

FINANCIAL STABILITY REPORT

FINANCIAL STABILITY REPORT 2013/2014

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Maintaining financial stability is defined as one of the CNB's main objectives in Act No. 6/1993 Coll., on the Czech National Bank, as amended:

Article 2

(2) In accordance with its primary objective, the Czech National Bank shall

e) set macroprudential policy by identifying, monitoring and assessing risks jeopardising the stability of the financial system and, in order to prevent or mitigate these risks, contribute by means of its powers to the resilience of the financial system and the maintenance of financial stability; where necessary, it shall cooperate with the relevant state authorities in setting macroprudential policy...

The CNB defines financial stability as a situation where the financial system operates with no serious failures or undesirable impacts on the present and future development of the economy as a whole, while showing a high degree of resilience to shocks. The CNB's definition is based on the fact that financial stability may be disturbed both by processes inside the financial sector that lead to the emergence of weak spots, and by strong shocks, which may arise from the external environment, domestic macroeconomic developments, large debtors and creditors, economic policies or changes in the institutional environment. Any interaction between weak spots and shocks can result in the collapse of systemically important financial institutions and in disruption of the financial intermediation and payment functions of the financial system.

The CNB's aim with regard to financial stability is above all to ensure a degree of resilience of the system that minimises the risk of financial instability. To fulfil this aim, the CNB as a monetary and supervisory authority uses the instruments made available to it by the Act on the CNB. Cooperation with other national and international authorities is also very important in this area. In order to maintain financial stability, the CNB focuses on prevention and broad communication with the public regarding the potential risks and factors posing a threat to financial stability. This Financial Stability Report is an integral part of such communication.

The global financial crisis has led not only to a strengthening of the importance of the objective of financial stability in central banks, but also to the institution of macroprudential policy designed to maintain financial stability. The main aim of macroprudential policy is to mitigate systemic risk, i.e. the risk of instability of the financial system as a whole. An intensive debate about the tools of macroprudential regulation, i.e. the set of pre-emptive measures intended to prevent financial instability, is going on at international level. The European Systemic Risk Board (ESRB) has been operating at the European level since the start of 2011. Together with three pan-European sectoral supervisory authorities (EBA, ESMA and EIOPA) it makes up the European System of Financial Supervision (ESFS). If it identifies increased risks of a systemic nature, the ESRB issues warnings and recommendations to mitigate those risks. CNB representatives are involved directly in the ESRB's work; the CNB Governor and another board member are members of the General Board of the ESRB, and CNB experts participate in its working groups. Since 2011, the CNB has also been represented in the Regional Consultative Group of the Financial Stability Board established by the G20.

The CNB regularly monitors and closely analyses developments in all areas relevant to financial stability. The members of the CNB Bank Board meet every six months with experts from key sections at regular meetings on financial stability issues. A wide range of information on developments of risks in the domestic financial system and abroad is presented at these meetings. The position of the Czech economy in the financial cycle is assessed and – if any risks to financial stability are identified – discussions are held regarding the use of regulatory, supervisory and other economic policy tools to suppress such risks or their potential effects.

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The Czech National Bank is pleased to present its tenth Financial Stability Report (FSR) to the public. The aim is to analyse and identify the risks to the financial stability of the Czech Republic. This year's FSR focuses mainly on the risks that may arise in connection with developments in global bond markets, the financing of property purchases and the banking union project. Significant space is devoted to new macroprudential capital buffers in the banking sector and instruments aimed at mitigating systemic risk.

The FSR is based on an advanced analytical and modelling framework, and stress tests of the key segments of the financial sector (i.e. banks, insurance companies and pension management companies), as well as a stress test of households, are integral parts of the FSR. The testing methodology has gradually been refined and several changes have been made since the previous FSR. In bank stress tests, the parameters of satellite models describing the evolution of some financial variables and risk measures were re-estimated. The FSR also newly contains the results of bottom-up micro stress tests conducted by the CNB in partnership with selected banks and insurance companies. The main refinements of the household stress test consist in enhanced modelling of flows between employment and unemployment and distinction between the short-term and long-term impacts of the interest rate shock.

The financial sector's resilience is tested by means of an adverse macroeconomic stress scenario entitled *Europe in Deflation*. This scenario assumes a significant decline in economic activity in Europe owing to negative expectations regarding global economic developments, a general increase in investors' risk aversion and the potential re-emergence of problems in the euro area. This will cause the domestic economy to return to recession and the pessimistic expectations in the private sector to deepen. This adverse scenario is compared with the *Baseline Scenario*, which is based on the CNB's official May forecast. The impacts of both scenarios are assessed not only from the perspective of the financial sector, but also with regard to the property market and the non-financial corporations and household sectors.

Like last year, the FSR is divided into five main sections followed by thematic articles. The *Real economy* section deals with the external and domestic macroeconomic environment and analyses the financial situation of non-financial corporations and households. The section entitled *Asset markets* analyses risks in the financial markets and the property market. The section called *The financial sector* describes key trends in the financial sector and the main sources of potential risks. The second part of this section includes stress tests of individual segments of the financial sector (banks, insurance companies and pension management companies). The final section *Risks to financial stability and macroprudential policy* focuses mainly on an overall evaluation of the financial stability indicators and risks presented in the previous sections of the FSR and goes on to provide information on how the CNB will respond to those risks using macroprudential policy tools, microprudential regulation and financial market supervision.

The thematic articles react to selected topical financial stability issues. The article *An Indicator of the Financial Cycle in the Czech Economy* proposes the construction of a new aggregate indicator capturing cyclical changes in perceptions of systemic risk and evaluates the current position of the Czech economy in the financial cycle using this indicator. The article *Concurrent Capital Buffers in a Banking Group* focuses on the Basel III capital buffers. It uses simulations to estimate what consequences these buffers would have for a banking group and a subsidiary within that group from the perspective of both the capital held by the parent bank and the probability of failure of the subsidiary or the group as a whole. The study *Collateralization and Financial Stability* looks at collateral use, asset encumbrance and related sources of systemic risk and maps out this phenomenon in the Czech financial system. The article *Office Property in Central European Countries* describes the development of the office property market and analyses its main determinants. Using a simple model, it endeavours to answer the question of whether current office property prices are overvalued or undervalued.

This Financial Stability Report was approved by the CNB Bank Board at its regular meeting on financial stability issues on 22 May 2014 and was published on 17 June 2014. It is available in electronic form at <http://www.cnb.cz/>.

PART I

OVERALL ASSESSMENT

Global financial markets have seen substantial volatility since the publication of last year's Financial Stability Report. Signals from the Federal Reserve regarding a possible tapering of its bond purchase programme and a subsequent revision of these signals led to an increase in long-term interest rate volatility in late May/early June 2013. A temporary rise in government bond yields in advanced countries caused a sizeable outflow of capital from emerging economies. In autumn 2013, however, the markets again started to expect that the monetary policies of major central banks would remain very easy for an extended period and that for this reason, among others, long-term interest rates in advanced countries would stay very low. In spring 2014, these expectations were supported by hints by the ECB that it might adopt quantitative easing. Euro area financial markets calmed considerably, as evidenced by a gradual decrease in government bond yields in the periphery countries towards levels usual in the core countries. However, financial stability in the euro area remains fragile and strongly dependent on the measures and forward guidance of the ECB.

The Czech financial market was also affected by the volatility in global financial markets, albeit significantly less so than emerging economies. Despite unfavourable economic activity, the risks to financial stability are virtually unchanged compared to spring 2013 and can still be regarded as weak. A potential deterioration of the credit portfolio resulting from renewed adverse developments in the real economy is the main risk to the Czech banking sector. Its sources lie not only in a potential worsening of the situation abroad, but also in a potential decrease in domestic demand. Some elements of planned EU regulations and of the rules being created for the operation of the banking union are also a source of partial risks to banking sector stability. The Czech financial sector as a whole is facing risks linked with persisting low long-term yields, as it could be adversely affected by bond market volatility given its focus on bond portfolios.

DEVELOPMENTS IN 2013 AND 2014 Q1

Expectations of a recovery in advanced countries materialised only partially in 2013. The US and UK economies experienced a visible recovery, but the same was not true of the euro area, where economic activity dropped slightly overall. The Czech economy only gradually emerged out of recession in 2013, with GDP falling by almost 1% year on year. However, the indicators for 2013 Q4 and preliminary data for 2014 Q1 confirm a recovery in the domestic economy and the euro area.

As in previous years, an absence of demand-pull inflation pressures allowed the major central banks to maintain easy monetary conditions by means of low monetary policy interest rates or unconventional instruments. The CNB's monetary policy rate has been at "technical zero" since November 2012. However, the negative output gap started to contribute to strong anti-inflationary or even deflationary pressures in the Czech economy during 2013. The CNB therefore began to use the

Monetary policies remained easy; the CNB used the exchange rate to ease the monetary conditions

exchange rate as an additional monetary policy instrument. The koruna weakened following the start of the interventions and its exchange rate has since been fluctuating slightly above the exchange rate commitment level of CZK 27 to the euro. The current regime will be maintained at least until early 2015. At its May meeting, the CNB Bank Board assessed the risks to the new forecast as being slightly anti-inflationary and commented in its statement on the monetary policy decision that the probability of a later exit from the exchange rate commitment was increasing.

The performance of the non-financial corporations sector gradually increased in late 2013. At the same time, however, the differentiation of economic results in this sector also increased, both in terms of sub-sectors (for example a continuing decline in construction) and in terms of size, as small firms often face a substantially larger financial burden than large ones. The strengthening export orientation of the Czech economy is increasing its dependence on the external environment. The low credit growth in 2013 was not caused by lower availability of credit to corporations and can be explained mostly by demand-side factors. There was an increase in foreign currency borrowing, which may make some corporations more sensitive to exchange rate movements.

The household sector faced an adverse labour market situation, as the unemployment indicators were flat or slightly rising and real wages fell in 2013. On the other hand, the net interest payments of households relative to gross disposable income decreased, owing primarily to a further four in mortgage interest rates. This decrease occurred despite a slight rise in the debt of Czech households. The debt burden of households is homogeneous across income groups. By contrast, the loan-to-value ratios for mortgage loans are highly heterogeneous across regions. Household credit risk as expressed by the default rate fell slightly in 2013 and is set to continue declining this year. Stress tests of households indicate that the proportion of distressed households was flat last year and should remain so 2014.

In 2013, residential property prices picked up for the first time in a long time. Their growth was moderate by international comparison and can be interpreted as a correction of the previous slight undervaluation of apartment prices. A decline in the number of property market transactions indicates no marked recovery in residential property demand. However, the increase in prices was reflected in a slight decrease in housing affordability and a modest reduction of the scope for making profits by purchasing property as an investment.

The developments recorded in the Czech financial sector in 2013 were mostly positive. The banking sector strengthened its capital adequacy. Despite a year-on-year decrease in profits, the sector remains sufficiently profitable and is well prepared overall for new European regulatory rules. The amount of deposits continued to increase despite a decline in deposit interest rates. Thanks to a high volume of residents' deposits, the domestic banking sector has long been independent of foreign funding. Its net external position is positive, despite having decreased as a result of

The financial condition of the corporate sector improved slightly but remains strongly differentiated by sector and corporation size

On the one hand, households faced deteriorating real income, but on the other hand the fall in interest rates favourably affected their ability to repay

Property prices rose slightly in 2013 and are close to their equilibrium values

Developments in the financial sector in 2013 were mostly positive but led to a decrease in profitability in some segments

the CNB's foreign exchange interventions. Insurance companies also have solid capitalisation. Like banks, they saw a decline in profits in 2013. Collective investment funds – in 2013 especially mixed funds – recorded increased interest from the public for the second consecutive year. The sector of pension management companies is stable, but there was insufficient interest in participation in the second pillar, which is thus likely to require some adjustment.

Despite the contraction in economic activity, all segments of the financial sector, including credit unions, recorded a rise in assets in 2013

Despite the continuing contraction in economic activity in 2013, financial sector's total assets increased year on year across all its segments. The revocation of licence of the then largest credit union in December meant a year-on-year drop in the total assets of the credit union segment in absolute terms, but adjusted for this one-off effect the total assets of this segment and the amount of deposits accepted rose further year on year.

RISKS TO FINANCIAL STABILITY AND ASSESSMENT OF THE FINANCIAL SECTOR'S RESILIENCE

The euro area financial sector is more stable, but the situation remains fragile because of the uncertain economic recovery

In spring 2014, the euro area financial sector is more stable than it was a year earlier and the level of uncertainty should decline further after the completion of the comprehensive assessment of banks' balance sheet tests at the end of this year. Thanks mainly to the measures and forward guidance of the ECB, the vicious circle between public finance problems, risks in banks' balance sheet and weak economic activity stopped dominating the euro area financial markets last year. However, the sources of this vicious circle persist, as in many countries the share of banks in the financing of growing government debt is continuing to rise and the economic recovery is very fragile, mainly because of high private sector debt. Lowering the euro area's debt burden will be a protracted process even given the easy monetary conditions owing to very low growth in nominal income. This is currently due not only to slow real output growth, but also to suboptimally low inflation.

Risks connected with investors searching for higher yields are increasing in foreign asset markets

2013 saw a global surge in new risks associated with the response of financial investors to low yields on safe assets. Efforts to achieve higher returns are being reflected in increased risk-taking, as a result of which bubbles are starting to form in some markets. The developments in bond markets and some property markets are generating potential for sizeable credit and market losses in the years ahead. The current situation therefore represents an unusual combination of risks that originated before the crisis and newly emerging risks related to the search for yield. Central banks and supervisory authorities are facing the task of avoiding a renewed decline in demand and a fall of their economies into the deflation trap while simultaneously preventing excessive risk-taking in the financial markets. So far, Czech assets have been affected relatively little by the search for yield and the CNB is actively combating the deflationary risks by means of an interventional monetary policy regime.

The recovery of the Czech economy will continue in 2014 and gain momentum in 2015

According to the CNB's May forecast, GDP will rise by 2.6% in 2014 thanks to stronger economic growth abroad, easy domestic monetary

conditions and to a lesser extent also a fiscal stimulus. The growth will then pick up further to 3.3% in 2015, aided significantly by more expansionary fiscal policy. The performance indicators of non-financial corporations, which are important as regards the future evolution of their credit risk, started to improve at the end of 2013. The labour market situation, which determines household credit risk, will not improve significantly until 2015, when wage growth will pick up pace and unemployment will start to fall.

In addition to potential renewed adverse developments in trading partner countries, a deterioration in domestic demand poses a risk to the Czech economic recovery. Signals that the financial surpluses generated by corporations and households could lead to domestic demand shortfalls amid a decreasing government deficit intensified in 2013. The use of the exchange rate as a monetary policy instrument and the weakening of the koruna significantly weakened the risk of a mismatch between expected future income and expenditure in the economy. Nevertheless, signals regarding the intensity of this risk must be monitored carefully in the quarters ahead.

The external balance of the Czech Republic again developed mostly favourably in 2013. The ratio of the gross external debt of the Czech economy to GDP rose from 51% to 57%. However, this rise was partly due to the statistical effect of the weaker koruna. Conversely, the coverage of the external debt by banks' external assets rose from 70% to 78%, mainly because of an increase in the CNB's international reserves. The government's net external debt continued to increase, and any further growth could be a source of systemic risk from the long-term perspective. The ratio of government debt to GDP was flat at 46%, where it will probably remain in the years ahead. The Czech Republic's current fiscal situation is sustainable and does not pose a threat to financial stability at the moment.

Residential property prices are currently close to their equilibrium levels. Given the assumptions regarding the macroeconomic environment, slight increases in prices of residential property and further differentiation between regions can be expected for the future. The scope for stronger price growth will be reduced by slow growth in household income and worsening demographic characteristics. Given the modest growth in loans for house purchase and the falling number of property market transactions there is no danger of a more significant price bubble emerging at the moment. The commercial property segment saw a renewal of investment activity, which, however, is not yet underpinned very much by an improvement in price fundamentals. The rise in investment activity is being driven mainly by foreign entities and may also reflect a search for yield. The potential impact of volatility in this segment on the Czech financial sector is small.

A prolonged period of very low yields on advanced countries' government bonds may also lead to a search for yield in these markets. Such behaviour may be reflected in inappropriate swings in prices of other countries' government bonds and other assets such as risky

The risk of the emergence of insufficient demand persists as a result of financial surpluses of households and corporations

The Czech Republic's external balance and public finances are not generating any short-term risks to financial stability

The risk of domestic property prices becoming overvalued is relatively low

The focus of investors on yield is increasing the risk of overvaluation of some government and corporate bonds

A potential renewed recession leading to a substantial rise in credit losses and a drop in profitability represents a risk to the banking sector

corporate bonds. A sudden change in market sentiment may cause sudden repricing of the assets concerned and related market losses. If risks were to be reassessed quickly and unexpectedly, a wave of sell-offs and a market liquidity crisis could occur.

Credit risk stabilised during 2013 but cannot be expected to decrease significantly in the near future

Risks to the banking sector stem from a potential economic slowdown leading to higher credit losses and a considerable decline in banking sector profitability. In addition, interest profit decreased slightly year on year for the second consecutive year. In a context of low interest rates, this trend can be expected to continue in the years ahead. The *Baseline Scenario* assumes a continuing decline in interest profit of around 5% year on year.

Some indicators suggest a still elevated level of credit risk, which could rise sharply in the event of adverse developments in the real economy

Credit risk in banks' balance-sheets, as expressed by the ratio of non-performing loans (NPLs) to total loans to residents, decreased slightly in 2013. By contrast, the volume of NPLs increased somewhat for loans to residents. Despite the improving macroeconomic environment, no significant decrease in credit risk can be expected in the near future, not least because some sectors are still experiencing a downturn and some corporations are recording a deterioration in financial indicators and a fall in financial reserves.

The coverage of NPLs by provisions may not be sufficiently prudent from the aggregate perspective

Other complementary indicators also suggest elevated credit risk. The quality of the NPL portfolio is still worsening and loan migration to riskier NPL subcategories is continuing. Within the NPL category, the share of loans that are not actually past due is decreasing and the proportion of loans that are more than three months past due is continuing to rise. Banks' balance sheets include loans categorised as performing even though another bank regards a loan to the same client as non-performing. Credit losses could therefore rise significantly in the event of worse-than-expected developments in the real economy.

The concentration of the portfolios of banks, insurance companies and pension management company funds on domestic government bonds remains significant

The current coverage of NPLs by provisions could also represent a risk. It has been virtually flat in recent years and may therefore not be fully consistent with the deteriorating NPL structure. There are substantial differences between banks in the prudence of NPL coverage.

2013 was an unfavourable year from the perspective of credit unions; the segment remains risky and draft legislation has been prepared to change this

The share of domestic government bonds in the total assets of banks, insurance companies and pension management company funds decreased slightly year on year. However, the interconnectedness of the financial and government sectors remains significant. The current yields on Czech government bonds are very low in relation to their fundamentals. However, the financial market trends could suddenly turn around as market expectations change. This would lead to a fall in bond prices, which, in turn, would have a negative impact on the profitability of financial institutions. If the CNB were to assess the risks connected with sovereign exposures as systemic, it could take action against banks in accordance with the updated Pillar 2 in the sense of evaluating concentration risk or applying the systemic risk buffer.

2013 was an unfavourable year from the perspective of credit unions. One credit union had its licence revoked. Another was prohibited from

accepting deposits from the public and some of its other activities were limited. In aggregate terms, the credit union segment is still riskier than the banking segment. The ratio of NPLs to total loans rose by 9 percentage points year on year to almost 23%. The CNB is looking into the situation in the credit union segment. Together with the Ministry of Finance it has drafted legislative changes that will lead to a reduction in the level of risk in this segment.

With regard to the risks identified above, the resilience of the domestic financial system was assessed as usual by means of stress tests on banks, insurance companies and pension management companies using a *Baseline Scenario* and a *Europe in Deflation* stress scenario. The *Baseline Scenario* is considered by the CNB to be the most probable. The stress scenario describes the risk of a long-lasting and pronounced decline in domestic economic activity caused by adverse developments in EU countries and low external demand. A long-lasting adverse economic situation will erode the financial reserves of households and non-financial corporations and cause a significant deterioration in their ability to repay their debts, leading to high credit losses in the banking sector. This scenario is supplemented in sensitivity analyses with other shocks, e.g. write-downs of claims on indebted EU countries and the collapse of the largest debtors of each bank.

The stress tests demonstrate that the banking sector remains highly resilient to adverse scenarios even in a strong recession accompanied by deflation. While the *Baseline Scenario* predicts a slight decline in credit risk, the adverse developments assumed in the *Europe in Deflation* scenario would mean, among other things, that the banking sector's credit losses would more than triple over the three-year test horizon. However, the banking sector has a large capital buffer which enables it to absorb highly adverse shocks and maintain the sector's overall capital adequacy sufficiently above the regulatory threshold of 8% even in such an unfavourable scenario. Banks also passed a liquidity stress test. The insurance company sector also showed sufficient resilience to the adverse scenario thanks to its large capital buffer. The pension management company sector remains sensitive to a rise in yields on securities holdings and would probably have to increase its capital in the event of a sharp future rise in yields.

SYSTEMIC RISK AND MACROPRUDENTIAL POLICY

The domestic financial sector is currently in a phase of the financial cycle that can be regarded as a modest credit recovery. The lending capacity of the banking sector is not limited by a shortage of balance-sheet liquidity or capital, but the absence of unhealthily optimistic expectations due to weakened economic activity is discouraging strong lending activity and excessive risk-taking. Lending growth remains subdued overall, although it started accelerating in late 2013 on the back of the economic recovery. The transposition of the EU Capital Requirements Directive (CRD IV) into Czech law through an amendment to the Act on Banks, which will take place this year, opens the door to the use of the countercyclical capital buffer. According to CNB analyses, however, the financial cycle in the

According to the stress tests, banks and insurance companies are resilient to adverse developments, but pension management companies show high sensitivity to a potential interest rate shock

The financial cycle in the Czech economy is in a phase of modest recovery

Banks are not relaxing their credit standards, their risk margins are not decreasing, and the interest rate conditions are having a strong countercyclical effect

Czech Republic has not yet entered its upward phase, so a non-zero countercyclical capital buffer is not needed at present.

From the point of view of credit risk, one positive factor is that banks are not relaxing their credit standards. At the same time, the decrease in margins on new loans has come to a halt. This can be regarded as a stabilising factor, since in the previous two years margins fell to levels that may not always have been consistent with appropriate credit risk valuation. The low interest rates on bank loans have been reflected in an absolute decline in interest paid, which is having a countercyclical effect by fostering a drop in the debt servicing costs of corporations and households.

The links between financial market institutions are increasing, as is the similarity of bank portfolios

The direct and indirect links between financial market segments are the source of the structural component of systemic risk. Indirect links through exposures to the same sectors were weakened slightly year on year by the falling exposures of individual segments to the government sector. However, this link is still significant in the domestic financial sector. The similarity of banks' portfolios, which reflects the structure of bank exposures to all sectors of the economy, increased further in 2013. Direct links through mutual exposures within the financial sector rose in 2013, especially between banks and other financial intermediaries. The structural component of systemic risk is being suppressed by robust banking sector liquidity. The ratios of quick assets to total assets and to client deposits increased further in 2013. However, the ratio of liabilities payable on demand to total liabilities continued to rise, causing maturity transformation to increase.

The CNB is monitoring the risks associated with property exposures and will legislate for macroprudential tools to tame credit expansion where necessary

A stabilisation of the property market and a related improvement in sales of apartments in residential development projects led to a drop in the share of NPLs in the property development sector in 2013. However, the favourable trends, particularly on the domestic commercial property market, may be disrupted by a correction of imbalances in European property markets and a related exit of foreign investors from the Czech market. For the eventuality of an overheating of the residential and commercial property markets, the CNB will legislate for and apply prudential tools able to moderate any excessive future credit expansion. These tools include sector-specific risk weights applicable under CRD IV/CRR and quantitative limits on the loan-to-value (LTV) ratio as recommended by the ESRB.

The CNB regards it as vital for banks to be prudent in their lending activities and subsequent loan classification and provisioning

Domestic banks are able to achieve reasonable profitability even in an adverse macroeconomic environment. This is aided by their ability to obtain funds at relatively low cost. For this situation to continue, the high confidence of the public and investors in the stability of the Czech banking sector needs to be maintained. Given the deterioration in the NPL structure, among other things, it is vital for banks to remain prudent in their lending activities and subsequent loan classification and provisioning.

The CNB is ready to introduce increased capital requirements for systemically important banks

The transposition of CRD IV authorises the CNB to set requirements for domestic banks partly on the basis of their systemic importance.

Although the Czech banking sector currently faces no acute risks and therefore is not a source of risk to the stability of the financial sector as a whole, the long-term structural characteristics of the Czech financial and economic system have led the CNB to introduce regulation of bank capital on the basis of systemic importance as soon as this mandate takes effect. Given the current situation in the Czech banking sector, the systemic risk buffer appears to be the most suitable of the capital buffers offered by CRD IV. CNB analyses show that compliance with this buffer needs to be required of two of the four most systemically important banks. The relevant banks were informed about this in the second half of 2013.

The CNB will be able to demand compliance with the systemic risk buffer – together with the capital conservation buffer, which will apply to all banks – as soon as the relevant legislation is adopted. However, the banks that will be subject to the additional capital requirements already have capital exceeding the new potential requirements. Therefore, banks will not be forced to suddenly increase their capital adequacy. The newly introduced capital requirements should therefore not have a negative effect on their ability and willingness to lend and thereby adversely affect the domestic economy.

The additional capital requirements will not cause a need to suddenly increase capital adequacy

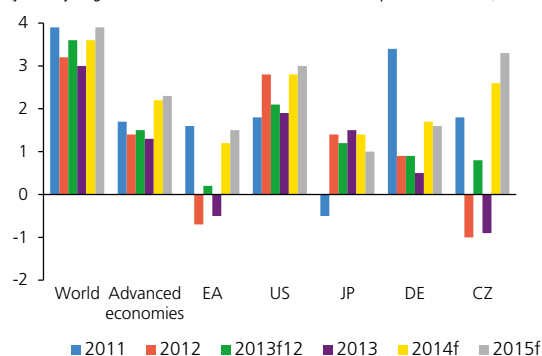
2 THE REAL ECONOMY

2.1 THE MACROECONOMIC ENVIRONMENT

Economic performance was very mixed across the regions of the world economy last year. In most European countries, however, the initial expectations of an economic recovery again failed to materialise. In 2014, however, the advanced European countries should return to GDP growth. The same goes for the Czech economy, where the risk of deflation has been averted by an easing of monetary policy by the CNB. Nevertheless, the risk of a general decline in prices is very topical in other EU countries, and the ECB will probably react by easing monetary policy. However, an increase in risks connected with search for yield and increased risk-taking in investing on asset markets could be a side effect. Additional risks to the EU economy are coming in mainly from emerging economies, which in many cases have been showing signs of imbalances. The expected growth slowdown in some of these economies may impinge on Czech exports, especially those to Germany. High debt will dampen the economic recovery in advanced countries. Private sector debt is also rising slightly in the Czech Republic, but from a low level. The Czech Republic's external debt rose in 2013, but its coverage by external assets and by the CNB's international reserves increased as well. The Czech Republic's ratio of government debt to GDP stabilised and should not rise significantly in the next two years.

CHART II.1

Economic growth worldwide and in the advanced economies
(year-on-year growth in %; outturns and October 2012 and April 2014 forecasts)

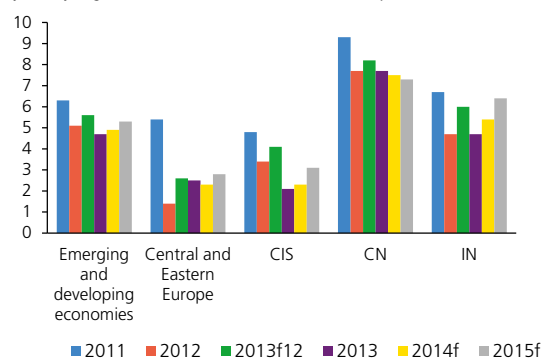


Source: IMF (World Economic Outlook, April 2014) and CNB (May 2014 macroeconomic forecast)

Note: 2013f12 is the October 2012/November 2012 forecast for 2013.

CHART II.2

Economic growth in emerging and developing countries
(year-on-year growth in %; outturns and October 2012 and April 2014 forecasts)



Source: IMF (World Economic Outlook, April 2014)

Note: 2013f12 is the October 2012/November 2012 forecast for 2013. The CIS item includes Ukraine even though it is no longer a member of the CIS.

Economic activity was very mixed across the regions of the world economy...

The more optimistic expectations at the start of the year regarding economic growth in the world economy again failed to materialise in almost all regions in 2013. As regards large economies, only Japan recorded a slightly better-than-expected result.¹ Despite the general non-fulfilment of growth expectations, last year was characterised by uneven developments. GDP growth in advanced economies was very low on average (see Chart II.1). By contrast, most emerging economies again showed rapid growth (see Chart II.2), although in some cases it showed signs of unsustainability.² In the euro area, which is the main trading partner of the Czech economy, the situation also remained heterogeneous. The countries hit by the debt crisis showed subdued economic activity and an unfavourable labour market situation. Nevertheless, slightly better results were achieved in the euro area than in 2012. Compared with the euro area countries, corporations and households in the USA and the UK are having more success in bringing down their debt ratios, aided by monetary policies and weaker

1 "Large economies" means the five largest economies in terms of nominal GDP, i.e. the USA, China, Japan, Germany and France.

2 Current account deficits, property market bubbles, strong inflation pressures, public finance deficits, etc. However, these developments are heterogeneous and do not pertain to all emerging economies.

currencies. Both economies experienced a noticeable recovery in 2013, although with different labour market characteristics. While labour demand remained muted in the USA, it rose unexpectedly fast in the UK.

... but this time the expectations of a return to growth in advanced European countries are on a more realistic footing

The 2013 Q4 results, leading indicators such as the PMI, and growth estimates themselves suggest that the advanced countries should continue to recover gradually this year (the yellow bars in Chart II.1) amid still very low inflation. The outlooks also indicate that the recession in the euro area should end. Although most forecasts published around the start of the year in previous years were also relatively optimistic, the favourable expectations are now on a more realistic footing.

Domestic economic activity bottomed out in 2013 and its growth in the two years ahead should be relatively robust

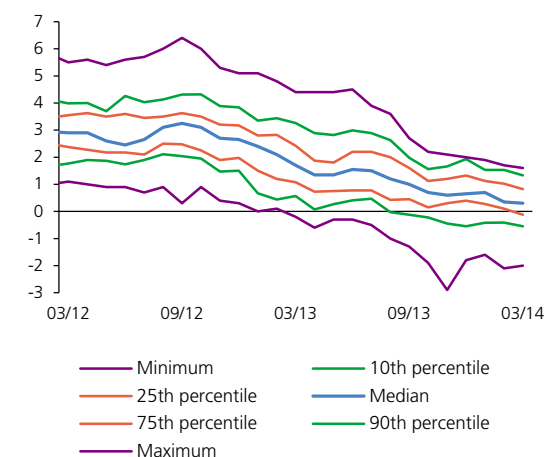
The Czech economy recorded a GDP contraction of 0.9% in 2013, with all demand components except government consumption making negative contributions to GDP growth. However, only the contribution of gross fixed capital formation was significantly negative. Developments were very uneven in the course of the year, with the economic contraction culminating at the start of the year and then being replaced by a subdued recovery in Q2 and Q3. The recovery turned into marked annual and quarterly GDP growth in Q4. Industrial production started to rise as early as in 2013 Q3 and recorded growth of 0.5% for 2013 as a whole. The CNB's May forecast predicts a relatively robust recovery of the Czech economy (GDP growth of 2.6%), aided by stronger external demand and easier monetary policy as a result of the weakening of the koruna amid slightly expansionary domestic fiscal policy. The weaker currency is boosting the price competitiveness of domestic production and, via a decrease in real interest rates, will support private consumption and investment expenditure. In 2015 economic activity should strengthen further, with GDP growth reaching 3.3%. The CNB Bank Board assessed the risks to the May forecast as being slightly anti-inflationary. In a debate of the forecast, the Bank Board stated that the probability of a later exit from the exchange rate commitment was increasing.

Developments in the euro area are the main risk to economic growth

As in the past, a renewal or escalation of adverse developments in economic activity in the Czech Republic's main export markets is the main risk to Czech economic growth. Such developments would be broadly consistent with materialisation of the *Europe in Deflation* stress scenario, which is described at the end of this section. Developments in Russia and Ukraine, which may be reflected in a drop in exports to these countries from the EU and the Czech economy and in lower availability and higher prices of energy commodities, are another significant – albeit difficult to quantify – source of risks to the domestic economy (see also section 2.2).

CHART II.3

Year-on-year changes in harmonized index of consumer prices in EU countries (%)



Source: Eurostat

Concerns about deflation are emerging in the euro area, and the ECB may respond by extending its unconventional policies

Although the central banks of large advanced countries have been applying strongly accommodative monetary policies for years, inflation pressures remain very subdued. In some countries, especially in the euro area, deflationary risks started to increase during 2013. Given the insufficient demand and high private and public debt, the emergence of more significant deflationary expectations or longer-running deflation could have a strong negative impact on economic activity and financial stability. In particular, elements of debt deflation would manifest themselves, with the nominal value of debt remaining the same but the real debt level increasing amid a decrease in nominal income. The deflation would thus hinder any improvement in consumer and investment demand not only through deferral of expenditure because of expected lower prices, but also through higher real debt service costs and efforts to repay existing debt faster. At the same time, with nominal disposable income falling, income and assets would be redistributed from indebted households with a high propensity to consume to creditor households with a low propensity to consume. A relatively clear trend of falling inflation can be observed across the member states (see Chart II.3). In some countries deflation has already become a realistic threat and the euro area as a whole is not too far away from it either. As a result of this risk, signals of the potential commencement of quantitative easing started to emanate from the ECB at the start of this year.

The threat of deflation in the euro area is also linked with credit market developments

The growing concerns about deflation in the euro area are also being fuelled partly by the fact that credit to the private sector is not growing overall and deleveraging is in fact occurring in some places. Lower availability of credit to the corporate sector can be observed in some countries, especially for small and medium-sized enterprises. The supply side of the credit market is perhaps being hampered in some euro area regions by the fact that banks are gearing up for the Asset Quality Review (AQR) and EU-wide stress tests as part of the preparations for the single supervisory mechanism (see section 5.6). Motivated by concerns regarding the results of these tests, some banks may be attempting to strengthen their capital positions, which may also be taking the form of deleveraging.

Accommodative monetary policies may also be generating risks to financial stability

With monetary policy having long been very easy, the difference between its effects on the real economy and on the financial sector started to be discussed in 2013. The low interest rates and quantitative easing have undoubtedly supported consumer and investment demand to some extent. However, their effects on financial market activity may have been

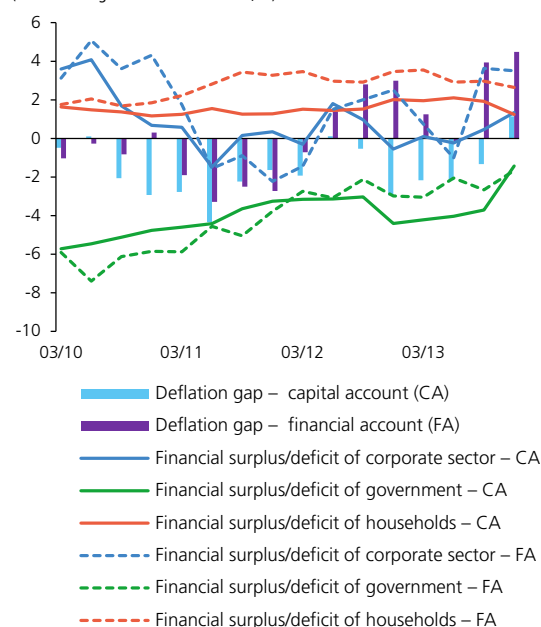
even stronger.³ Owing to low nominal yields worldwide, various forms of search for yield started to emerge, which could lead to the formation of bubbles in some asset markets, for example in European residential and commercial property markets, as evidenced by statements issued by central banks and precautionary measures adopted in Germany and Sweden (see section 5.4 for details). From the global perspective, the bond market is regarded as the biggest risk (see section 3.1 for details). However, the risk of bond overvaluation is not necessarily acute, as the exit from accommodative monetary policies will be either tapered (in the USA and the UK) or postponed further (in Japan). Amid weak demand growth, inflation will remain low and the saving rate elevated. Long-term interest rates may therefore stay at historical lows for a longer period of time, although for some corporate bonds the current yields seem excessively low. Concerns of overvaluation also relate to shares, which recorded a very good year worldwide in 2013. However, relatively weak investment in physical capital raises the question of whether the current profits of non-financial corporations are sustainable in the longer run.⁴

Signs of a balance-sheet recession also strengthened in the Czech economy during 2013

Given the low inflation observed in Europe and the potential deflationary pressures (see the *Europe in Deflation* stress scenario), the risk of a balance-sheet recession is often debated. This is a situation where, as a result of a mismatch between the level of debt and the value of assets (which has been reduced by the crisis), the private sector – in order to repair its balance sheets – generates high financial surpluses which other sectors are not able or willing to spend.⁵ In this situation, a slump in aggregate demand, a protracted recession and deflation pressures can occur, and the return to a full recovery is usually very slow. Data on financial surpluses/deficits by sector can be used to identify the risk of a balance-sheet recession in the Czech economy (see Chart II.4). Although the picture provided by the available data sources is not entirely clear-cut, a gradual rise in the financial surplus of the corporate sector (non-financial and financial corporations) can be observed in 2013 amid a decrease in the deficit of general government and a slightly falling

CHART II.4

Financial surpluses/deficits by sector and deflation gap
(annual moving totals as a ratio to GDP; %)



Source: CNB, CZSO

Note: FA and CA refer to the balancing items on the financial account and capital account respectively. The two balancing items measure the sector's financial surpluses/deficits in the given period and should be equal in theory. The differences in the indicators are due to measurement errors and statistical discrepancies. The deflation gap is the difference between the private sector surplus and the general government deficit.

3 See, for example, Stein, J.: *Overheating in Credit Markets: Origins, Measurement, and Policy Responses*, lecture at the Federal Reserve Bank of St. Louis research symposium, 7 February 2013; Shin, H. S.: *The Second Phase of Global Liquidity and Its Impact on Emerging Economies*, lecture at the Federal Reserve Bank of San Francisco conference, 7 November 2013; Haldane, A.: *Ambidexterity*, lecture at the American Economic Association in Philadelphia, 3 January 2014.

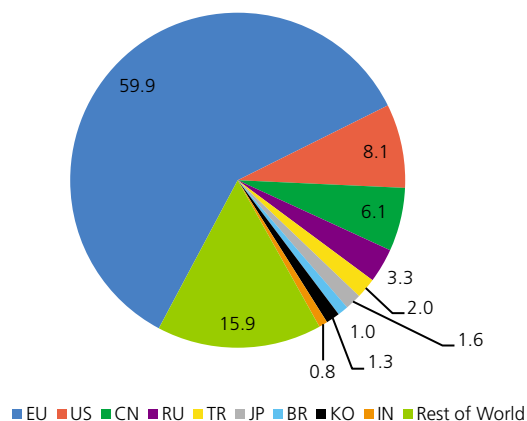
4 The increase in share prices in 2013 can be regarded as a standard reaction to procyclical monetary policies and as a reflection of the rise in corporate profits recorded at the end of the recession. The price growth may also be due to an upward trend in the ratio of profits to national income. Uncertainty regarding the long-term sustainability of high share prices is associated mainly with the fact that many large corporations are generating sizeable cash surpluses but are returning them to shareholders rather than investing them. This may be caused by the increased importance of bonuses derived from share prices, which is leading managers to adopt approaches that are successful in the short run but pose a long-term risk to firms: they are cutting investment and making higher profits through higher margins, which may gradually result in a loss of market share. This hypothesis implies that many shares may be overvalued given the current indebtedness of corporations.

5 The balance-sheet recession scenario was presented in more detail in Box 1 in FSR 2011/2012.

CHART II.5

Share of exports to different countries in total German exports

(%; figures for 2013)

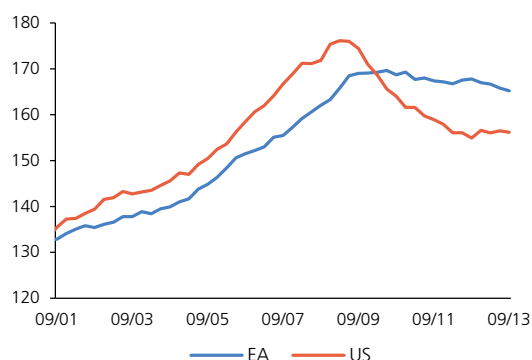


Source: German Statistical Office

CHART II.6

Ratio of loans to private non-financial sector to GDP (credit-to-GDP ratio)

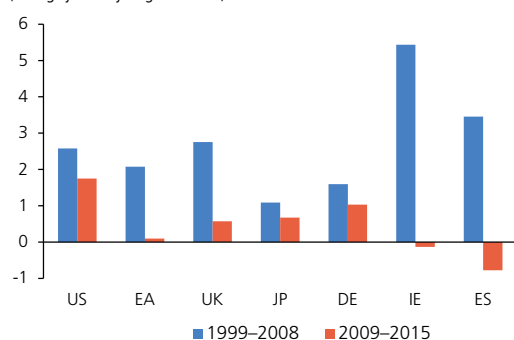
(%)



Source: Bank for International Settlements, Fed

Note: Loans to private non-financial sector include also loans from non-banks.

CHART II.7

Nominal GDP in selected countries
(average year-on-year growth in %)

Source: OECD

Note: Forecast used for 2014–2015.

financial surplus of households. The gap between the surpluses of the private sector and the general government deficit (sometimes also called the deflation gap) switched from a decreasing deficit to positive values in 2013; according to financial account data, it was in fact the highest positive gap in the history of these statistics. A positive gap represents a surplus of domestic funds, which could have been consumed (or invested) by domestic entities and used to increase domestic demand. The said developments therefore suggest that some shortfalls in aggregate demand occurred during 2013. These can be regarded as signals of a balance-sheet recession, or rather its more moderate form where a mismatch arises between expected future income and expenditure. A more accurate assessment of these signals will depend mainly on developments in the quarters ahead, which may generate a turnaround in the current tendency thanks to the economic recovery or, conversely, provide clearer confirmation of the current signals. The use of the exchange rate as a monetary policy instrument and the weakening of the koruna, which led to the elimination of deflationary expectations and an easing of the monetary conditions supporting a recovery in GDP growth, significantly reduced the risk of a balance-sheet recession. Monetary policy is thus helping to reduce the risks to financial stability.

New risks to economic activity in the EU are coming in from the external environment

European economies are currently facing many risks from the external environment, with some of these now stemming from emerging economies. In addition to rising private and government debt, many of these countries are showing current account and public finance deficits. Moreover, emerging markets may face swings in capital flows in either direction. If interest rates in advanced countries fall further, short-term capital may start flowing into emerging economies again. Conversely, if interest rates rise, owing, for example, to a re-assessment of risk premia, capital will flow out of emerging economies, causing their currencies to depreciate. These trends were observed in late 2013 and early 2014 in Turkey, South Africa, Brazil, Russia, India and Indonesia.

Weaker economic growth in emerging economies will affect Czech corporations

Efforts by emerging economies to stop the rapid rise in credit or stabilise their currencies through tighter monetary policy are contributing to a slowdown in economic growth from its previously very high levels in this group of countries. This, in turn, will affect exports from advanced countries, including Czech exports, which are heavily dependent on the activity and exports of German corporations. Like Czech exports, German exports are influenced mainly by developments in economic activity in neighbouring countries. In the case of Germany, the share of exports to emerging economies is just over 20%, of which the BRIC countries (Brazil, Russia, India and China) account for 11 pp, Turkey for 2 pp and other emerging economies for 8 pp (see Chart II.5). Of course, Czech exports would also be adversely affected by a deterioration of the situation in Ukraine and Russia (see section 2.2). The conflict could also have a negative impact on EU countries through bank exposures. However, consolidated banking statistics from the Bank for International

Settlements (BIS) reveal that these exposures are in the order of billions of euros vis-à-vis Ukraine and tens of billions of euros vis-à-vis Russia, together representing less than 0.5% of the assets of European banks.

Euro area debt is falling too slowly

High private sector debt can be regarded as the main obstacle to a recovery in consumer demand⁶ and demand for new housing in many advanced countries. Deleveraging, i.e. a reduction in debt relative to income, is taking place particularly slowly in private entities in the euro area, whereas in the USA the credit-to-GDP ratio has already fallen substantially from its peak (see Chart II.6). The high debt ratio pertains mainly to households, but in the euro area corporations are highly leveraged as well. If interest rates on loans were to rise as a result, for example, of renewed financial market stress without a corresponding increase in income dynamics, the default rate would increase in both sectors. The evolution of nominal income, as proxied by nominal GDP growth, has not facilitated the repayment of loans accepted before the crisis since 2008 (see Chart II.7). A key factor going forward will be the evolution of relative debt servicing costs, which have increased in many countries.

The credit market situation in the Czech Republic is relatively favourable, although income growth remains subdued

In contrast to most euro area countries, the volume of loans in the domestic economy increased in 2013, driven mainly by loans to households for house purchase. In their case credit standards remained similar as in 2012, while those for other loan types tightened slightly (see Chart II.8). The Czech Republic has a low ratio of bank loans to GDP,⁷ but also low income growth from the long-term perspective (see Chart II.9). However, it is one of a minority of countries in which debt servicing costs have also declined in recent years and remain at a low level (see Chart II.10). The ratio of interest and principal repayments to income is below 20%. This is due chiefly to a marked drop in interest rates on loans for house purchase, linked with the easing of monetary policy by the CNB and competition between mortgage loan providers.

The Czech Republic's external debt increased, but has higher coverage by banks' external assets

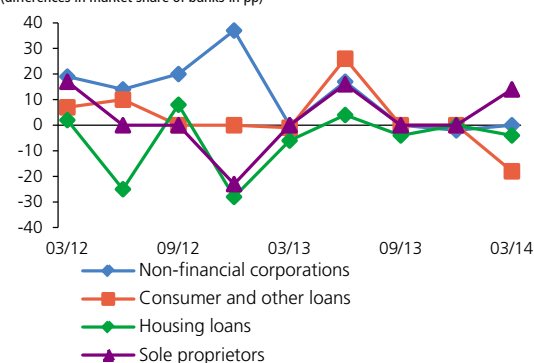
The ratio of the gross external debt of the Czech economy to GDP rose from 51% to 57% in 2013 (see Chart II.11). However, this rise was partly due to the statistical effect of the weaker koruna following the CNB's foreign exchange interventions in November. It therefore needs to be seen in this context and should be assessed according to the coverage of

⁶ The structural causes of the weakened consumer demand in advanced and emerging economies may include rising income inequality and an increasing share of capital in national income in relation to labour. In advanced countries this factor became very visible after the fall in demand temporarily funded by rising debt. The importance of this factor is pointed out in a highly regarded study written by the former IMF chief economist and current governor of the Reserve Bank of India Raghuram Rajan. See Rajan, R.: *Fault Lines: How Hidden Fractures Still Threaten the World Economy*, Princeton University Press, 2010.

⁷ In contrast to the euro area, therefore, private sector deleveraging is not needed in the Czech Republic.

CHART II.8

General lending standards in the Czech Republic (differences in market share of banks in pp)

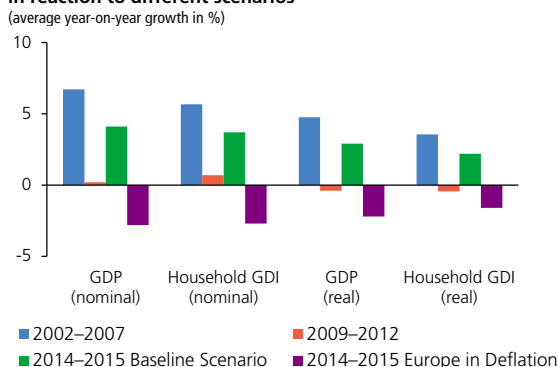


Source: CNB

Note: The data represent the difference between the market share of banks which reported a tightening of the credit standards and banks that reported an easing of the credit standards in the past three months. More details on the indicator methodology can be found on the CNB website.

CHART II.9

Macroeconomic income aggregates in the Czech Republic in reaction to different scenarios (average year-on-year growth in %)

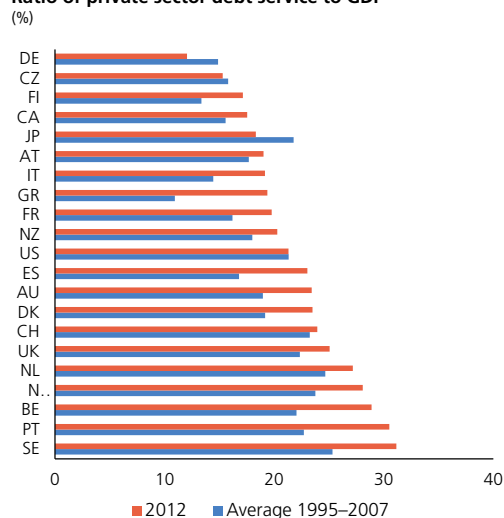


Source: CZSO and CNB forecast

Note: GDP – gross domestic product, GDI – gross disposable income.

CHART II.10

Ratio of private sector debt service to GDP

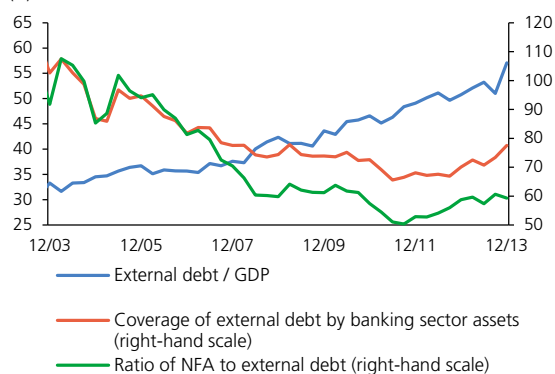


Source: BIS Annual Report 2012/2013, HBS 2012, CNB

Note: The data for CZ are estimates only. The long-term average for CZ is for 2004-2007. Debt service includes interest as well as repayments of principal.

CHART II.11

Ratio of the gross external debt of the Czech Republic to GDP and its coverage by the external assets of banks
(%)

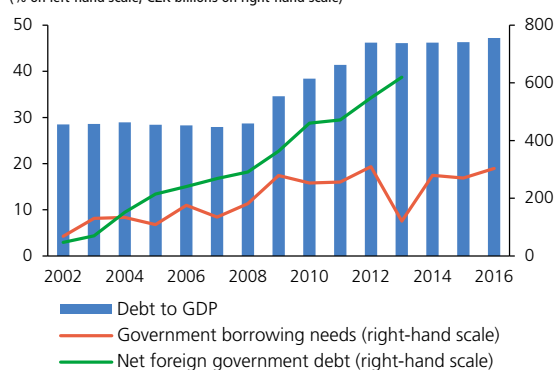


Source: CNB

Note: External assets of the banking sector (including the CNB) from the balance of payments statistics and net external assets of MFIs from the monetary survey.

CHART II.12

Government debt-to-GDP ratio, gross government borrowing needs and net foreign government debt
(% on left-hand scale; CZK billions on right-hand scale)

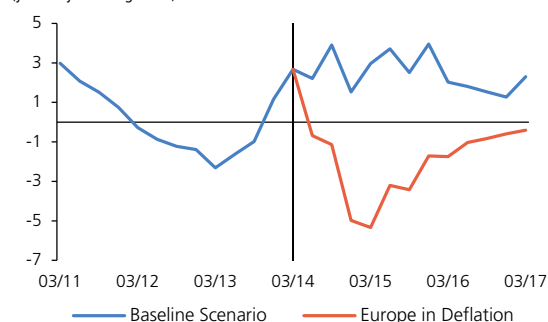


Source: CZSO, CNB, MF CR

Note: CNB estimates used for the debt-to-GDP ratio for 2014–2016 and MF CR estimates used for central government borrowing needs, which are gross of repayments of T-bills.

CHART II.13A

Alternative scenarios: real GDP growth
(year-on-year change in %)



Source: CNB

the external debt by banks' external assets, which conversely rose from 70% to 78% because of an increase in the CNB's international reserves. The investment position deficit shrank by CZK 104 billion in 2013, and the figure is similar when adjusted for the direct investment balance. The government's net external debt continued to increase at roughly the same pace as in previous years. According to the balance of payments statistics, this debt more than doubled to CZK 620 billion⁸ between 2008 and 2013 (see Chart II.12). Its further growth could be a source of systemic risk from the long-term perspective.

The government debt to GDP ratio stabilised

The general government deficit was 1.5% of GDP in 2013. The ratio of government debt to GDP fell from 46.2% to 46.0% in the same period (see Chart II.12). The decrease in the government's gross borrowing needs⁹ was due to use of the issuance activity reserve; in the years ahead, it will return roughly to the levels seen in 2009–2012. Both the level and the growth rate of government debt are favourable in the European context. The level of the structural deficit may be problematic. Last year it reached the lowest level in several years (about 0.5% of GDP), but in the future it should rise towards 2% of GDP according to the CNB forecast. The ratio of government debt to GDP should be stable around 46% in 2014 and 2015 and increase to roughly 47% in 2016. Figures of around 50% may raise questions among investors about the sustainability of such debt levels. However, the structural characteristics of Czech government debt are favourable, thus reducing this risk.

