cases). Larger companies also perceive finding customers as their most pressing problem (20%), followed by availability of skilled staff or experienced managers and costs of production or labour and (18% and 17% respectively), which are more relevant for them than availability of finance.

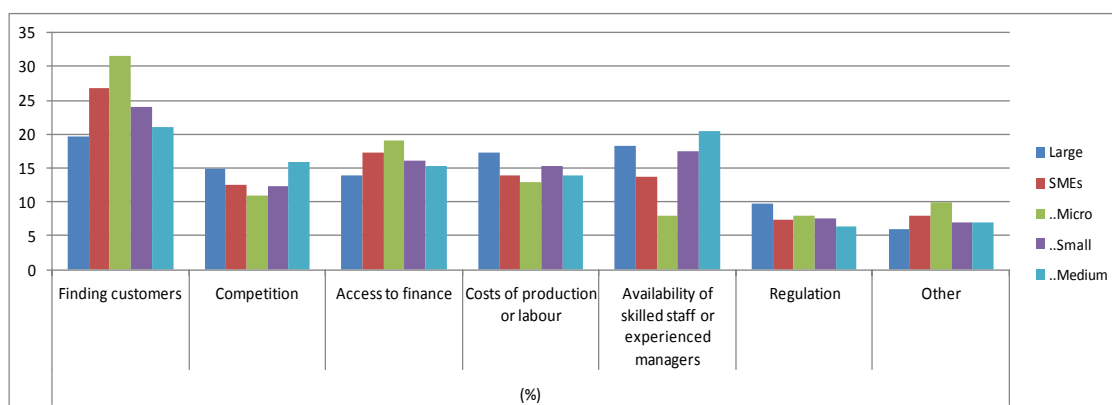


Figure 1: Most pressing problem for European firms.

Source: ECB Survey on the Access to Finance of SMEs, March 2012.

<sup>2</sup> Annual Report on EU Small and Medium Sized Enterprises 2010/2011, Rotterdam, Cambridge, 2011.

<sup>3</sup> Survey on the Access to Finance of Small and Medium-Sized Enterprises in the Euro Area October 2011 to March 2012 (ECB, April 2012).

Access to finance is not equally pressing for all kinds of SMEs. As expected, **this is a greater problem for micro enterprises**, followed by small companies. For medium-sized companies, access to finance is ranked the fourth concern, after finding customers, competition and availability of skilled staff.

In general, different sources of finance are more relevant to SMEs depending on the **stage of the firm in the growth cycle** (Ayadi, 2005). At the beginning of their existence, firms do not have a track record and they need equity. As they evolve and increase their number of clients, they start having access to trade credit (credit extended to the SME by their suppliers through a deferral in payments). For some companies, venture capital may be relevant. When they start to have a credit history, they start to have access to bank loan finance and, finally, only once they become medium-sized companies with a proven history can they access capital markets or private placements. Annex 1 shows how different sources of funding become important at different stages of the cycle as businesses grow.

Compared with large corporations, **SMEs traditionally rely more on banking debt** than on market debt: first, because banking debt does not require them to release so much information, and, second, because fixed costs make bonds less attractive for SMEs, although from an economic point of view market debt should be cheaper.

Additionally, European SMEs tend to rely even more on banking loans and less on market debt than those in the USA. This holds true also for bigger corporations and it has been a traditional difference between the US and EU markets.<sup>4</sup> One of the reasons is probably the different legal systems, as there is greater protection to investors in the US law; another important factor could be having one single market, which has not yet been fully achieved in Europe. In any case, the difference from the USA is still substantial, and these difficulties in accessing market debt can mean a competitive disadvantage for European firms in this downturn.

Another general feature of SMEs compared with large corporations is their **dependence on trade credit** (Carbo-Valverde et al., 2008). SMEs depend hugely on trade credit for liquidity purposes, perhaps even more than on bank finance. However, trade credit tends to contract

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<sup>4</sup> The structure of the financial sector in the Anglo-Saxon economies is the so-called capital market based financial system, in which firms finance their investments mainly with market debt and equity, whereas in continental systems they rely on 'traditional relationship banking'.

more than bank finance does in a recession, and this is one of the reasons SMEs tend to be under severe distress in economic downturns.

A typical feature of SMEs is that they **are especially exposed to domestic developments and the economic outlook**, because of their less diversified sources of income, while large corporates may be geographically diversified and have a wider range of income. It is not surprising, then, that the general economic outlook is considered to be the most pressing concern during the downturn. The Eurostat Access to Finance survey on 25,000 SMEs conducted during the economic downturn in 2010 shows the general economic outlook as the biggest fear, followed by price competition and margins, and then domestic demand.

For all the reasons mentioned above, **SMEs usually exhibit a more cyclical pattern than larger companies** and tend to suffer more in the downturn of the economic cycle. While financial instability is affecting SMEs more than even households and large companies, the prudential treatment of their risks should encompass this dimension.

The European Commission's (2009) *Cyclical nature of SME Finance* report confirms this cyclical nature of SMEs and finds that bank loans may be **more cyclical for SMEs than for larger firms**. In fact, increasing limited access to finance may make SMEs more vulnerable in a recession, with the result that SMEs exit the market more frequently. While 'creative destruction' is positive for economic growth<sup>5</sup> – with entry and exit of firms contributing to innovation, for which small firms are key – extended restrictions in access to finance could be a deterrent to SME development potential.<sup>6</sup>

## 2. European Commission and European Parliament CRD IV/CRR proposals for SMEs

The European Commission has asked the EBA to assess the effect of a reduction of current RWs for SMEs by a third, and the impact of raising the threshold on bank loans, from EUR 1 million to EUR 5 million, on the soundness of the banking system. In addition to the effects resulting from a micro-economic approach, a subsequent European Commission

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<sup>5</sup> SME entry rates in the EU are the same as in the USA, but exit rates are lower in the USA. As a result, inefficient EU SMEs operate in the market for longer than in the USA, contributing less to economic productivity. It is also noted that there are smaller barriers to entry and exit in the USA than in the EU so 'creative destruction' is more difficult in the EU.

<sup>6</sup> Section 3 of this report deals with the cyclical nature of SMEs.

letter in May mentions that it would be appropriate to take into account an analysis of this issue from the macro perspective, i.e. the systemic effect resulting from the risk in SME exposures and their weighting. These analyses and conclusions will contribute to the work by all EU institutions to support growth and to make a more rapid exit from the crisis possible.

The EBA has analysed the adequacy of the RWs and the evaluation of the quantitative threshold for the assignment of SME exposures in the Retail and Corporate exposures classes and is presenting the results in this report. However, it is important to note that **SME data analysis suffers several limitations**: it is not easy to collect data on SME lending as, in general, there is no breakdown for SME exposures in banks' financial information or the supervisory reporting that banks are required to submit to national supervisory authorities.<sup>7</sup> The CRD does not use an explicit definition of SMEs in the Standardised Approach (SA) or in the Internal Ratings Based (IRB) Approach for the breakdown of banking lending in the prudential exposure classes. Therefore, any data collection on actual lending to SMEs needs to be designed ad hoc and it is rather burdensome and extremely difficult to validate. In fact, this lack of consistent SME data across European banks makes it extremely difficult to perform a rigorous analysis on regulatory options for SMEs.<sup>8</sup>

Consequently, if SME lending is to be tracked in the future, a first recommendation would be to require this breakdown in financial and insolvency information. This would help to overcome the 'data gap' on SME lending and would help to track SME lending trends in the future.

Other possible source of information is each Member State's central bank's credit registers, which contain extremely valuable information on actual defaulted loans.<sup>9</sup> However, currently, information on different credit registers is still in the process of being harmonised in order to be comparable across Europe, and most credit registers do not have a definition of SME.

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<sup>7</sup> Neither the EU's harmonised reporting framework for financial information (FINREP) nor that for solvency common reporting (COREP) contains a specific breakdown for all SME exposure, so it is very difficult if not impossible to track SME lending information in a consistent way.

<sup>8</sup> Currently ECB public data show data for non-financial corporations' lending, but there is no breakdown on large, medium and small companies, which would be very useful for tracking lending to different-sized companies.

<sup>9</sup> Currently there are Credit Registers in Austria, Belgium, the Czech Republic, Germany, Spain, France, Italy, Portugal and Romania.



## 2.1 Current prudential regulation for SMEs

Under the current regulation, credit institutions calculate their capital requirements using either the SA or the IRB. In the SA, the assets are weighted with RWs provided in the EU legislation, while in the IRB credit institutions may use their own quantitative risk models to calculate the capital requirements, after approval by the competent authority is granted.

In both approaches, assets have to be assigned to the appropriate exposure or asset class, before the RWs are applied. Loans to enterprises can be assigned to either the Retail exposure class or the Corporate exposure class, depending on the loan size (i.e. exposures towards enterprises larger/lower than EUR 1 million) and some qualitative requirements. Under the SA, loans under EUR 1 million should be assigned to the Retail exposure class and would have a RW of 75% whilst loans in the Corporate exposure class have an RW according to the rating of the borrower (from 20% to 150% depending on the rating).

The regulation does not provide a definition of SME, or of a specific exposure class for SME loans under the SA. Loans to SMEs therefore can fall under the Retail or the Corporate exposure class, depending on the size of the loan. While Retail SME loans will be weighted at 75%, Corporate SME loans will probably be assigned an RW of 100% (which corresponds to unrated exposures), which is the most probable situation for European SMEs. These RWs can be reduced to 35% (or 50%) if the loans are secured by mortgages on residential property (or commercial real estate).

Table 1: SME treatment for unsecured exposures

<b>SME unsecured exposures in the CRD</b>	<b>SME – Retail</b>	<b>SME – Corporate</b>
<b>Definition</b>	SME exposure which is one of a significant number of exposures with similar characteristics and does not exceed EUR 1 million	SME exposure that does not comply with the Retail definition
<b>Standardised Approach (SA)</b>	75%	20%, 50%, 100% or 150% depending on the rating (100% for unrated exposures)

<b>IRB (Internal Ratings Based) FOUNDATION</b>	Not applicable	Capital supervisory formula <ul style="list-style-type: none"> <li>• Banks' own estimates of PD</li> <li>• Regulatory parameters for LGD (45%), EAD (100% of current exposures + 75% undrawn irrevocable commitments); Maturity (2.5 years)</li> <li>• Correlation ranges from 8% to 20%</li> </ul>
<b>IRB (Internal Ratings Based) ADVANCED</b>	Capital supervisory formula <ul style="list-style-type: none"> <li>• Own estimates of PD, LGD and EAD</li> <li>• Correlation ranges from 3% to 16%</li> </ul>	Capital supervisory formula <ul style="list-style-type: none"> <li>• Own estimates of PD, LGD and EAD</li> <li>• Maturity (1–5 years)</li> <li>• Sales (EUR 5 million – EUR 50 million) – firm size adjustment</li> <li>• Correlation ranges from 8% to 20%</li> </ul>

EAD, exposure at default; LGD, loss given default; PD, probability of default.

On 20 July 2011, the European Commission adopted a legislative package to strengthen the regulation of the banking sector, the CRD IV/CRR proposal. This proposal will replace the current CRD and reflects an international agreed commitment (G20 Declaration of 2 April 2009 on Strengthening the Financial System and Basel III rules issued in 2010). It constitutes a major step towards creating a sounder and safer financial system. The proposed regulation foresees an overall increase in capital requirements and also a higher level of own funds quality. In addition, a liquidity regime is proposed. In order to avoid unintended consequences in the economy, these capital increases in CRD IV/CRR would be phased in and higher capital requirements would be fully implemented only in 2019.

In this new regulation, IRB and SA capital credit RWs remain generally unchanged, as the prudential reform did not foresee the need to review the calibration of any or specific counterparty risks as regards credit risk but rather focused on economic cycles in this field. The CRD IV/CRR is generally increasing capital requirements for market risk and migration risks of counterparties with which the banks perform financial transactions but not for credit risk. Therefore, it does not create a higher increase of the level of capital requirements for SME than for all other exposures and it maintains a lower RW for Retail exposures compared with other exposure classes.

All in all, the capital increase is targeted on the riskier activities and not on traditional lending. The only increase for general lending is due to the introduction of the so-called conservation

buffer (2.5%), which will be introduced gradually from 2016 to 2019, in order to prevent unintended consequences in the non-financial sector.

## 2.2 Proposed changes in the CRD IV/CRR on SMEs

The current drafting of the CRD IV/CRR by the European Parliament (EP) has envisaged a supporting factor of 0.7619 for the Retail asset class in both approaches, the SA and the IRB, for SME exposures. Additionally, it proposes an increase in the Retail threshold from EUR 1 million to EUR 2 million under the SA and up to EUR 5 million under the IRB. It has also introduced some additional changes: a definition of SMEs within the Retail and the Corporate asset classes, according to the EU recommendation 2003/361<sup>10</sup> and a change in the IRB firm size adjustment from EUR 50 million to EUR 70 million.

The calculation of **the supporting factor** is simple; it has been reverse-engineered from the increase in capital caused by the new conservation buffer in the CRD4:

- Capital with conservation buffer (10.5%).
- Capital without conservation buffer (8%).
- The incremental charge of the conservation buffer with respect to capital without this buffer is 31.23%  $((10.5/8) - 1)$ . Then, a discount factor of 0.7619 leaves the capital charge at the same level as before the buffer  $(100 * 1.3123 * 0.7619 = 100)$ .

In the new regulation, the conservation buffer will be introduced gradually, from 2016 (with a first requirement of 0.6%) to 2019 (when the requirement will reach 2.5%).

Table 2: European Parliament proposal for SMEs

SME unsecured exposures in the CRD	SME – Retail	SME – Corporate
Definition	SME exposure is one of a significant number of exposures with similar characteristics and <b>does not exceed</b>	SME exposures that do not comply with the Retail definition

<sup>10</sup> The definition is based on the SME's staff numbers, turnover and balance sheet.

	<p><b>EUR 2 million</b> (for SA)</p> <p>SME exposure is one of a significant number of exposures with similar characteristics and <b>does not exceed EUR 5 million</b> (for IRB).</p>	
<b>Standardised Approach (SA)</b>	<p>75% General for Retail</p> <p><b>Supporting factor for SMEs 0.7619 (i.e. an RW of 57.14% for SMEs as well as a natural person investing in its business)</b></p>	<p>20%, 50%, 100% or 150% depending on the rating (100% for unrated exposures)</p> <p>Exposures for which such a credit assessment is not available shall be assigned a 100 % RW or the RW of its central government, whichever is higher, except for SMEs for which a <b>reduced rate may be applicable as defined elsewhere in this legislative package and as expected to be contained in the recommendations of EBA due September 2012.</b></p>
<b>IRB (Internal Ratings Based) FOUNDATION</b>	Not applicable	<p>Capital supervisory formula</p> <ul style="list-style-type: none"> <li>• Banks' own estimates of PD</li> <li>• Regulatory parameters for LGD (45%), EAD (100% of current exposures + 75% undrawn irrevocable commitments); Maturity (2.5 years)</li> <li>• Correlation ranges from 8% to 20%.</li> </ul>
<b>IRB (Internal Ratings Based) ADVANCED</b>	<p>Capital supervisory formula</p> <ul style="list-style-type: none"> <li>• Own estimates of PD, LGD and EAD</li> <li>• Correlation ranges from 3% to 16%</li> </ul> <p><b>Supporting factor for SMEs 0.7619</b></p>	<p>Capital supervisory formula</p> <ul style="list-style-type: none"> <li>• Own estimates of PD, LGD and EAD</li> <li>• Maturity (1–5 years)</li> <li>• Sales (EUR 5 million – EUR 50 million)</li> <li>• Correlation ranges from 8% to 20%</li> </ul> <p>For exposures to companies where <b>the total annual sales for the consolidated group of which the firm is a part is less than EUR 70 million</b>, institutions may use the following correlation formula in paragraph 1 (iii) for the calculation of RWs for corporate exposures. In this formula, S is expressed as total annual sales in millions of euros with EUR 5 million ≤ S ≤ EUR 70 million. Reported sales of less than EUR 5 million shall be treated as if they were equivalent to EUR 5 million. For purchased receivables the total annual sales shall be the weighted</p>

		average by individual exposures of the pool.
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EAD, exposure at default; LGD, loss given default; PD, probability of default.

**The supporting factor is, in fact, introducing a permanent 24% discount** in the current capital charge of SMEs, cancelling for this sector the enhancement buffer introduced to face general financial stress. For SME exposures in the SA, the supporting factor is equivalent to a capital requirement decrease from 6% to 4.57%. Figure 2 illustrates the trend in the capital charge for SME with and without the supporting factor for a general exposure weighted 100%.

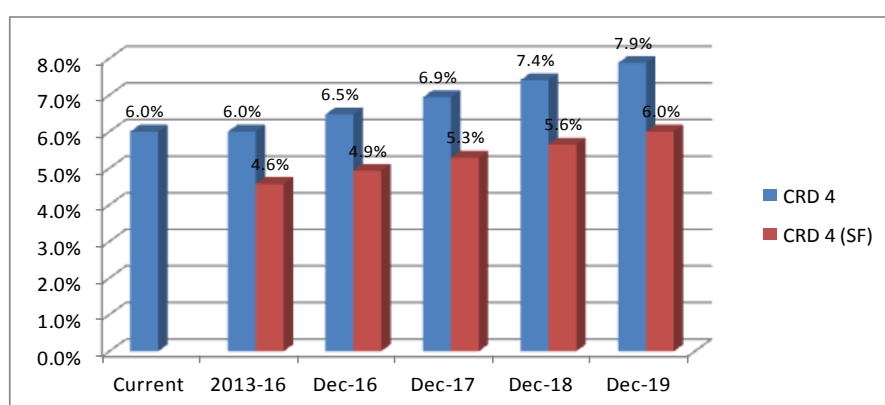


Figure 2: Capital requirements in SME Retail with the introduction of a supporting factor.

Additionally, the EP proposal includes **an increase in the Retail threshold**. This would imply a higher saving on capital for those exposures which end up migrating from the Corporate to the Retail portfolio. For SA exposures, the capital saving of this migration, adding the supporting factor, would be 43% (i.e. an SME loan covered with 8% capital would require 4.57% with the new regime). For the IRB exposures the capital saving would vary depending on the parameters of the exposure itself. For a loan with a probability of default (PD) of 1% and loss given default (LGD) of 45%, the reduction in capital requirements would be 52%.<sup>11</sup>

Figure 3 summarises the saving in capital of the current supporting factor and increase in threshold for SMEs' exposures depending on their original and final asset class.

<sup>11</sup> Under the IRB, credit institutions use their own risk quantitative models to calculate the risk parameters (probability of default, PD; loss given default, LGD; and exposure at default, EAD) which are introduced in the supervisory formula in order to calculate capital requirements. For a PD of 0.50% and 3% and the same LGD the saving would be 55% and 50% respectively.

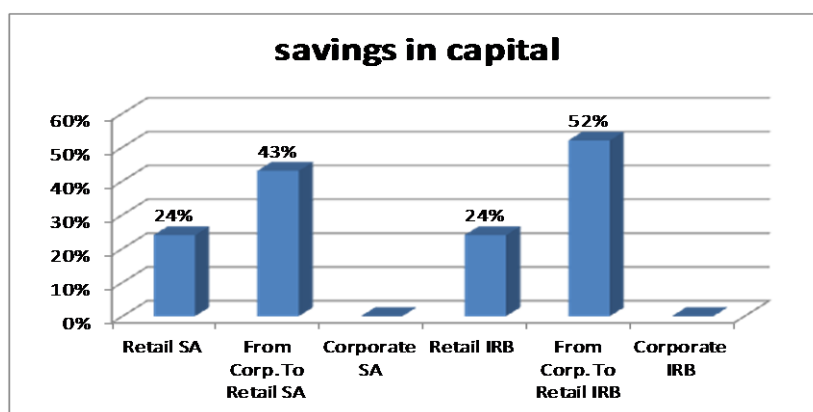


Figure 3: Capital saving with the introduction of a supporting factor and a change in the retail threshold.

This study focuses on the effect and appropriateness of capital requirements on SME exposures. Annex 2 briefly explains how the liquid and leverage provisions in CRD IV/CRR could affect SMEs.

### 2.3 Rationale and principles for a CRD change

Measures to facilitate SMEs' access to finance and related changes to CRD IV/CRR for this purpose should meet the following requirements:

1. Effectively ease banking lending to SMEs

It would be desirable that the proposed measure guarantee or at least be linked to additional lending to SMEs, as a way of promoting lending to the private sector. Otherwise, banks would just get a relief in capital without any commitment to employing this relief in additional lending to SMEs. This capital could be used for other purposes, such as raising less equity, paying more dividends or compensations, or increasing positions which still carry lower RWs than SMEs (high-rated corporate debt, institutions and governments).

2. Internal consistency: preserve the consistency in the CRD of the risk-weighting framework and within each approach, SA and IRB

It would be important to maintain the consistency in the current risk-weighting scheme, which recognises the differences in riskiness of different asset classes. At the same time, it would be desirable to maintain comparability

between the SA and IRB approaches, and the incentive scheme for banks that are currently under the SA and would evolve to the IRB in the future.

3. External consistency: avoid a major departure from internationally agreed rules

CRD IV/CRR reflects an internationally agreed commitment (G20 Declaration of 2 April 2009 on Strengthening the Financial System and Basel III rules issued in 2010). In order to avoid regulatory arbitrage and to ensure an international level playing field, any significant departure from this agreed framework should be minimised and very carefully assessed and examined.

4. Preserve financial stability

CDR IV/CRR's objective is to ensure adequate solvency of credit institutions and to contribute to a sounder financial system. The effect of the current financial crisis has been devastating and any measure that carries a substantial reduction in capital requirements could endanger future financial stability and should be considered carefully. This financial stability is essential in the current context of heightened uncertainty in the European financial sector, and credit will regularly flow into the real economy only when banks have a sound capital and liquidity position.

In the next section we will examine to what extent the proposals fulfil these requirements.

### **3. Reduction of the 75% risk weight for Retail**

The current Basel II RWs have been calibrated to reflect the different riskiness in different types of lending and be consistent with all regulatory asset classes. Therefore, a reduction in the RWs for SME Retail exposures would be presumed to challenge the former calibration, reflecting a new assessment due to previous erroneous measurement, evolving systemic conditions or using new tools which are deemed to reveal better the true risks.

In the current regulation, the Retail exposure class is defined on the basis of a threshold referred to the amount of the exposure – loans under EUR 1 million – and subject to a qualitative requirement of being one of a significant number of similarly managed exposures.

The Retail exposure class includes not only SME lending but also, to a large extent, loans to households. If SMEs are to be targeted as such, the text of the CRD IV/CRR should create a new exposure class for 'Retail-SME'. In fact, the EP is introducing a supporting factor of 0.7619 for SMEs in the Retail exposure class, and therefore is proposing an effective RW of 57.14% for the SA (see Art. 118). The same reduction in RWs is proposed for the IRB approach (Art. 149).

### 3.1 Rationale for the current risk weights in the Retail portfolio (including SMEs)

**The current framework already grants lower RWs to the Retail exposure class**, which include SME exposures. This was a specific amendment made in the Basel II regulation. The rationale for this change was that, even though SMEs could be riskier on an individual basis, on a portfolio basis SMEs were perceived as less dependent on the general state of the economy and therefore SME defaults would not tend to cluster.

Basel II's IRB approach is based on the widely known Asymptotic Single Risk Factor (ASRF) model of Gordy (2003). In this model the ability to pay can be decomposed into a **systematic factor**, which reflects the state of the global economy, and an **idiosyncratic one**, which is firm specific. The degree of the obligor's exposure to the systematic risk factor is expressed by the asset correlation. This framework is subject to the following relevant theoretical assumptions:

- Basel assumes that **asset correlation increases with size of the firm**. In the current framework the Retail portfolio correlation is lower than that of the Corporate portfolio. This implies that, for firms in the Corporate asset class, defaults tend to be more related to the general conditions in the economy. In contrast, defaults in the Retail portfolio tend to be more idiosyncratic (firm specific) and less dependent on the economic cycle given its granularity. The logic of Basel II is that, even though on an absolute basis the default risk is greater for smaller borrowers, the financial performance of these borrowers is assumed to be driven largely by specific firm factors and not by the general state of the economy.



- Basel assumes that **asset correlation is a decreasing function of borrower riskiness (PD)**. This negative relation implies lower correlation, and thus lower capital requirements, for more risky, high-PD exposures.

These assumptions result in lower RWs for SMEs in the current IRB framework as can be seen in Figure 4.

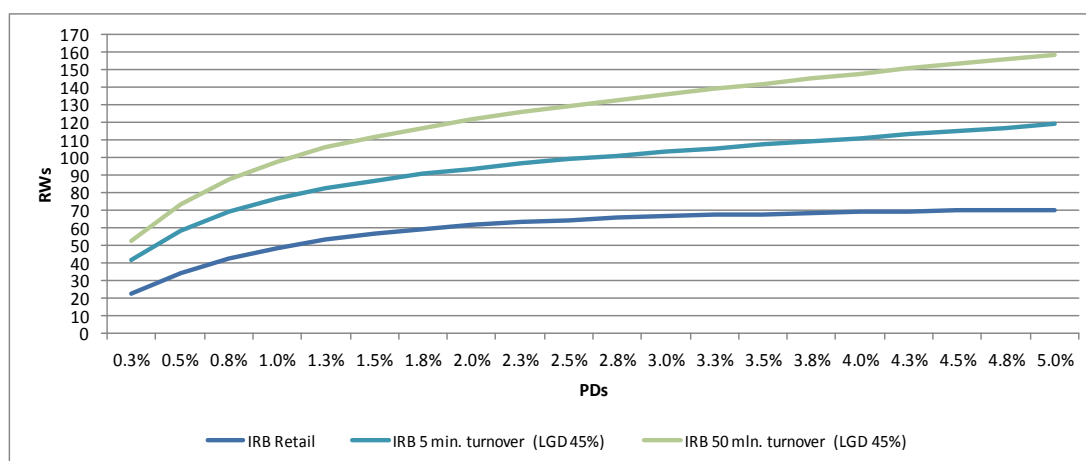


Figure 4: Risk weight (RW) as a function of the probability of default (PD).

This more favourable treatment for the Retail portfolio is mirrored in the SA with lower RWs (75%) than the Corporate asset class (100%).

Table 3: RW for SMEs exposures in the SA

CRD Risk Weights	AAA to AA-	A+ to A-	BBB+ to BB-	Below BB-	unrated	past due
CORPORATE	20%	50%	100%	150%	100%	
RETAIL	75%					150%
SECURED BY RESIDENTIAL MORTGAGES	35%					100%
SECURED BY COMMERCIAL REAL ESTATE MORT.	50%					150%
* National Discretion from 50 to 100%						

In the following sections we examine SME riskiness and analyse the soundness of the 10-year-old theoretical assumptions (dating from before the crisis) underlying the prudential framework that supervisors rely on. We find that these theoretical assumptions do not necessarily hold true in the presence of a recession, when defaults become more dependent on the general state of the economy and tend to cluster. Also, as the current crisis has shown, it is precisely at the time of a downturn that capital is most needed and should serve

as a cushion for potential losses. It may well be a further reflection and lesson due to the crisis that legislation should cover both stress and normal times while not indifferently requiring a simple average measure because cliff effects need to be managed to avoid big slumps.

In the run-up to the crisis, European banks did not show significant credit risk losses or a lack of credit capital compared with their risk-weighted assets. However, the EU banking system entered the crisis with capital of insufficient amount and quality. From 2008 to 2010 the European Commission has approved EUR 4.6 trillion (equivalent to 39% of the EU's GDP) of state aid measures to financial institutions.<sup>12</sup> These measures have covered both retail and wholesale banks. It is essential that capital requirements be sufficient not only for the good times but also for the bad ones, as in a recession losses tend to cluster and that is when it is most difficult to rebuild banks' capital bases.

### 3.2 Analysis of SME riskiness

We have analysed the European Bank for Accounts of Companies Harmonised (BACH) data, which provide financial information of non-financial companies monitored by Central Balance Sheet Offices of National Central Banks, in order to evaluate the risk level of each subgroup of entities and the ability to repay its debts depending on the firm size.<sup>13</sup>

Within this database, ratios which indicate better creditworthiness of the company, such as profitability (EBITDA<sup>14</sup>/total assets) or activity ratio (net turnover/total assets), show that larger companies perform better than smaller enterprises (20% better in the profitability ratio and 21% better in the activity ratio).

Figure 5 shows the profitability ratio (EBITDA/total assets). This ratio has collapsed in European companies since 2000, but the reduction is greater for smaller companies (blue trend line) than for larger ones (red trend line).

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<sup>12</sup> These measures include €3 trillion of guarantees, €138bn of liquidity and bank funding support, €546bn of approved state recapitalisations and €349bn of asset relief (European Commission Staff Working Paper, 2011).

<sup>13</sup> In this database SMEs are those companies with a turnover under €50m.

<sup>14</sup> Earnings before interest, taxes, depreciation and amortisation.

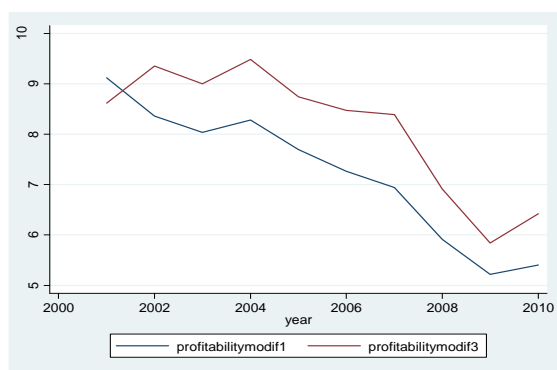


Figure 5  
Source: BACH data

The activity ratio (net turnover/total assets) shows declining value in a different way for small and large companies, but larger companies perform better than smaller enterprises.

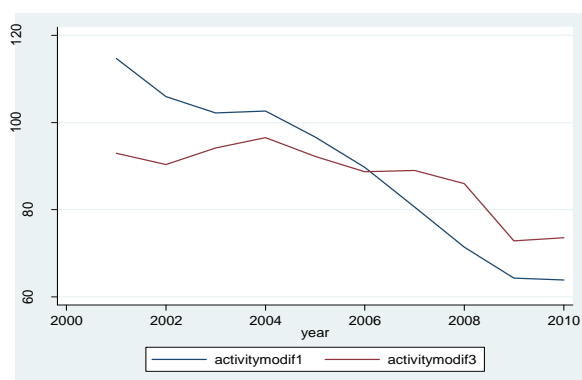


Figure 6  
Source: BACH data

Figure 7 shows that the ability of the company to generate profits to pay the interest expenses (EBITDA/interest expenses) is 31% higher in larger companies. However, this ratio has fallen dramatically since the beginning of the crisis; it started to recover in 2009 but remains lower for SMEs than for larger companies.

