The Economic Impact of Measures Aimed at Strengthening Bank Resilience – Estimates for Austria

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This paper proposes a conceptual framework for analyzing the effects that proposals to strengthen the resilience of the banking sector may have on the Austrian economy. We use this framework to quantify the macroeconomic costs of the following regulatory reform measures: Requiring banks to raise the quality of the regulatory capital base, with or without requiring them to hold additional common equity buffers; introducing a global liquidity standard based on a net stable funding ratio; implementing a contingent capital regime to address the risks created by systemically important banks; abolishing implicit government guarantees for senior bank bonds; and reforming EU rules on deposit guarantee schemes. We estimate the macroeconomic costs for different scenarios on a cumulative three-year basis, comparing medium- and long-term effects on the one hand and direct effects (generated in the domestic economy) and indirect effects (including spillover effects from other euro area countries) on the other hand. The results differ significantly depending on the individual measures, but the macroeconomic costs appear to be within reasonable limits and are comparable with those established for other countries by the Basel Committee on Banking Supervision. In any case, the costs are substantially below the results published by individual banks and interest groups.

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1 Basel III and Economic Growth

In 2010 the Basel Committee on Banking Supervision (BCBS) proposed a set of measures, known as Basel III, to tighten the existing capital and liquidity standards for banks, among which the capital proposals (BCBS, 2009, 2010b and 2010d) have, no doubt, captured most of the limelight. While acknowledging the objective of the reforms – which is to strengthen the resilience of the financial system – the ensuing economic policy debate has also highlighted the fact that the reforms are going to raise costs for banks and may therefore dampen GDP growth. In other words, there is a case of conflicting economic policy objectives.

However, for those negative growth effects to materialize and to have a sizeable impact, a number of conditions must be met according to economic theory: Banks must be undercapitalized by minimum regulatory standards and they must be subject to equity constraints or find it so expensive to raise new equity that the cost of lending becomes a function of the regulatory measures among other things. Furthermore, the dependence of the real economy on bank loans must be significant (Francis and Osborne, 2009, p. 3).[2] Finally, banks must not be in a position to absorb rising funding costs simply by lowering their economic profit or cutting the underlying costs. At any rate, there is more than one link between regulatory patterns and growth dynamics; the size of the growth effect – which may vary considerably from

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[2] *This would imply that the Modigliani-Miller theorem (1958) does not hold.*

country to country or from case to case – depends on the elasticity of credit supply and demand, and on the elasticity of supply- and demand-dependent macroeconomic variables like consumption and investment. Ultimately, determining the size of the growth effect is thus an empirical issue.

The macroeconomic impact of the Basel III proposals has been simulated by dozens of recent studies. Typically, international institutions and central banks have found these negative growth effects to be comparatively low, whereas banks or their lobbying institutions have found those effects to be comparatively high.[3]

In this respect, we consider the Macroeconomic Assessment Group – which was established by the Financial Stability Board and the BSCB and which brings together the macroeconomic expertise of numerous central banks, regulatory agencies and international institutions[4] – to have contributed a particularly relevant meta study on the impact of Basel III (MAG, 2010). Taking the median across all the results obtained (in 89 papers), the MAG estimates a 1-percentage-point increase in the target capital ratio to lead to a decline in the level of GDP by 0.16% (which masks a range of 0.07% to 0.31%, excluding outliers) after 18 quarters given an implementation horizon of four years. Subject to international spillover effects, the GDP level would drop by another 0.03% in the four-year implementation case. Moreover, the consensus is that a longer transition or implementation horizon cushions the negative macroeconomic impact of strengthening the regulatory environment. Following up on the MAG's work, the BCBS (2010a) examined the long-term (steady state) effects of stronger capital and liquidity requirements. In its meta study, a 1-percentage-point increase in the capital ratio maps into a median decline of 0.09% in the level of GDP, while additional funding required to meet the liquidity standards of Basel III was found to decrease the GDP level by another 0.08%.

The Bank of England (2010) and Barrell et al. (2009) arrive at similarly low effects, with the former finding a 6-percentage-point increase in the capital ratio to trigger a 0.6% decline of the GDP level in the long term, and the latter showing a 1-percentage-point rise in the capital ratio to reduce output by 0.08% in the long run.

In contrast, the results published by the Féderation Bancaire Française (FBF, 2010), the Institute of International Finance (IIF, 2010a) and La Caixa (2010) are markedly more pessimistic. La Caixa estimates the GDP level to contract by as much as 5% (in its most probable scenario) in the long term, the FBF arrives at a drop of 6%, and the IIF expects the decline to lie within a range of 2.6 (United States up to 2015) and 4.4% (euro area up to 2020). With regard to the IIF's figures it should be noted that these results also reflect the introduction of bank taxes, and that the costs of the redefined capital requirements were subsequently revised downward by approximately 30% in an update of the study (IIF, 2010b). This means that the impact on the GDP level would also be lower; by how much the effects would be lower has not been specified, however.

With regard to the impact on Austrian banks, two institutions have published figures so far: the Institute for

[3] *For an overview see table A-1 in the annex.*

[4] *See table A-1 in the annex for a list of participating institutions.*

Advanced Studies (IHS, 2010) and Bank Austria (2010). Bank Austria (2010) focused on repercussions for bank profits, funding costs and specifically bank lending spreads, rather than calculating direct growth effects. In its best-case scenario, Bank Austria expects Basel III to lower bank profitability; in its worst-case scenario it expects the banking sector to incur losses: Lending spreads are estimated to go up by between 0.06 and 0.14 percentage points for business loans, and by between 0.13 and 0.30 percentage points for consumer loans. The IHS projections imply that the Austrian GDP level stands to contract significantly compared with the findings of international studies. On the assumption that the loan volume will shrink by 10% (20%), the GDP level is projected to go down by 1.26% (2.49%) over a five-year horizon, and by 2.83% (5.66%) over a ten-year horizon. However, based on the information at hand (the full paper is not publicly available) this calculation would not appear to be conclusive; the scenario based on a 20% reduction of the loan volume even includes repayment of the state's participation capital, which causes the estimated contraction of risk-weighted assets to triple. Unlike all other studies, the IHS estimates are based entirely on a quantity adjustment of risk-based assets,[5] the key assumption being that, in the five years following Basel III implementation, banks will be unable to increase capital ratios either by retaining earnings or by issuing equity. In combination with the assumption that nonfinancial corporations do not have access to alternative financing sources, this scenario yields very high growth losses in the long run. In sum, Bank Austria did not look into growth effects, and the IHS relied on assumptions that do not facilitate meaningful international comparisons and singled out capital requirements from the wide range of measures proposed to improve the resilience of the banking system.

The study we have undertaken closes this gap and analyzes the negative growth effects that the various measures to strengthen bank resilience may have on the Austrian economy. The most prominent (and the most cost-intensive) proposals are the measures aimed at tightening the capital standards. In our long-term three-year scenario, we find the requirement to raise the quality of core tier 1 capital together with the need to hold additional capital buffers (which we assume, for the sake of illustration, to push the common equity tier 1 ratio 1 percentage point above the future regulatory minimum and above current buffer levels) to map into a cumulative 0.26% decline in GDP growth (including spillover effects from other euro area countries on GDP in Austria). In other words, our results are comparable with those of the BCBS.

This paper is organized as follows: Section 2 describes the conceptual framework of our analysis and the underlying methods. Based on this framework, we quantify the impact that the changes to the regulatory framework for banks are likely to have on the Austrian economy (section 3). Specifically, we analyze the macroeconomic costs of six different proposals: (1) requiring banks to raise the quality of tier 1 capital (which includes the requirement to build up capital conservation buffers); (2) requiring banks to raise the quality of equity capital and to hold additional

[5] *This assumption does not exclude an endogenous increase of loan rates.*

buffers on top of the capital conservation buffers (which we assume, for purely illustrative reasons, to be equivalent to a 1-percentage-point increase in the common equity tier 1 ratio); (3) introducing a global liquidity standard based on a net stable funding ratio; (4) implementing a contingent capital regime to address the risks created by systemically relevant banks; (5) abolishing implicit government guarantees for senior bank bonds; and (6) reforming EU rules on deposit guarantee schemes. Four of those measures are linked directly or indirectly with Basel III and corresponding drafts of EU legislation. On the issue of deposit guarantee schemes, the European Commission (2010b) has submitted a proposal. Implicit government guarantees might be abolished, for instance, through the implementation of a bank resolution regime, but on this point the EU proposal is yet to be drafted. We have covered this point nonetheless, as it plays a prominent role in the debate on the future regulatory framework.[6] Section 4 provides a summary of the key results, compares the results with the findings of other studies and also discusses potential sources of over- or underestimation of the growth impact.

2 Conceptual Framework of Analysis

Unless adjusted, traditional macro models which have been designed to simulate the effect of economic policy measures and to make macroeconomic projections are typically not able to capture the macroeconomic effects of regulatory measures directly, as most of these models have not been developed further to include (sophisticated) financial market frameworks. Against this backdrop, different papers have used different analytical approaches. Some economists have developed special macro models which serve to analyze the issues at hand directly. Given the complexity of such models, others have opted for reduced-form models. A third variant is to first use partial-equilibrium models to establish the direct effects that regulatory measures have on the loan market (e.g. on the supply of loans and on loan rates) and to subsequently incorporate the partial-equilibrium model results (e.g. bank lending spreads) as exogenous variables into dynamic stochastic equilibrium models or structural macroeconomic models to work out the overall macroeconomic impact.

In this study, we have opted to proceed along the lines of the third approach, which is also the approach on which the core MAG (2010) results are based: We use three steps to simulate the macroeconomic impact of the different regulatory measures: First, we estimate the absolute costs that the respective measures entail for the Austrian banking sector per year. Second, we convert these costs into a corresponding increase of loan rates based on a number of underlying assumptions. Third, we simulate the macroeconomic effects of rising lending spreads using the OeNB's quarterly macroeconomic model,[7] with due regard to spillover effects from other euro area countries.