Alternative economic scenarios

Alternative economic scenarios were defined on the basis of potential alternative future macroeconomic trends along with the risks identified. These scenarios are used mainly in section 4.2 to test the resilience of the Czech financial sector. The paths of key variables in each scenario are shown in Charts II.13A–D.¹⁰ The evolution of other variables relevant to the stress tests in relation to the evolution of the macroeconomic environment (credit growth, the default rate, the NPL ratio¹¹ and property prices) is presented in the following sections.

The **Baseline Scenario** is based on the CNB's May macroeconomic forecast published in Inflation Report II/2014 and assumes an increase in economic activity of 2.6% this year due to growth in both domestic and external demand. In 2015 the economy is expected to return to relatively robust growth of 3.3%. According to the forecast, the general

⁸ Using the Ministry of Finance definition of external government debt as government debt issued abroad, the figure would be CZK 393 billion.

⁹ Unlike in the past, the Ministry of Finance now calculates the government's gross borrowing needs net of repayments of T-bills. For the sake of comparability, we use the original methodology in the time series.

¹⁰ The path for the *Baseline Scenario* in the first two years is based on the CNB's official prediction of May 2014. Beyond this horizon it is extrapolated towards the expected long-term equilibrium values.

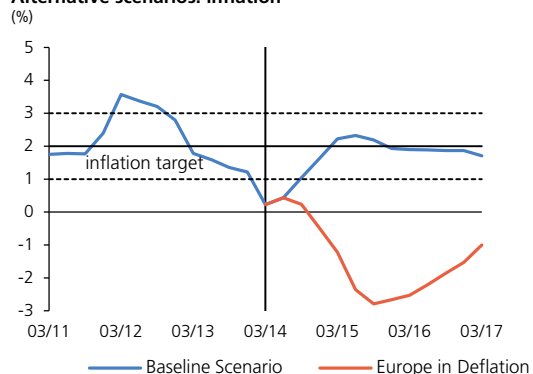
¹¹ The default rate and the NPL ratio relate to an identical event, i.e. a breakdown in a debtor's payment discipline. Whereas the default rate is a (usually forward-looking) flow indicator focused on a particular time interval (see the *Glossary*), the NPL ratio is a stock indicator describing the level of NPLs at a given point in time.

unemployment rate will be flat at around 6.8% in 2014 and fall gradually from 2015 onwards. Headline inflation will increase from its low levels and reach the inflation target of 2% in early 2015. Consistent with the forecast is stability of market interest rates, followed by a gradual rise in rates as from the start of 2015. The koruna exchange rate will continue to be used as an instrument for easing the monetary conditions during 2014.

The **Europe in Deflation** stress scenario assumes a marked drop in economic activity in Europe, for example as a result of negative expectations about the global economy and a general increase in investors' risk aversion with regard to emerging economies, or a resurgence of problems in the euro area. The Czech economy falls back into recession owing to a decrease in external demand, reinforcing the private sector's pessimistic expectations about future economic developments and increasing the deferral of household consumption and corporate investment. The combination of a downturn in external demand and then also in domestic demand will cause a sizeable decline in economic activity in the Czech Republic over the entire three-year horizon and result in a "V-shaped" recession. In addition, the debt deflation scenario will materialise, with price deflation leading to an increase in private sector debt in real terms as a result of declining economic activity, rising unemployment and falling wages. Moreover, the adverse economic situation lasting since 2009 will cause the funds of households and non-financial corporations to become exhausted. Coupled with a rise in real debt, this causes a significant deterioration in their ability to repay. The problems in the real sector later also affect the financial sector, which records considerable credit losses and a marked decline in profits. Monetary policy remains easy, the three-month PRIBOR stays very low over the entire test horizon and the exchange rate weakens. However, long-term bond yields surge as global risk aversion increases and the safety of some assets is re-assessed.

CHART II.13B

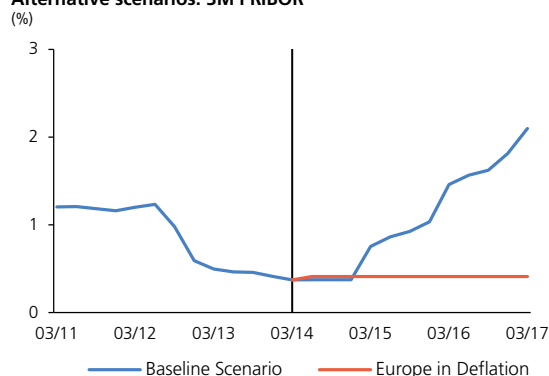
Alternative scenarios: inflation



Source: CNB

CHART II.13C

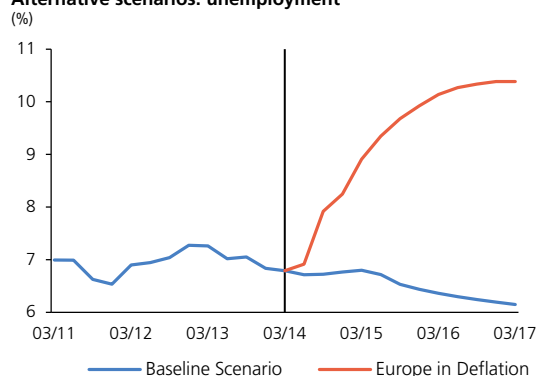
Alternative scenarios: 3M PRIBOR



Source: CNB

CHART II.13D

Alternative scenarios: unemployment



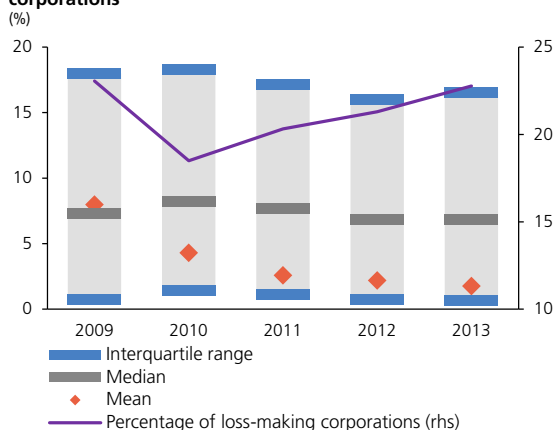
Source: CNB

2.2 NON-FINANCIAL CORPORATIONS

At the end of 2013 the non-financial corporations sector recorded an increase in performance in line with the economic recovery. However, the adverse effects of the long recession are still fading and performance differs significantly across industries. The sector's total debt was not much higher, but current profits and real interest rate growth slightly reduced corporations' ability to service their debts. The low increase in total debt can be explained mainly by demand factors, whereas credit supply can be assessed as satisfactory. The evolution of credit risk was favourable overall, though highly heterogeneous across the sector, with some industries recording a further rise. There are also large differences in credit risk in terms of corporation size, with the smallest firms having been hit hardest by the recent recession. The main risk scenario for the sector remains unfavourable developments in the Czech Republic's trading partner countries and a return to recession. In addition to euro area developments, the sector's financial situation may be affected by risks associated with an escalation of the Russia–Ukraine crisis.

CHART II.14

After-tax RoE and percentage of loss-making non-financial corporations



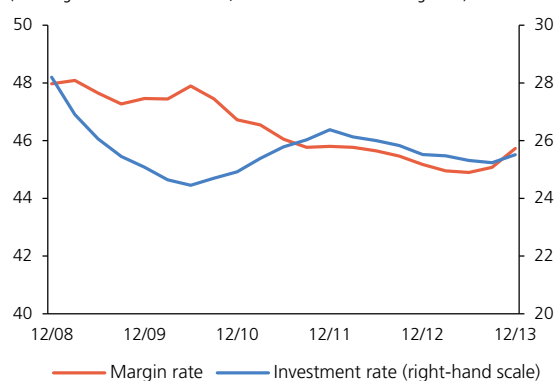
Source: CZSO, CNB calculation

Note: The results are based on a sample of corporations.

CHART II.15

Margin rate and investment rate

(as % of gross value added of sector; calculated from annual moving totals)



Source: CZSO, quarterly national accounts

Note: Margin rate = gross operating surplus/gross value added of sector. Investment rate = gross fixed capital formation/gross value added of sector.

The economic recovery in late 2013 is not yet fully reflected in the sector's financial results...

The sector's performance increased gradually in 2013, and Q4 brought some signals of a visible recovery. Overall, however, the results of the non-financial corporations sector for 2013 should be assessed with caution despite the favourable data at the year-end. The adverse tendencies associated with the long period of increased financial stress, when the economy was in recession and corporate financial reserves shrank, are still present. This environment continues to exert strong negative pressure on some corporations, putting their profit potential at risk.¹² In 2013, profitability in corporations with return on equity (RoE) close to the median was similar to that in 2012 (see Chart II.14), but the growing difference between the median and mean RoE shows that other corporations recorded a decrease in RoE or an increase in losses. The proportion of loss-making corporations was similar to that in the crisis year 2009. The sector's current condition and profitability is also documented by a falling investment rate and margin rate (see Chart II.15), although Q4 was favourable in terms of both these rates. According to the *Baseline Scenario*, growing external demand together with a weaker exchange rate and improving domestic sentiment should contribute to an overall improvement in the financial situation. However, the lag between the start of economic growth and its pass-through to the sector's financial condition will probably still negatively affect its results in the course of this year.

... the nature of the main risks was broadly unchanged...

The main risks to the sector going forward are still linked with the robustness of the recovery in trading partners' markets. If the adverse

¹² Besides some individual industries, small and medium-sized enterprises (SMEs) are most at risk. The situation in the SME segment is dealt with in more detail in Box 1.

Europe in Deflation scenario were to materialise, the risk level would increase further, potentially leading to a sharp deterioration in the situation because of shrinking financial reserves. The problems would be significantly exacerbated if the materialisation of the main risks were accompanied by a re-assessment of risk premia (see section 2.1), which would result in a rise in interest rates and a fall in debt servicing ability. In addition, the geopolitical risk in the form of potential sanctions threatening exports to Eastern markets (Russia and Ukraine), which have been growing in recent years, has increased significantly. On the other hand, retaliatory measures by the Russian Federation could result in a marked increase in prices of imported commodities, natural gas in particular.

... and differences in performance also persist across industries

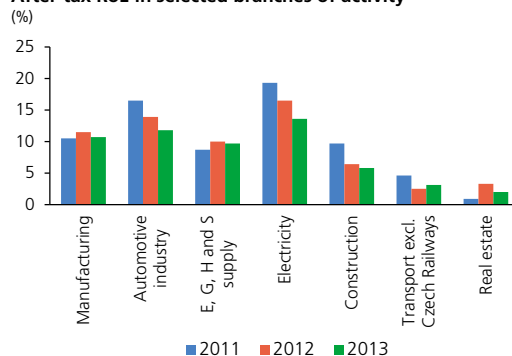
Despite the economic recovery, some industries are still experiencing a strong downturn and facing problems with weak demand. The differences in performance are documented by asymmetric profitability developments (see Chart II.16). The fact that key industries accounting for a large proportion of the sector's value added – especially manufacturing and, within it, the automotive industry – have managed to emerge from the downward phase is an important factor for financial stability in the near term. Although the automotive industry recorded a decrease in margins on sales in 2013 (see Chart II.17) and its RoE for the year as a whole still declined (see Chart II.16), 2013 H2 saw a recovery in external demand and partly also in domestic demand. However, the over-dependence of economic growth on the automotive industry may be problematic in the long term, and the short-term positive effects do not necessarily signify a very robust type of stability for the sector.

Whereas the tensions in manufacturing have eased, the long-running crisis in construction continues. The slump in construction is significant also by European standards. Building construction, which is facing a dramatic decline in public orders, is particularly hard hit. In addition to construction, the recovery has not yet passed through very strongly to the situation in services. In the longer run, serious risks are emerging in the area of energy, electricity supply and coal mining. This is due to the unsatisfactory situation and low competitiveness of the European energy sector, especially compared to the USA.¹³ Although the signs of a direct threat may not be all that apparent for Czech energy companies yet, a marked reduction in planned investment, a decrease in production and a sustained decline in the sector's RoE can already be seen (see Chart II.16). If energy prices were to stay higher in Europe than in the rest of the world in the long term, the competitiveness of European industry – and thus also of Czech industry – would probably fall.

¹³ The loss of competitiveness is mainly a result of high subsidies for renewable resources. If, however, the present course is changed and the subsidies are abolished, the energy segment based on renewable resources (e.g. photovoltaics) will be negatively affected. Czech banks' credit exposure to photovoltaics companies is currently around CZK 35 billion.

CHART II.16

After-tax RoE in selected branches of activity

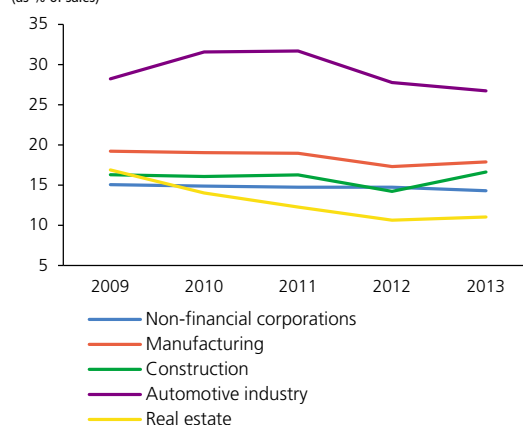


Source: CZSO, CNB

Note: E, G, H and S are electricity, gas, heat and sewerage. The results are based on a sample of corporations. Property development projects are included under construction. The automotive industry contains companies in NACE 29.

CHART II.17

Margins on sales in selected branches of activity (as % of sales)

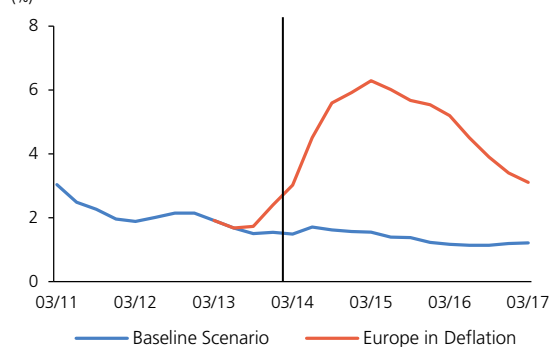


Source: CZSO

Note: The results are based on a sample of corporations. The automotive industry comprises companies in NACE 29.

CHART II.18

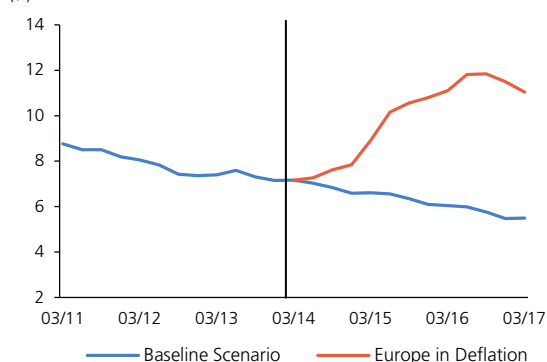
12-month default rate on bank loans to non-financial corporations (%)



Source: CNB

CHART II.19

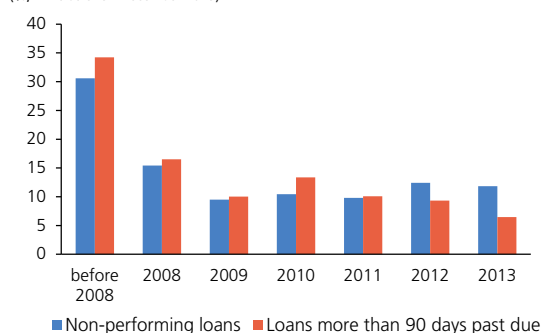
NPL ratio for bank loans in the non-financial corporations sector (%)



Source: CNB

CHART II.20

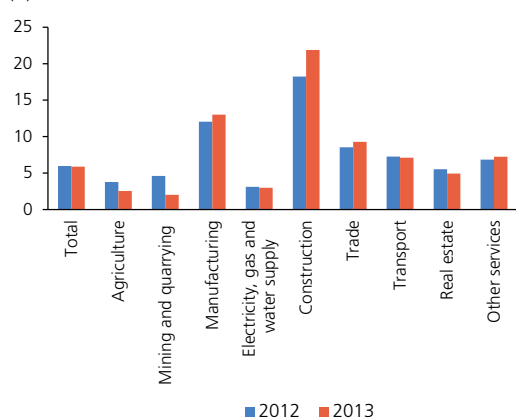
Bank NPLs broken down by year of loan provision (%) NPLs as of 31 December 2013



Source: CNB

CHART II.21

NPL ratios for bank loans in selected branches of activity (%)



Source: CNB

Credit risk is falling slightly overall...

Taking into account the length of the recession and the adverse conditions to which non-financial corporations have been exposed, the evolution of credit risk can be assessed as positive overall. The 12-month default rate on bank loans decreased gradually in 2013 (see Chart II.18), as did the ratio of non-performing bank loans to total loans to non-financial corporations (see Chart II.19). Non-bank financial intermediaries also recorded an improvement in corporate loan quality (see section 4.1). By contrast, one negative phenomenon in the credit risk area is that reclassification to the NPL category is not limited to old loans provided during the pre-crisis credit boom, but also applies to new loans, which are consequently turning into NPLs very quickly (see Chart II.20). This may indicate that some newly financed projects bear an increased level of risk and some banks are willing to lend to risky projects owing to sufficient liquidity or increased competition (see section 4.1).

Despite the improving macroeconomic data on the Czech economy, a more pronounced decline in credit risk cannot be expected in the near term. According to the *Baseline Scenario*, credit risk should be broadly flat for about a year and then fall slightly. If the present recovery proves to be only temporary and the conditions of the adverse *Europe in Deflation* scenario materialise, credit risk would rise sharply. It would start falling again in 2015, but would remain elevated (see Chart II.19).

... but the situation in some industries and in small enterprises remains extremely difficult

The overall evolution of credit risk masks large differences in riskiness across industries and may be over-optimistic (see Chart II.21). The varying level of credit risk across industries mirrors their differing performance in recent years. Construction, where credit risk has risen significantly further and the NPL ratio is almost four times higher than for the sector as a whole, is still one of the worst affected segments. With the conjunctural indicators in construction suggesting a continuing negative outlook, it can be assumed that credit risk in this industry may not have peaked yet. Some increase in risk can also be seen in manufacturing, primarily as a result of its worse performance in 2013 H1. Unlike in construction, however, the current data suggest a shift towards an improvement in the overall situation, and credit risk in this industry is no longer expected to rise significantly.

Besides the varying strength of its impact on individual industries, the length of the recession has also had a strongly asymmetric effect on loan riskiness in terms of the size of non-financial corporations. Whereas large enterprises have been able to withstand the adverse situation for a long time and their credit risk has tended to fall, the smallest (micro) enterprises, together with sole proprietors, have been exposed to much greater financial stress. This has led to an increase in their credit risk and has caused the indicators under review to follow a different course in recent years (see Chart II.22). Credit risk in the smallest enterprises is likely to remain very high in the near future and return to normal levels only very slowly. Given that these enterprises account for a high

proportion of total employment, this situation may also pose a risk to the future income situation of households (see Box 1 for more details).

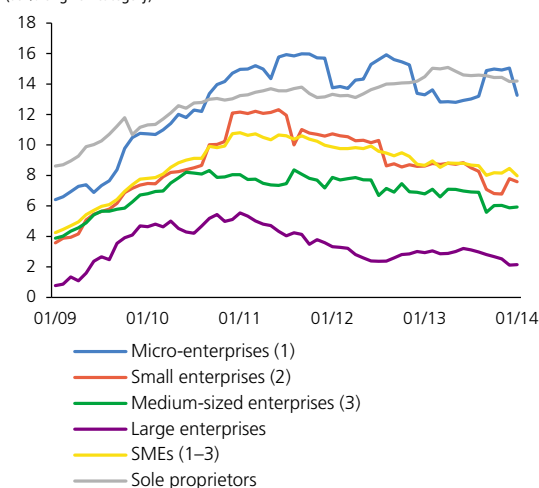
BOX 1: SITUATION OF SMALL AND MEDIUM-SIZED ENTERPRISES

The financial soundness of small and medium-sized enterprises (SMEs) and their access to external funding have become a major issue in Europe in recent years. Given their high share in total employment and in the value added of the sector in the Czech Republic (about 70% and 50% respectively¹⁴) any adverse changes in this segment would significantly affect the performance of the economy as a whole and increase the risks to financial stability. For this reason, the risk of the economic conditions having an asymmetric effect on the soundness of SMEs and large enterprises has started to be discussed more frequently in the post-crisis period, as SMEs tend to be less resilient to large one-off shocks as well as to shallow but long-running recessions. The financial condition of SMEs may also be more sensitive to an excessive reduction in credit supply or overly costly access to external funding. This box sets out to demonstrate how relevant these risks are to the Czech economy and what developments can be expected in the SME segment in the near future.

The correlation between firm size and performance in the Czech economy is not all that surprising and is determined to a large extent by the high share of exports in GDP and the dominant position of large firms in industries with a low price elasticity of demand. Whereas export performance, which is generally linked with the production of larger enterprises, has been satisfactory overall in recent years, domestic demand, which primarily affects locally operating small enterprises (which make up the majority of SMEs), has been unfavourable. In a long-running recession, a significant role is also played by the size of reserves, which tends to be higher in larger enterprises, thanks in part to their ownership structure, as some large firms can obtain relatively cheap funding from their parent companies abroad. Against the background of these factors one can indeed see large differences in the performance of individual types of enterprises in the crisis year 2009 and over the entire post-crisis period (see Chart II.1 Box and Chart II.2 Box). The smallest (micro) enterprises, which account for more than 90% of the SME population, have been worst affected.¹⁵

CHART II.22

NPL ratios for bank loans by non-financial corporation size
(as % of given category)

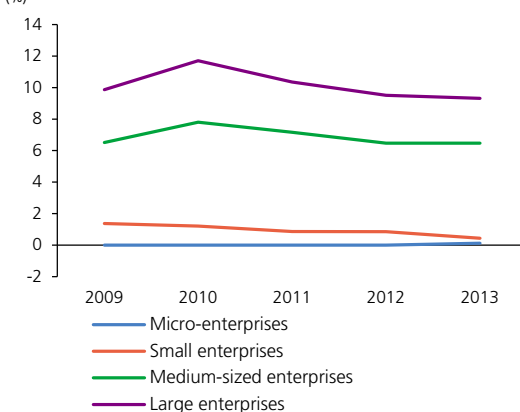


Source: CNB

Note: The breakdown available in the CCR database does not allow entirely exact categorisation of corporations in accordance with the valid definitions. The categories are therefore approximated using the following criteria. Micro-enterprises: 1–9 employees + turnover < CZK 50 million; small enterprises: 10–49 employees + turnover < CZK 300 million; medium-sized enterprises: 50–249 employees + turnover < CZK 1 billion; large enterprises: the rest.

CHART II.1 BOX

After-tax RoE by enterprise size
(%)



Source: CZSO, CNB calculation

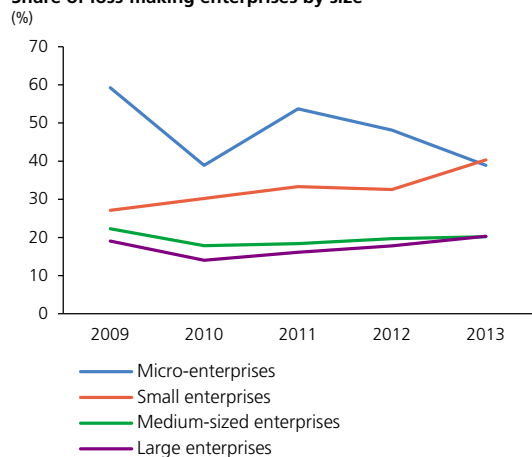
Note: The results are based on a sample of corporations. Micro-enterprises: 1–9 employees + turnover < CZK 50 million; small enterprises: 10–49 employees + turnover < CZK 250 million; medium-sized enterprises: 50–249 employees + turnover < CZK 1.25 billion; large enterprises: the rest.

14 2010 figures; source: CZSO.

15 The large proportion of loss-making micro-enterprises in 2009 and its subsequent gradual decrease may suggest that micro-enterprises are particularly sensitive to one-off strongly

CHART II.2 Box

Share of loss-making enterprises by size

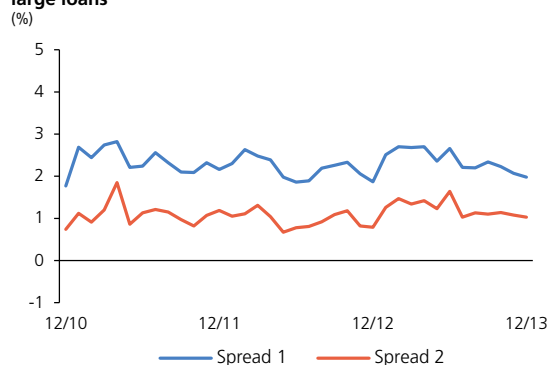


Source: CZSO

Note: The results are based on a sample of corporations. Micro-enterprises: 1–9 employees + turnover < CZK 50 million; small enterprises: 10–49 employees + turnover < CZK 250 million; medium-sized enterprises: 50–249 employees + turnover < CZK 1.25 billion; large enterprises: the rest.

CHART II.3 Box

Spread between average interest rates on new small and large loans



Source: CNB

Note: Spread 1: difference between average interest rates on loans of less than CZK 7.5 million and loans of more than CZK 30 million. Spread 2: difference between average interest rates on loans of less than CZK 30 million and loans of more than CZK 30 million.

This shows that the economic situation in recent years has hit small SMEs particularly hard and their low performance is a major factor hindering the overall recovery in the non-financial corporations sector. From the point of view of financial stability, the adverse situation in the SME segment is creating a noticeable source of growth in credit risk, which is particularly high in micro-enterprises (see Chart II.22). Other negative consequences of the poor condition of small enterprises – given their large share in employment – include a decline in real wages in this segment, a deterioration in the income situation of employees and the transmission of credit risk to the household sector.

Given the poor financial results and rising credit risk in the SME segment, the question of whether the stagnation in borrowing is due solely to insufficient demand for credit or whether borrowing has also been adversely affected by a tightening of credit standards, which may exacerbate SMEs' problems, has become an important issue. In the latter case, it would make sense to take measures aimed directly at banks' policies towards SMEs. The available data suggests that in the case of the Czech economy the truth lies more on the side of those who support the hypothesis that it is mainly a problem of insufficient demand. The absence of fundamental constraints on the credit supply side is confirmed both by banks in the BLS and by businesses themselves, which assess the availability of loans as good across all enterprise sizes.¹⁶ If we adopt the simplified assumption that small enterprises generally take out smaller loans and large enterprises larger loans, we can examine the interest rate component of the credit conditions by means of the spread between interest rates on small and large loans (see Chart II.3 Box). It is clear that larger enterprises generally have access to cheaper financing, but in recent years the spread has remained relatively stable or has narrowed slightly. This does not suggest any one-sided tightening of the interest rate component for SMEs. The size of the spread also roughly corresponds to the amount reported by banks for the SME segment in the BLS (i.e. 0.4–1.2 pp, with gradual rate convergence during 2013). Banks also stated that similar conditions should apply throughout next year.

The slow reduction in the spread may to some extent be surprising, as the gap between the credit risk of small and large enterprises is not closing much. This signals that banks'

negative shocks, whereas small enterprises have difficulty withstanding a long period of recession.

¹⁶ The differences in the assessment of loan availability are larger across industries than across enterprise size (see above). The empirical literature has identified some financial constraints on the sound part of the SME segment in the immediate post-crisis period (see Pospíšil and Schwarz, 2014: *Bankruptcy, Investment and Financial Constraints: Evidence from a Post-Transition Economy*, CNB WP).

willingness to lend to SMEs is not changing much despite the rising risks (for example due to stronger competition in the market). Nonetheless, banks have tightened the non-interest component of their credit conditions and are now demanding higher-quality and higher-value collateral or a higher degree of participation by SMEs in funding arrangements.

The CZSO's regular surveys offer a picture of SMEs' perceptions of the current and future economic situation.¹⁷ These surveys, in line with other indicators, show that in recent years larger industrial enterprises¹⁸ assess their condition generally more positively than small enterprises and are also more optimistic about the economic situation in the near future (see Chart II.4 Box). In the longer term, as domestic demand recovers, the situation in the SME segment should improve gradually and the segment should thus stabilise. However, the uncertainty associated with SMEs going forward remains relatively high, and continued in-depth monitoring of the segment is therefore necessary.

In the current conditions, the sector's total debt level may trigger growing difficulties...

Although the total debt of non-financial corporations has not gone up much (see Chart II.23), their declining profitability is limiting the sector's ability to generate enough funds to service the debt safely.¹⁹ Debt servicing ability is also currently being hampered by the low-inflation environment and the related rise in real interest rates on loans (see Chart II.24). Although nominal interest rates remain at record lows or are even showing a modest decline, the excessively low inflation has generated an increase in the real cost of debt, which nominal interest rates have not been able to absorb in full. By contrast, excessive escalation of corporate debt problems is being counteracted by conversion of the debt maturity profile towards longer maturities, thanks to which interest expenses are being spread over several years and funding is safer. In the event of a combination of negative trends, with the sector not showing any shift towards better financial results and real interest rates rising further amid a stable maturity profile, the current debt level may become an excessive burden. Such a scenario might materialise in the event of return of the economy to recession accompanied by deflationary pressures and a sharp increase in risk

17 The breakdown in these business surveys is based solely on the criterion of the number of employees, which is different from the SME definition. It therefore represents only a rough breakdown from the SME perspective, but the results provide a good illustration of the overall situation.

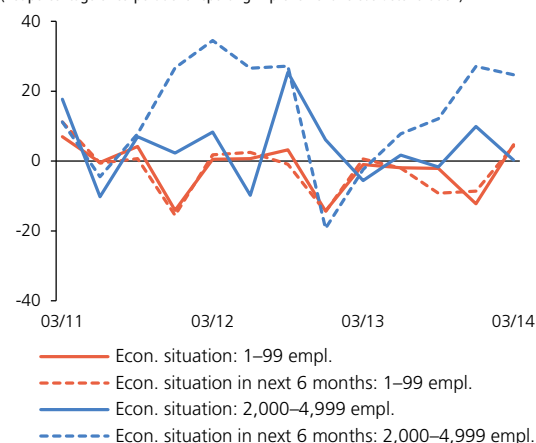
18 Interestingly, in the construction industry it is the smallest enterprises (i.e. those with 1–19 employees) that are currently recording the best economic situation. This is because the construction industry is suffering above all from very low demand for large structures, which are built by large firms (see above).

19 See line NC.7 in the *Table of Indicators* and also Chart 1 in the thematic article *An Indicator of the Financial Cycle in the Czech Economy* published in this Report.

CHART II.4 Box

Assessment of the economic situation in industrial corporations in relation to their size

(net percentage of corporations reporting improvement versus deterioration)

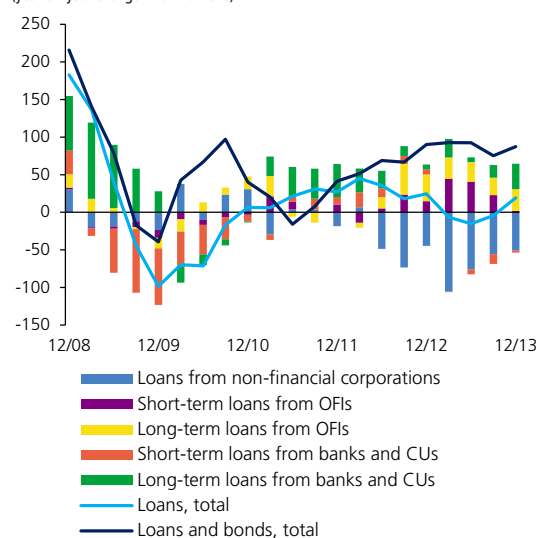


Source: CZSO

CHART II.23

Growth in loans to non-financial corporations and growth in bonds issued

(year-on-year change in CZK billions)

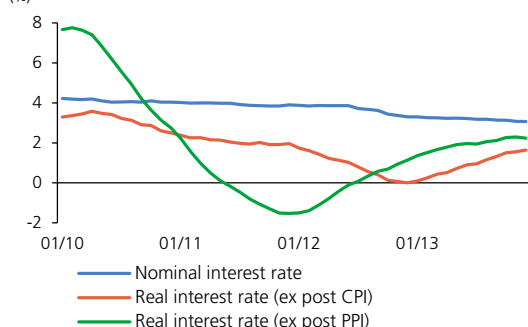


Source: CNB, quarterly financial accounts

Note: The growth in loans from OFIs amid an almost identical decline in loans from non-financial corporations in recent years is purely methodological, not economic, in nature. Holding (parent) companies are gradually being reclassified from the non-financial corporations sector to the other financial intermediaries subsector.

CHART II.24

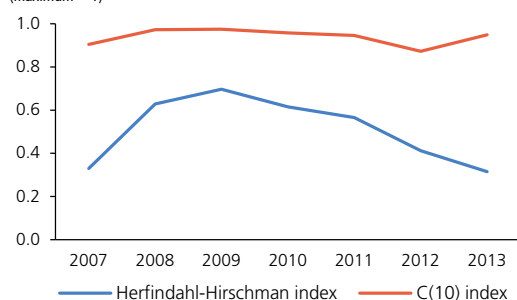
Comparison of nominal real interest rates on bank loans to non-financial corporations (%)



Source: CNB
 Note: Average rates on koruna loans, stock data. The real interest rates is obtained ex post by deflating nominal interest rates using the inflation rate as measured by the consumer price index (CPI) and the industrial producer price index (PPI).

CHART II.25

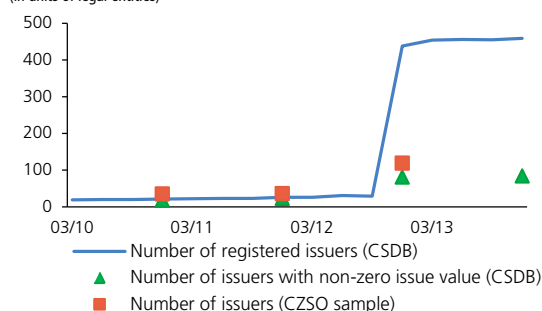
Concentration of bonds issued by Czech non-financial corporations (maximum = 1)



Source: CZSO, CNB calculation
 Note: The results are based on a sample of corporations. The C(10) index shows the share of the ten largest issuers in total bonds issued. The input data for the Herfindahl-Hirschman index are the squares of the shares of individual issuers in total bonds issued. An index of greater than 0.25 is generally regarded as a sign of very high concentration.

CHART II.26

Number of bond-issuing non-financial corporations (in units of legal entities)



Source: ECB CSDB, CSO
 Note: The CSDB is a database administered by the ECB and contains, among other things, information on securities issued and traded in the EU. The data for the Czech Republic are verified using data from the Central Securities Depository Prague. The number of issuers based on CZSO sample data also contains companies that have issued bills of exchange.

premia. However, the likelihood of this scenario occurring has decreased following the CNB's foreign exchange interventions.

... but the debt structure itself seems sustainable

As regards financial instruments, the sector structure of creditors and the debt structure have long been relatively stable and are not showing any shift towards more risky methods of financing. Besides trade credits, which traditionally account for a large share of the sector's liabilities due to the frequency of client-supplier links, loans provided by the banking sector are still the key source of external funding. In the medium term, however, debt securities are playing an increasing role in the raising of external funds (see Chart II.23). However, this trend pertains mainly to certain large firms in high-investment industries. The concentration indices show that the Czech corporate bond market remains highly concentrated from the point of view of issuers (see Chart II.25), despite the fact that the number of issuers has increased noticeably (see Chart II.26). The increase in newly registered bond issues was motivated primarily by advantageous tax conditions.²⁰ A closer look, however, reveals that only about one-quarter of the bonds have actually been issued to date. Some risks in the bond issue area are arising due to industry concentration. The most important issuers with rapidly growing indebtedness in the form of bonds include companies in the energy sector, which may become a problematic industry in the medium term (see above). On the other hand, the holders of these bonds are mostly non-residents, so the impacts of these risks on the Czech financial sector would be relatively limited if they materialised.

Loan availability is good, growth in lending is stagnating due to weak demand for loans...

A business survey conducted by the CNB and the Confederation of Industry in non-financial corporations reveals that most of the businesses surveyed now regard the availability of loans as normal or very good and only 6% see constraints on the credit supply side.²¹ The BLS results do not suggest any tightening of credit conditions either (see section 2.1), and the relatively constant interest rate margin on new loans also testifies against any tightening of the interest rate component of the credit conditions.²² The low credit growth observed in 2013 can therefore be explained primarily by demand factors, which reflected weak investment activity. A change in the credit dynamics was recorded in Q4, in line with high growth in investment in new machinery and equipment. According to the *Baseline Scenario*, credit growth will rise gradually, although over the next few years it will not reach the pre-crisis levels and will be relatively modest compared to those levels (see Chart II.27). By contrast, should the *Europe in Deflation* scenario materialise, the credit growth

20 Tax on interest income for bonds registered by the end of 2012 with a nominal value of one koruna is rounded down to the nearest whole koruna, i.e. to zero.

21 Loan availability is strongly industry-dependent. Most firms that assess loan availability as poor are operating in the construction industry.

22 Margins are calculated as the difference between the interest rate on new loans to non-financial corporations and the 3M PRIBOR.

rate would be strongly negative and the credit cycle would shift back towards its trough.

... and the growth rate and share of foreign currency loans are increasing

Compared to the low growth rate of total loans, foreign currency loans recorded relatively strong growth, causing their share in total loans to rise (see Chart II.28). This growth was partly due to an increase in the koruna value of loans owing to foreign exchange interventions and a low base. Growth in foreign currency loans had been observed before the interventions and may thus be linked more with the financing of planned investment projects (see also section 3.2). Foreign currency loans are traditionally taken out mainly by exporters, who use them as a mean of natural hedging against exchange rate risk. However, as the currency structure of loans to exporters has not changed much (see Chart II.28), it is likely that the increase in foreign currency loans is also partly due to firms with open foreign exchange positions. In the future, this may manifest itself in higher exchange rate risk and greater sensitivity of some firms to exchange rate changes.

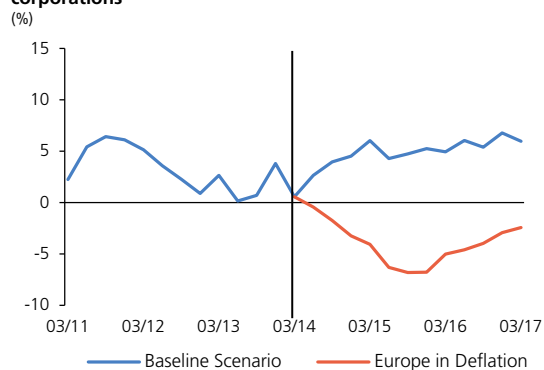
The sector's dependence on external developments is increasing

Owing to insufficient domestic demand, an ever larger proportion of domestic production is being channelled to foreign markets. Exports currently account for about 80% of GDP. The good results of exporters are reflected in their low credit risk, which is well below the level of the sector as a whole²³ (see Chart II.29). However, the strengthening of the Czech economy's export orientation further increases the dependence of the sector's performance on external developments. Given the territorial structure of exports, non-financial corporations are exposed mainly to the risk of an escalation of the problems in EU countries (the *Europe in Deflation* scenario) and to the risk of an escalation of the Russia–Ukraine crisis. The share of exports to the Russian Federation and Ukraine roughly doubled between 2009 and 2013, and the value of exports is currently almost CZK 150 billion (or 4.7% of total exports of goods and services). The imposition of economic sanctions would probably lead to a sharp fall in this value. It could also put current investment projects at risk and lead to asset freezing and default on current trade receivables. Materialisation of these risks would have serious consequences for companies strongly oriented towards this region. On the other hand, if sanctions were imposed, the risk of a reduction in gas and oil supplies (about 5% of total imports) cannot be ruled out. This would result in a substantial increase in prices of production inputs and subsequently in a deterioration in the condition of the sector as a whole.

²³ As the largest exporters are mostly large enterprises, there is a clear correlation with the credit risk of large enterprises, which have larger reserves to absorb the impacts of economic shocks (see Chart II.22). The comparison of credit risk rates between the largest exporters category and the sector as a whole may be distorted by this fact.

CHART II.27

Year-on-year growth in bank loans to non-financial corporations (%)



Source: CNB

CHART II.28

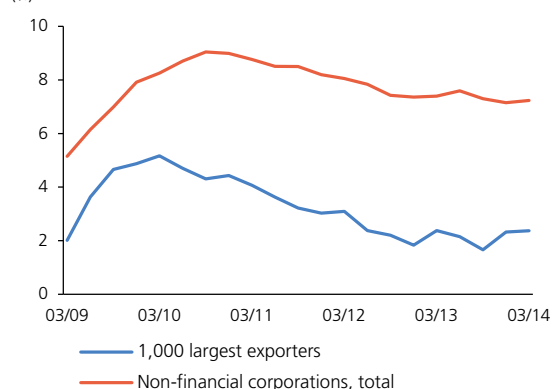
Year-on-year growth in foreign currency loans and their share in total bank loans to non-financial corporations (%)



Source: CNB

CHART II.29

Non-performing bank loans ratio for the 1,000 largest exporters (%)



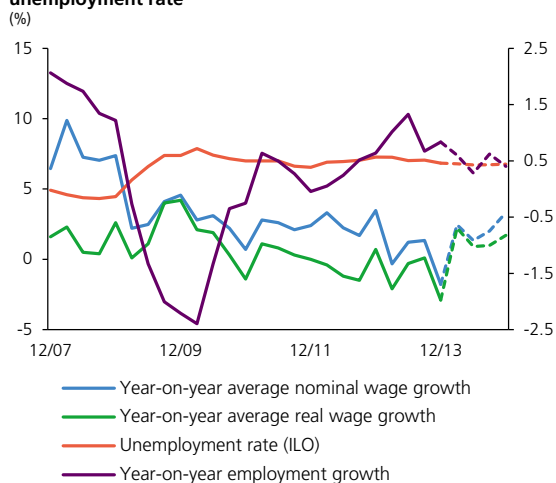
Source: CNB

2.3 HOUSEHOLDS

The labour market situation did not improve for households last year, as the unemployment rate remained flat or even increased and real wages fell again. The percentage of households that have loans remained similar to that in previous years, and the stock of both mortgage loans and consumer credit recorded a slight year-on-year increase in 2013. A further decline in interest rates on mortgage loans implied a slight decrease in the ratio of net interest payments of households to their disposable income. Despite a decline in real income, this was reflected in a slight fall in credit risk, which should continue into 2014. Growth in interest rates on mortgage loans coupled with a decline in income is the main risk to the household sector. This is a similar situation to the Europe in Deflation stress scenario. Households' debt burden is relatively even across income groups, which is positive for financial stability. By contrast, the average ratio of the value of mortgage loans to the value of collateral is heterogeneous across regions. Refined stress tests indicate that household distress increased fairly significantly in 2012, but is expected to fall slightly in both 2013 and 2014. Should the Europe in Deflation scenario materialise, household distress would increase sharply, especially among low-income households, who also have the highest initial distress rate.

CHART II.30

Nominal and real wage growth, employment growth and the unemployment rate



Source: CNB

Note: The unemployment rate is seasonally adjusted. Dashed lines indicate the evolution of the variables under the *Baseline Scenario*.

The real wages of households fell again, while the unemployment rate was flat

The continuing recession had a negative effect on the labour market in 2013. The average nominal wage was broadly flat (+0.1%), implying a decline in the average real wage (nominal wages were deflated by annual CPI growth) of 1.4% for the second consecutive year (see Chart II.30).²⁴ The general unemployment rate (ILO) was broadly unchanged. An alternative unemployment indicator provides a different picture, however, as the share of unemployed persons monitored by the MLSA rose by 1 pp last year. However, the fact that total employment rose slightly can be seen as a positive development. Unlike in 2012, this rise was due mainly to rising employment among employees rather than sole proprietors. Thanks to the expected recovery in general economic activity, real wages should go up by 1.5% in 2014, which should at least partly neutralise the main source of credit default risk in the household sector. Thanks to the CNB's foreign exchange interventions and the subsequent weakening of the koruna, the labour market situation should gradually improve in 2014, albeit for the time being through a shift from part-time to full-time work rather than the creation of new jobs.

²⁴ According to the CZSO's Household Budget Statistics, which also contain non-wage items, the average net income of households recorded a larger real decline of 2.5%. Likewise, the real GDI of households dropped by 2.9%.

A decline in mortgage loan rates and an only slight rise in household indebtedness again resulted in a fall in the ratio of net interest payments to GDI

The ratio of household liabilities to gross disposable income increased slightly in 2013, reaching 61.6% (see Chart II.31). Nevertheless, the debt of Czech households remains low relative to their income and compared to advanced countries. The absolute value of loans recorded similar growth in 2013 as in the previous two years (4.5%; see Chart II.32). This was due mainly to an increase in mortgage loans of 5.2%. Consumer credit went up by 2.1%. This represents a halt in the decline recorded in 2012. Growth in loans to households should pick up over the next few years, but if the *Europe in Deflation* stress scenario were to materialise, the above-mentioned credit aggregates would decline (see Chart II.32).

As regards the percentage of households who had some sort of loan at the end of 2012, no major shift was observed in the income quintiles compared to previous years, so it still holds that loans were used mainly by high-income households. The difference is more pronounced in the mortgage loans segment – almost 39% of households in the highest income quintile and only 7% of households in the lowest income quintile had mortgages at the end of 2012. As regards consumer credit and other loans, low-income households were also less frequently indebted, although when one looks at households divided into quintiles according to income per consumption unit, low-income households had this kind of credit roughly as often as high-income households (see Chart II.33).

Despite the increase in households' absolute debt, however, their net interest payments to banks relative to gross disposable income fell slightly in 2013, like they did in 2012. This was due to a further fall in mortgage interest rates, which reached historical lows. Households as a whole also slightly increased their relative wealth thanks to slow growth in their liabilities, with the ratio of net financial assets to GDP rising by 1.1 pp. In this respect, however, households are probably showing very heterogeneous developments across income groups. The structure of household financial assets remains similar as in the past, although a continuing upward trend in the share of government saving bonds (from 3.4% to 4.1%) and a downward trend in the share of time deposits (from 19.5% to 17.7%) can be seen.

The debt burden of households is very homogeneous across income groups

An analysis using the CZSO's Household Budget Statistics reveals that the heterogeneity of households in terms of their income and debt burden is not very high. As Table II.1 shows, the ratio of households' monthly loan repayments to their net monthly income (the debt-to-income ratio) is very stable across income deciles and over time, fluctuating around 13%. The Gini coefficient is used to assess the equality of the distribution of net

CHART II.31

Household debt ratios

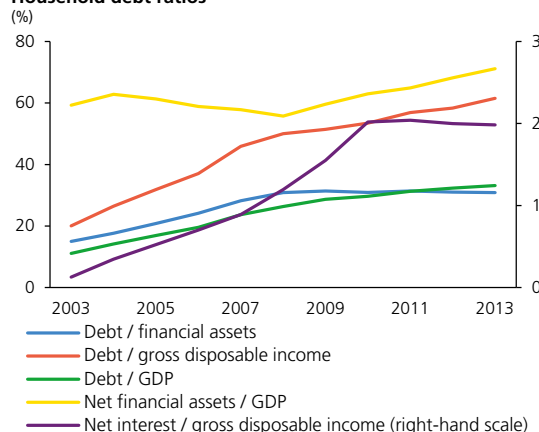


CHART II.32

Year-on-year growth in bank loans to households

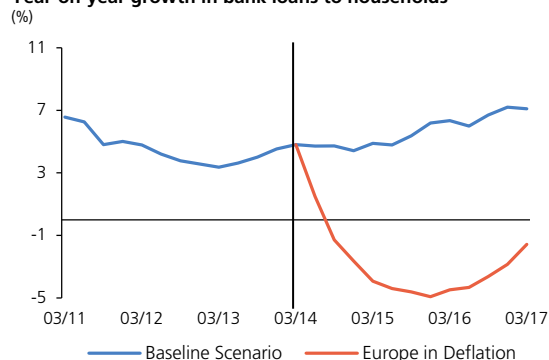


CHART II.33

Shares of households with loans according to different income quintile definitions

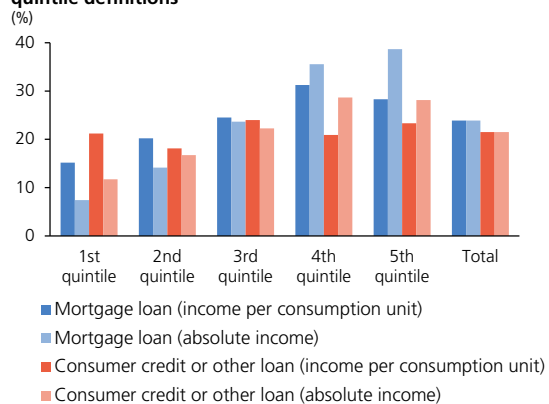


TABLE II.1

Ratio of households' loan repayments to net income by income decile and equality of the distribution of net income among households
(%)

Decile	2010	2011	2012
	Repayments/net income		
1st	15.0	10.9	11.1
2nd	13.1	13.6	14.7
3rd	12.3	15.5	15.1
4th	13.5	11.1	11.3
5th	14.7	12.1	15.6
6th	12.5	14.9	14.4
7th	12.5	13.5	15.6
8th	13.2	13.4	13.5
9th	13.3	14.7	14.0
10th	10.9	13.7	12.7
Total	12.5	13.7	13.8
Gini coefficient of net income			
Households with loans	24.9	24.1	24.6
all	27.8	27.7	28.5

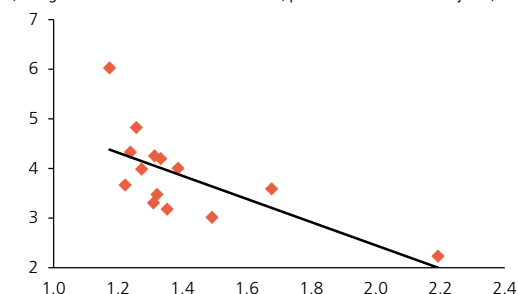
Source: CZSO Household Budget Statistics. CNB calculation

Note: The average ratio of repayments to net income is given for households with some sort of loan. Households are divided into income deciles regardless of whether they have a loan. The Gini coefficient of net income takes values of 0%–100%, with a lower value meaning greater equality of net income.

CHART II.34

Correlation between the problem loan ratio and the average mortgage value in regions

(average loan value in CZK millions on x axis; problem loan ratio in % on y axis)

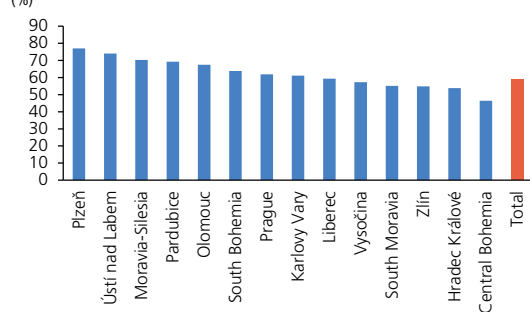


Source: BRCI, CNB calculation

Note: As of 31 December 2013. A problem loan was 90 or more days past due.

CHART II.35

Average LTV ratio of mortgages in regions when the loan was provided
(%)



Source: BRCI, 2012 SILC, CNB calculation

Note: As of 31 December 2012.

income.²⁵ The Gini coefficient for all Czech households was 28.6% in 2012. This ranks the Czech Republic among the countries with very high equality of income.²⁶ A positive message for financial stability is that the equality of income is higher for households that have some sort of loan (a Gini coefficient of 24.8% in 2012), which helps limit credit risk. Table II.1 also shows that the (in)equality of net income is almost constant over time.

The loan-to-value ratios for mortgage loans are highly heterogeneous across regions

Thanks to the new possibility of using data from the Bank Register of Client Information (BRCI) and linking them to data from the Survey of Income and Living Conditions (SILC), average loan-to-value (LTV) ratios can be estimated approximately for mortgage loans depending on the region where the loans were provided and the age of the person to which they were provided. The estimate of the LTV ratio uses the average amount financed by means of the mortgage loan as the numerator. This means that it corresponds to the LTV ratio when the loan was provided, not the current LTV ratio taking into account regular or extraordinary repayments made.²⁷ Higher LTV ratios tend to be recorded in regions with higher unemployment and lower wages (see Chart II.34), where the average mortgage loan applicant probably did not manage to save very much for the downpayment on the property. The dispersion of the LTV ratio is large – the lowest average LTV ratio is around 46% in the Central Bohemian region and the highest is around 77% in the Plzeň region. LTV ratios were estimated for individual age groups in a similar manner. Groups in the middle of the age spectrum tend to have below-average LTV ratios, while those on the margins of the spectrum tend to have above-average ones. The higher LTV ratios for younger persons can again be explained by small downpayments that such persons were able to save.

The mortgage loan amount is a good indicator of credit risk

FSR 2012/2013 drew attention to the negative correlation between the total debt in each region and the average problem loan ratio.²⁸ Data obtained from the BRCI allow us to calculate the average financed amount in each region, which proves to be more strongly negatively correlated with the problem loan ratio (see Chart II.35) than the absolute

25 This coefficient hypothetically takes a value of 100% if only one household has all the income in the economy and the rest have no income (absolute inequality of income) and a value of 0% if all households have the same income (absolute equality of income).

26 It should be kept in mind that we obtain different values if we calculate the Gini coefficient at the level of individuals and before taxes and social benefits. However, in order to examine the facts, it is essential to take into consideration that people live in households and to take taxes and transfers into account.