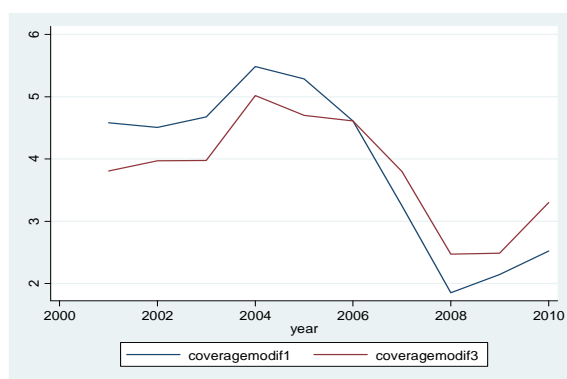


Figure 7  
Source: BACH data

In sum, the evidence shows that SMEs are riskier borrowers than larger corporates. Profitability, turnover and debt coverage ratios show that large corporates perform better than SMEs. Additionally, in the last decade there has been a widening gap between larger and smaller companies. For a more detailed analysis please see Annex 3.

Prudential data available at the EBA from IRB Banks participating in the Stress Test Exercise show that the regulatory probability of default (PD)<sup>15</sup> is on average higher (by 55%) for the SME Retail portfolio than for the Corporate one (an average of 3.63% compared with 2.34%). PDs are also higher for SMEs (by 72%) than the entire Retail asset class (which exhibits an average PD of 2.11%). Reflecting the granularity effect, SMEs' PDs show a higher dispersion. See Annex 4.

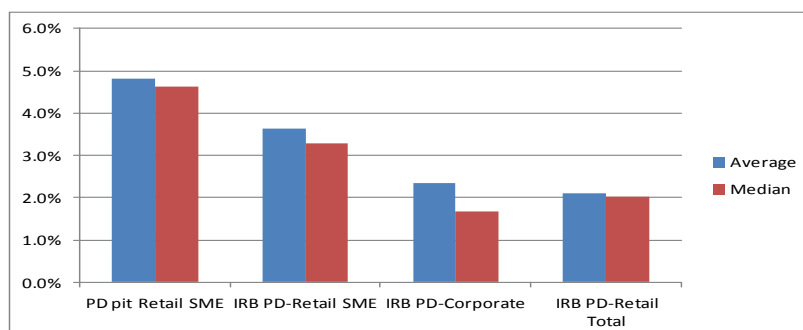


Figure 8: Average and median probabilities of default  
Source: EBA Stress Test Exercise 2010.

<sup>15</sup> PDs are through the cycle. PDs PIT (point in time) for SME Retail are 32% higher (4.8% vs 3.6%).

While PDs of SMEs are higher than Corporate PDs, capital requirements remain lower, which is a result of the recognition of the high granularity effect on the Retail portfolio. As an example, in the IRB, for the same loan with a PD of 1% and LGD of 45%, the capital charge in Retail would be 37% lower than in Corporate (capital requirement of 3.88% vs 6.14%, which corresponds to RWs of 48.5% and 76.8% respectively). In general, in the IRB approach the capital curve in the RW function for Retail exposures is lower and flatter than the capital curve in the Corporate exposures (see Annex 5 below). The same holds true for the SA, which applies also significantly lower RW for Retail (75%) than Corporate exposures (100% RW, as most EU SMEs would be unrated).

Initially, and on a loan-by-loan basis, it does not seem appropriate that SMEs, which have, on average, a larger PD than the whole of the Retail or Corporate asset class, receive a more favourable treatment in RWs. This could create perverse incentives for financial institutions to invest in areas where the regulatory RW does not reflect the actual riskiness of the business, which could lead to a further destabilisation of the financial sector in the future.

### 3.3 Analysis of SME portfolio riskiness

As stated in the EBA Report on Risks and Vulnerabilities (2012) -page14-, banks expect that the impairment levels will not decrease in the near term, and SMEs' exposures are considered the most problematic in terms of credit quality and impairment levels: 'exposures towards SMEs are the most frequently mentioned driver for the expected increase in problem loans'.

In order to assess the riskiness of the SME portfolio, and therefore its capital requirements, we need to assess not only the individual riskiness of the companies included in the portfolio, but also its **asset value correlation (AVC)**. In the IRB credit risk framework, AVC captures the sensitivity of debtors in an economy-wide, non-firm-specific manner, which represents the state of health of an economy.

In the underlying academic subtract of the prudential framework (Gordy, 2003), risks are measured along with the borrower's ability to pay. The ability to pay can be decomposed into a **systematic factor**, which reflects the state of the global economy, and an **idiosyncratic factor**, which is firm specific. The degree of the obligor's exposure to the systematic risk factor (and the general state of the economy) is expressed by the asset correlation; all borrowers are linked to each other by this single risk factor.

The theoretical role of AVC is clear cut but subject to **a set of relevant assumptions** (Annex 7 contains a more in-depth description), which merit discussion as regards SMEs' situation:

- Given that Basel assumes that **asset correlation increases with size**, it is implied that corporates are more closely related to the general conditions in the economy. In contrast, in the Retail portfolio, the lower regulatory coefficients reflect the fact that Retail defaults tend to be more idiosyncratic and less dependent on the economic cycle than corporate defaults. Even though on an absolute basis the default risk is greater for lower-quality borrowers, the financial performance of these weaker borrowers is assumed to be driven largely by idiosyncratic factors specific to the firm and relatively less sensitive to systematic or general economic factors.

While this holds true in times of an upturn, more recent empirical evidence suggests this is not the case in a recession. AVC is unstable over time and tends to increase in a downturn. More specifically as regards SMEs, in fact in bad times they, as a whole, tend to show a much larger dependence on the general state of the economy (systematic factor) than bigger corporates, which can easily diversify geographically and show a greater ability to survive.

The calibration of the Basel II framework was done in an economically favourable time and strove to incorporate empirical evidence on stress. Basel correlations may appear conservative, but it is precisely in a recession that correlations increase and defaults tend to cluster. Therefore, the correlation regulatory estimates should be valid not only for the 'good times' but also for the 'crisis times', when capital is more needed.

- The assumed **decreasing function between AVC and borrower riskiness (PD)** implies a lower correlation, and thus lower capital requirements, for more risky, high-PD exposures such as SMEs. However, many empirical studies conclude the opposite: correlations would increase for higher PDs (Moody's KMV, 2009). While the procyclicality embedded in prudential regulation may justify the current regulatory treatment (avoid increasing capital requirements in periods of rising PDs and, therefore, limit procyclicality), this assumption would also imply that the actual conservatism of the Basel correlations is indeed lower than it seems at first sight.

**Asset value correlation is subject to a high dose of model risk.** In fact, since the first release of the Basel II draft framework, both the banking industry and academia have tried to estimate the value of AVC empirically, reporting substantially different results. We have worked on the key AVC factor; however, estimating AVC is not trivial and there is no single right answer.

Some contributions have emphasised that ‘actual’ AVCs are lower than the regulatory ones, and on the back of these results they claim that capital requirements should be reduced (ABI, 2010). In what follows, we summarise the most relevant caveats related with the regulatory proposal of a capital requirement change based on empirical estimation. Annex 7 contains a more in-depth description.

- Among the modelling assumptions on which AVC estimates are extremely dependent (homogeneous riskiness of debtors, long-run observation period, constant AVC for the whole period, absence of serial correlation of the common factor variable, etc.), **the normality assumption of default events represents a major concern.** The theoretical model assumes a negligible number of high-impact events (Haldane, 2012). Unfortunately, actual defaults do not usually behave as predicted in a normal distribution: high-impact events are more frequent than theoretically assumed. Then, the use of normal distribution tends to underestimate the joint defaults probability of a pool of obligors (Frey, McNeil and Nyfeler, 2001).
- Most studies used what we could call ‘direct procedures’<sup>16</sup>. Nevertheless, the Basel Committee initially calibrated AVC by using what is called ‘backward’ procedure (see Basel Committee on Banking Supervision, 2005), which has the advantage of better capturing the reality of rare events or a fat-tailed distribution.
- Most empirical studies tend to use a dataset representative of a whole national jurisdiction. The diversification of these data is – by definition – larger

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<sup>16</sup> These procedures estimate AVC implied in the observed default frequencies or market data from a purely statistical point of view (using the Maximum Likelihood procedure or the Method of Moments).

than the one a bank can achieve in its asset composition. Thus, an AVC relying on these national jurisdictions' datasets is underestimated.

Therefore, there is a clear rationale for Basel II's more conservative (i.e. higher) AVC values than those derived from empirical estimation. This conservatism is needed to protect against important model risk in correlation calculations and lack of adequate data for this calculation. It is even questionable nowadays whether Basel calibrations could sufficiently incorporate cyclical effect to face stressed disruptions of a wave of counterparties.

Finally, it is worth noting that RWs do not have a one-to-one relation with AVC. A 50% lower estimated AVC value cannot be automatically converted in a 50% reduction in risk-weighted assets (RWAs) and capital requirement. Annex 8 shows the relationship between AVC and RWs.

### 3.4 Literature review

Empirical studies do not definitively conclude that SMEs are less risky than larger corporates.

Using bankruptcy as an indicator for default, Dietsch and Petey (2004) find that in France and Germany the largest SMEs are the least risky, whilst medium-sized SMEs' default rates are higher. Asset correlations in SMEs are found to decrease with size, and the relationship between PDs is found to be positive on average.

Antão and Lacerda (2008) analyse the impact of Basel II under the IRB approach, whereby capital requirements were changed depending on the PD and LGD parameters. They find that default rates increase for exposures of less than EUR 10 million and decrease for exposures greater than EUR 10 million. They find that firms with an annual turnover of less than EUR 50 million require relatively smaller capital requirements under Basel II despite their relatively high default rates.

Jacobson, Linde and Roszbach (2005) refute the preferential treatment afforded to SMEs under Basel II in their analysis of the impact of Basel II capital requirements on Swedish banks. Using their specific definition for SMEs, they find that there is no evidence to show that SMEs are less risky than larger firms. However, they do find that different definitions of SMEs (in terms of total sales) can sometimes result in SMEs exhibiting lower loss rates.



Buca and Vermeulen (2012) find from 2000 to 2009, firms which were more reliant on bank finance suffered more during the global financial crisis. There was a trend which saw those with a high concentration of bank loans deleverage more than those with lower bank debt. Significantly, SMEs in southern Europe were most adversely affected, as they tend to be more dependent on bank finance. This may indicate that the current situation faced by SMEs is because of a lack of diversification of their finance options.

As a conclusion, evidence has not been found in the literature review which indicates lower riskiness of SMEs than larger companies

Annex 6 summarises relevant studies on SMEs.

### 3.5 Conclusion on SME riskiness

Currently we do not find enough evidence to justify a relaxation of the RWs for the SME portfolio beyond the current favourable treatment in the current regulatory framework.

Establishing lower regulatory RWs needs to reflect the nature of the risk, as otherwise it could steer bank activities to this type of lending regardless of the actual risk, which could have a future negative impact on financial stability. The need for conservatism in this area is extremely important, as credit risk is still the most relevant risk for European banks; capital cushions should be high enough to cover future losses and withstand a reverse scenario or further deterioration in the economy.

## 4. Possible alternatives to a lowering in RWs

The EBA recognises that addressing the funding gap is especially relevant for the viability of SMEs in Europe at this moment. Therefore, if the regulator sees a change in the CRD IV/CRR as appropriate, the EBA proposes to explore alternative regulatory possibilities which combine the goal of trying to ease lending to SMEs with not distorting the current risk-weighting system.

Different alternatives that could be explored are described below. All three possible changes would need to have a separate and **clear distinction for SME loans** within the Retail portfolio, as SMEs are not recognised as an exposure class in the current regulation (see section XX).

#### 4.1 Temporary exemption of the conservation buffer for SMEs

Given that the objective of the proposal is to make possible a more rapid exit from the crisis, **a temporary measure could be more convenient and effective than a permanent change in the framework**, as a measure to alleviate the cyclical effects of lending to SMEs.

The rationale for the introduction of the supporting factor is to counterbalance the rise in capital resulting from the capital conservation buffer. Hence, a temporary exemption of the conservation buffer would be a much more convenient way to alleviate the pressures on the SME sector, without introducing distortions in the measurement of risks that might not be appropriate from a loan-by-loan risk management and supervisory perspective. This exemption would imply that the impact of Basel III for SMEs due to the progressive phasing in of the capital conservation buffer from 2016 to 2019 would be neutralised (see table 4). This capital buffer could be reintroduced when the economic context improves.

Table 4: Compared impact of an exemption of the capital conservation buffer for SMEs in the SA

	ASSETS	RISK-WEIGHTED ASSETS	RISK WEIGHT	CAPITAL RATIO	CAPITAL REQUIREMENTS
SUPPORTING FACTOR	100	57.1425	57.1425%	10.5%	6.00
EXEMPTION OF CONSERVATION BUFFER	100	75	75%	8.0%	6.00
BASEL 3	100	75	75%	10.5%	7.88

This measure would be neutral in terms of capital requirements, with regard to the introduction of the CRD IV/CRR, as **it would maintain the 8% capital requirements for SMEs**. At the same time, it would not distort RWs and RWAs. It would be very easy to implement and it would also remain neutral with reference to risk management practices. Moreover, it would not be such a significant departure from Basel III as changing the RWs. The legislative text should then envisage a review, possibly following a report from the EBA, to assess when this alleviation should come to an end.<sup>17</sup>

#### 4.2 Specific ‘countercyclical supporting factor deduction’ for SMEs

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<sup>17</sup> When the capital conservation buffer is introduced, it should be done in a gradual way.

*A second possibility would be a regulatory measure that would help to overcome cyclicalities in the supply of finance for SMEs during periods of economic difficulty.*

Bank lending activities in general are inherently pro-cyclical and it is generally perceived that bank loans to small firms can be particularly affected during a downturn, such as in the present global crisis. SMEs suffer particular difficulties in accessing credit during a downturn, and the lack of alternative sources of financing leads to higher mortality rates in a recession. Some studies confirm that there is a correlation between the supply and demand of external finance for SMEs and the expansion and contraction phases of the business cycle (Ruis, van Stel, Tsamis, Verhoeven and Whittle, 2009). Therefore, it would be appropriate to explore measures that would improve lending in the downturn of the cycle.

As we are currently in a downturn, a possible alleviation of capital could be admitted, which could be calculated in the same way as the reduction stemming from the supporting factor proposed by the EP on the stock of SME. **This capital alleviation would then be gradually removed during the upward swing of the credit cycle** and could be turned into a positive buffer when the phase of excessive credit expansion starts for this kind of lenders. This would provide relief for SME lending when it is most needed, but would not provide incentives for excessive indebtedness during the expansionary phase of the cycle.

This measure would not overlap with the general countercyclical buffer, as it would imply an immediate decrease in capital requirements. It would take into account the trend and increase of SME lending in each bank during subsequent years, in order to reverse this deduction,<sup>18</sup> and penalise future excessive credit expansion if it happens.

In the context of the current global economic crisis, regulatory measures that would ensure **overcoming cyclicalities in the supply of finance during periods of economic difficulty would constitute a major step in order to improve SME access to external finance.**

#### 4.3 ‘Supporting discount’ capital deduction

A third possibility would be **the introduction of a ‘supporting discount’**, which would not act on RWs, but would be applied at the end of the process of the capital calculation. Hence

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<sup>18</sup> The calibration of this regulatory measure, as well as macroeconomic implications and practical implementation of the requirements, could be managed by the EBA in collaboration with the European Systemic Risk Board (ESRB).

it would be easy to identify and **its aim would be not to alter the risk assessment, but to promote lending to the SME sector in Europe.**

The discount could be calculated in the same way as the reductions stemming from the supporting factor proposed by the European Parliament on the stock of SME loans, but it should be subject to a calendar of gradual reduction, until it reaches the desired level of capital with Basel III. This could be preferably linked to a predetermined calendar with an automatic ending; or it could be subject to a review clause. In the latter case it would need to be closely monitored and reversed as soon as lending to the SME sector starts growing.

In the end, this would be a measure similar to the supporting factor in the sense that it would grant a discount in the current level of capital, but this discount would be temporary rather than permanent. It would also be similar to countercyclical deduction as it is a deduction in capital for the same amount, except that the latter would penalise excessive credit expansion.

As a conclusion, a temporary measure subject to a predetermined ending would be more convenient than a permanent one. One possibility could be the design of a specific deduction in capital requirements, which could be reversed subject to a calendar or a review clause. Another alternative could be a countercyclical buffer for SMEs which could grant a discount on capital in this downturn, while building it up in moments of credit expansion. A temporary exemption of the conservation buffer for SMEs could also be considered. These possible changes would need to have a separate and clear distinction for SME loans.

Annex 9 shows a graphical comparison of the three measures and their effects on capital requirements.

## 5. Increase in the Retail/Corporate threshold

The Commission has also requested the study of a possible increase of the loan size threshold, as a way of including more exposures currently located in the Corporate asset class in the Retail asset class, which is less capital consuming. This option would affect only those SME exposures that are over the current regulatory threshold.

The criterion for assigning loans to the Retail or Corporate portfolio is not risk orientated, as one given firm could be included in the Retail exposure class by one bank (if its exposure with this bank is under EUR 1 million) and at the same time in the Corporate exposure class

by another bank (if its exposure with this bank is over EUR 1 million). This threshold was introduced in Basel II as a way of harmonising the exposures in Retail given the lack of international agreement on the SME definition at the time of drafting the Basel Accord.

While this proposal to increase the threshold could have some merit in recognising the effects of inflation and economic growth since the drafting of the CRD, it would exacerbate a non-risk criterion.

Regarding the CRD IV/CRR proposal of a threshold of EUR 2 million for the SA and EUR 5 million for the IRB, the following observations can be made:

- **Including a different threshold for SA and IRB includes further inconsistencies and creates opportunities for capital arbitrage.** It would be desirable to have the same threshold in all prudential approaches, in the interest of consistency and comparability, especially since many banks have positions which would evolve from SA to IRB. This inconsistency would exacerbate the reliability of a criterion which is not related to the riskiness of the companies. With the current CRD, one given SME may be treated by one bank as Retail and by another bank as Corporate, resulting in different RWs. With the current EP proposal, in addition to having same firms' loans treated as Corporate or Retail depending on the size of the loan, we would have a different treatment depending on the approach used by the banks. We provide an example in Annex 10.
- Increasing the threshold provides an additional unjustified alleviation of capital to non-SME exposures as **it grants a supporting factor to the 'other retail exposures', which may not be SMEs** (i.e. positions between EUR 1 million and EUR 2 million for the SA, and between EUR 1 million and EUR 5 million for the IRB, that migrate from Corporate to Retail), which is not consistent with the aim of the change in the CRD IV.<sup>19</sup>
- Additionally, it provides an additional preferential treatment to some SME positions that were considered Corporate and now will be considered Retail, in addition to the supporting factor. This would be in fact **a double preferential**

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<sup>19</sup> According to our Impact Assessment (please see section 7) a raise in the threshold for the SA banks could imply a higher reduction in capital requirements than the introduction of a supporting factor for the retail SMEs.

**treatment in capital, which would not be justified.** As we can see in the example, in figure 3 for some positions the saving in capital is 24%, which reflects the supporting factor, but some positions have an additional saving from the migration from Corporate to Retail, resulting in a saving of 43% or 52%.<sup>20</sup>

In sum, this is an arbitrary threshold, which does not target the right population and would grant a double preferential treatment to some SME loans and not to others based only on the size of their loans.

Besides the changes in the CRD IV/CRR already mentioned, the EP proposal is introducing an **increase in the firm size adjustment in the IRB**, which rises from EUR 50 million to EUR 70 million. This new threshold would lack consistency with the EU SME definition and include in the firm size adjustment, currently designed for SMEs, some large corporations.

## 6. Possible alternative to the increase in the Retail threshold

If a change is to be made in the Retail threshold, it would be technically **preferable to use the size of the firm** as a criterion for the mapping exposures to Retail or Corporate asset classes, instead of the size of the loans. From a risk perspective, **this could align the actual credit risk with capital requirements**, as the risk is more related to the size of the firm than to the size of the exposure. Also, with this approach SMEs could benefit from a unified treatment (while currently a given SME may be included in different asset classes in different banks and this creates a dual treatment which could be intensified if the RW for Retail were lowered or the threshold raised).

Replacing the loan size criterion by the firm size criterion could help to identify SMEs and even give a differential treatment of SMEs depending on their size, with small SMEs in the Retail asset class and medium-sized SMEs in the Corporate asset class, which would be helpful as behaviour may differ between these types of SME.

This would also **help to track such exposures in the future**, providing the possibility of following lending trends to supervisors and stakeholders. This is precisely the difficulty at the

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<sup>20</sup> In the case that a preferential treatment (supporting factor) for SMEs in both asset classes Retail and Corporate is included in the CRD IV, increasing this threshold does not have any effect on total the total population of SMEs affected by the supporting factor (as they are captured in the preferential treatment in either Retail or Corporate).

moment in gathering data for any SME study, as financial and solvency information held by banks is generally not structured into SME and non-SME. Having an identified SME exposures class could facilitate a deeper understanding of lending activities to SMEs in the future.

The **EP proposal has introduced an SME definition**, although it is not a replacement of the threshold but a subclass of the Retail and Corporate asset classes that are driven by the threshold. This proposal references the EU official SME definition:

According to the EU recommendation 2003/361, the main factors determining whether a company is an SME are, first, number of employees and, second, either turnover or balance sheet total.

Table 5: EU definition of SME

Company category	Employees	Turnover	or	Balance sheet total
Medium-sized	< 250	≤ EUR 50 million		≤ EUR 43 million
Small	< 50	≤ EUR 10 million		≤ EUR 10 million
Micro	< 10	≤ EUR 2 million		≤ EUR 2 million

These ceilings apply to the figures for individual firms only. A firm which is part of a larger grouping may need to include employee/turnover/balance sheet data from that grouping too.

From a prudential perspective it would be desirable to align the EU definition with the credit risk management practices, commonly based on consolidated figures on **turnover or balance sheet**, which are financial indicators, rather than on number of employees, which is usually not used for credit risk management. The advantage of balance sheet figures is that they are more stable in time, while the advantage of turnover is that it is already recognised in the firm size adjustment of the IRB approach and therefore would provide a more consistent treatment of SA and IRB exposures.

In order to assess the common practice, the EBA has conducted a stock-take, asking European national supervisory authorities to provide information on their supervisory definition of SME and on banks' internal management practises. Annex 11 includes the conclusions of the survey.

Regarding national supervisory authorities' practice, some countries have a specific regulatory definition for SMEs, which is basically used in order to define what can be included in the Retail exposures. This is done using a different set of variables; however, all of them tend to include only small enterprises within the SME borrowers in the Retail portfolio.

Regarding banks' definition of SMEs, although current practice varies, turnover is the most preferred method in defining SMEs. Asset size seems to be a measure to a lesser extent, whereas headcount is the least preferred method to define an SME. Depending on the size of the economy, banks in larger countries tend to have a threshold of about EUR 50 million turnover for defining SMEs, whereas banks in smaller economies tend to have a threshold around EUR 10 million or less.

If a change is to be made in the Retail–Corporate boundary we would suggest replacing the loan size criterion by the firm size criterion even if it needs to be tailored relative to the size of the economy or local corporate sector. This would align capital requirements with risk and would help to track SME exposures in the future. It could also help to give a differential treatment of SMEs depending on their size, with small SMEs in Retail and medium-sized SMEs in Corporate, as different-sized SMEs may have different risk profiles. This would be a significant change in the CRD IV, which would need to be carefully examined prior to its implementation.

## 7. Effect on financial stability

According to the banking and industry associations, if the regulatory proposal stays unchanged, a general increase of the capital requirements would impinge, in their point of view, on the availability and costs of funding for SMEs, causing negative effects for the real economy.

However, with or without the CRD IV, credit flow is unlikely to return to pre-crisis levels, when banks' business models were focused on generating high returns by increasing leverage in their balance sheets, reaching unsustainable levels of debt. In the current context, banks have a more risk-averse behaviour. The new regulations will lead banks to take de-risking actions, trying to restore confidence in banking as intending to prevent credit booms and severe credit contractions as previously and currently being witnessed. Greater financial stability will have a very important positive impact on SMEs, as it is hoped the current credit access situation will not be replicated.



In this section we are trying to clarify what the impact of the new regulation and of the supporting factor proposal would be in capital requirements.

## 7.1 Impact of new regulation

First, **the capital increase triggered by the new CRD regulation will be considerably bigger for large and complex banks than for banks that are more focused on Retail activities and remain under the SA.** In fact, Basel III monitoring results for Europe show that the increase in RWA for Group 1 banks, which are large internationally active banks<sup>21</sup>, is 21.2% on average, whereas the increase in RWA Group 2, which are banks more focused on lending activities, is lower (6.9%); this may be explained by the fact that these banks' business models are less reliant on exposures to counterparty and market risks (which are the main drivers of the RWA increase under the new framework). Figure 10 gives an indication of the distribution of the results across participating banks and illustrates that the dispersion is much higher within the Group 1 bank sample than among Group 2 banks.

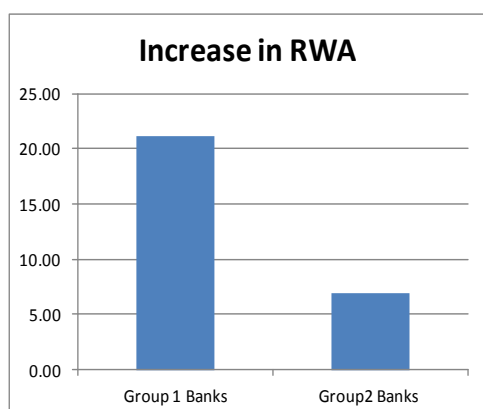


Figure 9: increase in Risk weighted Assets.  
Source: Basel III monitoring results. EBA, 2012.

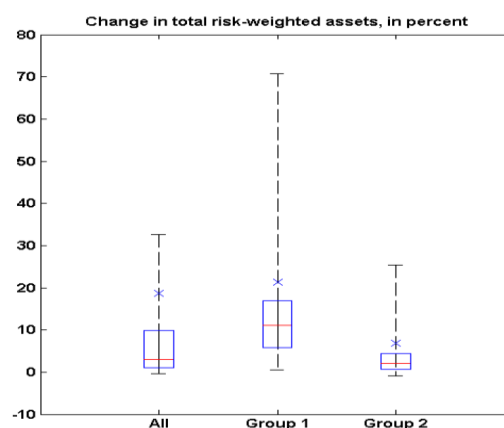


Figure 10: Interquartile range in change in RWAs.

Second, **the relative RW of Retail exposures compared with other portfolios is already due to be smaller in the new regulation.** To have a complete perspective of the impact of RW, SME RW should be compared with other investment classes or portfolios, as SME financing will be dependent not only on the absolute level of SME risk, but on the RW of other possible investments for banks.

<sup>21</sup> Group 1 banks are those with Tier 1 capital in excess of EUR 3billion and internationally active. All other banks are categorised as Group 2 banks. This report includes an analysis of data submitted by 48 Group 1 banks and 110 Group 2 banks.

Given that the CRD IV/CRR is increasing capital requirements for market risk and counterparty risk but not for Retail credit risk, the relative RW of SME exposures compared with other assets is lower under the new regime, and this should encourage banks to rebalance their activities towards this traditional lending sector.

The relative weight of Retail exposures compared with other portfolios will be smaller in the new regulation, given that the capital increase is focused on market-related activities. In fact, the capital increase triggered by the new regulation will be considerably bigger for large and complex banks than for banks that are more focused on Retail activities and remain under the SA.

## 7.2 Impact of the proposal

Banking associations state that the effect of the CRD IV/CRR should be neutral for SMEs. The only increase for general lending is due to the introduction of the so-called conservation buffer (2.5%), which will be introduced gradually from 2016 to 2019. However, the introduction of a supporting factor is not neutralising the increasing on capital in the new regulation but **introducing an important discount on the current level of capital**.

It will mean an actual decrease in capital requirements of 24%. By increasing the threshold, the capital decrease would become larger, as some of the Corporate exposures would migrate to the Retail portfolio, and these in addition to the supporting factor would imply a total reduction in capital requirements of 43% for the SA and around 52% in the IRB (see section 2.2).

In fact, this proposal, all together, could mean a substantial reduction in capital charges. With the current CRD IV/CRR proposal, a EUR 100 loan to a SME within the Retail asset class should be covered with EUR 6 of capital and this capital should increase from EUR 6 in 2016 to EUR 7.875 in 2019. With the EP proposal this same loan would currently need a EUR 4.57 coverage (which should be increased to EUR 6 gradually until 2019).

Table 6: Phased-in capital requirements under the supporting factor proposal

	ASSETS	RISK WEIGHT	CAPITAL RATIO	conservation buffer	supporting factor	CAPITAL REQUIREMENTS
current level of capital	100	75%	8.0%			6.00
capital with conservation buffer	100	75%	10.5%			7.88
EP CRD proposal (supporting factor) 2013-16	100	75%	8.0%		0.7619	4.57
EP CRD proposal (supporting factor) 2016	100	75%	8.0%	0.6%	0.7619	4.93
EP CRD proposal (supporting factor) 2017	100	75%	8.0%	1.3%	0.7619	5.29
EP CRD proposal (supporting factor) 2018	100	75%	8.0%	1.9%	0.7619	5.64
EP CRD proposal (supporting factor) 2019	100	75%	8.0%	2.5%	0.7619	6.00

This would mean that only a 5% variation of the value of this loan would wipe out the capital assigned to it. Figure 11 shows the part of an SME loan covered with capital (blue) and the “uncovered part” (in red) with the current treatment and the new proposal.

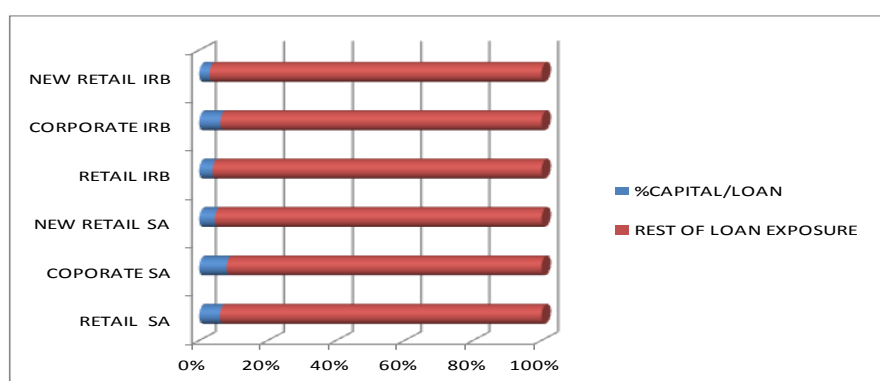


Figure 11

Basel II has been established to ensure a minimum capital amount present in the banking system, and reducing the capital charges at one end would reduce this overall amount. While facilitating lending is a desirable policy objective, it should not jeopardise the ultimate purpose of capital regulation, which would be to improve financial sector soundness and preserve financial stability.