Our analysis is based on the assumption that the measures will be implemented over a three-year horizon

[6] *The scope of this paper is limited to the six regulatory measures listed here. We do not address the issue of a non-risk-based leverage ratio or that of a systemic risk surcharge, as the specification and calibration of those two measures were too vague when this article went to press to permit meaningful analysis.*

[7] *The documentation on the "Austrian Quarterly Model" is publicly available (Schneider and Leibrecht, 2006).*

and under the current economic conditions. The numerous unknown variables in the analysis have been a challenge in parametrizing the model. This is why the results should not be read as projections but rather as *tentative estimates of how the macroeconomic costs of the individual measures relate to each other.* Last but not least, our analysis is limited to quantifying the macroeconomic costs of the proposed measures; these costs need to be seen in relation to the substantial costs of banking crises.[8]

2.1 Absolute Costs of Individual Regulatory Measures

To design a consistent conceptual framework for assessing the above-named measures, we translate all regulatory proposals into annual flows, i.e. into annual averages of the additional costs that the Austrian banking sector would have to bear. As identification and data problems do not allow us to estimate reliable demand and supply functions of the various bank products, we work with the following two scenarios: In a medium-term scenario[9] we assume that banks implement each measure step by step over a three-year horizon (with the exception of deposit guarantee schemes, which would need to be implemented without delay once the respective EU directive has been transposed into national law). Consequently, any additional costs per year can be passed through only to the average amount of new loans that banks extend during those three years. In a long-term scenario we start from the assumption that banks have implemented the measures in full and are able to reprice their entire loan portfolio.

2.2 Mapping Absolute Costs of Regulatory Measures into Higher Lending Spreads

The incidence of additional costs is dependent on a number of factors: the capital and liquidity intensity of bank products, the relative elasticity of supply and demand of those products, and banks' pricing power (see e.g. Hartmann-Wendels et al., 2007, p. 685ff.). The regulatory measures discussed here affect both the banking sector's equity capital and its debt capital. While the cost of refinancing debt feeds into internal fund transfer prices (CEBS, 2010) and is not a direct function of return on equity (ROE),[10] the cost of raising equity is directly dependent on ROE targets;[11] therefore, we estimate different scenarios with different ROE targets.

2.2.1. Debt Funding

Our analysis is based on an extended market rate model of product pricing as used in banking management (Hartmann-Wendels et al., 2007, p. 709 ff.). We estimate the additional funding costs banks would face each year based on the spread between the refinancing

[8] *On this point, see the extensive literature survey in annex 1 to BCBS (2010a) or Laeven and Valencia (2010).*

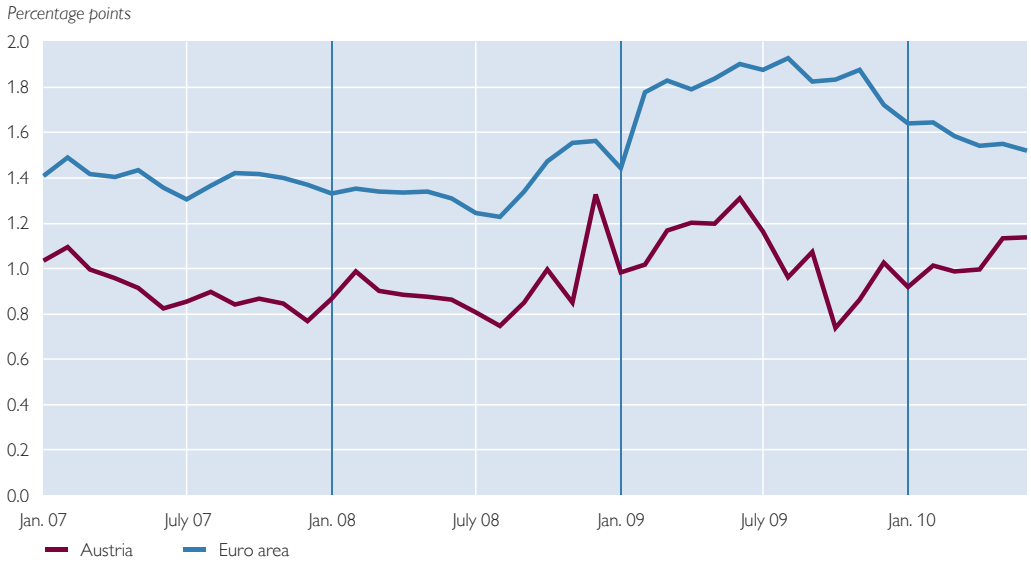
[9] *Our definitions of medium- and long-term scenarios differ from the common macroeconomic distinction between medium-term analyses (of business cycles) and long-term (equilibrium growth) analyses.*

[10] *In the case of debt funding, we calculate funding spreads and the impact on internal fund transfer prices, and we assume that the marginal debt raised does not feed back into ROE. Button et al. (2010) provide empirical evidence for the U.K. showing that lending costs rose even more sharply than internal transfer prices during the crisis. This can be explained by a back book effect: refinancing the existing loan portfolio becomes more expensive, but it is often impossible to price these higher costs into interest rates ex post.*

[11] *The targeted ROE has a direct impact on the bank's costs, as it determines the target interest rate for equity.*

Chart 1

Spreads between Euro-Denominated Corporate and Household Loans and Deposits



Source: OeNB, ECB.

instruments which the new regulatory framework would prescribe and those that they replace.

Banks have pricing power for just a few – if any – balance sheet positions. In the case of trading book and interbank transactions, with regard to liquid assets, own debt issues and participating interests and so on, banks are price takers in the money and debt capital markets. The area in which they have pricing power and may try to price additional costs into their products is, essentially, the deposit and loan business. However, loans are capital-intensive and highly liquidity-intensive products, which means that capital and liquidity costs need to be reflected adequately in loan pricing in line with competitive product pricing. Moreover, competition for deposits has risen considerably recently as a result of the BCBS liquidity rules and the recent liquidity crisis. Last but not last, interest rate margins are already very low in Austria (see chart 1). This is why our scenarios are based on the assumption that banks will attempt to recoup any additional costs by charging correspondingly higher lending rates. Assuming constant loan-based income streams, the spread by which lending rates need to rise depends, ceteris paribus, on how big the amount of new loans is to which the additional costs can be passed through.

To be able to estimate average outstanding loan volumes for the medium-term and the long-term scenarios, we need to combine different data sources, as maturity data and data on new lending are available only on an unconsolidated basis. At the end of 2009, the loan portfolio of Austrian banks totaled EUR 415 billion on an unconsolidated basis. Naturally, banks are not in a position to reprice their entire portfolio at any one point. The volume of loans that banks can reprice in our medium-term scenario consists of any new loans they

extend during that period: short-term loans (with a maturity of up to 1 year), loans with a maturity of more than 1 year and up to 5 years (which we assume to have an average maturity of 3 years) and loans with a maturity of more than 5 years (which we assume to have an average maturity of 12.5 years). In other words, the average outstanding loan portfolio to be repriced over the three-year horizon equals approximately EUR 170 billion p.a. In the long-term scenario we assume banks to be able to reprice the entire loan portfolio of EUR 415 billion. Another aspect to be considered is that an analysis of equity funding makes sense only on a consolidated basis. For this purpose, we use the consolidated reports filed by banking groups (based on IFRS and Commercial Code rules) and adjust the loan volume that may be repriced with an adjustment factor of 1.22. This adjustment factor results from the relation between the lending data reflected in the financial accounts and the data reported by the respective banking groups. Here we need to make the additional assumption that lending volumes, average maturities and pricing powers are the same in all submarkets. In this context, the higher credit spreads demanded in Central, Eastern and Southeastern European countries may partially offset the higher competition pressures prevailing in Austria. Eventually, we thus work on the assumption that the average loan repricing volume is approximately EUR 200 billion in the medium-term scenario and approximately EUR 500 billion in the long-term scenario.

While the additional costs of raising debt feed into product pricing through the internal fund transfer price, modeling the additional costs of raising equity is more complex and therefore described separately below.

2.2.2 Equity Funding

To quantify the impact of higher capital ratios on bank lending spreads, we adapt and generalize a loan pricing equation proposed by Elliott (2009). We start from the presumption that a loan should be made only if it provides sufficient return to cover the underlying costs. Expressed in an equation, this specification reads

$$r_{Loan} * (1 - tax) \geq equity * roe + \\ + (1 - tax) * ((1 - equity) * r_{Debt} + \\ + risk + adm),$$

where r_{Loan} = the interest rate on the loan, *equity* = the proportion of equity backing the loan, *roe* = the marginal return on equity, *tax* = the tax rate, r_{Debt} = the interest rate on debt (including deposits) funding the loan, *risk* = the risk premium (such as the credit spread) und *adm* = administrative and other expenses related to the loan. In formulating their irrelevance theorem, Modigliani and Miller (1958) assumed that the tax treatment of debt and equity was equivalent. Yet in practice, debt is tax-deductible while equity payments are not. This is why we include taxes only in the specification for debt.[12] When banks fund a loan with a higher proportion of equity, the share of debt (*1 – equity*) goes down mutatis mutandis. Typically, equity-based funding is more expensive for banks than debt funding, among other things because debt is subsidized by implicit government guarantees and by favorable tax treatment.

[12] *Factors determining the share of capital in the capital mix include information asymmetries, conflicts of interest among managers, equity investors and debt investors, and rating agency constraints.*

The decision of whether to reduce the leverage ratio by increasing the proportion of equity funding boils down to the question of whether this would increase the (average) capital costs of banks – and thus decrease their market value, which would go against the interests of equity investors. At the same time, banks are able to decrease the risk per unit of equity capital by substituting equity for debt funding, as a result of which equity capital costs go down (see Hartmann-Wendels, 2002, p. 536). The capital structure irrelevance theorem of Modigliani and Miller (1958) states that the two aforementioned effects will offset each other under optimal market conditions (absence of frictions and capital market imperfections), and that a company's average capital costs will ultimately not be affected by its sources of funding. Moving beyond the world of theory, the capital structure irrelevance theorem does not hold in imperfect markets: If, say, a bank is unable to raise additional equity in the market (as is the case in particular for the decentralized sectors of the banking system), its only options (ceteris paribus) are indeed to either lend less or to make less risky loans in order to reduce the volume of risk-weighted assets, or to charge higher default risk premiums, i.e. to raise lending rates. Thus, increases in the capital requirements would appear to be problematic above all for those banks which are unable to raise new equity in the market because of market access constraints (and hence imperfect capital markets). These banks will either have to curb (risky) lending (which is equivalent to credit rationing) or raise risk premiums.