27 However, the average property value for households with loans in the given region as of 31 December 2012 is used as the denominator. This may mean slight undervaluation of the denominator compared to the situation at the time when the loan was provided, when property prices were generally higher. The estimated values of the initial LTV ratio are thus probably overestimated and should be viewed as tentative and used mainly for comparison between regions.

28 The problem loan ratio used to compare the level of credit risk is conceptually similar to the NPL ratio, but cannot be compared directly to the NPL ratio due to the different ways in which BRCI and CNB statements are constructed.

mortgage liabilities of households, even if we take into account the division of households not only by region, but also by age. A likely explanation for this is that households with larger mortgages also have higher incomes on average.

Household credit risk fell slightly and this decline is set to continue

According to the 12-month default rate, household credit risk fell slightly in 2013 (see Chart II.36). According to the *Baseline Scenario*, this decline is set to continue in the years ahead. The decline in this indicator was more pronounced in the house purchase loan segment than in the consumer credit segment. This is generally consistent with the relative insensitivity of credit risk and interest rates on consumer credit to the economic and financial cycle. The NPL ratio also fell (see Chart II.37). This temporary decrease in household credit risk in 2013 was due mainly to the record low interest rates on mortgage loans, which account for the majority of the total stock of loans to households.²⁹ A rise in interest rates on these loans accompanied by a continued decline in real wages might present a risk in the future. Such developments would be broadly consistent with materialisation of the *Europe in Deflation* stress scenario, according to which the 12-month default rate would increase by around 2 pp at the three-year horizon. This, in turn, would be reflected in an increase in the NPL ratio of more than 2.5 pp (see Chart II.37).

Stress tests of households indicate that low-income households are highly sensitive to the stress scenario

The household stress test methodology has been further refined compared to FSR 2012/2013 to include, for example, calibration of model labour market flows to match the flows actually observed.³⁰ Generally, household distress³¹ is higher among low-income households and increased significantly across income quintiles in 2012 to a level at which it probably approximately remained in 2013 and at which it should stay in 2014 given the projected developments (see Chart II.38). The percentage of overindebted households rose most of all in 2012, when real wages declined and the unemployment rate went up. This had the strongest effect on the first two low-income quintiles. The proportion of households unable to repay their debts was broadly flat last year and should remain so in 2014³² due to generally low interest rates on mortgage loans and renewed growth in real wages. As in the past, low-income households show the highest sensitivity to the *Europe in Deflation* stress scenario. Nevertheless, the ratio of their liabilities to the total stock of loans to households is relatively low, and high-income households show low sensitivity to stress, so materialisation of this scenario would have a limited impact on bank balance sheets.

29 Over the longer term, low interest rates on loans may encourage excessive risk-taking and result conversely in an increase in the NPL ratio.

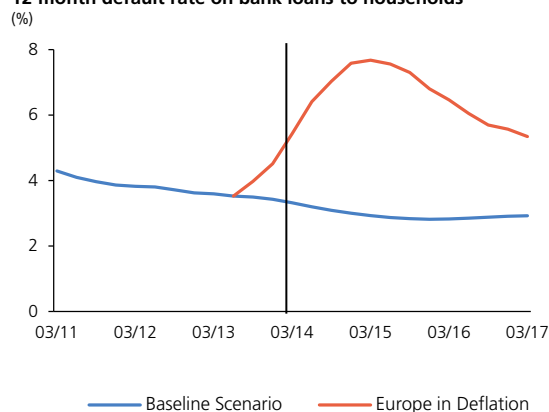
30 This is described in detail in CNB Working Paper No. 2/2014 (Galuščák, Hlaváč, Jakubík).

31 This term is defined in the above-mentioned Working Paper.

32 The data for 2013 are only estimated even though the macroeconomic data for this year are mostly known. This is because the most recent available data at the individual household level are for 2012.

CHART II.36

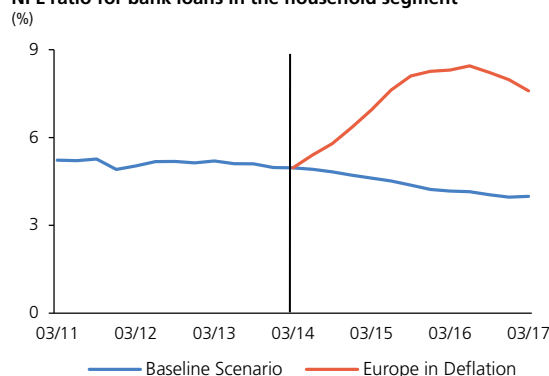
12-month default rate on bank loans to households (%)



Source: BRCI, CNB

CHART II.37

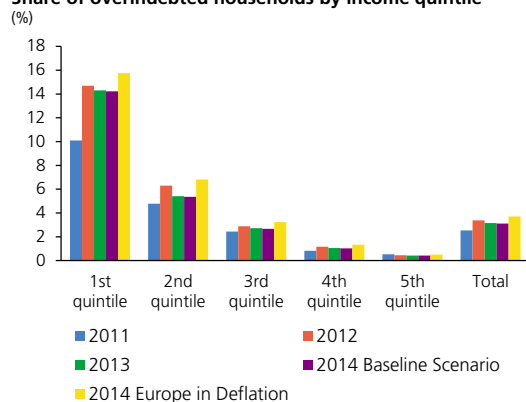
NPL ratio for bank loans in the household segment (%)



Source: CNB

CHART II.38

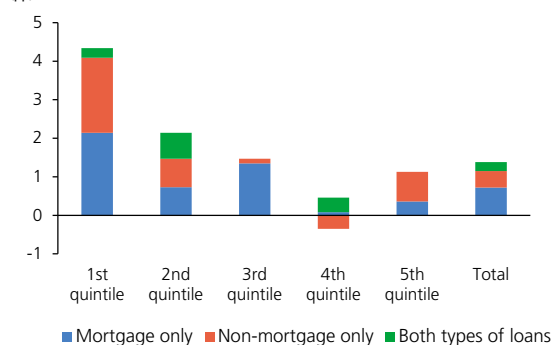
Share of overindebted households by income quintile (%)



Source: CZSO 2011 and 2012 Household Budget Statistics, CNB calculation
Note: The shares are given for households that have some sort of loan. However, the income quintiles are based on the full sample of households.

CHART II.39

Growth in the percentage of overindebted households in response to a 3 pp increase in interest rates
(pp)

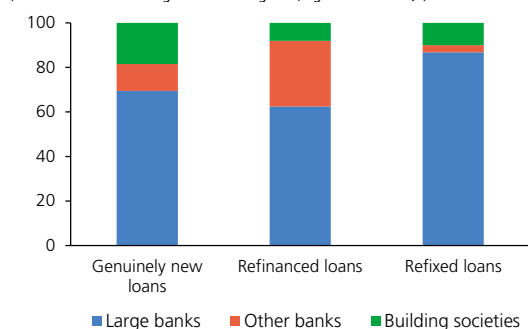


Source: CZSO 2012 Household Budget Statistics, CNB calculation

Note: The growth in the percentage of overindebted households pertains to all households having any loan and not only to households with a particular type of loan(s).

CHART II.40

New mortgage loans to households by bank type
(as % of all new loans in given market segment; figures for 2014 Q1)



Source: CNB

Note: The data are only preliminary. Large banks comprise Komerční banka, ČSOB, Česká Spořitelna, Hypoteční banka and UniCredit Bank. Other banks comprise small and medium-sized banks. Refixed loans were refixed with the same bank. Refinanced loans were refixed with a different bank.

The impacts of a large jump in interest rates on household distress would be relatively modest

The household stress testing framework was also used to simulate the impact of a jump in interest rates of 3 pp in a situation where all interest rates on loans to households are fully variable.³³ The impacts of this simulation on household distress are given separately for mortgage loans and non-mortgage loans (see Chart II.39). When determining whether a household will default on a mortgage loan or a non-mortgage loan, or both if it has both types of loans, it was necessary, due to a lack of data, to use the simplifying assumption that the household – after covering the essential costs of living – always uses its financial surplus³⁴ first of all to repay the mortgage loan (including partially), even though it also has consumer credit that could be fully covered using the surplus. The simulation shows that over half of the increase in the percentage of overindebted households would be due to default on mortgage loans. Rather surprisingly, households in the highest income quintile are more sensitive to a rise in interest rates than households in the fourth income quintile (the second-highest income quintile). The overall rise in household distress given the above-mentioned shock would be 1.38 pp, which can be regarded as relatively modest given the strength of the shock. The impact on bank balance sheets would be reduced by the fact that low-income households, which would see the largest increase in distress, have a relatively low absolute value of liabilities.

The sizeable volume of new mortgage loans does not represent as large a risk for the banking sector as it might appear

New mortgage loans include loans which, strictly speaking, are not new at all. They merely have a new interest rate fixation period, either with the debtor's original bank (refixation) or with another bank (refinancing). According to preliminary data,³⁵ these two types of loans accounted for around half of all loans reported as new in 2014 Q1, but in most cases they do not in reality imply an increase in the claims on households of the banking sector as a whole.³⁶ Moreover, the debtors associated with these loans have proved their ability to repay loans in the past, and this provides some indication of their payment discipline in the future. The publicly quoted figures on the volumes of new mortgage loans may thus be misleading in many cases (as they are not adjusted for refixations and refinancing). The same can be said generally for the concerns about growth in the credit risk assumed by banks. The new data also indicate that small and medium-sized banks are relatively successful in persuading

33 This assumption is consistent with the conservative nature of the stress tests, as the actual impacts of the simulated shock would be smaller. We adopted this assumption because the Household Budget Statistics do not contain data on whether households have variable-rate loans. A possible solution to this problem would be to simulate the impacts of the shock for certain typical households. However, the determination of such typical households would be highly arbitrary. The simulation of the impact of an interest rate shock on all households gives an idea of this impact on the "average household" in the individual income quintiles.

34 See the above-mentioned CNB Working Paper No. 2/2014.

35 Official data will be published in July 2014.

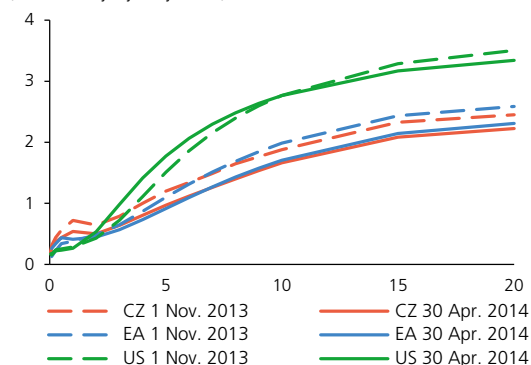
36 Nevertheless, refinancing or refixation in some cases involves an agreement between the bank and the debtor to increase the original funded amount. The claims on clients of the banking sector will rise by an amount equal to the size of this increase.

clients of other banks to refinance their mortgage loans with their banks. Their share in refinanced loans is much higher than in the case of refixed or genuinely new loans (see the red columns in Chart II.40). This is reflected in a large share of refinanced mortgage loans in the total new mortgage loans of small and medium-sized banks, which may suggest a reduction in credit risk in these institutions, which are generally less resilient to credit risk than large banks.

CHART III.1

Change in yield curves in the USA, the euro area and the Czech Republic

(x-axis: maturity in years; y-axis: %)

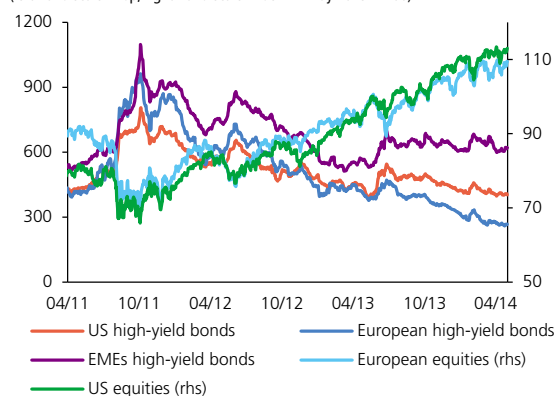


Source: Bloomberg L.P.

CHART III.2

Global view of prices of risky assets

(left-hand scale in bp; right-hand scale: index 17 May 2013 = 100)



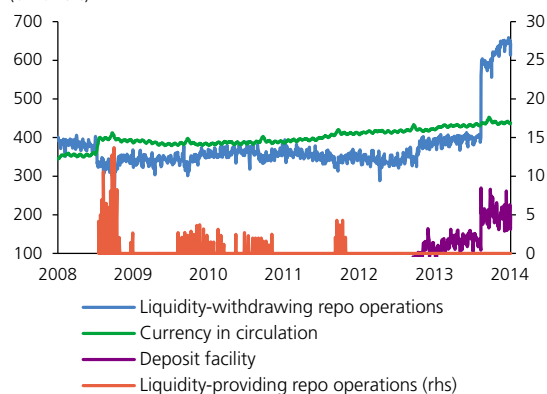
Source: Bloomberg L.P., Thomson Reuters, CNB calculation

Note: For bonds the option-adjusted spread is illustrated; a risky bond is a speculative-grade bond (BB+ or lower). For stocks the STOXX EUROPE 600E index was used for Europe and the S&P 500 COMPOSITE index for the USA.

CHART III.3

Open market operations and currency in circulation

(CZK billions)



Source: CNB

3 ASSET MARKETS

3.1 THE FINANCIAL MARKETS

Following a change in the major central banks' communication about the speed and intensity of the normalisation of their monetary policies, volatility in financial markets decreased and long-term interest rates fell again in mid-2013. Global financial conditions thus remain easy and the period of search for yield associated with greater risk-taking has been extended. The sensitivity of global portfolios to interest rate growth has intensified and the potential negative impact of the re-assessment of market risks has increased. The Czech financial market is also partially exposed to the risk of spillover of external shocks. The intensity of these shocks will depend on domestic fundamentals, and the size of their impact will be affected by the quality and extent of hedging by domestic financial institutions.

Global monetary conditions remain easy ...

Global financial markets continue to operate in an environment of very low interest rates, and the outlooks also remain low. The major central banks gradually indicated via forward guidance¹ that the easy monetary conditions would continue (see Chart III.1). Although the Federal Reserve has started to taper its quantitative easing programme by slowing the pace of bond purchases (gradually from USD 85 billion to USD 55 billion a month with effect from April 2014) and excess liquidity has also been decreasing in the euro area since 2013, the ECB lowered its key interest rate in November 2013 and announced other unconventional measures in June 2014. The Bank of Japan also started to ramp up its quantitative and qualitative easing programme last year. Together with positive economic outlooks for advanced economies, in particular the US economy (see section 2), investors' high risk tolerance is thus being maintained and demand for risky assets is being further stimulated by low portfolio returns (see Chart III.2).

...as do monetary conditions in the Czech economy

The CNB's monetary policy rate has remained at technical zero (0.05%) since November 2012. Market rates decreased again in November 2013 owing to the use of the exchange rate as an additional monetary policy instrument by the CNB (see Chart III.1). The total monetary liquidity in the Czech financial system increased as a result of foreign exchange interventions to weaken the Czech koruna. However, the additional excess liquidity was sterilised using standard two-week repo tenders and the overnight deposit facility. The participation of banks in sterilisation operations thus increased compared to previous months, and the take-up of an extraordinary liquidity-providing repo operation testifies not only to ample liquidity, but also to satisfactory distribution of that liquidity across the Czech financial system (see Chart III.3).

¹ See also *Global Economic Outlook*, January 2014, CNB.

Money market activity remains subdued...

The abundance of cheap liquidity in advanced countries reduced the liquidity component of the risk premium in the interbank market and the market's volatility. At the same time, however, activity in this market is falling. This is apparent from regular surveys of average daily turnovers in interbank markets in the Czech Republic and the EU. The average daily turnover in the Czech unsecured market fell by 50% year on year.² Moreover, all activity is concentrated in short-term (up to one week) maturities in the unsecured markets of both regions (see Chart III.4). This may indicate persisting caution about counterparty risk. The presence of this risk within the EU is suggested by a shift of activity to secured markets (see Chart III.5), where activity is rising again. This contrasts with the Czech secured market, which recorded a year-on-year decline of 67%. A preference for short maturities can be seen in both regions.

...and will continue to be affected by gradual adjustment to European regulations

The lower money market activity and partly also the increased preference for secured transactions may also be a response to changes to European regulations, primarily in the liquidity area. The proposed Basel liquidity standards (known as LCR and NSFR) encourage the banking sector on the one hand to hold assets eligible for creating a liquidity buffer³ and on the other to prefer stable, easily renewable and long-term funding sources.

Both the unsecured and secured interbank market will largely affect the conduct of banks that meet the limits of the said standards towards banks that do not meet them. Banks that prefer short-term maturities for unsecured transactions and accept eligible assets as collateral in secured transactions will feature on the liquidity supply side. The opposite preference will apply on the demand side. This may result in a shift of activity to the secured market and fragmentation between the secured and unsecured markets. Rates may go up in the secured market, as an additional premium will be demanded for transactions secured by ineligible assets. The introduction of liquidity standards also gives rise to a risk of a permanent shift of part of banks' activities from the interbank market to operations with the central bank, as funds raised in these operations are regarded as fully renewable regardless of their maturity. The risk of this shift will depend largely on the central bank's collateral policy, on the types and maturity of liquidity-providing instruments and on the liquidity allotment policy.⁴ In general, stricter central bank collateral policy regarding eligible assets, shorter maturities of such operations and restricted allotment of liquidity will lead to a reduction in

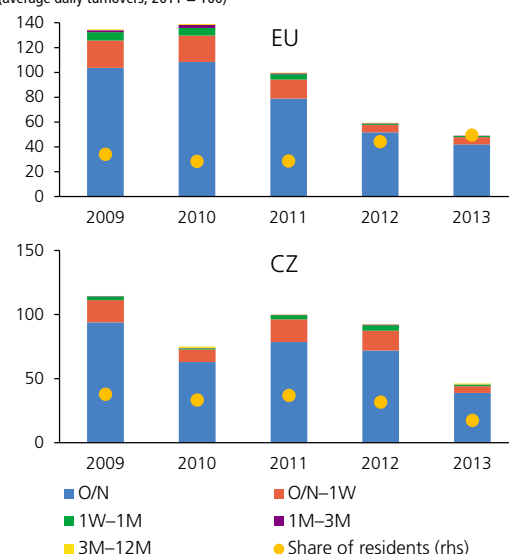
2 The average turnover dropped from CZK 52.8 billion in April 2012 to CZK 26.4 billion in April 2013 in the unsecured market and from CZK 5.9 billion to CZK 1.9 billion in the secured market.
http://www.cnb.cz/en/financial_markets/money_market/mm_turnover/index.html

3 The liquidity buffer is the sum of highly liquid assets immediately available to a bank to overcome a short-term liquidity stress situation.

4 When conducting open market operations, the central bank assesses the total liquidity need in the banking sector and allots this amount using tenders. In exceptional situations, however, it may allot the full amount of liquidity demanded by banks, i.e. satisfy all the bids.

CHART III.4

Transactions in the unsecured interbank market (average daily turnovers; 2011 = 100)

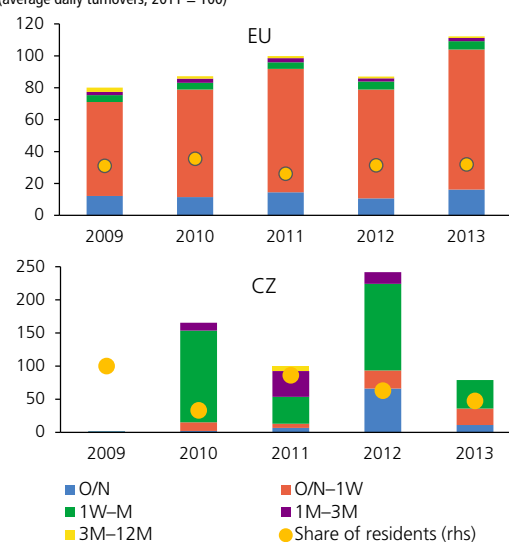


Source: CNB, ECB, CNB calculation

Note: Data from surveys of average daily turnovers on the relevant money market. O/N = overnight, 1W = 1-week, 1M = 1-month, 3M = 3-month, 12M = 12-month. The information for the EU relates to September of the given year. In the case of the Czech Republic the data are taken from the April survey in the given year.

CHART III.5

Transactions in the secured interbank market (average daily turnovers; 2011 = 100)



Source: CNB, ECB, CNB calculation

Note: Data from surveys of average daily turnovers on the relevant money market. O/N = overnight, 1W = 1-week, 1M = 1-month, 3M = 3-month, 12M = 12-month. The information for the EU relates to September of the given year. In the case of the Czech Republic the data are taken from the April survey in the given year.

CHART III.6

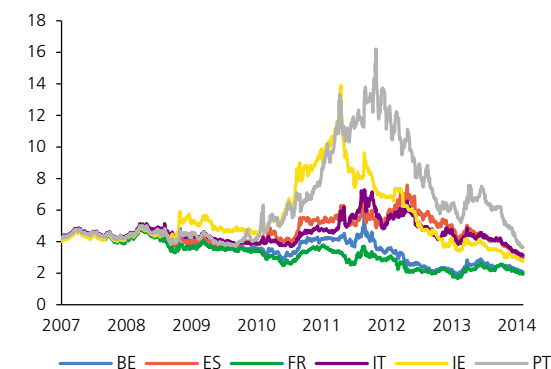
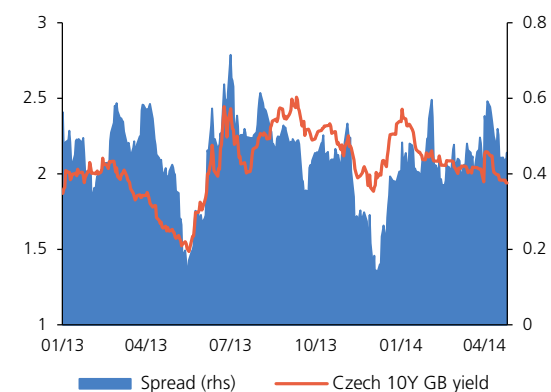
10Y government bond yields in selected euro area countries (%)

CHART III.7

10Y government bond yields in selected CEE countries (%)

CHART III.8

Czech versus German 10Y government bond yields (%)

this potential risk. Banks that are highly dependent on funding from money and capital markets can be expected to display the changes in conduct described above. As for Czech banks, which are mostly compliant with the LCR limits (see section 4.2), the impact of the new standards on Czech money markets is generally limited.

Low government bond yields are encouraging search for yield...

The changes in the future monetary policy settings of major central banks also affected the pattern and volatility of yields in government bond markets. The impact in euro area periphery countries was pronounced. In Italy, for example, the ten-year yield dropped to an all-time low (see Charts III.6).⁵ The effect is also visible in selected Central European countries (see Charts III.7 and III.8). This is evidenced by an increase in the correlation between their government bond yields and those in advanced economies. In the Czech Republic, this correlation has been rising since the onset of the debt crisis in 2010, and a stronger effect of the euro area has been apparent since the ECB launched its three-year lending operations (see Chart III.9). Owing to the expected introduction of further unconventional measures by the ECB, Czech government bond yields may decline further, as they still represent a relatively attractive investment (see Chart III.10). Corporate bonds are also a more profitable alternative. This is apparent from the very low yields on high-quality corporate bonds and the still declining yields for riskier issues (see Charts III.11 and III.12). Many large companies in advanced and emerging countries are taking advantage of this. Issuance of corporate bonds has also been rising in the Czech Republic in recent years (see Chart III.13), especially in the case of non-financial corporations (see section 2.2).

...which is causing growing concerns about the re-assessment of market risks...

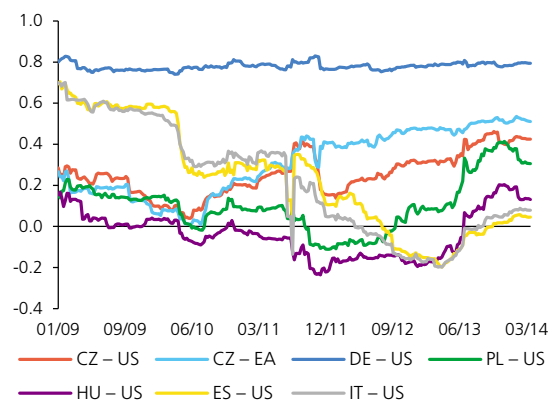
The current imbalance in bond markets is causing growing concerns about a sharp adjustment of prices of these assets and global restructuring of portfolios. This concern stems from the fact that institutional investors and asset managers, mostly from advanced countries, have in recent years created large portfolios often composed of bonds with longer maturities. In the search for yields, these investors might have underestimated the risks associated with at least some of these bonds. Underlying this concern is a substantial decline in risk premia on corporate bonds (i.e. the expected yield on top of the yield on short-term government bonds).⁶ A more pronounced increase in yield

5 For the first time since the debt restructuring in 2012, the Greek government successfully auctioned five-year bonds at a yield of less than 5% at the start of April.

6 See, for example, Stein, J.: *Overheating in Credit Markets: Origins, Measurement, and Policy Responses*, lecture at the Federal Reserve Bank of St. Louis research symposium, 7 February 2013, or Stein, J.: *Incorporating Financial Stability Considerations into a Monetary Policy Framework*, lecture at the Spring meeting of the International Monetary Fund in Washington, 13 April 2014. The combination of extremely low risk premia and an increasing share of bonds with a risky profile (junk bonds, covenant-lite bonds, etc.) in total bond issuance is identified there as a significant indicator of excessive risk-taking in the USA.

CHART III.9

Correlation of 10Y government bond yields between selected countries and the USA/euro area

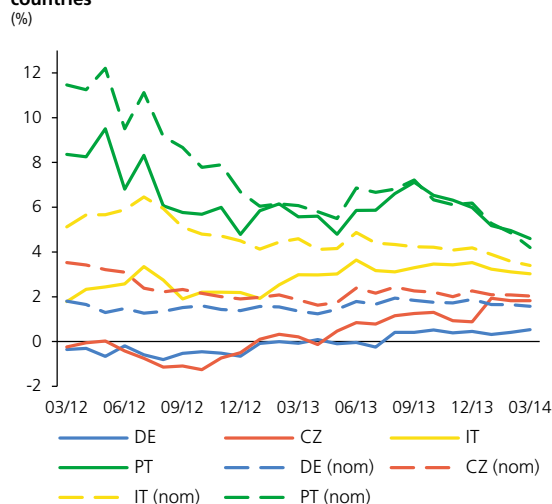


Source: Thomson Reuters, CNB calculation

Note: The correlations were obtained from data on weekly average 10Y government bond yields in 1997–2014 for CZ, DE, EA, ES, HU, IT, PL and US. The calculation was performed using the EWMA method (with a smoothing factor of 0.98), which takes into account changing data volatility and changing covariance.

CHART III.10

Real and nominal government bond yields for selected countries

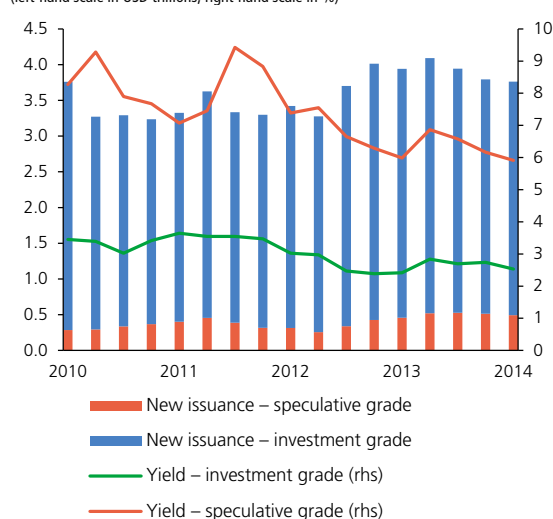


Source: Thomson Reuters, CNB calculation

Note: The chart shows ex post real yields, calculated as the difference between the nominal yield on 10Y GB and the year-on-year change in the CPI in the given economy.

CHART III.11

New issuance of corporate bonds on the global market

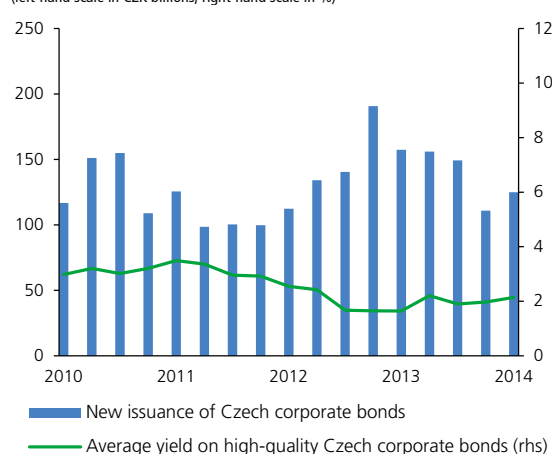


Source: Bloomberg L.P., CNB calculation

Note: The data on the volumes of bonds issued are converted to an annual basis by summing over the last four quarters.

CHART III.12

New issuance of Czech corporate bonds

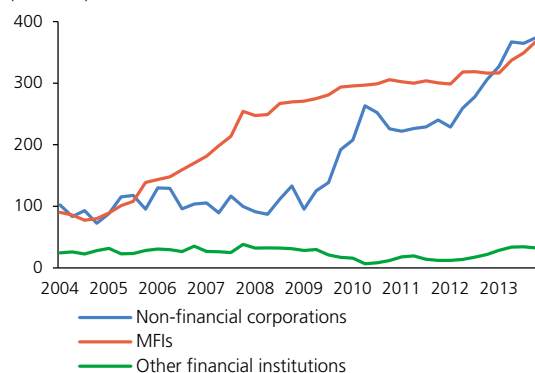


Source: Bloomberg L.P., CNB calculation

Note: The data only cover issues registered on the regulated market. The issue volume is converted to an annual basis by summing over the last four quarters. The average yield is calculated as a weighted average yield on a sample of bonds issued by Czech issuers with a rating of A– or higher in various currencies. The basket contains 20–40 issues with a time to maturity of no more than 15 years (average 5.5) depending on time. The face value of the issue is used as the weight in the calculation. The low number of bonds issued by domestic risky issuers (five) makes it impossible to calculate the average yield for such securities.

CHART III.13

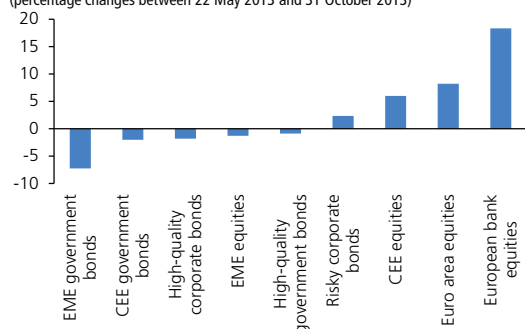
Value of corporate bonds issued in the Czech Republic (CZK billions)



Source: CNB

CHART III.14

Change in prices of selected global assets (percentage changes between 22 May 2013 and 31 October 2013)

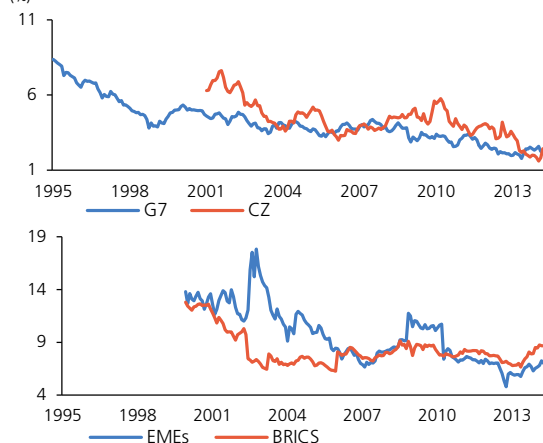


Source: Bloomberg L.P., CNB calculation

Note: CEE countries comprise CZ, HU, PL and SK. High-quality bonds are AAA-rated bonds, while risky bonds are speculative-grade bonds (BB+ or lower). The price change calculations are performed on individual price indices, except for the data on CEE countries, which are calculated as the average change in the price indices for individual countries.

CHART III.1 Box

Global view of government bond yields (%)



Source: Thomson Reuters, CNB calculation

Note: Yields on 10Y GB. EMEs comprise AR, BR, CL, CO, MX, PE and VE.

curve slopes in large advanced economies might trigger portfolio revaluation and restructuring. As a result, the yields demanded on bonds of smaller or globally less important economies, including the Czech Republic, might rise or suddenly return to levels consistent with fundamentals (see Box 2).

...concerns which partially materialised in spring 2013

This was also shown by events observed in late May and early June 2013, when a change occurred in market expectations about the US economic recovery and the related timing of the reduction in bonds purchased by the Federal Reserve under QE3.⁷ This change in expectations triggered an unusually sharp adjustment of prices in numerous asset categories across global markets, which was accompanied by market turbulence. The adjustment of prices differed across countries in terms of both its size and nature. While the markets for highly-rated government bonds recorded a decrease in prices, prices of most equities and risky corporate bonds increased (see Chart III.14). Last year's events also affected Czech financial markets, although less so than emerging markets.

BOX 2: HOW COMMENSURATE ARE THE CURRENTLY LOW GOVERNMENT BOND YIELDS WITH THEIR MACROFINANCIAL FUNDAMENTALS?

This box aims to identify the probable evolution of long-term government bond yields in the years ahead with respect to their trend and the course of the economic cycle. Government bond yields have long been falling across a wide range of countries (see Chart III.1 Box) despite the growing sovereign debt in those countries (see Chart III.2 Box). This trend is due to several common global factors. They include the large surpluses in emerging economies and the related accumulation of reserves in central bank balance sheets, global portfolio shifts towards safe assets, and the decline in nominal interest rates linked with the anchoring of low inflation expectations.

However, government bond yields did not fall sharply until the onset of the financial crisis. In response to declining inflation rates, falling investment and negative output gaps, a large number of central banks in advanced countries lowered their monetary policy rates to near-zero levels. In addition, some opted to use unconventional monetary policy instruments to directly influence the term premium on domestic government bonds. In this way they released a large amount of liquidity, reduced market volatility and changed interest rate differentials. This caused adjustments in

⁷ Events of a similar nature also occurred in late 1993 and early 1994, when volatility in global bond markets increased significantly in response to a tightening of monetary policy by the Federal Reserve. For details see ECB (2013): *Financial Stability Review*, November 2013, Box 4.

capital flows between countries due to an increase in demand for more attractive assets. The proportion of government bonds held by non-residents thus increased in some countries and their yields became more affected by external factors. The results of the latest studies of government bond yield determinants point to the changing importance of local and global factors. The relevance of foreign variables has been rising since 2007 due to market integration.⁸

Equilibrium real yields of government bonds were estimated on the basis of a simple model based on the calculation of the average effect of domestic macroeconomic variables across a wide range of countries. The difference between the observed average real yield on a government bond of a given country and the relevant fitted value implied by the model is the main variable of interest. The model is based on the assumption that real long-term government bond yields are determined mainly by current and expected future economic growth and the risk premium.⁹ This can be expressed formally by the following relationship:

$$r_{it} = \alpha_i + \beta trend_{it} + \gamma cycle_{it} + \delta debt_{it} + \eta balance_{it} + \theta savings_{it} + \varepsilon_{it}$$

where r denotes the real yield, defined as the average nominal five-year government bond yield minus inflation. The effects of real economic growth are estimated separately for its trend (*trend*) and cyclical (*cycle*) components to distinguish between short-term and long-term factors. The sovereign risk premium, which is affected mainly by government debt sustainability, was represented in the model by the government debt-to-GDP ratio (*debt*) and the government budget balance to GDP ratio (*balance*).¹⁰ The national saving rate (*savings*) is the last variable included. Savings represent domestic absorption capacity in the model. We deliberately abstracted from some temporarily important external effects, such as market sentiment, the sovereign rating and the above-mentioned effect of major foreign economies having a cross-border effect through capital investment.

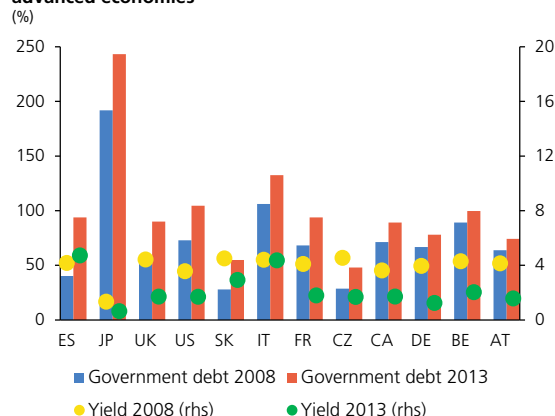
8 See Miyajima, K., Mohanty, M. S., Chan, T. (2012): *Emerging Market Local Currency Bonds: Diversification and Stability*, BIS WP No. 391, or Turner, P. (2013): *Benign Neglect of the Long-term Interest Rate*, BIS WP No. 403.

9 See Moore, J., Nam, S., Suh, M., Tepper, A. (2013): *Estimating the Impacts of U.S. LSAPs on Emerging Market Economies' Local Currency Bond Markets*, FRBNY Staff Report No. 595, or Bernanke, B. (2013): *Long-term Interest Rates, paper at the conference: The Past and Future of Monetary Policy*, San Francisco, USA, March 2013.

10 See IMF (2014): *World Economic Outlook*, April 2014.

CHART III.2 BOX

Comparison of government debt and yields for selected advanced economies

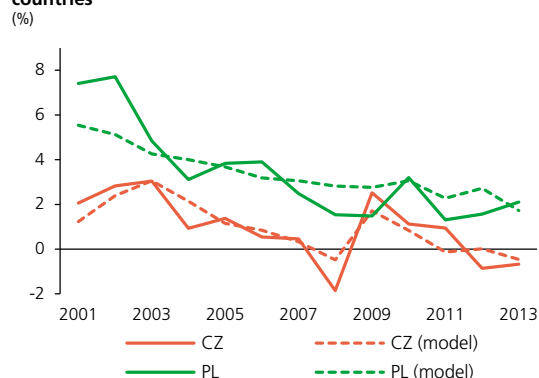


Source: IMF, Thomson Reuters, CNB calculation

Note: Yields are expressed as the average value on nominal yield on 10Y GB in the given year; debt is expressed as a percentage of GDP.

CHART III.3 BOX

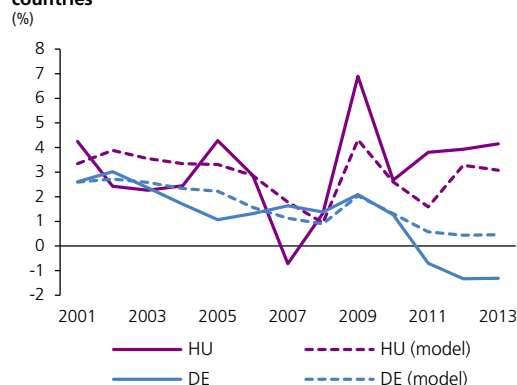
Observed and fitted government bond yields for selected countries



Source: EIU, Thomson Reuters, CNB calculation

CHART III.4 BOX

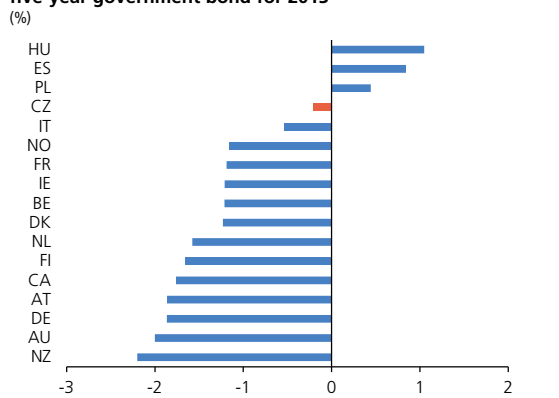
Observed and fitted government bond yields for selected countries



Source: EIU, Thomson Reuters, CNB calculation

CHART III.5 Box

Difference between observed and fitted values of real yield on five-year government bond for 2013



Source: EIU, Thomson Reuters, CNB calculation

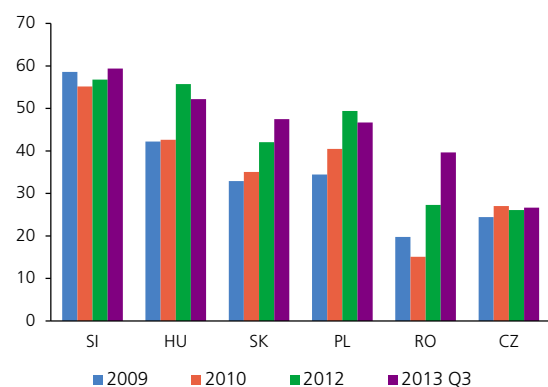
The selected model was estimated on data for the period 1980–2013 for selected OECD countries, for the period 2002–2013 for the Czech Republic.¹¹ The fitted yields were obtained by averaging the results obtained using two estimation methods – fixed effects panel regression and linear regression for individual countries.¹²

The results of both methods showed that the values observed for individual countries deviate only temporarily from the more stable fitted values (for the selection of countries see Charts III.3 Box and III.4 Box). Significant deviations of the model values from the actual values can be seen for most of the countries under analysis starting in 2009, i.e. at a time of debt crisis, significant economic contraction and very easy financial conditions. An upward deviation of the model value can be seen for countries whose government bonds are globally regarded as safe, countries such as Germany (Graf III.4 Box), Canada, New Zealand and Finland. By contrast, a second group comprises economies such as Italy, Ireland, Hungary (see Chart III.4 Box) and Spain, for which the model implies lower-than-observed yields in some observations from this period. In these countries, more pessimistic market sentiment about their fundamentals is thus apparent. As for the Czech Republic, the deviations of the actual values from the model ones are not too large, but they clearly reflect the impact of the 2008–2011 crisis and the subsequent introduction of unconventional monetary instruments by the ECB. All countries recorded a significant reversal towards the fitted value in 2013, although deviations are still visible (see Chart III.5 Box). The deviations can be attributed partly to the heterogeneity of the panel data, since government bond markets differ across countries in terms of investor base, size and liquidity, so their yields may display different sensitivities to external factors.

CHART III.15

Share of non-residents in government bond holdings in selected CEE countries

(%: end-of-period data)



Source: IMF, World Bank

The spillover of external shocks depends on several factors...

The risk of spillover of external shocks is associated with the presence of non-residents and their significant share in domestic asset holdings. Domestic asset prices are consequently more volatile and more vulnerable to external shocks, because non-residents usually hold their foreign assets for revaluation and constantly seek more profitable investment opportunities. They are thus far more sensitive to external factors, including global market sentiment, than residents and may succumb

11 The sample consists of Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, France, Germany, Hungary, Ireland, Italy, the Netherlands, New Zealand, Norway, Poland, Spain and Switzerland. Economist Intelligence Unit and Thomson Reuters data were used.

12 Tests of the sensitivity of the results to the scope of the country sample, the time period and the model specification were performed. Except for θ , the estimated coefficients were statistically significant at the 5% level with the expected signs: trend (+), cycle (-), debt (+), balance (-), savings (-). Moreover, their values were relatively robust to various model specifications and to the size of the source data sample.

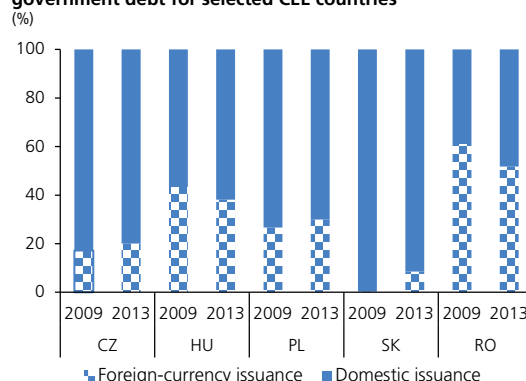
more easily to herd behaviour. The share of foreign holders of government debt is rising in most of the CEE countries under review (see Chart III.15), and not only in the case of foreign currency bonds. This is evident from a comparison of the higher share of non-residents in government debt holdings and the share of foreign issues (see Charts III.15 and III.16). The share of non-residents in Czech government debt has risen only slightly and, although not negligible, is lower and more stable (27%) than in other countries. Similarly, the share of foreign issues in Czech government debt remains relatively low (20%). However, non-residents predominate among investors buying bonds issued by Czech non-financial corporations (see Chart III.17). The same goes for bonds issued abroad by Czech banks, which are eligible collateral in ECB operations.¹³

...whose effects should not be underestimated in the case of the Czech Republic either

The lower liquidity in the Czech bond market may pose some risk. A sell-off of bonds by non-residents might trigger relatively high volatility. The effect of external fluctuations on specific investors would depend mainly on the size of the revalued portfolio, the number and price of sales, the amount of bonds used as collateral in repo operations in the event of realisation of collateral, and the level of hedging against interest rate risk. For banks, bonds account for around 20% of total assets, and around 50% of them are bonds for revaluation at market price (see Chart III.18). For insurance companies, the ratio is about 60% of assets, with 60% for revaluation. For funds operated by pension management companies, the ratio is about 87% of assets, with 80% for revaluation. However, institutions face not only risks of immediate losses due to revaluation of assets sensitive to interest rate movements, but also the risk of a decline in their market liquidity and hence the impossibility of selling such assets on the planned date. The asset holding period may thus get longer at times of market stress, gradually increasing the maturity mismatch. This is why the CNB includes these risks in its stress tests (see section 4.2)

CHART III.16

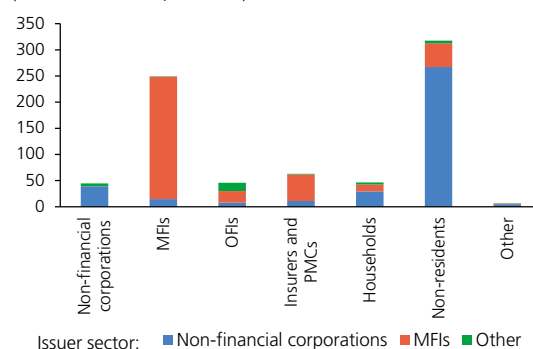
Share of domestic and foreign-currency issuance in government debt for selected CEE countries



Source: MF CR, IMF, World Bank

GRAF III.17

Holders of bonds issued by the Czech private sector (as of 31 December 2013; CZK billions)



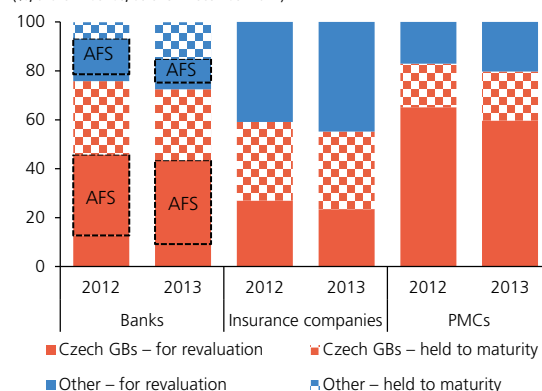
Source: CNB

Note: The "Other" category comprises general government and non-profit institutions serving households.

CHART III.18

Breakdown of the bond portfolio by sector and valuation method

(%; share in bonds; as of 31 December 2012)



Source: CNB

Note: AFS denotes financial assets classed as "available for sale". The figures for the insurance sector include financial placement of unit-linked insurance.

¹³ Foreign issues, or issues under foreign law, were allowed by a May 2012 amendment of the Act on Bonds. This option has so far been exercised only by Raiffeisen Bank, which issued covered bonds totalling EUR 500 million in June 2013, and UniCredit Bank, which issued five-year mortgage bonds worth EUR 800 million in December 2013.

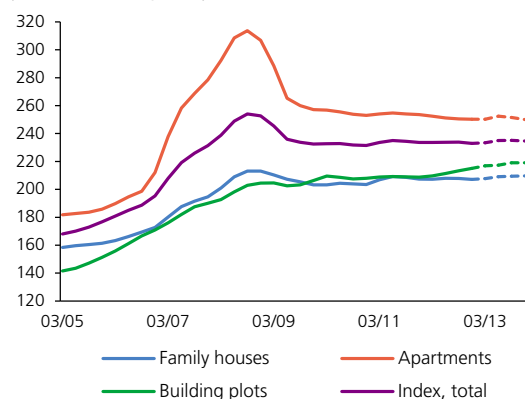
3.2 THE PROPERTY MARKET

Following quite a long period of decline, property prices started rising again in 2013, driven mainly by prices in Prague. The growth was generally moderate by international comparison. However, it was not underpinned by economic fundamentals, as lower wage growth, a worse labour market situation and deteriorating demographic indicators were recorded compared to the assumptions in FSR 2012/2013. At the same time, the recovery in demand for apartments was not in line with the number of transactions, which continued to fall. Although the property price sustainability indicators as such still suggest that apartment prices are potentially undervalued, estimates using econometric methods indicate that they are slightly overvalued. The current prices appear to be approximately in equilibrium when all price fundamentals are taken into account. Based on the assumptions of the Baseline Scenario, moderate but gradually accelerating price growth is expected in the period ahead.

CHART III.19

Property prices – transaction prices

(absolute index; 1999 Q1 = 100)



Source: CZSO, HB index, CNB calculation

Note: The data for family houses and apartments for 2013 H1 are preliminary data. The other data for 2013 are calculated from alternative sources of data on transaction prices (HB index, etc.).

The phase of falling residential property prices in the Czech Republic seems to be at an end...

Two major changes in residential property transaction prices were recorded compared to 2012. First, the signals that the almost four years of constant decline in property prices were coming to an end were confirmed in most categories in 2013 (see Chart III.19). Transaction prices of apartments switched to a growth phase in 2013 Q2 (year-on-year growth of 0.5%), driven mainly by prices in Prague (growth of 3.0%). In the rest of the Czech Republic, prices continued to fall on average (by 0.7%), although some regions outside Prague started to record noticeable growth (2.6% in South Bohemia and 2.7% in the Liberec region). In 2013 H2, for which CZSO data on transaction prices from property transfer tax returns are not yet available, alternative sources indicate mostly stagnating prices.¹⁴ Prices of family houses and building plots also increased (by 1.2% and 1.9% respectively in 2013 Q4). The second change was a substantial upward revision of CZSO data, which retrospectively changed the view of the post-2010 price dynamics of most types of property. Although the overall price trend remained downward after the revision, the previous price decline in the main monitored category of transaction prices of apartments is in fact more moderate by comparison with the pre-revision data.¹⁵ As regards family houses, the revision pertained mainly to the period of price growth in 2011, which was longer according to the latest data. Similarly, the decline in family house prices in 2012 was considerably smaller according to the new data (0.4% on average). However, building plots recorded the

¹⁴ For example the alternative transaction price indicator based on the HB index (see <http://www.hyposvet.cz/hb-index/>). As transaction price data according to this index have recorded larger decreases or weaker increases in the last few quarters, it is likely that the figure showing a decrease in transaction prices of apartments in 2013 Q4 is also biased downwards. The HB index does not provide data broken down by region.

¹⁵ While the original estimates had indicated year-on-year declines in apartment prices of 3.8% in Prague and 10.7% in the rest of the Czech Republic, according to the new data the declines were only 0.2% and 1.8% respectively. About six months earlier the CZSO had revised its original estimates for 2012 H1 in the opposite direction (down by 1.4% in Prague and 8.4% outside Prague).

biggest upward revision, with the 5.2% year-on-year decline in 2012 Q3 corrected to an increase of 2.1% in the same period.

In the case of apartments, for which more alternative data sources with more up-to-date data are available, the end of the phase of price decline in the Czech Republic is confirmed across regions and types of prices monitored (see Chart III.20). Following a surge in 2012, growth in asking prices in Prague started slowing substantially in mid-2013 (by 3.8% in 2013 Q1), confirming the hypothesis of a statistical anomaly in this CZSO time series mentioned in Inflation Report I/2013. By contrast, asking prices in the other regions switched only very gradually to growth last year.

While FSR 2012/2013 had pointed to two-speed property prices, with Prague as the price leader and the rest of the country relatively homogeneous, now the situation is starting to vary substantially across regions. According to alternative information on asking prices from the Institute for Regional Information,¹⁶ asking prices in 2014 Q1 recorded sizeable year-on-year growth – comparable to that in Prague (5.4%) – in Brno (4.5%), České Budějovice (5.5%) and Hradec Králové (5.5%). On the other hand, asking prices continued to fall in Ústí nad Labem (by 6.0%) and Zlín (by 4.4%). In Prague, the segment of new apartments is an exception from the rising trend, as it recorded a further slight decline in 2013 Q4 (0.8%). This can be regarded as a delayed correction of an earlier overvaluation, as in the past new apartment prices had fallen much more slowly than old apartment prices. In addition, the price decline played a role in the recovery in sales of apartments in development projects (see below).

