



SYSTEMIC RISK BUFFER

**Background analysis for the implementation
of the Systemic Risk Buffer
as a macro-prudential measure in Estonia**

May 2014

SUMMARY

Starting from 1 January 2014 the revised prudential requirements for credit institutions, established by Regulation (EU) No 575/2013, entered into force in the European Union. The provisions of Directive 2013/36/EU came into effect in Estonia from 19 May 2014, after the requirements were transposed into Estonian legislation by amendments to the Credit Institutions Act.

As the macro-prudential authority in Estonia, Eesti Pank intends to apply a systemic risk buffer of 2% effective from 1 August 2014 under § 86⁴⁹ of the Credit Institutions Act. The systemic risk buffer will be applicable to all banks and banking groups authorised in Estonia.

The main reasons for setting the systemic risk buffer in Estonia are the structural vulnerabilities of the Estonian economy and the financial sector:

- The structural vulnerabilities of the economy stem primarily from the small size and the openness of the Estonian economy. The ongoing convergence and build-up of capital stock mean the economy remains more volatile than those of most other EU countries. In addition, the Estonian labour market is highly sensitive to changes in economic conditions. Although the financial buffers available in the economy are growing, they are still relatively low and provide limited resilience against sudden shocks, particularly external shocks.
- The structural vulnerabilities of the financial sector include the high concentration of the

banking sector and the exposures of institutions to the same set of economies and economic sectors, which includes exposure through other members of parent banking groups.

The Estonian economy is small and open and Estonian experience has shown that any unexpected deterioration in the economic environment can lead to significant debt servicing problems in the non-financial sector and that the need for credit institutions to make additional provisions for non-performing loans can increase very rapidly. As long as the structural vulnerabilities remain, it is important that adequate macro-prudential tools be applied that have been tailored to meet the challenges that are specific to the economy and the financial sector. Eesti Pank will reassess the appropriateness of the systemic risk buffer at least every other year.

As at 31 December 2013 all banks operating in Estonia were able to fulfil the current total capital adequacy requirement of 10% with CET 1 capital with sufficient excess. Therefore the introduction of the 2% systemic risk buffer is expected to have a neutral impact on the capitalisation of banks and the financing conditions of the real economy. Given the limited cross-border activity and exposures of credit institutions operating in Estonia, the potential effects on the whole of the financial system of the EU and on parts of it are expected to remain small or negligible.

Foreign credit institutions providing credit in Estonia via branches will be asked to apply equal treatment for exposures located in Estonia.

Buffer rate	2% Common Equity Tier 1 capital
Scope	all banks and banking groups authorised in Estonia
Effective from	1 August 2014
Next review	at least once every two years
Legal basis	Credit Institutions Act § 86 ⁴⁹

1. SYSTEMIC RISK BUFFER

Under Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, a member state may introduce a systemic risk buffer of Common Equity Tier 1 capital for the financial sector or one or more subsets of that sector, in order “to prevent and mitigate long term non-cyclical systemic or macroprudential risks in the meaning of a risk of disruption in the financial system with the potential to have serious negative consequences to the financial system and the real economy in a specific Member State.”

This allows member states to request that credit institutions authorised in their jurisdictions hold additional capital to make them more resilient against non-cyclical vulnerabilities. Furthermore, if they consider it relevant and potentially effective, they may mitigate the build up of such risks as well. A systemic risk buffer has to be maintained by an institution in the form of Common Equity Tier 1 capital allocated specifically for that purpose.

Relevant authorities in other jurisdictions may recognise the systemic risk buffer rate set for exposures located in the jurisdiction where the requirement has been established and may require credit institutions under their jurisdiction to treat exposures located in such a jurisdiction on terms equalling those set in the given country. Institutions operating in several jurisdictions may also recognise country specific systemic risk buffer requirements on a voluntary basis.

2. STRUCTURAL SYSTEMIC RISK IN ESTONIA

2.1 Structural characteristics of the Estonian banking sector

The Estonian financial sector is **heavily bank dominated** (see Figure 1) and **concentrated** (see Figure 2). As at December 2013 there were 8 banks licensed and 7 branches of foreign credit institutions operating in Estonia. The Herfindahl index of the Estonian banking sector exceeded 0.25 at