Besides, banks with large capital positions are less sensitive to cyclical shocks and are thus more likely to pursue lending-growth strategies even in more difficult markets. In contrast, banks with lower capital levels are more sensitive to cyclical shocks and more likely have problems in accessing funding and maintaining lending levels in a downturn.

Banks should be capitalised enough to withstand further deterioration in economic conditions in Europe. A reduction in capital requirements may temporarily alleviate lending constraints, but it could also result in a slowdown in the recapitalisation process of the banks and could also deteriorate lending conditions even more in the future.

### 7.3 Impact assessment

The EBA has conducted an exercise in order to evaluate the consequences of a change in capital requirements for banks based on different policy alternatives in the initial mandate provided by the European Commission. The analysis uses a dataset from SA banks resulting from an ad-hoc data collection exercise the EBA has conducted together with European national supervisory authorities, with reference date December 2011.

Although the overall data quality is satisfactory, several caveats should be considered. The main one is that COREP (common reporting) reports for SA banks do not provide the breakdown (SME-retail, SME-corporate) that would be needed as ideal input for this analysis. Equally they lack a breakdown of exposures based on different thresholds.<sup>22</sup> Therefore, these data breakdowns have been provided through estimation on a best-effort basis.

These limitations considered, the estimated reduction in capital charges for the SA sample would range from EUR 3.6 billion to EUR 28.6 billion (1.3% and 10% of total credit risk capital requirements), which corresponds to RWAs of EUR 45 billion and EUR 357 billion respectively, depending on the policy options used; thus the actual impact of different options may differ substantially. It would be worth further studying if this impact is evenly spread among countries and would question the European level playing field to the extent that it is justified not by different economic conditions but by regulatory choices.

Besides the impact assessment on SA, the EBA has performed an analysis based on the effect of the supporting factor on data stored at the EBA for IRB banks,<sup>23</sup> resulting in a lower reduction (between EUR 1.8 billion and EUR 8.1 billion capital – 0.9% and 3.7% of total credit risk capital requirements – and EUR 23 billion and EUR 100 billion RWAs respectively).<sup>24</sup> The reason for the smaller reduction is mainly that IRB banks have more reduced RWs for the same exposure classes than SA banks; besides, SA banks tend to have a higher proportion of SME lending in their balance sheets and, finally, for IRB banks it was not possible to test all the options tested for the SA banks.

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<sup>22</sup> Conducting a comprehensive and rigorous impact assessment for SME exposures on the change of the threshold is not possible, unless extremely detailed information on loans is provided on a bank-by-bank basis, which would be extremely burdensome.

<sup>23</sup> Thirty-four large banking groups in Europe, reference date 31.12.2011.

<sup>24</sup> This comparison also confirms that the proportion of SME lending over all exposures is higher in SA than IRB banks (around 30% compared with 10%), while the absolute amount of lending is higher in IRB banks.

In total these two samples account for EUR 9 350 billion of loans to the Retail and Corporate exposures classes.<sup>25</sup> While the impact assessment quantifies capital savings, the estimated results should not be automatically converted to additional credit flows to the SME. As described within this report, the resources stemming from reduced capital requirements can be used by banks in a wide variety of ways.

Data on a representative sample, collected on a best effort basis, show that the effect of the supporting factor could range from 1.3% to 10% of total capital requirements for SA banks and from 0.9% to 3.7% in IRB banks.

Annex 12 includes the main conclusions of the Impact Assessment conducted by the EBA regarding SME exposures.

## 8. External consistency with the Basel Committee framework

The CRD IV objective is to preserve the financial stability and promote soundness of credit institutions. This legislative package reflects an international agreed commitment, the G20 Declaration of 2 April 2009 on Strengthening the Financial System and the Basel Committee rules issued in 2010 (the so-called Basel III international framework), which was agreed by the Governors and Heads of Supervision and endorsed by the G20 Leaders at their November 2010 Seoul summit.

This regulation constitutes a major step towards creating a sounder and safer financial system, and any measure that deviates from the Basel II framework would be thoroughly examined and questioned by other Basel Committee members and the market players. Additionally, if these measures lead to a reduction in capital requirements it could be seen as a potential danger for future financial stability, which is vital to consider in the current context of heightened uncertainty in the European financial sector, as it could worsen the market perception of European banks' solvency.

Currently, regarding SME regulation, most countries are following the Basel II regime, which is recognised in the CRD IV (see section 2). One exception is the USA, which is still using the Basel I regime assigning a 100% RW to all corporate exposures. However, the USA will

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<sup>25</sup> As a reference, total loans and advances, according to the ECB data, accounted for EUR16.712billion in December 2010.

implement the new standards (Basel II/III) and replace Basel I from 1 January 2013 (on 7 June 2012 the US Agencies published their notices of Proposed Rulemakings for an Integrated Regulatory Capital Framework; currently open for public comment until 22 October).

The new draft US regulation does not provide the current preferential RWs to SMEs, already recognised in Basel II and in Europe with the CRD IV. The proposed rule does not specify a preferential IRB curve for SMEs exposures as, according to the previous adaptation to Basel II rules, the US agencies were 'not aware of compelling evidence that smaller firms with the same PD and LGD as larger firms are subject to less systemic risk than is already reflected in the wholesale risk-based capital functions'. It does not grant a preferential RW in the SA either.

Despite the fact that RWs are higher for SMEs in the USA, US SMEs are perceived to have fewer problems in accessing finance than their European peers.<sup>26</sup> This may indicate that RWs are not a fundamental driver on the amount of credit provided to a certain type of borrower. In any case, a change in the RW, which is a cornerstone in banking regulation, should be primarily driven by the underlying risk of the exposure and not by the aim of easing or restrict credit availability.

Any departure for the Basel framework should be taken with careful consideration, as it would be questioned by other Basel Committee members and market players. International practice shows that most countries follow the Basel II regime. And those countries that deviate from this agreement (principally the United States) reflect higher RWs for SMEs. Contrary to intuition, this more stringent treatment does not seem to restrain SMEs' access to finance compared with European firms.

## 9. Effect of capital on lending conditions for SMEs

In this section we will examine the current trends in SME financing, with the particular analysis of banking financing and lending conditions. We then examine the reasons for credit tightening and, finally, the relationship between capital and credit supply, in order to assess

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<sup>26</sup> A comparison of small and medium sized enterprises in Europe and the USA, European Capital Markets Institute. February 2001.

whether a lowering in the RW would translate into better lending conditions for SMEs in Europe.

## 9.1 Trends in banking lending conditions

Lending problems to European companies, both SMEs and large, arise from a combination of problems in credit demand and credit supply which are intensified in the current economic context and are extremely difficult to identify and disentangle. On the credit demand side, in a downturn, companies tend to ask for less credit, as they tend to delay investments and accumulate cash. Also companies see a decrease in sales, profits and delays of client payments. On the credit supply side, in a recession, banks would tend to tighten their credit standards.

Data from the ECB Bank Lending Survey show that lending constraints are shared by both large and smaller firms, which traditionally exhibit a similar pattern, but since 2007 **tightening of credit standards appears to have been applied more to large firms than to SMEs.**

According to the April 2012 Bank Lending Survey, ‘the net tightening of banks’ credit standards on loans to non-financial corporation’s dropped markedly in the first quarter of 2012. In net terms, the overall tightening of credit standards again appears to have been applied more to large firms than to small and medium-sized enterprises (SMEs)’.

Figure 12 reflects the diffusion index<sup>27</sup> for the tightening of credit standards over the last decade, which reflects the change in lending conditions.

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<sup>27</sup> The ‘diffusion index’ regarding banking lending policies refers to the share of banks reporting that credit standards have been tightened and the share of banks reporting that they have been eased (the higher the result, the tighter the standards). Likewise, regarding the demand for loans, the diffusion index refers to the weighted difference between the share of banks reporting an increase in loan demand and the share of banks reporting a decline. The diffusion index is constructed in the following way: lenders who have answered ‘considerably’ are given a weight twice as high (score of 1) as lenders having answered ‘somewhat’ (score of 0.5).

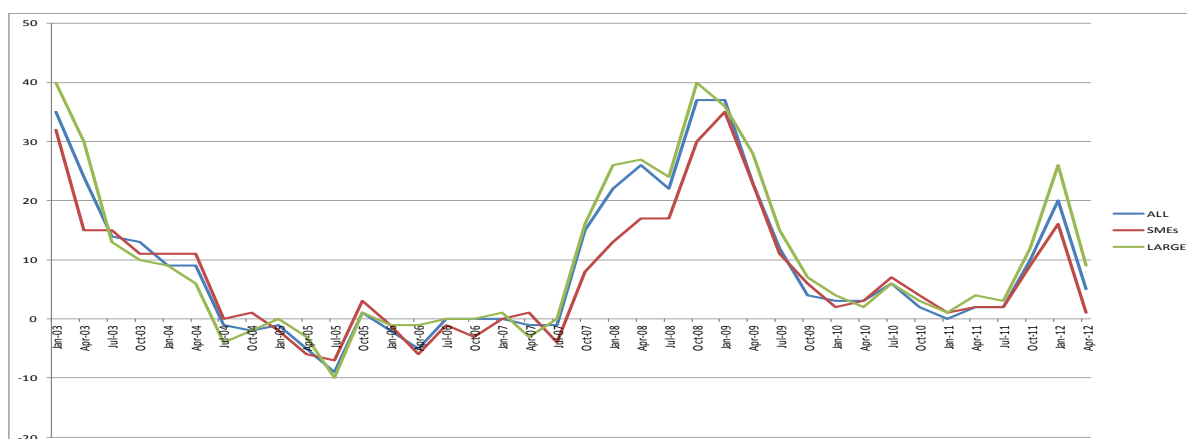


Figure 12: Diffusion index for the tightening of credit standards

Source: Data from ECB Bank Lending Survey April 2012

Bank lending to non-financial companies is dependent not only on the supply but also on the demand of loans. Recently, **the net demand for loans to non-financial corporations has dropped significantly** (–30% in the first quarter of 2012, compared with –5% in the fourth quarter of 2011); this recent decline in demand shows a similar trend for SMEs and large corporates. Figure 13 reflects the diffusion index for loan demand over the last decade, where we can see a slighter greater demand for banking loans from SMEs as a general trend; we can conclude that different-sized companies do not exhibit a substantially different pattern on loan demand.

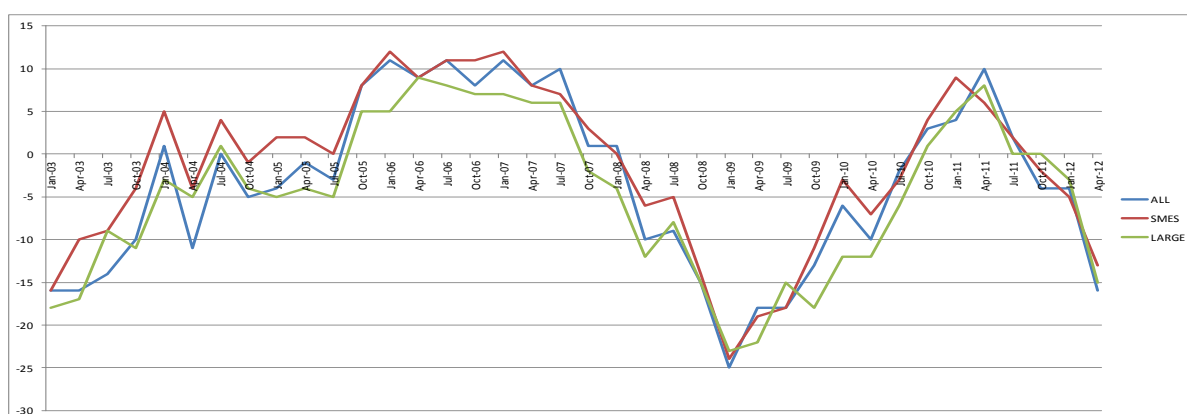


Figure 13: Diffusion index for loan demand.

Source: Data from ECB Bank Lending Survey April 2012.

In fact, the literature on financing obstacles among eurozone firms shows that, although restrictions in lending are commonly associated with firm size, **the age of the firm and**



**ownership are the most relevant drivers of financing obstacles**, while size of the company is less relevant than its age (Ferrando and Griesshaber, 2011); see Annex 13 below. An interpretation of these results may be that a company's age, reputation and proven performance record significantly affect its access to finance.

The fact that SMEs are perceived as more financially constrained than large corporates **could be due to the effect of different sources of finance**, as smaller firms tend to rely to a large extent on bank loans while larger companies have some direct access to the capital market. The analysis on BACH data (please see Annex 3) confirms this statement and shows how smaller companies have a higher dependence on the credit institution funding than bigger ones. We can also observe how large companies in Europe have switched into capital markets funding since the beginning of the crisis, replacing bank loans by bond issuance.

Another general feature of SMEs compared with large corporations that makes their access to finance more difficult is their dependence on trade credit. As trade credit tends to contract more for SMEs than for large companies in a recession, this becomes an additional source of distress in economic downturns. Again we can get confirmation in the BACH analysis, which shows how larger firms have in trade credit an additional source of finance (see Annex 3 section 2.1).

According to the ECB Bank Lending Survey, different-sized companies exhibit a very similar pattern in their credit conditions. Furthermore, since 2007, credit standards have tightened more for large firms than for SMEs. Financial obstacles seem to be more related to the age of the firm than the size, and to the fact SMEs are more dependent on banking debt than larger firms.

## 9.2 Possible causes of tightening of credit standards in EU companies

According to the ECB Bank Lending Survey, the reasons for these conditions of tightening credit standards may be banks' capital constraints, but also banks' liquidity position or access to market financing. Some other important reasons for credit rationing include economic outlook or industry-specific outlook.

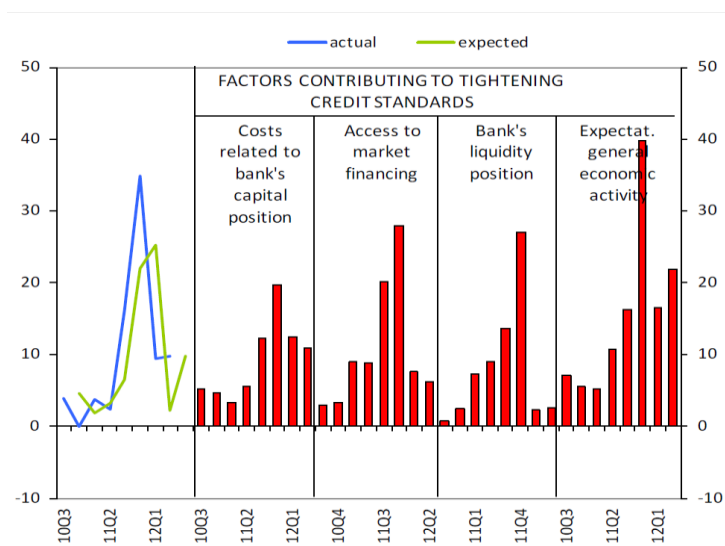


Figure 14: Changes in conditions for approving loans or credit lines to enterprises.

Source: ECB July 2012 Bank Lending Survey.

Currently, access to market and liquidity are the main contributors to tightening of lending standards, followed by concerns on the general economic outlook. If we look at the historical trend, capital is just one of the drivers for lending restrictions and not the most important of them since 2007 (Annex 14 includes a summary of credit restriction factors and consequences according to the ECB Bank Lending Survey, April 2012).

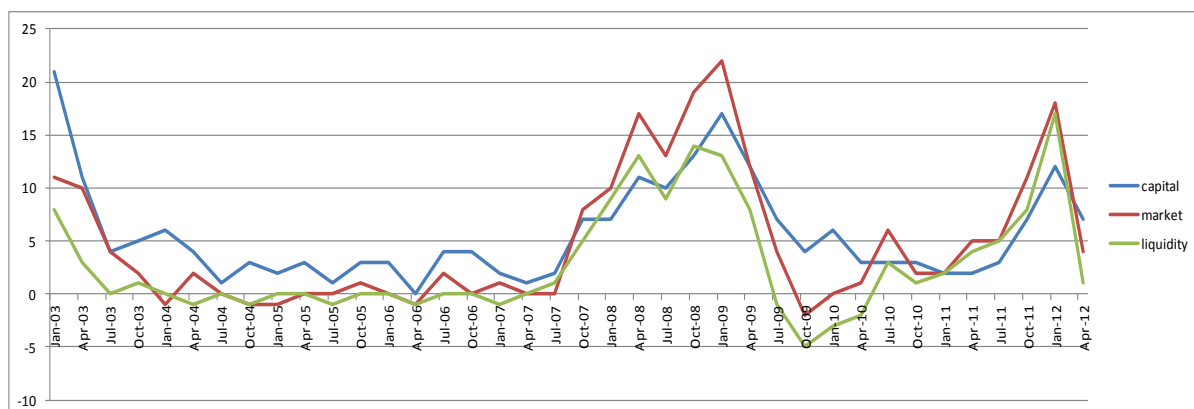


Figure 15: Drivers of tightening credit standards.

Source: Data from ECB Bank Lending Survey April 2012.

During the worst periods of the economic crisis, capital was not the prominent factor, as conditions tightened more for banks' liquidity and market finance. In fact, credit tightening during 2011 was probably due to the sovereign debt crisis, which has rapidly worsened

banks' ability to obtain market funding. In the first quarter of 2012 the ECB's three-year Long Term Refinancing Operation (LTRO) has provided significant temporary relief, especially in terms of liquidity and funding, and therefore has contributed to the decrease in the tightening of credit standards.

We understand that weakness in credit conditions will remain until there is a substantial improvement in banks' funding and liquidity position. Therefore, **opening the capital markets and strengthening the liquidity position** of banks could be a key issue in solving the lending weakness in Europe, and more effective than a reduction in capital.

Finally, according to the ECB survey, **capital is a more influential driver for banking lending policies for large corporations** than for smaller ones. An interpretation of this result could be that cost of capital tends to be measured more accurately in lending to larger than smaller companies. As for smaller companies, repayment capacity and collateral are more important drivers for the lending decision.

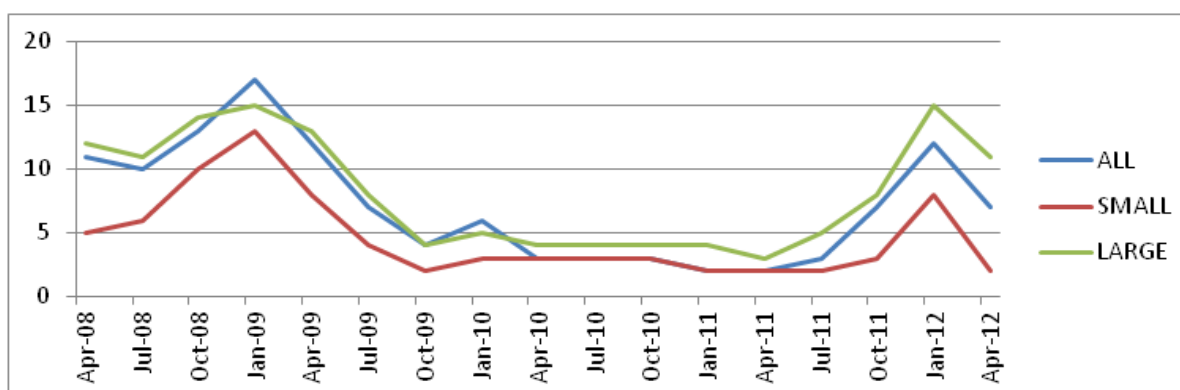


Figure 16: Costs related to banks' capital position.

Source: Data from ECB Bank Lending Survey April 2012.

In any case, it is important to understand what the relevance of capital is as a driver in banks' lending policies, in order to assess if a measure based on capital relief would be effective.

### 9.3 Effect of capital on lending conditions

The presence of a direct relation between credit supply and capital requirement represents the main theoretical assumption underpinning the claim for a reduction in the capital requirement for the SMEs. A reduction in capital requirement for an asset class is assumed to translate directly into an increase in credit supply to the same asset class. Although this

description is appealing, **the existence of such a causal relation between a change in capital requirement and credit supply is not straightforward.**

Annex 15 includes a summary of relevant work on the effect of capital and credit supply. It shows that, if an SME capital relief is granted, a bank could translate this alleviation into higher lending, but it could also translate this reduction into a less urgent need to accumulate additional capital through retained earnings or raising new equity. The impact of this regulatory change on lending would depend only on the following three strategies for banks, which are not mutually exclusive: (i) raise less equity; (ii) pay more dividends; (iii) increase lending. If banks decide to raise less equity than required or pay more dividends, then impact on lending would be modest.

Besides, even if banks' strategies focus on the third option, higher lending to SMEs would not be necessarily guaranteed. Lowering the RWs or increasing the threshold would free up some capital that could be used to increase lending. However, there is no guarantee that this measure would lead to additional lending to the private sector or, more importantly, that this potential increase in lending would effectively go to SMEs.

Banks could use the 'unlocked' capital in other activities which will still consume less capital (e.g. good-rated corporate or sovereign bonds). In fact, this has been the trend in recent years, when investment in sovereign debt has produced a very clear crowding-out effect (see Annex 16). It is difficult to predict what the behaviour would be, especially in the current crises when banking investment policies are changing; however, as banks are becoming more risk-averse there is a general trend towards 'flight for safety' in the current investing environment.

Therefore, **from the 'effectiveness of the measure' point of view, a measure that links capital requirements for SMEs with actual lending to this group of lenders would be preferable.**

In the end, it may be possible that the effectiveness of capital measures in order to improve SME lending remains uncertain and, therefore, it is not guaranteed that capital alleviation would encourage banks to ease credit.

Other factor to be considered on the effect of capital in lending is that **banks have a general incentive to reduce the capital base.** First, there are regulatory incentives towards financing by debt instead of equity finance for fiscal reasons (as debt is deductible and equity is not). In addition to the tax corporate effect, there is implicit 'state support' that tends

to promote leverage.<sup>28</sup> Moreover, since the governance structure of banks' profitability analyses is based on return on equity (ROE) more than return on assets (ROA), senior management remuneration is often linked to ROE. This approach tends to minimise the equity base in order to maximise profits.

An increased focus on the profitability of the assets to invest would decrease the focus on the RWs and would not distort investing strategies in banks that could be biased by low capital RWs.

In the next section we touch upon alternative measures that could more directly facilitate SMEs' access to finance.

## 10. Additional measures to improve SME financing

As described in the previous section, RWs, or more broadly speaking capital requirements, are just one possible method that may contribute to lending restrictions to SMEs, but they are not the most significant. The European Commission's action plan for SMEs covers a wide range of initiatives and regulatory measures which would be far more promising and effective, such as promoting angel investing, private equity and venture capital; improving SME access to capital markets; promoting ratings for SMEs; and enforcing late payment regulation. These direct measures, which are very relevant to helping SMEs to access to finance, would, in particular, promote at the same time SMEs' creditworthiness and access to banking finance.

In general, enterprises have regulatory incentives towards financing by debt instead of equity finance. Traditionally, debt has been a cheaper way of financing companies, for fiscal reasons. This brought both non-financial and financial corporations to a high level of leverage at the beginning of the crisis, which should be gradually brought to more reasonable levels. While some leverage can be good for the economy, higher levels of leverage may be detrimental to growth. However, there is still a regulatory incentive to increase leverage beyond a sustainable level. The main reason is that interest debt payments are deductible in corporate taxes while equity remuneration is not, and tax incentives are quite a strong driver in management decisions, as they do imply an outflow (while capital and provisioning do not). **A more neutral approach to the cost of external (debt) or internal (equity) funding in companies would promote sustainable growth** in the economy, in the medium and long

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<sup>28</sup> This is clear for the bigger banks, but has also worked in practice, for the smaller European ones as well.

term, and would encourage firms to seek for more equity finance. As a consequence we see a lot of merit in promoting SMEs' access to equity.

In particular, at early stages of companies, equity should be more adequate for financing a small firm than banking debt. Promoting **angel investing, venture capital and private equity** with legal and, especially, fiscal measures would have a direct very positive effect on SME funding, especially for these smaller firms. Additionally, it would have indirect positive effects as an increase in the capital base of these firms would increase their creditworthiness and make them more attractive for bank lending. Also, the development of a European SME stock market could serve as a direct form of finance for SMEs. It would be interesting to explore and promote **alternative markets** across Europe.

Promoting the use of **consistent ratings** across SMEs in the EU could also have a beneficial effect on their access to finance. On the one hand, good-rated SMEs included in the Corporate asset class could directly have lower capital requirements (as RWs in the SA are directly linked with company ratings). At the same time, a more widespread use of rating across European companies would help to foster securitisation and private placement of bonds, which could be a major step in medium-sized companies' financing, as the main root cause of SMEs' difficulties in obtaining financing is their high dependence on banking.

We understand that there is room for **developing debt markets in Europe**. The development of the corporate debt market could mitigate the effect of financial crises or reduce its effect when there is a high reliance on banking debt, as alternative sources of finance are available for companies when banks are in a constrained position. Recent trends, subsequent to the crisis, show that European corporate are starting to tap the capital market with increasing frequency, as bank loans reflect their risk more and also because issuing corporate bonds has become easier recently as various European stock exchanges have special platforms for SMEs (Germany, for example). However, compared with the USA, European companies are still more dependent on banking debt and this can mean a competitive disadvantage for European firms in this downturn.

Additionally, **combating late payments** is crucial for the endurance of SMEs. In a downturn, larger companies tend to delay their payment to the smaller ones and there is still a significant section of the public sector which also fails to pay promptly. This lack of ability to receive payment promptly creates liquidity problems, which undermine SMEs' access to bank finance and could ultimately result in the firm's insolvency.

Furthermore, the CRD provides an ample spectrum of guarantee recognition, which is one of the main differences from the previous banking capital regulation. Traditionally, state guarantees have proven a very effective way of promoting lending to SMEs. In the current context, **additional guarantee alternatives** could be explored, such as mutual guarantee schemes, which are already working in some European countries and could be fostered in the European market. In 2009, the European Commission estimated that 1.8 million SMEs benefited from guarantees in individual Member States.

Finally, some industry initiatives for **alternative sources of finance**<sup>29</sup> could help to match demand in an environment of weak growth in bank lending, stimulating competition and greater efficiency in the banking sector. Overall, this non-bank finance, which is currently at low levels, could contribute to greater financial stability; however, it should be monitored as soon as it becomes more significant.

In sum, all these measures do directly improve SME financing, whilst alleviation of banks' capital requirements is an indirect measure which would need the support of banks' strategies in order to effectively produce an improvement in SME lending conditions. As shown in section 9.3, capital alleviation does not necessarily guarantee better lending standards, as banks can use this alleviation for other purposes.

## 11. Conclusion

The effect of the current financial crisis has been devastating, and is having very damaging consequences in the private sector. In response to the crisis, the CRD IV/CRR is looking to strengthen the regulation of the banking sector by gradually increasing the amount of capital banks must hold. This increase is targeted to the more risky activities and not to traditional lending. The only change in the regulation for SMEs is the general conservation buffer (2.5%), which will be introduced gradually from 2016 to 2019.

In order to facilitate credit to SMEs and to neutralise the effect of the conservation buffer, the EP has proposed the introduction of a supporting factor 0.7619 for SME RWs. This proposal would imply a current decrease of capital requirements for SMEs in order to neutralise the

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<sup>29</sup> Such as peer-to-peer lending, whereby investors and businesses are matched on an electronic forum without financial intermediaries.

incremental effect of the conservation buffer in the future (a EUR 100 loan to an SME in the Retail asset class, which is currently covered with EUR 6 of capital, would then need EUR 4.57).

The EBA received a mandate from the European Commission to analyse the appropriateness of a reduction in the current RWs and an increase in the Retail threshold. In general, it is very difficult to obtain SME data, as there is no breakdown of such exposures in banks' financial or solvency information. This lack of consistent SME data across European banks makes it extremely difficult to perform a rigorous analysis on regulatory options for SMEs.

Based on Supervisory Authorities' data and Balance Sheet Central Banks data we conclude that SMEs are a riskier sector than larger corporate on a stand-alone basis. Also, on a portfolio basis, SMEs suffer more in a downturn and tend to be a more cyclical sector. Some contributions conclude that empirical asset correlation values should be made lower than Basel II ones. However, there is a clear rationale for more conservative regulatory correlation values in order to cover the important model risk in correlation calculations, the lack of adequate data for this calculation and the fact that in a recession, when capital is most needed, correlations tend to align. Therefore, in the EBA's opinion, lowering the RWs for the SMEs sector is not adequately supported by the riskiness of this type of lending.

The proposal also raises the threshold for loans to be included in the Retail asset class, which will result in a more favourable treatment for some SMEs' and non-SMEs' exposures. If a change is to be made in the Retail–Corporate boundary we would suggest replacing the loan size criterion by the firm size criterion. This would align capital requirements with risk and would help to track SME exposures in the future.

In the EBA's opinion, institutions should be well capitalised to withstand future deterioration of the economic outlook. A reduction in capital requirements may temporarily alleviate lending constraints, but it could also result in a slowdown in the recapitalisation process of the banks and could also worsen lending conditions even more in the future. Besides, a departure from the Basel framework should be taken only after careful consideration, as it would be questioned by other Basel Committee members and market players.

Nevertheless, the EBA understands SME financing constraints in Europe and is willing to explore and study any measure that actually alleviates credit constraints for non-financial



companies in a downturn. The financial crisis has highlighted some important limitations in SME financing in Europe and there is an opportunity to analyse the structural problems and to take decisive action to overcome these limitations and set the basis for a better access to finance for SMEs in Europe.

On the CRD IV/CRR side, the EBA acknowledges that, in the current context, a temporary measure may be more adequate than a permanent one. In particular, a temporary exemption from the conservation buffer for SMEs or a temporary deduction in capital for SMEs' current exposures, which could be reversed subject to a calendar or a review clause, would be a measure that would not interfere with the risk-weighting scheme. Also, the design of a specific countercyclical buffer for the SMEs, which could grant a discount on capital in this downturn, while building it up in moments of credit expansion, could be far more effective than a plain change of the RWs.

However, the effectiveness of a capital measure could be modest if banks decide not to pass on the lowered capital requirements to SMEs in lending and use it for other purposes such as a reduced effort at recapitalisation (issuing less capital) or an increase in other types of investment (such as sovereign or other corporate debt).