...as also indicated by an international comparison

The end of the phase of across-the-board declines in property prices is apparent from an international comparison with advanced countries, which, however, continue to show very mixed trends (see Chart III.21). Of the countries where the bursting of the price bubble after the onset of the financial crisis was accompanied by debt problems, prices are still falling in Greece and Spain (by 15.2% and 4.4% respectively in 2013). By contrast, property prices in Ireland, which had been decreasing fastest in this group of countries, saw one of the largest increases in all the countries under review (6.2%) in the most recent period. Only in the USA, where the price turnaround occurred much earlier, as it did in the UK, are prices rising faster. The early market recovery there has also been aided by an early credit market recovery and a stronger general economic recovery. The 10.1% rise in housing prices in the USA in 2013 Q4 is causing concerns about the emergence of another speculative bubble, even though the previous declines recorded in the USA were more pronounced. A favourable factor from the perspective of potential cross-border contagion, however, is that prices in countries where FSR

CHART III.20

Apartment prices according to the CZSO – transaction prices and asking prices

(%; year-on-year change in indices)

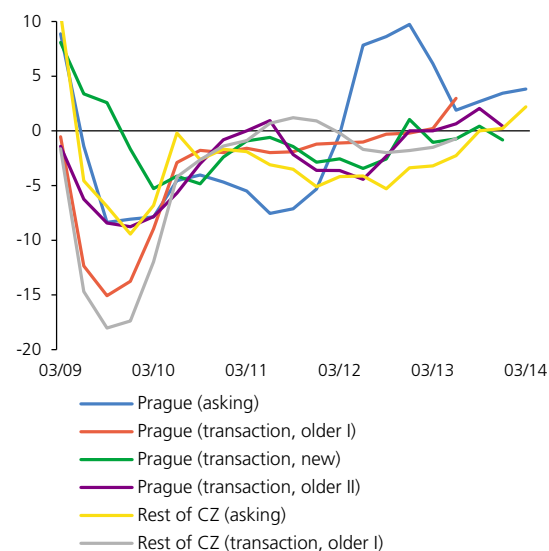
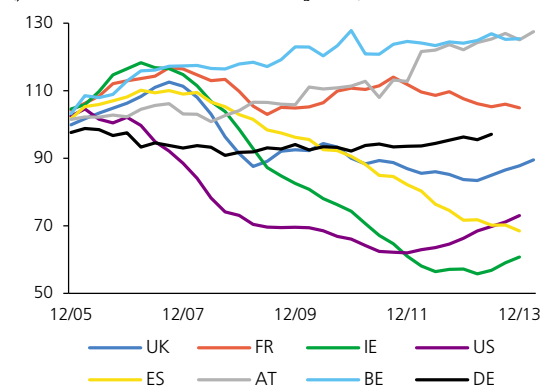


CHART III.21

Property prices – international comparison, advanced countries

(prices in real terms; absolute index; 2005 average = 100)

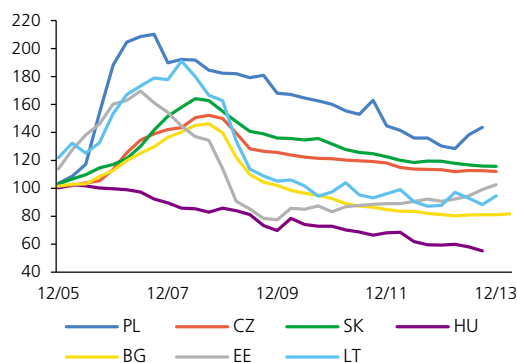


¹⁶ IRI apartment prices are an alternative source to CZSO asking prices, but are further broken down by region.

CHART III.22

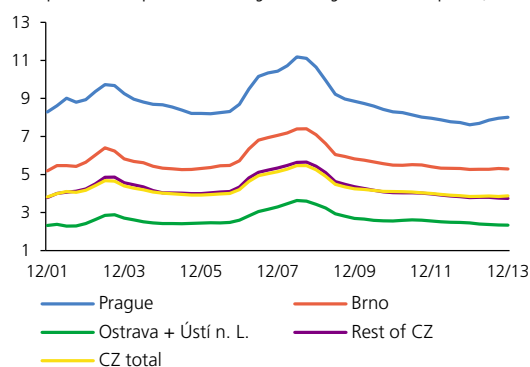
Property prices – international comparison, selected EU countries

(prices in real terms; absolute index; 2005 average = 100)



Source: BIS, national statistical offices and central banks

GRAF III.23

Price-to-income ratios(ratio of price of 68 m² apartment to moving sum of wage over last four quarters)

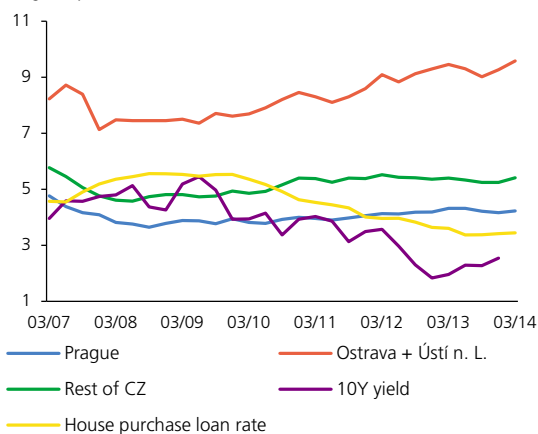
Source: CZSO, CNB calculation

Note: 2013 data preliminary or calculated from asking prices.

CHART III.24

Apartment rental returns

(averages for period in %)



Source: IRI, CNB

Note: Comparison with 10Y government bond yields and rates on new house purchase loans.

2012/2013 highlighted uncertainty about property prices are growing at low rates (2.6% and 1.1% respectively in Austria and Belgium) or even falling steadily (-2.5% in France). Nevertheless, some of these countries are still showing signs of property market overheating,¹⁷ and any correction of these imbalances could have indirect impacts on the Czech property market (e.g. a general move of multinational investors away from property investment).

In the newer EU Member States (see Chart III.22), the latest data indicate continuing declines in Hungary (-7.4%) and in Slovakia (-3.1%), which has long had the closest price dynamics to those in the Czech Republic. Conversely, Bulgaria – like the Czech Republic – saw a noticeable recovery in 2014 Q1 (growth of 1.8%) after four years of decline. Prices have long been going up in Estonia (13.2%) and have started surging in Poland (from -10.0% year on year in 2012 Q4 to 5.6% in 2013 Q3) and Lithuania (from -8.7% in 2012 Q4 to 7.8% in 2013 Q4). Overall, the slow transition to price growth in the Czech Republic can thus be regarded as moderate, as the amplitude of the year-on-year changes is as usual smaller than in other countries.

Housing affordability may therefore start worsening...

Following a long period of increasing housing affordability driven by falling prices, the price-to-income ratio worsened for the first time in the Czech Republic as a whole (see Chart III.23). The rise in this indicator in late 2013 (of 0.9% in both year-on-year and quarter-on-quarter terms) was driven mainly by rising prices and falling affordability in Prague (of 5.2% year on year). This currently means a further widening of the already large differences in housing affordability between Prague, Brno and the rest of the Czech Republic. Compared to the rest of the country, it takes an average household in the capital twice as long to earn enough to purchase its own home, and the difference against Ostrava and Ústí nad Labem is more than threefold. This difference is probably due in part to a greater willingness of households to pay to live in Prague, as unemployment in the capital is significantly lower than in regions with the most affordable housing. Although worsening housing affordability is not yet visible in the year-on-year changes in the price-to-income ratio outside Prague, given the low inflation and still subdued economic recovery, housing affordability can also be expected to worsen in regions outside Prague, where the expected price growth will probably not be fully offset by wage growth.

...and the room for making profit by investing in property is thus beginning to shrink

As with the price-to-income ratio, the above-mentioned price recovery influenced apartment rental returns in 2013. In most regions, rental returns fell by 0.1–0.3 pp in 2013 following roughly four years of growth

¹⁷ Property prices are said to be overvalued in Austria, Belgium and Sweden (see the ECB FSR). In Germany, where the aggregate index has so far been rising relatively modestly (by 4% in real terms in the last three years taken together), property prices are growing strongly in the largest cities (by 22.6% in real terms in last three years).

(see Chart III.24), but on average they remain 0.6 pp above the low recorded in 2008. However, given the historically low interest rates on loans for house purchase, which were mostly flat in 2013, speculative purchases of apartments for investment are still relatively profitable. Owing to rising returns on alternative investment in government bonds and higher returns on commercial property (6%–7.5% depending on the type of property), however, the relative profitability of such investments is gradually falling, especially for institutional investors. As for individual investors, whose share is rising according to anecdotal evidence, the question is whether they are always aware of all the risks of such investment. Overall, the property price sustainability indicators continue to suggest slight undervaluation of property prices in the Czech Republic, despite a partial deterioration compared to historical values. However, updated estimates of equilibrium property prices based on more complex econometric techniques indicate that property prices are broadly in equilibrium or even slightly over-inflated (see section 5.4 for details). It can be said that the current prices are close to equilibrium when all price fundamentals are taken into account.

The property price recovery is not fully underpinned by economic fundamentals...

The above-mentioned partial recovery in property prices in 2013 was rather surprising. The increase in apartment prices was around 4 pp larger than assumed in the Baseline Scenario in FSR 2012/2013 (see Chart III.25). Although this surprising result may have been partly due to the revisions of transaction prices discussed above, implying increased uncertainty connected with the interpretation of actual developments, it is clear that the price growth was not fully in line with economic fundamentals. In particular, GDP growth was lower than assumed last year, and the related deterioration of the labour market situation was reflected in a drop in real wages and a rise in unemployment (see section 2). Demographic trends also worsened, with negative natural population growth and negative net migration recorded in 2013. A negative overall increase in the population (0.35 person per 1,000) occurred for the first time since 2002, while during the peak in property prices the total growth had reached 8.7 persons per 1,000.

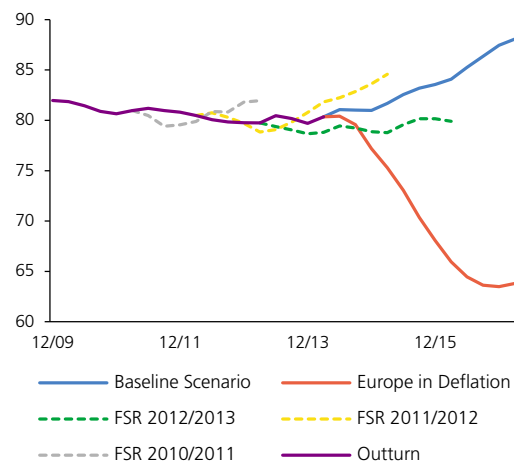
...probably representing a correction of the previous undervaluation...

The growth in property prices despite their worsening determinants can be interpreted as a correction of the price undervaluation identified in the past, i.e. convergence towards equilibrium. Given that the mismatch between fundamentals and apartment prices was coupled with an increased share of property held as a financial investment, further rapid price growth could mean, *ceteris paribus*, that the seeds of a speculative bubble are being sown as a result of speculative activity in the market.

Although the interpretation of prices is subject to considerable uncertainty, slight growth in property prices of around 0.75–2% year on year can be expected until mid-2015, in line with the *Baseline Scenario*. Starting in 2015 H2 the growth may accelerate to 3%–5% (see Chart III.25). This property price growth is conditional mainly on the projected

CHART III.25

Property price scenario
(absolute index; maximum: 2008 Q3 = 100)



Source: CZSO, CNB calculation

Note: Due to revisions, the historical property price scenarios were linked to updated apartment prices for the scenario period.

CHART III.26

Numbers of transactions on the property market

(thousands of transactions; moving sums over past year)



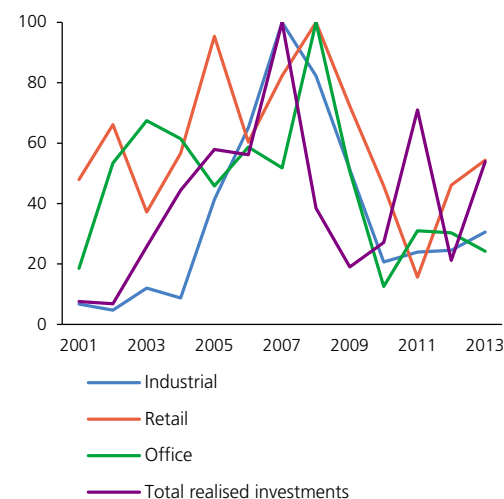
Source: CZSO, COSMC, FINCENTRUM HYPOINDEX

Note: Entries of records of title to buildings and apartments only.

CHART III.27

Planned supply and realised demand on the commercial property market

(maximum = 100)



Source: Jones Lang LaSalle

Note: Supply of industrial and retail property calculated from new supply in m² for the Czech Republic as a whole and supply of office property in m² for Prague; realised investments from data in EUR. Maximum for office and retail property for 2008 and for industrial property and investments for 2007.

recovery in economic activity, driven mainly by developments abroad, easy monetary policy and the expected easing of fiscal policy. The easing of the exchange rate component of the monetary conditions through the use of the exchange rate as an additional monetary policy instrument by the CNB (see section 2) also plays a not insignificant role, as it may motivate non-residents to purchase property for investment purposes. These macroeconomic developments, and, in turn, price developments, are still subject to considerable uncertainty and can be expected to remain mixed across regions. Given the lower unemployment rate in and around Prague and the expected difference in population growth,¹⁸ growth in apartment prices will still be concentrated in the capital. Further differentiation between the other regions can also be expected. The risk of significantly worse macroeconomic developments is illustrated in the *Europe in Deflation* stress scenario, which could lead to a decrease in apartment prices of up to 20% (see Chart III.25). In the long term, property price growth will be hindered by worsening demographic characteristics, with the population of the Czech Republic shrinking by as much as 4% by 2050 according to the latest CZSO demographic projection.

...and has yet to be reflected in housing market activity

The recovery in property demand possibly implied by the growth in prices has yet to be confirmed by the number of property market transactions, which is still falling. The numbers of apartment completions and starts also continued to decrease, reaching their lowest level since 2001 for apartment completions and since 1998 for apartment starts (see Chart III.26). The number of transactions as measured by the number of proceedings on entry of title to houses and apartments in the cadastre also dropped (by 6.9% in 2013 as a whole; this measure has fallen to about 55% of its 2008 level). However, differentiation in the property market situation between Prague and the rest of the Czech Republic is also indicated by the fact that the number of transactions for houses and apartments rose by 9.3% in Prague and Central Bohemia but fell by 10.4% in the rest of the Czech Republic. This is in line with the 24.9% rise recorded for sales of new apartments in development projects in Prague (Ekospol data).

Following a large increase in the number of new mortgage loans in 2011–2012, the market stabilised in early 2013. At the close of the year, however, the number of new mortgages surged again. Also related to the rise in the number of mortgage loans was a 10.3% rise in the number of new entries of title (source: COSMC). The increase in new mortgage lending was largely due to refinancing of existing loans (see section 2.3 for details), although it may partly be an indicator of an upcoming rise in housing market activity.

¹⁸ According to the CZSO projection for the Czech regions, Prague and Central Bohemia will see total population growth of around 2% in the next five years, while the population of the rest of the country will shrink by 0.7%.

Investment activity in the commercial property market is on the rise

Following a downturn in 2012, the commercial property market saw a recovery in realised investment¹⁹ to EUR 1.559 billion in 2013, roughly 40% above the long-term average (see Chart III.27). Almost one-half of the transactions involved office property in Prague. The renewed investment activity is being driven mainly by foreign entities, maybe motivated by a search for yield given the low yields on alternative assets and the gradually improving situation on foreign commercial property markets (especially in Germany). However, the increase in investment activity is not yet being supported very strongly by improvements in commercial property fundamentals.²⁰ The supply of office property (newly completed office space) fell by 20% year on year and remains at roughly one-half of its long-term average. By contrast, the supply of industrial and retail property increased and is now only slightly (roughly 10%) below the long-term averages. The total gross take-up in the office property sector (total rental stock) increased by 9.6% year on year in 2013 and is above its long-term average, but the growth was driven by a further rise in the proportion of renegotiations of existing contracts, which grew by 6.4 pp year on year to 49.4%. Net take-up, which is adjusted for renegotiations, thus declined by 2.9% year on year. This was reflected in a rise in the vacancy rate of 1.2 pp to 13.2% (see Chart III.28). Both gross and net take-up increased in the industrial property sector (by 29% and 5% respectively year on year), but the vacancy rate also rose by 1 pp to 7.9%. In the context of the Central European region, the vacancy rates are relatively low.

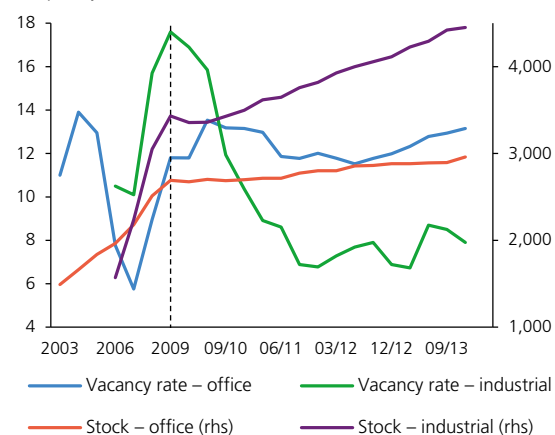
The NPL ratio in the property development sector decreased

The improvement in sales in residential property developments together with the recovery in the commercial property market in 2013 led to a decrease in the NPL ratio in the property development sector, which is now close to the ratio for the entire non-financial corporations sector (see Chart III.29). In addition, loans to developers started rising again year on year at the close of 2013. On the other hand, CCR data also show some adverse tendencies associated with lending to developers. First, the time for which banks monitor potentially risky clients before categorising loans as NPLs continued to increase for these companies in 2013. In 2007–2008, the average monitoring period for loans ultimately classified as NPLs had been around 5.1 months, whereas in 2013 it was 11.2 months (1.3 months longer than in 2012). On the one hand, this may reflect more prudential behaviour of banks vis-à-vis the sector as a whole, but on the other hand it may mean deferral of categorisation as NPLs and creation of provisions. The second potentially problematic tendency in the area of loans to companies operating in the property sector is an increase in the share of foreign currency loans to 44% of total loans (from 25%–

CHART III.28

Total stock and vacancy rates

(vacancy rate in %; stock in thousands of m² on right-hand scale; 2003–2009 yearly data, then quarterly)

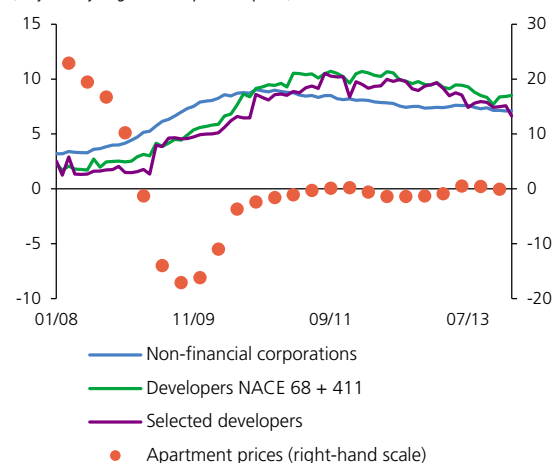


Source: Jones Lang LaSalle, Prague Research Forum

CHART III.29

NPL ratios in the property development sector

(%; year-on-year growth for apartment prices)



Source: CZSO, CNB

¹⁹ Realised investments include transactions in newly completed commercial property as well as transactions in property completed in the past, where, for example, the original investor has arranged the letting of the property and is selling it on to a real estate fund.

²⁰ Office property fundamentals are discussed in the thematic article *Office Property in Central European Countries* in this Report. Among other things, the article explains the relationship between gross take-up and the vacancy rate and compares office property indicators between Central European countries and Germany.

35% in 2007–2013). This share is similar as in 2002–2004 and it could be argued that, especially for commercial property, the exchange rate risks are mitigated by natural hedging, as a large proportion of rental returns are contractually denominated in euros. Nevertheless, the sensitivity of developers to exchange rate movements is increasing. In a situation where rents are contracted in foreign currency the exchange rate risk is transferred to the tenant, but the tenant's financial situation often depends on the domestic economic situation. An exchange rate weakening may then manifest itself in a different area (e.g. the vacancy rate) and ultimately affect the developer.

4 THE FINANCIAL SECTOR

4.1 FINANCIAL SECTOR DEVELOPMENTS

The developments recorded in the Czech financial sector in 2013 were mostly positive. The banking sector strengthened its capital adequacy. Despite a year-on-year decrease in profits, the sector remains sufficiently profitable and is generally well prepared for the new European regulatory rules. Similarly, insurance companies have solid capitalisation, but also saw a decline in profits. Collective investment funds recorded an increase in clients' interest in mixed funds. By contrast, credit unions showed adverse developments in 2013. Among other things, the licence of the then largest institution was revoked. The credit union segment as a whole is still significantly risky and the regulations applying to it need changing. The sector of pension management companies is stable, but there was insufficient interest in participation in the second pillar, which is thus likely to require some adjustment.

The main risks to the financial sector stem from a potential insufficient economic recovery or renewed recession. A continued contraction in economic activity would mean renewed growth in credit risk and a sizeable fall in the banking sector's profitability. Although the credit risk level stabilised during 2013 and even improved in some respects, it remains elevated. It is therefore vital for banks to remain prudent in their lending activities and subsequent loan classification and provisioning. There are substantial differences across institutions in their resilience to risks and in their approach to the provision of riskier types of loans.

The financial sector's assets rose in 2013 despite the continuing contraction of the real economy

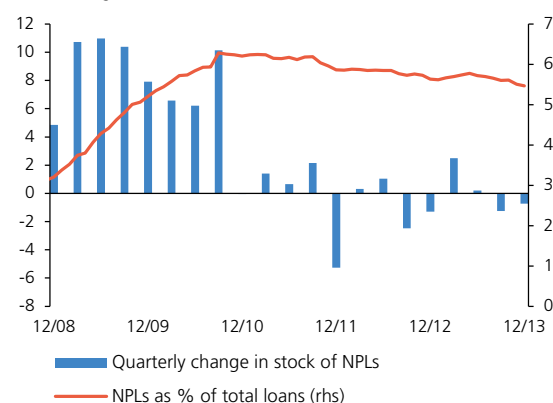
Despite the continuing contraction in economic activity in 2013, the financial sector's total assets increased year on year across almost all segments. The only segment to record a decrease in absolute terms was credit unions, as a result of the revocation of the licence of the then largest credit union in December. Adjusted for this effect, however, the segment's total assets increased by more than 7%. A larger rise in assets was recorded by collective investment funds. The strongest year-on-year growth – more than CZK 500 billion – was recorded by the banking sector. However, more than 50% of this can be attributed to the CNB's interventions in November and another roughly 20% to the merger of UniCredit Bank in the Czech Republic and Slovakia. Banks are still the largest segment of the financial sector, accounting for almost 80% of its total assets. Loans to households and corporations make up the bulk of the asset side of its balance sheet (see line FS.2 in the *Table of Indicators*).

Credit risk in domestic banks' portfolios as expressed by the ratio of NPLs to residents decreased slightly...

Credit risk in banks' balance sheets, as expressed by the ratio of non-performing loans (NPLs) to total loans to residents, decreased slightly in 2013 and stood at 5.5% at the year-end (see Chart IV.1). The NPL ratio

CHART IV.1

NPLs in the Czech banking sector
(CZK billions; right-hand scale in %; client loans to residents)



Source: CNB

TABLE IV.1

Structure of NPLs
(%)

	NPLs by collateralisation			NPLs, total
	Collateralised loans to households and corporations	Non-collateralised loans to households and corporations	Other loans	
2010	35.1	31.5	33.4	100.0
2011	36.8	30.6	32.6	100.0
2012	35.5	29.4	35.1	100.0
2013	32.1	30.8	37.1	100.0

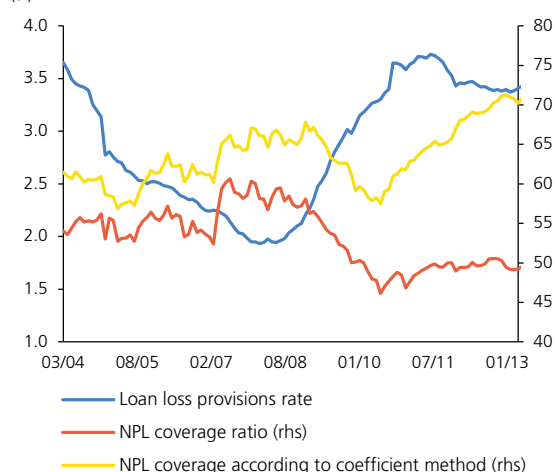
	NPLs by categorisation			NPLs, total
	Non-standard	Doubtful	Loss	
2010	39.2	13.4	47.4	100.0
2011	32.6	14.0	53.5	100.0
2012	27.0	14.3	58.7	100.0
2013	26.4	14.3	59.3	100.0

	NPLs past due			NPLs, total
	Not past due	Up to 3M past due	More than 3M past due	
2010	51.6	9.9	38.5	100.0
2011	46.1	9.4	44.5	100.0
2012	43.6	9.5	46.9	100.0
2013	41.8	6.7	51.5	100.0

Source: CNB, CNB calculation

Note: Collateralised loans = loans for house purchase + loans to corporations backed by property and at least two other types of collateral (pledged receivables, movables, securities, sureties, guarantees, etc.). Other loans are loans not included in the other two categories.

CHART IV.2

Provisions and coverage of NPLs by provisions
(%)

Source: CNB

declined in both the non-financial corporations sector and the household sector, falling by 0.2 pp year on year in both cases to 7.2% and 5% respectively at the end of 2013. Whereas in the first half of 2013 the decrease in the NPL ratio in both sectors was caused by higher growth in loans provided, in the second half of the year a significant role was also played by an absolute decline in NPLs. Although this decline was partly due to write-offs of such loans from banks' balance sheets, the write-off rate in 2013 was the lowest in four years.¹ However, both the volume and the ratio of NPLs to non-residents continued rising during the year, particularly the volume, as the ratio was reduced by rapid growth in loans to this sector.²

...but the quality of the NPL portfolio continues to deteriorate

In line with the loan migration analysis contained in FSR 2012/2013, migration of NPLs to the worst, i.e. loss, category continues. At the end of 2013, loans classified as loss loans accounted for about 60% of total NPLs (see Table IV.1), although the increase in this share was smaller than in previous years. Falling NPL quality is also apparent from the decreasing share of NPLs that are not actually past due (42% at the end of 2013). Moreover, the proportion of NPLs more than three months past due increased by more than one-third overall in 2011–2013 and exceeded 50% in 2013.

NPL coverage by provisions may not be sufficiently prudent from the aggregate perspective...

The falling quality of the NPL portfolio is increasing the probability of these loans not being duly repaid in the future and banks incurring losses on them. It is therefore desirable for banks to adjust their provisioning to account for migration of loans to riskier NPL subcategories. Although the overall coverage of NPLs by provisions has long been around 50% and recorded a modest year-on-year increase, there is still a large difference between the actual level of provisioning and the level calculated using the coefficient method (see Chart IV.2).³ This calculation does not take into account the collateralisation of NPLs, which reduces the necessary level of provisioning, but this indicator should not be ignored given the falling share of collateralised NPLs and the rising share of non-collateralised NPLs (see the upper part of Table IV.1).

- 1 The average write-off rate in 2013 was 7.7% of the NPL volume, compared to almost 9% in 2012 and 10.5% in 2011 and 2010.
- 2 The ratio of loans provided by domestic banks to non-residents increased by 2.4 pp in 2013, exceeding 11.4% at the end of 2013. The ratio of NPLs to non-residents was similar at the end of both 2012 and 2013, at around 9.1%.
- 3 Under Article 201 of Decree No. 123/2007 (and Article 78 of the new Decree No. 23/2014), banks may determine impairment losses by means of i) discounting of expected future cash flows, ii) the coefficient method, or iii) statistical models. The coefficient method sets the impairment loss at 1% for watch claims, 20% for substandard claims, 50% for doubtful claims and 100% for loss claims. However, the coefficients are applied to the unsecured part of the claim only. This could not be done in the analysis in question because of insufficient information on the collateral value related to NPLs.

...and some banks remain well below the sector's average levels in the coverage area

Looking more closely at the year-on-year change in the coverage ratios in banks with market shares exceeding 1%, it is evident that banks maintained – or even increased – the rate of coverage of NPLs by provisions. Only one bank exhibited an undesirable combination of a significant fall in the coverage ratio and a rise in the NPL ratio. Despite the overall year-on-year improvement in the coverage ratio and NPL ratio across the sector, however, there are still banks whose coverage ratios lie well below the sector average (see Chart IV.3).

Credit risk may be partly underestimated in banks' balance sheets...

Despite the fall in NPLs, there are loans in banks' balance sheets that are not currently classified as non-performing even though they are at risk of non-payment. These are loans to clients who have credit from several banks and some of those banks already classify their claims on such clients as NPLs while others still record their loans to such clients as performing loans. As the categorisation of loans as non-performing and performing is based on examination of the client's situation, it is likely that a client whose loans with one bank are non-performing will soon or later also have problems with repaying loans to other banks.⁴ Loans to such clients classified as performing loans represent a possible source of underestimation of NPLs and thus of the credit risk in banks' balance sheets.

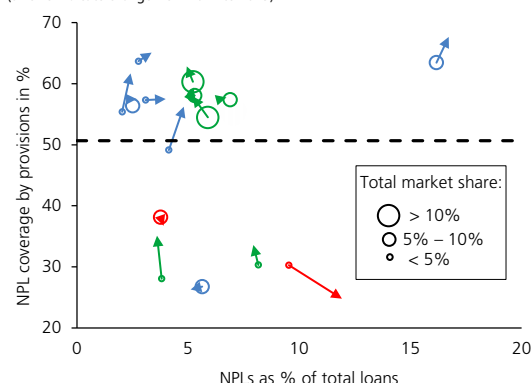
Underestimation of NPLs to non-financial corporations of CZK 7.3 billion was identified at the end of 2013 using Central Credit Register (CCR) data (see Chart IV.4).⁵ Although this amount declined by about CZK 1 billion year on year, probably due to the overall year-on-year decline in credit risk in banks' balance sheets, it still represents almost 12% of NPLs to non-financial corporations. If this underestimation was included in the total NPL volume, the share of NPLs to non-financial corporations at the end of 2013 would be 0.8 pp higher, at 8%.

...and there is also a risk of NPLs increasing via certain off-balance-sheet items

Credit risk also arises from off-balance-sheet items, especially from guarantees and irrevocable loan commitments given. If such guarantees and irrevocable loan commitments are honoured, the resulting claims will constitute new balance-sheet claims of the bank on clients. To quantify the credit risk stemming from off-balance-sheet items, risky guarantees and risky loan commitments were calculated using CCR data. These are defined as guarantees and irrevocable loan commitments given to non-financial corporations whose bank loans are classified as NPLs. This concept expresses risky off-balance-sheet items that may give rise to

CHART IV.3

Year-on-year change in NPL coverage ratios across banks
(arrows indicate change from 2012 to 2013)

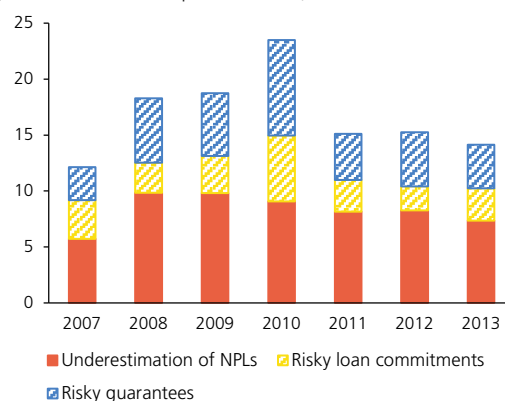


Source: CNB

Note: Green colour indicates an improvement, red colour a deterioration and blue colour an ambiguous path of the combined risk position. Only banks with market share > 1% are included. The dashed line marks the mean NPL coverage ratio of the analysed banks equal to 50.6% at the end of 2013.

CHART IV.4

Underestimation of NPLs, risky loan commitments and guarantees
(CZK billions; non-financial corporations, residents)



Source: CNB

Note: Underestimation of NPLs = volume of loans provided to clients that are not classified as NPLs even though some bank has already classified its loans to the given clients as NPLs. Risky guarantees / loan commitments = volume of guarantees / irrevocable loan commitments given to clients who have an NPL with the given bank or another bank.

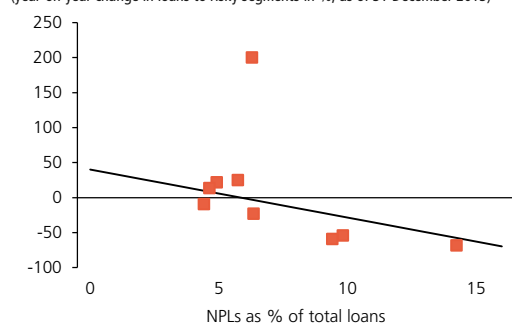
⁴ In this respect the risks are somewhat overestimated, as some loans categorised as NPLs are not overdue (see Table IV.1).

⁵ Owing to data unavailability, it is not possible to perform an analogous analysis for the household segment.

CHART IV.5

Bank credit portfolio quality and lending to risky segments

(year-on-year change in loans to risky segments in %; as of 31 December 2013)



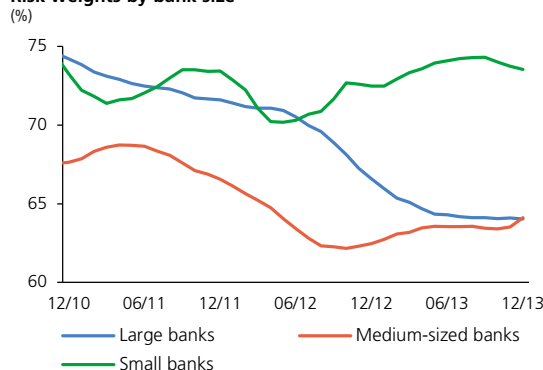
Source: CNB

Note: Risky credit segments are defined according to credit provided to non-financial corporations with the highest default rate in 2010–2012. The segmentation is by industry, turnover and number of employees of the firm. Only banks (excluding branches of foreign banks) with market share > 1 % are included.

CHART IV.6

Risk weights by bank size

(%)



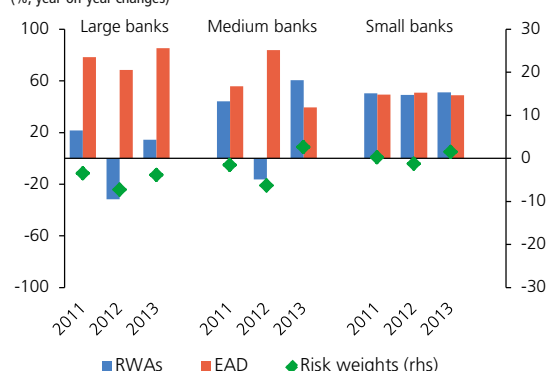
Source: CNB

Note: The calculation of risk weights covers assets in the investment portfolio excluding sovereign exposures. The values are six-month moving averages.

CHART IV.7

Risk weights and the contributions of RWAs and EAD

(%; year-on-year changes)



Source: CNB

Note: Risk weights are defined as the ratio of risk-weighted assets (RWAs) to exposures at default (EAD) approximated by exposures in the investment portfolio less sovereign exposures. The sum of the contributions of RWAs and EAD equals 100%.

balance-sheet items with worse credit quality.⁶ The evolution of risky loan commitments and guarantees given to non-financial corporations since the end of 2010 suggests declining credit risk arising from off-balance-sheet items. However, if this risk were to materialise in full, NPLs would rise by a further CZK 6.8 billion. Including the above underestimation of credit risk in banks' balance sheets, the share of NPLs to non-financial corporations would have been 8.7% at the end of 2013.

Provision of new loans increased primarily in banks with lower NPL ratios

An analysis of the provision of new loans to non-financial corporations reveals that year-on-year growth in new loans in 2013 was recorded mainly in banks with lower NPL ratios and higher NPL coverage by provisions. Lending to risky credit segments decreased as well, particularly among banks with higher NPL ratios (see Chart IV.5). However, there are some exceptions with relatively aggressive business models, and they may accumulate relatively risky loans in their portfolios.

Aggregate risk weights decreased...

Implicit risk weights can also be used to assess the riskiness of bank portfolios. These are calculated as the ratio of risk-weighted assets (RWAs) to exposure at default (EAD).⁷ Risk weights – adjusted for sovereign exposures – decreased by 7.9 pp in 2011–2013, to 64%. This suggests that banks are moving away from risky exposures. The downward trend seen in recent years pertains mainly to medium-sized and large banks (see Chart IV.6).

...but the reduction in the riskiness of bank portfolios may be illusory

The question is to what extent the said decrease in risk weights adjusted for government exposures reflects an actual reduction in the riskiness of the banking sector's portfolios. The decomposition of the change in risk weights reveals that their decline in large and partly also medium-sized banks was accompanied by a rise in exposures without a marked increase in RWAs or even with a decline in RWAs (see Chart IV.7).⁸ This suggests that the reduction in risk weights may not have been due solely to a move away from risky exposures. It may also have been linked with efforts by banks to make maximum use of the possibilities offered by the existing regulations (optimisation), including the extension of the IRB approach to new segments, the use of previously little used parameters in the calculation of capital requirements, and the recalibration of existing models. A comparison of the risk weights with the values calculated

6 See also FSR 2011/2012 (pp. 63–64) and FSR 2012/2013 (pp. 53–54).

7 For simplicity, we approximate EAD by exposures in the investment portfolio.

8 In addition, an analysis of risk weights in nine banks with a total market share of around 90% of the credit market reveals that even in relatively homogeneous credit segments there are considerable differences in risk weights across banks. For example, in the segment of loans for house purchase the risk weights range between 21% and 33%. The risk weights for loans to corporate clients range from 37% to 81% and those for consumer credit from 49% to 91%.

using the Basel I⁹ rules reveals widening differences in the implied riskiness of bank portfolios in 2011–2013 (see Chart IV.8). The results thus point to relative flexibility in the existing Basel II/III rules, which may substantially reduce the comparability of risks in bank portfolios.¹⁰

The capital adequacy of the banking sector is increasing...

The Czech banking sector is well capitalised. In 2013, the sector's Tier 1 capital adequacy ratio (Tier 1 CAR) rose to 16.9%. All banks are compliant with the minimum Tier 1 CAR requirement of 8%, which for the Czech banking sector is almost identical to the new Common Equity Tier 1 requirement (see Chart IV.9). The banking sector is compliant with the new CRD IV/CRR capital regulations by a sufficient margin. This is also evidenced by the fact that banks representing more than 83% of the sector's assets had a Tier 1 CAR exceeding 15% at the end of 2013.

...not only because of rising capital, but also because of falling risk weights

The above-mentioned trend of falling risk weights also has an effect on the calculation of capital adequacy, which it can increase even in the absence of corresponding growth in capital. For example in 2012 H2, the sector's capital adequacy increased even though the absolute amount of capital decreased. If we estimated the sector's capital adequacy using the risk weights as of the end of 2010, before they started to show a downward trend, the Tier 1 CAR would have been 1.5 pp below its current value at the end of 2013.

Capital adequacy can alternatively be examined using the leverage ratio...

To adjust capital adequacy for the effect of risk weights it should alternatively be examined using the leverage ratio, i.e. the ratio of capital to non-risk-weighted assets. The advantage of this indicator is its relative simplicity and its robustness to efforts by banks to optimise the calculation of risk weights (or capital requirements) and also the fact that it is more cyclical than the capital adequacy ratio (see Chart IV.10). At times of economic growth, when bank lending activity is higher, the leverage ratio decreases faster than the capital adequacy ratio. The introduction of a minimum limit on the leverage ratio envisaged in Basel III may therefore offer an instrument capable of creating an upper limit for the expansion of balance sheets in the optimistic phase of the financial cycle and thereby preventing the accumulation of excessive systemic risks of a cyclical nature.¹¹

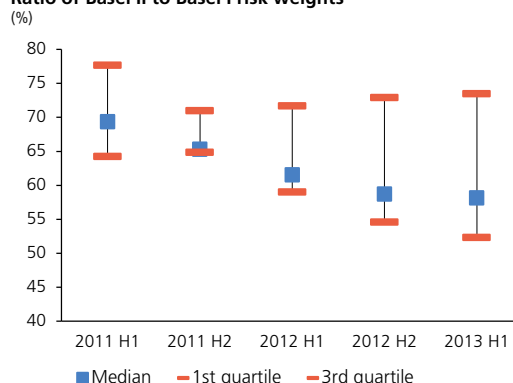
9 The Basel I prudential rules divided balance-sheet and off-balance-sheet items into four main categories with risk weights of 0%, 20%, 50% and 100%. For example, a 0% risk weight was assigned to the instruments of governments of OECD countries, a 20% weight to interbank loans, a 50% weight to loans for house purchase and a 100% weight to other loans to the private sector.

10 See, for example, the EBA (2013): *Interim Report on the Consistency of Risk-Weighted Assets in the Banking Book*, February 2013.

11 The disadvantage of introducing a limit on the leverage ratio is that institutions may be encouraged to replace low-risk assets in their balance sheets with higher-risk assets. For this reason, the limit on the leverage ratio should be used as a complement to the existing

CHART IV.8

Ratio of Basel II to Basel I risk weights

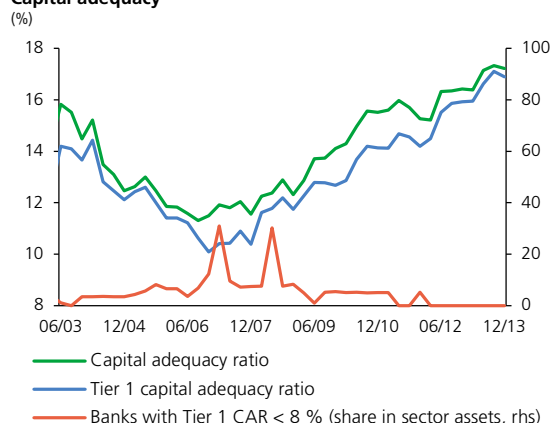


Source: CNB

Note: The analysis was performed on a sample of nine banks using the IRB approach with a total market share of around 90% of the credit market.

CHART IV.9

Capital adequacy



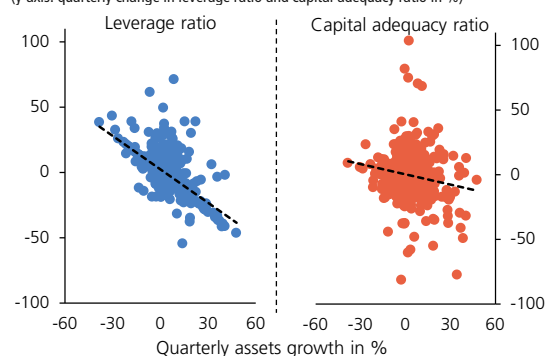
Source: CNB

Note: Assets of sector = assets of banks excluding branches of foreign banks. Banks active at the end of 2013.

CHART IV.10

Cyclicality of the leverage ratio and the capital adequacy ratio

(y-axis: quarterly change in leverage ratio and capital adequacy ratio in %)

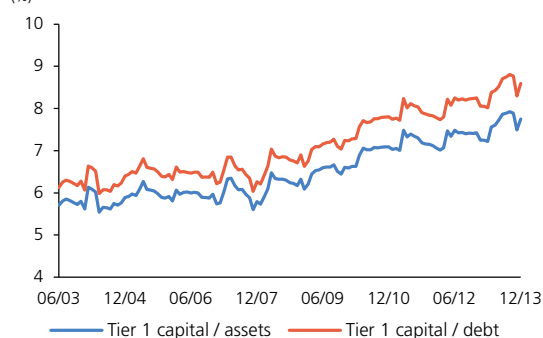


Source: CNB

Note: The data are for individual banks excluding branches of foreign banks, 2003 Q1–2013 Q4.

CHART IV.11

Leverage ratio (%)



...which is also favourable in the domestic banking sector

The aggregate leverage ratio of the domestic banking sector, defined as the ratio of Tier 1 capital to non-risk-weighted assets,¹² is 7.7%, well above the 3% minimum regulatory limit. Regulatory implementation of this ratio is not expected until 2018.¹³ The calculation method and the limit itself may thus change in the future. The leverage ratio can alternatively be defined as the ratio of Tier 1 capital to bank debt. For the Czech banking sector this indicator shows similar dynamics (see Chart IV.11).

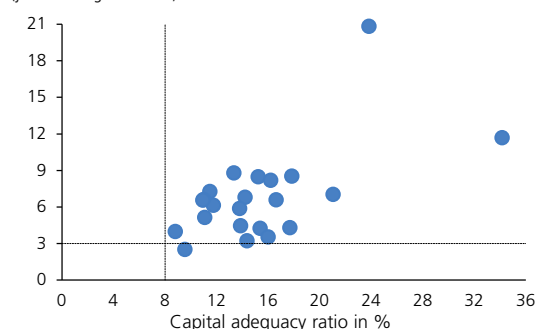
The low leverage ratios of some banks remain a potential risk

Although the leverage ratio is favourable at the aggregate level and is well above the preliminary 3% limit in most banks, there is significant heterogeneity across banks. Some are close to the limit, and one is even below it (see Chart IV.12). Such banks should therefore gradually increase their capital or adjust their balance sheets so that they safely comply with the limit when it is introduced.

CHART IV.12

Capital adequacy ratios and leverage ratios across banks

(y-axis: leverage ratio in %)



The banking sector is prepared for the tightening of capital rules

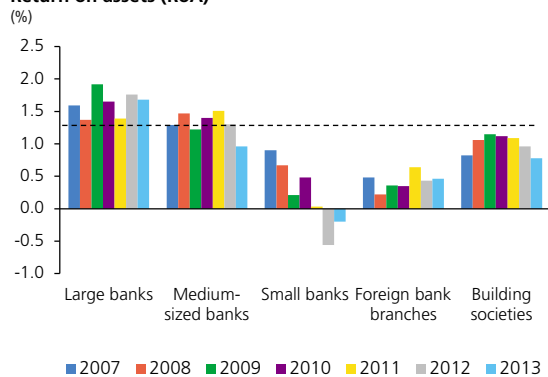
The above information implies that the Czech banking sector is well capitalised in terms of both its capital adequacy ratio and its leverage ratio and is thus prepared for the tighter capital regulation linked with new European legislation. In 2013, the CNB informed four selected banks that it would require an additional capital reserve of 1% to 3% from them to cover systemic risk (for more details see section 5.3).

Domestic banks maintained good profitability...

The Czech banking sector has long been profitable and significantly exceeds the euro area average.¹⁴ The banking sector's profitability is determined above all by the performance of large banks, which account for almost 60% of the banking sector's assets and whose return on assets (RoA) was 1.7% in 2013 (see Chart IV.13). The segments of medium-sized banks and building societies experienced a pronounced year-on-year decline in RoA, while small banks again recorded a loss. The

CHART IV.13

Return on assets (RoA) (%)



limits on risk-weighted assets (the capital adequacy limit). For more details, see, for example, Wagman, K. (2013): *The Leverage Ratio – What Is It and Do We Need It?* Sveriges Riksbank Economic Commentaries 5/2013.

12 This is merely an estimate of the leverage ratio as defined in Basel III, according to which the denominator of the leverage ratio should, in addition to balance-sheet assets, include off-balance-sheet items such as loan commitments and derivatives. The indicator used in this text therefore slightly overestimates the leverage ratio. The Basel III leverage ratios as of 2013 Q4 obtained from selected banks representing about 85% of the assets of the Czech banking sector indicate that this overestimation is roughly 1 pp.

13 Limits on the leverage ratio already exist in various forms in, for example, the USA (4%), Canada (5%), China (4%), Switzerland (3% on a consolidated basis and 4% on a solo basis for two large banks, excluding domestic loans) and the UK (3% for two selected banks). Some countries plan to introduce higher limits than the proposed 3% level, for example Turkey (5% as from 2015) and the Netherlands (4% for systemically important banks). The OECD recommends a minimum limit of 5%.

14 See the *Analyses of the Czech Republic's Current Economic Alignment with the Euro Area in 2013*, pp. 84–85.

RoA of the banking sector as a whole in 2013 was 1.3%, down by 0.1 pp year on year. The sector's net profit fell by 4.5% year on year.¹⁵

...but their interest profit decreased for the second consecutive year

The decline in the sector's profitability was due mainly to lower interest profit, which is a key component of domestic banks' profitability and fell for the second year in a row (see Chart IV.14). This trend is in line with the prediction given in FSR 2012/2013 and is linked with the period of low interest rates and the limited ability of some banks to further reduce their interest rates on the liability side. Similarly, profit from fees and commissions fell slightly for the second consecutive year. Despite positive economic growth in the *Baseline Scenario*, profitability is still expected to drop by about 5% year on year in the next two years.

The volume of deposits in the banking sector increased despite falling interest rates

Despite a modest overall decline in the average deposit interest rate (of 0.2 pp), bank deposits of resident clients increased in 2013 to the same extent as in 2012, i.e. by about CZK 190 billion. As in 2012, household deposits rose the most in small banks, which on average offer the highest rates. Medium-sized banks showed greater heterogeneity in their deposit rates in 2013, especially for household deposits. Only foreign bank branches and building societies saw an outflow of deposits (see Chart IV.15).

Banks keep a sizeable liquidity buffer...

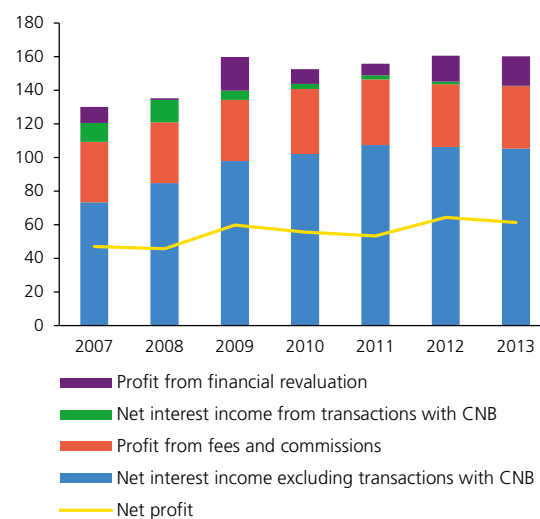
The liquidity situation of the banking sector is still very good, thanks mainly to an excess of client deposits over client loans, which reached 130% at the end of 2013 (see Chart IV.16). Client deposits and loans are denominated mostly in Czech koruna (89% of deposits and 82% of loans), while residents account for 96% of deposits and 89% of loans. The liquidity surpluses are having a positive effect on holdings of liquid assets, whose share in banks' balance sheets has been increasing over the last three years. Quick assets consist mainly of Czech government bonds (47%), cash and cash balances with the CNB (45%) and interbank loans payable on demand (4%). The good liquidity position will enable banks to comply with the liquidity rules under the newly applicable CRR banking regulation (see section 4.2) and also leaves room for supporting lending activity in an economic recovery.

...only building societies invest liquidity in their banking groups at longer maturities

The smallest liquidity buffer is held by building societies (see Chart IV.17), which usually deposit excess liquidity with their domestic parent banks in the form of deposits with longer maturities or invest in securities issued

CHART IV.14

Key components of profit from financial activities
(CZK billions)

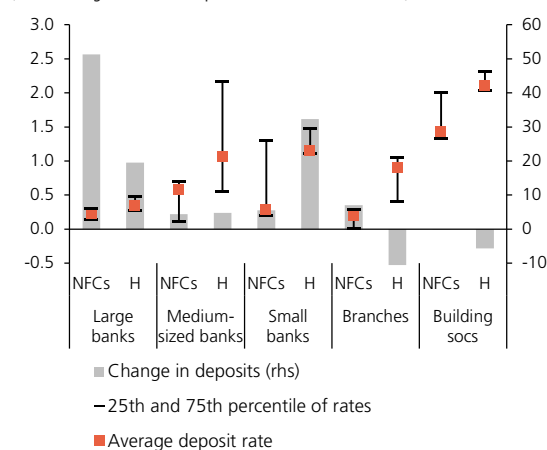


Source: CNB

CHART IV.15

Change in household deposits in 2013 and average interest rates

(rates in %; right-hand scale: deposits of residents in CZK billions)



Source: CNB

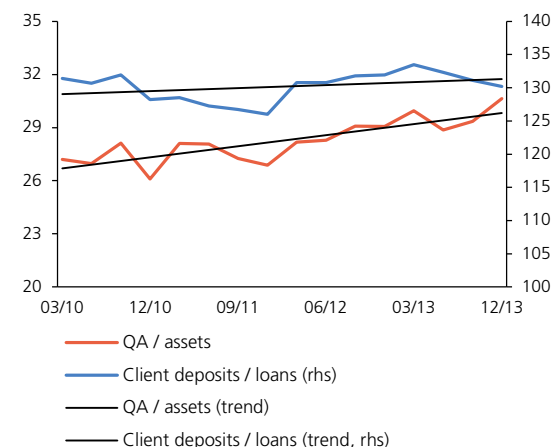
Note: Bank size classification by asset size as of 31 December 2012. NFCs = non-financial corporations; H = total households. NFCs' deposits at building societies are deposits of housing cooperatives and owners' associations. NFCs' deposits account for less than 0.5% of total building society deposits.

¹⁵ Domestic banks' profit also includes dividends paid by their subsidiaries. They totalled more than CZK 6.5 billion in 2012 and rose further to CZK 8.8 billion in 2013. If this increase in dividends paid was deducted, the banking sector's profitability would drop by about 8% year on year.

CHART IV.16

Liquidity ratios over time

(%; QA = quick assets)



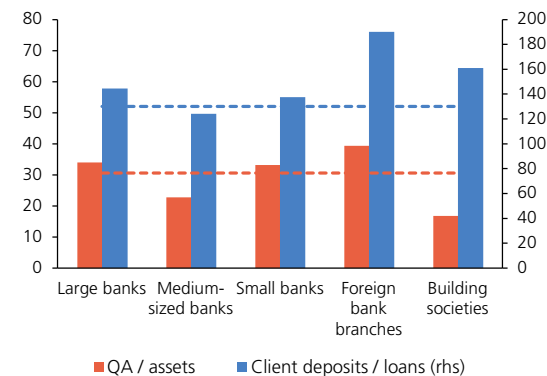
Source: CNB

Note: The ratio of deposits to loans covers both residents and non-residents.