While our simulations are based on the assumption that capital requirements affect neither debt funding costs, taxes, risk premiums nor administrative costs, we need to take into account that banks will be able to pass rising funding rates onto customers to different extents; therefore we quantify the effects that different capital ratios may have for different ROE levels and for different loan repricing volumes. The smaller the extent to which banks may pass through higher costs to their customers, the larger the impact of costs on their returns will be (given constant cost-income ratios). This is why we conduct our simulations with ROE levels of 10%, 15%, 20% and 25%, respectively. We consider the lower limit for the medium- and long-term ROE to lie at 10%, because the capital costs of Austrian banks currently exceed 10% so that they should find recapitalization at ROE target rates below 10% difficult.[13] Our other assumptions are as follows: Taxes (tax) = 30%, interest rate on debt (r_{Debt}) = 5%, risk premium ($risk$) = 3%, and administrative costs (adm) = 1.5%. We did not simulate any instances of rationing in the capital market, as Austria's banks managed to increase their tier 1 capital by some EUR 12 billion (excluding government participation capital and extra-ordinary effects) despite interim losses even under the highly adverse market conditions prevailing in the period from Q2 07 to Q2 10.

2.3 Macroeconomic Simulations

In the following simulations, we take the higher lending spreads that we established for the measures discussed here as the starting point for quantify-

[13] *At the same time, Basel III might cause capital costs to decrease in the long term. The ROE averaged 12.2% for a broad sample of banks during the period from 1995 to 2009 (BIS, 2010).*

ing the effects that they are likely to have on the Austrian economy (GDP, private consumption, gross fixed capital formation and HICP inflation). To simulate the direct effects of these scenarios on the Austrian economy (changes in long-term interest rates), we use the OeNB's macroeconomic Austrian quarterly model (AQM). In the AQM, higher interest rates work through a number of channels, with varying effects: Above all, higher interest rates drive up the real user costs of capital and as such have a particularly strong impact on corporate investment demand. In addition, but to a much smaller extent, higher interest rates also dampen private consumption, as they cause the saving ratio to increase and net household income to decrease (through a decline in employment). Moreover, higher interest rates also work through the exchange rate channel, as they cause the domestic currency to appreciate against other currencies and thus cause exports to decline. In the case of Austria as a small open economy, the impact on the price level will be limited.

As the implementation of the proposals to amend the regulatory requirements will not be limited to Austria, we are also taking into account the real economic effects that those measures are going to have on the other euro area countries. We do so by integrating projection update elasticities, as provided by the Eurosystem NCBs. These projection update elasticities reflect the elasticity of key economic variables (HICP, GDP, etc.) with regard to interest rates, oil prices, exchange rates, etc. This step serves to explicitly catch any spillover effects between the euro area countries that arise from changes in import demand and trade prices. To simplify this exercise, we assume that the proposed measures are going to drive up lending spreads by the same amount in all euro area countries.

The simulations were run for two different scenarios (a medium-term and a short-term scenario), which differ with regard to the implementation horizon of the proposed measures and with regard to banks' loan repricing volumes but not with regard to the simulation horizon (three years each). We assume the shocks that we analyzed to be of a permanent nature. In the medium-term scenario, we assume lending rates to be adjusted gradually at quarterly intervals in the first year. In other words, the new target interest rate will not be reached until the fourth quarter of the first year. All simulation results reflect the cumulative baseline deviation of the growth rates in percentage points or the baseline deviation of the GDP level in percent after a period of three years. *The simulation results are broadly linear, i.e. they can be scaled accordingly for different lending spreads.*

3 Macroeconomic Costs of Different Regulatory Measures

3.1 Requiring Banks to Raise the Quality of Capital

The proposal to require banks to raise the quality of capital (and hold capital conservation buffers) is the most prominent and also the most cost-intensive of all proposed measures.

Minimum capital requirements stipulate that (groups of) credit institutions need to hold certain amounts of capital to cushion the risks of their assets. The key rationale for these capital cushions is the need to ensure that banks are adequately capitalized and remain solvent even if unexpected losses materialize. Austrian credit institutions are obligated to hold eligible capital for their business operation risks (credit risks, market risks, operational

risks) at all times in line with the minimum capital requirements specified in Article 22 of the Banking Act. Which forms of capital are deemed eligible in this respect, has been laid down in Article 23 of the Banking Act. As a rule, different types of capital are eligible to different extents. The regulatory framework known as Basel II differentiates between three "tiers" of capital: core capital (tier 1), supplementary capital (tier 2) and subordinated debt (tier 3). The respective minimum capital requirements are expressed as capital ratios, i.e. as the levels of capital that banks must hold relative to their risks. Ever since Basel I, capital ratios have related to banks' risk-weighted assets rather than to their total assets, the idea being that in line with different risk profiles, different buffers will be adequate for different positions. Hence, the absolute amounts of capital banks are required to hold depend above all on the risks they incur and, thus, on the size of their risk-weighted assets. Banks' capital adequacy ratios thus reflect the amount of eligible capital they hold relative to risk-weighted assets.

Another key indicator of a bank's shock-absorbing capacity, alongside the capital adequacy ratio, is the tier 1 ratio. This indicator has become increasingly significant since the financial crisis that emerged in 2007. Unlike the capital adequacy ratio, the tier 1 ratio reflects only capital of the highest quality that banks may use to absorb losses right as they incur. The latest banking and financial crisis has evidenced the need to improve the quality of tier 1 capital, as under the existing Basel II framework credit institutions have been classifying capital items under tier 1 capital that are not necessarily loss-absorbing in the event of adverse developments.

The proposals for a new regulatory regime, dubbed Basel III, which are to be implemented in the EU through amendments to the Capital Requirements Directive (CRD IV), have been designed to simplify the capital structure and to raise the quality of capital (European Commission, 2010a). Under Basel II, banks have in essence been required to achieve a capital adequacy ratio of at least 8% of risk-weighted assets and a tier 1 ratio of at least 4% of risk-weighted assets.

The way things stand at the time of writing, Basel III is shifting the focus from tier 1 capital toward "common equity tier 1 capital" by imposing the constraint that the predominant form of capital must be common shares and retained earnings. Moreover, deductions from capital of intangible assets or stakes in insurance companies and the like will henceforth need to be made, as a rule, from common equity tier 1 capital rather than from the overall level of tier 1. Last but not least, minority interests and hybrid forms of capital will cease to be eligible for inclusion in tier 1 capital under the Basel III proposals published in December 2009 (BCBS, 2009), which should also be instrumental in improving the quality of tier 1 significantly. That said, the latest proposals (BCBS, 2010c and 2010d) have become somewhat more lenient on this point. In the future, only core capital (tier 1) and supplementary capital (tier 2) will be deemed eligible by the regulatory agencies. In other words, tier 3 will be abolished, so that the capital used to meet market risk requirements must be of a higher quality. To be included in tier 1, instruments will, as a rule, need to be sufficiently loss-absorbent on a going-concern basis.

In the context of this study, we have assessed how the new definition of tier 1 capital affects the aggregate capital

ratios of the Austrian banking system.[14] We used banks' reporting data and essentially adjusted them in line with the new regulatory provisions. We thus found the Austrian banking sector to need to raise EUR 8.9 billion to be able to meet the required common equity tier 1 levels (including capital conservation buffers).

The macroeconomic effects of several regulatory requirements are estimated based on the assumption that credit institutions are going to meet the new standards solely by raising additional equity (rather than, for instance, reducing their risk-weighted assets by shifting to less risky portfolios, or, closely related, by transferring risks and thus reducing the risks on their balance sheets). Note that our estimates of the effects that Basel III is likely to have in terms of raising the quality of equity capital explicitly refer to the latest proposals of the BCBS (2010d) dated September 12, 2010. Moreover, our figures include a (common equity tier 1) capital conservation buffer in the range of 62.5 to 250 basis points.[15] Furthermore, we also assume that Austrian banks will *retain the option of deducting participating interests in the central institution of their sector,* as laid down in Article 23 paragraph 13 item 6 Banking Act. This derogation is meant to create a level playing field for the decentralized sectors of the Austrian banking system vis-à-vis the incorporated banks and is a specialty of the Austrian banking sector. At the time of writing, this derogation is subject to an intensive debate, the outcome of which is still unclear. We have opted to as-

Table 1

Medium-Term Growth Impact of Higher Quality of Core Tier 1 Capital (Introduction of Common Equity Tier 1 Capital)

		ROE 10%	ROE 15%	ROE 20%	ROE 25%
	Costs (EUR million p.a.)	386	682	979	1.276
	Lending spread (change in basis points)	19	34	49	64
Direct growth impact over 3 years[1]	GDP	–0.11	–0.19	–0.27	–0.35
	Gross fixed capital formation	–0.34	–0.59	–0.85	–1.11
	Private consumption	–0.15	–0.27	–0.39	–0.51
	HICP	–0.04	–0.07	–0.09	–0.12
Direct and indirect growth impact over 3 years[1]	GDP	–0.15	–0.26	–0.37	–0.48
	Gross fixed capital formation	–0.39	–0.69	–0.99	–1.29
	Private consumption	–0.17	–0.31	–0.44	–0.57
	HICP	–0.05	–0.08	–0.12	–0.16

Source: Simulations based on the OeNB's AQM (direct effects) and on Eurosystem NCBs' projection update elasticities (indirect effects), Eurostat.

[1] Cumulative deviation of simulated growth rates from baseline in percentage points.

Note: Medium-term: Pass-through of increased spreads to new loans and step-wise adjustment to new regulations.
Long-term: Pass-through of increased costs to entire loan portfolio and full adjustment to new regulations.

[14] As defined by the European Commission (2010a) and BCBS (2009, 2010d). The following estimates give an indication of the banking system's recapitalization needs following implementation of Basel III for the purpose of our study, i.e. for analyzing the macroeconomic effects of Basel III. However, those figures must not be seen as a supervisory interpretation of Basel III.