Figure 1. Size of the Estonian financial sector

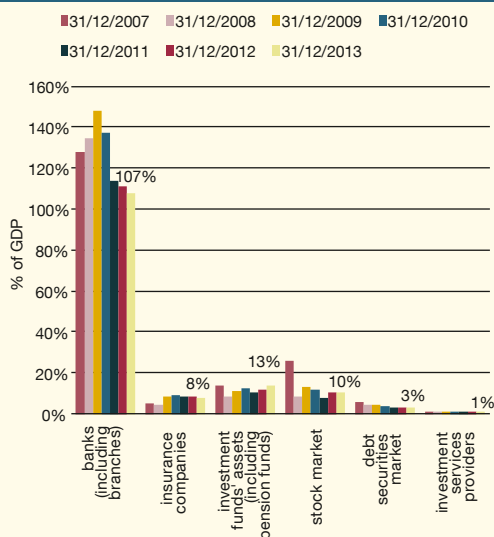
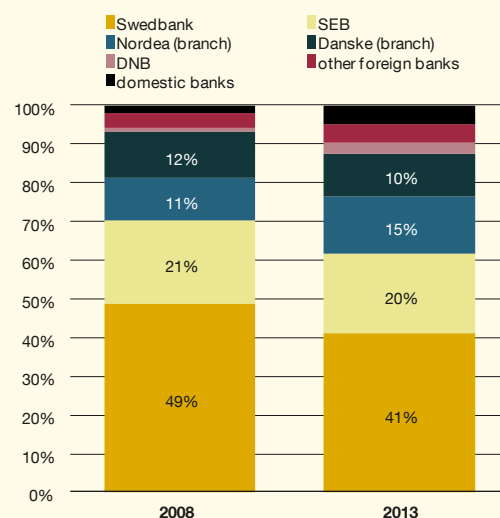


Figure 2. Banks' market shares by total assets



the end of December 2013 (including the assets of the branches of foreign credit institutions), while the market share of the two largest credit institutions authorised in Estonia exceeded 60% of the banking sector's total assets. The market share of foreign branches was 29%.

Although the direct exposure of banks in Estonia to each other may be considered fairly limited as the highest share of total liabilities to a domestic credit institution remains around 2%, their credit portfolio structures still indicate that they are either directly exposed to the domestic real sector to a significant degree or are likely to be significantly affected through second round effects should a bank with significant market share fail to provide services.

More than 90% of the Estonian banking market is affiliated to **large Nordic banking groups**, which mostly operate in the same Nordic-Baltic region. While this may on the one hand provide risk mitigation, it might on the other hand also channel unfavourable developments into other parts of the groups, directly or indirectly, affecting the financing conditions of the Estonian affiliates. Second, should adverse macroeconomic developments occur in one or several countries in the region, the impact could be enhanced through the real economy as the Nordic and Baltic countries are also the main export markets for Estonia.

2.2 Structural characteristics of the Estonian economy

With a GDP of about 18 billion euros, Estonia is a relatively **small and open economy** with a history of significant economic volatility, which is explainable by specific structural characteristics.

In recent decades the Estonian economy has gone through quite marked **cycles of growth and decline** (see Figure 3). The years of rapid economic expansion in 1996-1997 were followed by a sharp recession during the downturn in the Russian economy in 1998. After significant reorganisation and a resumption in growth, another period of economic expansion followed in 2004-2007, fuelled by increased foreign credit inflows and an easing of credit standards. The years 2008-2009 saw another sharp economic downturn.

Figure 3. Real GDP growth in Estonia and the euro area.