CHART IV.17

Liquidity situation in the banking sector

(%; QA = quick assets, as of December 2013)



Source: CNB

Note: The value for medium-sized banks excludes Hypoteční banka and Česká exportní banka owing to their specific funding models. The dashed lines denote values for the banking sector. The ratio of deposits to loans covers both residents and non-residents.

by their parent banks, which are not a component of quick assets. As domestic building societies form regulated consolidated groups¹⁶ with their parent banks, there are no caps on mutual exposures between these domestic entities.¹⁷ At the end of 2013, the gross exposure of building societies to their domestic parent banks was 460% of their regulatory capital (or 22% of their assets), with 45% of the exposure being in the form of mortgage bond holdings and 55% in the form of other claims. This suggests, among other things, that the building savings system cannot be regarded as completely closed, as a significant proportion of building savings deposits placed in building societies are then provided to commercial banks within banking groups.

Banking groups are also active in other forms of financial intermediation...

Domestic banking groups not only operate in the banking business and, via their subsidiaries, in the building society business, but also form quite large consolidated groups allowing them to carry on business in less regulated industries (e.g. non-bank companies providing consumer credit).

...while banks and the entities they control are linked not only through ownership interests, but also through credit exposures...

The entities within banking groups are linked not only through ownership interests, where the domestic parent bank owns shares in the group members it controls, but also through credit exposures. The credit links between the largest domestic banks and the entities they control have increased since 2010 on both the asset and liability sides (see Chart IV.18).¹⁸ Domestic parent banks are in a debtor position mainly vis-à-vis building societies that are members of these bank groups. Building societies' claims on their parent banks represent 86% of parent banks' total liabilities to all the entities they control. By contrast, domestic parent banks are in a creditor position vis-à-vis non-bank financial corporations engaged in lending, whose liabilities to the parents banks account for about 88% of total parent banks' claims on all controlled entities. This primarily concerns the funding of leasing companies and consumer financing and factoring services. Liquidity within domestic banking groups thus effectively spills across entities with varying loan portfolio quality.¹⁹

16 Regulated consolidated groups pursuant to Decree No. 123/2007. Prudential consolidation is now regulated by the CRR.

17 The exception is Wüstenrot stavební spořitelna, which is not a subsidiary of a domestic bank. It forms a regulated consolidated group with Wüstenrot hypoteční banka.

18 The chart does not show the credit links between ČSOB and its subsidiary Hypoteční banka, which provides mortgage loans in the ČSOB group. As a result, close links exist between these entities, the majority source of funding of Hypoteční banka being loans from ČSOB and mortgage bonds issued by Hypoteční banka and held by ČSOB in its balance sheet.

19 At the end of 2013, the ratio of impaired loans to total client loans for the banking sector was 9.7% on a consolidated basis for regulated consolidated groups and 8.6% on a solo basis. This indicates higher credit risk for entities belonging to consolidated groups than for banks on a solo basis.

...increasing the complexity of financial intermediation and the possibility of reputational contagion

The information above implies that domestic banking groups contribute to the interconnectedness of the financial sector, thereby increasing the complexity of the sector and the structural component of systemic risk. Non-banks in consolidated banking groups are not completely unregulated, as they are subject to supervision on a consolidated basis, but greater complexity of consolidated groups may reduce the possibility of identifying risks inside groups effectively and in a timely fashion. The links between banking group entities may thus, among other things, constitute a channel of reputational contagion. Greater complexity should therefore be accompanied by greater transparency in the area of disclosure of information about banks' business, risks, structures and interconnectedness (see Box 3).

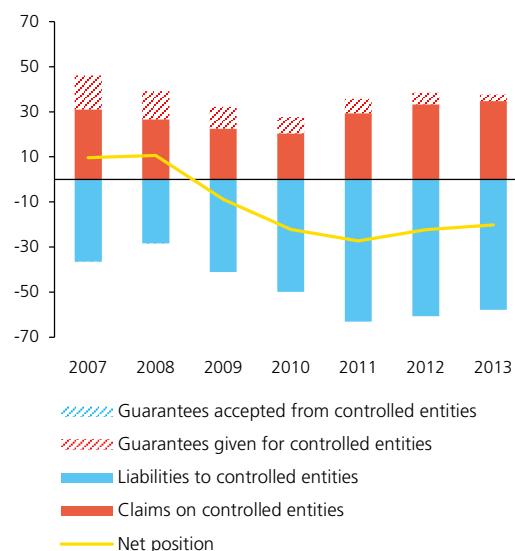
BOX 3: INITIATIVES TO ENHANCE BANK TRANSPARENCY

Banks' financial results are closely monitored by investors, financial analysts, economic experts and the media in addition to supervisory authorities themselves. These financial professionals implicitly supervise financial institutions and thereby enhance market discipline. However, their ability to adequately assess the risk profiles and resilience of banks is affected by the scope and quality of the available information and by how up-to-date that information is. Czech banks therefore publish – in addition to annual reports – obligatory information on a quarterly basis about their financial condition, main prudential indicators and organisation structures and their relations with shareholders, management, and parent companies and subsidiaries.²⁰

The new CRR, in effect since the start of 2014, also focuses on enhancing transparency within Pillar 3 by stipulating information disclosure requirements. The CRR aims to standardise the information published by EU banks at least on an annual basis. According to the CRR, annual disclosures should be published in conjunction with the date of publication of the financial statements. The CRD gives national regulators discretion to increase the frequency of disclosure and set deadlines for publication. However, the CRR focuses on transparency at the level of European parent institutions on a consolidated basis and less at the level of subsidiaries in the Member States, which account for the bulk of the assets of the Czech banking sector. Subsidiary banks in the Czech Republic of material significance for the local market will therefore be subject to reduced disclosure

CHART IV.18

Credit interconnectedness in domestic bank groups
(as % of regulatory capital of domestic parent banks)



Source: Obligatory information to be disclosed pursuant to Decree No. 123/2007
Note: The chart depicts the aggregate interconnectedness between the largest domestic banks, i.e. Česká spořitelna, ČSOB, Komerční banka and Raiffeisenbank. UniCredit Bank is included only in the periods when it controlled entities.

²⁰ See the obligatory information to be disclosed pursuant to Decree No. 123/2007 Coll. and Decree No. 23/2014 Coll. Links to the obligatory information of individual institutions are available on the CNB website: http://www.cnb.cz/en/supervision_financial_market/conduct_of_supervision/information_duties/info_disclosure_banks.html

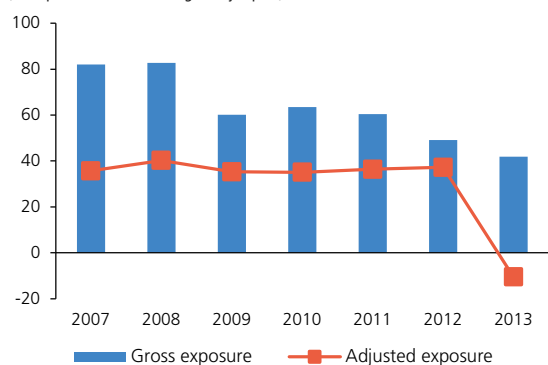
requirements under the CRR.

In the context of financial stability, the ESRB emphasises the potential benefits of regular collection of standardised Pillar 3 information to enable comparisons of information over time and across banks and countries.²¹ For this reason it proposes the creation of a European public database of harmonised Pillar 3 information, similar to the one available in the USA.²²

In line with this idea, the CNB advocates the disclosure of information by domestic banks in standardised formats that will allow comparisons over time and across banks. Standardised formats (available on the CNB website in Czech and, from summer 2014, also in English) should increase the clarity and facilitate the processing of data, particularly quantitative data, and give foreign investors and analysts access to such information.²³ This is in line with the EBA's advice that institutions should consider the needs of disclosure users when choosing the language for their disclosures.²⁴

CHART IV.19

Gross and adjusted exposure to parent groups
(%: exposure in relation to regulatory capital)



Source: CNB

Note: The chart shows the aggregate exposure of the five largest banks in the Czech Republic, which have foreign parents in the euro area. Gross exposure consists mainly of claims in the form of loans provided to the parent group and claims arising from derivatives transactions and other off-balance-sheet items in the investment and trading portfolios. Adjusted exposure = gross exposure minus liabilities in the form of deposits and loans accepted from foreign parent banks. The values in the chart do not reflect any collateralization.

Domestic banks have become net debtors of foreign parent groups...

The exposure of the five largest domestic banks²⁵ to foreign parent groups has been falling for several years. At the end of 2013, the gross exposure of their investment and trading portfolios represented 42% of their regulatory capital, down by 7 pp from the end of 2012 (see Chart IV.19). The domestic banking sector had long been a net creditor of foreign parent groups and there had been concerns about an outflow of liquidity from the domestic banking sector combined with credit risks, but at the end of last year the position of domestic banks changed into one of a net debtor, as foreign banks helped to satisfy demand for the euro during the CNB's interventions in November 2013.

...but the banking sector's net external position remains positive

Thanks to a high volume of residents' deposits, the domestic banking sector as a whole has long been independent of foreign funding and its net external position fluctuated around 8% of GDP in 2013. In 2013 Q4,

21 ESRB (2013): *Benefits of a Standardised Reporting of Pillar 3 Information*, ESRB Staff note, January 2013.

22 In the USA, the information disclosed by banks is stored in a public database in the same format and structure as the regular supervisory reports (see <https://cdr.ffiec.gov/public/Default.aspx>).

23 Official Information of the Czech National Bank of 4 April 2014, including Annexes 1 and 2.

24 EBA (2013): *Follow-Up Review of Banks' Transparency in Their 2012 Pillar 3 Reports*, EBA Report, December 2013.

25 Česká spořitelna, ČSOB, Komerční banka, UniCredit Bank, Raiffeisenbank (Hypoteční banka has higher assets than Raiffeisenbank but was not taken into account because it is a subsidiary of ČSOB and has no direct exposures to its foreign parent bank KBC).

the sector's net external position saw a one-off decrease of about CZK 140 billion to CZK 180 billion as a result of the CNB's foreign exchange interventions, but it was still positive at 5% of GDP at the end of 2013.

Deposits in credit unions are continuing to rise despite adverse developments in this segment...

2013 was an unfavourable year from the perspective of credit unions. One credit union had its licence revoked. Another was prohibited from accepting deposits from the public and some of its other activities were limited. Despite this adverse trend, the other credit unions reported a continued increase in deposits received in 2013 (year-on-year growth of 7.3%). Credit unions represent only a marginal part of the financial sector, accounting for a mere 0.5% of its total assets at the end of the year. The 2013 experience confirms, however, that problems in small institutions can have adverse reputational impacts and reduce the high public confidence in other credit institutions.

...and a comparison with banks confirms that credit unions have a high level of risk

In aggregate terms, the credit union segment is still riskier than the banking segment (see Table IV.2). The ratio of NPLs to total loans rose significantly year on year (by almost 9 pp to 22.7%). Owing to provisioning for NPLs, the sector recorded a year-on-year fall in profit and thus also in its profitability indicators. The concentration of the largest loans showed a modest improvement – the ratio of the five largest loans to capital decreased from 102% to 93%. An analysis of concentration by industry also reveals that the biggest loans in the credit union segment were provided to corporations with a very similar classification of economic activities²⁶ – mostly property development projects and real estate activities. This represents a risk of concentration if conditions worsen in these areas of economic activity. The above loans account for 60% of the total volume of the 15 largest exposures of individual credit unions. The CNB will continue to pay increased attention to the situation in the credit union segment and initiate regulatory changes that will reduce its level of risk (see the Box *The current and expected regulatory framework for credit unions* in section 5).

The evolution of the real economy in 2013 had an adverse effect on the insurance market

As expected in FSR 2012/2013, premiums written in life insurance stagnated, mainly as a result of a fall in premiums written for new contracts (see Chart IV.20). Moreover, this stagnation is being accompanied by a rise in claim settlement costs, due mainly to policies maturing. The non-life insurance segment saw a modest rise in premiums written, thanks among other things to more favourable developments in vehicle liability insurance and vehicle accident insurance. The increase in claim settlement costs arising from insurance against damage to or loss of property in 2013 had an adverse effect on the financial results of non-

TABLE IV.2

Selected indicators of credit unions as compared to banks
(%; end-2012 and end-2013 data; credit unions active as of 31 December 2013)

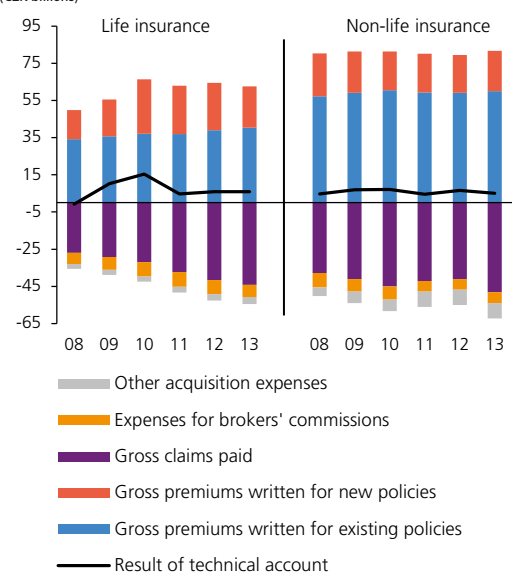
	2012		2013	
	Credit unions	Banks	Credit unions	Banks
Average interest rate on client loans (1)	8.0	4.8	7.8	4.2
Average interest rate on client deposits (2)	2.9	1.1	3.0	0.8
Interest margin (1)–(2)	5.1	3.8	4.8	3.3
Client deposits / loans (excluding general government)	125	119	115	118
Client NPL ratio	14.0	6.2	22.7	6.1
Quick assets / total assets	18.2	28.8	18.6	30.6
Coverage of NPLs by provisions	16.2	49.5	16.6	51.6
Tier 1 CAR	12.8	15.9	13.1	16.8
RoE	4.5	20.7	0.3	16.9
RoA	0.5	1.4	0.0	1.2
Share of sector in client loans	0.8	99.2	1.0	99.0
Share of sector in client deposits	0.9	99.1	0.9	99.1

Source: CNB

Note: The year-on-year comparison excludes Metropolitní spořitelní družstvo, whose licence was revoked in December 2013. The accounting period is not unified across the credit union segment, so the relevant data were annualised for some institutions.

CHART IV.20

Key financial indicators for the insurance sector
(CZK billions)



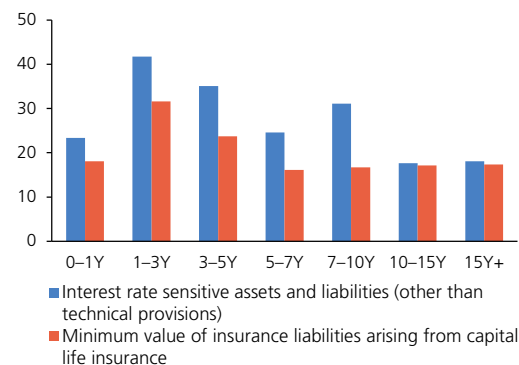
Source: CNB

26 By line of business or other activity as stated in the Business Register.

CHART IV.21

Asset and liability maturity profile in life insurance

(CZK billions; as of 31 December 2012)



Source: CNB

Note: Interest rate sensitive assets include financial assets held to maturity at amortised cost. Y stands for year.

life insurers and contributed to a slight decline in the technical account for non-life insurance. These factors, coupled with a sizeable fall in returns on financial placement (see below), fostered an overall decline in the profit and RoE of the insurance sector in 2013 (see line NI.6 in the *Table of Indicators*).

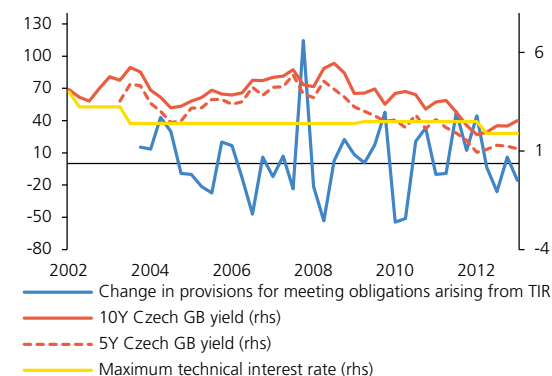
Financial market developments led to a year-on-year decline in realised gains and gains from revaluation

The investment strategies of domestic insurance companies are relatively conservative. Their portfolios are dominated by Czech government bonds and the current regulations contain no limits on investment in bonds issued by governments or central banks of OECD countries. As a large proportion of the debt securities held by insurance companies are marked to market (see Chart III.18 in section 3), the decline in Czech bond yields during 2012 meant a rise in insurers' gains from the revaluation of these instruments to fair value. By contrast, the financial market developments in 2013, linked with growth in yields, led to a decline in realised gains and gains from revaluation.

CHART IV.22

Maximum technical interest rate and Czech government bond yields

(%)



Source: CNB

Note: Interest sensitive assets include financial assets held to maturity at amortised cost. Data from a sample of 11 insurance companies taking part in joint stress tests.

The limited returns on some assets are leading insurance companies to seek alternative investments

Although debt securities with long maturities dominate the financial asset placement of life insurers (see Chart IV.21), the segment of traditional life insurance is also characterised by long liability maturity, which usually exceeds asset maturity. The low or even negative differential between market and guaranteed nominal returns is reducing the scope for generating profit on these products (see Chart IV.22), and this, in turn, is encouraging insurers to seek more profitable investments. Some changes in the financial placement structure can now be seen on insurance companies' asset side. Although their assets are still dominated by government bonds and bonds issued by international organisations, disposable funds are being increasingly invested in more profitable types of assets such as bonds issued by banks and non-financial corporations (see Chart IV.23).

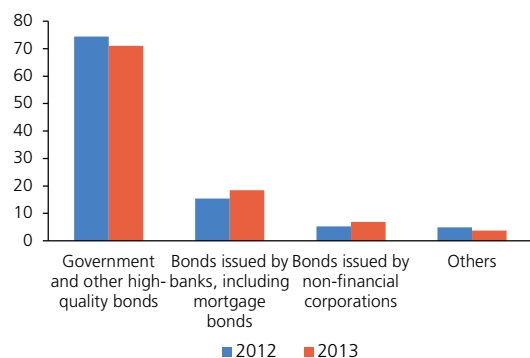
The adverse effects of the financial cycle are being partly dampened by regulations

The impacts of the financial cycle on insurers' finances are also being dampened on the asset side by the option of valuing high-quality government bonds (with the same or higher rating than the Czech Republic) held to maturity at amortised cost, and on the liability side by the regulations applying to the creation of statutory technical provisions, whose level is set using the technical interest rate (TIR). In the case of changes in interest rates, regular liability adequacy test is reflected in the creation or release of additional reserves. At the end of 2012, the average TIR was about 2.9%,²⁷ while the five-year bond yield was only 1.12% (the average maturity of the bonds held is about seven years). The

CHART IV.23

Composition of insurance companies' bond portfolio

(as % of total; based on face values)



Source: CNB

27 The average TIR is calculated as the average TIR for a sample of insurance companies participating in regular joint stress tests weighted by the capital life insurance liabilities of the respective insurers.

upper limit on the TIR for new contracts was 1.9% at the end of 2013 (see Chart IV.22). This limit partly reduces the competitive pressure to offer excessively high guaranteed returns on traditional life insurance products and hence also the risk associated with generating a guaranteed investment return.

The pension management companies sector switched in 2013 to new regulations based on an approved reform...

The pension fund sector started to operate under new rules on 1 January 2013. One manifestation of this was the conversion of pension funds to pension management companies (PMCs), with separate administration of managed funds and company assets. PMCs manage funds under both Pillar II (retirement funds) and Pillar III of the pension system. Pillar III allows voluntary pension schemes (transformed funds and participation funds). At the end of 2013, the PMC sector had total assets of CZK 297 billion, with transformed funds – which manage the original funds of Pillar III participants – having the dominant position. The assets of participation funds amounted to CZK 0.4 billion and those of retirement funds to CZK 1.3 billion as of the same date. Neither the funds deposited in the new PMCs' funds nor the number of Pillar II participants met expectations regarding the take-up of this form of investment during the first year, and further amendments of Pillar II can probably be expected in the years ahead.²⁸

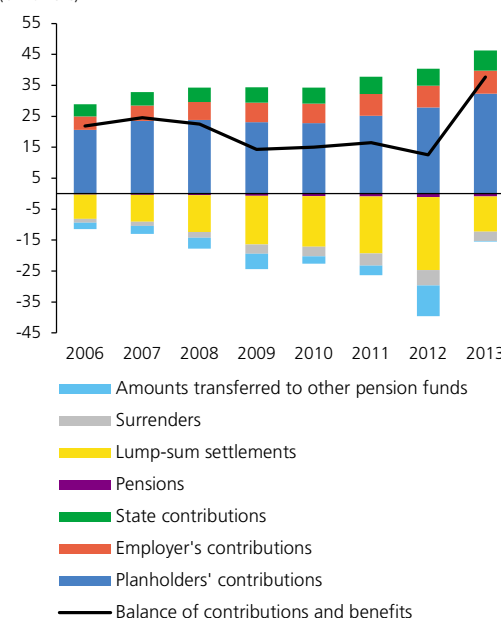
...and started to offer new investment opportunities to planholders

During 2013, transformed funds recorded an increase in planholders' contributions, reflecting a change in the legal conditions for obtaining state contributions and applying tax deductions (see Chart IV.24).²⁹ The much higher balance of contributions and benefits was due to both its deposit and expenditure components. The amount of benefits paid in 2013 dropped to the pre-crisis level, driven mainly by a decline in lump-sum settlements. At the same time, migrations between PMCs halted. This reflects system changes made as part of the legislative amendments of Pillar III, and a similar trend can be expected in the years to come. Migration of Pillar III participants from transformed funds to new participation funds offering the option of choosing investment strategies was minimal in 2013 (1,300 clients according to the Czech Ministry of Finance). The clients of new participation funds chose evenly between conservative and riskier funds (see Chart IV.25).

CHART IV.24

Contributions and benefits in transformed PMC funds

(CZK billions)

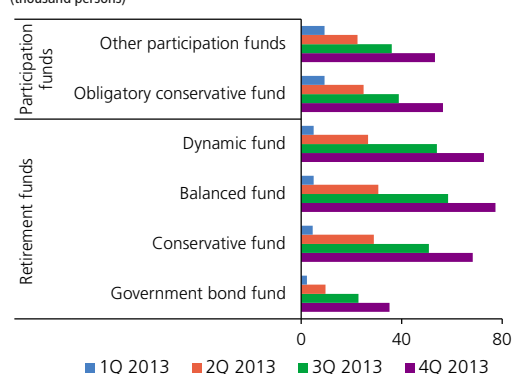


Source: CNB

CHART IV.25

Number of planholders in new Pillar II and III funds by type of fund

(thousand persons)



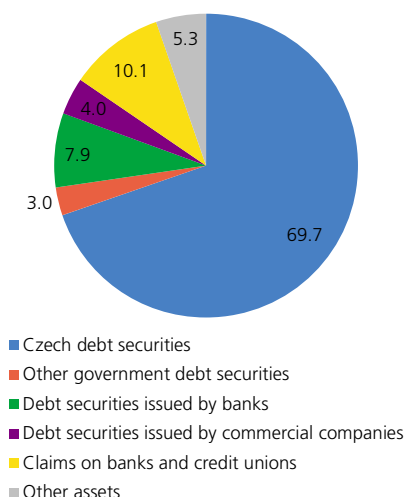
Source: CNB

Note: The chart does not show the total number of planholders in each fund, as a single client may be a planholder in multiple funds. Retirement funds consist of retirement savings, i.e. Pillar II of the pension system. Participation funds consist of planholders' funds in voluntary pension schemes, i.e. Pillar III.

28 The legal conditions for carrying on PMC activities stipulate that, 24 months after being granted a licence to establish an obligatory conservative fund, the PMC must have at least 10,000 participants and the participation fund managed by the PMC must have assets worth at least CZK 50 million; this does not apply to the obligatory conservative fund.

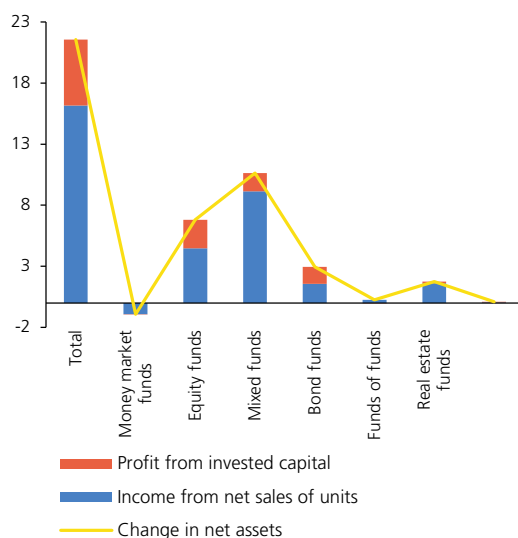
29 The minimum monthly planholder contribution for which a state contribution is paid was increased from CZK 100 to CZK 300 on 1 January 2013. Tax deductions now apply only to monthly planholder contributions of between CZK 1,001 and CZK 2,000, as against the original range of CZK 501 to CZK 1,000. The maximum monthly state contribution is now CZK 230 and the maximum amount deductible from the income tax base in a one-year tax period is CZK 12,000.

CHART IV.26

Placement of assets of transformed PMC funds (%)


Source: CNB

GRAF IV.27

Decomposition of changes in the net assets of open-ended mutual funds intended for the public (CZK billions; for 2013)


Source: CNB

Conservative investment still predominates, but the portfolio structure is broadening

Most contributions to transformed funds continue to be placed in Czech government bonds (see Chart IV.26). In 2013, however, there was an increase in investment in bonds issued by Czech banks and commercial companies. As with insurance companies, this is associated with efforts to invest in assets yielding higher returns than those currently offered by government bonds (see section 3.1). The new funds, both participation and retirement, currently hold a large proportion of contributions as cash.

Collective investment funds recorded increased public interest for the second consecutive year...

There is persisting public interest in investing via collective investment funds (CIFs). The assets managed by open-ended mutual funds totalled CZK 140 billion at the end of 2013. This represents a year-on-year increase of CZK 22 billion. All types of funds except money market funds recorded inflows (see Chart IV.27). This is consistent with the current financial market conditions, as the low interest rates are making it impossible to achieve high returns on monetary funds. By contrast, rising stock markets and favourable expectations are boosting investment in equity and mixed funds. Mixed funds, which invest in both government bonds and riskier securities, recorded the strongest interest from the public in 2013.

Non-bank financial corporations engaged in lending recorded a slight fall in loans to households

Total loans provided by non-bank financial corporations engaged in lending (NFCEs) declined slightly in 2013 and stood at CZK 243.3 billion at the end of the year (see Chart IV.28). This decline was due to a fall in consumer credit provided to households. By contrast, loans to non-financial corporations, which account for about two-thirds of total loans provided by NFCEs, rose slightly.³⁰ The shift from financial leasing to operational leasing was not as significant as in previous years. According to figures from the Czech Leasing and Finance Association, new loans financed by operational leasing increased only slightly and accounted for 42% of the total amount financed at the end of 2013.³¹

The market share of NFCEs is not rising and a large proportion of them have links with banks

The stricter regulatory rules for the banking sector in the EU imply a risk of a shift in lending towards the unregulated NFCE sector. However, the market share of NFCEs in loans to non-financial corporations and households in the Czech Republic is relatively stable and tending to fall

³⁰ The calculation of growth in lending only covers entities active at the end of 2012 and 2013. If all entities are included, a decline is also apparent for loans to non-financial corporations (see the *Table of Indicators*).

³¹ Operational leasing allows a movable or immovable item to be used, but unlike in the case of financial leasing there is no transfer of the substantial risks and benefits associated with ownership of the asset. Operational leasing is therefore de facto renting and is not included in the CNB's financial intermediation statistics. In 2011 operational leasing had accounted for less than 32% of the amount financed by new lending, whereas in 2012 the figure was 41%.

slightly (see Chart IV.28). At the same time, it turns out that roughly 70% of all loans provided by NFCEs were provided by companies in groups headed by a domestic or foreign bank ("bank NFCEs"), so they are not completely unregulated units under the consolidated approach to banking supervision.

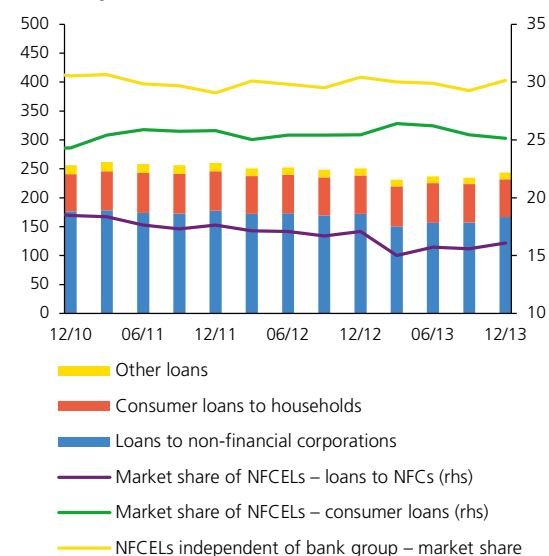
The riskiness of loans provided by NFCEs was little changed in 2013

Data from the Non-bank Register of Client Information (NRCI) and from the credit register of natural persons maintained by the SOLUS association indicate that credit risk in NFCE balance sheets was little changed in 2013. In general, however, the risk of default on loans provided by NFCEs is higher compared to banks (see Chart IV.29).³² Should defaulters be allowed to delete their records from non-bank registers, the default rate could increase further in the future, not only in the NFCE subsector, but also in the banking sector.

CHART IV.28

Loans provided by non-bank financial corporations engaged in lending

(CZK billions; right-hand scale in %)

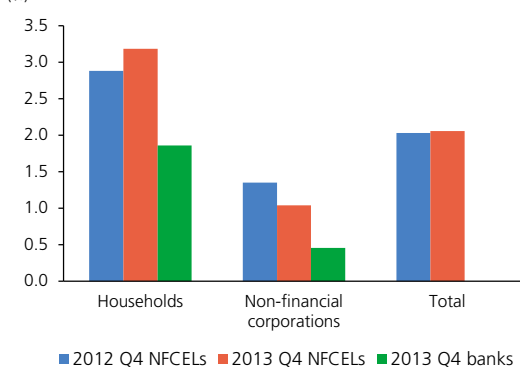


Source: CNB

Note: Market share of NFCEs in total loans provided to residents by banks and NFCEs combined. The market share of independent NFCEs relates solely to loans to residents provided by all NFCEs.

CHART IV.29

3M default rate on loans provided by credit institutions (%)



Source: BRCI, NRCI, SOLUS, CNB

Note: The default rate on loans provided to households by NFCEs is calculated as the average of the data from the NRCI and SOLUS. Only the NRCI is used for loans to non-financial corporations and total loans.

³² A survey conducted by the CLFA among its members suggests that at the end of 2013 the share of NPLs provided by CLFA members to non-financial corporations was at a similar level as that of NPLs provided by banks. By contrast, the share of consumer credit was much higher compared to banks.

4.2 STRESS TESTS OF BANKS, INSURANCE COMPANIES AND PENSION MANAGEMENT COMPANIES

The stress tests demonstrate that the banking sector is highly resilient to the selected adverse scenarios. Banks have a large capital buffer enabling them to absorb adverse shocks and maintain their overall capital adequacy ratio sufficiently above the regulatory threshold of 8% even in a very adverse scenario. Banks also passed a liquidity stress test. The insurance company sector also showed sufficient resilience to the adverse scenario thanks to its large capital buffer. The pension management companies sector remains sensitive to the price volatility of securities holdings and would be hit by significant losses in the adverse scenario.

The stress tests are based on an adverse scenario called *Europe in Deflation*, extended to include other sensitivity analyses

The resilience of banks, insurance companies and pension management companies was tested in macro stress tests using a *Baseline Scenario* for the most probable future developments and a *Europe in Deflation* stress scenario, representing a hypothetical sizeable decline in economic activity in the Czech Republic, the return of a V-shaped recession and a fall of the economy into deflation (see section 2.1). The developments represented by the adverse scenario are extended to include other sensitivity analyses that amplify the shocks' impacts and illustrate the sectors' resilience to relevant risks.

The bank stress test methodology is regularly updated

This year's stress tests saw no major methodological changes. As usual, the tests were refined as regards the satellite models used, which were re-estimated using the most recent time series. Like last year, the banking sector tests were performed on end-Q1 data. As banks' capital adequacy reporting was postponed in 2014 H1 due to a switch to common reporting frameworks, the tests use the end-2013 capital value.³³ The stress tests of insurance companies and pension management companies were performed on end-2013 data.

In the *Baseline Scenario* credit risks fall slightly and the sector's profitability continues to decline

Stress tests of the banking sector are traditionally one of the most important tools for assessing potential risks to the stability of the Czech financial sector. Particular attention is paid to credit risk, which is the largest risk in the Czech banking sector. The evolution of credit risk is closely linked with developments in the household and corporate sectors. The economic outlook, which assumes quite a noticeable recovery in economic activity, is thus reflected in a greater ability of households and corporations to repay their debts, i.e. a lower level of credit risk (see sections 2.2 and 2.3). The default rate, a key indicator of credit risk, is gradually decreasing at the three-year horizon in the *Baseline Scenario* in both the non-financial corporations and household sectors (see Table

³³ Capital adequacy data will be available as from 2014 H2 in a new statement compiled under the COREP framework (COSIFE10, COS 10-04).

TABLE IV.3

Key variables in the individual scenarios (averages for given years)

	Actual value	Baseline Scenario				Europe in Deflation		
		2013	2014	2015	2016	2014	2015	2016
Macroeconomic variables								
GDP (y-o-y %)	-0.9	2.6	3.3	1.7	-1.0	-3.4	-1.0	
Inflation (%)	1.4	0.8	2.2	1.9	0.1	-2.3	-2.0	
Unemployment (%)	7.0	6.7	6.6	6.3	7.4	9.5	10.3	
Nominal wage growth (%)	0.1	2.3	4.3	4.9	-0.7	-5.1	-0.3	
Effective GDP growth in euro area (%)	0.5	1.6	2.1	1.8	0.5	-0.9	-0.3	
Credit growth (%)								
Total	4.7	6.0	8.6	10.5	-0.4	-7.2	-5.9	
Corporations	1.8	2.9	5.1	5.8	-1.2	-4.5	-4.0	
Households	3.9	4.7	5.3	6.6	0.6	-4.5	-3.8	
Default rate (PD. %)								
Corporations	1.7	1.6	1.3	1.2	4.8	5.9	4.3	
Loans for house purchase	2.5	2.2	2.0	1.9	5.7	6.6	5.4	
Consumer credit	7.1	6.3	5.9	6.2	9.8	10.4	8.6	
Loss given default (LGD. %)								
Corporations	45.0	45.0	45.0	45.0	50.7	53.9	53.7	
Loans for house purchase	22.0	22.0	22.0	22.0	27.0	38.4	49.9	
Consumer credit	55.0	55.0	55.0	55.0	57.6	67.2	68.7	
Asset markets (%)								
3M PRIBOR	0.5	0.4	0.9	1.6	0.4	0.4	0.4	
5Y yield	1.2	1.2	1.7	2.2	2.7	4.0	4.1	
3M EURIBOR	0.2	0.3	0.3	0.6	0.2	0.2	0.6	
5Y EUR yield	0.7	0.8	0.9	1.1	1.4	2.3	2.2	
Change in res. property prices	0.0	1.0	2.3	3.7	-0.8	-9.7	-10.1	
Change in share prices	-4.8		-5.0			-30.0		
Banks' earnings								
Adjusted operating profit (y-o-y %)	-1.6	-5.1	-5.1	-3.3	-19.7	-16.9	-3.6	

Source: CNB, CNB calculation, BRCI

Note: A methodological change was made to the calculation of the default rate for bank loans provided to households for house purchase and for consumer credit in 2013. This change caused a decrease in the default rate for loans for house purchase and an increase in the default rate for consumer credit compared to the historical figures.

IV.3). The long-standing environment of low interest rates reduces banks' traditional interest income and results in an overall decline in the sector's profits. Given the expected interest rate developments, the *Baseline Scenario* expects banks' adjusted operating profit to continue to trend downwards by around 5% a year.³⁴

The banking sector remains very well capitalised in the *Baseline Scenario*

Despite the worse profitability outlook, the banking sector remains resilient over the entire three-year test horizon and has sufficient capital reserves. The sector's aggregate capital adequacy ratio (CAR) is around 16%, i.e. well above the regulatory minimum of 8%. The Tier 1 CAR is only about 0.3 percentage point below the total CAR, again illustrating that the sector is well capitalised.³⁵ Nevertheless, two banks (representing less than 1% of the sector's assets) get into a situation of insufficient capital adequacy in the *Baseline Scenario*. This is due to their business models, which the stress test methodology assesses as unsustainable from a longer-term perspective. This will require an adjustment of the banks' business models or an increase in their capital (see Table IV.4, column 1).

The *Europe in Deflation* stress scenario would imply significant accounting losses for the banking sector

The *Europe in Deflation* stress scenario assumes that seriously negative developments in the EU would result in a sizeable decline in economic activity in the Czech Republic, a surge in unemployment and financial market turbulence, leading to a significant jump in EU government bond yields. Since this negative shock would come on the back of several years of adverse developments in the domestic economy, the financial reserves of some households and corporations would be exhausted and debt repayment by the real sector would deteriorate sharply. This would be reflected in a sizeable rise in the default rate in both the non-financial corporations and household sector and in an overall increase in the banking sector's credit losses. These would be more than three times larger than in the *Baseline Scenario* at the three-year horizon. Given the expected rise in government bond yields in the Czech Republic and other EU countries, banks would also record market losses due to a decline in the value of these debt instruments (see Table IV.4, column 2). These credit and market losses, combined with a decline in the sector's operating profit, result in an accounting loss of the sector and a sizeable fall in its CAR.

...but the sector's overall capital adequacy ratio would remain sufficiently above the regulatory threshold

Despite these adverse developments, the CAR of the banking sector does not drop below 12% in the *Europe in Deflation* stress scenario (see Chart

TABLE IV.4

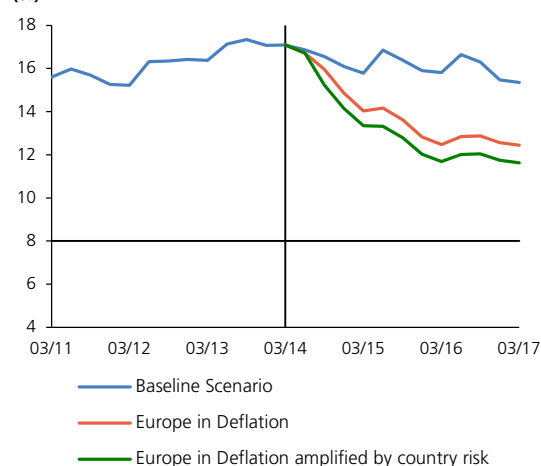
Impact of the alternative scenarios on the banking sector

	<i>Baseline Scenario</i>			<i>Europe in Deflation</i>		
	2014	2015	2016	2014	2015	2016
Expected credit losses (minus sign for losses)						
CZK billions	-21.0	-21.3	-21.4	-41.8	-79.2	-65.2
% of assets	-0.4	-0.4	-0.4	-0.8	-1.6	-1.4
Profit/loss from market risks						
CZK billions	-0.4	-3.8	-5.2	-17.8	-2.9	0.1
% of assets	0.0	-0.1	-0.1	-0.4	-0.1	0.0
Earnings for covering losses (adjusted operating profit)						
CZK billions	72.5	68.7	66.5	61.3	50.9	49.1
% of assets	1.4	1.2	1.1	1.2	1.0	1.0
Pre-tax profit/loss						
CZK billions	51.1	43.6	39.9	1.6	-31.4	-16.5
% of assets	1.0	0.8	0.7	0.0	-0.6	-0.4
Capital adequacy ratio (CAR) at end of period in %						
CAR	16.1	16.2	15.5	14.9	12.8	12.6
CAR Tier 1	15.8	15.9	15.3	14.6	12.6	12.3
Capital injections						
CZK billions		0.3			12.1	
% of GDP		0.01			0.3	
No. of banks below 8% CAR						
		2			11	

Source: CNB, CNB calculation

CHART IV.30

Capital adequacy ratios depending on scenarios (%)



Source: CNB, CNB calculations

34 Adjusted operating profit is largely the same as pre-provision profit but does not include the impacts of interest rate and exchange rate gains/losses.

35 As discussed in section 4.1, the Tier 1 CAR requirement is essentially the same for the Czech banking sector as the new Common Equity Tier 1 requirement.

TABLE IV.5

Haircuts on EU countries' exposures
(%)

Country	Haircut in %
Austria	1
Belgium	7
Croatia	31
Cyprus	49
France	4
Germany	0
Greece	48
Hungary	30
Ireland	23
Italy	23
Malta	18
Netherlands	1
Portugal	33
Slovenia	24
Spain	25
United Kingdom	2

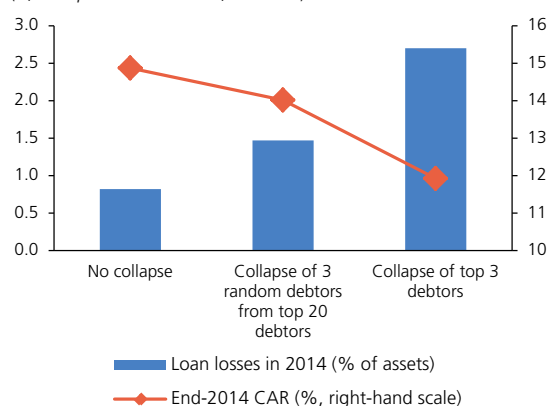
Source: CNB, CNB calculation

IV.30). Although the CAR stays sufficiently above the regulatory minimum, 11 banks – representing about 17% of the sector's assets – record a fall in capital adequacy below the regulatory minimum and have to strengthen their capital. The necessary capital injections total around CZK 12 billion, i.e. around 0.3% of GDP (see Table IV. 4, column 2). Relative to the size of the banking sector, this figure is not significant enough to jeopardise its stability. The banking sector's stability is based on its high CAR, which went up by a further 0.7 pp compared to the previous year, and on its ability to generate income to cover losses even in the event of adverse developments.

An additional sensitivity analysis in the Europe in Deflation scenario assesses the impacts of partial impairment of exposures to indebted countries

Within the Europe in Deflation scenario, a sensitivity analysis is performed assuming partial impairment of all domestic banks' exposures to EU countries with debt exceeding 60% of GDP. Some haircut on exposures is already assumed in the Europe in Deflation scenario through a decline in the value of government bonds of EU countries, including the Czech Republic, due to growth in yields demanded by the market. To this baseline haircut the additional sensitivity analysis adds haircuts on all domestic banks' exposures to indebted countries based on figures derived from those countries' average ratings (see Table IV.5). This assumption generates additional losses of CZK 26 billion for the banking sector. The sector's CAR remains above 11.5% over the test horizon (see Chart IV.30, Europe in Deflation amplified by sovereign risk), while the capital injections increase to almost CZK 18 billion (almost 0.5% of GDP).

CHART IV.31

Impact of the collapse of top 3 debtors of each bank
(%; in Europe in Deflation scenario; LGD = 50%)

Source: CNB, CNB calculation

The portfolio concentration test represents a strong shock...

The final sensitivity analysis in the *Europe in Deflation* scenario focuses on testing concentration risk assuming default by the largest debtors of each bank. Although the concentration of client loan exposures (as measured by the share of the three largest exposures in the portfolio of loans to legal entities) has long been relatively constant at around 13%, the largest loans may not be sufficiently collateralised in some cases. This is evidenced by the fact that the share of uncollateralised loans in loans to the top three debtors was 53% at the end of 2013.³⁶ If these debtors default, banks' credit losses could reach high levels.

...but the banking sector is resilient to this major shock, too

The concentration test is performed in two variants. The first assumes the collapse of three random debtors from the top 20 debtors of each bank. The other, stricter, one assumes the collapse of the top three debtors of each bank. Given the above share of uncollateralised loans in loans to the largest clients, a 50% haircut on these exposures is considered in both cases. This shock has a big effect on the banking sector's credit losses and CAR. The CAR falls to 12% at the end of 2014 for the collapse of

³⁶ The share of uncollateralised claims to non-financial corporations in loans to the five largest borrowers was 49% at the end of 2013.

the top three debtors. The collapse of three random debtors of each bank would cause a less sharp fall in the CAR, to below 14% (see Chart IV.31). The concentration test represents a very strong stress scenario, and the resulting banking sector CAR based on such a large shock can therefore be assessed as positive.

Tests of domestic banks' balance-sheet liquidity confirm their resilience to liquidity shocks

The assessment of the banking sector's resilience also involved a macro stress test of balance-sheet liquidity, whose two-round methodology was presented in FSR 2010/2011. The test focuses on the resilience of the liquidity buffer to potential bank liquidity shocks. The first round of the impact involves the emergence of a potential gap in banks' balance sheets associated with increased demand for asset financing amid lower funds (see the first two items of Table IV.6) and a concurrent decline in the value of some assets (the other items) with no difference in their accounting (the revaluation also affects assets held to maturity). The second round of shocks emerges as a result of a rise in reputational and systemic risk brought about by banks' efforts to close the liquidity gap and is expressed through additional losses arising from the revaluation of securities. Overall, these are very strong stress scenarios.

The scenario was applied individually to 23 banks having their registered offices in the Czech Republic at the one-month and three-month horizons. To assess resilience, the liquidity buffer³⁷ (LB) was selected. It was calculated at its initial value and after the application of the two rounds of liquidity shocks (see Chart IV.32). The initial liquidity buffers (the full columns) suggest a relatively high level of quick assets in the banking sector as a whole (over 20%). The lowest level of quick assets is held by building societies.

The impacts of the negative shocks on the balance sheets of the groups of banks monitored were quite mixed (see Chart IV.32). On average, small banks and building societies would be hit hardest at both horizons. For these banks in the liquidity buffer would fall by around three-quarters at the one-month horizon and by more than 90% at the three-month horizon. This is due to the configuration of the building savings system, where a significant share of time deposits consists of deposits redeemable at notice of three months. The liquidity buffer would be fully exhausted by three banks in the case of the one-month test and by six banks in the case of the three-month test.

This is due to the types of business model chosen by individual banks and the total volume and composition of quick assets held (see Table IV.7). The quick asset composition changed slightly from the previous year,

TABLE IV.6

Scenario type and shock size in the bank liquidity stress test	
Scenario type	Values
One-month / three-month bank run (average for banks, %)	11/19*
Drawdown of credit facilities (credit lines, % of volume)	10
Share of short-term claims on banks that will become unavailable (%)	50
Share of short-term claims on other clients that will become unavailable (%)	30
Reduction in value of government bonds eligible as collateral in CNB liquidity-providing operations (%)	25
Reduction in value of other securities (%)	30
Reduction in value of assets sold before maturity (average for banks, %)	49**

Source: CNB, CNB calculation

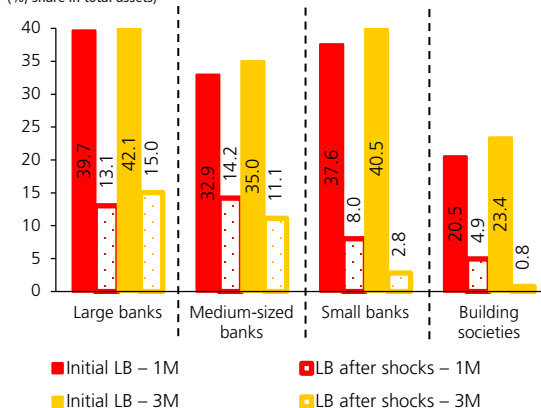
Note: *The first figure applies to the one-month test and the second figure to the three-month test.

**The bank run and the reduction in the value of assets sold before maturity are derived from the results for individual banks in the solvency stress tests. Banks with higher accounting losses face a larger run. For sales of liquid assets, the quality of the bank's assets, as measured by the risk costs of the loan portfolio, is taken into account.

CHART IV.32

Results of the liquidity test

(%, share in total assets)



Source: CNB, CNB calculation

Note: LB = liquidity buffer; 1M = one-month; 3M = three-month.

37 The liquidity buffer for the one-month horizon is defined as the sum of cash, claims on the central bank, government bonds and claims maturing within one month, while claims maturing within three months are taken into account for the three-month horizon. The liquidity buffer for the three-month horizon is equal to or greater than the liquidity buffer for the one-month horizon.

TABLE IV.7

Year-on-year comparison of the composition of the liquidity buffer for claims with maturities of up to one month
(as % of total liquidity buffer)

Composition of buffer	Large banks		Medium-sized banks		Small banks		Building societies	
	2012	2013	2012	2013	2012	2013	2012	2013
Cash	2.5	2.1	0.3	0.3	0.9	1.7	0.0	0.0
Claims on central banks	21.7	33.3	24.2	21.9	21.5	32.0	11.0	5.1
Claims on credit institutions	7.0	5.0	13.3	9.5	3.7	12.7	7.1	19.5
Claims on general government	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims on other clients	15.3	11.6	13.8	10.8	9.7	4.6	0.2	0.2
Government bonds	62.6	44.2	31.9	30.5	50.1	47.1	61.6	58.2
Securities issued by central bank	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Liquidity buffer / total assets	33.7	36.2	30.5	30.7	43.1	36.1	19.1	22.9

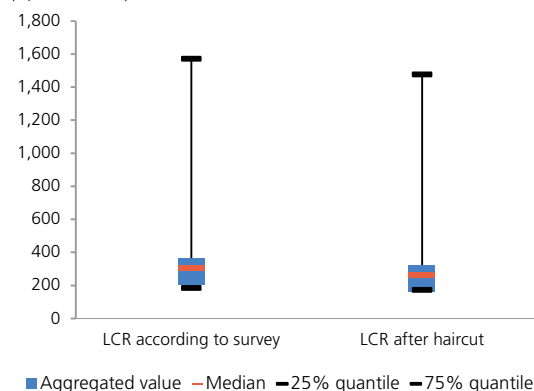
Source: CNB

Note: The figures in the table express the median for the relevant banks.

CHART IV.33

Aggregated results of the LCR survey

(%; selected banks)



Source: CNB

especially for large banks. Claims on central banks, which are not subject to stress, had a more significant average weight in their buffers. This increase is linked with the foreign exchange interventions to weaken the Czech koruna. They led to a rise in total monetary liquidity in the Czech financial system, which was subsequently sterilised using the CNB's standard monetary policy instruments. By contrast, the share of government bonds fell slightly. However, they are still the largest liquidity buffer item. The portfolio is concentrated in Czech government bonds. If a scenario similar to the Greek crisis was applied, with Czech government debt being subject to large write-downs due to materialisation of sovereign risk, the results of the balance-sheet liquidity tests would be much worse.

Although the conditions of the balance-sheet liquidity testing scenario were relatively tough, the banks tested withstood the simulated shock and would be able to close the potential liquidity gap within one month or three months even under worse market conditions.

The good liquidity position of Czech banks is confirmed by a liquidity coverage survey

The good liquidity position of Czech banks is also evidenced by a survey of compliance with the Basel liquidity coverage ratio (LCR) requirement performed by the CNB on a sample of 16 banks (see Chart IV.33). According to Basel guidelines, banks should hold an adequate stock of liquid assets to withstand any potential mismatches between liquidity inflows and outflows in a significant stress scenario lasting one month.

The LCR offers another way of stress testing the banking sector's balance-sheet liquidity. The test assumes a deposit outflow and a restricted cash inflow. The resulting gap (the net liquidity outflow) is covered by the stock of liquid assets, which is marked to market. In the logic of the testing, the highest rate of outflow is applied to short-term and uninsured deposits (e.g. liabilities to other credit institutions), while short-term claims are subject to the lowest inflow restrictions. Putting it simply, the longer-term and more stable are the funding sources on the liability side, and the shorter-term are the claims on the asset side, the lower is the stress. Moreover, liquidity inflows are capped at 75% of liquidity outflows. The LCR is also included as a liquidity coverage requirement in CRD IV/CRR. It is to be phased in gradually – the liquidity reserve should cover at least 60% of the net outflow as from 2015 and the full 100% as from 1 January 2018.

The survey results reveal that the LCRs of most of the Czech banks tested are compliant by a sufficient margin. The aggregate LCR is over 280% and stays high (at 243%) even when the haircuts are tightened by 20 pp for all assets in the reserve. This is mainly because the banks tested hold most of the reserve in assets of the highest quality and liquidity, to which the highest weight (or lowest haircut) is applied.

BOX 4: RESULTS OF JOINT STRESS TESTING BY THE CNB AND SELECTED BANKS

In addition to top-down macro stress tests of the banking sector, the CNB has been performing bottom-up micro stress tests in partnership with selected Czech banks. Such testing is currently being performed for the largest EU banks in a comprehensive check by the ECB and the EBA (see section 5.6). The micro stress tests differ from the macro stress tests mainly in that the impacts of shocks on banks' capital adequacy are calculated by the banks themselves based on their own portfolios. The micro stress tests thus use much more detailed portfolio information than that available to the CNB for its macro stress tests. However, it is the CNB that defines the most probable and adverse scenarios in both types of test.

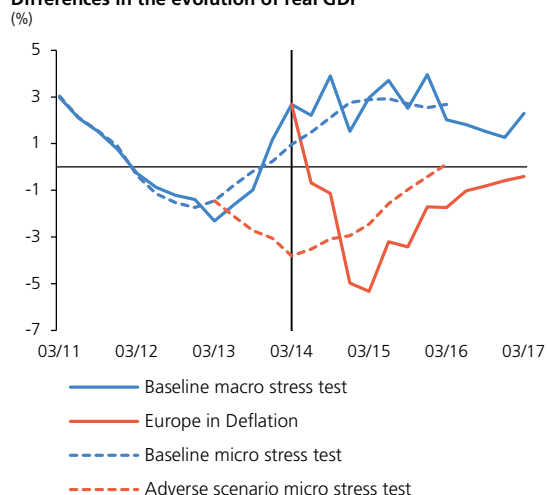
The nine largest domestic banks, representing almost 90% of the assets of the Czech banking sector, took part in the tenth round of micro stress tests using end-2013 data.³⁸ While previous rounds of micro stress tests had focused on credit risk testing, which is the largest risk for the Czech banking sector, the range of risks tested in the tenth round was extended to include the interest rate risk of the bank's entire portfolio and the specific interest rate risk of domestic government bonds.