[15] In contrast, we have not explicitly integrated countercyclical buffers (ranging from 0 to 2.5 percentage points of common equity tier 1 capital) as those measures have not yet been specified in sufficient detail and are ultimately going to be implemented according to national circumstances. What we have simulated is the effect of creating an additional buffer by increasing the level of common equity tier 1 (by 1 percentage point, for the sake of illustration); see section 3.2.

Table 2

Long-Term Growth Impact of Higher Quality of Core Tier 1 Capital (Introduction of Common Equity Tier 1 Capital)

		ROE 10%	ROE 15%	ROE 20%	ROE 25%
	Costs (EUR million p.a.)	579	1,024	1,469	1,914
	Lending spread (change in basis points)	12	21	29	38
Direct growth impact over 3 years[1]	GDP	–0.07	–0.12	–0.17	–0.23
	Gross fixed capital formation	–0.22	–0.40	–0.57	–0.74
	Private consumption	–0.10	–0.18	–0.26	–0.34
	HICP	–0.03	–0.06	–0.08	–0.10
Direct and indirect growth impact over 3 years[1]	GDP	–0.09	–0.16	–0.23	–0.30
	Gross fixed capital formation	–0.26	–0.45	–0.65	–0.85
	Private consumption	–0.12	–0.20	–0.29	–0.38
	HICP	–0.04	–0.07	–0.10	–0.12

Source: Simulations based on the OeNB's AQM (direct effects) and on Eurosystem NCBs' projection update elasticities (indirect effects), Eurostat.

[1] Cumulative deviation of simulated growth rates from baseline in percentage points.

Note: Medium-term: Pass-through of increased spreads to new loans and step-wise adjustment to new regulations.
Long-term: Pass-through of increased costs to entire loan portfolio and full adjustment to new regulations.

sume that this clause will be retained but, to give a full picture, we have detailed the changes that would result should this derogation be abolished. To complete the picture, we have also quantified the Austrian banking system's total *capital adequacy requirements* (tier 1 and tier 2 under the Basel III framework) and assessed the corresponding impact on the Austrian economy (rather than limiting our assessment to the common equity tier 1 ratio, which is likely to be the central and most prominent capital ratio of the future).

In the medium-term scenario, we single out a low ROE of 10% as our main scenario, given that banks are likely to continue to feel the repercussions of the crisis and will most likely not be in a position to pass through the entire cost of the new regulatory framework to their clients in the simulation horizon. Here we find the cumulative three-year macroeconomic effect to be such that GDP growth declines by 0.11 percentage points (see table 1). This decline in the headline figure masks a more pronounced reduction (–0.34 percentage points) in growth of gross fixed capital formation. The impact on the HICP inflation rate appears to be limited.

As the capital proposals are meant to be implemented throughout the EU, we also need to take into account the indirect effects, which bring the total decline in GDP growth (including direct effects) to 0.15 percentage points. This wider perspective also implies a somewhat stronger overall decline in the growth rate of gross fixed capital formation (–0.39 percentage points). In comparison, a ROE of 15% rather than 10% would substantially reinforce the direct effects (decline in output growth by 0.19 percentage points) and also the combined direct and indirect effect (decline in output growth by 0.26 percentage points). A further increase of ROE to 25% would, according to our model calculations, cause GDP growth to contract by a total of 0.48 percentage points (reflecting both direct and indirect effects).

In the long-term scenario we wish to highlight the results based on a ROE of 15%, which in the long term seems

to be most closely aligned with past experience (see table 2). Here, the direct effects as simulated by the model would add up to a cumulative decline in GDP growth of 0.12 percentage points, and of 0.40 percentage points in gross fixed capital formation. Given EU-wide implementation, we also include EU spillovers and thus arrive at an overall decline of 0.16 percentage points for GDP growth and of 0.45 percentage points for gross fixed capital formation.[16] The comparative calculations with higher levels of ROE again show the size of the direct and indirect effects to depend substantially on the ROE levels.

If the derogation under Article 23 paragraph 13 item 6 Banking Act cannot be retained, funding costs are estimated to rise by as much as EUR 520 million in the medium-term scenario and by as much as EUR 1.4 billion in the long-term scenario (reflecting both direct and indirect effects). Those figures map into a total rise in lending spreads by 26 (28) basis points and into a total contraction of GDP growth by 0.20 (0.22) percentage points.

When we compare the results of the medium-term and the long-term scenario, we find the macroeconomic effects to be stronger for the same ROE levels over the medium term. While the absolute costs are indeed higher in the long term for the same ROE levels, these costs can be spread over a markedly larger volume of loans that can be repriced, so that the lending spreads are in fact lower in the long term. Thus, the sooner banks start implementing the measures, the longer are the transition horizons at which they can aim. This increases the volume of loans that come up for repricing, and this decreases the lending spreads required to finance the higher costs, as a result of which the macroeconomic costs are lower ceteris paribus.

Table 3

Combined Medium-Term Growth Impact of Higher Quality of Core Tier 1 Capital and Additional Buffers (+1 pp of Common Equity Tier 1 Capital)

		ROE 10%	ROE 15%	ROE 20%	ROE 25%
	Costs (EUR million p.a.)	752	1,232	1,712	2,192
	Lending spread (change in basis points)	31	62	86	110
Direct growth impact over 3 years[1]	GDP	–0.17	–0.34	–0.47	–0.61
	Gross fixed capital formation	–0.54	–1.07	–1.49	–1.91
	Private consumption	–0.25	–0.49	–0.68	–0.87
	HICP	–0.06	–0.12	–0.16	–0.21
Direct and indirect growth impact over 3 years[1]	GDP	–0.23	–0.46	–0.64	–0.82
	Gross fixed capital formation	–0.63	–1.25	–1.73	–2.22
	Private consumption	–0.28	–0.55	–0.77	–0.98
	HICP	–0.08	–0.15	–0.21	–0.27

Source: Simulations based on the OeNB's AQM (direct effects) and on Eurosystem NCBs' projection update elasticities (indirect effects), Eurostat.

[1] Cumulative deviation of simulated growth rates from baseline in percentage points.

Note: Medium-term: Pass-through of increased spreads to new loans and step-wise adjustment to new regulations.
Long-term: Pass-through of increased costs to entire loan portfolio and full adjustment to new regulations.

[16] Overall, the capital adequacy costs (tier 1 plus tier 2) total EUR 641 million per annum in the medium-term scenario and EUR 1.7 billion per annum in the long-term scenario, which raises lending spreads by 32 (34) basis points and causes GDP growth to go down by 0.24 (0.27) percentage points (reflecting both direct and indirect effects). If the derogation under Article 23 paragraph 13 item 6 Banking Act cannot be retained, total capital adequacy costs would rise by as much as EUR 793 million (EUR 2.1 billion), which means that lending spreads would rise by 40 (42) basis points and GDP growth would go down by 0.30 (0.33) percentage points.

3.2 Requiring Banks to Raise the Quality of Capital and to Hold Additional Buffers

Apart from requiring banks to build up capital conservation buffers over the regulatory capital minimum that will help them to better absorb losses in periods of financial or economic stress, the BCBS would also require banks to add on countercyclical buffers ranging from 0 to 2.5 percentage points of common equity tier 1 capital. Irrespective of the buffers designed by the BCBS, the markets (or investors) might well be critical of credit institutions which do not exceed the regulatory minimum (by much) and hence force them to do better than the regulatory minimum. In this section we look into the effects that additional buffers other than capital conservation buffers are likely to have on lending spreads and the economy. By way of illustration, we quantify the combined effects of increasing the quality of capital (as outlined in section 3.1) and of creating an additional buffer equivalent to a 1-percentage-point increase in the common equity tier 1 ratio.

In the medium-term estimates, our main scenario is again based on a ROE of 10%. Raising the quality of capital and building an additional buffer equivalent to a 1-percentage-point increase of the common equity tier 1 ratio causes lending spreads to go up by 31 basis points, GDP growth to contract by 0.17 percentage points and growth of gross fixed capital formation to go down by 0.54 percentage points over the three-year horizon (see table 3), when we look at Austria alone. To catch spillover effects within the EU it is, again, important to add indirect effects, which brings the total contraction of GDP up to 0.23 percentage points. Here, too, the model calculations show that higher ROE levels drive up the macroeconomic costs significantly.

In the long-term scenario (see table 4) we again focus on a ROE of 15%. The macroeconomic effects of raising the quality of capital and creating an additional buffer equivalent to a 1-percentage-point increase in the common equity tier 1 ratio are such that lending spreads go up by 33 basis

Table 4

Combined Long-Term Growth Impact of Higher Quality of Core Tier 1 Capital and Additional Buffers (+1 pp of Common Equity Tier 1 Capital)

		ROE 10%	ROE 15%	ROE 20%	ROE 25%
	Costs (EUR million p.a.)	1,129	1,656	2,569	3,289
	Lending spread (change in basis points)	23	33	51	66
Direct growth impact over 3 years[1]	GDP	–0.13	–0.20	–0.30	–0.39
	Gross fixed capital formation	–0.44	–0.64	–1.00	–1.28
	Private consumption	–0.20	–0.30	–0.46	–0.59
	HICP	–0.06	–0.09	–0.14	–0.18
Direct and indirect growth impact over 3 years[1]	GDP	–0.18	–0.26	–0.41	–0.52
	Gross fixed capital formation	–0.50	–0.74	–1.14	–1.46
	Private consumption	–0.22	–0.33	–0.51	–0.66
	HICP	–0.07	–0.11	–0.17	–0.21

Source: Simulations based on the OeNB's AQM (direct effects) and on Eurosystem NCBs' projection update elasticities (indirect effects), Eurostat.

[1] Cumulative deviation of simulated growth rates from baseline in percentage points.

Note: Medium-term: Pass-through of increased spreads to new loans and step-wise adjustment to new regulations.
Long-term: Pass-through of increased costs to entire loan portfolio and full adjustment to new regulations.

points and that GDP growth contracts by 0.26 percentage points over the three-year simulation horizon (reflecting both direct and indirect effects). Again, the macroeconomic effects would be almost twice as strong for an ROE of 25%.