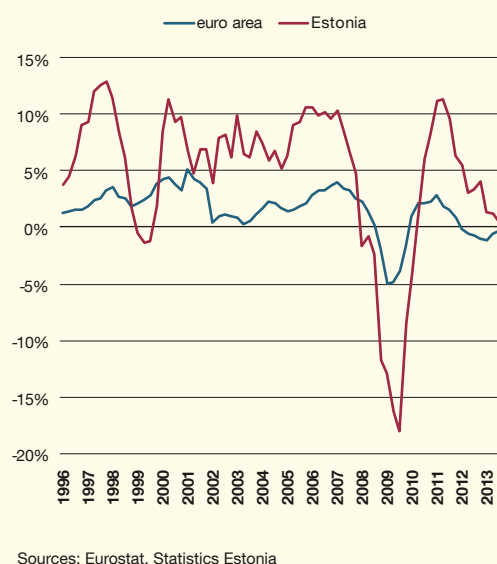


Figure 4. Standard deviation of real economic growth rate

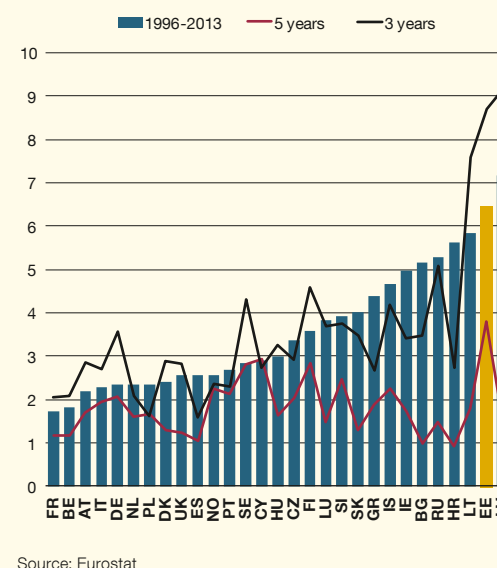
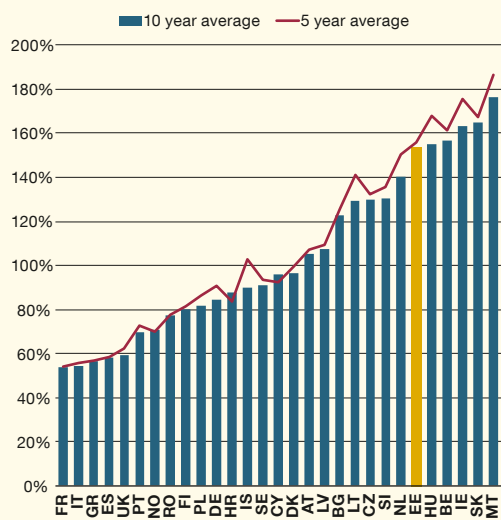
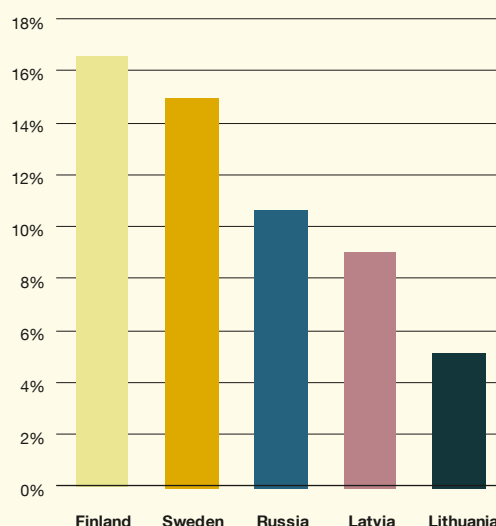


Figure 5. Trade openness measured as exports + imports as % of GDP



Source: Eurostat

Figure 6. Geographical distribution of export, 2009-2013 average



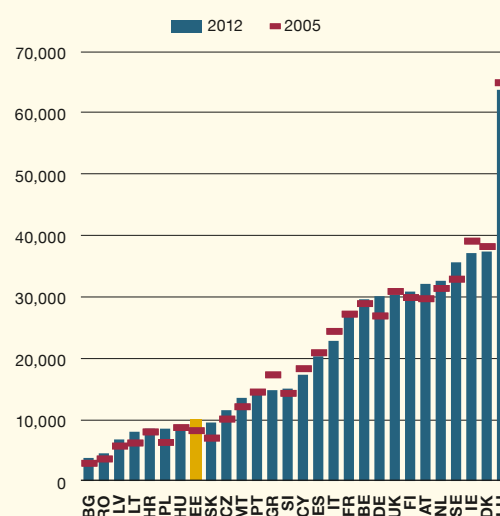
Source: Statistics Estonia

The result of these past developments is that Estonia has had one of the highest economic growth rate volatilities, measured as the **standard deviation of real GDP**, of any European country, including other transition countries (see Figure 4).

The volatility of the Estonian economy can be explained to a significant degree by its **openness**, as it is amplified by the geographical and sectoral concentration of trade. The indicator of relative trade openness, measured as exports plus imports as a percent of GDP, indicates that Estonia is one of the most open countries in Europe (see Figure 5). While openness may contribute to growth, it also indicates higher sensitivity to external shocks. The export-related vulnerabilities are amplified for Estonia as Estonia's main trading partners (see Figure 6) are also among the countries with the highest economic volatility in Europe.

The levels of volatility in Estonia have to be assessed against the specific features of the economic history of the country, and against its position among the member states of the European Union and the euro area. While the real GDP per capita of Estonia remains lower than the EU average (see Figure 7), the process of convergence may cause higher than average economic volatilities.

Figure 7. Real Gross Domestic Product per capita (euros per inhabitant)



Source: Eurostat

During the convergence period the Estonian inflation rate is expected to remain higher than the euro area average. This means that the real interest rates in Estonia under the single monetary policy will be relatively low. Lower real interest rates may foster extensive credit growth and amplify economic expansion, increasing the probability of macroeconomic imbalances accumulating.

The convergence process is accompanied by the building up of capital stock. Consequently the **share of investments**, the most volatile and sentiment driven component of GDP, is relatively high in Estonia (see Figure 8). From a low starting point, the level of credit financing to the economy has increased more rapidly than elsewhere in the euro area.

An important channel related to the convergence process that may amplify the impact of different shocks is the financial loop between asset prices, lending volumes and economic activity¹. Real estate prices increased annually in Estonia by more than 50% in the second half of the past decade, accompanied by similar growth rates in domestic bank lending. As less favourable economic conditions emerged, this rapid growth was followed by a sharp decline, which was amplified by an increase in the banks' risk aversion. Although these developments can be considered fairly cyclical in nature, the magnitude of the domestic impact of an initially external shock is dependent at least partly on structural characteristics, specifically the availability of buffers within the economy to mitigate the impact.