We also recognise that there are some other alternatives that could be far more promising and effective for SMEs' access to finance, such as promoting angel investment, venture capital and private equity; fostering a European market for private and public placements for medium-sized enterprises; promoting rating consistency across Europe; and making a wider use of guarantees. In general, the measures which promote equity funding in European companies would limit their dependence on banking credit and could promote a more sustainable growth in the economy.

## Annexes

Annex 1: Life cycle of financing needs of the SMEs

Annex 2: CRD IV/CRR liquidity standards and leverage ratio

Annex 3: Empirical investigation of the creditworthiness of European SMEs

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Annex 7: Analysis of SME portfolio riskiness: asset value correlation

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Annex 13: ECB survey on access to finance of SMEs in the euro area, April 2012

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Annex 15: The relation between capital requirement and credit supply

Annex 16: Recent trends in lending: public sector vs non financial corporations and households

## Annex 1

### Life cycle of financing needs of the SMEs

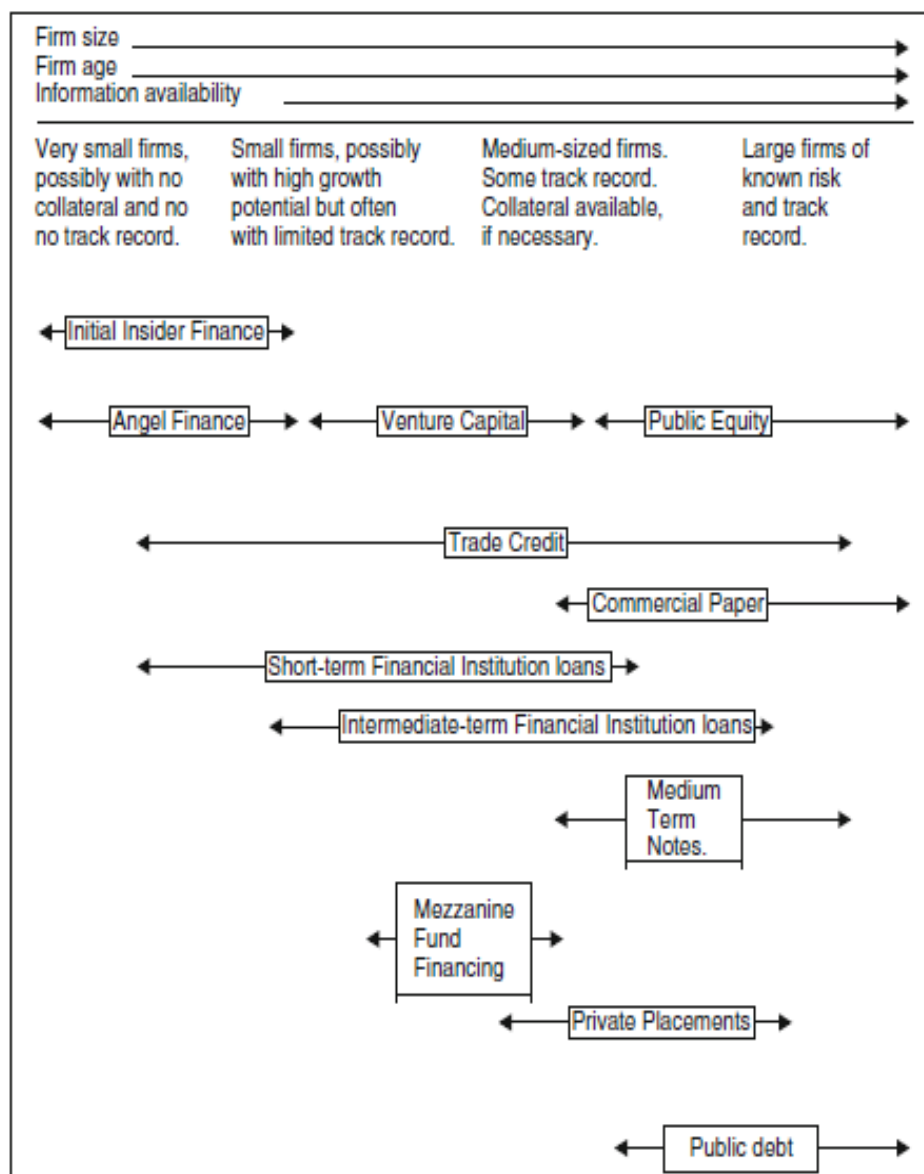


Figure 17: Source: Berger A. and Udell G. (1998).

## Annex 2

### CRD IV/CRR liquidity standards and leverage ratio

#### **CRR liquidity standard**

From a liquidity risk perspective, interaction with SMEs is accounted for in the CRR 'Liquidity Coverage Ratio' in one of two ways:

- (i) the **inflow** weighting applied to repayments on loans from SMEs, due within the 30-day LCR period;
- (ii) the **outflow** rate applied to deposits from SME customers, with whom the institution may also have an exposure-based relationship.

**(i) Inflow (from exposures that are not past due and for which the bank has no reason to expect non-performance within the 30-day time horizon<sup>30</sup>)**

An inflow has the same effect as a liquid asset in the LCR calculation: one contributes to the numerator, the other reduces the denominator. Reducing the weighting on permissible inflows thus increases the requirement on banks to hold more liquid assets. For the purpose of calculating inflows in the LCR standard (Article 413.2), an SME is treated the same as retail depositors and non-financial corporate customers and would fall into the following 'catch all' bucket (weighted at 50%):

'The liquidity inflows shall be measured over the next 30 days. They shall comprise contractual inflows from exposures that are not past due and for which the institution has no reason to expect non-performance within the 30-day time horizon. The inflow shall be taken into account in full with the exception of the following:

'(a) monies due from customers that are not central banks or financial customers for the purposes of principal payment shall be reduced by 50% of their value or by the contractual commitments to those customers to extend funding, whichever is higher.'

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<sup>30</sup> Article 413, draft CRR text

[http://ec.europa.eu/internal\\_market/bank/docs/regcapital/CRD4\\_reform/20110720\\_regulation\\_proposal\\_part3\\_en.pdf](http://ec.europa.eu/internal_market/bank/docs/regcapital/CRD4_reform/20110720_regulation_proposal_part3_en.pdf)

Long-term lending to SMEs by credit institutions is highly unlikely to be affected by the treatment afforded to these counterparties in a short-term liquidity standard. Furthermore, within credit institutions themselves, the decision to lend to SMEs remains influenced by the counterparties' risk characteristics, and should not be constrained by the new liquidity standards.

#### Policy considerations:

- An individual bank's credit risk assessment and due diligence around lending to SMEs is likely to focus on *whether* and *how much* to lend to a specific counterparty. There is little evidence to suggest that a liquidity regime would curtail this process or, indeed, be an additional factor in the bank's assessment about lending to SME counterparties.
- The draft CRR LCR does not distinguish among lending to retail, SME or Non-Financial Corporate Customers. It is difficult, therefore, to see how lending to SME customers alone could be unduly affected.
- There is no appetite (nor would it be appropriate) to apply a more favourable inflow/outflow rate to SMEs than that which is applied to retail depositors.
- The 50% roll-over rate has been appropriately calibrated based on the characteristics of non-financial customers in a stress scenario.

#### (ii) Outflow (on retail deposits)

Article 400 of the 5th Council text defines 'Retail deposit' as:

'a liability to a natural person or to a **small and medium sized enterprise** if the natural person or enterprise would qualify for the retail exposure class under the Standardised or IRB approaches for credit risk and where the **aggregate liability to such clients or group of connected clients shall not exceed 1 million EUR.**'

SME depositors are therefore treated identically to retail depositors, provided they do not deposit more than EUR 1 million.

Should the SME deposit exceed this, the deposit will be treated in line with Article 409.5 as being from a 'non financial customer' and receive a 75% outflow weighting.

#### Policy considerations

- Within the draft CRR, the LCR regime is purposefully designed to take into account the liquidity risk of specific business models, and thus treat those business models proportionately, i.e. harsher treatments of interbank lending and capital market-driven transactions. SME depositors are treated identically to retail depositors (on the liability side), and SME customers are treated identically to both retail and non-financial customers (on the asset side).
- Basel is in the process of considering whether the definition of an SME depositor – above which one would be treated as a non-financial customer – should be liability (i.e. deposit size) or asset (i.e. exposure size) led, and whether the outflow rate for Non-Financial Corporates (set to 75%) is correctly calibrated given the varying size of the counterparties captured in this bucket. The definition of SME remains an unnecessary consideration, on the inflow side, because all non-financial counterparties are bucketed into one standard roll-over rate.
- There is no evidence, however, to suggest that the treatment of the depositor relationship, for liquidity risk purposes, affects that of the lending relationship, with these counterparties.

### **Leverage ratio**

The leverage ratio is intended to be non-risk based so does not have a specific treatment for different business lines (with the exception of unconditionally cancellable off-balance-sheet commitments such as credit cards). However, the impact of the leverage ratio on different business models or lines – including SMEs – is included as a topic for further analysis during the monitoring period through 2016, with a report to be produced to inform the finalisation of the leverage ratio calculation and calibration in 2017 (CRR Art. 482).

The non-risk-based leverage ratio will be more constraining on bank activities that attract low RWs. However, the risk weighting of SME lending is likely to remain above the level at which this constraint would occur. As a result the leverage ratio proposal is unlikely to have any detrimental effect on banks' lending to SMEs.

## Annex 3

### Empirical investigation of the creditworthiness of European SMEs

#### Executive summary

This paper contains an empirical analysis of the creditworthiness of SMEs. Risk weights are fundamental measures that reflect credit default risk of obligors, which should be consistent among different asset classes. A comparative analysis of the creditworthiness of small and medium-sized debtors in comparison with large debtors is essential for an evaluation of the appropriateness of RWs.

For this study we use the comprehensive Bank for Accounts of Companies Harmonised (BACH) dataset, which covers nine European countries. The BACH database is the most reliable source of available data containing balance sheet and profit and loss data for European companies. Nevertheless, it has some limitations: institutional differences, differences in accounting rules and differences in the sample composition. A major caveat in the sample composition is that companies are included in an observed time point only if they existed in the observed and the previous period. Therefore, firms which actually defaulted may not be included in the dataset and an improvement of a certain ratio could have resulted because a corporate which had poor values of creditworthiness defaulted and therefore is excluded from the sample.

Since our dataset does not contain realised default rates for different size classes, we study key economic indicators for default risk of large, medium and small companies instead. We have analysed several financial indicators which can be classified into the following categories: (1) liquidity, (2) leverage, (3) profitability, (4) activity and (5) coverage. Based on these indicators we have evaluated which companies perform better with respect to their size (annual turnover above or below EUR 50 million).

Overall, based on the five categories, firms with an annual turnover higher than EUR 50 million perform better than firms with a lower annual turnover. SMEs obtain better results only for the liquidity ratio. However, this is not always a good sign of better creditworthiness of companies because it represents higher costs. In most other categories

larger enterprises tend to achieve better results. The results consequently show that smaller firms could be considered to be less creditworthy.

## **1. Key features of the BACH database**

The database is managed by the European Committee on Central Balance-Sheet Data Offices (ECCBSO) and was set up in cooperation with the European Commission in 1987. The main target groups of users of the BACH product are economists, universities, investors and public bodies.

### **1.1 Advantages of BACH**

The BACH database is unique in that it contains largely harmonised annual accounts data, with a uniform format of the balance sheet and profit and loss account of non-financial corporations, as required by the Fourth Council Directive (78/660/EEC of 25 July 1978).

The BACH database was set up to allow for inter-country comparisons. It is a useful tool to analyse the structure and performances of non-financial companies across the selected countries, extracting the statistical records from national bodies which collect annual account data.

In detail, the BACH database provides harmonised annual accounts statistics for:

- nine European countries (Austria, Belgium, France, Germany, Italy, the Netherlands, Poland, Portugal and Spain);
- at least 10 financial years (from 2000 onwards);
- the 95 major harmonised items of the balance sheet (expressed in percentage of the balance sheet total), of the profit and loss account (expressed in percentage of the turnover) and of the notes in the financial statements;
- 28 financial ratios (quartiles and weighted averages);
- the business sectors corresponding to the NACE Rev. 2<sup>31</sup> broken down into divisions (two digits);

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<sup>31</sup> The NACE code system is the European standard for industry classifications and was introduced in 1970. NACE Rev. 2 is the current revised version of NACE.



- three firm size types (defined according to the firms' turnover);
- either a variable sample (as many companies' accounts as possible each year) or a sliding sample over two years (the same companies' accounts over the two years).

Therefore, this unique database allows us to empirically analyse indicators of creditworthiness for companies of different sizes across major European countries.

## 1.2 General limitations of BACH

The BACH database is the most important available source for our empirical analysis. Nevertheless, it has limitations regarding the quality and the quantity of the information guaranteed by data providers.

The main limitation of the database is that it contains not individual but aggregated<sup>32</sup> financial statements data because of confidentiality issues. Given this, a linkage of the financial account data with default and/or rating data on an obligor basis is not present.

Since the main aim of the BACH project has been the harmonisation of statistical data among European countries, a certain degree of harmonisation could be reached. However, limitations remain because of differences across countries. These can be classified into the following three areas:

- institutional differences;
- differences in accounting rules;
- differences in the sample composition.

### ***Institutional differences***

The countries providing data to BACH have different reasons for collecting data and rely on mostly different sources from which they draw their sample.

Data providers for BACH come from a variety of public institutions, predominately Central Balance Sheet Data Offices at central banks (or closely linked institutions), or at National

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<sup>32</sup> In quartiles and weighted averages.

Statistical Institutes. Their tasks and reasons are mostly different. Their reasons for collecting data of non-financial firms include the following:

- In Spain and Germany the motivation for data collection is to analyse and monitor their economies.
- In Austria, Germany and France, central banks collect information for the assessment of collateral in refinancing transactions with the European System of Central Banks.
- In Belgium, the commercial register is located in the central bank and allows the use of information from this data source.
- In Portugal, the central bank is required by law to gather data for the total number of non-financial companies by means of an electronic data collection system which was launched in 2005.
- The Netherlands collects consolidated data on large groups and includes just their activity and a large number of individual statements of small firms from the tax authority.
- The Cerved<sup>33</sup> group in Italy mainly develops statistical models which are applied in Italian banks in exchange for financial statement data from them.

### ***Differences in accounting rules***

The common basis for accounting rules in all BACH member countries is the Fourth Council Directive (78/660/EEC of 25 July 1978). Differences across countries still exist that limit the BACH providers' efforts to create a fully harmonised database. In order to mitigate these constraints, the Working Group (WG) on BACH started a permanent process to study these differences across countries and to work out recommendations how to use and to interpret BACH data. In particular the WG on BACH has created transition tables for each country which allow for a mapping of the national formats/taxonomies into a common BACH format.

Specifically, the differences across countries are mainly due to

- the valuation of certain assets;
- the practice of assigning extraordinary items which can create distortions of profitability ratios such as EBIT or NOP.<sup>34</sup>

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<sup>33</sup> Recognised as an external credit assessment institution.

<sup>34</sup> Earnings before interest and tax; net operating profit.

Generally, some countries, such as Germany and Austria, have an approach which adheres to the principle of historical costs or the lower cost of market. Others, such as Spain and Portugal, apply valuation rules which are more in line with IFRS. In between are countries such as France and Italy which adopt some selective rules of IFRS in their national GAAP.<sup>35</sup> These differences in the valuation practice have a strong impact on ratio values by country. It is therefore strongly recommended not to compare just the static ratio values by country but rather to make trend comparisons.

### ***Differences in the sample composition***

Some countries have a favourable legal position to enforce the collection of the total company population (Belgium, Portugal). These countries' samples include almost the total population (Belgium, Portugal) or a very high share of it (France). Other countries, however, have limited access to data sources to obtain a representative sample with reasonable coverage. In some countries it is even necessary to merge different data sources to obtain a certain level of coverage in some sectors. Moreover, the fluctuation from one year to the next is relatively high in selected countries. One technique to exclude or dampen the effect from sample selection is the use of a cylindered sample, which is a panel of exactly the same firms used for two consecutive years. This technique is very useful to get a better interpretation of data for samples with this characteristic.

## **1.3 Limitations of the use of BACH for an analysis of SMEs**

To the best of our knowledge, the BACH is one of the very few databases which allows a cross-country time-series analysis of financial accounts data for large, medium and small European countries.

Nevertheless, the representation of SMEs in the BACH sample is limited since only corporations or partnerships having the characteristics of a corporation are included in the BACH sample. Typically, small firms organised in the form of (unregistered) sole proprietorships are therefore not included in the sample.

Finally, the distinction between small, medium and large companies in the BACH database is solely based on net turnover. Specifically, firms with an annual net turnover lower than

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<sup>35</sup> Generally accepted accounting principles.

EUR 10 million are considered as small, entities with a turnover between EUR 10 million and EUR 50 million are classified as medium, and firms with a turnover of more than EUR 50 million are regarded as large. A composite size classification by turnover, assets and number of employees has not yet been considered.

Our empirical investigations thus have to rely on the approximation of the different size classes based on the turnover alone.

## **2. Empirical analysis**

The following analysis tries to evaluate the impact of the size of the company on its creditworthiness. We have based our study on the BACH database, which includes some details about the balance sheet and the income statement of the companies. Additionally, this information can be aggregated and segmented in two main subcategories, the companies with turnovers less than EUR 50 million and the rest.

In the analysis some credit risk drivers are defined as ratios of the balance sheets and income statements. Additionally, the trend of these ratios has been studied. Furthermore, we have developed Altman's Z-score ratios.

The main conclusion is that there is not enough empirical evidence to support the assumption that the creditworthiness of smaller companies is better than for larger ones; in fact the graphical analysis suggests just the opposite.

### **2.1 Graphical analysis**

According to the BACH dataset definitions, the balance sheet figures are given as a percentage of the total assets (weighted average); the income statement and the notes figures are given as a percentage of net turnovers. We can create a different aggregation by using those figures. For example, if we want to calculate the 'cash at credit institution and in hand' value for all the countries, we have to multiply the figure assigned to each country by its total assets; then we can add up all the resulting values and divide that by the sum of all total assets.<sup>36</sup> As a result, the original information and the analysis derived from it are not detailed enough to do robust statistical analyses; but the graphical approximation could help

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<sup>36</sup> When using this procedure it is necessary to ask for the BACH maintenance department to verify that the procedure keeps the property and the content of the information.

us to reject some hypotheses. Additionally, it is important to highlight that the conclusions obtained in this analysis are applicable only to the BACH companies.

In order to evaluate the risk level of each subgroup of entities, we have analysed five different ratios:

- the credit institution leverage ratio, defined as (credit institution debt/capital and reserves); this has been approximated as  $(F2+I2)/L$ ,<sup>37</sup>
- the liquidity ratio, represented as the cash over total assets ratio  $(D.4/AE)$ ;
- the operating working capital ratio  $((D1+D2.1-F3-F4-I4)/1)$ ;
- the profitability ratio represented as the earnings over assets  $(EBITDA/Total\ Assets)$ , roughly calculated as  $(U/AE)$ ; the activity has been approximated as  $1/AE$  (net turnover/total assets);
- the coverage ratio, calculated as  $EBITDA/interest\ expenses\ (U/13)$  and  $EBIT/interest\ expenses\ (V/13)$ .

Additionally, as a measure of dependence of companies on the credit institutions, we have calculated the credit institution debt over total debt ratio  $(F2+I2)/(F+I)$ .

We have compared the trend of the weighted average of these ratios with companies with net turnovers higher than EUR 50 million, as well as the remaining companies.

The data samples are not significantly large before 2001; therefore the analysis is focused only on years after 2001. The following graphs show the results obtained using the sliding sample.

## CREDIT INSTITUTION LEVERAGE RATIO

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<sup>37</sup> The definition of the codes is included at the end of Annex 3.

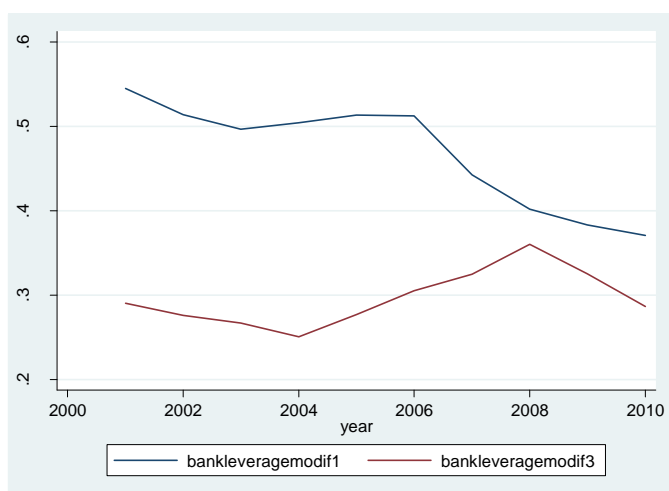


Figure 18:  $(F2+I2)/L$  (Amounts owed to credit institutions)/Capital and reserves.

As can be seen, the smaller companies (blue trend line) have a higher credit institution debt leverage ratio than larger firms (red trend line). Although the graph shows a reduction in the gap for recent years, it is not clear why the credit institution debt leverage ratio has reduced in value for the smaller companies. Specific analysis on this is explained later. In terms of total debt, the ratio shows the result in Figure 19.

## CREDIT INSTITUTION DEBT RATIO

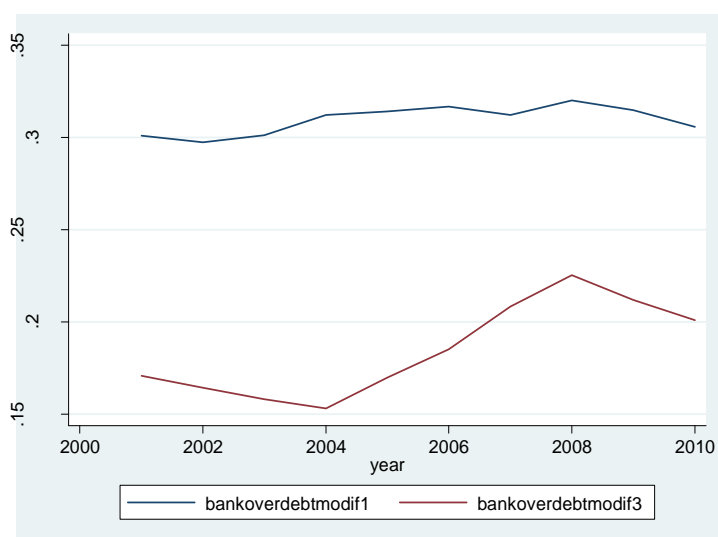


Figure 19:  $(F2+I2)/(F+I)$  (Amounts owed to credit institutions)/Total creditors.

The graph shows that the smaller companies have a higher dependence on the credit institution funding than do the larger ones.

It is very important to highlight the fact that usually larger companies are in a better position to have a higher number of trade creditors, normally from smaller companies. Figure 20 shows the ratio of what we have called 'trade credit loan', i.e. the ratio of the net trade position (trade debtors minus trade creditors) in terms of total assets.

## TRADE CREDIT

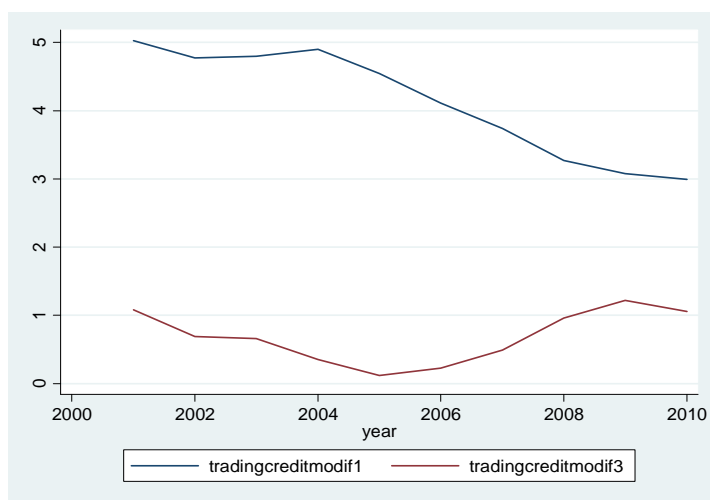


Figure 20: (D.2.1–F.4)/AE (Trade debtors–Trade creditors)/Total assets.

Smaller companies are 'obliged' to give a higher amount of trade credit; in fact it doubles the larger company's ratio. Additionally, smaller companies have decreased their capacity to give these loans to other companies. The random sample shows the same behaviour.



Figure 21: (D.2.1–F.4)/AE (Trade debtors–Trade creditors)/Total assets.

## LIQUIDITY

### Cash/total asset

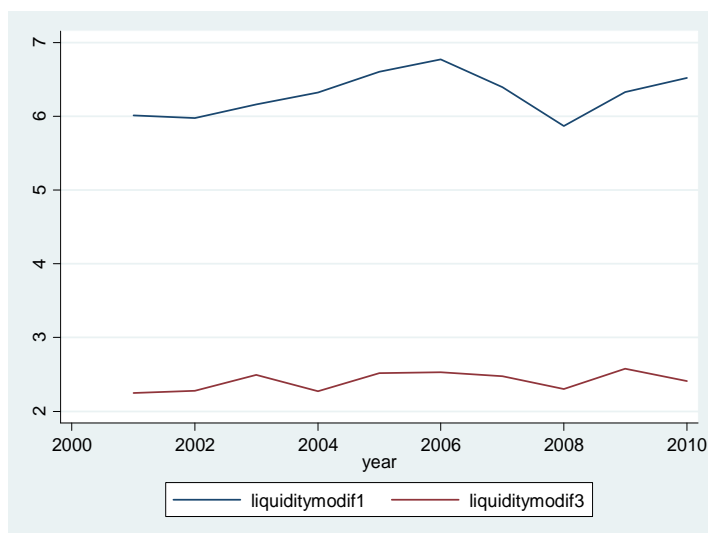


Figure 22: D.4/AE Cash/Total assets.

The liquidity ratio represents the percentage of cash. The ratio looks stable since 2000, but it is higher for smaller companies. For smaller companies, cash represents more than 6% of all the assets, but for the larger companies the ratio is always below 4%.

### Operating working capital ratio

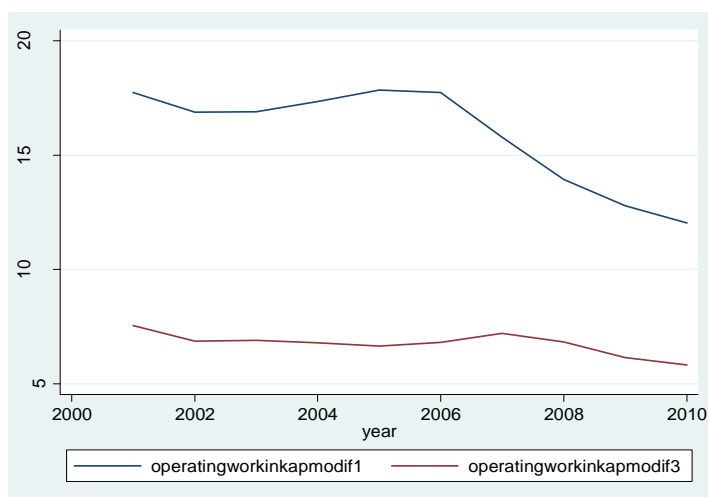


Figure 23:  $(D1 + D2.1 - F3 - F4 - I4)/1$  (stocks + trade debtors – payments on accounts – trade creditors – debenture loans)/net turnover.



As can be seen, usually smaller companies have a higher ratio than the larger ones; in fact the difference is close to 50%. This capacity has been reduced in recent years.

In fact, the two previous ratios show the pressure that the larger companies can put on the smaller ones, generating a distortion in the liquidity ratio. Since liquidity is very expensive and larger companies can obtain 'trade credit' more easily than the smaller ones, they can use their better negotiating position to pass the liquidity costs to the smaller companies. The ability to obtain more liquid positions has been reduced in the recent years.

## PROFITABILITY

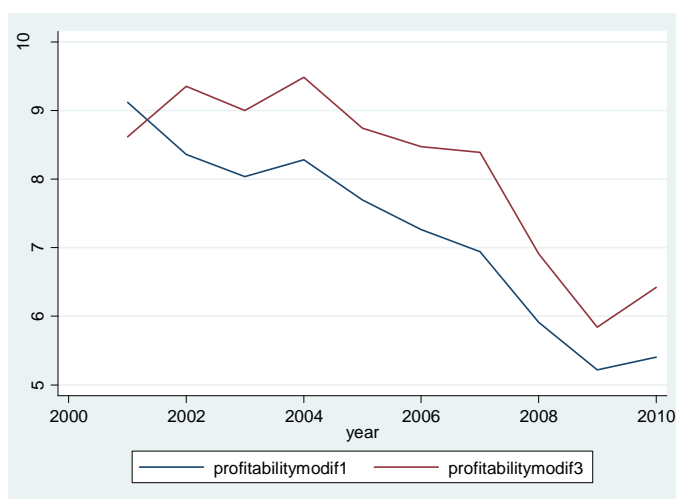


Figure 24: (U/AE) Gross operating profit/Total assets.

The value represents the EBITDA over total assets. This ratio has collapsed for all companies during the period under analysis but the reduction is more dramatic for smaller companies. Additionally, the value is lower for smaller companies since 2002.

## ACTIVITY

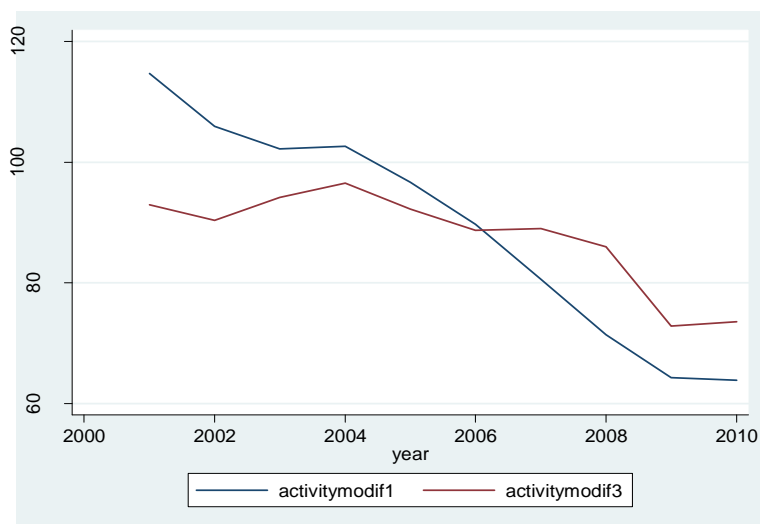


Figure 25: (1/AE) Net turnover/Total assets.