If the derogation under Article 23 paragraph 13 item 6 Banking Act cannot be retained, funding costs would rise by as much as EUR 972 million under the medium-term scenario and by as much EUR 2 billion under the long-term scenario (reflecting direct and indirect effects). Those figures map into a total rise in lending spreads by 38 (41) basis points and a total contraction of GDP growth by 0.29 (0.32) percentage points.[17] In other words, raising the quality of capital alone, without creating buffers beyond the regulatory minimum, implies but moderate macroeconomic costs. Regulatory requirements or market demands to hold additional common equity buffers stand to drive up lending spreads more significantly and would thus also translate into stronger macroeconomic effects.

3.3 Liquidity Requirements under Basel III: Net Stable Funding Ratio

In the debate on liquidity standards, the BCBS proposed to establish two global minimum liquidity ratios by introducing a liquidity coverage ratio and a net stable funding ratio (BCBS, 2009 and 2010b). The liquidity coverage ratio (LCR) is meant to ensure that banks maintain a stock of high-quality liquid assets which is sufficient to meet short-term liquidity needs. Eligible assets include above all sovereign bonds, central bank reserves as well as nonfinancial corporate bonds with low credit risk. The objective of the net stable funding ratio (NSFR) is to promote more medium and long-term funding of assets. The idea is to require banks to hold to a minimum amount of long-term funding in relation to the underlying liquidity risk of assets. The available amount of stable funding must be proven to exceed the required amount of stable funding in a stress scenario. The NSFR thus limits the amount of maturity transformation a bank may undertake. Due to the structure of the liquidity coverage ratio, estimating the LCR is rather difficult, which is why we concentrate on the NSFR in the following. Moreover, the NSFR is going to have significantly higher structural implications, as it may fundamentally change the maturity transformation of banks' operations. This means that it is also going to have the stronger macroeconomic effects.

Under the agreement reached on the reform package by the Group of Governors and Heads of Supervision – the oversight body of the BCBS – on July 26, 2010, the NSFR will be subjected to an observation phase and will not be introduced before 2018 (BCBS, 2010b). We are nonetheless assessing the impact of the calibration of the NSFR in our paper, based on the balance sheet structure of the Austrian banking system as at December 31, 2009.

[17] *Servicing additional capital requirements for meeting the total (tier 1 plus tier 2) capital adequacy ratios and creating an additional buffer raising the common equity tier 1 ratio by, say, 1 percentage point amounts to EUR 1.1 billion per annum in the medium-term scenario and EUR 2.3 billion per annum in the long-term scenario, which raises lending spreads by 44 (46) basis points and causes GDP growth to go down by 0.33 (0.37) percentage points (reflecting both direct and indirect effects). If the derogation under Article 23 paragraph 13 item 6 Banking Act cannot be retained, the cost of servicing additional capital requirements would increase to EUR 1.4 billion (EUR 2.8 billion), which would in turn raise lending spreads by 52 (56) basis points and cause GDP growth to go down by 0.39 (0.44) percentage points.*

The simulations are based on market opinions, initial internal exercises at major domestic banks and internal OeNB estimates. Assuming in line with market assessments that NSFR implementation will increase EU-wide long-term refinancing needs by between EUR 1,100 billion and EUR 2,600 billion, and assuming that Austrian banking assets (approximately EUR 1,150 billion) account for roughly one-thirtieth (approximately EUR 31,000 billion) of European banking assets, Austrian banks would need to secure additional long-term funding in the range of EUR 33 billion to EUR 80 billion to meet the NSFR standards. Estimates made within the framework the Quantitative Impact Study (QIS) launched by the BIS arrived at a figure at the lower end of this spectrum, namely some EUR 35 billion, which can be attributed to the fact that the balance sheets of Austrian banks exhibit a higher degree of liquidity than the European average.

Austria's largest banks currently expect spreads of long-term refinancing costs above mid-swap of between 60 to 70 basis points and 110 to 150 basis points; against this backdrop we assume the spreads to average 120 basis points for the Austrian banking system. Based on the assumption of additional long-term funding needs of EUR 35 billion over the next three years, which we established above, banks would need to raise their issuance volumes by EUR 11.7 billion in each of the three years of our simulation horizon. In practice, as banks stagger their necessary issuance activities in the medium term over three years, we assume that the stock of long-term debt increases by EUR 23.3 billion on average over the three years. Based on this amount and on a spread of 120 basis points, we arrive at additional annual funding costs of EUR 280 million on average. In the long-term scenario the outstanding stock of long-term debt increases to the full amount of EUR 35 billion, which drives up banks' additional funding costs to EUR 420 million per year. In addition to extending the refinancing horizon, banks may also resort to the substitution of assets: They may replace assets which are assigned high weights under NSFR (such as loans) with assets that carry low weights (such

Table 5

Growth Impact of a Net Stable Funding Ratio

		Medium-term scenario	Long-term scenario
	Costs (EUR million p.a.)	280	420
	Lending spread (change in basis points)	14	8
Direct growth impact over 3 years[1]	GDP	–0.08	–0.05
	Gross fixed capital formation	–0.24	–0.16
	Private consumption	–0.11	–0.07
	HICP	–0.03	–0.02
Direct and indirect growth impact over 3 years[1]	GDP	–0.11	–0.06
	Gross fixed capital formation	–0.28	–0.18
	Private consumption	–0.13	–0.08
	HICP	–0.03	–0.03

Source: Simulations based on the OeNB's AQM (direct effects) and on Eurosystem NCBs' projection update elasticities (indirect effects), Eurostat.

[1] Cumulative deviation of simulated growth rates from baseline in percentage points.

Note: Medium-term: Pass-through of increased spreads to new loans and step-wise adjustment to new regulations.
Long-term: Pass-through of increased costs to entire loan portfolio and full adjustment to new regulations.

as government bonds). If we assume that opportunity costs are roughly 120 basis points on average in this context, then the type of adjustment does not play a significant role within our conceptual framework. In the medium-term scenario the higher internal fund transfer price can be passed though to a repricing loan volume of EUR 200 billion on average, which maps into an increase in lending spreads by approximately 14 basis points.

The long-term scenario, in which these costs can be passed through to a higher repricing loan volume of EUR 500 billion, the spread narrows from 14 to 8 basis points. Note that these figures do not include second-round effects: The high issuance volumes of European bank bonds, which do not qualify as liquid assets in the LCR scenarios but need to be fully covered with long-term funding under the NSFR scenarios, and the high issuance volumes of EU Member States may cause the spreads of bank bonds to rise.

The medium-term direct macroeconomic effects of implementing the NSFR cause GDP growth to contract by 0.08 percentage points over the three-year horizon, which is rather moderate compared with the other measures. Effects are found to be strongest, and thus quite relevant, for the growth of gross fixed capital formation, which is projected to go down by 0.24 percentage points. The long-term direct macroeconomic effects add up to –0.05 percentage points. As the proposals to amend the Capital Requirements Directive (CRD IV) provide for the EU-wide implementation of the NSFR, we also need to take indirect effects into consideration: Doing so pushes the medium-term contraction of GDP growth up to 0.11 percentage points, and the long-term contraction up to 0.06 percentage points. The overall impact on the growth of gross fixed capital formation is again somewhat higher (–0.28 percentage points in the medium-term and –0.18 percentage points in the long-term scenario).

Taking account of QIS results, the BCBS considerably weakened the initial NSFR calibration and decided to postpone implementation of the revised NSFR at least until 2018 (agreement reached on July 26, 2010). The initial version (December 2009) would have had stronger effects: The combined direct and indirect effect would have been –0.23 percentage points (medium-term scenario) and –0.14 percentage points (long-term scenario).

3.4 Contingent Capital

Government rescue packages providing a downside safety net to protect "too big to fail" institutions from default have created a classic moral hazard problem, referred to in the media as a problem of "privatizing profits, socializing losses." The prospect of government rescue packages prompts systemically important credit institutions to incur higher risks, since they can bank on being bailed out by the government at relatively low cost to themselves, which gives them a competitive edge over more risk-averse institutions (which, in turn, earn lower profits and appear less attractive to investors). Yet the higher risks do not translate into higher refinancing costs on the debt capital markets, as creditors expect the governments to step in anyhow in the event of crisis. Numerous economists have argued that the "too big to fail" problem could be addressed with the issuance of "contingent capital" (Acharya et al., 2009; Kashyap et al., 2008; Shiller, 2010; Squam Lake Working Group on Financial Regulation, 2009). The BCBS (2010b and c) has also discussed the contingent capital idea as a

potential measure for reducing the cost of banking crises and for tackling the "too big to fail" problem.

In practice, banks would issue contingent capital in the form of, for instance, contingent convertible bonds.[18] Under certain extreme conditions (e.g. if the issuing bank would fail to meet a given minimum capital adequacy ratio), those debt instruments would automatically convert into equity qualifying as common equity tier 1 capital. In other words, debt capital would convert into risk-absorbing equity capital. This instrument causes the capital ratio to rise and averts default or significantly weakens the threat of default, thus significantly reducing the underlying systemic risk.

To analyze the use of contingent capital, let us look at two examples: Lloyds Banking Group issued contingent capital, dubbed enhanced capital notes, in November 2009, inviting investors to swap selected tier 1 and tier 2 hybrid capital instruments they already had in their books against the new instruments. Lloyds pays a higher coupon for enhanced capital notes than for existing tier 1 (ranging from +150 to +200 basis points) and tier 2 hybrid capital (+250 basis points). These enhanced capital notes come with compulsory annual coupon payments. As such, the new instruments are not compatible with CRD II provisions. The enhanced capital notes automatically convert to equity should the core tier 1 ratio fall below 5%. Investors swapped the equivalent of GBP 9.3 billion, significantly more than Lloyds had anticipated (GBP 7.5 billion). If we assume the additional refinancing costs to lie in the range of 200 basis points, the additional costs would add up to GBP 465 million. In the absence of data on the maturity structure of the loan portfolio of Lloyds, we deduce the average amount of loans repriced in the medium-term scenario from the Austrian share of 40%: 40% out of a loan portfolio of GBP 626 billion are GBP 250 billion, which we reprice to reflect the additional refinancing costs established above (GBP 465 million). Thus, we find lending spreads to rise by approximately 19 basis points. In the long-term scenario, lending spreads again rise by a lower margin (7 basis points), as the additional costs can be passed through to the entire loan portfolio of GBP 626 billion.