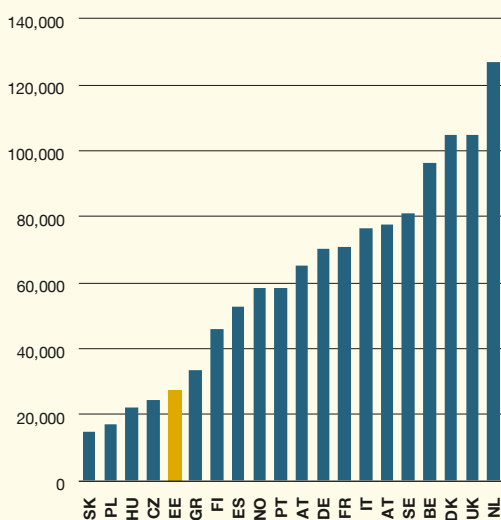
The current **level of Estonian households' financial wealth** implies that Estonian households have lower buffers to use during an economic downturn than households in several other EU member states have (see Figure 9). Consequently, they can be expected to be more prone to changing their consumption behaviour under deteriorating economic conditions. This explains the observed **consumption volatility** of Estonian households (see Figure 10). A further increase in the buffers available in the economy can be expected to reduce consumption volatility and decrease systemic vulnerability.

Figure 8. Share of investments in GDP and investments growth rate volatility



Source: Eurostat

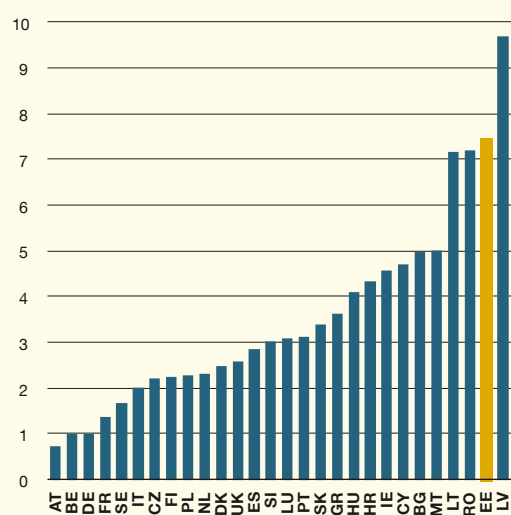
Figure 9. Financial assets of households per capita in 2010 US dollars at current PPPs



Source: OECD, National Accounts at a Glance 2013

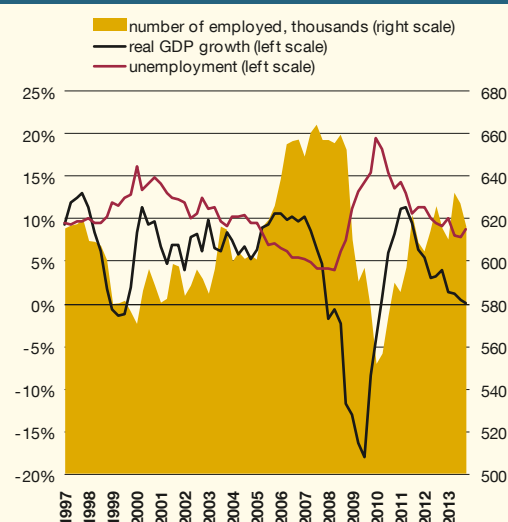
¹ Hansson, A., Randveer, M. *Economic Adjustment in the Baltic Countries*. Eesti Pank Working Paper Series 1/2013.

Figure 10. Standard deviation of consumption growth rate in 1996Q1 – 2013Q1



Source: Eurostat

Figure 11. Labour market dynamics in Estonia



Source: Statistics Estonia

Table 1. Deviation in GDP growth from the forecast (percentage points)

	Estonia		Euro area	
	Actual growth of real GDP vs IMF forecast 1Y in advance	Actual growth of real GDP vs EC forecast 1Y in advance	Actual growth of real GDP vs IMF forecast 1Y in advance	Actual growth of real GDP vs EC forecast 1Y in advance
2001	0.3	0.0	-1.4	-1.1
2002	1.6	1.9	-1.3	-0.4
2003	2.8	3.1	-1.6	-1.1
2004	1.2	0.7	0.3	0.4
2005	3.5	2.9	-0.5	-0.3
2006	4.1	2.9	1.4	1.3
2007	-0.5	-2.0	0.9	0.8
2008	-10.2	-10.6	-1.7	-1.8
2009	-14.6	-12.9	-4.6	-4.5
2010	5.2	2.7	1.7	1.3
2011	6.1	5.2	0.1	0.1
2012	-0.1	0.7	-1.8	-1.2

Sources: World Economic Outlook (IMF), European Commission, Eurostat

The ability of households to service their debt is affected by **labour market developments**. In Estonia the number of employed fell from its peak in 2008 by more than 15% (see Figure 11). The structural specifics of the labour market also have to be taken into consideration in this. In Estonia one of the sectors most significantly affected was construction, and this was a negative reflection of the preceding period of rapid increase in the share of employment in the construction sector.