The ratio is defined as net turnover over total assets. According to the graph, this ratio is declining in value in a different way for small and large companies. For the smaller companies, the ratio declines from 114% in 2000 to 63% in 2010. This represents a reduction of about 45% of their activity. On the other hand, for larger companies, the ratio is relatively more stable, which declines from 92% to 73%, with a 20% of reduction.

## COVERAGE

### EBITDA/interest expenses

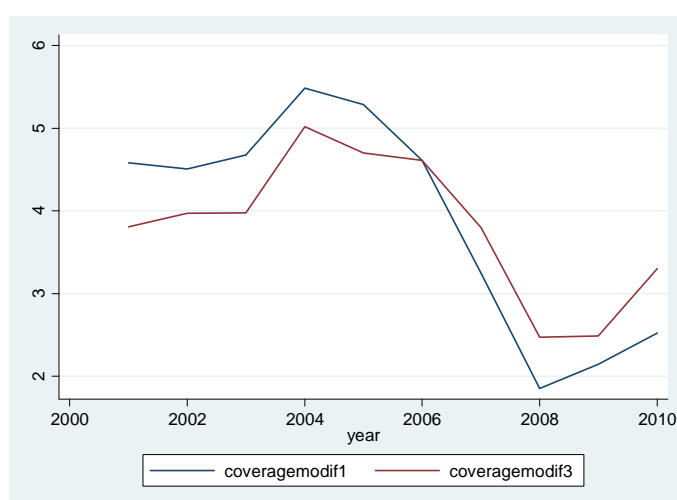


Figure 26: (U/13) Gross operating profit/Interest and similar charges

## EBIT/interest expenses

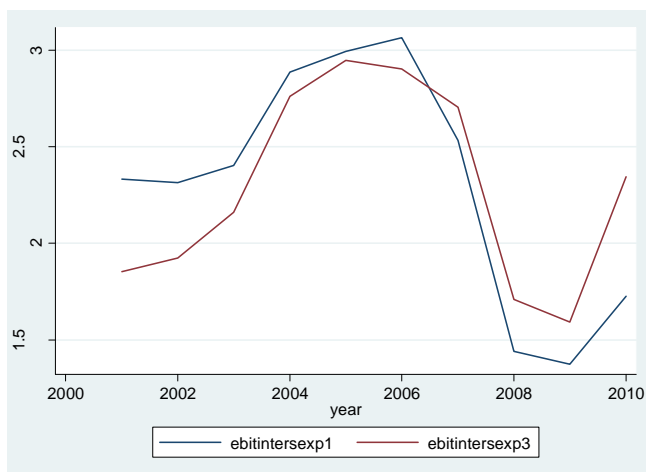


Figure 27: (V/13) Net operating profit/Interest and similar charges.

Both ratios have fallen drastically from 2006 for all companies, but smaller companies have suffered more than the larger ones.

## 2.2 Leverage ratio-specific analysis

The classic short-term leverage is defined as short-term debt (under one year) over the total capital and reserves, or (F/L). The result for the companies is seen in Figure 28:

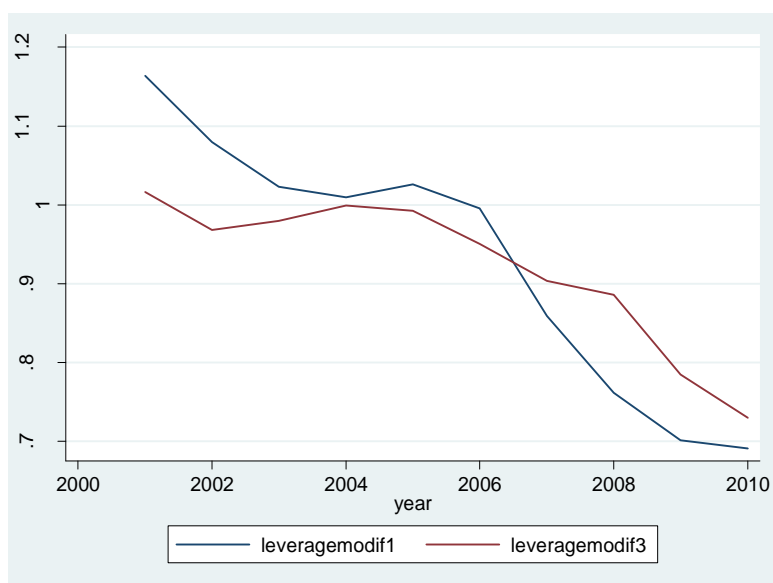


Figure 28: (F/L) Short-term debt/Total capital and reserves.

It looks as if all companies have been deleveraging since 2001, and this is very counterintuitive because the private sector has been leveraging since then. In order to understand the behaviour better, we have decomposed the total liabilities into four different values:

- short-term liabilities (F);
- long-term liabilities (I);
- capital (L);
- other liabilities (J+K).

The evolutions of the ratios are shown in the following graphs.

For smaller companies, Figure 29 shows that the companies have been changing their short-term liabilities from 2001, basically increasing the capital categories.

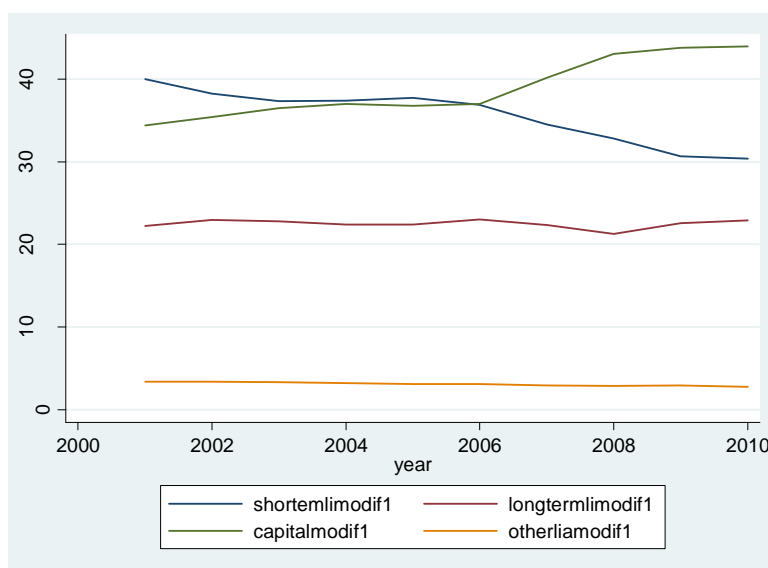


Figure 29

In the following graphs we represent the same ratios for the larger companies. The results are different in three aspects:

1. Other liabilities represent a higher percentage of the funds.
2. The long-term liabilities have increased their weight.
3. The capital category has not relatively increased its weight.

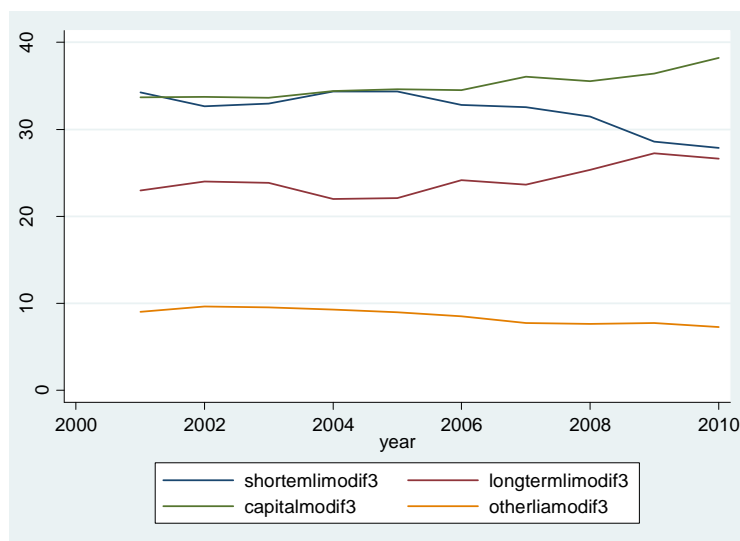


Figure 30

Finally, in order to evaluate the credit institution debt behaviour we have defined the following ratios:

- total credit institution liabilities =  $(F2+I2)$ ;
- short term non-credit institution liabilities =  $(F-F2)$ ;
- long term non credit institution liabilities =  $(I-I2)$ ;
- capital =  $L$ ;
- other liabilities  $(J+K)$ .

With these ratios we can analyse the weight of the credit institution debt in the total liabilities.

For the smaller companies the results are as in Figure 31:

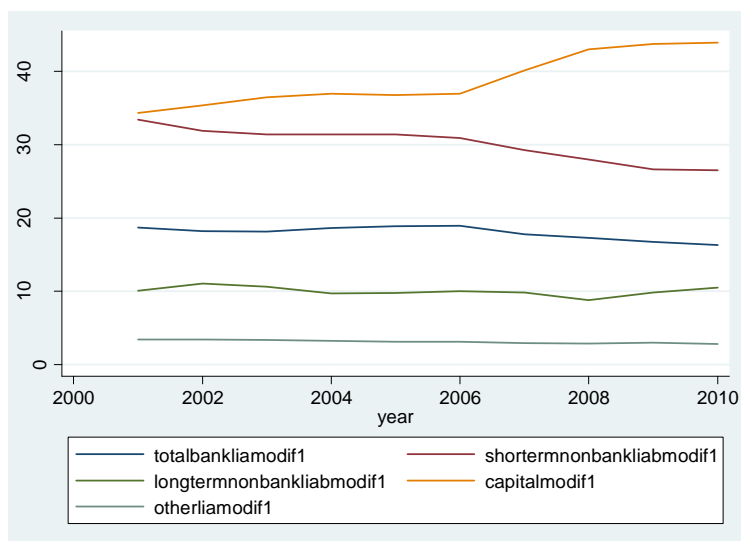


Figure 31

Since 2000, the ratio of total credit institution liabilities as percentage of total liabilities shows a stable behaviour. The capital has increased its weight in total liabilities, reducing the short-term non-credit institutions' weight.

For the larger companies the results are as in Figure 32:

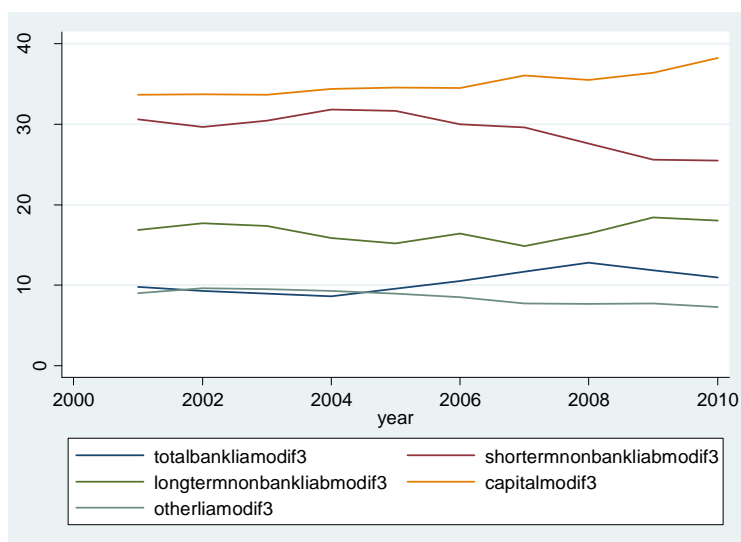


Figure 32

The first difference is that the total credit institution liabilities represent only 10% of all the liabilities, or just about half of the smaller companies' liabilities. Additionally the weight of the other liabilities is much lower for the smaller companies. Finally, the relative weights show the same behaviour as in the smaller companies.

This behaviour is equal for all the sizes, as can be seen in the graphs. The only difference are that the lower the size of the company, the bigger the capital<sup>38</sup>. And, similarly, the larger companies have a greater percentage of other liabilities and long-term non-credit institution liabilities than the smaller companies.

In conclusion, the increase in the capital categories for all the companies has induced the 'deleveraging effect'. Additionally, the smaller companies show a high dependence on the credit institutions' funding. It is very important to highlight that this result is biased by the fact that only the 'survival' companies are included in the database, such that the graph shows basically the change in the liabilities composition on those companies that have survived the year before.

### **2.3 The Altman Z-score: further analysis**

Finally we present five ratios which can be estimated out of the BACH database and cover the categories which are, according to studies based on the Altman Z-score, the most crucial ones for measuring the creditworthiness of corporates.

In 1968, Edward Altman developed the Z-score, which aims to select, based upon a statistical model, a profile of economic and financial ratios which predict best the defaults for a sample of 66 firms for a time period of 20 years. The 22 ratios investigated, which later have been reduced through a statistical selection process to five, can be classified into the following categories: liquidity, leverage, profitability, activity and coverage.

On the basis of this work Altman and Sabato (2006) investigated a new set of indicators for US firms with annual sales less than \$65m for the time period 1994–2002.

We reproduced the final ratios of Altman and Sabato (2006) from the BACH database and substituted the ones which could not be reproduced for lack of data with similar ratios out of the same category. The definitions of the ratios according to the BACH database are:

Liquidity:                      Cash/Total assets

Leverage:                      Short-term debt/Total capital

Profitability:                      Gross operating profit/Total assets

---

<sup>38</sup> An interpretation of these results may be that smaller companies may have suffer higher credit restrictions and are required to hold more capital in order to access credit.

Activity: Net turnover/Total assets

Coverage: EBITA/Interest expense

As shown in Figure 33 and 34, companies with sales below EUR 50 million reach a significantly better result for the liquidity ratio than companies with sales above EUR 50 million. Nevertheless, as explained above, this is not always a good sign for the creditworthiness of companies because it represents higher costs.

In all other categories the larger companies achieve better results than the smaller firms for both years.

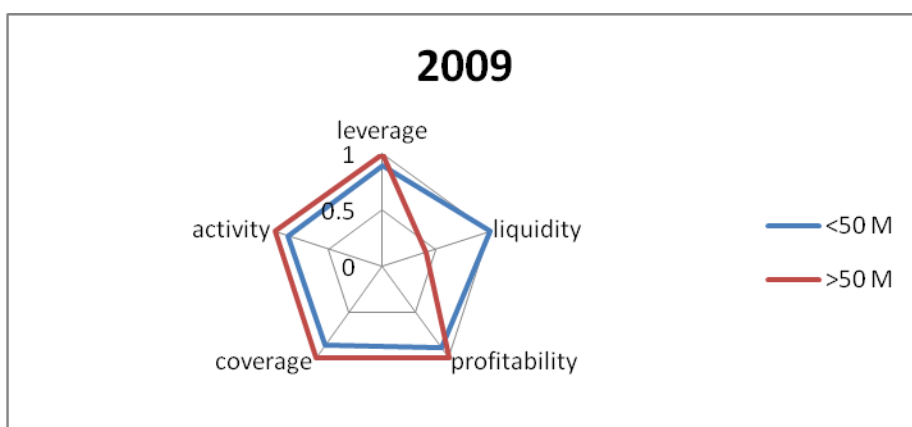


Figure 33

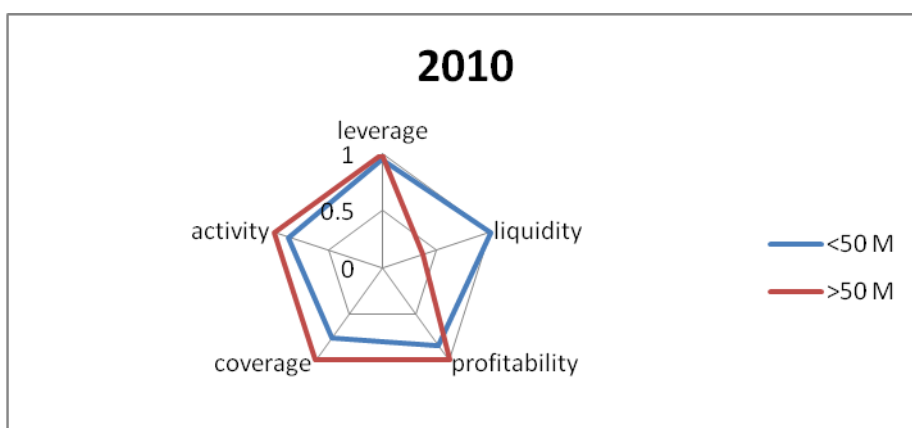


Figure 34

### 3. Conclusion

In the presented analysis, an investigation of the creditworthiness of companies depending on their size (sales above or below EUR 50 million), using different ratios of balance sheet items and the profit and loss account, has been undertaken.



Since the available data are not detailed enough to perform a proper statistical analysis, a graphical approach has been chosen to evaluate the creditworthiness of the companies considering the following indicators:

- credit institution leverage ratio;
- credit institution debt ratio;
- trade credit;
- cash/total asset;
- operating working capital ratio;
- profitability;
- activity;
- EBITDA/interest expenses;
- EBIT/interest expenses;
- leverage.

Furthermore, according to the Altman Z-score, an updated set of indicators has been selected to provide a direct comparison of the creditworthiness of the companies for the years 2009 and 2010.

The BACH database has been used for this analysis; it provides 95 major harmonised items of the balance sheet and the profit and loss accounts for nine European countries of at least 10 financial years. Nevertheless, there are caveats to consider when using the BACH database, especially in relation to differences in the accounting rules and the sample size (coverage). Additionally, a further major drawback of the sample composition should be mentioned: only the firms which have existed in both the observed and the previous year are included, because of the sample selection possibilities of the BACH database. Therefore, firms which actually defaulted may not be included in the data, or an improvement of a certain ratio could be due to the default of companies which had poor values.

As an overall conclusion, there is not enough empirical evidence to support the assumption that the creditworthiness of the smaller companies is better than that of the larger ones; in fact the graphical analysis suggests just the opposite: the larger companies' creditworthiness looks better than that of the smaller ones. It can be said that, according to the analysis described above, firms with annual sales higher than EUR 50 million tend to function better than firms with lower annual sales. Larger firms perform better against the indicators examined: leverage, profitability, activity and coverage. SMEs obtain significantly better results only for liquidity. However, this is not always a good sign of the creditworthiness of

companies because it represents higher costs. In most of the other categories larger companies tend to achieve better results than SMEs.

Table 7 shows figures of the main results from the empirical study.

Table 7

1) Credit institutions' leverage ratio

-----		
		sizemodif
year		1 3
-----+-----		
2001		.5450867
		.2902468
2002		.5137507
		.2761262
2003		.4965256
		.2668006
2004		.5043807
		.2505184
2005		.5135869
		.2769782
2006		.5125657
		.3053039
2007		.4424587
		.3248071
2008		.4020111
		.3602766
2009		.3833579
		.3250514
2010		.3709039
		.2865823

---

2) Credit institution debt ratio

---

	sizemodif	
year	1	3
<hr/>		
2001	.3010755	
		.1708473
2002	.2974	
		.1643742
2003	.3012683	
		.1580569
2004	.3123128	
		.1529105
2005	.3142293	
		.1697359
2006	.3167397	
		.185041
2007	.3123547	
		.2082848
2008	.3200429	
		.2252778
2009	.3147817	
		.2119356
2010	.3056928	
		.2009408

---

3) Liquidity ratio

-----		
		sizemodif
year	1	3
-----+-----		
2001	6.012123	
		2.246674
2002	5.979647	
		2.280279
2003	6.163697	
		2.493921
2004	6.328319	
		2.270564
2005	6.609165	
		2.515778
2006	6.772443	
		2.52978
2007	6.399115	
		2.475055
2008	5.869111	
		2.303769
2009	6.329039	
		2.578216
2010	6.524598	
		2.411527
-----		

#### 4) Profitability ratio

-----		
		sizemodif
year	1	3
-----+-----		
2001	9.123374	

		8.62054
2002		8.362175
		9.358163
2003		8.039972
		9.00496
2004		8.28503
		9.48535
2005		7.695975
		8.744597
2006		7.26579
		8.473671
2007		6.944756
		8.389465
2008		5.911981
		6.916115
2009		5.219963
		5.840587
2010		5.403416
		6.423296
-----		

5) Coverage ratio

-----		
		sizemodif
year		1 3
-----+-----		
2001		4.582374
		3.807673
2002		4.505313
		3.973714

2003		4.676523
		3.975726
2004		5.483851
		5.017676
2005		5.289322
		4.699631
2006		4.61272
		4.611081
2007		3.247912
		3.795582
2008		1.854006
		2.471746
2009		2.142389
		2.485837
2010		2.524273
		3.303662

6) Activity ratio

		sizemodif	
year		1	3
2001		114.7184	
		92.93633	
2002		105.9308	
		90.32851	
2003		102.1891	
		94.18388	
2004		102.61	
		96.56184	

2005   96.70281
92.20924
2006   89.69682
88.72499
2007   80.5843
89.0013
2008   71.39699
85.99651
2009   64.31416
72.83205
2010   63.84365
73.52534

-----

7) Leverage ratio

	sizemodif
year	1 3

-----+-----

2001   1.163824
1.016361
2002   1.079557
.9681236
2003   1.022908
.9795095
2004   1.009512
.9992265
2005   1.025905
.9928184
2006   .9957975

		.9505471
2007		.859405
		.9035155
2008		.7613889
		.8857161
2009		.7012485
		.7849572
2010		.6912554
		.7298133

---



## BACH INFORMATION

### BACH: definition of names and codes of variables

#### 1. Absolute figures

Tass: Total Assets (€ thousand)  
 Turn: Turnover (€ thousand)  
 Vadd: Value Added (€ thousand)  
 Entpr: Number of Enterprises  
 Empl: Employment

#### 2. The balance sheet (given as a percentage of total assets – weighted average)

Code	BALANCE SHEET - ASSETS	Code	BALANCE SHEET - LIABILITIES
A.	Subscribed capital unpaid	F.	Creditors : amounts becoming due and payable within one year
C.	Fixed assets	F.2	Amounts owed to credit institutions
C.1	Intangible fixed assets	F.3	Payments received on accounts of orders
C.1.1	Formation (preliminary) expenses	F.4	Trade creditors
C.1.5*	Other intangible fixed assets	F.10*	Other creditors
C.2	Tangible fixed assets	F.101*	Other financial creditors
C.2.1	Land and buildings	F.102*	Other non financial creditors
C.2.2	Plant and machinery	I.	Creditors : amount becoming due and payable after more than one year
C.2.3	Other fixtures	I.1	Debenture loans
C.2.4	Payments on account and assets in construction	I.2	Amounts owed to credit institutions
C.3	Financial fixed assets	I.4	Trade creditors
C.3.1/3	Shares in affiliated companies and participating interests	I.10*	Other creditors
C.3.8*	Other financial fixed assets	I.101*	Other financial creditors
D.	Current assets	I.102*	Other non financial creditors
D.1	Stocks	J.	Provisions for liabilities and charges
D.1.1	Raw materials and consumables	J.1*	Provisions for pensions and similar obligations
D.1.4	Payments on account	J.4*	Other provisions
D.1.5*	Other stocks	K.	Accruals and deferred income
D.2	Debtors	L.	Capital and reserves
D.2.1	Trade debtors	L.1	Subscribed capital
D.2.7*	Other debtors	L.2	Share premium account
D.3	Current investments	L.3	Revaluation reserve
D.4	Cash at bank and in hand	L.4	Reserves
E.	Prepayments and accrued income	L.5	Profit or loss brought forward
AE.*	Total assets	L.6	Profit or loss for the financial year
		FL*	Total liabilities

#### 3. The income statement and the notes (given as a percentage of net turnover – weighted average)

Code	PROFIT AND LOSS ACCOUNT		INFORMATION ON THE NOTES
1.	Net turnover		– Statement of investment –
2.	Variation in stocks of finished goods and work in progress	251.*	Acquisitions of intangible fixed assets
3.	Capitalised production	252.*	Sales and disposals of intangible fixed assets
4.	Other operating income	253.*	Acquisitions - sales and disposals
5.*	Total operating income	261.*	Acquisitions of tangible fixed assets
5.	Cost of materials and consumables	262.*	Sales and disposals of tangible fixed assets
5.a	Raw materials and consumables	263.*	Acquisitions - sales and disposals
5.b	Other external charges	271.*	Acquisitions of financial fixed assets
8.	Other operating charges and taxes	272.*	Sales and disposals of financial fixed assets
T.*	Added value BACH (S - 5 - 8)	273.*	Acquisitions - sales and disposals
6.	Staff costs		– Statement of depreciation –
6.a	Wages and salaries	28.*	Accumulated depreciation on intangible assets
6.b	Social security costs	29.*	Accumulated depreciation on tangible assets
U.*	Gross operating profit (T - 6)	30.*	Accumulated depreciation on financial assets
7.	Value adjustments on non financial assets	311.*	Distribution of profit for the current year
7.a	Depreciation on intangible and tangible fixed assets	312.*	Distribution of profit for the previous year
7.c	Other value adjustments and provisions		
V.*	Net operating profit (U - 7)		
9/11	Financial income		
12.	Value adjustments on financial assets		
13.	Interest and similar charges		
13.a*	Interest paid on financial debts		
13.b*	Other financial charges		
W.*	Financial income net of charges		
X.*	Profit or loss on ordinary activities before taxes		
16.	Extraordinary income		
17.	Extraordinary charges		
Y.	Taxes on profits		
21.	Profit or loss for the financial year		

\* Item not in conformity with the fourth European directive.

## Annex 4

### EBA stress test exercise

Comparison of probability of default (PD) on different asset classes

PIT PD – point-in-time probability of default (reflects current probabilities of default)

PD – regulatory PD (assesses the PD over the PD cycle)

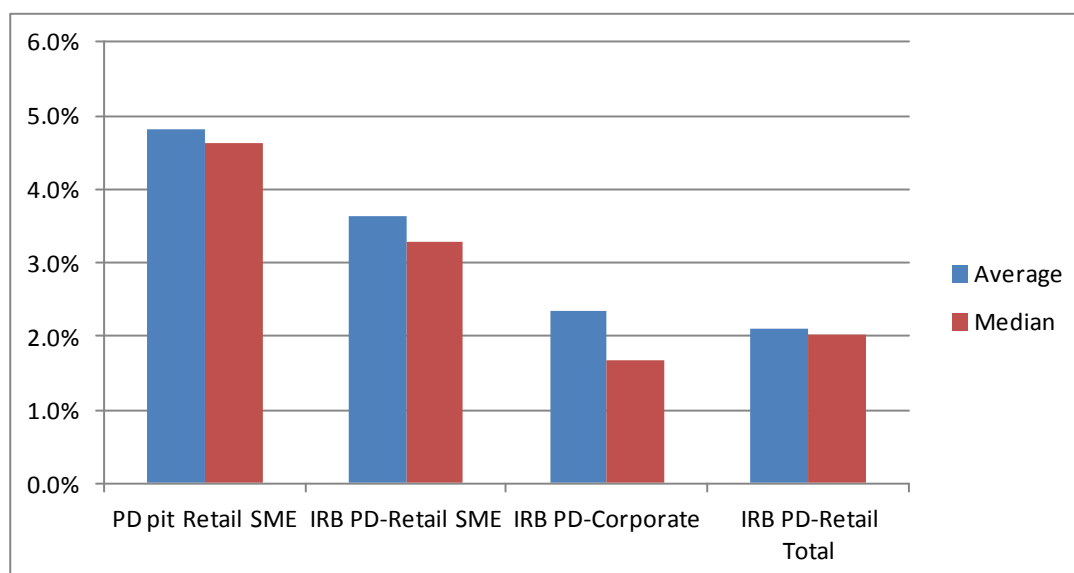


Figure 35

Table 8

Asset Class	PD pit Retail SME	IRB PD-Retail SME	IRB PD-Corporate	IRB PD-Retail Total
Average	4.8%	3.63%	2.34%	2.11%
Min	0.2%	0.00%	0.56%	0.00%
25% percentile	2.9%	2.23%	1.19%	1.11%
Median	4.6%	3.29%	1.68%	2.02%
75% percentile	6.5%	4.79%	3.09%	2.92%
Max	10.8%	9.92%	8.55%	6.02%
N	76	44	58	49

## Annex 5

### Capital curves (risk weights) in the advanced internal rating approach

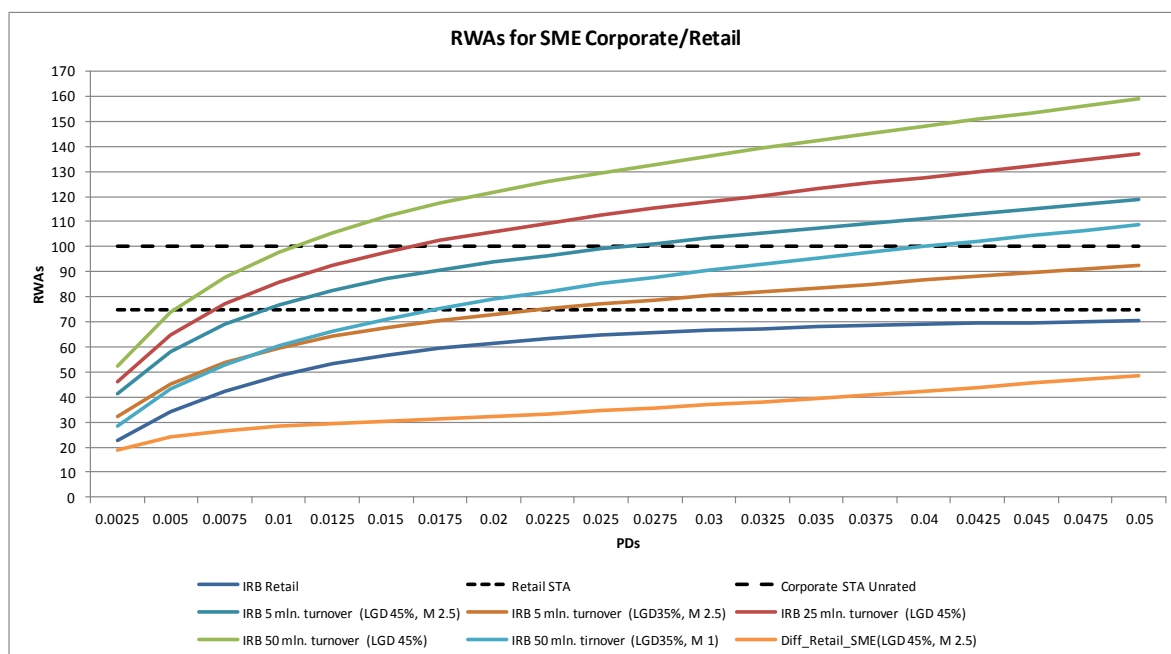


Figure 36

## Annex 6

### Literature review on SME riskiness

This annex summarises several studies on SMEs which use different databases.