UniCredit launched a similar transaction based on CRD II provisions with a tier 1 contingent capital product in July 2010, issuing 10-year bonds (which it may redeem after those ten years subject to Banca d'Italia approval) with a volume of EUR 500 million and subject to the following conditions: Coupon payments will be suspended if the bank's capital adequacy ratio falls below 8%, and the bonds will be written down, pari passu and pro-rated with the issuer's nonconsolidated tier 1 capital, if the ratio falls below 6%. The paper carries a coupon of 9.375% in the first ten years and was issued at par. The transaction met with strong demand (the offer was oversubscribed 2.2 times). If not called after ten years, the instrument will pay a floating rate coupon equal to the 3-month EURIBOR plus a spread of 749 basis points. Strong investor demand allowed UniCredit to price the coupon slightly below initial expectations. All in all, 210 different parties invested in the instrument, with asset managers accounting for 52%, banks for 32% and insurance compa-

[18] *Other proposals along the lines of contingent capital refer to the issuance of "regulatory hybrid securities," "mandatory capital notes" or "enhanced capital notes."*

Table 6

Growth Impact of Substituting Contingent Capital for Hybrid Capital

		Medium-term scenario	Long-term scenario
	Costs (EUR million p.a.)	200	300
	Lending spread (change in basis points)	10	6
Direct growth impact over 3 years[1]	GDP	–0.06	–0.04
	Gross fixed capital formation	–0.17	–0.12
	Private consumption	–0.08	–0.05
	HICP	–0.02	–0.02
Direct and indirect growth impact over 3 years[1]	GDP	–0.08	–0.05
	Gross fixed capital formation	–0.20	–0.13
	Private consumption	–0.09	–0.06
	HICP	–0.02	–0.02

Source: Simulations based on the OeNB's AQM (direct effects) and on Eurosystem NCBs' projection update elasticities (indirect effects), Eurostat.

[1] Cumulative deviation of simulated growth rates from baseline in percentage points.

Note: Medium-term: Pass-through of increased spreads to new loans and step-wise adjustment to new regulations.
Long-term: Pass-through of increased costs to entire loan portfolio and full adjustment to new regulations.

nies for 4% of investors. Demand was widespread across Europe (only 14% of all investors were based in Italy).

How do we estimate the lending spreads associated with the issuance of contingent capital in Austria? We start out by assuming a total volume of EUR 15 billion (i.e. the amount of equity made available under the Austrian bank support package of 2008). We also assume that the contingent capital instruments would come with the same average spread over the existing hybrid capital as in the Lloyds scenario, and that the instruments would be issued over a period of three years. Thus, we arrive at additional annual costs of EUR 200 million under the medium-term scenario and of EUR 300 million under the long-term scenario. Passing through those amounts to the loan portfolios that come up for repricing (EUR 200 billion and EUR 500 billion, as above), we arrive at an increase in lending spreads by 10 and 6 basis points, respectively.

The macroeconomic impact of issuing contingent capital, as established by the model calculations, is shown in table 6. In the medium-term scenario the direct impact on GDP growth is fairly small, adding up to a cumulative decline in output growth of a mere 0.06 percentage points after three years. This compares with a cumulative reduction of 0.17 percentage points for gross fixed capital formation, and of 0.08 percentage points for private consumption. If EU rules are amended to cover such forms of hybrid capital, it is also necessary to take account of indirect effects. From such a wider perspective, we find GDP growth to decline by as much as 0.08 percentage points.

In the long-term scenario, the effects are even more moderate, as they would be cushioned by a significantly higher volume of loans that can be repriced. In this scenario, increases in lending spreads narrow to 6 basis points, and the cumulative decline in GDP growth narrows to 0.04 percentage points (direct effects). Even subject to the inclusion of indirect effects, GDP growth would not go down by more than 0.05 percentage points.

In sum, we find the relative macroeconomic costs of issuing contingent capital fairly moderate under both the medium-term and the long-term scenario.

3.5 Abolishing Implicit Government Guarantees

Implicit government guarantees might be abolished e.g. under a new bank resolution regime. While the EU has not drafted specific proposals for a bank resolution regime to date, we have nonetheless included the macroeconomic effects of such a measure in our study, as a bank resolution regime does play an important role in the regulatory debate. In the following, we approximate the size of the subsidies granted to banks through implicit government guarantees with two independent methods:

The starting point for the first method is the difference between the spread on senior bank bonds and the spread on tier 1 hybrid capital. The former benefit from implicit government guarantees; there have not been any defaults of such bonds. In contrast, hybrid capital has been used to absorb risks in some instances (cases in point being callable bonds which were not called or lost coupons), and hybrid capital has hence suffered significant price setbacks. This is a relationship that we can exploit with our first method: JP Morgan estimates the yield difference for a sample of 16 major international banks to average 79 basis points (over a 5-year horizon), with U.K. banks reporting significantly higher values on account of European Commission rules. In the case of UniCredit, for instance, JP Morgan (2010) arrived at a value of 68 basis points.

The second method exploits the fact that Moody's publishes a standalone rating and a senior debt rating for all banks. The latter explicitly reflects any implicit government guarantees, while the former is an indicator of the financial strength of a given institution. We used the ratings for the seven Austrian banks included in Moody's sample. The average difference between the stand-alone ratings and the senior debt ratings in the sample is seven notches. We use Bloomberg Fair Value indices to translate those rating differences into yield spreads. As a fair number of bank bonds (above all bonds issued by smaller banks such as a number of Austrian institutions) are not traded heavily, Bloomberg calculates theoretical prices for those bonds on the basis of more liquid instruments with the same rating and a similar maturity. Specifically, Bloomberg's Fair Value AA index provides the best fit for the senior debt ratings of the banks included in the sample, while its Fair Value BBB index approximates the standalone ratings best. Thus, we arrive at a yield difference of some 75 basis points between the two indices for the first half of 2010.

Our conservative approximation based on those two methods is that implicit government guarantees give Austrian banks an interest rate advantage of 70 basis points. Should those guarantees cease to apply, the higher spreads would apply only to any future issues. According to financial accounts data for Austria (2009), the volume of outstanding bank bonds totals approximately EUR 260 billion, which Moody's (2009) assumes to have an average maturity of 5.7 years. Those figures would imply refinancing needs of some EUR 46 billion per year. Those funding needs would in turn generate additional costs of EUR 322 million in the first year, of EUR 644 million in the second year, and of EUR 944 million in the third year – or of EUR 644 million on average in those three years. In our model, we pass those costs through to the average portfolio of loans that may be repriced in the medium term (EUR 200 billion), thus arriving at an increase in lending spreads by 32 basis

Table 7

Growth Impact of Abolishing Implicit Government Guarantees for Senior Bank Bonds

		Medium-term scenario	Long-term scenario
	Costs (EUR million p.a.)	644	1,820
	Lending spread (change in basis points)	32	36
Direct growth impact over 3 years[1]	GDP	–0.18	–0.21
	Gross fixed capital formation	–0.56	–0.70
	Private consumption	–0.25	–0.32
	HICP	–0.06	–0.10
Direct and indirect growth impact over 3 years[1]	GDP	–0.24	–0.28
	Gross fixed capital formation	–0.65	–0.80
	Private consumption	–0.29	–0.36
	HICP	–0.08	–0.12

Source: Simulations based on the OeNB's AQM (direct effects) and on Eurosystem NCBs' projection update elasticities (indirect effects), Eurostat.

[1] Cumulative deviation of simulated growth rates from baseline in percentage points.

Note: Medium-term: Pass-through of increased spreads to new loans and step-wise adjustment to new regulations.
Long-term: Pass-through of increased costs to entire loan portfolio and full adjustment to new regulations.

points. In the long term, repricing the entire portfolio of bonds (EUR 260 billion) will generate additional costs of EUR 1.8 billion in each of the three years. When we pass through this sum to the entire credit portfolio, we arrive at a widening of lending spreads by 36 basis points.[19]

Abolishing implicit government guarantees on senior bank bonds (e.g. by establishing a bank resolution regime), would generate substantial growth effects. In the three-year medium-term scenario, Austrian GDP growth would go down by a total of 0.18 percentage points (direct effect alone; see table 7). The combined direct and indirect effects of EU-wide implementation of bank insolvency legislation would dampen Austrian GDP growth by as much as 0.24 percentage points.

In the long-term scenario, our model calculations yield a cumulative direct growth effect of 0.21 percentage points, and a cumulative direct and indirect growth effect of –0.28 percentage points.

To sum it up, abolishing implicit government guarantees on senior bank bonds (e.g. by implementing bank resolution legislation) stands to create substantial macroeconomic costs both in the medium and long term. It should also be noted that our estimates do not reflect any second-round effects, which might raise the refinancing risk of banks.

3.6 Reforming Deposit Guarantee Schemes

Statutory deposit guarantee schemes protect client savings (deposits made in savings, fixed-term or current accounts and deposits made under saving and loan contracts) if their bank should fail. Such schemes are meant to prevent a run on banks that have become distressed or are rumored to have run into financial troubles. In the following we refer to the legislative proposal to reform the EU Directive on Deposit

[19] In this context, the lending spread is higher in the long-term scenario than in the medium-term scenario. The difference reflects the necessary time lag in the repricing of bank bonds, which depends on the average maturity of close to six years.

Guarantee Schemes that the European Commission (2010b) adopted in mid-2010. Under the reform, banks throughout the EU would provide a uniform level of protection to all depositors, including nonfinancial corporations (EUR 100,000 or the equivalent thereof per depositor and bank).