The characteristics of the Estonian economy described above explain some of the reasons why **forecasting** the developments in the economy is rather challenging. Deviations appear to be more prominent for Estonia, particularly during larger upswings and downturns (see Table 1). Thus the level of uncertainty about future developments appears to be higher for a small and open economy like Estonia's than for more stable economies.

As the volatility of the Estonian economy arises from a number of structural features like its openness and size and its convergence, it is important that adequate macro-prudential tools be applied that are tailored to meet the challenges specific to this economy for as long as these characteristics remain². At the same time it is important to monitor developments continuously, to ensure that adequate resilience is provided without unnecessary restrictions.

2.3 Estonian banking sector sensitivity to macroeconomic shocks

Changes in macroeconomic variables could affect the ability of bank clients to service their debt, which in turn would create a need for credit institutions to make additional provisions or consider previously provided credit as uncollectable.

To estimate the potential impact of macroeconomic shocks on the aggregate credit portfolio of the Estonian banking sector, the credit risk model³ has been used together with a macroeconomic vector-autoregressive (VAR) model. First, the VAR model was used to generate three adverse macroeconomic scenarios by giving GDP growth an initial one-quarter shock of -5, -10 and -15 percentage points. As the variables in the macroeconomic VAR models are linked, the initial shock to GDP growth is also projected onto the other variables, resulting in shock volume specific scenarios⁴. Thereafter, a credit risk model was used to estimate the impact of the adverse macroeconomic scenarios on credit quality, measured as the ratio of non-performing loans⁵ to the total loan portfolio.

After the application of a macroeconomic shock, the ratio of non-performing loans increased rapidly during the next four consecutive quarters.

² The importance of the adequate application of macro-prudential measures has also been suggested by the OECD. (Estonia. OECD Economic Surveys. October 2012).

³ The credit risk model is described in more detail in R. Kattai *Credit Risk Model for the Estonian Banking Sector*, Eesti Pank Working Paper Series 1/2010. The credit risk model has been used regularly for forecasting and stress testing as a part of the Financial Stability Review, meaning that it has proven its robustness in practice.

⁴ The scenarios are shown in more detail in Appendix 1.

⁵ Non-performing loans are defined as loans that are more than 60 days overdue.

Figure 12. The potential impact of various levels of GDP shock on the non-performing loans of the four largest banks (on aggregate more than 85% of banking sector total assets)

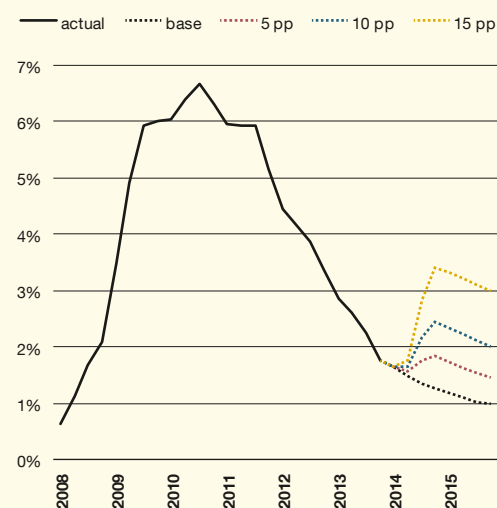
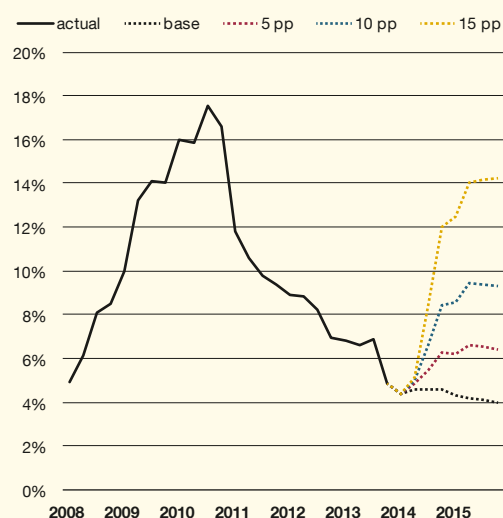


Figure 13. The potential impact of various levels of GDP shock on the non-performing loans of small banks (on aggregate less than 15% of banking sector total assets)



In the most adverse scenario applied, where the cumulative negative effect on GDP growth is estimated to be similar to the levels witnessed during the 2008-2009 economic crisis, the average share of non-performing loans in the larger banks will increase to 3.4% (see Figure 12), which is 0.5 to 2.1 percentage points higher than the result from the model for the base scenario⁶. The negative impact will be significantly stronger for smaller banks. Among the credit portfolios of the 12 banks considered in this group, the share of non-performing loans would reach 14.2% after four quarters, which is somewhat below the levels witnessed during the peak of the economic downturn in the second half of the past decade (see Figure 13). Should adverse conditions persist, the impact of a macroeconomic shock on the ability of clients to service their debt may be significantly larger than shown by this exercise, where only a one-time shock to GDP growth was assumed.