*Corporate Investment and Bank-Dependent Borrowers during the Recent Financial Crisis* by Andra Buca and Philip Vermeulen (2012), European Central Bank

The aim of this study is to investigate the role of bank credit as explanation for the collapse in corporate investment during the financial crisis. The underlying hypothesis is that in 2009 problems in the banking sector caused a supply-sided credit crunch and therefore companies depending on bank credit had to cut investments more than others that had different financing possibilities. In detail, the study aims at measuring the effect of the crisis for the different credit channels, or, more precisely, the relation of the downturn of investment to the ratio of bank debt to total financial leverage.

The observed time period is 2000–2009. A distinction is made between boom years, downturn years and 2009, the year of the investment collapse. Furthermore, the effects of the size of the companies and the home country (North vs South) are taken into account. The database comprises BACH data from six countries (Germany, France, Italy, Spain, Belgium and Portugal).

The results of the econometric model tested in this study made the following conclusions:

- Firms that entered 2009 with higher bank debt leverage reduced investment substantially more than firms that entered with lower bank debt leverage.
- The same level of bank dependence led to larger reductions in investment in 2009 than in boom years and normal recessions.
- Bank debt outside the 2009 crisis had little or no effect.
- Total leverage (total debt excluding trade debt) has no independent effect; the amount of bank debt is the important driver.<sup>39</sup>

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<sup>39</sup> In other words, a company which has a high amount of total leverage in relation to the total assets but whose bank debt accounts only for a small part of the total leverage is expected to have a lower decrease of investment than a company with the same amount of total leverage in relation to total assets but a higher amount of bank debt on the total leverage.

- The effects are much more pronounced for small and medium-sized firms and for the south of Europe, as these firms are more bank dependent.

*Credit Risk versus Capital Requirements under Basel II: Are SME Loans and Retail Credit Really Different?* by Tor Jacobson, Jesper Lindé and Kasper Roszbach (2005)

This work is one of the few studies that take the hypotheses about properties of SME and retail credit and test it by empirical analysis. The authors employ data from two Swedish banks' business loan portfolios to investigate the assumption that SME and retail loan portfolios display smaller (unexpected) loss rates than corporate loan portfolios owing to a lesser dependence on systematic risk factors.

To this end, a nonparametric Monte-Carlo resampling method is applied to two banks' complete loan portfolios. By exploiting the fact that a sub-sample of all borrowers has been assigned an internal rating by both banks, the authors can compare the credit loss distributions for the three credit types, and compute both economic and regulatory capital.

The results indicate that there is no evidence that SME loan portfolios are consistently less risky or require less economic capital than corporate loan portfolios. In contrast, the findings show that SME portfolios are usually riskier than corporate credit. Consequently, the special treatment of SMEs under Basel II is not justified. The authors argue, however, that their findings are dependent on the particular SME definition chosen, bank specific, and likely to be sensitive to the size of the portfolio.

*An Assessment of Capital Requirements under Basel II: The Portuguese Case* by Paula Antão and Ana Lacerda (2008), Banco de Portugal

The aims of this study are twofold: on the one hand an impact assessment of the Basel II rules on capital requirements driven by credit risk under consideration of credit classes (retail vs corporate) is carried out; on the other hand the authors investigate differences in PD for firms depending on the exposure size. For both analyses only the IRB approach is taken into account.

The database of this study is the Credit Register dataset managed by the Banco de Portugal, which provides monthly data by credit institutions of all loans granted to non-financial

corporations and credit lines with an outstanding balance higher than EUR 50. Additionally, information on annual sales of companies is obtained from the Central Balance Sheet Database.

The impact assessment shows that the change in the capital requirement from Basel I to Basel II (i.e. higher/lower capital requirement for Basel II) for the corporate class depends highly on the values assumed for the parameters PD and LGD. This does not hold, however, if the credit is categorized as retail. In fact, for values of commonly accepted PD and LGD, banks obtain smaller capital requirements under Basel II than under Basel I. Further, among all credit classes, retail is the one for which capital requirements are the least sensitive to changes in the PD.

The evaluation of default rates yields the following results. Different default rates are observed across sectors (the highest default rates are found in the construction sector). Further default rates depend on the firms' exposure sizes. The authors find that default rates increase non-monotonically with the exposure size for exposures smaller than EUR 10 million and decrease significantly for exposures larger than EUR 10 million.

Antão and Lacerda conclude that among the SMEs, which are defined as firms with turnover below EUR 50 million per year, those which are allocated to the retail class have the lowest capital requirements, even though their default rate is comparably high.

## **Summary and conclusion**

The major statements of these studies can be summarised as:

- On average SMEs are riskier than larger businesses.
- Default rates tend to decrease on average with the firm's size.
- SMEs are more affected by a financial sector credit crunch.
- For the exposures studied, a reduction in SMEs under Basel II would not be justified.

## Annex 7

### Analysis of SME portfolio riskiness: asset value correlation

In order to assess the riskiness of the SME portfolio, and therefore its capital requirements, we need to assess not only the individual riskiness of the companies included in the portfolio, but also its **asset value correlation (AVC)**. In the IRB credit risk framework, AVC captures the sensitivity of debtors in an economy-wide, non-firm-specific manner, which represents the state of health of an economy.

The theoretical role of AVC is clear cut. However, its actual calculated value is subject to a set of relevant assumptions and a high dose of model risk. In fact, since the first release of the Basel II draft framework, both banking industry and academia have tried to empirically estimate the value of AVC, reporting substantially different results. Indeed, estimating AVC is not trivial and unfortunately, there is still no ‘single right answer’.

For the aims of the present report, AVC estimation matters for two aspects:

- Regulatory vs empirical AVC value. The Basel II framework assigns pre-determined values of AVC for different asset classes.
- SMEs vs large enterprises AVC values. The Basel II framework already awards SMEs lower AVC values, assuming small firms are less sensitive to the macroeconomic cycle.

Some contributions have emphasised that ‘actual’ AVCs are lower than the regulatory ones, and on the back of these results they claim for a reduction of capital requirements.

Table 9 summarises asset correlation resulting from a variety of studies which use default data.

Table 9

Source Study	Data Source	Results
Gordy (2002)	S&P	1.5% - 12.5%
Cespedes (2000)	Moody's	10%
Hamerle <i>et al.</i> (2003a)		max of 2.3%
Hamerle <i>et al.</i> (2003b)	S&P 1982-99	0.4% - 6.04%
Frey <i>et al.</i> (2001)	UBS	2.6%, 3.8%, 9.21%
Frey & McNeil (2003)	S&P 1981 - 2000	3.4% - 6.4%
Dietsch & Petey (2004)	Coface 1994-2001	0.12% - 10.72%
	AK 1997-2001	
Jobst & de Servigny (2004)	S&P 1981-2003	intra 14.6%, inter 4.7%
Duellmann & Scheule (2003)	DB 1987 - 2000	0.5% - 6.4%
Jakubik (2006)	BF 1988 - 2003	5.7%

Source: Chernih, Vanduffel and Henrad (2006).

In what follows, we present the most relevant caveats related with the regulatory proposal of a capital requirement change based on empirical estimation

### Estimation methodology

**AVC estimates are extremely dependent on the modelling assumptions.** Indeed the assumptions used in the estimation procedure (homogeneous riskiness of debtors, long-run observation period, constant AVC for the whole period, absence of serial correlation of the common factor variable, etc.) severely affect the result.

Given all this uncertainty, from a prudential perspective, **the need for sensitivity analyses**<sup>40</sup> (i.e. number of buckets, observation period, etc.) to the different assumptions used in the correlations estimates, which is not always seen in general studies, should be emphasised. Additionally, correlation calculations need a very extensive data sample; otherwise high standard errors would provide a general caveat for this analysis. **Precision analysis is also recommended.**<sup>41</sup> This additional analysis would provide a range of possible asset correlation values, and not just a 'true correlation value'.

<sup>40</sup> 'What if' analysis, in order to measure the variability of the result depending on the different modelling assumption (for example a change in the buckets used for the calculation).

<sup>41</sup> Calculation of a confidence interval for the correlation estimate.



The **normality assumption of default events represents a major concern**. The theoretical model assumes a negligible number of high-impact events. Unfortunately, actual defaults do not usually behave as predicted in a normal distribution: high-impact events are more frequent than theoretically assumed. The use of normal distribution tends to underestimate the joint defaults probability of a pool of obligors.<sup>42</sup>

Regarding the methodology used, most studies have used ‘direct procedures’. These procedures estimate AVC implied in the observed default frequencies or market data from a pure statistical point of view (using the Maximum Likelihood procedure or the Method of Moments). Nevertheless, the Basel Committee initially calibrated AVC by using what we could call a ‘backward procedure’.<sup>43</sup> With regard to the direct procedures, the Basel backward procedure has the advantage of better capturing the reality of rare events distribution, as it does not ‘force’ the Vasicek or the normal distribution to reach the rare events or fat tails density functions.

This procedure is basically established to reach those rare or low-frequency events. This is essential from a prudential point of view as historical observed defaults rates rarely behave as a ‘normal distribution’ (Figure 37), so the direct procedure would not capture the reality of rare events distribution (Figure 38) or fat tails (Figure 39).

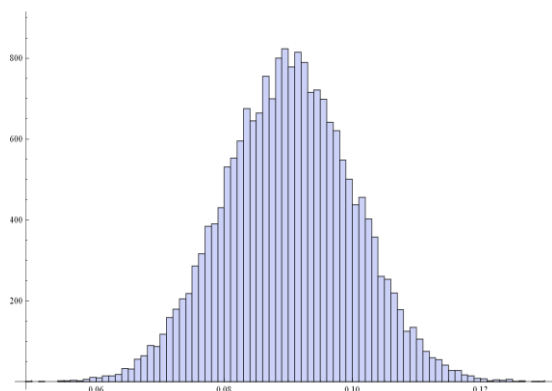


Figure 37: Normal distribution.

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<sup>42</sup> Frey R, Mc Neil A, and Nyfeler M (2001) Modelling dependent defaults: Asset correlations are not enough! University of Zurich, ETH Zurich and UBS Zurich.

<sup>43</sup> See Basel Committee on Banking Supervision (2005). An explanatory Note on the Basel II IRB Risk Weight Functions.

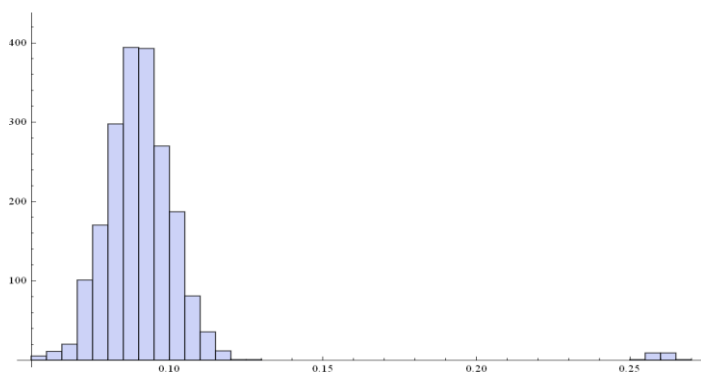


Figure 38: Distribution with rare events.

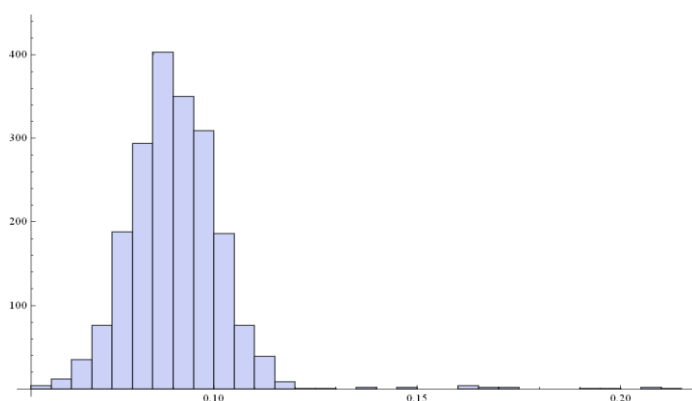


Figure 39: Distribution with fat tails.

The 'backward procedure' aims to reach the specific percentile used for the calculation of capital requirements, but it is not so focused on the body of the whole distribution. In contrast, the direct procedure is focused on the whole distribution, but the normality assumption could keep the final accumulative distribution function of the estimated default frequencies from reaching all the high percentiles. From a regulatory perspective, it would make sense to focus on the high percentiles of the distribution. Both methodologies are different and could lead to very different results for higher percentiles in the case of rare events or fat tails.

As a theoretical example, for a high PD bucket, the following figures would be the estimated correlations coefficients for two defined distributions. The first one would be a distribution with rare events, as those in which the observed default frequency is next to 26% (two times bigger than the normal average), and we have assumed that those events happened only in 1%, i.e. one in each 100 observations. The second one would be a distribution with fat tails, as those in which the observed default frequency is next to 21% (two times bigger than the

normal average) with great dispersion in its appearance probability, and we have assumed that those events happened in only 1%, i.e. once in every 100 observations.

The calculations show that in the fat tails distribution the implicit rho is 9.14%, i.e. 10 times that estimated by using the maximum likelihood (ML) procedure. In the rare event observed default frequencies the implicit rho is 3%, i.e. six times that estimated by using the ML procedure.

Table 10: Example

	Distribution with fat tails		Distribution with rare events	
Methodology	Direct procedure (maximum likelihood)	Basel backward procedure	Direct procedure (maximum likelihood)	Basel backward procedure
Correlation	0.8%	9.14%	0.5%	3%
PD	9%		9%	

Unfortunately, rare events and fat tails are commonly observed in credit risk portfolios, while we could say the 'normal distribution' is not commonly observed.

We have replicated the results obtained by the Italian industry ABI (2010) in order to have a better understanding of the methodology and its results.

ABI estimates first 99.9% of the loss distribution **assuming a gamma distribution for loss distribution**.<sup>44</sup> The value used for the expected loss (EL) is 1.33% for the bigger companies and 3.53% for the 99.9th percentile.<sup>45</sup> We have replicated their figures obtaining an implicit rho of 2.51% (next to their 2.50%); the difference should be due to the precision given in the figures of the EL and 99.9%. For the smaller companies the EL is equal to 0.94%, the 99.9th percentile is 1.65% and the implicit rho is equal to 0.65%. These results are highly

<sup>44</sup> This procedure obtains rho implicit in the observed percentile k in the closed capital risk weight function for a given PD, LGD and level of confidence. It is similar to the one used by the Basel Committee, although the latter does not assume an underlying distribution (backward procedure).

<sup>45</sup> In all cases we are using 45% for the LGD.

dependent on the use of an underlying distribution function; in this case the gamma distribution, which is not a fat-tailed distribution.

As a way to evaluate the impact of this assumption we have carried out the same procedure, but in this case using only the empirical data; **we have not assumed any underlying distribution function**. As the number of observations is very small, we have used the 85th percentile of the observed distribution. The results show a big dispersion: for the larger companies the implicit rho increases by 20% (to 3.05%) and for the smaller ones it increases by 100% (reaching 1.36%). Additionally, we have noticed that the ratio between estimators is much more variable (from 2.8 times to 1.2) than assuming any underlying distribution function.

Next, we have created **sub-samples using different timeframes** in order to evaluate the robustness of the implicit rho estimate, using again the 85th observed percentile. The following graph represents this calculation. The y-axis represents the time – when it is equal to 1 we are using the whole sample – and for the value  $t$  we have deleted the  $t - 1$  first observations. The blue line represents the larger companies and the red the smaller ones. The long-run PD is assumed to be equal to the ML estimator, and the LGD equal to 45%.

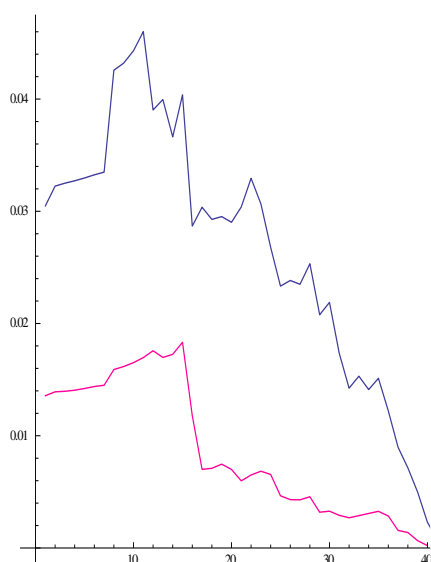


Figure 40

We can notice the high volatility embedded in the rho when using the backward procedure, which shows the difficulties in obtaining a robust estimator for this parameter.

## Business cycle dimension

Basel II is based on the widely known **ASRF model of Gordy (2003)**. In this model, default is triggered in this model if the ability-to-pay process  $Y_{i,t}$  of firm  $i$  falls below an exogenous default threshold  $\gamma_i$ .  $Y_{i,t}$  follows a Gaussian distribution, i.e. a standard normal distribution with mean 0 and variance 1. It can be decomposed into the return of a **systematic** and unobservable factor  $X_t$  and an **idiosyncratic firm-specific** part  $\varepsilon_{i,t}$ :

$$Y_{i,t} = \sqrt{\rho_i} X_t + \sqrt{1 - \rho_i} \varepsilon_{i,t}.$$

For every point in time  $t$ ,  $X_t$  and  $\varepsilon_{i,t}$  are independent for every obligor  $i$  and follow a Gaussian distribution. The factor loading  $\sqrt{\rho_i}$  of the systematic risk factor can be interpreted either as the sensitivity against systematic risk or as the square root of the asset correlation  $\rho_i$ .

Therefore, the single systematic risk factor in the ASRF model may be interpreted as reflecting the state of the global economy. The degree of the obligor's exposure to the systematic risk factor is expressed by the asset correlation. The asset correlations show how the asset of one borrower depends on the asset value of another borrower. Correlations could be described as the dependence of the asset value of a borrower on the general state of the economy; all borrowers are linked to each other by this single risk factor.

In the current framework the **Retail portfolio correlation is lower than that of the Corporate portfolio**. This implies that, for corporates, the financial conditions of larger firms are closer related to the general conditions in the economy. In contrast, in the Retail portfolio, the lower regulatory coefficients reflect the fact that retail defaults tend to be more idiosyncratic and less dependent on the economic cycle than corporate defaults. These borrowers are not strongly interlinked either. The logic of Basel II is that, even though on an absolute basis the default risk is greater for lower-quality borrowers, the financial performance of these weaker borrowers is assumed to be driven largely by idiosyncratic factors specific to the firm and is relatively less sensitive to systematic or general economic factors.

While this assumption tends to reflect the reality in periods of expansion, **in periods of recession it may not hold true**, as it is widely known that SMEs are very dependent on general economic conditions and they struggle to survive in deteriorated general economic conditions because of less geographical diversification, lower demand, late payments, etc. In

fact, during bad times, SMEs, as a whole, tend to show a much larger dependence on the general estate of the economy than bigger corporates, which can easily diversify geographically and show a greater ability to survive in a downturn. So, contrary to intuition, diversification is not effective in bad times and is even less so for SMEs than for large corporates. In fact, correlations are actually unstable over time and they tend to increase during periods of recession.

Chiosini, Marucci and Quagliariello (2011) find that, under normal cyclical fluctuations, Italian SMEs are less cyclical than larger firms. However, in times of abnormally severe recession, such as the one after the 2007–09 crisis, the PDs of all firms seem much more correlated with systemic factors.

Table 11 provides the correlations over the full sample and the pre-crisis (1999–2007) and post-crisis (2008–09) periods.

Table 11

<b>1999Q2-2009Q4</b>				
	<b>GDP (qoq)</b>	<b>GDP (yoy)</b>	<b>GAPT</b>	<b>GAPHP</b>
sales<5	-0.0341*	-0.0447*	-0.0469*	-0.0193*
5<sales<50	-0.0477*	-0.0690*	-0.0691*	-0.0424*
sales<50	-0.0313*	-0.0419*	-0.0436*	-0.0215*
sales>50	-0.0508*	-0.0716*	-0.0659*	-0.0426*
<b>1999Q2-2007Q4</b>				
	<b>GDP (qoq)</b>	<b>GDP (yoy)</b>	<b>GAPT</b>	<b>GAPHP</b>
sales<5	-0.0094*	-0.0186*	-0.0380*	-0.0040*
5<sales<50	-0.0048*	-0.0101*	0,0008	-0.0144*
sales<50	-0.0062*	-0.0136*	-0.0273*	-0.0057*
sales>50	-0,0122	-0.0172*	0,0026	-0.0189*
<b>2008Q1-2009Q4</b>				
	<b>GDP (qoq)</b>	<b>GDP (yoy)</b>	<b>GAPT</b>	<b>GAPHP</b>
sales<5	-0.0232*	-0.0318*	-0.0208*	-0.0256*
5<sales<50	-0.0143*	-0.0415*	-0.0390*	-0.0411*
sales<50	-0.0208*	-0.0327*	-0.0236*	-0.0278*
sales>50	-0,0137	-0.0347*	-0,025	-0.0292*

Bernake et al. (1996) maintain that SMEs are very vulnerable to a change in the business cycle. This means that, because of the so-called financial accelerator, SMEs could be more exposed to macroeconomic shocks and will have a higher asset correlation in the one-factor model.

Finally, according to the Impact Assessment for the CRD IV/CRR, ‘pro-cyclical effects may be more pertinent to borrowers which are more prone to asymmetric information, including SMEs not subject to external ratings and extensive disclosure requirements’.

For this reason, **the correlations embedded in the Basel formula for the retail exposure class should remain sufficient to cover the actual dependence on the state of the economy, not only in periods of expansion but also in periods of recession.**

### **Time and geographic data dimension**

For regulatory purposes, the correlation estimates should be valid not only for ‘tranquil times’ but also for ‘crisis times’, as empirical evidence suggests that correlations are unstable over time and tend to align in periods of stress. Therefore, **data used for empirical studies for regulatory purposes should cover a period of a full economic cycle, including a severe downturn.**

Moreover, correlations vary geographically. Accordingly, regulatory parameters should cover this variability. A change based on estimation from a subset of banks from a single jurisdiction’s results could bias results. Unfortunately, it is extremely difficult to obtain and validate data on defaults at a European level.

On the other hand, most empirical studies tend to use a dataset representative of a whole national jurisdiction. The diversification of these data is – by definition – larger than the one a bank can achieve in its asset composition. Thus, AVC relying on these national jurisdictions’ datasets is underestimated.

### **Consistency of the whole framework**

Some contributions suggest a further reduction of capital requirements for SMEs on the basis that they are more weakly related to the whole economic cycle than large companies are. These requests are based on lower estimated AVC values for SMEs. The claim for a change in regulatory calibration for a subset of the Basel asset classes may yield unexpected negative consequences. The **overall RW framework would lose consistency** if AVCs are reduced for one asset class only. Indeed, there is some merit in proposing a fully fledged exercise aiming at verifying that regulatory RWs are aligned with the observed loss values. Modifying a single component of a large framework may jeopardise the whole consistency of the framework itself.

Moreover, any change in proposal should take into account the whole structure of the relationship underlying Basel II formulae. For instance, **Basel assumes a decreasing function between AVC and borrower riskiness (PD)**. This negative relation implies lower correlation, and thus lower capital requirements, for more risky, high-PD exposures. However, some studies find the opposite relationship. The economic explanation for a higher correlation with a higher PD is that borrowers with a lower rating would tend to have a lower capacity to adjust to adverse economic conditions and, therefore, suffer more defaults in a downturn. Dietsch and Petey (2004) find that SMEs are riskier than large businesses and that the relationship between PDs and asset correlations is not negative, but positively on average, contrary to Basel II assumptions. While there may be a regulatory justification for the current regulatory treatment (avoid increasing capital requirements in periods of rising PDs and, therefore, limit procyclicality), this assumption would also imply that the actual conservatism of the Basel correlations is indeed lower than as perceived at first sight.

Basel is also assuming a **positive relationship between asset correlation and the size of the firm**, based on the idea that smaller firms have a higher component of idiosyncratic risk. Most studies confirm this relationship. However, as mentioned in the previous section, studies also demonstrate that small firms are more exposed to systemic risk in case of a recession. And it is precisely in a downturn when capital is most needed to cover potential losses.

Düllmann and Koziol<sup>46</sup> (2012) show how asset correlation estimated with asymptotic maximum likelihood (AML) varies with firm size (turnover) and rating categories. These results give a valuable further insight into the relationship of asset correlation and firm size. However, these estimates cannot be directly used for prudential regulatory purposes. The first reason is that this study covers an observation period of seven years for Germany, which represent a quite sound domestic economy compared with the other European countries and not a deep recession, whereas the latter should be the case for calibrating regulatory capital requirements. In fact, unlike many European peers, German savings banks did not have a double-digit annual lending growth ahead of the crisis. Second, as mentioned in this section, there is a rationale for regulatory AVC being higher than empirically observed ones, due to the high dose of model risk embedded in its calculation; one of the most important assumptions is the normality one, which tends to underestimate actual risk.

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<sup>46</sup> Version under preparation (unpublished).



Table 12

AML estimates for asset correlations and probabilities of default							
Asset correlation estimates							
Rating Category \ Turnover (in m €)	[0,0.3]	(0.3, 1]	(1, 2.5]	(2.5, 5]	(5, 20]	(20, 50]	> 50
I - II	0.77%	0.10%	0.16%	0.21%	0.90%	3.48%	2.63%
III	0.45%	1.03%	0.65%	1.58%	1.88%	1.38%	2.00%
IV	0.69%	0.50%	1.02%	0.90%	0.94%	1.26%	1.69%
V	0.97%	0.72%	0.97%	1.26%	1.93%	0.84%	5.36%
VI	0.65%	0.40%	0.90%	1.24%	1.66%	1.88%	3.95%
PD estimates (one-year horizon)							
Rating Category \ Turnover (in m €)	[0,0.3]	(0.3, 1]	(1, 2.5]	(2.5, 5]	(5, 20]	(20, 50]	> 50
I - II	0.41%	0.31%	0.28%	0.30%	0.25%	0.21%	0.24%
III	0.98%	0.93%	1.04%	1.15%	1.02%	1.21%	0.87%
IV	2.16%	2.35%	2.53%	2.69%	2.34%	2.72%	2.37%
V	4.99%	5.62%	6.70%	6.36%	5.91%	5.96%	5.95%
VI	14.18%	15.30%	17.67%	16.90%	17.81%	15.70%	14.93%

Source: Düllmann and Koziol (2012).

### Some studies on correlation

More generally, literature on asset correlations is not unanimous. The following studies highlight the important caveats regarding empirical estimation of asset correlation and its translation into RW.

**The Relationship Between Average Asset Correlation and Default Probability** by Lee, Wang and Zhang (Moody's ,2009). 'Asset correlation and default probability are critical drivers in modelling portfolio credit risk. It is generally assumed, as in the Basel II Accord that average asset correlation decreases with default probability. We examine the empirical validity of this assumption in this paper. Overall, we find little empirical support for this decreasing relationship in the data for Corporate, commercial real estate (CRE) and Retail exposures. For Retail exposures, sub-prime borrowers are more sensitive to general economic conditions and thus experience higher asset correlations than prime borrowers. Our analyses suggest that it is imprudent to assume a decreasing relationship between average asset correlation and default probability in measuring portfolio credit risk'.

**Basel II Correlation Values, An Empirical Analysis of EL, UL and the IRB Model** by Hansen,Vuuren, Ramadurai and Verde (Fitch 2008). 'Across asset classes, the Basel II asset value correlation assumptions are generally more conservative (i.e., higher) than the correlations derived in this empirical study. Fitch finds that this conservatism helps to address

the global scope of Basel II and the need to accommodate, for example, differences across banks in risk factor sensitivities, single-obligor concentration risk and model risk (e.g., uncertainty and variability in banks' internal default and loss severity estimates).'

An important consideration in evaluating Basel II ratios of financial institutions, however, is that defaults tend to cluster, correlations increase, and loss rates exceed historical means during periods of financial market stress. Thus, while the Basel II assumptions appear conservative relative to empirically derived correlations during 'normal' market conditions, it is unclear whether the Basel II assumptions sufficiently capture correlation 'jumps' during market crises.

**Asset Correlations: A Literature Review and Analysis of the Impact of Dependent Loss Given Defaults** by Chernih , Vanduffel and Henrad (2006) points out a number of issues which require further research. The most significant could be the issue of horizon; that is, does asset correlation vary significantly over the time horizon used? The evidence thus far is inconclusive. A more difficult issue is the choice of clustering; in other words, what are the factors that differentiate asset and default correlation and how can they best be grouped? A related issue is the effect of various factors on asset correlation. Basel II recommends increasing correlations with decreasing default probabilities; however, there is evidence that world region and sectors are important differentiators of asset correlation. Asset correlations are merely one source of dependence and if other dependencies are not explicitly modelled (such as dependence between LGDs) then the unexpected loss will be underestimated unless the asset correlations are increased.

**Correlation and Credit Risk** by Pu and Zhao (2010) questions the assumptions that defaults are independent of each other. They suggest that contagion is not only statistically but also economically significant in causing correlation in credit risk. Thus, it is important to incorporate an unobservable risk factor into credit risk models in future research. They also find that the correlation is countercyclical and is higher among firms with low credit ratings than among firms with high credit ratings.

**Capital Adequacy for Credit Risk: a practical exercise** by Management Solutions (2010): 'Capital consumption under this model for the SME portfolio appears to be higher than regulatory values, which set capital levels at 7.89% and 6.75% respectively, i.e. capital under this model is 17% higher than regulatory requirements. As can be observed from the above tests, this is mainly due to the effect of PD/LGD correlation and portfolio concentration.'

## Conclusion

Correlations used for regulatory purposes should be conservative to limit the effect of many limiting assumptions behind the Basel II IRB framework (among others: a single factor loading, homogeneity across banks in risk sensitivity, infinite granularity and the relative absence of concentration risk).

Therefore, **there is a clear rationale for Basel II's more conservative (i.e. higher) AVC values than those derived from empirical estimation.** This conservatism is needed to protect against important model risk in correlation calculations and lack of adequate data for this calculation.

The need for conservatism is important as credit risk is still the biggest risk most European banks are currently facing and capital should be high enough to cover future losses and withstand a reverse scenario or further deterioration in the economy.

In any case, a case-by-case reform approach in prudential regulation parameters change should be avoided; the whole consistency of the Basel II framework must be preserved.

Finally, it is worth noting that RWs **do not have a one-to-one relation with AVC**. A 50% lower estimated AVC value cannot be automatically converted into a 50% reduction in RWA and capital requirement. In fact, a reduction of 50% in AVC would always imply lower RW and capital reductions for PDs over 0.13% (see Annex 8).<sup>47</sup>

## Annex 8

### Relationship between asset value correlations (AVCs) and risk weights (RWs)

Some industry position papers maintain that there is a one-to-one relationship between AVC and RW and, therefore, that a reduction in AVC from 30% to 50% should imply the same reduction in RW. However, RWs do not have a linear relationship with AVC value changes. These changes are dependent on the initial level of asset correlation, and the other parameters of the capital RWs formula (PD and LGD).