The proposal reflects the European Commission's preference for a predominant share of ex-ante funding (calculated on the basis of risk-based contributions). Requiring banks to build up sufficiently high stocks is meant to ensure that depositors can be repaid within one week in the event of bank failures. After a transition period from 2013 to 2020, deposit guarantee schemes would have to have assets amounting to 1.5% of eligible deposits on hand. In this respect we can offer only a rough estimate of how big the corresponding burden will be on Austrian banks, as the draft proposal is yet to be fine-tuned in a number of points, and as the provisions are yet to be transposed into national law. At the time of writing, we can only refer to unconsolidated data on the amount of deposits that were subject to deposit guarantees on December 31, 2009. As the draft proposal's definition of assets that are eligible for deposit protection differs from the definition of eligible deposits under current reporting requirements, we can but provide a range estimate. Based on the deposits of domestic households and nonfinancial corporations, eligible deposits totaled EUR 249 billion; including deposits made by nonresident households, nonresident nonbank financial intermediaries and foreign sovereigns, eligible deposits totaled EUR 297 billion at the end of 2009.[20] In line with the proposed ex-ante funding of deposit insurance schemes and the target level of 1.5% of eligible deposits established for 2020, we estimate banks to have to set aside assets within a range of EUR 466 million and EUR 558 million in order to reach this level. For the purpose of esti-

Table 8

Growth Impact of Annual Deposit Guarantee Contributions Based on European Commission Proposals

		Medium-term scenario	Long-term scenario
	Costs (EUR million p.a.)	500	500
	Lending spread (change in basis points)	29	12
Direct growth impact over 3 years[1]	GDP	–0.16	–0.07
	Gross fixed capital formation	–0.51	–0.23
	Private consumption	–0.23	–0.11
	HICP	–0.06	–0.03
Direct and indirect growth impact over 3 years[1]	GDP	–0.22	–0.09
	Gross fixed capital formation	–0.59	–0.27
	Private consumption	–0.26	–0.12
	HICP	–0.07	–0.04

Source: Simulations based on the OeNB's AQM (direct effects) and on Eurosystem NCBs' projection update elasticities (indirect effects), Eurostat.

[1] Cumulative deviation of simulated growth rates from baseline in percentage points.

Note: Medium-term: Pass-through of increased spreads to new loans and step-wise adjustment to new regulations.
Long-term: Pass-through of increased costs to entire loan portfolio and full adjustment to new regulations.

[20] The data on the deposits of domestic households are based on unlimited coverage of deposits, which continued to apply on December 31, 2009. It was not possible to remove the deposits made by nonbank financial intermediaries and foreign sovereigns from the data on nonresident deposits.

mating the underlying macroeconomic effects, we assume that banks will have to contribute EUR 500 million per year to the deposit guarantee funds. Apart from the fact that we need to rely on assumptions with regard to size of eligible assets, there is the problem of consolidation: As the contributions of foreign subsidiaries reflect the risk profile of the subsidiaries and as the contributions of foreign competitors reflect the institutional frameworks prevailing in the individual EU countries, we use unconsolidated data and apply them to unconsolidated loan repricing volumes. Based on loan repricing volumes of EUR 170 billion (medium-term scenario) and EUR 415 billion (long-term scenario), we expect lending rates to rise by 29 and 12 basis points, respectively.

The incidence of these assumptions must be viewed very critically, however, as in this case bank product pricing refers to the internal price of deposits and not to lending spreads. We used the same incidence assumptions as for the other debt funding measures that we assessed above in order to ensure comparability across measures and due to the structure of the macro model.

The macroeconomic costs of the medium-term scenario significantly exceed those of the long-term scenario, as it is not possible to stagger the introduction of the annual contributions in the medium-term scenario, and as loan repricing volumes to which those contributions can be passed through are smaller (see table 8). Over the three-year simulation horizon, GDP growth would go down by a total of 0.16 percentage points (direct effects only) in the medium-term scenario, but only by 0.07 percentage points in the long-term scenario. Again, it is useful to add indirect spillover effects from other EU countries. The combined direct and indirect effect is non-negligible in the medium term (–0.22 percentage points), but moderate in the long term (–0.09 percentage points).

4 Summary and Discussion

Chart 2 provides an overview of the implications that the individual regulatory measures are likely to entail for the Austrian banking system. First, the requirement to raise the quality of the capital base and the need to build additional buffers (which we assume to raise the level of common equity by 100 basis points) maps into additional costs of EUR 752 million in the main medium-term scenario. The corresponding estimate for the long-term scenario is EUR 1,656 million. In the medium-term scenario, those costs break down into the cost of raising the quality of tier 1 capital (EUR 386 million) and of building additional buffers (equivalent to a 1-percentage-point increase in the common equity tier 1 ratio = EUR 367 million).[21] In the long-term scenario, the costs break down to EUR 1,024 million and EUR 633 million. Second, abolishing implicit government guarantees for senior bank bonds e.g. by implementing a bank resolution regime would drive up annual funding costs by EUR 644 million (medium-term scenario) or EUR 1,820 million (long-term scenario). Third, we find the introduction of a net stable funding ratio (NSFR) to create additional average annual costs of EUR 280 million (medium-term scenario) or EUR 420 million (long-term scenario).

[21] *Given approximately linear relationships, the effects of the illustrative 1-percentage-point rise in the common equity tier 1 ratio are scalable. For instance, building a 2-percentage-point buffer beyond the regulatory minimum in the form of common equity comes at a cost of some EUR 750 million per year. The measures that we established for the macroeconomic effects are also approximately linear.*

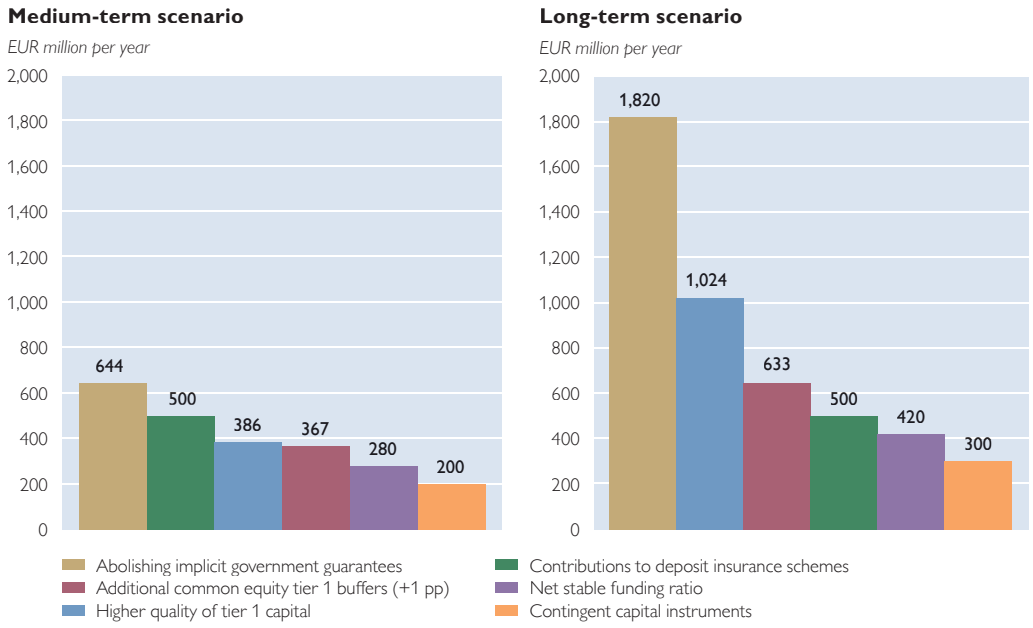
Fourth, reforming deposit guarantee schemes would increase annual costs by EUR 500 million on average (medium- and long-term scenario). Fifth, the issuance of contingent capital would trigger additional annual costs of EUR 200 million (medium-term scenario) or EUR 300 million (long-term scenario). *It is important to see each of these costs simply as an indication of the relative impact of each measure. It is not possible to add up those figures,* as the sum total would have to be adjusted for complex interdependencies between the measures and would need to reflect changes to the balance sheet structure and to the business models and strategies with which banks are likely to respond to the measures. For instance, tighter capital regulations might, ceteris paribus, raise the ratio of available stable funding and hence decrease the costs of complying with NSFR requirements.

Chart 3 shows the effects on the Austrian economy of banks' higher funding costs. In this respect, two findings are particularly obvious:

First, the medium-term effects tend to be stronger than the long-term effects. This pattern is particularly pronounced with regard to deposit guarantee schemes, the NSFR and contingent capital (see chart 3). Above all, this can be attributed to the fact that the loan repricing volume is significantly higher in the long-term scenario, which implies lower increases of lending spreads. The fact that the macroeconomic effects of requiring banks to raise the quality of capital in combination with the creation of a 1-percentage-point common equity tier 1 buffer are higher

Chart 2

Implications of the Individual Measures for the Austrian Banking Sector



Source: OeNB.

Note: The underlying assumptions of the medium-term scenario include a staggered repricing of loans over the three-year simulation horizon reflecting average new lending volumes and a gradual implementation of all measures (other than deposit guarantee schemes). The underlying assumptions of the long-term scenario are that the entire loan portfolio can be repriced and that all measures have been implemented in full. This chart reflects the proposed measures to raise the quality and/or quantity of common equity tier 1 capital subject to a 10% ROE in the medium term and subject to a 15% ROE in the long term.

in the long-term scenario can be traced to the higher ROE underlying the long-term scenario (15%, compared with 10% in the medium-term scenario). If we had retained an ROE of 10% in the long-term scenario, the medium-term scenario would again have emerged as the scenario with the higher effects. The only true exception in this respect is the abolition of implicit government guarantees: Its effects are stronger in the long-term scenario than in the medium-term scenario. This can be explained as follows: (liability-side) bank bonds come with a longer repricing period – compared with the time it takes to implement the proposed measures in full – than (asset-side) loans, as the underlying average maturity of bank bonds (which we assume to be about 5.7 years) is longer than the underlying average maturity of loans. With the exception of bank resolution legislation, the clear policy conclusion from the first key finding of the paper is thus as follows: The sooner banks start to implement the measures (above all by recapitalizing their balance sheets and by raising the liquidity of their balance sheets), the longer are the transition periods over which they can phase in the measures. This increases the volume of loans they can reprice and to which they can hence pass through higher costs, and this decreases the lending spreads required to finance the higher costs, as a result of which the macroeconomic costs are lower ceteris paribus.