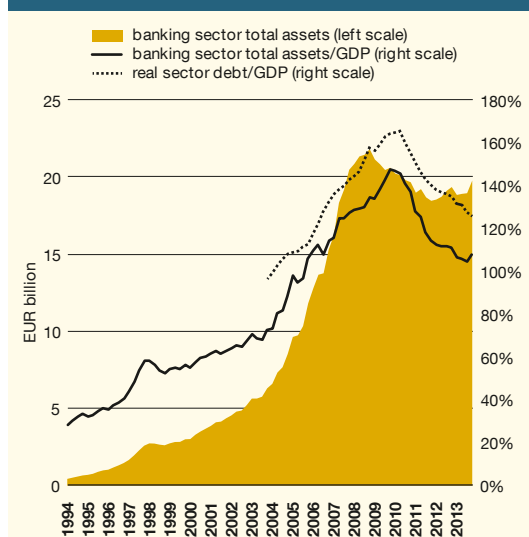
3. CAPITAL REQUIREMENTS

All banks and banking groups licensed in Estonia were subject to a 10% minimum capital requirement until 31 December 2013.

The 10% capital adequacy requirement was first applied from 1 October 1997 and aimed to increase the resilience of the domestic banking sector in an environment of rapid economic growth attributable to a significant degree to foreign capital inflows, one consequence of which was increased risk-taking by the banks. With the total assets of credit institutions increasing by more than half annually (see Figure 14), Eesti Pank decided to take precautionary measures to strengthen their ability to withstand less favourable conditions, should they occur.

The next wave of credit expansion during 2004–2007 can again be attributed to some extent to the environment of abundant liquidity in surrounding markets and a decline in risk aversion supported by growing confidence in Estonia's economic prospects subsequent to the country's accession to the European Union in 2004. Increasing competi-

Figure 14. Banking sector total assets and real sector indebtedness

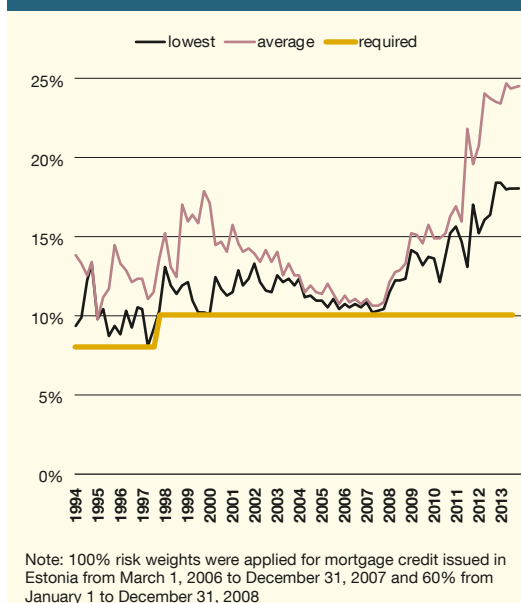


tion for market share by foreign banking groups aggravated cross-border funding, lowered interest margins and loosened credit standards. By 2006, the annual growth rates of credit portfolios and real estate prices exceeded 50%. To address the rapid build-up of risks, Eesti Pank decided to increase the **risk weights for resident mortgage loans from 50% to 100%**, effective from March 2006 (see Figure 15).

Despite the additional capital requirement, credit growth continued at double digit rates in the second half of 2006. The slowdown became evident only in the first half of 2008, while the increased risk weights for resident mortgages had already been partially released with the adoption of the risk assessment principles introduced by Directive 2006/48/EC and 2006/49/EC (the introduction of the Basel II principles). The lowering of the risk weights for resident mortgage loans was limited for 2008 to 60% instead of 35% for banks using the standardised approach for calculating credit risk.

⁶ The base scenario is based on the macroeconomic forecast published in Estonian Economy and Monetary Policy 2/2013.

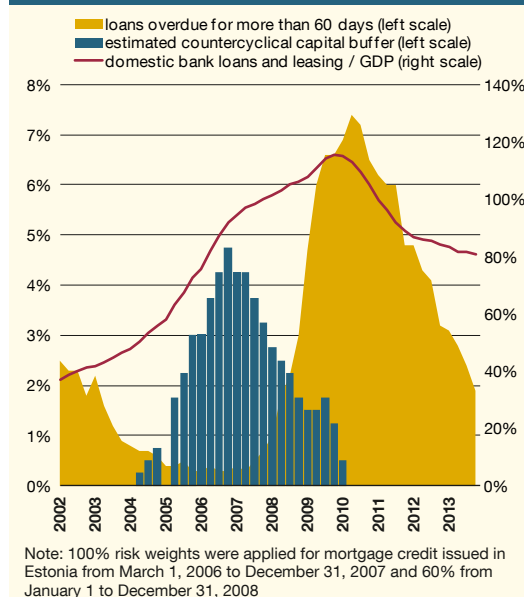
Figure 15. Capitalisation of banking sector



If a credit institution calculated the capital requirements for credit risk using its own internal ratings, then its own funds had to equal at least 95% of the required own funds during 2007, calculated using the legal provisions in force before 1 January 2007. This transition floor was set at 90% for 2008 and at 80% for 2009-2012.