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<sup>47</sup> In fact, for the average PD for the retail SME portfolio (which is 3.63% according to the Stress Test data a reduction on 50% and 30% would imply a reduction of around 42% and 25% in RWs.

As a simple example, in a portfolio with a loss given default (LGD) of 45%, a reduction of 50% in AVC would always imply lower capital reductions for PDs over 0.13%, and a reduction of around 30% would also imply smaller reductions in RW for PDs over 1.13%.

Table 13: Reductions in RWs with different asset correlation (AC) reductions

Reduction in RW		50% reduction in AC			Around 30% reduc. in AC		
		from 16% to 8%	from 10% to 5%	from 6% to 3%	from 16% to 11%	from 10% to 7%	from 6% to 4%
PD	0.005%	-57.5%	-54%	-51%	-38%	-34%	-35%
	0.01%	-57.0%	-54%	-50%	-37%	-34%	-34%
	0.03%	-55.8%	-52%	-49%	-37%	-33%	-33%
	0.05%	-55.2%	-52%	-48%	-36%	-32%	-33%
	0.10%	-54.1%	-51%	-47%	-35%	-31%	-32%
	0.13%	-53.6%	-50%	-47%	-35%	-31%	-31%
	1.13%	-48.3%	-45%	-42%	-31%	-27%	-28%
	2.13%	-46.0%	-43%	-41%	-29%	-26%	-27%
	2.23%	-45.8%	-43%	-41%	-29%	-26%	-27%
	3.13%	-44.4%	-42%	-40%	-28%	-25%	-26%
	3.63%	-43.7%	-42%	-39%	-27%	-25%	-26%
	4.13%	-43.1%	-41%	-39%	-27%	-24%	-26%
	4.79%	-42.3%	-40%	-39%	-26%	-24%	-25%
	5.13%	-42.0%	-40%	-38%	-26%	-24%	-25%
	6.13%	-41.0%	-39%	-38%	-25%	-23%	-25%
	7.13%	-40.2%	-39%	-37%	-25%	-23%	-24%
	8.13%	-39.4%	-38%	-37%	-24%	-22%	-24%
	9.13%	-38.7%	-38%	-36%	-23%	-22%	-23%
	9.92%	-38.1%	-37%	-36%	-23%	-22%	-23%
	10.13%	-38.0%	-37%	-36%	-23%	-21%	-23%
	11.13%	-37.3%	-37%	-36%	-22%	-21%	-23%
	12.13%	-36.7%	-36%	-35%	-22%	-21%	-23%
	13.13%	-36.2%	-36%	-35%	-22%	-20%	-22%
	14.13%	-35.6%	-35%	-35%	-21%	-20%	-22%
	15.13%	-35.1%	-35%	-34%	-21%	-20%	-22%
	16.13%	-34.6%	-35%	-34%	-20%	-20%	-22%

In fact, for the average PD for the retail SME portfolio, which is 3.63% according to the stress test data, reductions of 50% and 30% would imply reductions of around 42% and 25% in RWs. For the 25th and 75th percentiles of PD in this same portfolio (PDs of 2.23% and 4.75% respectively), capital reduction would vary depending on the reduction of AVC. It would go from 45.8% to 39% for a reduction in AVC of 50%, and from 29% to 25% for a reduction in AVC of around 30%.

This relationship between AVC and RW can be represented on a two-dimensional basis: assuming an LGD of 45%, these would be the different RWs, representing different levels of PD in these different curves (PD on the x-axis and RW on the y-axis).

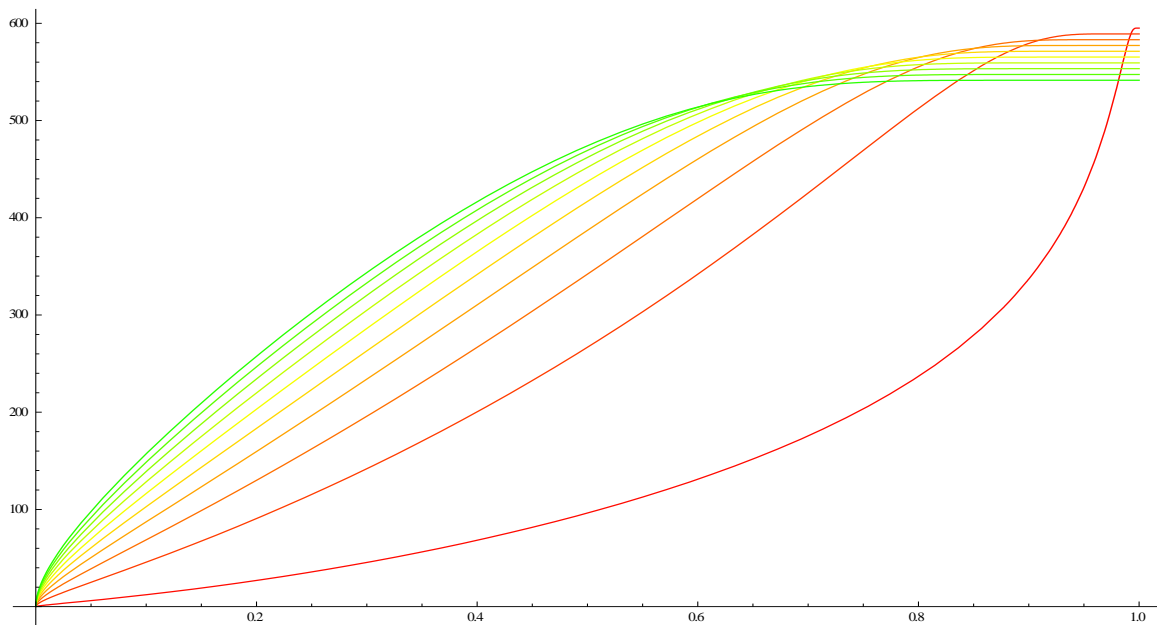


Figure 41

And also as a three-dimensional figure, RW as a function of PDs and AVC:

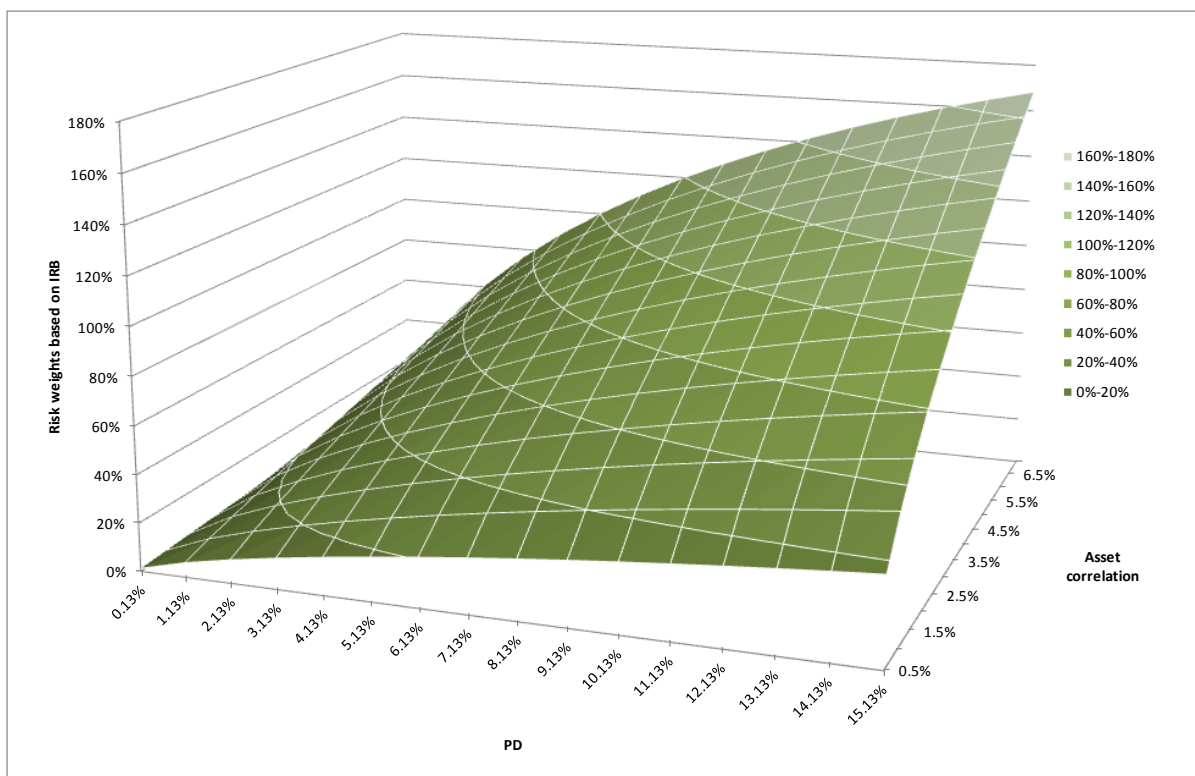


Figure 42

## Annex 9

### Theoretical implementation of the alternative proposals

Figure 43 shows the general capital requirements for the period 2013–22 under the proposed CRD IV/CRR compared with the ‘supporting factor’ proposed by the European Parliament (EP SF), the exemption from the capital conservation buffer (CCB) and the EBA’s option 3 (a temporary supporting factor capital deduction).

The capital reduction resulting from the specific countercyclical buffer would depend on its calibration and would be very similar to option 3, so it was not added to the graphs. In Figure 43, we are assuming the CCB exemption would be gradually removed from 2020 and that option 3 is calibrated in such a way that the capital reduction equals the European Parliament’s proposal in 2013 and would reach the proposed level of 10.5% capital requirement in 2020.

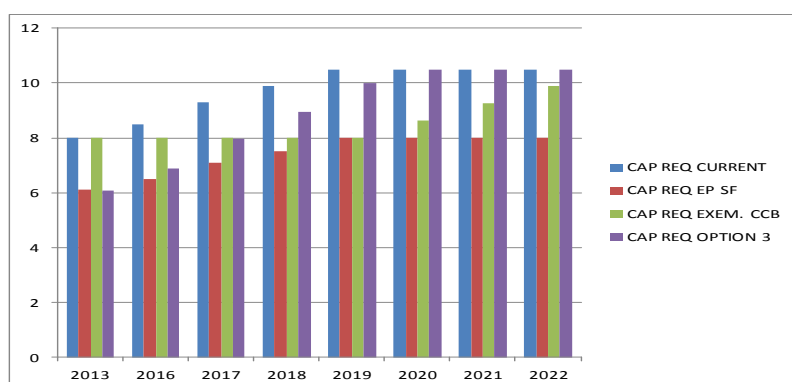


Figure 43: Capital requirements

Figure 44 just depicts the same information, in the form of percentage of capital reduction compared with the proposed framework.

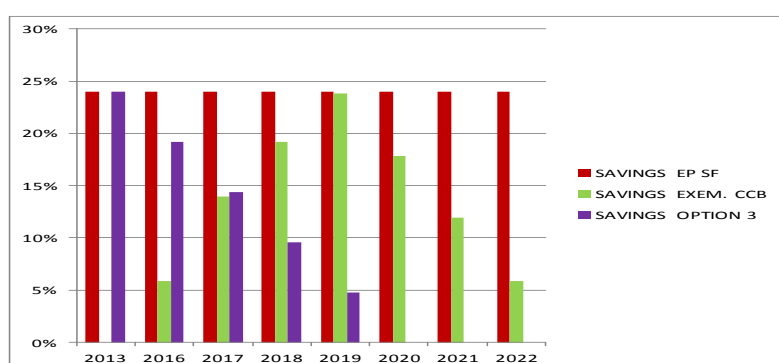


Figure 44: Capital requirements reductions

## Annex 10

### The impact of different threshold increases under SA and IRB

Including different thresholds for SA and IRB would create further inconsistencies and opportunities for capital arbitrage.

With the current CRD, one SME may be treated by one bank as Retail and by another bank as Corporate, resulting in different RWs.

With the current EP proposal, in addition to having the same firms' loans treated as Corporate or Retail depending on the size of the loan, we would have a different treatment depending on the approach used by the banks. Therefore the same SME would have a different capital charge depending on the size of its loans and on the approach of the bank.

For example, under IRB, for a loan with a PD of 1%, an LGD of 45% and a maturity of 2.5 years, Table 14 show the current and future treatment granted by different banks to the same SME.

Table 14

Loan	Bank	Current (SA or IRB)	New (SA BANK)	New (IRB BANK)
10	bank A	Corporate	Corporate	Corporate
2	bank B	Corporate	Retail	Retail
3	bank C	Corporate	Corporate	Retail
1	bank D	Retail	Retail	Retail

Table 15 shows the different capital charges (EUR) for different banks' loans to a given SME.

Table 15

SME	Current SA	Current IRB	New SA	New IRB	Savings SA	Savings IRB
10 bank A	100	76.8	100	76.8	0%	0%
2 bank B	100	76.8	57.14	36.95	-43%	-52%
3 bank C	100	76.8	100	36.95	0%	-52%
1 bank D	75	48.5	57.14	36.95	-24%	-24%





## Annex 11

### The definition of SMEs

In the current Capital Requirements Directive, there is no explicit definition of SMEs. Implicitly, there is a definition for banks following the IRB approach and Corporate exposures in the firm size adjustment of the IRB curve 'where the reported sales for the consolidated group of which the firm is a part is less than €50m'. A change in the regulation targeting SMEs should include its definition.

Currently, no pan-European harmonised and legally binding definition of SMEs exists. The relevant literature offers various approaches to characterise and identify SMEs, often tailor-made for a very specific purpose. These approaches mostly differ with respect to the type of criteria used to distinguish between small, medium and large companies and to the thresholds set for the different qualitative or quantitative criteria.<sup>48</sup>

Presumably the most widespread definition for SMEs is the one of the European Commission. This definition was first issued in the year 1996 (96/280/EC) as a recommendation. In 2003 the Commission revised this recommendation (2003/361/EC). The current definition relies on three distinct quantitative criteria: staff headcount and either annual turnover or annual balance sheet total. However, as an EC recommendation, the definition outlined above is not legally binding. The relevant threshold values are given in Table 16.<sup>49</sup>

Table 16: Threshold values for SME categories (see European Commission, 2005; the new SME definition)

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<sup>48</sup> Qualitative criteria may, for example, address the personality of the entrepreneur, often being manager and/or owner of the firm.

<sup>49</sup> Fluctuations above the definitional figures do not mean the firm will lose its SME status unless this is over two consecutive accounting periods. The same is true for large enterprises which may fall into the SME category.

Enterprise category	Headcount: Annual Work Unit (AWU)	Annual turnover	or	Annual balance sheet total
Medium-sized	< 250	≤ €50 million (in 1996 € 40 million)	or	≤ €43 million (in 1996 € 27 million)
Small	< 50	≤ €10 million (in 1996 € 7 million)	or	≤ €10 million (in 1996 € 5 million)
Micro	< 10	≤ €2 million (previously not defined)	or	≤ €2 million (previously not defined)

## SME questionnaire

In order to assess the common practice of SME definition in the scope of the CRD IV/CRR, the EBA has conducted a stock-take, asking European National Supervisory Authorities (NSAs) to provide information on their supervisory definition of SME and on banks' internal management practices. Based on these answers we could conclude the following:

**Supervisory definition:** Some countries have a specific regulatory definition for SMEs, whereas others leave it as an open choice for their banks, and use the regulatory threshold of EUR 50 million for only the IRB approach. Amongst the NSAs that do have a specific regulation for SMEs, they use it to define what can be included in the Retail exposures, using a different set of variables and tending to include only smaller SMEs in the retail portfolio (currently the CRD uses a EUR 1 million loan threshold and not a size variable):

- the threshold of the exposure (EUR 290 000 in Lithuania or EUR 600 000 in Sweden);
- SME turnover (EUR 2.5 million in Greece and EUR 5 million in Italy);
- proportion of the exposure to the overall portfolio (individual exposure cannot be larger than 0.2% of the retail portfolio in Norway);
- head count (9 in Poland and 19 in Norway).

These variables are very different from each other and some of them apply only to the IRB, while others apply to the SA or both approaches. However, all of them tend to include only the small enterprises among the SME borrowers in the Retail portfolio. This may be done on an exposure level (smaller countries use a more restrictive definition than the one provided in

the CRD IV), by turnover (in this case, not even all the small companies are included in the Retail exposure class) or by head count (again micro and some small SME are eligible for the retail exposure class).

**Banks' internal definition:** Banks that operate across borders tend to have different SME definitions for each and every country in which they function. Smaller banks (typically using the SA) that do not operate across borders tend to have a definition that is usually in consensus with other banks in their jurisdiction.

Despite this variability, we can extract some general conclusions. Turnover is the most preferred method in defining SMEs. Asset size seems to be a measure to a lesser extent, whereas headcount is the least preferred method to define an SME.

Depending on the size of the economy, banks in larger countries tend to have a threshold of about EUR 50 million turnover for defining SMEs, whereas smaller-sized economies tend to have a threshold around EUR 10 million or less. A few banks differentiate the smallest companies within the SME and then apply a EUR 2 million or EUR 2.5 million threshold.

## **Conclusion**

Despite the SME definition recommendation by the EC and the implicit IRB turnover definition in the CRD, banks do not treat SME exposures consistently. It would be difficult for any policy to effectively target SME lending with current definitional obstacles.

Current practice varies according to bank size and NSA discretion. The use of turnover is the most widely practised method of defining SMEs, EUR 50 million being the most common threshold, even though its application is not completely consistent across jurisdictions, with some of the smaller countries in the EU tending to use a lower threshold.

## Annex 12

### Impact assessment

The EBA assessed the quantitative impact of the different policy alternatives. The reduction in credit risk capital requirement is used to measure this quantitative impact. The impact assessment (IA) tries to give a quantitative measure of the capital resources that would be freed if a given policy is implemented.

While the IA quantifies capital savings, the estimated results should not be automatically converted in additional credit flows to the SME. As described within this report (see section 9.3), the resources stemming from reduced capital requirements can be used by banks in a wide variety of ways.

For this IA, the EBA conducted an EU-wide data collection exercise.<sup>50</sup> The information collected through the exercise template covered two areas, within the Standardised Approach (SA) banks:

- Credit risk exposure: these data are drawn from COREP reports. Credit risk figures are divided by asset class and RW.
- Asset class breakdown: for both retail and corporate exposure, the breakdown by borrowers type (retail), borrower size and loan size (corporate). This information was collected on a best-effort basis.

### Data

Table 17 presents the main figures of the resulting sample (herein: the Sample); all the figures refer to December 2011.

Table 17: The sample for the SA impact assessment exercise

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<sup>50</sup> The EBA had submitted the template to all European National Supervision Authorities, which were responsible for filling it in. The EBA asked NSAs to provide data exclusively for banks using the Standardised Approach (SA) for credit risk.

Exposures				RWAs		
	Sample total	of which:		Sample total	of which:	
		Retail	Corporate		Retail	Corporate
Value	7,564	1,216	1,681	3,584	854	1,459
% on Sample total		16%	22%		24%	41%
% on SA+IRB credit risk (mean)	39%			48%		

*Reporting date: December 2011; values in EUR bn; mean value calculated as weighted average of individual country values.*

The Sample banks account for a total of EUR 7 564 billion in credit risk exposures (EUR 3 584 billion in risk-weighted assets, RWAs). Of these Sample banks' total credit risk figures, the exposures for the Retail asset class account for EUR 1 216 billion; the value for the Corporate class is higher, accounting for EUR 1 621 billion. On average, the two asset classes account for 16% and 22% of the Sample credit risk exposure respectively (24% and 41% of RWAs). About 22% of the whole retail RWAs are from SMEs; the corresponding figure for corporates is 41%.

## Policy options

Using this data, the EBA has assessed different possibilities of interpreting the mandate it was given by the EC. This exercise aims at providing a quantitative assessment of different, not necessarily mutually exclusive, policy options. These are:

- lowering the capital requirement by a 0.7619 supporting factor for SME-retail exposures only;
- increasing the loan size threshold identifying retail exposures from EUR 1 million to EUR 2m;
- combining options a) and b);
- increasing the loan size threshold identifying retail exposures from EUR 1 million to EUR 5 million;
- combining options a) and d);
- lowering the capital requirement by a 0.7619 supporting factor for both SME-retail and SME-corporate exposures;
- Combining options d) and f).

## IA: methodology and results

The indicator used to assess the impact of a given option is the capital saving with respect to keeping the current Basel II framework unchanged,<sup>51</sup> which represents the baseline.

- To assess the impact of option a, we use a two-step process. First, for each country, we identify the SME portion of its Retail exposures; then, we apply the 0.7619 supporting factor to these exposures. This allows us to work out the capital saving with respect to the baseline.
- To assess the impact of option b and option d, we first identify the proportion of Corporate exposure with a loan value between EUR 1 million and either EUR 2 million or EUR 5 million. To these, we apply a 75% RW (which is the RW these exposures would receive if they were in the Retail asset class). Finally, we work out both the corresponding capital requirement and the capital saving with respect to the do-nothing option.
- To assess the impact of option c and option e, we use all the assumptions described above. Moreover, with respect to options b–d, the exposures formerly in the Corporate asset class have been granted a further 0.7619 supporting factor.
- Finally, to assess the impact of option f we replicate the process for option a, additionally using the information on the proportion of SME exposures in the Corporate asset class.

Table 18: Estimated capital requirements savings in the Sample

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<sup>51</sup> Therefore the baseline scenario is not represented by a fully implemented Basel III framework.

		Capital requirement saving:			
		value	% of credit risk capital	% of SME capital	% of NFC (retail and Corporate)
Opt a)	Supporting factor for SME-retail only	3,637	1.3%	5.7%	2.0%
Opt b)	EUR 2 mln retail loan threshold	4,248	1.5%	6.7%	2.3%
Opt c)	Option a)+b) combined	14,023	4.9%	22.0%	7.6%
Opt d)	EUR 5 mln retail loan threshold	8,151	2.8%	12.8%	4.4%
Opt e)	Option a)+d) combined	22,825	7.9%	35.7%	12.3%
Opt f)	Supporting factor for both SME-retail and SME-corporate	15,038	5.2%	23.6%	8.1%
Opt g)	Supporting factor for both SME-retail and SME-corp + EUR 5 mln th	28,645	10.0%	44.9%	15.4%

Reporting date: December 2011; values in EUR mln.

- Introducing the supporting factor for the SME portion of retail asset class (option a) would result in a reduction in the Sample capital requirement of EUR 3.6 billion; the value represents 1.3% of the Sample total capital requirement for credit risk (EUR 284 billion).
- Raising the threshold defining Retail exposure to EUR 2 million (option b) would result in a slightly larger impact on capital requirements: the value would be a reduction in the Sample capital requirement of EUR 4.2 billion, representing 1.5% of the Sample total. This capital saving is entirely driven by the reduction of the RW of a portion of exposure that move from the corporate (RW = 100%)<sup>52</sup> to the retail asset class (RW = 75%).
- Combining the two options (option c) would dramatically increase the saving impact: the value would be EUR 14 billion, more than three times the impact of either option a or option b on a stand-alone basis (4.9%). The substantial reduction in RW of the EUR 1-EUR 2 million exposures drives this effect: indeed, their equivalent RW would reduce from 100% to 57%.

<sup>52</sup> For unrated Corporate exposure.



- Increasing the loan size threshold further to EUR 5 million (option d) would determine a capital saving impact of EUR 8.1 billion; this value is about twice that of option b (2.8%).
- As for option c, combining the loan size increase with the supporting factor (option e) dramatically amplifies the impact: this would be equal to EUR 22.8 billion, more than 8% of the Sample credit risk capital requirement.
- We also assess the impact of introducing a supporting factor for all the SME exposures (option f) within the Sample. The 0.76 supporting factor reduces the capital requirement of these exposures, irrespective of their asset class (either Retail or Corporate). The corresponding capital saving adds up to EUR 15 billion (5.2% of credit risk requirements).
- Finally, the impact of introducing a supporting factor for all the SME exposure (option f) plus raising the threshold to EUR 5 million accounts for a capital saving of EUR 28.6 billion (10% of credit risk requirements).

### **Internal ratings-based (IRB) estimation**

In order to assess the impact on the IRB banks, we have used the information held at the EBA. This information is required for the biggest banks in Europe, almost all of which are IRB banks, and has been submitted since 2008 on a quarterly basis. This information provides a breakdown of SME exposures and capital requirements for the Retail and Corporate exposure classes. It does not provide any information on loan thresholds. Therefore, only options a and f can be calculated. For the information provided at 31.12.2012 by a sample of 34 banks the results are the following:

- Introducing the supporting factor for the SME portion of retail asset class (option a) would determine a reduction by 0.86% total capital requirement for credit risk (EUR 1.8 billion).
- If the supporting factor is included for all SME exposures (option f) the impact would be of 3.1% total capital requirement for credit risk (EUR 8.1 billion).

These figures are consistent with SA results, as, in percentage terms, SA banks tend to have a larger SME portfolio. Also IRB banks already have more reduced RWs than SA banks, and therefore a lower capacity for further savings. Finally, in the IRB sample it has been possible to test only two options.

### **Conclusions**

The IA exercise aims at evaluating the consequences on capital requirements for banks based on different policy alternatives. The analysis uses an SA dataset resulting from an ad

hoc data collection exercise the EBA has conducted together with European NSAs and data storage in EBA for IRB banks.

Although the overall data quality is satisfactory, several caveats should be considered. First and foremost, COREP reports for SA banks do not provide the breakdown (SME-retail, SME-corporate) that would be needed as ideal input for this analysis. Therefore, these data breakdowns have been provided through estimation on a best-effort basis.

These important limitations considered, the estimated impacts for SA banks in the sample used, would range from EUR 3.6 billion to EUR 28.6 billion (from 1.3% to 10% over credit risk capital requirements) depending on the policy options used; thus, the actual impact of different options may differ substantially.

In order to assess the impact on the IRB banks, EBA has used already existing information. Results show savings between EUR 1.8 million and EUR 8.1 billion (between 0.9% and 3.7% over credit risk capital requirements) considering only the supporting factor options (as this information does not provide any breakdown on loan thresholds).

While the IA quantifies capital savings, the estimated results should not be automatically converted in additional credit flows to the SME. As described within this report, the resources stemming from reduced capital requirements can be used by banks in a wide variety of ways.

## Annex 13

### ECB SME survey on the access to finance of small and medium-sized enterprises in the euro area, April 2012

The ECB has been conducting this survey since 2009. The latest survey is based on 7 511 firms and the financial situation faced by them, compared with large firms, over the preceding six months (October 2011 to March 2012)

#### 1. Most pressing problem

The most pressing problems for euro area SMEs (answers are shown in percentage of respondents) are listed in Table 19. Clearly, finding customers is the biggest concern for SMEs, with access to finance, costs of production of labour, staff and competition important, secondary constraints.

Table 19

Most pressing problem	(%)						
	Finding customers	Competition	Access to finance	Costs of production or labour	Availability of skilled staff or experienced managers	Regulation	Other
<b>Large</b>	20	15	14	17	18	10	6
<b>SMEs</b>	27	12	17	14	14	7	8
..Micro	32	11	19	13	8	8	10
..Small	24	12	16	15	17	7	7
..Medium	21	16	15	14	21	6	7

As a general trend, finding customers has traditionally been the standout concern for SMEs, followed by competition, and recently, by access to finance.

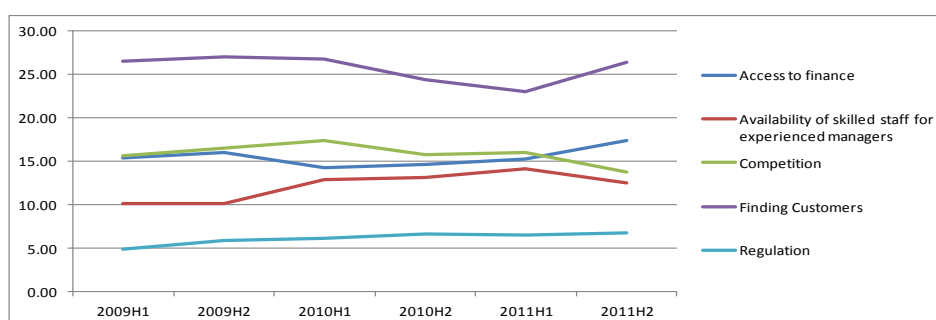


Figure 45: Most pressing problem for European firms (all SMEs).

Source: ECB Survey on the Access to Finance of SMEs data. April 2012

## 2. Impact of age vs size of the firm on access to finance

Access to finance is a major concern for SMEs of all ages during this period but it becomes a less significant concern as the age of the SME increases.

Table 20

Age of the firm		(%)							
		Finding customers	Competition	Access to finance	Costs of production or labour	Availability of skilled staff or experienced managers	Regulation	Other	DKNA
10 years or more	Large	20	15	13	18	19	9	5	1
	SMEs	27	13	17	14	13	7	7	1
	..Micro	32	12	19	13	6	7	8	1
	..Small	25	12	16	15	17	7	6	1
	..Medium	22	17	15	14	20	6	5	1
	Total	25	14	16	15	15	8	6	1
5 years or more but less than 10 years	Large	12	18	23	15	24	3	6	0
	SMEs	24	11	17	14	15	10	7	1
	..Micro	28	9	20	13	11	10	7	2
	..Small	19	16	13	15	18	10	7	0
	..Medium	16	13	15	15	26	7	9	0
	Total	22	12	18	14	17	9	7	1
2 years or more but less than 5 years	Large	12	28	21	26	7	0	6	0
	SMEs	22	9	24	16	14	8	5	2
	..Micro	25	8	24	16	11	9	5	2
	..Small	16	9	26	18	19	4	6	3
	..Medium	19	16	20	11	19	9	2	3
	Total	20	13	23	17	13	7	5	2
Less than 2 years	Large	100	0	0	0	0	0	0	0
	SMEs	24	11	22	14	20	1	8	0
	..Micro	30	12	23	16	9	2	8	1
	..Small	12	9	5	10	57	0	6	0
	..Medium	7	3	54	13	14	0	9	0
	Total	35	9	18	12	17	1	7	0
[DKNA]	Large	19	11	14	11	10	23	7	5
	SMEs	32	9	15	10	14	7	8	4
	..Micro	38	9	15	6	9	7	10	6
	..Small	26	9	14	16	18	9	6	1
	..Medium	25	13	15	14	22	5	4	2
	Total	27	10	15	11	13	13	7	4

Figure 46 represents access to finance for different-sized firms with respect to their age. Small firms have the biggest challenge when aged two years or less. As companies grow older, access to finance becomes a decreasing concern for all sizes of firms. In general, older firms (over 10 years), no matter which size, have fewer difficulties in financing themselves than younger firms.