The second key finding is that the – cumulative three-year – growth effects exceed –0.20 percentage points (including spillover effects from the euro area) only in three instances in the medium-term scenario: Raising the quality of tier 1 capital (–0.15 percentage points) and building an additional 1-percentage-point common equity tier 1 buffer (–0.08 percentage points) maps into a decline of GDP growth by 0.23 percentage points; abolishing implicit government guarantees on senior bank bonds would dampen GDP growth by 0.24 percentage points; and the reform of deposit guarantee schemes would shave 0.22 percentage points off GDP growth – all in the medium term. On a lesser scale, compliance with NSFR requirements – if their introduction had not been postponed to 2018 – would decrease GDP growth by 0.11 percentage points. The negative growth effects are even lower for the issuance of contingent capital, i.e. for the substitution of contingent capital for hybrid capital (–0.08 percentage points).

In the long-term scenario, the negative growth effects (including spillovers from other euro area countries) of raising the quality of tier 1 capital and of building a 1-percentage-point common equity tier 1 buffer add up to 0.26 percentage points; these costs break down into the cost of higher tier 1 capital quality requirements (–0.16 percentage points) and the cost of raising the common equity tier 1 buffer by 1 percentage point (–0.10 percentage points). The macroeconomic costs of abolishing implicit government guarantees stand to rise to –0.28 percentage points compared with the medium-term scenario, whereas the cost of reforming deposit guarantee schemes would dampen GDP growth by 0.09 percentage points. In contrast, the negative growth effects of meeting NSFR targets and of issuing contingent capital would be comparatively low (at –0.05 or –0.06 percentage points). As before, the growth effects of the individual measures cannot be aggregated meaningfully, as it is not possible to estimate the interaction between those measures and banks' response.

Apart from the relationships between the individual measures, the simulations show clearly that the macroeconomic effects are the stronger, the higher the ROE targets are. Conversely, the macroeconomic effects stand to decline as banks raise their efficiency and lower their cost-income ratios. Finally, the macroeconomic costs ultimately also reflect base effects: In banking systems that are well capitalized and very liquid to begin with, those effects are considerably lower than in poorly capitalized and comparatively illiquid banking systems.

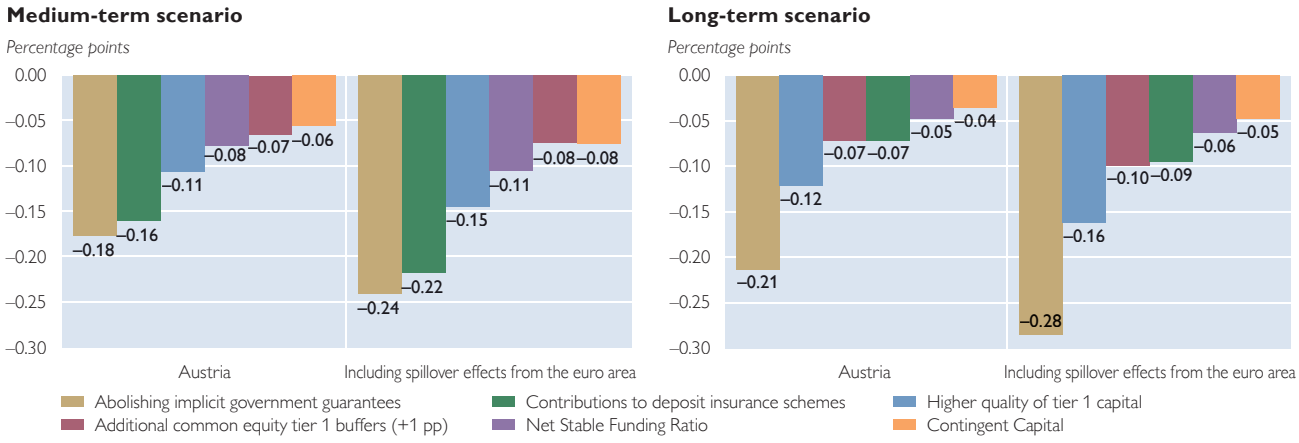
What the model simulations can do, in essence, is to highlight the relative magnitudes of the economic effects that the different regulatory measures create: First, the proposed measure will remain work in progress until they become binding for banks; second, analyzing the macroeconomic effects of these measures requires a variety of assumptions, each of which is subject to uncertainty. Some assumptions made in the model calculations will cause effects to be underestimated, whereas other will cause effects to be overestimated.

The underestimation bias results from the impact of other crisis effects which we have neglected (such as the fact that the general repricing of risks in money and capital markets drives up banks' refinancing costs). We focused on price effects and assumed the supply of capital to be price-elastic; yet in the case of very stringent capital and liquidity provisions poorly capitalized banking systems might suffer from rationing and second-round effects. This problem might in fact have been solved through recalibrations of the Basel III framework undertaken in July 2010. An underestimation bias may also result from the fact that, while we did include spillover effects from other euro area countries, we did not take into account spillovers from other economic areas. As the Basel III framework is meant to apply on a global scale, we may have underestimated the effects on exports, and thus on GDP growth.

The overestimation bias underlying the macroeconomic effects results

Chart 3

Negative Growth Effects after Three Years (Cumulative Deviations of Growth Rates from Baseline)



Source: OeNB.

Note: The underlying assumptions of the medium-term scenario include a staggered repricing of loans over the three-year simulation horizon reflecting average new lending volumes and a gradual implementation of all measures (other than deposit guarantee schemes).
The underlying assumptions of the long-term scenario are that the entire loan portfolio can be repriced and that all measures have been implemented in full. This chart reflects the proposed measures to raise the quality and/or quantity of common equity tier 1 capital subject to a 10% ROE in the medium term and subject to a 15% ROE in the long term.

above all from the use of recent data on the growth of credit, which has fallen below long-term growth rates in the wake of the financial crisis, and from a failure to account for possible substitution effects in the behavior of banks and borrowers. The reforms themselves might cause equity and debt servicing costs to go down as the banking system becomes more resilient to shocks, as a result of which the macroeconomic effects would be lower than we found them to be in our analysis. Moreover, we started from the assumption of constant asset and liability levels and balance sheet structures. Asset-side and/or liability-side substitution effects should – assuming rational behavior of banks – tend to lower banks' costs and the ensuing macroeconomic effects (e.g. the level of risk-weighted assets should go down as risks go down). Another overestimation bias may result from the fact that we neglected the kind of positive long-term effects that may result from volume effects: The proposed regulatory measures should limit economically inefficient lending (where lending spreads do not cover risk costs) which is detrimental to long-term growth and should thus dampen the boom-bust lending cycle.

Yet in sum, the overestimation and the underestimation bias effects should cancel each other out more or less.

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Annex

Table A-1

Empirical Evidence on the Macroeconomic Effects of Basel III

Paper	Countries	Method[1]	Measures[1]	Ensuing Drop in GDP Growth or Level[1]
MAG (2010)[2]	Very large sample of numerous studies on numerous countries / regions	Many different methodologies: large structural macro models, reduced-form vector autoregressions, DSGE models	1-percentage-point increase in the ratio of capital to risk-weighted assets	Drop in median GDP level (across all papers) after 18 quarters: 0.12% (transition period of 2 years) 0.16% (transition period of 4 years); ranging from 0.07% to 0.31% (excluding outliers); international spillovers: 0.03%
BCBS (2010a)	Similar to above; some overlaps	Long-term steady state analysis, different models	As above	Steady state output loss: 0.09%
Bank of England (2010)	U.K.	Production function approach	6-percentage-point increase in the ratio of capital to risk-weighted assets	Long-term decline of GDP trend growth: 0.6%
Barrell et al. (2009)	U.K.	Cost/benefit analysis, structural models + NIGEM	1-percentage-point increase of capital	Long-term steady state output decline: 0.08%
IIF (2010a)	U.S.A., euro area, Japan	Balance sheet models; profit and loss models; bank capital supply models; macro bloc	Different scenarios with and without regulation	Drop in GDP level 2011–2015: between 2.6 % (U.S.A.) and 4.3 % (euro area) Drop in GDP level 2011–2020: between 2.7 % (U.S.A.) and 4.4 % (euro area)
IIF (2010b)	U.S.A., euro area, Japan	As above	As above	Update (2010a). Cost of redefinition of capital requirements revised downward by 30% (without specifying the expected decline in GDP)
IHS (2010)	Austria	Macroeconomic growth models, sample-based estimate of potential decline in loan volumes in Austria	Decline in loan volume by 10% or 20%	Decline in GDP level after 5 years: between 1.26% (loan volume 10% lower) and 2.49% (loan volume 20% lower) Drop in GDP level after 10 years: between 2.83% (loan volume 10% lower) and 5.66% (loan volume 20% lower)
Bank Austria (2010)	Austria	Profit and loss account	Additional capital needs of between EUR 19.2 billion and EUR 34.9 billion	No GDP effects Bank profits drop to ⅓ (best-case scenario) or turn into losses (worst-case scenario) Lending spreads increase by 6 to 14 basis points for corporate loans and by 13 to 30 basis points for household loans
FBF (2010)	Euro area	Estimated drop in loan volume	New tier 1 ratio and new net stable funding ratio	Drop in GDP level: 1.5% in the short term more than 6% in the long term
La Caixa (2010)	Spain	Estimated drop in loan volume, using ECB elasticities	Shortfall in core capital: EUR 48 billion, new stable funding: EUR 300 billion	Long-term drop in GDP level: between 5% (most likely scenario) and 1.6% (best-case scenario)

[1] *Selected results.*

[2] *Participating institutions: Reserve Bank of Australia, Central Bank of Brazil, Bank of Canada, People's Bank of China, Banque de France, Deutsche Bundesbank, Banca d'Italia, Financial Services Agency (Japan), Bank of Japan, Bank of Korea, Bank of Mexico, De Nederlandsche Bank, Banco de España, Schweizerische Nationalbank, Financial Services Authority (U.K.), Bank of England, Board of Governors of the Federal Reserve System, European Commission, ECB, IMF, Financial Stability Board, BCBS, BIS.*