To find what the **possible level of the countercyclical capital buffer** would have been under the methods suggested in the Basel III framework, the deviation of the ratio of credit-to-GDP from its long term trend was calculated for Estonia. As Figure 16 shows, a backward looking calculation like this indicates that the suggested countercyclical capital requirement should have increased gradually from 2004, peaking at 4.75% in 2006. Thus the results of the calculations suggest that applying this measure would have increased the banking sector capitalisation requirement. At the same time, credit institutions were already subject to an additional 2% capital requirement on top of the more commonly used 8% required rate of capitalisation throughout this period and the risk weights for resident mortgage loans were increased from 50% to 100% from March 2006, making it difficult to

Figure 16. Estimated countercyclical capital buffer and actual loans overdue as percentage of credit portfolio

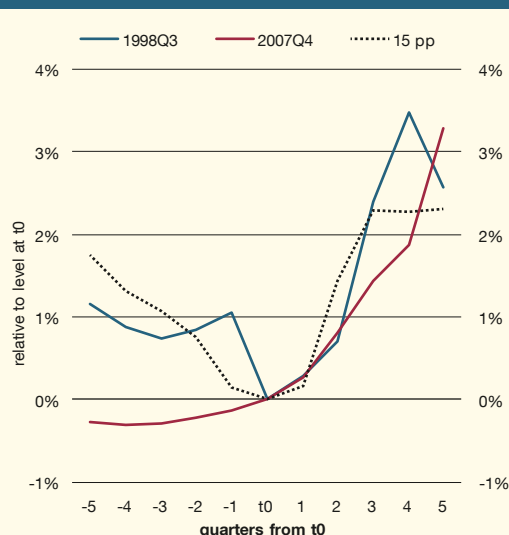


assess how the credit supply and the consequent countercyclical buffer rate would have differed had these measures not been applied.

However, while a countercyclical capital buffer can be considered a valuable tool for mitigating cyclical risks, future credit quality downturns in Estonia may not necessarily be preceded by cyclical loan growth, and so the additional capital required in the form of the countercyclical capital buffer may not be available, or sufficiently available, to mitigate potential impacts.

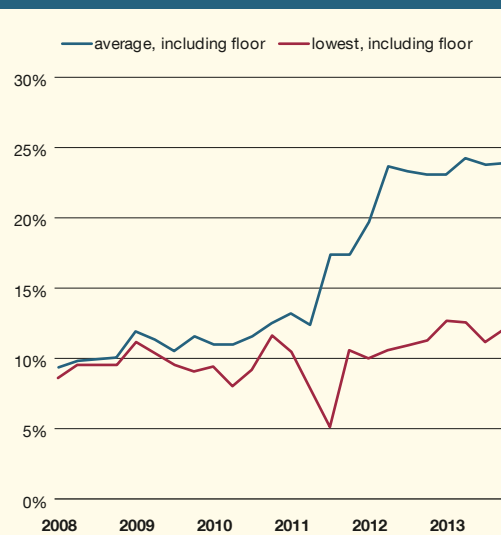
In addition, the **speed and extent** of the deterioration in the ability of borrowers to service their debt during the past periods of economic downturn suggests that once the deterioration of the economic environment is already clearly noticeable, it is likely that the banks would no longer be in a good position to raise additional capital. During the last two periods of significant increases in non-performing loans in Estonia, the ratio of loans with payments overdue for more than 60 days increased by more than 2 percentage points in just 3-5 quarters (see Figure 17).

Figure 17. Non-performing loans ratio reaction to the crisis



Source: Eesti Pank

Figure 18. CET 1 capital as a ratio to risk weighted assets



4. EXPECTED IMPACT

4.1 Potential impact on banking sector resilience

Additional capital buffers increase the ability of credit institutions to withstand shocks and absorb losses.

As at 31 December 2013, all credit institutions operating in Estonia fulfilled the minimum requirement of 10% with voluntary excess (see Figure 15). Periods of high profitability have provided the banking sector with significant buffers of retained earnings, which explains why the aggregate level of Common Equity Tier 1 (CET 1) capital among the credit institutions was as high as 23.9% of risk weighted assets⁷ as at 31 December 2013, while the lowest ratio exceeded 12% (see Figure 18). Thus all the credit institutions licensed in Estonia are expected to be able to meet the additional 2% CET 1 requirement with the buffers they are already holding.