Since the micro stress test scenarios are prepared one quarter before the macro stress tests presented in this Report, the scenarios for the two tests are not fully comparable. The baseline scenario for the micro stress tests (*Baseline*) is based on the CNB's macroeconomic forecast published in Inflation Report I/2014 and assumes a less robust economic recovery in the coming years than this Report's *Baseline Scenario*. The stress scenario for the micro stress tests (*Adverse*) assumes a less sharp fall in domestic economic activity than the adverse *Europe in Deflation* scenario in this Report, and is thus to some extent less severe (see Chart IV.1 Box).

The macroeconomic developments assumed in the *Baseline* and *Adverse* scenarios determine the evolution of the credit risk parameters. As the micro stress tests are calculated for a one-year horizon, faster transmission of credit risks to banks' balance sheets is assumed than in the macro stress tests. A slight fall in credit risk for corporate exposures and, conversely, a slight rise for retail portfolios can be observed for the *Baseline* scenario one year ahead. Much higher credit risk is visible in the *Adverse* scenario, in

CHART IV.1 Box

Differences in the evolution of real GDP



Source: CNB

³⁸ Banks were selected according to whether they have received approval to use the special IRB approach for calculating the capital requirement for credit risk.

TABLE IV.1 Box

Risk parameters for the credit segments and scenarios tested
(%; weighted by EAD)

	31 Dec. 2013		Baseline 31 Dec. 2014		Adverse 31 Dec. 2014	
	PD	LGD	PD	LGD	PD	LGD
Corporate exposures	1.8	36.1	1.7	36.1	3.7	42.2
- large enterprises	1.1	35.9	1.0	35.8	2.3	42.0
- small and medium-sized enterprises	2.6	34.9	2.4	34.8	5.2	40.7
- specialised credit exposures	2.0	39.3	1.9	39.2	4.0	45.8
Retail exposures	2.6	30.4	2.7	30.6	3.8	39.4
- retail-assessed SMEs	6.0	42.8	5.4	42.7	11.2	48.2
- loans for house purchase	2.0	22.6	2.0	22.7	2.7	32.2
- other loans to individuals	3.5	48.9	3.7	50.1	4.8	57.9
Institutions	0.1	32.8	0.2	32.8	0.3	37.7
Central governments	0.0	16.5	0.0	16.5	0.0	24.6

Source: CNB

TAB. IV.2 Box

Banks' capital requirements and capital adequacy ratios

	31 Dec. 2013	Baseline 31 Dec. 2014	Adverse 31 Dec. 2014
Capital requirements (year-on-year change)	-	2.4	42.6
Regulatory capital (year-on-year change)	-	9.1	5.6
Tier 1 CAR	17.3	18.3	12.9
CAR	17.5	18.6	12.9

Source: CNB

line with the adverse evolution of economic activity. This is expressed by a broad rise in both the probability of default (PD) and the loss given default (LGD) in all the credit segments tested (see Table IV.1 Box).

The results of the micro stress tests for the *Baseline* scenario point to a slight rise in the capital requirements of banks and a fall in annual profit by almost 3%. The aggregate Tier 1 CAR of the banks tested would go up by 1 pp to 18.3%. In the *Adverse* scenario the capital requirements rise by a significant 42.6% and profit declines by more than 35% overall. Despite these adverse developments, the aggregate Tier 1 CAR of the institutions tested remains well above the 8% threshold at the one-year horizon, dropping to 12.9% (see Table IV.2 Box).

The micro stress test results confirm that the banks tested are highly resistant to adverse scenarios, in line with the results of the macro stress tests of the banking sector. The results and individual parameters, however, are not fully comparable, not only because of the slightly different macroeconomic scenarios, but also because of the different samples of institutions tested and different test horizons, which lead to different assumptions about the speed of transmission of risks to banks' portfolios.

In addition to the *Baseline* and *Adverse* scenarios, a sensitivity analysis of general interest rate risk and the specific interest rate risk of CZK government bonds was performed in this round of micro stress testing. The economic logic of the test was applied in the interest rate risk testing, so the effect of accounting categories on the revaluation of bank assets and liabilities was suppressed. The sensitivity analysis covers the entire portfolio (the banking and trading books) and uses four scenarios. *Scenario 1* assumes a 3 pp parallel shift of the yield curve, *Scenario 2* assumes a 3 pp widening of the CZK government bond spread vis-à-vis the IRS yield curve, *Scenario 3* assumes a larger increase in the slope of the yield curve³⁹ and *Scenario 4* contains a combination of a more moderate increase in the slope of the yield curve and a 2 pp widening of the CZK government bond spread vis-à-vis the IRS yield curve.⁴⁰

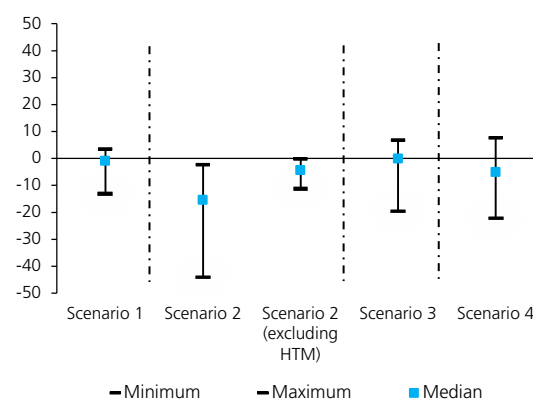
39 A 5 pp shift was assumed for maturities of over 5 years, the curve was left unchanged for maturities of up to 3 months, and linear interpolation was used for the shift for maturities of over 3 months and up to 5 years.

40 Increase in the yield curve slope: a 3 pp shift was assumed for maturities of over 5 years, the curve was left unchanged for maturities of up to 3 months, and linear interpolation was used for the shift for maturities of over 3 months and up to 5 years. Widening of the CZK government bond spread: a 2 pp widening was assumed for maturities of over 5 years, no widening was assumed for maturities of up to 3 months, and linear interpolation was used for the shift for maturities of over 3 months and up to 5 years.

The results of the sensitivity analysis show that a rise in interest rates would have mixed impacts across the banks tested (see Chart IV.2 Box). In *Scenario 1*, the impact of a parallel shift of the yield curve would be between -13% and 3.5% of capital.⁴¹ In *Scenario 3*, banks' sensitivity to rotation of the yield curve increases further, with the impact on the capital of the banks most exposed to interest rate risk ranging from -20% to 7%. *Scenario 2* assumes a widening of the CZK government bond spread because of a rise in the yield demanded by investors. The strongly negative impact of this scenario is due to the significant exposure of domestic banks to domestic government bonds. However, if the accounting principles are taken into consideration, moving away from a purely economic perspective, the impact of the test is significantly smaller, since domestic banks hold almost half of domestic government bonds in the "held to maturity" accounting category (see Chart III.18 in section 3.1) and hence do not mark these debt securities to market.

CHART IV.2 BOX

Interest rate risk sensitivity analyses (as % of Tier 1 and Tier 2 regulatory capital)



Source: CNB

Note: Banks included in micro stress tests, excluding building societies. In Scenario 2 (excluding HTM), accounting principles are taken into consideration and so CZK government bonds held to maturity are not marked to market. HTM = held to maturity.

The stress tests of insurance companies and transformed funds of pension management companies assess the sectors' resilience at the one-year horizon

The stress tests of insurance companies and transformed funds of pension management companies (PMCs) focus on assessing the risks to the two sectors at the one-year horizon. Together with the *Baseline Scenario*, their resilience to the *Europe in Deflation* stress scenario was also tested; this variant captures adverse economic developments coupled with increased tensions in financial markets. This adverse scenario will manifest itself as sharp falls in the property and equity markets, depreciation of the exchange rate and a jump in yields on long-term Czech and foreign government bonds. Growth in bond yields, which, however, is not very likely, may pose a particularly significant risk to insurance companies and transformed funds of PMCs, which hold a large proportion of their portfolios in debt securities.

The PMC sector is resilient in the *Baseline Scenario*, but sensitive to interest rate risk in the stress scenario...

This year's stress tests of the PMC sector cover the transformed funds of PMCs. This represents a comparable sample of tested institutions as in last year's stress tests.⁴² For the first time, the cumulative impact of all the risks considered is assessed in relation to the statutory capital ratio

TABLE IV.8

Results of the stress tests of transformed funds of PMCs

		Baseline Scenario	Europe in Deflation
Equity (as of beginning of period)	CZK billions	10.1	10.1
	% of assets	3.4	3.4
Capital ratio (equity / capital requirements) (as of beginning of period)	%	175.5	175.5
Losses arising from interest rate risk	CZK billions	-0.2	-2.7
	% of equity	-1.7	-26.7
Gains / losses from changes in share and unit value	CZK billions	-0.2	-1.2
	% of equity	-2.3	-11.5
Exchange rate gains/losses	CZK billions	-0.7	-2.2
	% of equity	-7.0	-21.8
Gains / losses from changes in property value	CZK billions	0.01	-0.1
	% of equity	0.1	-0.5
Impact of risks on equity	CZK billions	-1.10	-6.12
	% of assets	-0.37	-2.1
Equity (as of end of period)	CZK billions	9.02	3.91
	% of assets	3.1	1.32
Capital ratio (equity / capital requirements) (as of end of period)	%	160.0	69.0
Capital injection	CZK billions	-	2.2

Source: CNB, CNB calculation

⁴¹ Under Decrees 123/2007 and 23/2014, a bank is obliged to take remedial action if the total impact of the interest rate shock might cause a decline in the economic value of the bank of more than 20% of the sum of original (Tier 1) and additional (Tier 2) capital. In this case, the impact of a 200 bp parallel shift in the yield curve on the bank's investment portfolio is tested.

⁴² The stress tests do not include new retirement and participation funds, as their total assets are relatively insignificant as yet. At the same time, these new funds hold most of their funds as cash, which reduces the significance of the risks tested.

TABLE IV.9

Results of the insurance company stress tests		Baseline Scenario	Europe in Deflation
Equity risk	CZK billions	-0.77	-7.10
	% of assets	-0.20	-1.80
Real estate risk	CZK billions	0.22	-0.66
	% of assets	0.06	-0.17
Exchange rate risk	CZK billions	-0.05	-0.04
	% of assets	-0.01	-0.01
Interest rate risk	CZK billions	1.04	-6.64
	% of assets	0.26	-1.68
Credit spread risk	CZK billions	0.05	-1.23
	% of assets	0.01	-0.31
Risk of fall in GB prices	CZK billions	-0.38	-1.57
	% of assets	-0.10	-0.40
Premium risk	CZK billions	0.00	-1.13
	% of assets	0.00	-0.29
Impact of risks on ASM	CZK billions	0.12	-18.38
	% of assets	0.03	-4.65
Initial profit/loss before application of shocks	CZK billions	14.43	14.43
	% of assets	3.65	3.65
Planned dividends for payment in 2014	CZK billions	-10.67	-10.67
	% of assets	-2.70	-2.70
Other impacts (tax)	CZK billions	3.34	3.85
	% of assets	0.85	0.97
ASM as of end of 2013	CZK billions	59.93	59.93
	% of assets	15.16	15.16
ASM as of end of 2014	CZK billions	63.39	45.40
	% of assets	16.04	11.49
Solvency ratio	2013	311%	311%
	2014	329%	236%

Source: CNB, CNB calculation

(defined as the ratio of equity to capital requirements), and unchanged capital requirements are assumed in the tests for simplicity. While the capital ratio of PMCs in the *Baseline Scenario* is around 160%, i.e. well above the regulatory limit of 100%, the *Europe in Deflation* stress scenario indicates that this sector is highly sensitive to adverse developments (see Table IV.8). A rise in interest rates is naturally the most significant risk to the transformed funds of PMCs. This is due to the composition of their portfolios, which are dominated by debt securities sensitive to interest rate changes. In the adverse scenario, the rise in rates would cause transformed funds losses of almost CZK 3 billion. By contrast, the risk of a fall in equity prices implies no major losses, reflecting the fact that the transformed funds of PMCs further reduced their investment in shares and units in 2013. Real estate risk is still almost negligible in Czech PMC funds.

...and its capital ratio drops below the regulatory minimum

The total impact of the shocks in the *Europe in Deflation* scenario would cause PMCs' equity to fall from CZK 10 billion to CZK 4 billion and their aggregate capital ratio to drop to 69%. This would require an increase in capital by PMC shareholders. The necessary capital injections would amount to around CZK 2 billion. A stable portfolio structure is assumed when estimating the impacts of risks. However, it is reasonable to assume that if yields rose, the transformed funds of PMCs would again increase the proportion of OECD government bonds classified as held to maturity. This would reduce the magnitude of the shock, and the necessary capital injections would drop to around CZK 1.5 billion.

The stress tests of insurance companies confirmed the sector's strong capital position...⁴³

In the *Baseline Scenario*, insurance companies recorded slight losses due to revaluation of equities and government bonds (see Table IV.9). However, these losses would be offset by revaluation gains on other interest rate sensitive assets and liabilities, property and profits from insurance activities. The aggregate solvency ratio in the *Baseline Scenario* should thus be slightly higher at the end of 2014 than at the end of 2013. However, this scenario does not assume any major natural disasters.

In the adverse scenario, insurance companies would be hit hardest by losses from interest rate risk totalling 1.7% of assets. Other major losses would arise from a decline in the value of shares and units of 1.8% of assets and, last but not least, a decline in the value of bond holdings. The cumulative impact of all the risks considered on the available solvency margin (ASM) in this scenario would be 4.7% of assets. Given the expected profit of CZK 14.4 billion and planned dividends of around CZK 10.7 billion, the ASM would drop from CZK 60 billion (15% of assets) to

⁴³ The tests are conducted for the 11 institutions taking part in the joint stress testing project of the CNB and selected insurance companies, which account for 89% of the assets of the domestic insurance sector. The tests use the CNB's internal data as of the end of 2013 supplemented with information from the results of joint stress tests.

CZK 45.4 billion (11.5% of assets). As a result, the aggregate solvency ratio would decline from 311% to 236%, which is still well above the regulatory minimum of 100%. As a result of these adverse developments, one insurance company would fall below the minimum solvency ratio. The necessary capital injections would amount to CZK 98 million. Despite these risks, the insurance company sector can be assessed as stable and resilient to adverse developments over the horizon considered.

BOX 5: RESULTS OF JOINT STRESS TESTING BY THE CNB AND SELECTED INSURANCE COMPANIES

The fifth round of joint CNB stress testing of selected insurance companies took place in April 2014. The aim of the test is to assess the ability of insurance companies to absorb the impact of adverse economic developments. The test is repeated on an annual basis. The insurance companies participating this year again accounted for more than 90% of the domestic market in 2013 based on gross premiums written.

The stress test assesses the impact of significant changes in risk parameters on the value of the insurance company's assets and liabilities, and hence on the available and required solvency margins (in accordance with the principles of Solvency I), at the one year horizon.⁴⁴ The start date of the test is 31 December 2013. The basic methodology of the test was unchanged from last year. The investment risks examined were equity risk, asset and liability interest rate risk, real estate risk, exchange rate risk, credit risk and the risk of a fall in government bond prices, and the non-life insurance risks were motor vehicle insurance premium risk and the risk of claims due to natural disasters. The scenario was derived from the adverse scenario used in the tenth round of micro stress tests of the banking sector supplemented with risk factors relevant to insurance companies.⁴⁵ Like last year, this scenario was extended to include a 10% decline in premiums written for motor vehicle insurance at the same level of costs as in 2013. The extended scenario also tested how insurance companies' capital would be affected in the event of simultaneous floods.

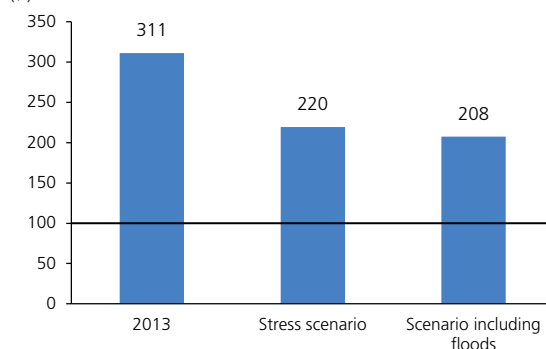
The aggregated results confirm that thanks to sufficient available capital, the sector as a whole, as represented by the participating

⁴⁴ As the new Solvency II regulatory framework for the insurance sector will take effect on 1 January 2016, the 2015 stress test of insurance companies will be fully in accordance with Solvency II principles.

⁴⁵ We assumed a 35% drop in the value of shares, an 18% fall in property prices, a rise of about 1.5 pp in the IRS curve, an increase of about 2.5 pp in the government bond yield curve, a 7% depreciation of the koruna and a rating-dependent increase in the corporate bond spread.

CHART IV.3 BOX

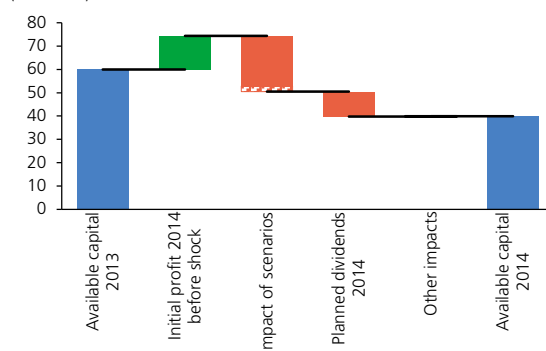
Solvency ratio for the stress scenario and the scenario including floods
(%)



Source: CNB

CHART IV.4 BOX

Change in the available solvency margin
(CZK billions)

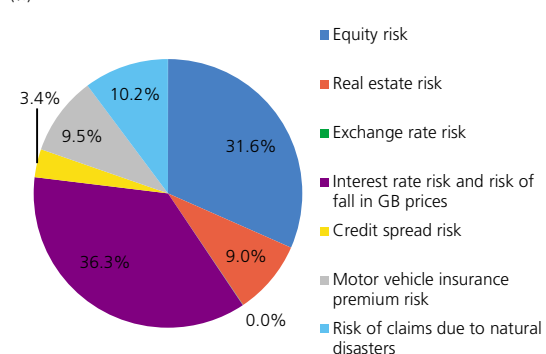


Source: CNB

Note: In the Impact of scenarios column the impact of floods is indicated by hatching.

CHART IV.5 BOX

Contribution of risks to the fall in the ASM caused by the shock
(%)

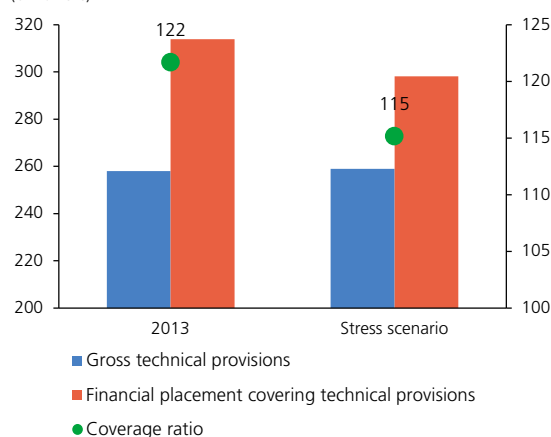


Source: CNB

CHART IV.6 BOX

Coverage of technical provisions by financial placement for the stress test

(CZK billions)

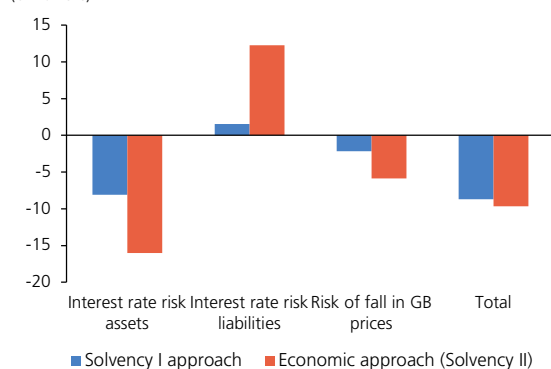


Source: CNB

CHART IV.7 BOX

Comparison of the impacts of the scenarios for interest rate risk and the risk of a fall in GB prices on the change in capital depending on the valuation approach

(CZK billions)



Source: CNB

insurance companies, would absorb the impacts of even a large increase in risk factors, including simultaneous floods (see Chart IV.3 Box), as the sector stays relatively high above the 100% solvency threshold even after these shocks. The resulting available solvency margin (ASM) one year ahead was affected not only by impact of the shocks and the insurance companies' ensuing losses, but also by the amount of dividends planned to be paid in 2014 and the initial profit from insurance activities in 2014 (see Chart IV.4 Box). The aggregate impact of the shocks for interest rate risk and the risk of a fall in government bond prices had the biggest downward effect on the ASM in the scenario applied (see Chart IV.5 Box). The impact of these shocks was larger than in last year's test, mainly as a result of a bigger shift of the IRS curve in the stress scenario. For individual insurance companies, however, the impact of these shocks is significantly affected by the proportion of government bonds classified as held to maturity at amortised cost (see section 4.1). Although the share of equity instruments in financial placement increased slightly compared to the previous year, the impact of the shock for equity risk fell year on year due to a decrease in the size of the equity shock. Given the low interest rate environment, insurance companies are seeking new investment opportunities. As a result, growth in the share of investment in property has been recorded. Owing to an increase in the size of the property shock, the impact of the stress scenario for property risk is also becoming significant in the insurance sector. The favourable result for the shocks for the risk of floods relative to the other risks shows that insurance companies have well-structured reinsurance programmes for catastrophic damage caused by floods in respect of the tested scenario. The stress test results also reveal that insurance companies have sufficient financial placement to cover technical provisions even after the application of shocks (see Chart IV.6 Box).

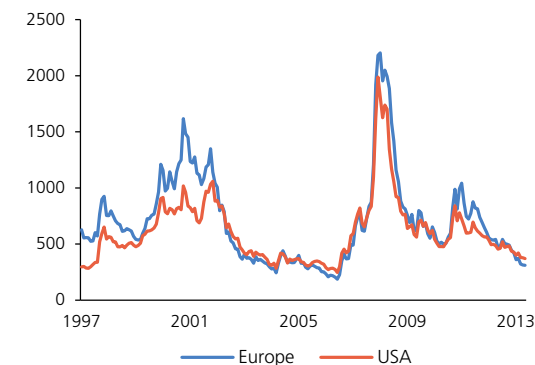
As in the previous year, the stress test also incorporated an economic view of the sensitivity of insurance companies' assets and liabilities to movements in interest rates and government bond yields, i.e. an approach consistent with the Solvency II valuation principles. On the asset side, all bonds, including bonds classified as held to maturity at amortised cost, were marked to market and exposed to a shock in the economic approach. The interest rate sensitivity of the minimum value of insurance liabilities was estimated on the liability side. The effect of the shocks for interest rate risk and the risk of a fall in government bond prices rose significantly for assets and liabilities separately in the economic approach, but the resulting impact on the change in capital is only slightly higher for the participating insurance companies than under Solvency I (see Chart IV.7 Box). However, the results vary across insurance companies due to differences in

the maturity mismatch of assets and insurance liabilities and different accounting classification of assets.

The test also included an analysis of the sensitivity of assets and liabilities to a further decline in interest rates and a qualitative assessment of the consequences of a longer period of low interest rates. With interest rates falling, the negative impact on traditional capital life insurance is offset by a positive impact on investment life insurance and risk insurance and additional insurance. In order to mitigate the risk of insufficient returns on financial placement (see section 4.1), insurance companies are mostly opting for strategy of changing product composition. This chiefly involves focusing more on unit-linked investment life insurance and also on reducing guaranteed rates on new insurance policies. In general, insurance companies do not foresee a need for any major change in investment strategy in the event of a longer period of low interest rates.

CHART V.1

Yield spreads on risky corporate bonds
(bp)

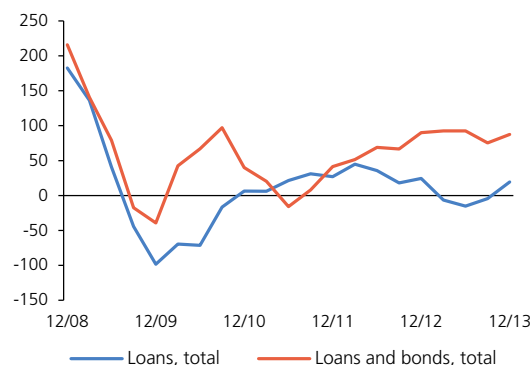


Source: Bloomberg L.P.

Note: Spread means the option-adjusted spread between corporate and government bond yields. A risky bond is a speculative-grade bond (BB+ or lower).

CHART V.2

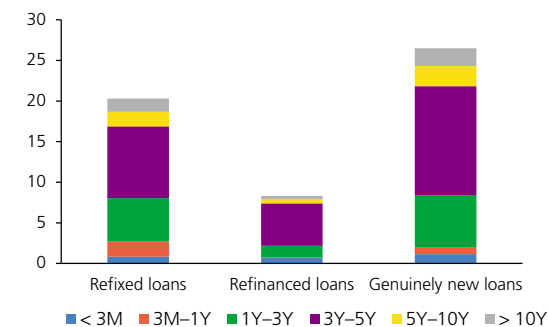
Change in funds raised by non-financial corporations
(year-on-year change in CZK billions)



Source: CNB, quarterly financial accounts

CHART V.3

New loans to households for house purchase by rate fixation period
(CZK billions; figures for 2014 Q1)



Source: CNB

Note: The data are only preliminary. M stands for month and Y for year. The upper boundary of a range belongs within that range.

5 RISKS TO FINANCIAL STABILITY AND MACROPRUDENTIAL POLICY

The aim of this section is to assess the main risks to financial stability and to assign risk mitigation tools to them. To this end, the text evaluates the risks stemming from the external environment, the current position of the Czech economy in the financial cycle, the resilience of the Czech financial sector to the risks identified, and the tasks and recommendations arising from the analyses for macroprudential policy, microprudential supervision and other economic policies. The first part contains an assessment of financial stability indicators, including a macroprudential dashboard. The second part shows the main sources of risks to financial stability and describes measures the CNB might take to reduce them. The third, fourth and fifth parts provide information about the use of macroprudential and other tools in response to the risks identified and about regulation in this area. The final part describes the regulatory environment in the EU, macroprudential policy in the EU and progress in the banking union area.

5.1 ASSESSMENT OF RISKS TO FINANCIAL STABILITY

In advanced countries, the risks that originated in the pre-crisis boom and during the crisis are still apparent...

The advanced economies have yet to fully mitigate the risks that originated before and during the crisis. Household and corporate debt-to-income ratios are falling very slowly. Overall debt servicing costs, i.e. the ratio of interest and principal to income, are very high in many countries. Increasing downward pressures on prices, which the euro area in particular is facing, are creating a risk of debt deflation, a situation where the real debt level increases due to falling nominal income. In this environment there is an increased probability of default, worse profitability of financial institutions and increased vulnerability of financial institutions to risks and shocks. The impacts of these conditions on economic activity and the functioning of financial markets are having adverse side effects on the Czech economy.

... and are being joined by risks associated with easy financial conditions

The very low interest rates and high availability of liquidity are encouraging global investors to search for yield. This is being reflected in increased risk-taking in financial markets and the formation of bubbles in some asset markets. Strong growth in prices and activity in the residential and commercial property markets can be seen in the USA and many European countries. There are also concerns that some stock markets may be overvalued. From the global perspective, however, the increasing size of bond markets combined with a general decline in their risk premia poses a much greater risk. This applies in particular to corporate bond issues in advanced and emerging economies. Investors are also showing a high willingness to accept bonds with higher risk characteristics and lower creditor protection.

The risk of a shock adjustment of bond portfolios is increasing

The yield spreads on both US and European corporate bonds have returned to the extremely low levels observed before the financial crisis (see Chart V.1) and the absolute yield has fallen to even lower levels. This may indicate a partial loss of investors' ability to value risks appropriately in the current environment. As virtually all types of financial institutions are showing significantly higher exposures to corporate and government bonds, even a modest increase in long-term interest rates could prompt global portfolio reshuffling, which would lead to a sharp rise in financial market volatility and substantial market losses and possibly also credit losses.

The financial cycle in the Czech Republic is still being affected by subdued economic activity

The amount of credit in the Czech economy increased again in 2013. As in previous years, this rise was due mainly to loans to households for house purchase. However, consumer credit also started to edge up after several years of decline. The relatively high year-on-year growth in new loans for house purchase is, however, a result of a rising share of refixed/refinanced loans, which, strictly speaking, are not new loans at all (see also section 2.3).¹ According to preliminary data, refixed and refinanced loans accounted for about half of total new loans in 2014 Q1. A potential risk to the household sector – one which could increase its sensitivity to interest rates – would be a situation where households, when refixing, also reduced the rate fixation period of the new contract. This risk is not currently relevant, however. Although the share of loans with new fixation periods of up to one year is rather higher for refixed/refinanced loans than for genuinely new loans, the differences are not large (see Chart V.3). Corporate loans also recorded a recovery. As in other countries, large domestic enterprises took advantage of the favourable conditions to increase their bond issuance, which, however, can be still regarded as quantitatively low. Including corporate bonds, the growth in external corporate funds (see Chart V.2) is slightly above the average of recent years. Credit growth remains rather subdued overall (see Chart V.16), despite having started to accelerate in late 2013 as the economy recovered. As there are no major supply-side constraints, this can be attributed to low credit demand, particularly among large enterprises. Subdued lending growth can also be expected in the future, as indicated by the evolution of new loans to non-financial corporations and households (see Charts V.4 and V.5). This will reflect weak aggregate demand in the domestic economy, as evidenced by the emergence of a positive gap between the private sector's financial surpluses and the general government deficit, indicating a risk of balance-sheet recession (see section 2.1).

¹ Only those refixed loans where refixation occurred on the basis of active action by the client are classed as new loans. If a loan was refixed "automatically" under an earlier loan agreement, it is not included in new loans.

CHART V.4

New koruna loans to non-financial corporations
(including overdrafts; %)

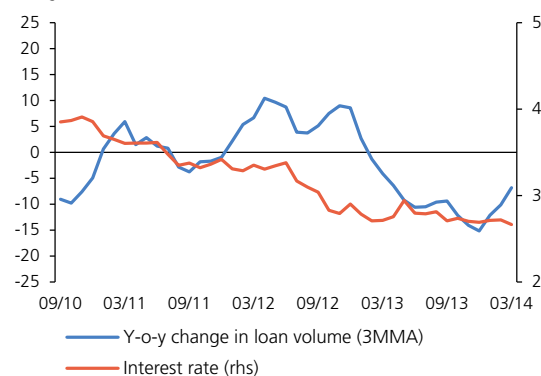


CHART V.5

New koruna loans for house purchase
(%)

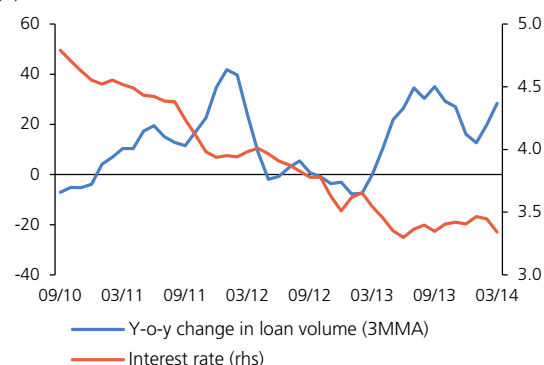


CHART V.6

Interest paid on bank loans
(CZK billions; annual moving totals)

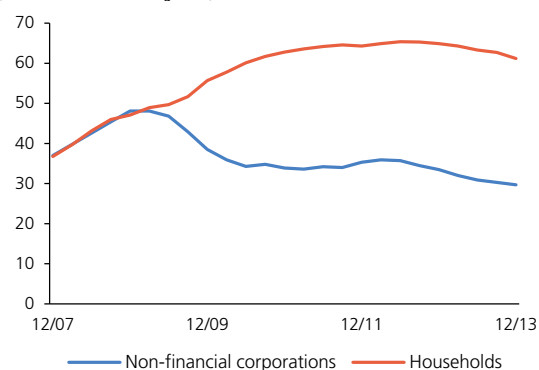
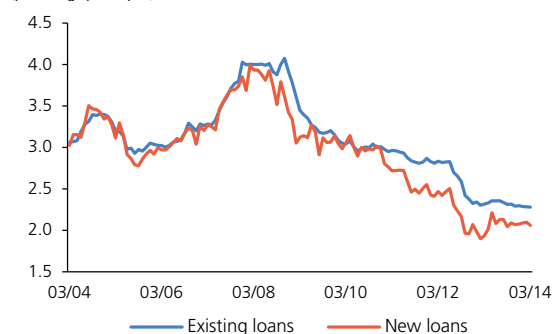


CHART V.7

Margins on bank loans to non-financial corporations (percentage points p.a.)

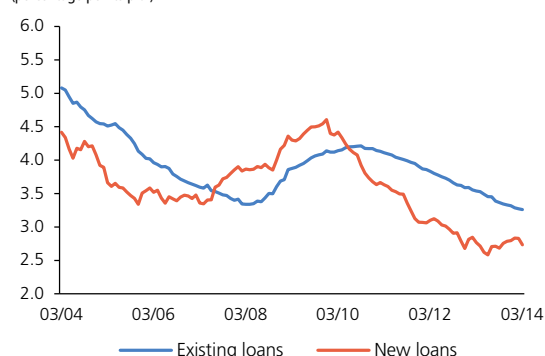


Source: CNB

Note: Margins are calculated as the difference between loan rates and relevant deposit rates.

CHART V.8

Margins on bank loans to households for house purchase (percentage points p.a.)

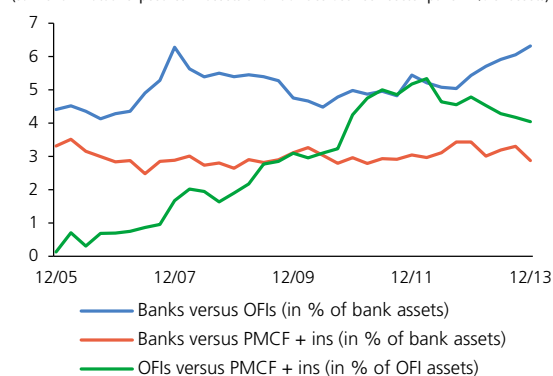


Source: CNB

Note: Margins are calculated as the difference between loan rates and relevant deposit rates.

CHART V.9

Interconnectedness of segments of the financial sector (sum of all mutual exposures in assets and liabilities between sector pairs in % of assets)



Source: CNB (financial accounts)

Note: OFIs comprise other financial corporations engaged in lending, mutual funds other than money market funds, controlling holding companies and some other financial institutions. PMCF + ins comprises funds of pension management companies and insurance companies (see ESA 95 methodology).

Credit standards tightened slightly in 2013, while margins on new loans were virtually unchanged

From the point of view of credit risk, one positive factor is that banks are not easing their credit standards. These standards were little changed in 2013 or, with the exception of loans for house purchase, were tightened very slightly. By contrast, rates on new loans remain at historical lows of around 3% for both loans for house purchase and corporate loans (see Charts V.4 and V.5). The generally low level of bank lending rates was reflected in an absolute decline in interest paid (see Chart V.6), which occurred despite a rise in the stock of loans. For corporations and households this is reducing the risks associated with the decline in economic activity and is having a countercyclical effect by fostering a drop in debt servicing costs. At the same time, margins on new loans stopped falling or showed modest growth (see Charts V.7 and V.8).² This can be viewed as an appropriate trend, as the rapid fall in margins in the previous period led to a rise in the risk of their levels not always being consistent with appropriate credit risk evaluation.

The stock of loans in the Czech economy remains at a reasonable level

The ratio of loans to GDP in the Czech Republic is currently slightly below its trend level (see Chart V.17). Due to the current and expected growth in lending it is reasonable to assume that the Czech financial sector faces no risks due to excessive credit growth. This is a key guide for setting the countercyclical capital buffer, which is dealt with in section 5.3.

Some links between financial sector segments increased

Most of the links between financial sector segments continued to strengthen in absolute terms in 2013, owing to a rising volume of mutual deposits, loans and ownership interests. However, the evolution of these links relative to the asset volume was mixed across segments. A significant increase was recorded between banks and other financial intermediaries (OFIs; see Chart V.9) due to a large increase in the exposures of OFIs to banks. The stronger intersectoral links are generating an increase in the risk of transmission of financial distress across sectors.

Bank portfolios are getting more alike

The cross-sectional dimension of systemic risk can increase as a result of changes in banks' loan portfolios leading to greater similarity between them. An analysis of domestic banks' exposures suggests that the similarity of their portfolios is increasing (see Chart V.10). Exposures to the non-financial corporations sector broken down by category of economic activity and exposures to other sectors were considered as portfolio components in this analysis. Whereas the changes in previous years had been affected most of all by banks' exposures to general government (see section 5.5), the increase in similarity in 2013 had no clear source. The increase in the similarity of bank portfolios represents

2 Margins are measured as the difference between the relevant lending and deposit rates.

a risk because shocks to one sector or a part thereof would have a stronger effect on the banking sector as a whole and risk diversification might prove to be insufficient.

Growth in the structural component of systemic risk is being suppressed by robust banking sector liquidity

The Czech banking sector has long had above-average liquidity by international comparison. Its liquidity position improved slightly further in 2013 thanks to a rising share of quick assets in total assets and client deposits (see Chart V.11). In an environment of low interest rates and a flat yield curve, however, the ratio of liabilities payable on demand to total liabilities continued to rise. This is causing maturity transformation to increase, which may represent a potential risk factor if sudden sharp shocks occur (see Chart V.12). However, this is a consequence of the natural response of economic agents to a situation of near-zero monetary policy interest rates.

The macroprudential dashboard

As in FSR 2012/2013, the CNB's view of the current situation and trends in the Czech economy from the systemic risk and macroprudential policy perspective is described using a simple graphical tool called a macroprudential dashboard (see Table V.1).³

The current fundamental message of the dashboard reflects the findings and conclusions presented in the other parts of this Report. Among other things, the risks stemming from low Czech government bond yields and low interest rate margins increased slightly compared to the previous period (although developments in 2013 H2 indicated a possible change in trend in this area – see Charts V.7 and V.8). By contrast, a relative weakening of future risks is evident, for example, in the evolution of the total stock of loans in the economy. The risks to financial stability are being kept at a low level thanks also to a further increase in banks' capital adequacy.

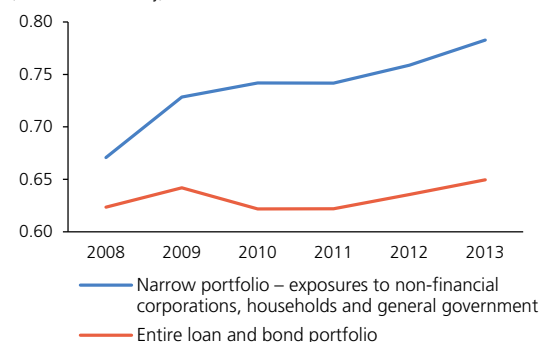
The dashboard is dominated by green colour, indicating that it may be possible or appropriate to ease the macroprudential conditions thanks to low risks to future financial stability in the relevant areas. However, some indicators (those marked in red) suggest some potential risks. Although the vast majority of these are only potential risks, the CNB will monitor them closely in the future.

Of course, the CNB's decisions on the configuration of macroprudential tools cannot be based mechanically on the dashboard alone, but must draw on many other, more detailed data and considerations. The multi-criteria nature of the financial stability objective makes it necessary to expertly assess whether each particular indicator value reflects the emergence of future risks or the materialisation of past risks, whether it

CHART V.10

Similarity of bank portfolios

(1 = maximum similarity)



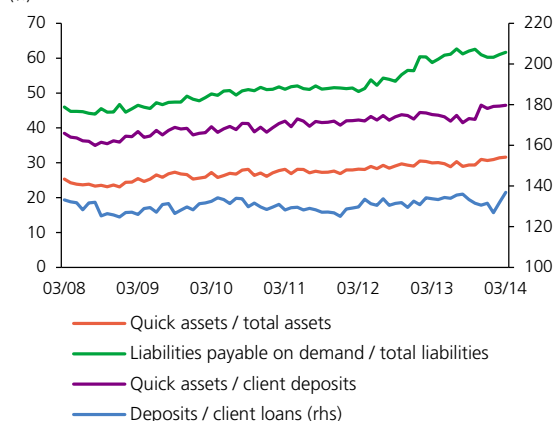
Source: CNB

Note: Similarity is expressed as a weighted average of the cosine distances between the vectors of the portfolios of the individual bank pairs. The weights are the smaller of the two market shares of the bank pair. The vector of the portfolio of each bank expresses the share of the individual investment types in the total. Building societies are included under their parents.

CHART V.11

Liquidity ratios in the banking sector

(%)

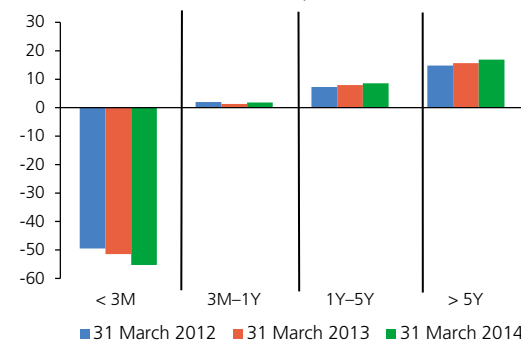


Source: CNB

CHART V.12

Loan and deposit maturity mismatch: net balance-sheet position

(as % of balance sheet; standard loans minus deposits)



Source: CNB

³ A more detailed explanation of the dashboard's structure and content was provided in section 5 of FSR 2012/2013.

indicates a short-term or medium-term risk, and so on. A more detailed assessment of the risks described by the individual indicators is given in the other subsections.

TABLE V.1

Macroprudential dashboard (key financial stability indicators in 2012 and 2013)
(distance from benchmark expressed as number of standard deviations)

1. RISK FACTORS

1a. Short-term

Real GDP growth (year on year, %)	
Real gross disposable income growth (year on year, %)	
Interest expenses/gross disposable income (%)	
Non-performing loans/total loans (%)	
Growth in demand deposits in banks (year on year, %)	
10Y government bond yield (average for period, %)	
Growth in residential property prices (transaction prices, year on year, %)	
Dividends paid on CET1 of banks (%)*	

1b. Medium-term

Loans/GDP (%)	
Credit growth (% end of period, year on year)	
Public sector debt/GDP (%)	
Household debt/nominal gross disposable income (%)	
Apartment price/average annual wage	
Apartment price/annual rent (according to IRI)	
Interest margin (new loans vs. deposits, %)	

2. MULTIPLICATION OF IMPACTS ON FINANCIAL SYSTEM

Interconnectedness in banking sector (%)	
Concentration of bank claims (five largest/CET1, %)	
Concentration of bank liabilities (five largest/CET1, %)	

3. ABSORPTION MECHANISMS IN FINANCIAL SYSTEM

3a. Absorption of all types of shocks

Excess of CET1 of banks above regulatory minimum (pp)	
Leverage (bank assets/equity)	

3b. Absorption of credit risk

Aggregate LTV for residential mortgage loans (%)	
NPL coverage ratio (provisions/NPLs, %)	

3c. Absorption of liquidity risk

Quick assets/total assets of banks (%)	
Client loans and credit facilities/client deposits of residents (%)	

Source: CNB

Note: Unfilled (filled) values are for 2012 (2013). Green (red) indicates a need to consider looser (tighter) macroprudential policy; grey signifies no clear indication in either direction in the current situation.

The benchmarks for the indicators are the estimates of the trend values or the averages since 2002 (or later, depending on data availability).

The indicators are unweighted, so the same values for the different indicators can mean different contributions to total systemic risk.

* Dividends paid out of the profits of the previous year and earlier periods.

5.2 SYSTEMIC RISKS AND MACROPRUDENTIAL POLICY RECOMMENDATIONS

Credit risk remains the focus of the CNB's attention

A potential deterioration of the credit portfolio resulting from adverse developments in the real economy is the main risk to the Czech banking sector. Its sources lie not only in a potential worsening of the situation abroad, but also in a potential decrease in domestic demand. The level of credit risk was broadly flat in 2013 and cannot be expected to fall significantly in the near future despite the improving macroeconomic data. Regardless of the economic recovery, some industries are still experiencing a strong contraction, with financial indicators deteriorating and financial reserves shrinking in some firms. This applies to small enterprises to an increased extent. Distress among many debtors from the corporate and household sectors is currently being dampened by low interest rates on loans. If these rates were to rise, whether as a result of an increase in liquidity premia or a reassessment of risk premia, the number of loan defaults could increase significantly. The persisting elevated level of credit risk is evidenced by the evolution of non-performing loans (NPLs) and provisioning (see Chart V.13). From this it can be deduced that new NPLs are continuing to flow into bank balance sheets and credit risk costs are therefore rising steadily. However, this trend is associated mainly with loans to non-residents (see section 4.1).

Banks must maintain a high loss-absorbing capacity

Czech banks currently have robust capital adequacy and a very favourable aggregate leverage ratio. This is aided by their ability to maintain adequate profitability even in the adverse macroeconomic environment, which, in turn, is due partly to the possibility of obtaining funds at relatively low cost. For this favourable situation to continue, the high public and investor confidence in the stability of the Czech banking sector needs to be maintained. As the quality of the NPL portfolio is deteriorating, i.e. these loans are continuing to migrate to the loss category and the share of classified loans that are not actually past due is falling, it is vital for banks to remain prudent in their lending activities and subsequent loan classification and provisioning. The importance of prudence is increased by indicators suggesting that credit risk might be underestimated, such as a decline in implicit risk weights without any apparent move away from risky exposures and a sizeable amount of loans not yet categorised as NPLs even though they are at risk of default. Maintaining robust capital buffers is of particular importance for banks that are systemically important by dint of their position and character. To this end, the CNB is ready to start applying the relevant capital buffers already this year and to actively use the options available under CRD IV in the period ahead if it identifies systemic risks (see section 5.3).

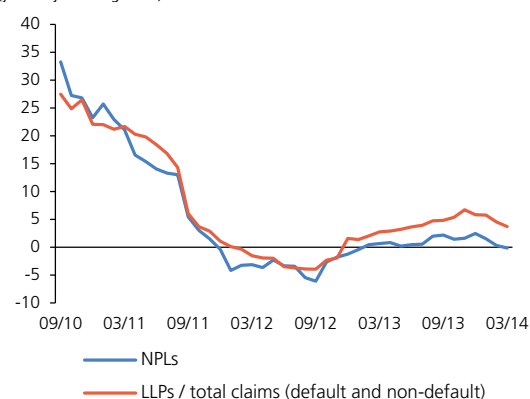
The CNB will continue to focus on the approach of banks and credit unions to assessing credit risk

The banking sector as a whole is in good shape, but significant differences persist between individual institutions, including in their approaches to providing riskier types of loans. In its supervisory work, the CNB will therefore focus on making sure that credit institutions

CHART V.13

Growth in NPLs and ratio of loan loss provisions to total claims

(year-on-year change in %)



Source: CNB

Note: The data are adjusted for the exposures of the Czech Export Bank and take into account the merger of the Czech and Slovak UniCredit Bank.

appropriately value the risks linked with their claims, assess collateral quality in a conservative manner, and set sufficient loan loss provisions. This will apply to an increased extent to the credit union segment, where the level of risk has long been elevated and where the relevant law needs to be amended to improve the situation (see Box 6). Like its partner supervisory authorities in the EU, the CNB will focus in the period ahead on whether banks set sufficiently conservative risk weights for the calculation of capital requirements when applying advanced approaches, and in particular on whether they underestimate probabilities of default and final losses given default.

BOX 6: THE CURRENT AND EXPECTED REGULATORY FRAMEWORK FOR CREDIT UNIONS

Developments in the credit union segment in recent years have led to an intense debate regarding the principles of operation of these institutions and the adequacy of the current regulatory framework. This box aims to (i) discuss the desirable principles of operation of credit unions, (ii) describe how credit unions currently operate and how the current business conditions in this segment contribute to its elevated level of risk, and (iii) outline current proposals for possible regulatory changes that would stabilise the situation in this segment in the long run.

Credit institutions such as credit unions are common in many European countries, where they operate mostly as a complement to standard commercial banking. As in the case of banks, their main activity consists of accepting deposits and providing loans. In contrast to banks, however, their operations should be dominated by the mutuality principle, with credit unions providing deposit and lending services primarily or solely to their members in a particular community, occupation and so on. Members should also be allowed to actively participate in the governance of the credit union. A rule of one member one vote regardless of membership contribution is commonly applied abroad, further reinforcing the membership principle.⁴ Given the membership principle, the initial capital needed for the operation of a credit union should consist primarily of the membership contributions of small savers. The capital requirements for the establishment of a credit union are therefore considerably lower than those for a bank. In the Czech Republic, the minimum initial capital of a credit union is set at CZK 35 million, while the minimum for banks is CZK 500 million. The objectives and principles of

⁴ MF CR (2014): *Final Assessment Report on the Impacts of the Act Amending Act No. 87/1995 Coll., on Credit Unions and Certain Related Measures and on the Amendment of Czech National Council Act No. 586/1992 Coll., on Income Taxes, as amended, April 2014*, pp. 27–28.

operation of banks and credit unions should thus differ significantly despite the fact they have similar lines of business.

One of the characteristic features of the Czech credit union sector is low coverage of NPLs by provisions. It is often argued that credit unions do not create provisions to such an extent as banks because most of their loans are backed by collateral in the form of property. However, it should be noted that the loans for which banks create provisions are usually collateralised as well. It is vital for collateral to be valued conservatively, especially in the case of property. This is why the standards of the World Council of Credit Unions recommend that at least 35% of non-standard and doubtful loans and 100% of loss loans should be covered by provisions. However, many Czech credit unions do not follow this recommendation.

In addition, the operation of credit unions in the Czech Republic is often non-compliant with the other principles outlined at the beginning of this box. The low capital requirement compared to banks is inconsistent with the fact that credit unions' business model is not limited. Credit unions in the Czech Republic have thus become rather similar to banks and are often a source of funding for a narrow set of individuals at the expense of the mutuality principle. Their role in society has therefore been greatly suppressed. However, credit unions are attractive to the public because of the higher interest rates they offer on deposits, which, as in the case of banks, are fully insured (up to EUR 100,000). As a result, rank-and-file members have a reduced interest in the running of the union and its management is often controlled by a few members only. This is because in the Czech Republic the number of votes is derived from the size of the membership contribution.

The business model of Czech credit unions also differs significantly from the traditional cooperative banking model in that credit unions can be members of groups and thus face a whole range of risks on a consolidated basis. In some credit unions this has been reflected in substantial concentration of loan portfolios on just a few debtors and in less prudent lending, in many cases not accompanied by a thorough analysis of the applicant's creditworthiness. This is evidenced by the CNB's findings from inspections in credit unions. Loan quality worsens significantly as the loan amount rises. Default rates start rising sharply at the CZK 15 million level and are very high for loans exceeding CZK 30 million. Risk management thus fails most significantly in respect of large loans.

These problems and discrepancies were also identified in the report of the 2011/2012 IMF FSAP mission, which labelled the

credit union segment as risky. It also pointed out that although the segment is small, it might become a sizeable burden on the deposit insurance scheme and its problems might adversely affect the reputation of the entire financial sector. The mission therefore recommended substantial changes to the regulations governing this segment.

The CNB has been trying to eliminate these shortcomings since 2006, when it took over supervision of this segment. It has pushed through major changes to the prudential rules. However, in order to implement essential changes, including the IMF's recommendations, the relevant law must be amended. The current proposal for legislative changes in the credit union segment, prepared by the Ministry of Finance in partnership with the CNB, includes the introduction of a loan ceiling of CZK 30 million, the restriction on the provision of products to non-members and the introduction of the minimum basic membership contribution.⁵ These measures are aimed at strengthening the mutuality principle and increasing the interest of credit union members in proper governance of the credit union and in its financial results. A proposal to increase the mandatory contribution from after-tax profit to the risk fund and increase the contribution to the deposit insurance fund aims to take into account the greater level of risk of credit unions. Conversion of credit unions into banks is also proposed where the credit union's scope of business increases substantially and its total assets exceed CZK 5 billion.

An extended period of very low long-term interest rates poses a challenge to insurance companies

A persisting environment of low long-term interest rates is a major risk currently facing insurance companies, especially in life insurance. These rates influence not only technical provisions given the discount rate used, but also the insurance company's ability to generate sufficient returns on financial placement to cover the guaranteed technical interest rate in long-term life insurance. If the low long-term interest rates were to persist for an extended period, the profit margin would further decline, adversely affecting solvency. Insurers might then start seeking riskier, higher-yielding investments or move away from guaranteed products to unit-linked investment life insurance. If the investment portfolio structure were to become riskier, insurance companies would also become more sensitive to financial market fluctuations and upward shocks to interest rates.