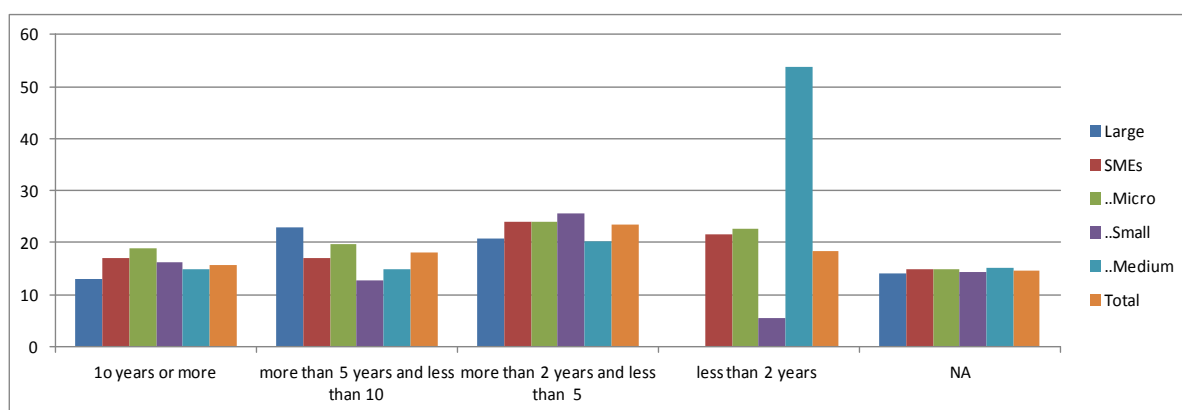


Figure 46: Difficulties in access to finance by age of firm

### 3. Geographical impact on access to finance

Figure 47 represents access to finance for different countries in Europe. As expected, firms operating in economies with a deteriorated outlook have bigger challenges in accessing finance, and this factor is more determinant than the specific size of the firm (micro vs small/medium).

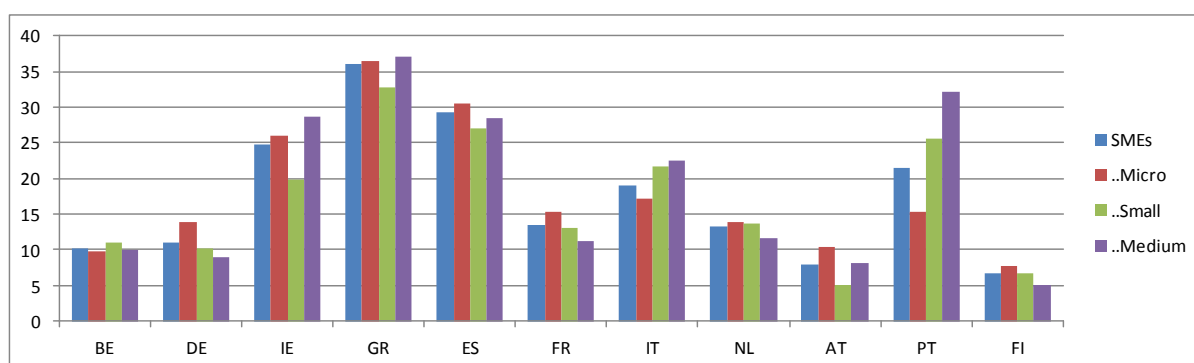


Figure 47: Difficulties in access to finance by country

## Annex 14

### ECB Bank lending survey 2003–12

The following graphs show euro area bank finance trends from 2003 to 2012 (and breakdown of trends 2008–2012), by extracting the questions most relevant to SMEs from the survey.

The survey sample size has varied over the timeframe (for example, the latest survey April 2012 with a sample of 131 banks from all Euro area countries, and the first survey in January 2003 survey using 90 banks).

The graphs represent the **drivers for tightening of credit standards** and how these **tightened conditions have materialised** using the diffusion index (DI) published by the ECB banking lending survey.

The DI regarding banking lending policies refers to the share of banks reporting that credit standards have been tightened and the share of banks reporting that they have been eased. Likewise, regarding the demand for loans, the DI refers to the weighted difference between the share of banks reporting an increase in loan demand and the share of banks reporting a decline. The DI is constructed in the following way: lenders who have answered ‘considerably’ are given a weight twice as high (score of 1) as lenders having answered ‘somewhat’ (score of 0.5).

A positive DI indicates that a larger proportion of banks have tightened credit standards (‘net tightening’), whereas a negative net percentage indicates that a larger proportion of banks have eased credit standards (‘net easing’). Likewise, the term ‘net demand’ refers to the difference between the share of banks reporting an increase in loan demand and the share of banks reporting a decline. Net demand will therefore be positive if a larger proportion of banks have reported an increase in loan demand, whereas negative net demand indicates that a larger proportion of banks have reported a decline in loan demand.

The surveys look at the impact on lending to SMEs, large companies and households.

- ‘All’ includes corporations (large and SMEs) and households.

- The distinction between large enterprises and SMEs is based on annual sales. An enterprise is considered large if its annual net turnover is more than EUR 50 million.

## 1. Main drivers of tightening credit standards

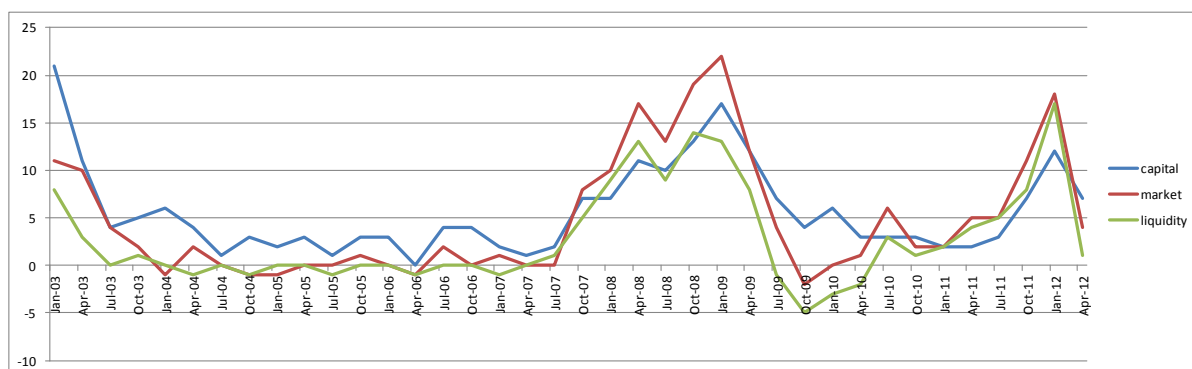


Figure 48: Drivers of tightening credit standards (i)

Figure 48 shows that the ECB's three-year Long Term Refinancing Operation (LTRO) has provided a significant temporary relief, especially in terms of liquidity and funding, and therefore contributed to the decrease in the tightening of credit standards in the first quarter of 2012. During the worst periods of the economic crisis, capital was not the prominent factor. Greater focus on bank liquidity and market finance may be important to understand the reasons behind tighter credit conditions for large and small firms.



Figure 49: Drivers of tightening credit standards (ii)

Add the idea that greater competition among banks is the main driver of loosening credit standard for European firms. We can observe that, from 2007, competition, or its effect on loosening credit standards, has declined.

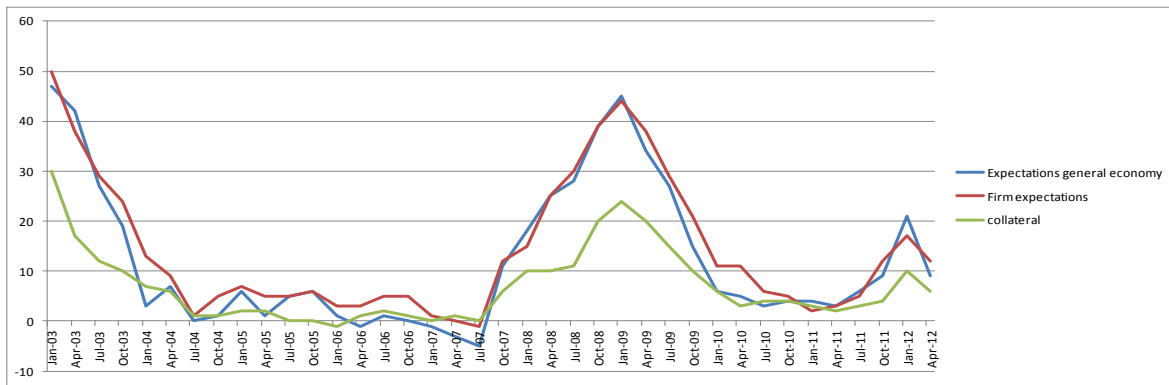


Figure 50: Drivers of tightening credit standards (iii)

Finally, it seems the main reasons that account for the tightening of credit standards are the poor economic outlook and the poor economic expectations of individual firms.

## 2. Analysis of financial constraints in SMEs vs larger companies

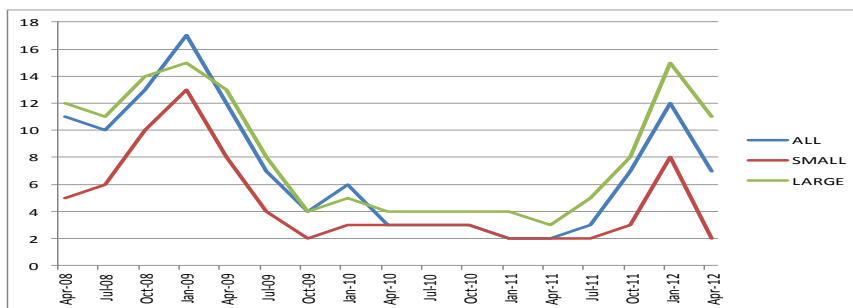


Figure 51: Costs related to bank's capital position.

The ECB bank lending survey shows relative conditions and not the absolute impact of different factors. However, capital conditions have been tighter for large firms throughout this period with some convergence during the peak of the financial crisis.

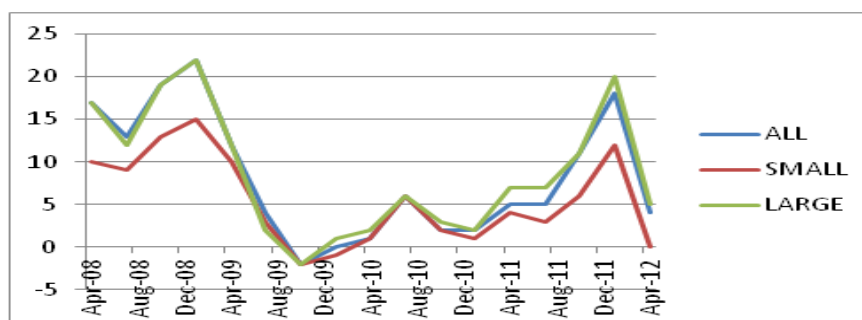


Figure 52: Costs related to the ability of the bank's access market financing.



Market finance conditions generally affect large firms more than small firms, except for the strong convergence of conditions during the financial crisis. This may be because large firms require larger loans (individually and on an aggregate level).

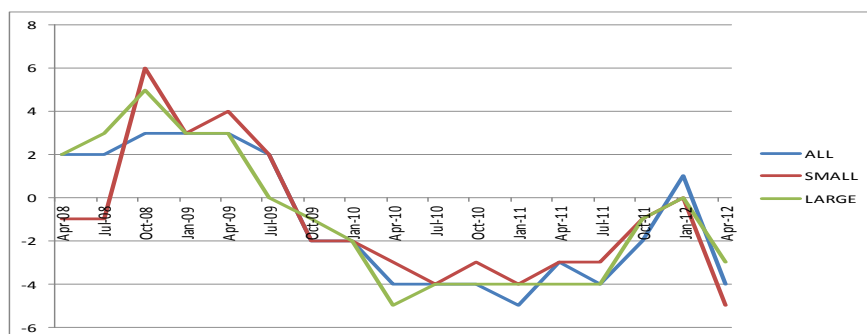


Figure 53: Costs related to the liquidity position.

Liquidity seems to represent a greater concern for small firms than capital and market finance conditions (balanced with alternative measures such as prompt payments; this could potentially be mitigated).

### 3. Analysis of the outcome of tightening credit standards

Tightening of credit standards can be measured using different parameters, not only the availability of loans. Data from the bank lending survey show that this tightening has been driven by a combination of higher margins, the amount of a loan, collateral requirements, non-interest rate charges etc.

Figure 54–60 show the DI for the different components of the tightening of standards. The question asked was: over the past three months, how have your bank's conditions and terms for approving loans or credit lines to enterprises changed?

It can be concluded that the tightening has generally and broadly been higher for larger companies than for SMEs (although this is only a representation of the relative effect on conditions).

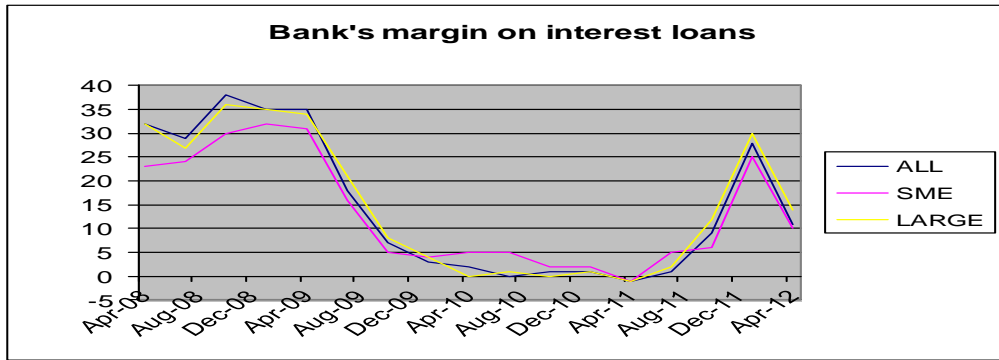


Figure 54: Bank's margin on interest loans.

The difference between riskier SME and large company loans is small. Banks appear not to be differentiating lending with an eye on their margins for much of this period.

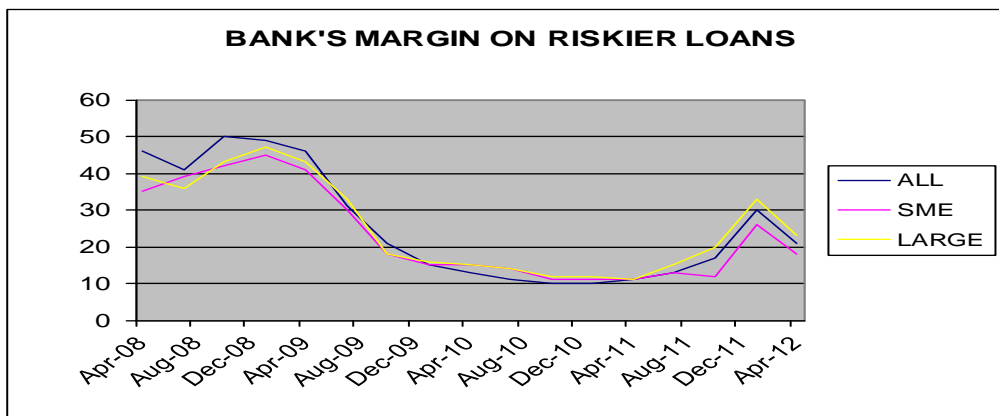


Figure 55: Bank's margin on riskier loans.

The difference between riskier SME and large loans is negligible for much of this period, so banks' margins are not greatly affected by differentiating between offering loans to SMEs and large companies.

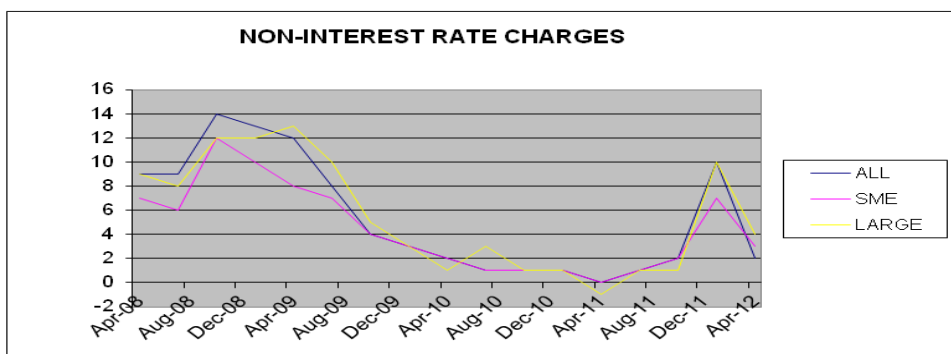


Figure 56: Non-interest rate charges.

Non-interest rate charges are fees. Various kinds of fees can form part of the pricing of a loan, such as commitment fees on revolving loans, administration fees (e.g. document preparation costs) and charges for enquiries, guarantees and credit insurance. Fee conditions have fluctuated, with tighter conditions for large firms before and after 2010–11.

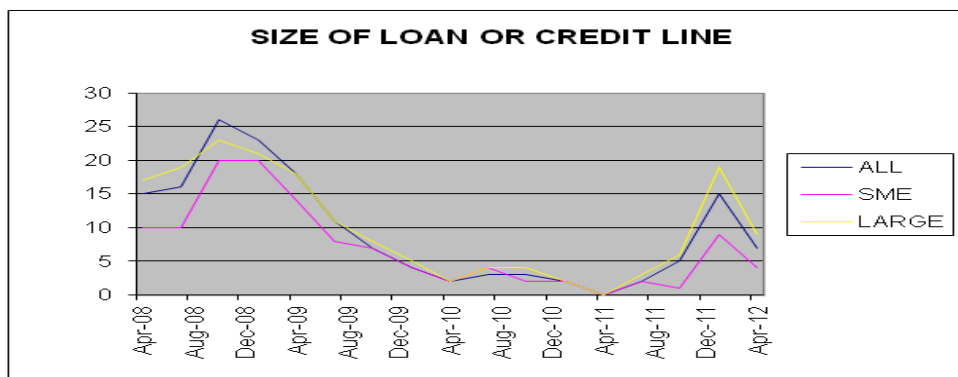


Figure 57: Size of loan or credit line.

Conditions with respect to the maximum size of the bank loan have been tighter for large firms. This shows that large firms face tighter conditions when requesting the maximum amount of the loan they require. Again this may be because banks apply higher conditions on larger loans.

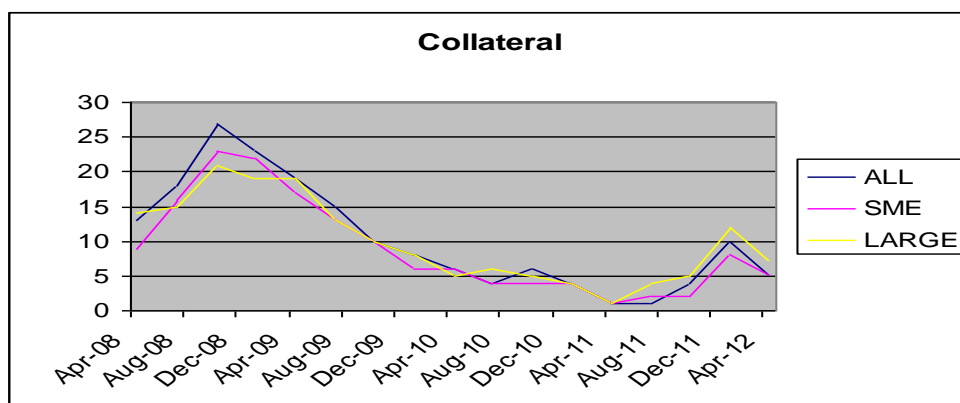


Figure 58: Collateral.

Requirements for collateral have increased slightly more for large firms than for SMEs (again this may be expected because large firms represent a higher proportion of bank lending and request larger amounts of finance).

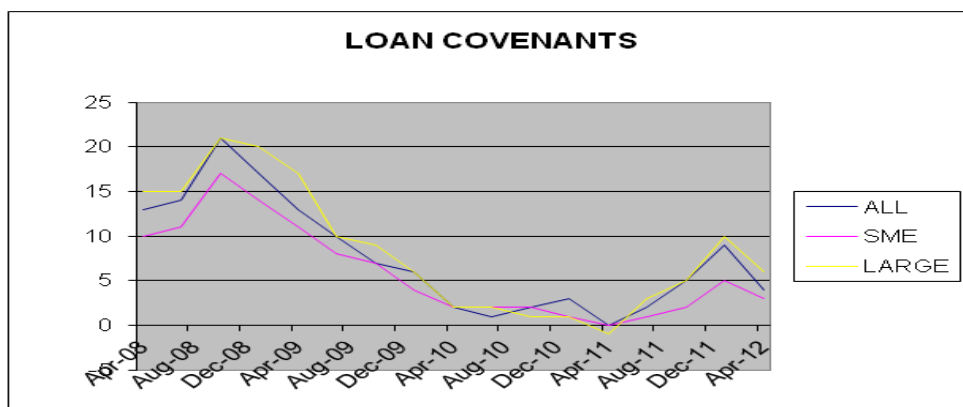


Figure 59: Loan covenants.

Loan covenant conditions are similar to maturity conditions. Conditions have tightened more for large firms, probably because of the absolute larger loans requested by large firms.

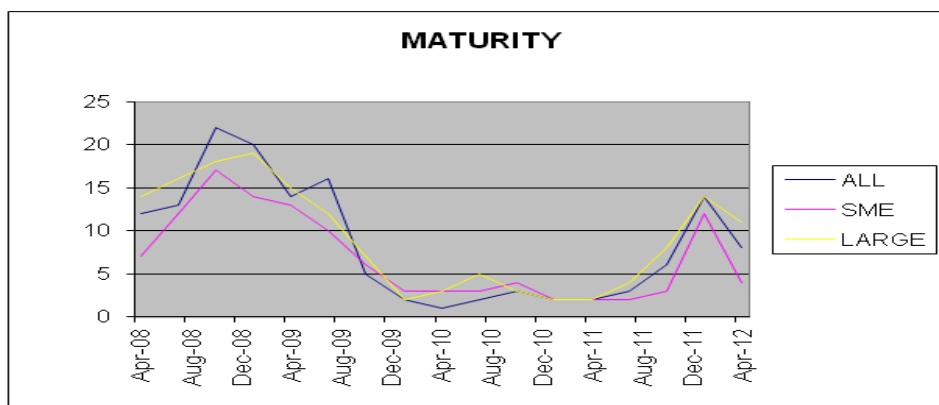


Figure 60: Maturity.

Maturity as used in the bank lending survey is original maturity, and only two types are used: short-term and long-term. Short-term loans are loans with an original maturity of one year or less; long-term loans have an original maturity of more than one year.

Absolute maturity timeframes have been considered to be very small for small firms but conditions in maturity did not tighten more than they did for large firms during this period.

## Annex 15

### The relation between capital requirement and credit supply

The presence of a direct relation between credit supply and capital requirement represents the main theoretical assumption underpinning the claim for a reduction in the capital requirement for SMEs. Following this assumption, a reduction in capital requirement for that asset class would directly translate into an increase in credit supply to the same asset class. Although this description is appealing, the existence for such a causal relation between a change in capital requirement and credit supply is not straightforward.

In order to explore this relation further, we rely on a set of works that have been produced in the last few years as an attempt to assess the macroeconomic impact of the new Basel III framework. This literature has primarily attempted to estimate the impact of stiffer capital requirements on key macro variables<sup>53</sup> as well as examining the impact on lending spreads.<sup>54</sup>

In what follows, we rely mainly on the work of Angelini and Gerali (2012),<sup>55</sup> which employs a modified version of the works by the Basel Committee on Banking Supervision (2010) and Macroeconomic Assessment Group (2010).<sup>56</sup> Remarkably, in presenting the relevant assumptions and results, we actually use a symmetrical approach with respect to the original works. Indeed, we describe both the banks' options and the estimated impact of a *decrease* (rather than an increase) in regulatory minimum capital requirement. This is a necessary step in order to assess the impact of the reduction in RWs/capital requirement for a given asset class's exposures.

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<sup>53</sup> These works include those of the Basel Committee on Banking Supervision (2010), Macroeconomic Assessment Group (2010), Angelini *et al.* (2011) and Roger and Vlček (2011).

<sup>54</sup> These works include those by Elliott (2009); Hanson *et al.* (2011) for the USA: and Schantz (2010) and Osborne *et al.* (2010) for the UK.

<sup>55</sup> Angelini and Gerali (2012) use a dynamic general equilibrium model of the euro, developed and estimated by Gerali *et al.* (2010), to study banks' possible responses to the stricter capital requirements called for by the Basel III reform package. Baseline results are derived under the assumption that the capital requirement grows linearly over a period of seven years from the value of 9% to 10%. Working with a one-percentage-point increase does not affect the results, which turn out to be approximately linear with respect to the increase. Thus, in the end this exercises yield elasticities – percentage changes in key variables for a one-percentage-point change in the capital requirement – used to assess the impact of reform scenarios.

<sup>56</sup> Indeed, it originates from work conducted to contribute to the Basel Committee on Banking Supervision (2010) and Macroeconomic Assessment Group (2010).

In particular, if such a regulatory option applies, a bank needs to comply with a lower capital requirement than the 'null option', that is a fully fledged implementation of Basel III minima.<sup>57</sup>

In turn, this gives a bank to follow three strategies, which are not mutually exclusive:

- i. Raising less equity than required if this regulatory option was not taking place: Basel III framework enhances banking sector stability by asking banks to maintain a higher capital cushion (with respect to Basel II) to face losses. If a piece of regulation decreases the overall Basel III minimum capital requirement, a possible option for banks may be to reduce the amount of fresh capital to inject in their liability structure.
- ii. Increasing dividends paid out to shareholders: with respect to a fully fledged Basel III implementation, a reduced capital requirement for SMEs may translate to a less urgent need for banks to accumulate additional capital through retained earnings.
- iii. Easing the lending condition through loan spreads: as a consequence of an SME RW reduction, banks are less incentivised to boost profitability through a hike in loan spreads.

These different strategies differ in their impact on economic variables. According to the works mentioned before, while the overall macroeconomic impact is likely to be modest, it can vary substantially depending on the banks' strategies. If banks follow scenario (i), slow down recapitalisation, the impact is likely to be negligible. The macroeconomic impact is more pronounced under scenario (ii), under which banks opt for a less aggressive dividend cut policy. Scenario (iii) has the most pronounced effect. Channelling the capital resources that would have been saved with respect to a fully fledged Basel III implementation could permanently increase credit supply.<sup>58</sup>

As expected, a strategy hinging around an increase in credit resources for the real sector has the most pronounced economic impact. However, what about the likelihood that banks will follow this strategy? In order to answer this additional question, we need to evaluate the effects of the three different strategies on the banks' profitability.

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<sup>57</sup> For the sake of clarity, the following example represents this scenario: the implementation of a total capital ratio (8%) plus a capital conservation buffer (2.5%) as the 'null option' of a full implementation of Basel III requirements; and the implementation of the total capital ratio without the capital conservation buffer as an alternative option.

<sup>58</sup> These findings are consistent with the rest of the literature mentioned before.

From the banks' point of view, the ranking of the three strategies would be, in declining order of preference, a less pronounced cut in dividend, a softer recapitalisation and an ease in credit conditions. According to the studies' results, under both scenario (i) and (more pronouncedly) scenario (ii), banks' profitability in the long run settles at a higher level than in the 'null option' scenario. Differently, profitability stays at its original level under scenario (iii). Thus, under these hypotheses banks have an incentive not to follow option (iii). On the one hand, the incentive for the banks not to ease credit standards is clear. On the other hand, it is unlikely that banks will decide not to transfer part of their gain to their customers.

While some of the conclusions may be specific to the model used, some robust conclusions can be drawn from the above discussion.

- Banks are given a set of (not mutually exclusive) strategies to react to a capital alleviation, in the form of a reduction of capital requirement for a given asset class.
- The impact on both economic growth and credit supply is generally negligible; easing the lending conditions yields more pronounced effects.
- Nevertheless, an analysis from the banks' point of view, based solely on the effects on banks' profitability, suggests that the latter option may be the less likely to be chosen.

## Annex 16

### Recent trends in lending: public sector vs non financial corporations and households

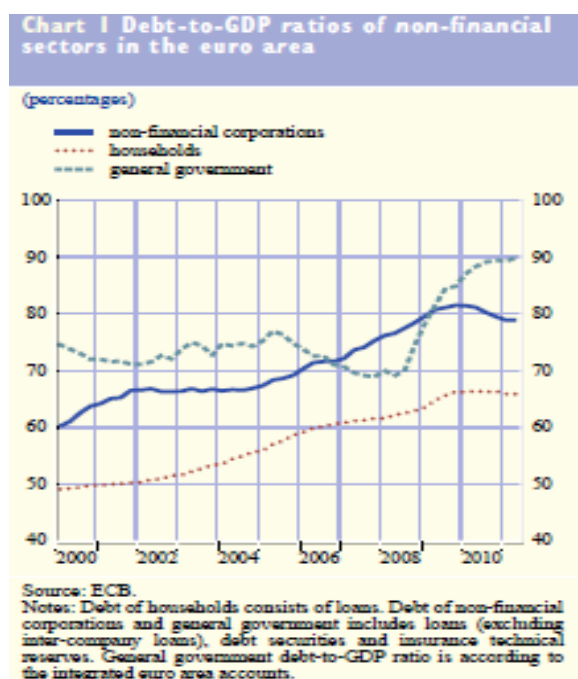


Figure 61: Debt-to-GDP ratios of non-financial sectors in the euro area.



## Abbreviations

AML- Asymptotic Maximum Likelihood

ASRF- Asymptotic Single Risk Factor

AVC- Asset Value Correlation

BACH- Bank for Accounts of Companies Harmonised

CCB- Capital Conservation Buffer

COREP- Common reporting

CRD- Capital Requirements Directive

CRR - Capital Requirements Regulation

DI- Diffusion Index

EBA- European Banking Authority

EBIT- Earnings Before Interest and Tax

EBITDA- Earnings Before Interest, Taxes, Depreciation and Amortisation

ECCBSO- European Committee on Central Balance-Sheet Data Offices

EP-European parliament

FINREP- Financial reporting

IA- Impact Assessment

IRB- Internal Ratings Based

LCR- Liquidity Coverage Ratio

LGD- Loss Given Default

LTRO- Long Term Refinancing Operation

ML procedure- Maximum Likelihood procedure

NOP- Net Operating Profit

NSA- National Supervisory Authority

PD- Probability of Default

PIT PD- Point in time Probability of Default

RW- Risk Weight

RWAs- Risk Weighted Assets

SA- Standardised Approach

SF- Supporting Factor

SME – Small and Medium Sized Enterprise

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