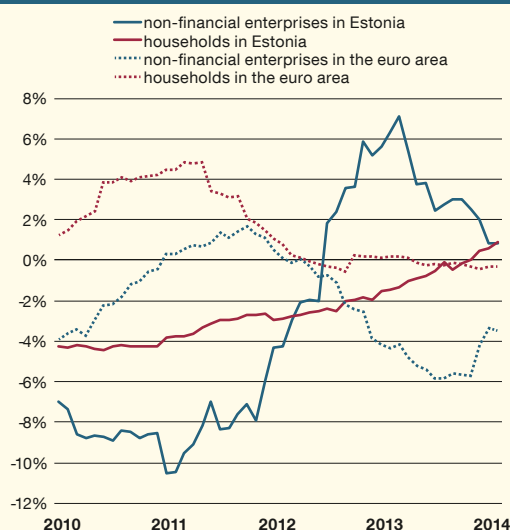
⁷ Calculated using the Basel II transition floors of 80% of requirements calculated using the principles applicable before 1 January 2007.

4.2 Potential impact on domestic credit supply

After a period of rapid growth in the first half of the previous decade and a slowdown following the change in market conditions and general sentiment in 2007-2008, the volume of outstanding loans to the real sector issued by banks operating in Estonia has been slowly increasing again since April 2012 (see Figure 19). Although credit growth has stalled somewhat during recent months, lending has become more broad-based than in 2012 and more new loan contracts have been signed. Borrowing by households has also become more active and loan turnover and the outstanding loan stock have continued to increase. Loan demand has also been supported by low interest rates.

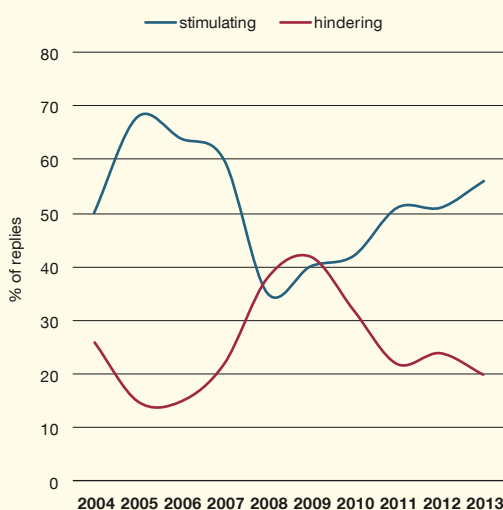
Although the increase in nonperforming loans in 2009-2011 resulted in banks tightening their credit standards, the assessments of respondents to the quarterly Bank Lending Survey conducted by Eesti Pank do not indicate plans for any further tightening of lending standards, with the indicator remaining stable for the past year and a half.

Figure 19. Annual growth of loan stock in Estonia and in the euro area



Sources: ECB, Eesti Pank

Figure 20. Impact of financial conditions on investments as assessed by manufacturing enterprises



Source: Estonian Institute of Economic Research

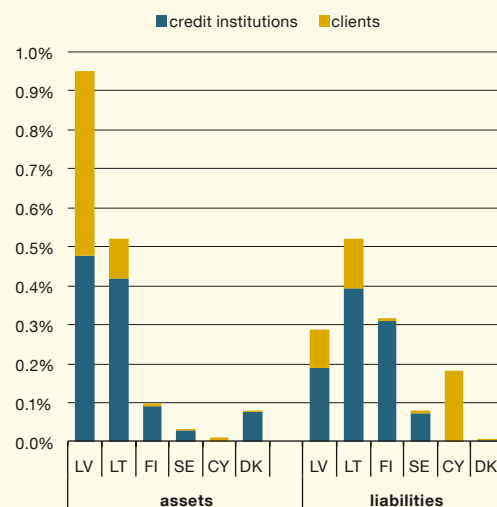
Equally, the results of the survey by the Estonian Institute of Economic Research among manufacturing companies indicate that in recent years the larger share of companies has reported that their financial position for financing investments has improved (see Figure 20). According to the Institute there are even fewer companies in the service sector and in construction that consider financial problems to be a factor inhibiting expansion of production.

4.3 Potential cross-border impact

Data from the ECB and Eesti Pank show that the cross-border exposures held by credit institutions licensed in Estonia remained below 0.01% of the total banking sector assets of all EU member states as at 31 December 2013.

Given the limited cross-border activity and exposures of credit institutions operating in Estonia (see Figure 21) and given that these credit institutions were effectively required to meet a 10% capital requirement until 31 December 2013, the potential adverse effects on the whole of the financial system of the EU or on parts of it stemming from the application of the 2% systemic risk buffer on credit institutions authorised in Estonia are expected to remain small or insignificant.

Figure 21. Cross-border loans and deposits of credit institutions in Estonia as a ratio of total assets of credit institutions in the respective Member State, as at 30 September 2013



Sources: ECB, Eesti Pank

Appendix 1 – macroeconomic scenarios