⁵ See the *Proposal for an Act amending Act No. 87/1995 Coll., on Credit Unions and Certain Related Measures and on the Amendment of Czech National Council Act No. 586/1992 Coll., on Income Taxes, as amended* (<https://apps.odok.cz/kpl-detail?pid=KORN9HZGTLGV>)

Although the current capital position of the insurance sector as a whole is strong enough to cover the above risk in the medium term, insurance companies differ in the robustness of their solvency positions and in their interest rate sensitivity. In their internal risk assessments to be carried out for the first time next year under Solvency II,⁶ insurance companies should therefore focus on the risk of persisting low interest rates, as well as assessing credit risk not only in isolation, but also in the context of other investment risks, reinsurers' credit risk, cancellation risk and other insurance risks, and testing their solvency position in relation to stress scenarios over the assessment horizon. After assessing the size of the impact of the risk of persisting low interest rates, insurers should adopt appropriate measures to mitigate this risk. One possible conservative measure would be to create a reserve from the insurance company's current profit from financial placement for future contributions to returns paid to policyholders. CNB supervisors will continue to focus on interest rate risk.

Pension management companies must focus on the risks associated with a potential rise in interest rates

A sharp rise in interest rates from their current very low levels poses a significant risk to pension management companies, as the transformed funds they manage hold most of their portfolios in debt securities.⁷ Pension management companies should therefore prudently assess the size of the impact of a potential rise in interest rates and the ensuing decline in the prices of their debt securities holdings. Such developments would lead to negative valuation differences, as occurred in 2007–2009, and the value of the assets of the transformed fund could fall below the value of its liabilities, as happened in the past. In such a situation the pension management company would be obliged to increase the capital of the transformed fund.

The risk of domestic property prices becoming overvalued is relatively low...

The modest growth in residential property prices in 2013 can be regarded as a return approximately to equilibrium. With the onset of the economic recovery, the gradual rise in residential property prices can be expected to continue, although the room for price growth will still be limited by the labour market situation and slow growth in household income. The low interest rates on loans for house purchase imply that speculative purchases of apartments for investment are profitable, but the evolution of yields on alternative assets is making this strategy less attractive. As

⁶ The upcoming Solvency II regulation, which insurance companies are preparing for, will take full effect on 1 January 2016. The Omnibus II Directive, which amends the original Solvency II Directive approved in 2009, introduces volatility adjustment and matching adjustment for the risk-free yield curve used to value technical provisions. These adjustments were introduced in order to reduce the volatility of insurers' available capital. What is very important, however, is that Solvency II should bolster the risk management culture and also strengthen asset and liability management, which is not of sufficient quality in some insurance companies given the current Solvency I asset valuation principles, among other things. Solvency II requires a forward-looking risk-oriented approach, with insurance companies assessing their risks in the medium term. A pilot risk assessment will already take place as part of the implementation of the Solvency II guidelines in 2015.

⁷ The nominal value of bond holdings was CZK 228 billion at the end of 2013.

growth in loans for house purchase and in the number of property transactions remains moderate, the danger of a property price bubble emerging is not currently relevant in the Czech Republic as a whole.

... there are signs of overheating in foreign property markets

Unlike the Czech economy, a number of advanced countries are showing signs of property market overheating. A correction of these imbalances could have indirect effects on the domestic property market, especially in the commercial property segment, where increased activity of foreign investors can be seen. Financial stability analyses conducted by foreign central banks link the property market overheating with relaxed credit standards in property financing (lower client-income and down-payment requirements, and the provision of interest-only loans) and with over-optimistic assessment of credit risk by banks. Credit standards on the Czech property market remain relatively conservative. However, growing diversity between banks' approaches and increasing attempts to provide riskier loans for house purchase can be observed.

The CNB will legislate for and apply prudential instruments focusing on property exposure risks

In case the domestic property market starts to show signs of overheating in the years ahead, the CNB stands ready to apply the tools defined in the CRD IV/CRR legislation. These tools include higher sector-specific risk weights for the calculation of capital requirements for banks. At the same time, the CNB will legislate for the power to apply other instruments included in ESRB recommendations, in particular limits on LTV ratios, which are dealt with in more detail in section 5.4.

The risks associated with sovereign exposures will continue to be monitored regularly

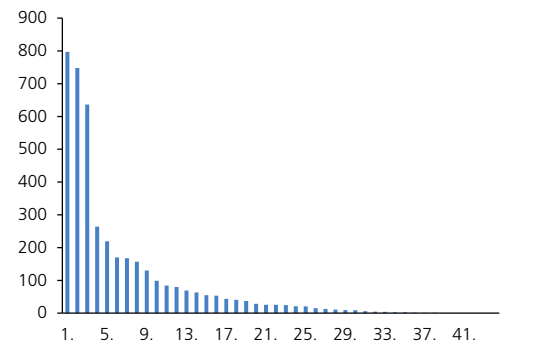
In FSR 2012/2013 the CNB pointed out that the accumulation of domestic sovereign exposures in bank balance sheets was leading to close links between the banking and government sectors. Significant holdings of domestic government bonds, which are the source of these links, are natural for many reasons. At the same time, though, they may become a source of systemic risk if doubts concerning public finance sustainability start to emerge. However, that is currently not the case in the Czech Republic, as its current fiscal situation is sustainable and sovereign risk therefore does not pose a threat to financial stability. The fact that the share of government bonds in the total assets of banks in the Czech Republic declined year on year can also be regarded as positive. Nonetheless, one can speak of increased concentration risk in some banks in this regard. In addition to sovereign risk, the government bond portfolio is also associated with market risk, which increased further in 2013 and the first few months of this year as a result of global financial market developments (see section 3.1). If the CNB were to assess the risks associated with holdings of sovereign exposures as systemic, it could proceed in accordance with the updated Pillar 2 regulatory framework by evaluating concentration risk or it could apply the systemic risk capital buffer based on sovereign exposures (see section 5.5 for details).

Changes in EU financial regulation and the banking union project require a high degree of attention

Significant changes in banking sector regulation in the EU were agreed in 2013 and the first few months of 2014. The most important include a directive on establishing a framework for recovery and resolution and amendments to the directive on deposit insurance schemes. The euro area banking union project also moved into an advanced stage. In the years ahead, this may have a significant effect on the functioning of the Czech banking sector, even though the Czech Republic will not be involved in the banking union, at least not from the beginning. The possibility of the conversion of some major subsidiary banks into branches of their foreign owners is one of the risks associated with the changes in the EU. The CNB will devote considerable attention to these risks and react to them appropriately (see Box 7 in section 5.6).

CHART V.14

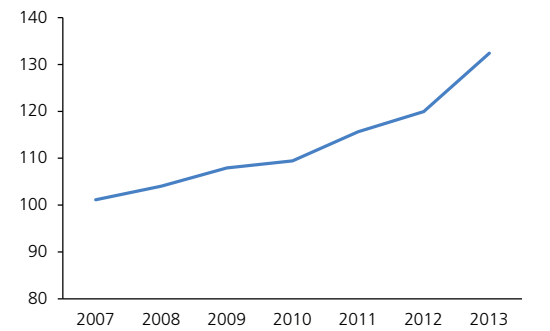
Assets of individual banks and foreign bank branches in the Czech Republic as of 31 March 2014
(CZK billions; x axis: banks in sequence)



Source: CNB

CHART V.15

Assets of the Czech banking sector in relation to GDP
(as % of GDP)



Source: CNB

5.3 CAPITAL BUFFERS AND THEIR SETTINGS IN THE CZECH REPUBLIC

5.3.1 BUFFERS RELATING TO SYSTEMIC IMPORTANCE

Based on the experience of the financial crisis, the foundations have been laid in recent years for regulation of banks on the basis of their systemic importance for the global or domestic economy, i.e. on the basis of the consequences their collapse would have for the global or domestic economy.⁸ In EU legislation, the Basel Committee on Banking Supervision’s (BCBS) original proposals were to a large extent incorporated into CRD IV, which took effect in July 2013. This directive creates room for regulation on the basis of systemic importance via three capital buffers: the capital buffer for global systemically important institutions, the capital buffer for other systemically important institutions and the systemic risk buffer. The transposition of the relevant parts of this directive into Czech law should take the form of a law amending the Act on Banks, the Act on Credit Unions, the Capital Market Undertakings Act, the Act on the CNB and the Building Savings Schemes Act, which is expected to be adopted in mid-2014.

As is clear from the other sections of this Report, the Czech banking sector currently faces no acute risks and is not a source of risk to the stability of the financial sector as a whole. However, given the long-term structural characteristics of the Czech financial and economic system, including the high concentration of the banking sector (see Chart V.14) and its key significance for the Czech economy (see Chart V.15), the CNB has decided that banks should be regulated on the basis of systemic importance as soon as the relevant laws take effect. The CNB is therefore ready to take the relevant decisions and introduce capital requirements for banks based on their systemic importance into regulatory and supervisory practice as soon as the implementing law and the CNB decree stipulating the details of the capital buffer calculation take effect.

No bank having its registered office in the Czech Republic satisfies the criteria for systemic importance for the global economy laid down in CRD IV, so the capital buffer for global systemically important institutions is not relevant to the Czech Republic. At the same time, the current version of CRD IV sets a maximum capital buffer for other systemically important institutions of just 2% of the bank’s total risk. As a 2% buffer may not be sufficient given the systemic importance of some banks, the CNB is prepared to implement systemic importance-based regulation by means of the systemic risk buffer.

This buffer will be set on the basis of the estimated systemic importance of individual banks. The indicators used for this estimate take into

8 In line with the literature and the media, we are somewhat inaccurately using the term “collapse” (of a bank) for all situations where a bank’s capital falls to dangerously low levels. The literal collapse of the bank, i.e. the revocation of its banking license, is, however, only one of a range of possible solutions to such situations.

account the characteristics of the Czech banking sector and cover the areas of interconnectedness, substitutability and complexity. The second step then involves setting the appropriate buffer for the given bank. This second step is based on the principle of equal expected impact, which can be expressed as follows: a rise in systemic importance should be accompanied by a fall in the probability of collapse so that the expected impact of collapse (i.e. the importance multiplied by the probability) is roughly equal for all banks for which the buffers are set. The probability of collapse can be reduced by setting a higher capital buffer.⁹

The CNB analysed the consequences of the above procedure for the Czech banking sector back in 2013 and concluded that the four systemically most important banks must be required to satisfy the systemic risk buffer requirement. The relevant banks were informed about this in the second half of 2013. All these banks hold capital exceeding the current (i.e. microprudentially motivated) CNB requirements. It will thus be possible to demand compliance with the systemic risk buffer together with compliance with the capital conservation buffer (see below) as soon as the relevant legislation takes effect without forcing banks to seek ways of quickly increasing their capital.

The imposition of an obligation to maintain a systemic risk buffer on a bank due to its systemic importance has no direct connection with any future decision on the resolution action to be taken by the CNB and the Czech government if that bank runs into a crisis. The obligation to maintain a relevant buffer is a preventive measure designed to reduce the probability of a bank experiencing a crisis. Crisis resolution decisions will always have to take into account the current situation of the bank and the financial sector as a whole, and so cannot be anticipated. As from 2015, this procedure will be strongly affected by the recovery and resolution directive (see section 5.6).

5.3.2 THE CAPITAL CONSERVATION BUFFER

In addition to the systemic risk buffer and the capital buffer for global or other systemically important institutions, the transposition of CRD IV into Czech law also means the introduction of a capital conservation buffer of 2.5% for all banks and credit unions. The version of the amending law currently being discussed in the Czech Parliament envisages immediate introduction of the capital conservation buffer.

The final macroprudential capital buffer is a countercyclical one. Its setting in the Czech Republic is dealt with in the following section.

⁹ The analytical basis for estimating systemic importance and setting the relevant capital buffer is the methodology described in Skořepa, M., Seidler, J. (2013): *An Additional Capital Requirement Based on the Domestic Systemic Importance of a Bank*, FSR 2012/2013.

5.3.3 THE PROPOSED CNB METHODOLOGY FOR SETTING THE COUNTERCYCLICAL CAPITAL BUFFER IN THE CZECH REPUBLIC

CRD IV introduces into EU regulatory practice a new macroprudential tool, the countercyclical capital buffer (CCB), designed to increase the banking sector's resilience to cyclical risks associated with fluctuations in lending. Credit institutions (e.g. banks and credit unions) should create such a buffer on the instructions of the supervisory authority in the expansionary phase of the credit cycle. This phase is usually characterised by the formation of financial imbalances and the accumulation of systemic risk as a result of high lending activity. The CCB should conversely be "released" by banks and credit unions at times of economic downturn or during a financial crisis when credit institutions tighten the credit conditions in response to rising loan losses, giving rise to a risk of a credit crunch in the sound part of the private sector. The CCB should thus not only increase the sector's resilience by means of higher capital for covering potential losses, but also prevent an additional shock to the real economy at times of subdued economic activity and falling credit supply from credit institutions.

Although CRD IV does not envisage full introduction of the CCB until 2016, the Member States have the discretion to introduce it as early as 2014. The amending law relating to CRD IV/CRR empowers the CNB to set the CCB in the Czech economy. The CNB is planning to use its discretion and assess and set the necessary CCB every quarter after the above amending law takes effect during 2014.

CRD IV requires the regulatory authorities to take into account the deviation of the credit-to-GDP ratio from its long-term trend when setting the CCB in their jurisdictions. Regulatory authorities should also apply the methodological recommendation of the European Systemic Risk Board (ESRB), which is based largely on the original methodology proposed by the BCBS. According to this recommendation, a non-zero CCB in a given country should be set on the basis of the magnitude of the deviation of the credit-to-GDP ratio from its long-term trend, which is obtained by applying the Hodrick-Prescott (HP) filter with a high smoothing parameter ($\lambda = 400,000$) to the longest available time series.

Over the last three years, the CNB has published several analyses in its Financial Stability Reports dealing with the calibration of the CCB from the Czech banking sector's perspective.¹⁰ These analyses pointed to the fact that the original methodology proposed by the BCBS is not easily applicable in the Czech Republic. This is primarily due to the limited length of the relevant time series, structural breaks in the time series

¹⁰ FSR 2010/2011, pp. 112–120, FSR 2011/2012, pp. 82–83, FSR 2012/2013, pp. 82–85.

linked with the late-1990s banking crisis, and the existence of trends specific to converging economies.¹¹

The fact that the BCBS methodology may send out confusing signals in some countries is admitted even in the ESRB recommendation itself. For this reason, the national authority should set the CCB taking into account other indicators that have a good ability to identify excessive credit growth and the accumulation of systemic risk. In this respect, the current proposal for the transposition of CRD IV into the amending act makes it possible for the CNB to set the CCB with due regard the specifics of the Czech economy.

For the above reasons, when setting the CCB the CNB will use a wider range of indicators and consider the specifics of a converging economy. The decision-making on the size of the CCB will thus take the form of “guided discretion”. A similar approach to CCB-setting is applied by other countries, such as Switzerland, Sweden and Norway.¹² The set of indicators considered by the CNB in its CCB decision-making may vary depending on the nature of the current risks. If, for example, credit growth is very uneven across credit segments (as it has been in the past – see Chart V.16), the CCB may not be the best macroprudential tool even if the aggregate values suggest excessive credit growth, as it may put an excessive burden on lending in non-problematic segments while insufficiently tightening the conditions in problematic segments. In such case, the setting of a non-zero CCB may conversely motivate credit institutions to lend even more to segments that seem more profitable to them. To eliminate any minor imbalances in the credit market the CNB would therefore use other macroprudential tools, for example an increase in the sectoral risk weights or a stricter LTV ratio (see section 5.4).

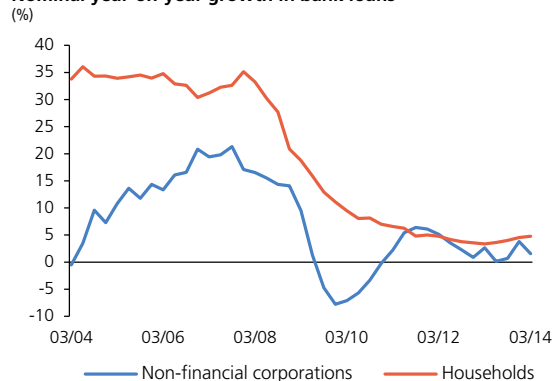
Assessment of the current situation

The current credit market situation continues to be characterised by subdued activity. Year-on-year growth in bank lending to residents was just under 2.7% at the end of 2014 Q1, well below the ten-year average (see Chart V.17). Loans to non-financial corporations were up by 0.6% and loans to households by 4.6% year on year. The credit growth estimate for the next three years also indicates no threat of excessive credit expansion for either non-financial corporations or households (see section 2).

Looking at the trend level of the credit-to-GDP ratio, it is clear that the current ratio of bank loans to GDP is below the trend of the last ten years (see Table V.2).¹³ Indicator 1, which was constructed on the basis of the

CHART V.16

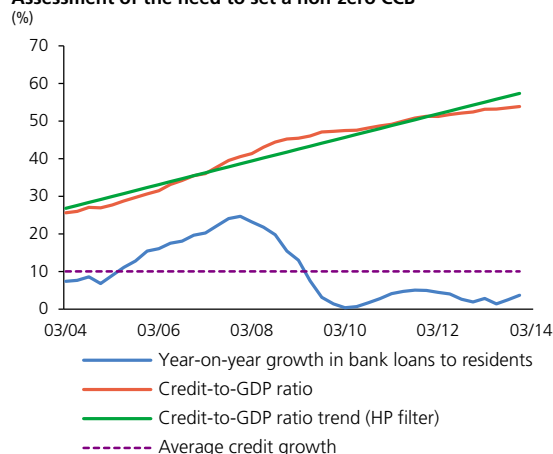
Nominal year-on-year growth in bank loans (%)



Source: CNB

CHART V.17

Assessment of the need to set a non-zero CCB (%)



Source: CNB

Note: The credit-to-GDP ratio trend corresponds to the HP filter calculation of the gap for indicator (2) in Table V.2.

¹¹ These problems are also faced by other countries that have been through a process of economic transformation.

¹² Sources:

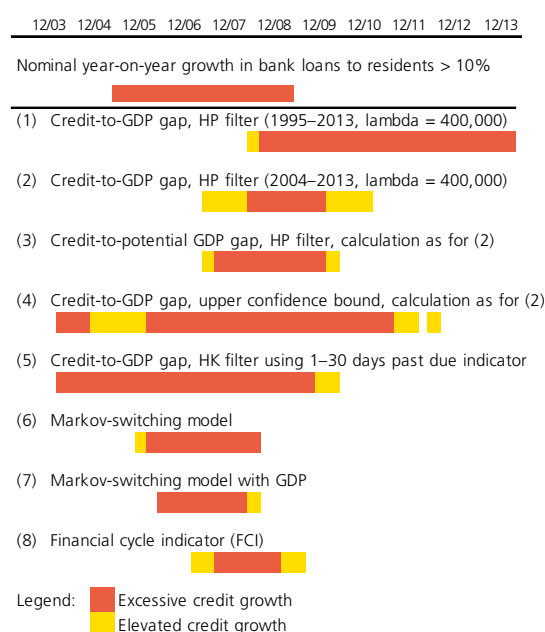
Switzerland: <http://www.snb.ch/en/mmr/reference/CCB%20communication/source>.

Sweden: http://www.riksbank.se/Documents/Rapporter/Ekonomiska_kommentarer/2013/rap_ek_kom_nr02_130503_eng.pdf.

Norway: <http://www.norges-bank.no/en/about/published/speeches/2013/aci-norge/>.

¹³ A more detailed description of the indicators used in the table is presented in FSR 2012/2013, pp. 82–85.

TABLE V.2

Identification of excessive borrowing and accumulation of risks according to various indicators

For indicators 1–5: credit-to-GDP gap > 2 pp for excessive growth, > 0.7 pp for elevated growth. **For indicators 6–7:** excessive credit growth for probability of credit expansion state > 95%, elevated credit growth for probability > 85%. **For indicator 8:** excessive growth for FCI > 0.5, elevated growth for FCI > 0.3.

Source: CNB

Note: HK filter stands for Hirose-Kamada filter.

BCBS methodology on the time series since 1995, is affected by write-offs of bad loans from banks' balance sheets and cannot be used to identify periods of excessive credit growth. When the data for the last ten years (i.e. since 2004), which are not distorted by the above fact, are used, the conclusions are similar across various specifications of the calculation of the trend credit-to-GDP ratio and do not indicate that the current credit-to-GDP ratio is excessive (indicators 2–5). When a wider credit aggregate (covering all loans to non-financial corporations and households and also corporate bonds) is used instead of bank loans, the results remain qualitatively similar.¹⁴

The current credit growth rate and credit-to-GDP ratio were also analysed using the Markov-switching (MS) model in order to identify the probabilities of various phases of the credit cycle (indicators 6 and 7, Table V.2). The MS model outputs can be interpreted as meaning that the risks associated with excessive credit growth can be considered very low. The above conclusions are corroborated by the newly constructed aggregate financial cycle indicator (FCI) (see the thematic article *An Indicator of the Financial Cycle in the Czech Economy* in this Report).

None of the other indicators under review relating to the risk of excessive credit growth in the domestic economy are elevated either: private sector debt is still relatively low, total debt service does not represent an excessive burden thanks to low interest rates (see section 2.1) and residential property prices were broadly flat in 2013 and the CNB expects them to rise only slightly in the coming years (see section 3.2). The share of loans 1–30 days past due, which was identified as a relevant leading indicator in FSR 2012/2013, is also below its long-term average.

All the above findings point to the relatively straightforward conclusion that the cyclical risks are low and that the current phase of the credit cycle in the Czech Republic does not necessitate the creation of a countercyclical buffer, i.e. the setting of a non-zero CCB. The conclusions in FSR 2012/2013 thus remain valid for the future outlook represented by the *Baseline Scenario*, and it is highly unlikely that a non-zero CCB will have to be set in the next two years either.

¹⁴ At the end of 2013, bank loans accounted for about 65% of the private sector's total loan debt.

5.4 REGULATION OF RISKS ASSOCIATED WITH EXPOSURES TO THE PROPERTY MARKET

The instruments for mitigating systemic risk also include sector-specific regulations. These apply mainly to bank exposures linked with property market developments. Two possible aspects of regulation of the risks undertaken by banks in financing residential property are described below. The first is stricter capital regulation of property exposures using increased risk weights and minimum LGD values under the CRR. The second is the setting of upper limits on the LTV (loan-to-value) ratio for individual retail loans for house purchase, i.e. the ratio of the size of the loan to the value of the pledged property.

The two types of instrument can be complementary, as they act through different channels. Capital regulation, which acts through bank balance sheets, may not always be fully sufficient and capable of adequately dampening credit creation in the banking sector as a whole. LTV limits may assist in preventing bank balance sheets (individual as well as aggregate) from swelling at a time of an interconnected credit and property boom, as they restrict the overall borrowing capacity of the household sector.

Regulation of property exposures under CRD IV/CRR

One of the main legislative changes last year was the approval of the CRD IV/CRR regulatory package, which among other things changes and broadens the regulation of risks associated with exposures secured by property.¹⁵ The CRR took effect on 1 January 2014. However, it has yet to be complemented with regulatory technical standards, which the EBA is required to develop. These standards will specify the conditions for setting stricter risk weights and LGD values for exposures secured by property and the criteria for setting the pledge value of a property. The standards should be prepared by the end of 2014.

The CRR introduces the option of setting higher risk weights or tightening the settings of certain other regulatory parameters for property-secured exposures based on the risks identified. The regulations differ for the standardised approach and the internal ratings based (IRB) approach.

Under the standardised approach, property exposures are covered mainly by Articles 124 to 126 of the CRR, which specify the risk weights in more detail, broken down into residential and commercial immovable property.¹⁶ Unless it is included in another exposure category (e.g. exposures in default) an exposure fully secured by property is assigned

¹⁵ For a description of CRD IV/CRR, see the CNB's Financial Market Supervision Report 2013, section *EU regulations in 2013*, or section 5.6 of this Report.

¹⁶ A residence is treated as residential property. To assign a preferential risk weight, the property must be either occupied or let by the owner or in the case of an exposure to a tenant who has an option to purchase. Property other than residential property is therefore treated as commercial immovable property and includes, for example, office, retail and industrial property.

a risk weight of 100%. If an exposure is fully secured by property and meets other qualitative criteria, a preferential risk weight as low as 35% and 50% may be assigned for exposures secured by residential property and commercial property respectively. For exposures fully secured by residential property, the LTV ratio must not exceed 80% of the market value or the mortgage lending value of the property; for exposures fully secured by commercial property, the LTV ratio may not exceed 50% of the market value or 60% of the mortgage lending value. The part of the exposure exceeding the value of the mortgage lending value will be assigned the risk weight applicable to unsecured exposures of the counterparty involved. If these conditions are met, the preferential risk weights will be the default ones for exposures secured by property.

The CRR allows the CNB to set a higher risk weight of up to 150% for both types of property exposures. At the same time, the CNB may set stricter criteria for the application of preferential risk weights. For example, it may reduce the share of the exposure to which the lowest risk weight can be applied (a reduction of the requested LTV ratio).

Under the IRB approach where the institution does not estimate LGD itself and the exposure is compliant with the necessary over-collateralisation,¹⁷ the institution may, pursuant to Article 230 of the CRR, apply a lower minimum LGD than for unsecured exposures – 35% instead of 45%. For the IRB approach where the institution estimates LGD values itself provided that all the conditions are met, minimum average weighted LGD values are specified (10% for exposures secured by residential property and 15% for exposures secured by commercial property). If the CNB assesses the property market situation as risky, it may specify a higher LGD value for banks using the IRB approach.

The CNB will be obliged to periodically (at least annually) analyse the property market and assess whether the preferential weights and LGDs are appropriately based on the loss experience of such exposures and forward-looking property market developments. Likewise, it may set higher weights or stricter other criteria after identifying risks to financial stability on the basis of the loss experience of such exposures, expected market developments and other risk indicators. The CNB will consult the EBA if, on the basis of this assessment, it decides that stricter criteria or risk weights are necessary. Institutions will have a six-month transitional period before the stricter criteria are applied.

LTV regulation

While the regulation of capital requirements for property exposures under CRD IV/CRR is an already approved part of EU law that will be fully implemented in national legislation with no possibility of additional modifications, the regulation of LTV is left entirely to national discretion. However, application guidelines are provided in ESRB documents (see section 5.6). Different transmission channels are mentioned for sectoral

¹⁷ Over-collateralisation of the exposure of 140%, corresponding to an LTV of roughly 71%.

capital requirements and for LTV (LTI) limits, with the former mostly affecting credit supply and the latter primarily affecting credit demand. It therefore makes sense to use both instruments at the same time.

The ESRB document is relatively optimistic as regards the effectiveness of the two instruments. It states that LTV limits may be more effective in influencing the credit cycle than capital instruments. LTV limits may also be applied to a broader group of financial institutions. In addition, the document mentions the risk of banks having an incentive to overvalue collateral and the risk of banks circumventing limits, for example by splitting up loans or topping up with non-secured loans. It also states that frequent changes in the LTV limit are not appropriate given the increased possibility of stronger credit growth in anticipation of a tightening of the limit. Another risk is that LTV and LTI limits may affect decisions regarding housing ownership versus rental and the availability of loans to some groups of the population and may therefore be regarded as politically sensitive.

Risks stemming from property exposures are regulated using LTV limits in many EU and non-EU countries (see Table V.3).¹⁸ Various countries started regulating LTV for various reasons, mostly of a macroprudential nature (to prevent excessive lending in credit booms), but often also for microprudential or consumer protection reasons. Experience with the use of the LTV tool differs considerably across countries. It is often said that LTV restrictions have had a favourable effects on the credit market, but the impact on property prices is less clear-cut. Although it is still premature to evaluate the impacts of LTV regulation (implemented mostly in 2010–2013), we can generally say that the use of LTV limits appears to be more successful in countries where they were applied relatively early and not in reaction to rapid credit or property price growth.

The manner of application differs in some respects from country to country, but the LTV limit tends to be applied only to new or refinanced residential loans, not to loans provided in the past. In most countries the LTV limit pertains only to exposures relating to residential property, with regulation of exposures to commercial property being less common (e.g. Poland). This may be due to complications in defining the loans to which such regulation applies. While for residential property it is sufficient to use a definition similar to the definition of loans for house purchase used in CNB statistics, for commercial property the definition is very complicated and there is a higher risk of regulatory arbitrage.

TABLE V.3

Use of LTV limits in individual countries

Country	LTV limit	Country	LTV limit
Austria	80% *	Netherlands	104%
Cyprus	70%	Poland	95%; 75%
Germany	80% *	Romania	60%–85%
Finland	90%	Sweden	85%
Hungary	45%–80%	Norway	85%
Lithuania	85%	New Zealand	80%
Latvia	90%		

Source: National supervisory authorities

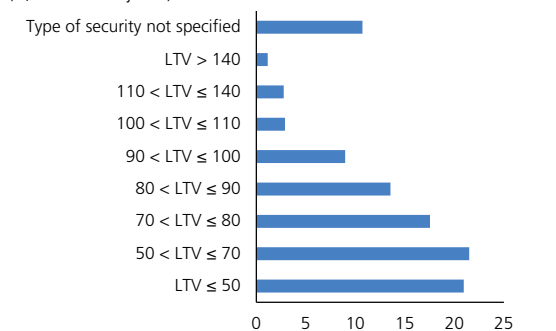
Note: The figures for Poland are the LTV limits for residential and commercial property respectively. The figures for Hungary and Romania are the ranges depending on the loan currency.

* For Germany and Austria, the regulation only applies to building societies.

18 According to the IMF, in a sample of 46 countries LTV limits were being applied in 24 countries, sectoral capital requirements in 23 countries and LTI limits in 14 countries. In 18 cases two instruments were being used in combination and in seven cases all three instruments were being used. In most countries the limit is around 80%, which corresponds to the limit set for preferential risk weights in the STA approach.

CHART V.18

Share of bank loans to households in each LTV interval
(%; as of 31 January 2014)



Source: CNB

Most countries limit the provision of new individual loans with high LTV ratios, although in some cases banks are allowed to provide loans with a high LTV but the share of such loans in total new loans provided during a specified period is limited.

In most countries the LTV limit pertains to bank loans, but in some countries it is also applied to non-bank providers of loans for house purchase. In some cases the supervisor's authorisation is defined directly in law, but elsewhere it is derived from less binding acts or mere recommendations from the regulator. In a number of the countries under review, (especially Poland, Hungary and Romania), LTV regulation was also motivated by protecting debtors and restricting foreign currency lending.

Immediate application of LTV limits in the Czech Republic is not necessary at present. Following sizeable decreases in the past, property prices are roughly at equilibrium and only modest price growth is expected in the near future (see section 3.2 and the text below). At less than 60%, the aggregate LTV ratio is relatively low. As mentioned in FSR 2012/2013, however, the aggregate level does not provide a complete picture, as information about loans with a high LTV may be hidden within a portfolio of earlier loans with a lower LTV. Data from new statistical surveys show that loans with a relatively high LTV are not negligible (see Chart V.18).

Assessment of equilibrium property prices

As stated above, under the CRR the CNB will be obliged to periodically analyse the property market and assess whether the preferential risk weights and other criteria for exposures secured by property are appropriately based on current and future developments in the Czech property market. At the same time, the CNB will assess the applied risk weights and LGD levels in reports on property market exposure losses (Article 101 of the CRR). The CNB will thus mainly analyse the sustainability and potential overvaluation of property prices. This type of analysis has been performed in the Financial Stability Reports since 2004 (see section 3.2).

The assessment of equilibrium property prices should be based on a combination of the results of various methods. Expert judgement will always play a large role in addition to mechanical application of those methods. Suitable methods include relatively simple "statistical" approaches using univariate filters such as the HP filter applied to the apartment price time series and an assessment of ratios such as price-to-rent and price-to-income relative to their long-term averages. However, the assessment of property price sustainability using these simple indicators (see Chart V.19) does not guarantee correct identification of property price overvaluation. Besides the well-known problems with

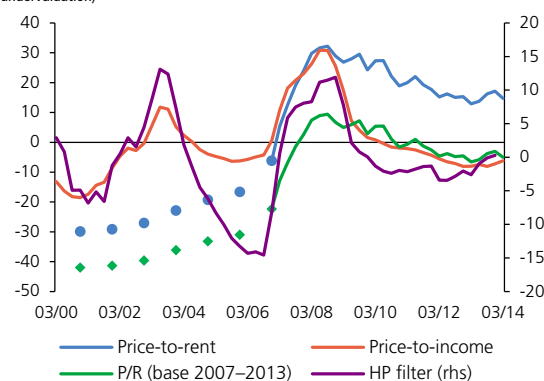
univariate filters,¹⁹ there are issues associated with the use of property price ratios as well. Determining the historical average against which the ratios are compared can pose problems, especially when significant structural breaks have occurred in the past. Take, for example, the price-to-rent ratio, which was relatively low in 2000–2006 owing to widespread rent regulation at the time. This, among other things, pushed rents up to high levels in the unregulated market segment. In addition, the low price-to-rent ratio (or the related high returns on apartment rental) can be explained by the then relatively high interest rates. If we compare the price-to-rent ratio with its average for 2007–2013, apartment prices thus appear undervalued (see Chart V.19).

The shortcomings of the above approaches are addressed to some extent by the “econometric approach” to bubble identification, which compares the market value with the estimated fundamental value of the asset. Three methods are applied in the econometric approach (see Chart V.20). The first one uses simple time series analysis with a broad set of explanatory variables and abstracts from any correlation between growth in property prices and loans for house purchase. The second approach attempts to analyse the heterogeneity of apartments using panel regression estimates for the individual regions of the Czech Republic. The third approach to estimating the apartment price gap is motivated by the existence of a long-term (equilibrium) relationship between the business and credit cycles and the housing price cycle. Overall, the estimates based on the econometric approach suggest lower undervaluation, or even slight overvaluation, compared to the ratios.

CHART V.19

Simple property price sustainability indicators

(as % of 2000–2013 average; positive values indicate overvaluation, negative values undervaluation)

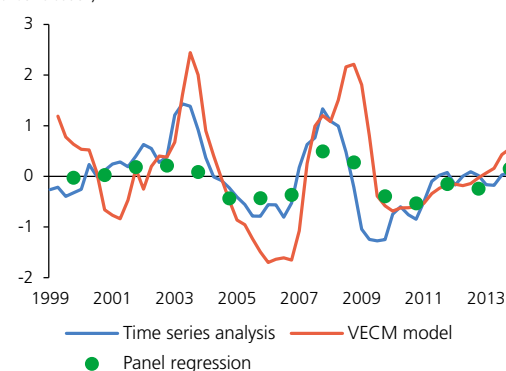


Source: CZSO, IRI, CNB calculation

CHART V.20

Apartment price gap in the Czech Republic – deviations of actual prices from estimates

(CZK thousands/m²; positive values indicate overvaluation, negative values undervaluation)

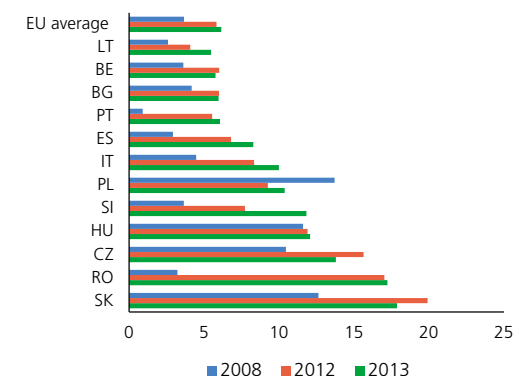


Source: CZSO, CNB calculation (CNB WP 12/2009)

19 For example, the HP filter is subject to end-point bias, which manifests itself in excessive dependence of the price trend estimate on the most recent data, especially in a situation of sharp price changes. Univariate filters also ignore property price fundamentals.

CHART V.21

Domestic government bonds in MFI balance sheets (%)



Source: ECB, CNB calculation

Note: For other EU countries the share of government bonds in MFI balance sheets is below 5%. The EU average is computed as the arithmetic mean.

5.5 REGULATION OF RISKS ASSOCIATED WITH SOVEREIGN EXPOSURES

The CNB indicated in FSR 2012/2013 that it had started to closely monitor the accumulation of domestic sovereign exposures in bank balance sheets. This was due mainly to the risk stemming from the links between the banking and government sectors.²⁰ The share of government bonds in total bank assets in the Czech Republic was lower at the end of 2013 than a year earlier, but an international comparison reveals that it is still above average (see Chart V.21).

Domestic government bonds are safe assets from the regulatory point of view. There are economic and practical reasons for this. The specific regulatory position covers several areas. In the area of liquidity regulation, government bonds are recommended for inclusion among high-quality liquid assets similarly as for hedging of transactions with central counterparties. With respect to capital regulation, sovereign exposures can be assigned a zero or very low risk weight, which creates only a very low capital requirement for exposures secured by government bonds. As regards market risk, a capital requirement is often created solely for general interest rate risk in respect of sovereign exposures held in the trading portfolio. These types of preferential treatment of government bonds imply that it is desirable and useful from the regulatory point of view to hold them in bank balance sheets. Nevertheless, banks' portfolios should not be concentrated in a single asset even if the regulations permit it. In general, banks should hold a diversified stock of assets from various categories, since it is impossible to predict which assets will be hit by potential shocks.

Exposure to the sovereign sector is not directly restricted in EU legislation, nor can it be restricted under Pillar 1. Rules for large exposures are included in the single rules governed by the CRR, which is a directly applicable EU legal rule. Under the CRR, a limit of 25% of the bank's capital is applied to exposures to all counterparties or groups of connected clients. Exposures to central governments are exempt from these limits. The introduction of limits on sovereign exposures does not count among the cases where a supervisory authority may diverge from the CRR rules.²¹

Consequently, only Pillar 2 remains applicable for the supervision of a specific institution or group of institutions. The CNB generally reviews and assesses the risks which a bank faces or may face. The CNB also reviews and assesses exposure to concentration risk in accordance with CRD IV, which updates the previous Pillar 2. On the basis of such reviews and assessments, the CNB determines whether the measures, strategies,

20 For more information on the risks stemming from the relationship between the banking and sovereign sectors, see the article *Fiscal Sustainability and Financial Stability* in FSR 2012/2013.

21 As part of their risk management systems, banks apply internal limits for the sovereign sector which take into account its credit risk, the risk of concentration in respect of this sector, and the volume and structural requirements for liquid assets defined in the CRR.

procedures and mechanisms put in place by a bank provide for proper management of the risk and whether it is sufficiently covered by capital and liquidity buffers. Depending on the result, the CNB may impose remedial measures. For example, it may require the bank to reduce its concentration risk vis-à-vis the sovereign sector.²²

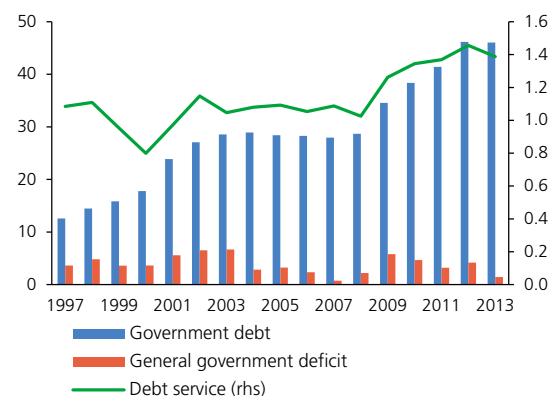
As regards sovereign exposures, the CNB not only assesses whether such exposures are excessively concentrated in bank balance sheets, but also monitors sovereign risk itself. Sovereign risk is currently low (see Chart V.22), but it is gradually increasing in line with the growth in government debt. In this context, Pillar I enables the CNB to require banks using the IRB approach to change their PD or LGD parameters. For this type of exposure, however, some Czech banks use the standardised approach and apply a zero risk weight. In this case, the CNB performs supervision under Pillar 2 and monitors and assesses whether sovereign risk is properly managed and covered. Depending on the result, it can impose measures in the form of an increase in the capital requirement for sovereign exposures.

As for the application of different risk weights to the same exposures, a general discussion of whether this is an appropriate situation is going on at international level. The differences stem not only from the high degree of expert judgement involved in calibrating internal models, which affect their input and output parameters. The approaches of national supervisory and regulatory authorities themselves also differ. The BCBS and the EBA, independently of each other, conducted empirical portfolio analyses in collaboration with a sample of the largest European banks applying the IRB approach.²³ Large differences in LGD were observed for sovereign exposures, while the differences in PD were small. However, this result is not surprising. PD depends on the frequency of counterparty default in historical data, which is very low for the sovereign sector. Another EBA study points to large differences in supervisory practices concerning risk weights.²⁴ It also notes that there are different rules for the permanent partial use of different approaches for the same types of exposures.

These discussions and analyses have produced several basic recommendations for supervisory authorities. For example, authorities are advised to more precisely and completely specify their parameter estimation rules and data requirements, to introduce minimum PD and LGD values for exposures with a low default frequency, to introduce benchmark estimates for selected parameters and to use complementary instruments for assessing capital adequacy (e.g. the leverage ratio).

CHART V.22

Public finance in the Czech Republic
(as % of GDP)



Source: CZSO, CNB calculation

22 If the bank is part of an international group, the results are discussed in colleges set up by the competent supervisory authorities for individual banking groups.

23 BCBS (2013): *Analysis of Risk-Weighted Assets for Credit Risk in the Banking Book*, Regulatory Consistency Assessment Programme, July 2013, and EBA (2013): *Review on the Consistency of Risk Weighted Assets*, December 2013.

24 EBA (2013): *Report on the Comparability of Supervisory Rules and Practices*, December 2013.

The existing European regulatory framework offers supervisory authorities another option in terms of a preventive approach to sovereign risk, namely the systemic risk buffer. In general, this can be applied to a specific bank or group of banks in order to prevent long-term non-cyclical systemic or macroprudential risks which cannot be sufficiently suppressed by means of standard supervision. An important prerequisite is that the risk might disrupt the continuity of the financial system, which would have serious negative consequences for the financial system and the real economy of the country concerned. This instrument can be applied to all exposures or parts thereof (i.e. domestic or sectoral exposures). Although this capital buffer was not primarily designed as a tool for reducing systemic risk stemming from public finances, the supervisory authority should have the option of using it if it finds this sector to be a source of such risk.

Sovereign exposures generate interest rate risk positions, with general interest rate risk related to interest rate movements and specific interest rate risk related to movements of the pure government yield curve. Under Pillar 1, a capital requirement for interest rate risk is specified only for the trading portfolio. The interest rate risk of instruments in the investment portfolio is captured by a standardised interest rate shock and is subject to review and assessment under Pillar 2. For prudential reasons, banks are obliged to specify prudential valuation adjustments for instruments measured at fair value, which should take into account unearned credit spreads, close-out costs, the uncertainty of market prices, funding costs, and so on. In the case of instruments held to maturity, which are not measured at fair value, it would be appropriate to assess whether, in the event of the fair value of sovereign exposures being lower than the book value,²⁵ the bank would be able to cover this difference from its current profit. If the current profit would not be sufficient, the bank can be required to cover the difference with regulatory capital. The CNB could again apply Pillar 2 in that case.

Interest rate and sovereign risks are included in stress testing in both the Czech Republic and the EU. In the stress tests of banking sector solvency performed currently by the EBA two types of stress were applied to sovereign exposures. Government bonds were tested in the context of market risks, where, among other things, losses arising from a rise in government bond yields are estimated, and also in a sensitivity analysis, which assumes partial impairment of sovereign exposures from all EU countries, which banks mark to market. This sensitivity analysis should reflect the experience of the recent European debt crisis, in which some countries – and not only strongly indebted ones – recorded a loss of investor confidence. As for interest rate risk, the baseline scenario of the EBA test expects Czech government bonds to show low growth comparable to that expected for government bond yields in Belgium, France and Slovakia. In the sensitivity analysis, the differences between haircuts are relatively small for individual countries, even though their different fiscal and market situations were considered. Sovereign risk is also included in the stress tests performed by the CNB (see section 4.2).

²⁵ In a standard situation, the bank would record these losses in the notes to the financial statements.

5.6 THE REGULATORY ENVIRONMENT IN THE EU AND THE BANKING UNION

5.6.1 MACROPRUDENTIAL POLICY IN THE EU

The CNB's macroprudential policy framework is being created in close connection with the approaches to the identification and mitigation of systemic risks in the EU as a whole. This work is going on mainly within the European Systemic Risk Board (ESRB).

In 2013 the ESRB made significant progress in creating an EU-wide macroprudential policy framework. The main task of this institution's committees was to prepare a document comprehensively describing the key instruments for preventing and mitigating systemic risk in the banking sector. This work led to the compilation of the *Flagship Report on Macro-prudential Policy in the Banking Sector* and an accompanying more detailed *ESRB Handbook on Operationalising Macro-prudential Policy in the Banking Sector*. Both documents were published in March 2014. The CNB was actively involved above all in the work on capital buffers and instruments concerning property market risks. The main concepts discussed in detail in the two documents from the perspective of the practical conduct of macroprudential policy are arranged according to their mutual links in Table V.4, which is taken from the *Flagship Report*. The instruments in the table correspond to those the CNB will apply as from 2014 or is ready to apply in the future if necessary.

In addition to the two documents described above, the ESRB continued to issue recommendations to central banks, supervisors and other authorities. In 2013 these included recommendations on money market funds, on the balance sheet liquidity of credit institutions and also – particularly importantly from the CNB's perspective – on intermediate objectives and instruments for national macroprudential regulators in EU countries, which should be taken into account in the practical conduct of domestic macroprudential policy. The content of this recommendation is in line with the CNB's ongoing efforts to refine its macroprudential analyses and database, and the CNB follows the recommendation in its work.

TABLE V.4

Sources of systemic risk and macro-prudential instruments

Systemic Risk:	Excessive credit growth and leverage			Excessive maturity mismatch and market illiquidity		Exposure concentrations	Misaligned incentives	
Key instruments	Counter-cyclical capital buffer	Capital instruments: - leverage ratio - by sector (real estate, intra-financial) - systemic risk buffer	Loan-to-value / loan-to-income caps	Stable funding restrictions (e.g., NSFR, LTD)	Liquidity charges	Large exposure restrictions (by counterparty, sector, geographic)	SIFI capital surcharges (G-SII and O-SII buffer)	Systemic risk buffer
Transmission channels	Resilience of banks; contribute to curbing excessive (sectoral) credit growth		Resilience of borrowers and banks, mitigate pro-cyclicality mortgage credit	Resilience of funding base to stressed outflows		Resilience to counterparty and concentration to sectors	Lower probability and impact of failure of SIFIs; increased resilience of banks	

Source: ESRB (Flagship Report on Macro-prudential Policy in the Banking Sector, Table 3)

Coordination of national macroprudential policies and exchange of views, experience and information between representatives of macroprudential regulators from various EU Member States is also an important part of the ESRB's activities. It is apparent from coordination of information and notifications that many other EU countries are planning to apply macroprudential instruments in the coming months or years. As in the case of the CNB, these will often involve higher capital requirements for banks depending on their systemic importance (see section 5.3). Authorities in Croatia, Estonia, the Netherlands and Sweden have already announced this. A number of countries will soon start applying the capital conservation buffer, and some will also actively apply the countercyclical capital buffer. A whole range of countries have already reacted or intend to react to risks linked with property exposures by setting or adjusting LTV or LTI limits (see section 5.4), setting floors for risk weights or the LGD factor for mortgage loans, or ordering mandatory repayments of principal in regular repayments of these loans. However, changes to tax legislation aimed at making debt financing of residential property purchases less attractive have already appeared as well.

5.6.2 THE BANKING UNION AND CHANGES TO THE BANKING RULES IN THE EU

During 2013 and the first few months of 2014, EU and euro area institutions focused, in line with the conclusions of the euro area summit of June 2012, on achieving progress in establishing the banking union (see Boxes 1 and 2 in FSR 2012/2013). Efforts were directed mainly towards the preparation of the Single Supervisory Mechanism (SSM) and the Single Resolution Mechanism (SRM). Work on the Single Rule Book for the banking sector entered an advanced stage following the approval of the CRD IV/CRR regulatory package. The rules also include the Bank Recovery and Resolution Directive (BRRD), the final wording of which was approved in April 2014.²⁶ The regulatory package should act preventively, while the BRRD is aimed mainly at cases where prevention has failed. However, a significant proportion of the technical standards necessary for practical compliance with the above-mentioned components of the Single Rule Book are still under preparation. Negotiations on the Deposit Guarantee Schemes Directive (DGSD) also entered their final stage. It maintains the maximum coverage of deposits at EUR 100,000 but introduces a rule that contributions to the schemes will be derived not only from the amount of insured deposits of individual institutions, but also from their risk profiles.

As part of the preparations for the establishment of single supervision, the ECB in March 2014 launched a comprehensive assessment of the 128 banks that it will directly supervise. This assessment includes an asset quality review (AQR), a stress test and a supervisory assessment of risks in individual banks. The main pillar of the assessment is the AQR, which should cover around 60% of the assets of the banks under review. The

²⁶ See the CNB's Financial Market Supervision Report 2013, section *EU regulations in 2013*.

stress test, which will draw on some of the findings from the AQR, is being prepared in parallel. It is designed to examine the impacts of various macroeconomic scenarios on the stability of the banks concerned. At the end of April 2014 the EBA published the test methodology and the macroeconomic scenarios prepared by the ESRB. The loan portfolios of Czech banks are included in the review not directly, but only on an ad-hoc basis as a part of their parent groups' portfolios. The results will be announced at group level, not for individual group members.

After completing the test in late 2014, the ECB should assume direct supervision of the banks under review. In general, direct supervision will include large banks with total assets exceeding EUR 30 billion or 20% of national GDP and, as the case may be, other banks so that the three largest banks in each participating country are always included. Almost 85% of banking assets in the euro area will be subject to supervision by the ECB. Supervision will be performed by joint teams made up of staff of the ECB and national supervisory authorities. At the ECB, around 1,000 employees, headed by a Supervisory Board, will be involved in this work. Representatives of the national supervisory authorities of SSM-participating countries will also attend the meetings of this Board, whose decisions will be adopted by the ECB Executive Board. The remaining more than 6,000 euro area banks will continue to be supervised by their national supervisory authorities. The ECB will gain some powers over these banks, primarily in the area of granting and withdrawing licenses. The new arrangements for the supervision of large banks with cross-border activities are expected to deliver stricter supervision and ensure that the same rules are applied across the entire euro area. This should help reduce the high degree of fragmentation of the EU banking market which arose during the crisis (see Box 7). At the same time, however, supervision will become a more complicated process. The new functional links between the components of this process may take some time to configure, and the system is not without the risks that are inherent in highly complex structures with shared responsibilities. Macroprudential policy will remain primarily at the national level. However, the national supervisory authorities will still be obliged to notify the ECB of any planned measures in advance and the ECB will have the power to further tighten the macroprudential instruments.

The SSM will operate in all euro area countries. Non-euro area Member States can participate in the SSM by entering into "close cooperation". Non-participating countries will conclude a multilateral memorandum of understanding with the ECB and the supervisory authorities of the other non-participating countries. As the Czech Republic will not participate in the SSM, at least not to begin with, the CNB will retain its current powers over Czech financial market participants, and its position in cross-border supervisory colleges will not change significantly either.

Final discussions on the text of the regulation establishing the SRM are under way. It will be based on the BRRD. Among other things, the BRRD, which will be applicable to all EU members, harmonises and defines in detail the rules for resolving banks that get into distress. In addition, it defines the powers that the authorities will need in order to intervene in

distressed banks, including the power to use common equity write-downs and conversion of subordinated debt or hybrid capital as resolution tools at a “point of non-viability”. The original draft of the BRRD created sizeable risks for the Czech banking sector. A number of positive changes compared to the text proposed by the European Commission were achieved. However, some issues persist, especially the concept of group interests and the possibility of providing intra-group financial support under more favourable conditions than is usual in business relationships (see Box 1 in FSR 2012/2013).

The BRRD fundamentally changes the rules for interventions by national authorities in distressed banks and for the recapitalisation of such banks. As the authorities should start applying the BRRD at the start of 2015, its content is also important for the current comprehensive assessment of large European banks. On the basis of the assessment results or supervisory findings, some of the banks under review may have to prepare recapitalisation plans and adopt other stabilising measures. Although unlikely, it cannot be ruled out that resolution using private funds will not be possible. In such cases, if a Member State wants to use public funds for recapitalisation it will have to proceed in accordance with the BRRD and the rules applying to public support. If the conditions for preventive recapitalisation from public funds (solvency of the bank, maintaining a level playing field, etc.)²⁷ are not met, measures will have to be taken in the area of write-downs and conversion. If this does not lead to stabilisation and the supervisory authority concludes that the bank has failed or is likely to fail, resolution of the bank will follow if that is in the public interest, or in the opposite case the bank will go into liquidation or insolvency proceedings. In addition, the BRRD requires it to be possible by 2016 to apply the bail-in tool, i.e. the write-down or conversion of part of unsecured debt into capital of the bank with the exception of deposits protected by a deposit guarantee scheme, following the write-down and conversion of capital and subordinated debt. However, the procedure for writing down liabilities according to the rules for state assistance will not be entirely mechanical. The European Commission will be authorised to approve exceptions in specific cases, and a different procedure will be followed in the event of a systemic crisis. The above requirements make it necessary to redefine the particulars of bank solvency, the method for determining whether a bank is in jeopardy and a number of procedures for applying that method. At the national level it will be necessary to establish a resolution authority.

At the banking union level, the SRM will operate on the basis of the above regulation and an Inter-Governmental Agreement (IGA), which will cover issues related to the Single Resolution Fund (SRF). A Single Resolution Board (SRB), located in Brussels, will be established to govern the SRM. Its approximately 300 employees will prepare resolution plans, assess the options for the resolution of distressed banks, adopt resolution

²⁷ Preventive recapitalisation from public funds may be carried out without the write-down/conversion of capital instruments, but only under specific conditions laid down in the BRRD.

measures and monitor the implementation of resolution by national resolution authorities. The SRF should become fully funded from banks' contributions within eight years. According to the rules, the SRF's assets should cover at least 1% of the covered deposits of the relevant banks, the contributions being on top of those pooled in deposit insurance funds. The SRM should enable the relevant national authorities to react decisively before a bank gets into difficulties, or at least at an early stage of distress. The primary aim is to keep the bank operational without using taxpayers' money (see the discussion of the bail-in tool below). In the first phase, therefore, efforts will be made to stabilise the distressed bank using private funds. If this proves impossible, insolvency or resolution will take place provided that the relevant conditions are met.

Contrary to initial ideas, the SRM in the banking union will not be fully centralised, i.e. it will not be based on joint and shared funds from the participating countries, at least not initially. Resolution will be conducted at national level. Where the situation requires resolution from budgetary funds, those funds will also be obtained primarily at national level. It will still be possible to use national public funds to recapitalise banks on a prudential basis, i.e. not only in a situation where a bank runs into difficulties. It will also be possible to use public national funds in the event of a systemic crisis. It will be possible to use union funds only when resolution at national level is not possible, although the funding sources and relevant mechanisms for involving EU funds are not entirely known at the moment. The important thing is that the EU mechanism will not have funds available for the resolution of bad loans or other assets that were created before the SRM was established, and the future funds of the SRF will also be quite limited. Even after eight years, the shared funds should reach just EUR 55 billion. A similar amount might also be available from the ESM in the initial phase. These are fairly small sums compared to the current assets of banks in the euro area (around EUR 30,000 billion), loans to the private sector (EUR 10,500 billion) and NPLs (around EUR 800 billion).

One of the key objectives of the European Council in approving the plan to establish a banking union in 2012 was to use it to break the vicious circle between the balance sheets of banks and sovereigns. In this respect, much hope is pinned on the bail-in tool, which is an important part of the BRRD and the SRM agreement. It consists of a set of rules under which, as of the start of 2016 at the latest, banks' shareholders and unsecured creditors (holders of the bank's bonds and some uninsured deposits) will participate in the rescue of failing banks, thus making public bail-outs the last resort. The rules of the bail-in tool are defined quite strictly. The resolution fund will be able to cover the losses and recapitalise the bank only if shareholders' and creditors' funds amounting at least to 8% of the bank's total liabilities have first been used to cover the loss or to recapitalise, and the contribution from the fund may not exceed 5% of such liabilities (with some exceptions in the event of systemic crises). Although the bail-in tool clearly reduces the potential liabilities of governments vis-à-vis banking sectors, it also entails some costs and risks. First, the tool may not always be easy to apply from the practical and procedural perspectives and may complicate the rescue

of a bank in a crisis situation. It is also suitable primarily for the resolution of individual banks, whereas in a systemic crisis its use might generate large costs for the national economy, as evidenced by the bank resolution experience in Cyprus in 2013. The impacts of the implementation of this tool on the behaviour of investors and bank creditors are a major unknown. One intended consequence may be an increase in the cost of funds, especially for large banks, if it leads to the removal of the implicit “subsidy” associated with expectations of bail-out.²⁸ However, investors and creditors may respond to the threat of losses in the event of the application of the bail-in tool with lower demand for unsecured bank bonds, which might reduce the availability of loans for funding long-term investments. Since unsecured bank bonds are held largely by other financial institutions, the relevant risk might be transferred to other financial market sectors and the potential for contagion might increase. The resolution authorities will therefore set limits on banks’ claims on institutions to which bail-in might be applied.

Some skepticism is also in order as regards the bail-in tool’s ability to break the vicious circle between banks and their governments, as it only addresses the one-way interaction running from weak banks with bad assets to their expected bail-out from taxpayers’ money. However, the opposite way of this two-way interaction between banks and governments – running from the disorderly government financial position to the quality of banks’ balance sheets via their investments in government bonds – remains intact. In this situation, reasonable doubts arise as to the ability of governments to support banks in the event of distress, and there is increasing uncertainty about the willingness of national and supranational authorities to contribute to stabilisation in the event of a crisis and a growing probability that the banking sector as a source of funds for safeguarding the stability of public finances will turn into a source of instability. Although euro area banks hold only EUR 1,700 billion in government bonds out of the total of over EUR 7,000 billion issued, this exposure has risen significantly in most countries in recent years (see section 3.1), and the new capital and liquidity regulations create incentives for a further rise.²⁹

To sum up, the banking union is not a cure-all for the risks inherent in banking business or for the euro area’s problems. The reduction in potential liabilities associated with the participation of governments in bank bail-outs and more efficient banking supervision will partly break the vicious circle between the government and banks, but other sections of this circle will remain intact. The illusion that it might be a cure-all may itself give rise to heavy costs. The idea that banks will be supervised at EU level but their problems will be solved at national level also entails some risks. Disentangling the two-way interaction between governments and

²⁸ See, for example, *Global Financial Stability Report*, April 2014, section *How Big is the Implicit Subsidy for Banks Considered Too Important to Fail?*

²⁹ This risk is also discussed in detail in the thematic article *Fiscal Sustainability and Financial Stability* in FSR 2012/2013.

banks in the euro area and the EU as a whole therefore remains a long-term goal rather than a short-term prospect.

BOX 7: FRAGMENTATION, RING-FENCING OF LOCAL ACTIVITIES, AND FOREIGN BANK BRANCHES

The need to eliminate the fragmentation of the euro area banking sector has become a major communication issue in the process of creating the banking union. Fragmentation is usually understood to mean different credit conditions, including different interest rates on loans or bonds issued in different Member States. Minor differences in credit conditions existed even before the financial crisis because of the different cyclical and structural characteristics of the euro area economies. However, these differences widened considerably during the systemic crisis in the euro area in 2011. SMEs in the periphery economies were hit particularly hard by worse access to loans, which, in addition, were much more costly than in the core countries of the euro area. The yields demanded by investors in government bonds also varied considerably across countries, although this can be explained by the varying degrees of public finance sustainability. One of the objectives of the banking union is to end this fragmentation and eliminate these differences in the single market.

However, increasing efforts to ring-fence certain activities on a national or local principle – a tendency that is not limited to Europe – are running counter to the clear advantages of having completely free and single banking services market. In particular, there is pressure to ensure sufficient capitalisation and balance-sheet liquidity for banks operating in the national market, be they domestic banks or subsidiaries and branches of foreign banks. The opinion that foreign banks should operate in national markets as branches only if they are not systemically important is also starting to win support. There are two reasons why local ring-fencing, and thus also some degree of fragmentation, may be desirable: first, a lower potential for cross-border contagion during crises, and second, a reduced ability of banks to significantly expand their externally funded activities in the optimistic phase of the credit cycle. In this respect, the desirable types of ring-fencing are those which prevent the provision of loans in the local economy in an amount that is fundamentally inconsistent with the level of locally available savings. The advocates of some degree of fragmentation admit that ring-fencing generates costs for cross-border institutions. However, they regard this as a relatively small price to pay for financial stability. By contrast, the proponents of free movement of capital and liquidity in cross-border groups argue that an absence of ring-fencing allows banks' head offices to stabilise foreign subsidiaries that get into distress during a crisis. Although this may be true in some cases, empirical studies show

that this effect is not very strong and that parent banks were not a significant source of strength to their subsidiaries in 2008–2009.³⁰

During the financial crisis, some countries experienced risks stemming from a situation where the domestic supervisory authority did not have sufficient powers over foreign bank branches operating in the country via the European passport valid in the European Economic Area. The case of the British and Dutch branches of Icelandic bank Landsbanki illustrates that a Member State may not always be able to meet its liabilities arising from insurance of deposits collected by a domestic bank in its foreign branches. This gave rise to doubts about the practices of “unsupervised” branches in host countries. The Capital Requirements Directive (CRD) responded to this by introducing the concept of significant branches, which the host regulator can be more closely involved in supervising. If a branch is assessed as significant, the host regulator can demand a range of information and take some decisions by mutual agreement of the home and host supervisors.

In light of the experience of the crisis period and the changes in European and global regulation, the British authorities (the Bank of England, Prudential Regulation Authority) issued a consultation paper *Supervising International Banks: The PRA’s Approach to Branch Supervision* in February 2014. The aim of this paper is to provide information about the future approach to supervising foreign bank branches, with a specific focus on branches of banks from non-EEA countries. In the period ahead, the PRA will focus on the extent to which foreign branches represent a risk to UK financial stability and the national deposit guarantee scheme. The approach to these branches will depend mainly on whether the home regulator’s supervision is equivalent to that applied to banks licensed in the UK. The home regulator will be informed that certain branches have been identified as significant from the UK financial stability perspective and that the UK supervisor is ready to help to assess their level of risk. At the same time, the authorities envisage some branches having to be converted into subsidiaries within this process. As regards EEA branches, some of them may be assessed as systemically important under the new European legislation (CRR). In such case, the UK supervisor will require home regulators to provide more information and to consult it on important issues. Tighter rules for the operations of foreign banks will soon also take effect in the USA. In February

30 See for example De Haas, R. and Van Lelyveld, I. (2014): *Multinational Banks and the Global Financial Crisis: Weathering the Perfect Storm?* European Bank for Reconstruction and Development Working Paper 135, December 2011.

this year, the Federal Reserve stated that the operations of foreign banks had become more complex, interconnected and concentrated in recent years. It has responded to this by introducing rules requiring foreign banks to have higher capital and liquidity. Large foreign banks will be required to establish a holding company subject to the same standards applicable to US bank holding companies.

Significant barriers to the business of foreign bank branches can be found in some smaller economies. In Canada, the regulator allows foreign bank branches to operate under significant restrictions, either as branches that can provide loans and accept deposits only from financial institutions ("lending foreign branches"), or as branches that can provide services to other sectors as well but cannot accept deposits smaller than CAD 150,000. This condition prevents branches from accepting deposits insured by the Canadian insurance fund and de facto prevents them from accepting retail deposits. Both types of branches also have to hold a certain amount of liquid assets as an equivalent to the capital buffer. The New Zealand regulator explicitly regulates the status of systemically important branches. It requires institutions exceeding a certain degree of importance to convert from a branch into a local subsidiary subject to domestic regulation. The regulatory framework in New Zealand is relevant to the debate about the Czech banking sector because there, like in the Czech Republic, most banks are owned by foreign institutions and the central bank of New Zealand, like the CNB, is mostly in the position of host regulator.

The situation where a significant subsidiary bank is converted into a branch may pose a risk to financial stability and to the stability of the economy as a whole. This risk is very pronounced in the EU, where the ability of host regulators to influence the activities of branches of banks from other Member States is more limited since the approval of CRD IV. These risks may materialise during booms and busts. During booms, branches may become a source of excessive growth in loans with inappropriate credit conditions. This, in turn, will "encourage" other banks operating in the domestic market to take a similar approach. During busts, branches may significantly rein in their activities in order to help improve the capital position of the overall cross-border group or the parent bank itself. If the group as a whole runs into problems,

the authorities in the host country will not be able to stabilise the branch through recapitalisation even though it is a systemically important institution in the market.³¹

The risk of subsidiaries being converted into branches makes it necessary to regularly assess whether the conditions for the operations of banks in the Czech Republic are worsening relative to the other Member States to such an extent that parent banks have an incentive to convert. At the same time, it is vital to set the conditions applying to such conversions so as to reduce the long-term prudential risks of such a step as much as possible. To this end, the CNB has in recent months proposed an amendment to the Act on Banks aimed at protecting insured depositors and retail consumers/debtors. These clients have limited options for protecting their interests themselves through direct negotiations with banks. At the same time, the proposal strengthens depositors' and debtors' freedom to choose the bank or foreign bank that will be their debtor or creditor or provide other services to them. First and foremost, the proposal regulates the disclosure duties of a bank vis-à-vis its clients regarding planned changes to the bank as a provider of financial services. In the period between the announcement and implementation of a planned change, depositors should have the right to cancel the liabilities on the basis of which they are depositors free of charge and with immediate effect. Similarly, debtors of the bank should have the right to cancel their claims on it. Mortgage bond holders should have the right to request early repayment of the face value of the bond plus a pro rata yield. The proposal also includes the introduction of an extraordinary contribution to the Deposit Insurance Fund to be paid by banks exiting the Czech insurance system. This proposal is aimed at maintaining depositor protection and overall financial stability in the Czech Republic following the termination of a bank's participation in the deposit insurance scheme.

The existence of large and complex foreign branches is not appealing to home country authorities either, as the home country ultimately assumes broad responsibility for developments in markets where it has limited powers in a whole range of areas. If a systemically important subsidiary in the Czech Republic does convert into a branch, its activities should be closely monitored and – if any risks are identified – the above possibilities offered by the concept of significant branches should be actively used.

31 The significance of this factor is mentioned in Fiechter, J. et al. (2011): *Subsidiaries or Branches: Does One Size Fit All?* IMF Staff Discussion Paper, March 7, 2011. For the EU see also Fáykiss, P. et al. (2013): *Transforming Subsidiaries into Branches – Should We Be Worrying about It?* MNB Occasional Papers 106, September 2013.

PART II – THEMATIC ARTICLES

AN INDICATOR OF THE FINANCIAL CYCLE IN THE CZECH ECONOMY

Miroslav Plašil, Jakub Seidler, Petr Hlaváč, Tomáš Konečný

This article describes a method for assessing the position of the Czech economy in the financial cycle. On the basis of selected variables tracking risks in the financial sector and the real economy, we construct an indicator aimed at signalling the emergence of future problems in timely fashion. The results show that the indicator is able to capture the individual phases of the financial cycle and predict the size of the banking sector's future loan losses six quarters ahead. Assessing the current position of the Czech economy in the financial cycle is a necessary condition for proper macroprudential policy-making and especially for setting the countercyclical capital buffer.

1. INTRODUCTION

The negative experience of the recent financial crisis has prompted a need for closer study of the linkages between the financial and real sectors. These sectors cannot be analysed separately, as the growing importance of financial intermediation is causing problems to spill over more easily from one part of the economy to another, thereby magnifying the intensity of the original negative shock. Developments in the global economy in recent years clearly illustrate the growing importance of this link: a crisis initially linked with the housing market and its financing subsequently turned into an economic crisis and then a debt and banking crisis. This in turn significantly limited the scope for economic recovery and renewal of financial stability.

These experiences imply a need to study the financial cycle in addition to the economic cycle itself, not least because the foundations of financial risks and imbalances are laid in good economic times, when expectations are running high. An expansionary phase of the financial cycle, associated with high (or even excessive) credit growth, is often followed by a deterioration in borrowers' ability to repay, growth in non-performing loans and large losses in the banking sector, which together can limit banks' ability to lend to the sound part of the real economy (for more details, see Frait and Komárková, 2012, pp. 12–14).

Correctly determining the current phase of the financial cycle is therefore vital for successfully identifying emerging risks, taking timely preventive action and implementing stabilisation policies. First among those policies is macroprudential policy, which is aimed at preventing the formation, propagation and materialisation of systemic risks in the financial sector and thereby reducing the probability of financial crises. In practice, however, it is difficult to assess the current position of the economy in the financial cycle because the definition of the financial cycle is itself too vague. The financial cycle is usually described merely as a latent (not directly measurable) process that cannot be

associated with a single, specific observable variable. For empirical analysis it is necessary in this situation to construct a suitable indicator that will capture the aggregate tendency of the financial system to behave cyclically and will thus yield information on the position of the economy in the cycle.

This article sets out to present one possible method for measuring the position of the economy in the financial cycle and to evaluate its ability to signal an impending risk of financial instability in advance. The proposed indicator takes into account the requirement that it be practically applicable in macroprudential policy-making, and especially in decision-making on the countercyclical capital buffer rate.¹ Although a single indicator cannot fully substitute for the wide range of analyses needed for such decision-making, it can be taken as a useful starting point for assessing the overall situation.

2. DEFINITION OF FINANCIAL CYCLE

The definition of financial cycle used in this article corresponds to that described in previous CNB Financial Stability Reports (see Frait and Komárková, 2011) and, for example, in Borio (2012). In this concept, the financial cycle is understood to mean recurrent swings in the ability of market participants to recognise financial risk. Falling risk aversion is usually reflected in rapid credit growth, rising asset prices, easy access to external financing and increased investment activity.

¹ This requirement is important primarily because the traditional method for setting the countercyclical capital buffer and determining its level (implemented in CRD IV and based on estimating the long-term trend in the credit-to-GDP ratio using the HP filter) is not suitable for the Czech economy, as it leads to highly misleading conclusions (Geršl and Seidler, 2011).

In light of the above definition, the identification of the phases of the financial cycle is based solely on a set of variables that captures swings in risk perceptions from over-optimism to under-pessimism. The key to determining the course of the cycle is the fact that changes in sentiment characterise general changes in the behaviour of all market participants and thus take place across various different areas of the economy. The cycle so defined is linked with – but is not entirely identical to – the *financial conditions*, as the latter rather reflect the level of financial stress and the materialisation of risks (Ng, 2011).

With regard to changes in risk sentiment, it is appropriate to describe in more detail the relationship between the cycle as defined above and the materialisation of risks per se. Risk materialisation indicators usually lag behind the cycle, or are even completely inverted in phase, as they often attain their most optimistic levels in the risk accumulation phase. From this perspective, the set of variables characterising the financial cycle can be viewed as a forward-looking indicator of potential problems in the economy. Identification of the financial cycle as we define it is therefore linked to some extent with the issue of early-warning models, which have been examined in many studies in past decades.

Early-warning models were initially used to identify currency crises and balance of payments crises (see, for example, Krugman, 1979) and were subsequently extended to the identification of other sorts of crises, such as banking and debt crises (Kaminsky and Reinhart, 1996; Reinhart and Rogoff, 2011). The global financial crisis generated renewed interest in this type of analysis, leading to the application of new empirical methods and larger and more detailed cross-country time series (see, for example, Leaven and Valencia, 2010, and Babecký et al., 2012).

These studies generally find that suitable indicators of future crises are generally variables connected with changes in risk aversion, such as the rate of growth of credit to the private sector, the debt and debt servicing ability of the private sector, property price growth, the tightness of the credit conditions, and the current account deficit or government debt level.²

The variables used to identify the Czech Republic's position in the credit cycle were chosen with due regard to the

studies mentioned above. The resulting set of variables (see section 2.1) also took into account the requirement to cover the widest possible area of the economy that might be affected by changes in risk aversion, i.e. the credit demand and supply sides, debt sustainability and general financial market sentiment. The financial cycle indicator should therefore reflect common tendencies in the chosen variables.

3. METHOD OF CONSTRUCTION OF THE COMPOSITE INDICATOR

Aggregate information on the comovement of variables is most often gathered on the basis of factor models³ (see, for example, Ng, 2011). These methods attempt to explain the observed correlations between variables as being a consequence of the existence of underlying factors – in this case the action of the financial cycle. This study, however, proposes a different approach based on the methodology of the composite indicator of systemic stress (CISS; see Holló et al., 2012), which, if one chooses appropriate variables, can also be used to assess the position in the financial cycle and as a basis for discussing the setting of the countercyclical capital buffer (see below). In the text below, we use the abbreviation FCI for our proposed financial cycle indicator in order to differentiate it from the CISS indicator.

The proposed technique may offer several advantages over factor models:

- With the short time series typical of most transforming economies, including the Czech Republic, it is difficult to verify (or ensure) the validity of the statistical assumptions needed to estimate factor models. The FCI may be less problematic in this regard.
- The output in the form of the FCI is more intuitive in nature and more intuitive to interpret, so it is more suitable for communication purposes. The proposed technique makes it easy to break down the indicator into the contributions of individual components and the effect of the correlations between the variables.
- The construction of a factor in a factor model is subject to a requirement to faithfully reproduce the variability of

² Forward-looking indicators can also differ across studies depending on the set of countries examined. For emerging economies one often sees indicators such as the amount of foreign exchange reserves and the equilibrium real exchange rate (see, for example, Frankel and Rose, 1996).

³ Various estimation techniques can be used to estimate a factor model, depending on the nature of the input data and the fulfilment of statistical conditions. The factor characterising the financial cycle is probably most commonly estimated using principal components.

the original data, yet it does not take into account whether the estimated factor displays good predictive properties for the preselected variable. By contrast, the FCI in some sense allows us to set the weights on the variables optimally, for example with regard to the estimate of future loan losses. In the case of the FCI, variables that play a large role in explaining a factor can have a minimal weight if they do not help to explain the materialisation of credit risk.

- Basic factor models usually assume a constant cross-correlation structure over time and hence constant relationships between the variables. In the case of the FCI, by contrast, the identification of changes in the cross-correlation structure is an important output, as it helps in identifying the individual phases of the financial cycle and reveals the formation of non-linearities.

The process of constructing the FCI can be split into several steps. The first step involves selecting relevant variables capturing changes in perceptions of financial risk across various segments of the economy. In the second step, all the input variables are transformed to make them mutually comparable. Finally, the transformed variables are combined into a single indicator using a simple aggregation algorithm. These steps are described in more detail below.

3.1 Selection of variables

The fundamental criteria for choosing the variables were given at the end of section 1. As well as material aspects, however, the availability and information content of the time series also had to be taken into account. Constructing the FCI from the time series for the period 2000 Q1–2013 Q3 offers a suitable compromise between data length and data quality. Wherever it makes sense, the input variables are compiled separately for the non-financial corporations sector and the household sector to make it easy to distinguish between sectoral tendencies and tendencies at the whole-economy (whole-private-sector) level. To suppress the effect of the convergence of the Czech economy, variables that display constant growth trends due to a low initial level are expressed as year-on-year changes. Table 1 lists the input variables together with the adjustments made. The ranking of the variables in the table reflects our subjective assessment of their relevance to the identification of the individual phases of the financial cycle and also reflects the quality of the data.⁴ A brief rationale for including each variable in the composite indicator is given in the following paragraphs.

Evolution of (new) loans to households and non-financial corporations

Many studies have shown that excessive credit growth is one of the best explanatory variables for future problems in the financial sector (see Drehmann and Borio, 2009, and Babecký et al., 2012). This fact is linked with the procyclicality of the financial sector, as economic agents become less prudent at times of economic growth and optimistic expectations. Faced with the prospect of rising future incomes, both households and firms are more willing to borrow. Analogously, lenders suffer from short-sightedness and are willing to lend to riskier clients. The amount of new bank loans in a given period is used as an indicator of credit growth. Unlike the year-on-year change in the stock of loans, this indicator is not affected by the exclusion of bad loans from banks' balance sheets or by regular repayments of existing loans.

Property prices (changes in the property price index)

Many studies consider property market imbalances – associated with sharp growth in residential and commercial property prices – to be a factor that accompanies, or significantly accelerates, the onset of most financial crises (see, for example, Giese et al., 2013, Drehmann et al., 2012, and Allen and Rogoff, 2011). Cheap financing in an optimistic phase of the financial cycle can push demand and prices above a sustainable level. The growth in prices can stimulate further credit expansion as a result of rising collateral value and the income effect on consumers (Bernanke and Gertler, 1995). The return to equilibrium is usually accompanied by negative effects on banks' balance sheets and by investment pessimism. As in Ng (2011), we use the year-on-year change in the property price index to capture imbalances in the property market (the index tracks property transaction prices as monitored by the CZSO on the basis of tax returns).

Debt sustainability (ratio of households' debt to gross disposable income, ratio of non-financial corporations' debt to gross operating surplus)

Rapid growth in the ratio of household debt to gross disposable income can signal that economic agents are overestimating their future ability to repay their debts. Higher growth in debt than in disposable income means that households may spend an increasingly large proportion of their income in the future on repaying their loans. If their income situation turns out worse than they expected, they will often become insolvent (the relationship between households' debt-to-disposable-income ratio and credit risk is described, for example, by Rinaldi and Arellano, 2006).

⁴ This ranking is partially used in setting the weights of the input variables (for more details, see section 2.2).

TABLE 1

LIST OF INPUT VARIABLES AND MAIN ADJUSTMENTS	
Indicator	Original units and adjustments made
1 New bank loans to households	CZK bn, quarterly sum of monthly new loans
2 New bank loans to non-financial corporations	CZK bn, quarterly sum of monthly new loans
3 Property prices (inflation)	y-o-y change in price index
4 Household debt/gross disposable income	bank loans/moving annual total, y-o-y change, %
5 Non-financial corporations' debt/gross operating surplus	bank loans/moving annual total, y-o-y change, %
6 Spread between rate on new loans to households and 3M PRIBOR	% p.a., computed from quarterly average rates
7 Spread between rate on new loans to NFCs and 3M PRIBOR	% p.a., computed from quarterly average rates
8 PX 50 stock index	three-month average
9 Adjusted current account deficit/GDP	% p.a., adjusted for reinvestment and transfers

Source: CNB and CZSO, authors' calculations

A similar line of reasoning applies to the ratio of debt to gross operating surplus of non-financial corporations. In this case, moreover, the aspect of debt repayment sustainability is magnified by the fact that firms' total profit, which can be affected by variable or one-off items, does not figure in the denominator. In a converging economy the relative debt level of the private sector is constantly rising, so in this case falling risk aversion is measured using year-on-year changes, i.e. using the rate of growth of debt relative to income. Owing to the short time series available, total debt is proxied by bank loans only. However, as bank loans are the main source of external financing of the real sector, the informative value of these indicators should still be high.

Lending conditions

Lending conditions characterise financial risk perceptions on the credit supply side and feature among the suitable indicators of future crises (Giese et al., 2013). In the growth phase of the cycle, banks may encourage less creditworthy and more risky clients to borrow by offering low interest rates, but they have a tendency to underestimate the level of risk involved. In the risk materialisation phase, by contrast, banks may tighten their lending conditions too much, leading to perceptible constraints on the financing of the sound part of the real sector (a credit crunch). As the bank lending survey in the Czech Republic has too short a history, the lending conditions are approximated using the difference between the interest rate on new loans to households/non-financial corporations and the three-month PRIBOR. Plašil et al. (2013) demonstrate that this simple approximation reproduces the results of the euro area survey relatively reliably.

Stock index (PX 50)

Some studies (see, for example, Borio, 2012) indicate that equity price volatility is not necessarily linked directly with the financial cycle as it is determined more by the business cycle. However, the stock index may complete our overall

picture of the nature of market participants' expectations and reveal over-optimism about future asset prices.

Adjusted current account deficit-to-GDP ratio

A current account deficit can be interpreted as meaning that more is invested in the economy than the private sector and the government save together. This may indicate the formation of external imbalances, overheating of the economy, and growth in future problems repaying loans financed by capital inflows from abroad (Giese et al., 2013). The current account also contains the income balance, which in turn has a reinvested earnings item. Countries which in past years attracted high FDI inflows (such as the Czech Republic) may face rising current account deficits due to growth in their income deficits. If, however, such deficits are driven by reinvested earnings the growth is rather optical and does not mean a worsening external imbalance, because the reinvested earnings return to the host economy in the form of FDI. In other words, this is a relatively safe (though not entirely risk-free) source of capital. The current account also contains the balance of current transfers, which is determined primarily by the government sector income item (which often reflects random administrative factors). For this reason, the ratio of the current account to GDP was adjusted for the balance of reinvested earnings and the balance of transfers so as not to be distorted by these factors.

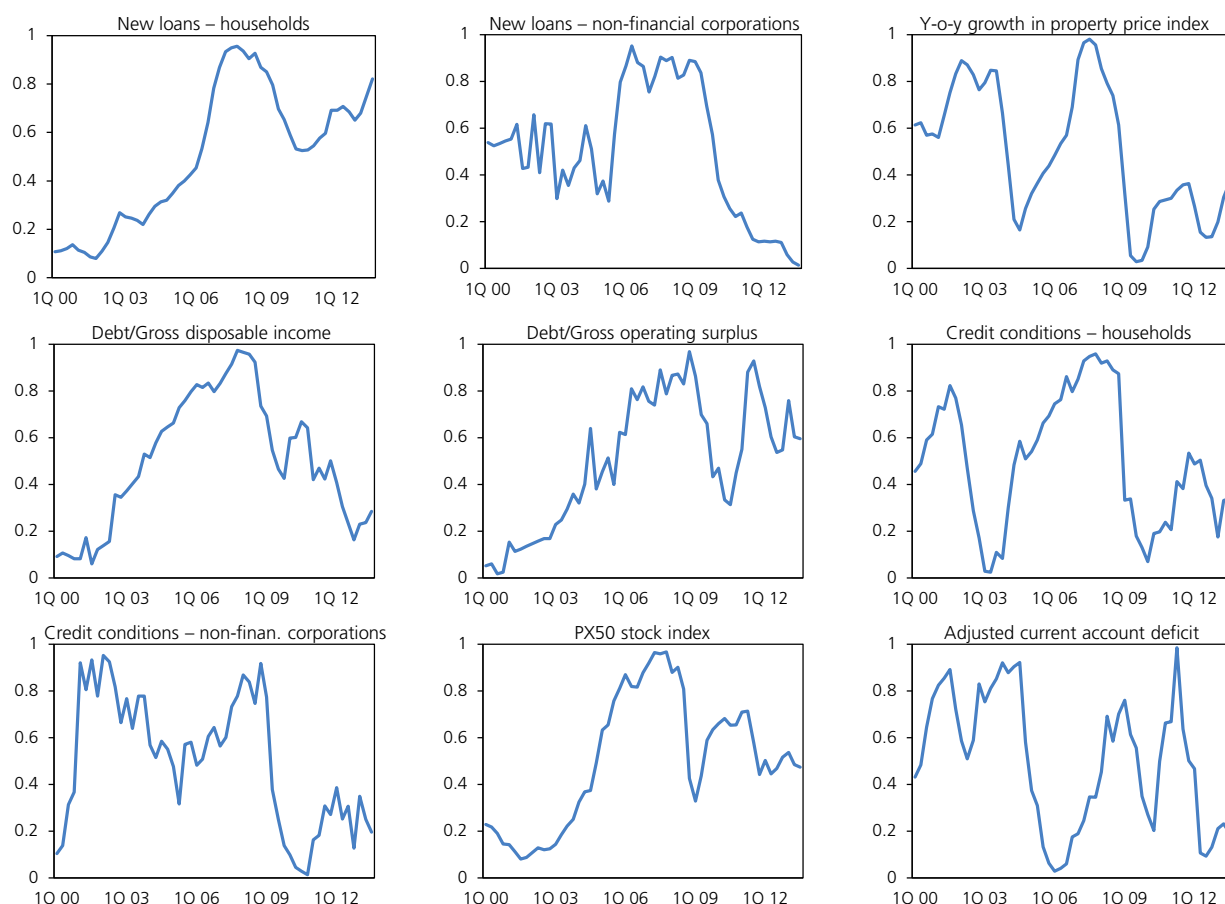
3.2 Transformation of variables and aggregation method

Before aggregation, the input variables are first transformed into the interval (0, 1) using the kernel estimate of the cumulative distribution function (Gaussian kernel) so that the lowest value of the transformed variable corresponds to the trough of the cycle and the highest value

CHART 1

TRANSFORMATION OF INPUT VARIABLES USING THE KERNEL ESTIMATE OF THE CUMULATIVE DISTRIBUTION FUNCTION

(y-axis: value of transformed indicator, 0 = minimum, 1 = maximum)



Source: CNB and CZSO, authors' calculations

to the peak⁵ (see Chart 1). This step ensures that the input variables are homogeneous and comparable. Transformation on a unit interval can also facilitate subsequent interpretation of the FCI, as it provides a clearer idea about what is a low value and what is a high one.

One of the main features of the chosen aggregation method is that it takes account of the time-varying cross-correlation structure of the data. The FCI generally takes higher values when optimism is rising across all monitored segments. The stronger are the correlations between all the transformed variables (subindicators), the stronger is the

signal sent out by the FCI about changes in sentiment over the cycle. This property is also useful for setting the countercyclical capital buffer, as the latter should be imposed in the event of general growth in cycle-related risks. If the growth is due to only some of the monitored segments (for example, only growth in mortgage loans to households) it may be more appropriate to use a different prudential tool to eliminate the nascent risks.

In addition to the cross-correlation structure, which characterises the interactions between individual segments and thus offers a cross-sectional view of the risks, the resultant aggregation captures the time dimension of risk.⁶

⁵ The original CISS applies a rather simpler transformation using the empirical cumulative distribution function. Some of the variables (spreads, current account deficit/GDP) had to be multiplied by a coefficient of -1 before the transformation itself so that low financial risk aversion corresponded to higher values for all the variables.

⁶ Clear definitions of the time and cross-sectional dimension of risk can be found in Frait and Komárková (2012). In the present article, however, the cross-sectional dimension of risk is defined rather differently. The original concept defined the cross-sectional dimension as the degree of financial

The latter is given by the magnitude of the subindicators themselves. Their differing importance can be reflected in the resultant aggregation using a system of weights. Formally, the aggregation method can be expressed using the following formula (see Holló et al., 2012)

$$IFC_t = (w \circ s_t)' C_t (w \circ s_t), \quad (1)$$

where $w = (w_1, w_2, \dots, w_9)$ is a vector indicating the relative importance of the individual subindicators, $s_t = (s_{1,t}, s_{2,t}, \dots, s_{9,t})$ is the vector of subindicators at time t and $(w \circ s_t)$ represents the element-by-element multiplication of these vectors (known as the Hadamard-product). Matrix C_t contains the values of the cross-correlation coefficients $\rho_{t,ij}$ determining how strong the relationship between subindicators i and j is at time t .

Using aggregation (1) the result is a composite indicator defined on the interval $(0, 1)$. The higher is the indicator, the higher is the degree of financial risk tolerance generally observed among market participants in the economy.

The correlation coefficients were estimated recursively using the exponentially weighted moving average (EWMA) method with smoothing factor $\lambda = 0.94$ (RiskMetrics, 1996). If the covariance σ_{ij} and variance σ_i^2 (or σ_j^2) at time $t-1$ are known, the correlation coefficient $\rho_{t,ij}$ can be approximated using the following formulas:

$$\begin{aligned} \sigma_{t,ij} &= \lambda \sigma_{t-1,ij} + (1 - \lambda) \tilde{s}_{t,i} \tilde{s}_{t,j} \\ \sigma_{t,i}^2 &= \lambda \sigma_{t-1,i}^2 + (1 - \lambda) \tilde{s}_{t,i} \tilde{s}_{t,i} \\ \rho_{t,ij} &= \sigma_{t,ij} / (\sigma_{t,i} \sigma_{t,j}) \end{aligned}$$

where $\tilde{s}_{t,i} = (s_{t,i} - 0.5)$ denotes the values of the individual subindicators after subtracting their "theoretical" median. The initial values of the correlation coefficients at time $t = 1$ were also estimated using the EWMA method, although applied to the time series in reverse order from the most recent observation to the oldest.

The relative weight of the individual subindicators (the vector of weights w) was determined by means of simulation techniques. A total of 30,000 different weight distributions were simulated and the vector which, after substitution into equation (1), gave the best predictions (in

terms of RMSE) of future loan loss impairments in the Czech banking sector⁷ six quarters ahead was chosen. The chosen number of quarters reflects the fact that when a non-zero countercyclical capital buffer is announced, banks need at least one year to implement it. To this one also needs to add the input data publication lag and the time needed to make the decision to set the capital buffer. Expert knowledge was taken into account *a priori* when estimating the final weights in order to avoid unintuitive results. The *a priori* constraints on the vector of weights can be expressed as an inequality where all the simulated weight distributions must satisfy the condition

$$w_1 \geq w_2 \geq w_3 \geq \dots \geq w_9,$$

where the indices correspond to the indicator ranking in Table 1. Note that the *a priori* assessment of the relevance of each variable does not rule out the possibility that all the variables have the same weight.

It is useful to demonstrate the properties of the FCI using a simplified example. If the composite indicator were based on the aggregation of just three subindicators, its resultant value could be written in the following form:

$$\begin{aligned} IFC_t &= (w_1 s_{t,1} + w_2 \rho_{t,12} s_{t,2} + w_3 \rho_{t,13} s_{t,3}) w_1 s_{t,1} + \\ &+ (w_1 \rho_{t,12} s_{t,1} + w_2 s_{t,2} + w_3 \rho_{t,23} s_{t,3}) w_2 s_{t,2} + \\ &+ (w_1 \rho_{t,13} s_{t,1} + w_2 \rho_{t,23} s_{t,2} + w_3 s_{t,3}) w_3 s_{t,3} \end{aligned} \quad (2)$$

$\underbrace{\hspace{15em}}_{\text{Weight characterising cross-sectional dimension of financial risk}} \quad \underbrace{\hspace{15em}}_{\text{Weight characterising time dimension of financial risk}}$

It is clear from (2) that the total weight of a subindicator is given – in addition to the weights w themselves – by the value of the expression in parentheses, which in turn depends on the magnitude of the correlations between the given subindicator and the other variables in the system under consideration. If, for example, subindicator s_3 is not correlated with indicators s_1 and s_2 , its contribution to the FCI will be lower; in the case of a strong negative correlation it will potentially even be negative. This illustration shows that variables that are strongly positively correlated with each other will have the largest positive effect on the final value of the FCI. This can be loosely interpreted as meaning that the FCI, like the factor model,

interconnection between economic agents, which can generate financial risks, whereas here the cross-sectional dimension is taken to mean the degree of interconnection between the various aspects of financial risk, which can amplify the overall level of financial risk.

⁷ As an alternative, the weights were determined with regard to the predictive power of the FCI for the 12-month default rate in the non-financial corporations sector and for the first difference of the ratio of non-performing loans to total loans in the private sector. The results were similar.

makes it possible to somehow detect the effect of the latent factor causing the variables to co-move.

A special case is the situation where the correlation between all the subindicators is equal to one (perfect correlation), so that the FCI attains its upper bound with respect to the values of the subindicators. Comparing the current value of the composite indicator with its hypothetical maximum helps to determine the extent to which the correlation structure influences the final result, or the size of the “loss” caused by imperfect synchronisation of subindicators over the cycle. The overall value of the FCI can therefore be broken down into the contributions given by the subindicator values and the negative contribution (loss) that depends on the cross-correlation structure of the data. The lower are the observed correlations between the subindicators, the larger is the negative contribution (in absolute terms).

4. EVOLUTION OF THE FCI

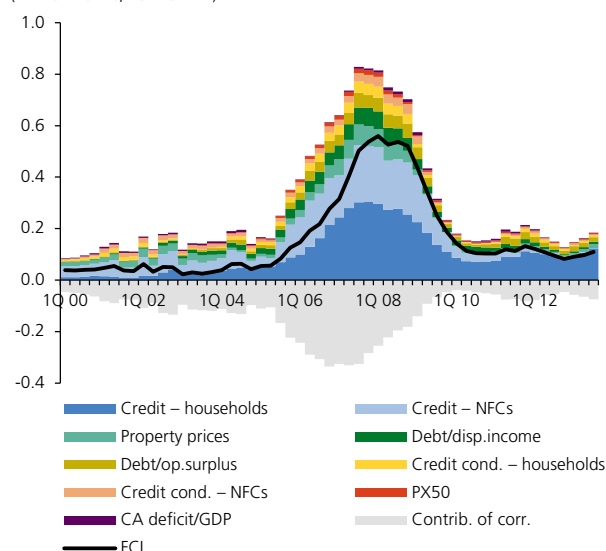
In line with earlier literature, the estimated weights⁸ $w = (0.35 \ 0.27 \ 0.09 \ 0.08 \ 0.07 \ 0.05 \ 0.05 \ 0.02 \ 0.02)$ indicate that credit dynamics provide the main signal for forecasting the materialisation of financial risks, as loans to households and non-financial corporations together have a weight of over 60% in the composite FCI. Using the estimated weights w and the correlations C we can obtain the FCI values according to (1). Chart 2 shows the evolution of the FCI (the black line) along with its decomposition into individual contributions (the bar chart).

The results show that the FCI was very low until roughly the end of 2005. This reflected high financial risk aversion linked with the late-1990s banking crisis and the subsequent consolidation of the banking sector, which took until the start of the new millennium to complete. The period of 2005–2008 can be described as an expansionary phase of the financial cycle, with an economic recovery accompanied by gradually rising optimism and risk tolerance. Among other things, the expansion was fostered by growing popularity of mortgage loans along with quite a strong construction boom and growth in property prices.⁹ In this period, bank clients showed a greater willingness to

CHART 2

THE FCI AND ITS DECOMPOSITION

(minimum FCI = 0, maximum = 1)



Source: CNB and CZSO, authors' calculations

Note: The negative contribution of the cross-correlation structure to the FCI value (the loss due to imperfect correlation of the subindicators) is due to the difference between the current FCI value and the (potential) upper bound. Highly negative contributions indicate a generally weak correlation between the subindicators, whereas near-zero contributions indicate growing interconnectedness in individual areas of financial risk.

borrow despite the risks associated with future debt service. As time went on, this willingness was also fostered by banks themselves through ever weaker lending conditions. Late 2008/early 2009 can be identified as the peak of the cycle. This was followed by a rapid switch to a downward phase of the cycle as a result of (the effects of) the financial crisis impacting on the Czech economy. The latest figures indicate that the Czech economy has been at the bottom of the financial cycle for some time now and is not showing any signs of accumulation of cyclical risks.¹⁰

The evolution of the FCI from the perspective of the cross-correlation structure and its contributions suggests that in the initial expansion phase (i.e. roughly between 2005 and 2007) the individual subindicators displayed quite mixed trends and the overall correlation between them was relatively low. This hindered growth in the composite indicator and manifested itself in a large difference between the upper bound (see section 2.2) and the actual value of the FCI (see Chart 2). By contrast, the peak phase of the cycle (2008/2009) was accompanied, in addition to growth

⁸ The ordering of the weights corresponds to the ranking of the variables in Table 1. The weights are rounded, and the rounded values were used to calculate the FCI.

⁹ Hlaváček and Komárek (2009) point to some overvaluation on the property market in 2007 and 2008. This reflected, among other things, a pre-announced increase in VAT on residential property construction.

¹⁰ In recent years, moreover, the FCI values have been further overestimated due to the phenomenon of mortgage refinancing, which is inflating the total amount of new loans to households. It is not yet possible to fully filter out this effect on the basis of the available statistics.

in the contributions of the individual subindicators, by gradual growth in the correlations between them. Even at the peak of the expansion, however, the FCI was fluctuating around 0.6, which is by no means a dramatic figure given the admissible range of (0, 1). The correlations were still rising during the acute phase of the recession, when all the subindicators were falling together.

4.1 The FCI and the countercyclical capital buffer

One of the macroprudential tools intended to play a stabilising role in the financial cycle is the countercyclical capital buffer (CCB). Banks should create a CCB at times of excessive credit growth in order to increase the resilience of the banking system at times of falling economic activity and rising loan losses. The greater resilience of banks due to the possibility of partly or fully releasing the CCB is supposed to reduce the risk of a sharp contraction in the credit supply and the transmission of shocks from the financial sector to the real economy.

Because the Basel Committee's baseline method for determining the CCB, which the CNB will have to publish in connection with CRD IV, is not very suitable for the Czech Republic and many other transforming economies (see Geršl and Seidler, 2011), the FCI can be used to obtain aggregate information on the evolution of risks in the domestic economy. In this context, however, it is necessary to verify whether the composite indicator provides a timely signal of future materialisation of the risks and bank losses that the CCB is supposed to cover.

For the sake of simplicity we present only a trivial model between a measure of risk materialisation and the FCI:

$$\text{Materialisation}_t = \beta_0 + \beta_1 \text{FCI}_{t-6} + u_t, \quad (3)$$

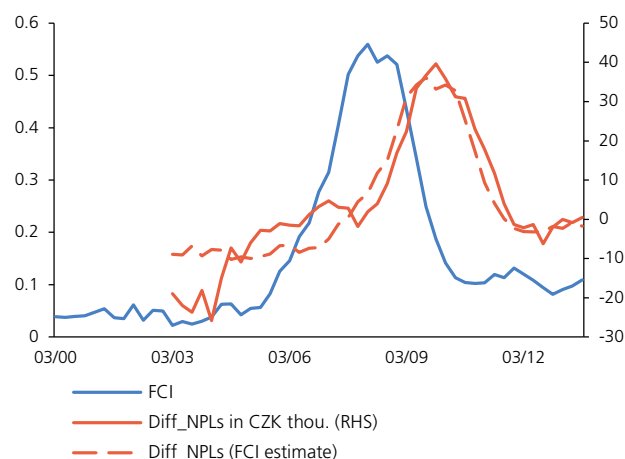
where the measure of risk materialisation at time t (year-on-year differences in NPLs to the private sector¹¹) depends only on the FCI lagged by six quarters, β_0 and β_1 are regression coefficients and u_t is the error term.

The plots in Chart 3 show that the financial cycle as measured using the FCI is closely linked with future risk materialisation, with the materialisation curve lagging approximately 6–8 quarters behind the financial risk

CHART 3

THE FCI AND RISK MATERIALISATION

(FCI value; right-hand scale: CZK billions)



Source: CNB, authors' calculations

Note: The estimate of the FCI for changes in the NPL ratio does not cover the pre-2003 period, when this ratio was significantly affected by the transfer of bad bank loans to a consolidation bank/agency. R-squared is equal to 0.82.

perceptions cycle. This finding is formally confirmed by the estimate of model (3), which, despite its simplicity, is capable of forecasting future changes in NPLs¹² with sufficient accuracy, especially when those changes are positive and imply growth in risk materialisation. On the other hand, the results should be interpreted with caution, as the period under review covers only one financial cycle and the predictive properties of the indicator may change in the future.

The above results are favourable in terms of the possibility of using the FCI to set a non-zero countercyclical capital buffer, suggesting that it could be applicable in this area. Thanks to its simplicity and good predictive properties, the FCI serves as a starting point for more comprehensive evaluation of the accumulation of financial risks and also as a suitable communication tool.

5. CONCLUSION

Successful macroprudential policy requires correct and timely assessment of the position of the economy in the financial cycle. This article described the construction of a composite indicator that captures the accumulation of risks in the financial sector and signals their potential materialisation in advance. To this end, we selected a set of

11 This measure was chosen on account of its easy implementation into the existing bank stress tests, which can be used to determine the necessary capital injection and therefore also to determine the CCB. However, the good predictive ability of the FCI is robust across possible risk materialisation measures such as the 12-month default rate and bank loan losses.

12 R-squared is equal to 0.82.

variables which, according to earlier studies and expert judgement, expresses the cyclical swings in financial risk perceptions in the financial and real sector. Those variables are: credit growth, property prices, lending conditions, debt sustainability in non-financial corporations and households, asset prices and the adjusted current account deficit-to-GDP ratio.

Using these variables we constructed a composite indicator – the FCI – which takes into account the changing cross-correlation structure and takes its highest values at times of rising synchronisation between the monitored variables characterising various aspects of the financial cycle. The weights of the individual variables in the composite indicator are calibrated so that the indicator best identifies the loan impairment losses observed in the Czech banking sector, i.e. the risks in the materialisation phase.

The evolution of the proposed indicator suggests that it identifies the potential future materialisation of credit risks approximately 6–8 quarters ahead. Its simple construction and interpretation makes the FCI a suitable ancillary tool for identifying the phases of the financial cycle in the Czech Republic, which in turn is vital for conducting macroprudential policy and especially for setting the countercyclical capital buffer (see section 5 of this Report).

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CONCURRENT CAPITAL BUFFERS IN A BANKING GROUP

Michal Skořepa

In this article we simulate how much the capital of a parent bank must be increased above the minimum capital requirement applying to the parent alone as a result of a requirement being imposed on the banking group as a whole, and how the probability of failure of a subsidiary and the group changes after a capital buffer is imposed on the group as a whole and/or the subsidiary. The simulation takes into account the relative sizes of the parent and the subsidiary, the parent's share in the subsidiary, the similarity between the business models of the parent and the subsidiary, and the preparedness of the parent to support the subsidiary if the latter is in danger of failing.

1. INTRODUCTION

One of the main innovations of the Basel III global regulatory framework for banks (BCBS, 2011) is the concept of capital buffers. In this context, "buffer" means a bank-specific capital requirement (in relation to the bank's risk-weighted assets) imposed on top of the minimum requirement under certain conditions. If a bank's capital falls below the sum of the minimum and the buffer, the bank has to observe certain restrictions on actions (such as the payment of dividends) that would further reduce its capital or hinder it in rebuilding its capital to the required level.

The general logic of any Basel III capital buffer is that if the imposition of a buffer on a banking group leads to growth in the group's total capital adequacy, then – other things being equal – the probability of the bank incurring a loss that will fully deplete its capital will decrease, hence the probability of failure of the group will also be reduced. The same logic applies to the probability of failure of a subsidiary in the group if a buffer is imposed on that subsidiary. The imposition of a buffer on the group will also probably lead to growth in the parent's capital above the minimum requirement imposed on the parent alone. This gives rise to issues regarding the impacts of a group or subsidiary buffer on the parent's capital and on the probability of failure of the group and the subsidiary.¹

In this article we examine the above issues using a set of simulations. We investigate how the answers change depending on the relative sizes of the two members of the group, on the size of the parent's share in the subsidiary and on the similarity between the business models of the

parent and the subsidiary. By contrast, we abstract from any changes in the parameters of the environment in which banks operate (such as borrowers' ability to repay their loans) and from the effects of changing capital requirements on banks' lending and other activities and on their profitability.

The existence of concurrent buffers in a group is clearly a relevant topic for macroprudential and microprudential policy-makers wherever a banking sector they regulate contains members of banking groups – parents, subsidiaries or both. Turning specifically to the Czech banking sector, subsidiaries of other banks account for the lion's share of its assets, while most parent banks are based in other countries. The four largest Czech banks are subsidiaries of foreign parents; one (Komerční banka) is around 60% owned by its parent, while the remaining three (Česká spořitelna, ČSOB and UniCredit) are wholly or almost wholly owned by their parents. The four banks each account for between a few per cent and around one-sixth of the assets of the relevant banking group as a whole.

In these circumstances, frictions can arise between home and host regulators over what capital buffer rates should be set for the group as a whole and for the subsidiary so that the probability of failure of both falls to the desired level. For example, after imposing a global systemically important bank buffer on a group, the home regulator may conclude that this buffer in itself ensures that the subsidiary bank is also sufficiently stable. Consequently, it may put pressure on the host regulator not to impose any additional buffer on the subsidiary. By contrast, the host regulator, whose primary objective is to ensure that the subsidiary, not the group, is stable, may feel that the buffer imposed on the group does not in fact ensure that the subsidiary is sufficiently stable. The point of imposing a buffer on a subsidiary is to increase its resilience to the risks it faces, because the experience of recent years has shown that the parent's capital may not sufficiently protect the subsidiary and so taxpayers in the country where the subsidiary operates may have to foot the

¹ For the sake of brevity, throughout this article a requirement applying to the group will mean a requirement applying to the group at the consolidated level, and a requirement applying to the parent alone (or to the subsidiary) will mean a requirement applying to the parent (or the subsidiary) at the stand-alone level.

bill if it becomes distressed. Our simulations are intended to shed some light on these highly topical issues.² We will focus on Basel III at the general level and therefore abstract from the specifics of how this framework has been transposed into EU legislation (in CRD IV and CRR).

The remainder of this article is structured as follows. Section 2 analyses the logic of each of the three types of capital buffers introduced in Basel III and explains that only the buffer based on systemic importance leads to meaningful differentiation of probabilities of failure for different banks, so our subsequent simulations can be viewed as relating primarily to this type of buffer. Section 3 describes the simulation results, i.e. our estimates of the necessary increase in the parent's capital on top of the stand-alone minimum requirement for various combinations of capital buffers for the group and for the subsidiary, and then our estimates of the probability of failure of the group and the subsidiary assuming that the parent is prepared to provide assistance to the subsidiary where necessary. Section 4 summarises all the main findings as well as describing some of the (tentative) implications for regulatory practice.

2. CAPITAL BUFFERS INTRODUCED BY BASEL III

Basel III introduced three types of capital buffers. The first is the capital conservation buffer, which is applicable equally to all banks. The second is the countercyclical buffer, which should be imposed on each bank commensurately with its contribution to any credit boom that the competent regulator regards as unhealthily strong (BCBS, 2010; Repullo and Saurina, 2011). The third type is a buffer based on systemic importance, usually referred to as the SIB (systemically important bank) buffer. The higher the macroeconomic losses that would be generated by a bank's distress or failure, the larger this buffer should be (BCBS, 2012, 2013). This concept can be applied either to the global economy or to the domestic economy, so this buffer can be said to have two subtypes: a buffer for global systemically important banks (G-SIB buffer) and a buffer for domestic systemically important banks (D-SIB buffer).

All three types of reserves have the same impact in terms of the conservation and rebuilding of capital: all three buffers

applicable to the bank are summed, and if its actual capital is less than the sum of the combined buffer and the traditional minimum capital requirement, the bank must put in place the restrictions referred to above. The bank must fill all three buffers with capital in the form of Common Equity Tier 1 (CET1).

The conservation buffer – if introduced in the banking sector at all – applies equally to every bank. This type of buffer can therefore be interpreted as a non-selective, simple “soft” extension of the “hard” Pillar 1 minimum capital requirement. By contrast, the remaining two types of buffer allow the regulator to take into account, among other things, a bank's exposure to its parent or subsidiary and the capital adequacy ratio of that parent or subsidiary when choosing the rates for these buffers.

Under Pillar 1 of Basel II, the same minimum capital requirement of 8% of risk-weighted assets (RWA) was applied to all banks. This can be interpreted in very simplified terms as an effort to anchor the probability of failure of all banks (stemming from the risks covered by Pillar 1) at the same level, specifically at the 0.1% level stipulated as desirable in Basel II. Kuritzkes and Schuermann (2010, p. 125), for example, interpret this probability as the “implied solvency standard of the Basel capital requirements”.³

This logic also seems to underlie the countercyclical buffer. In the growth phase of the financial cycle, the risks get increasingly underestimated, so that the reported RWA level – i.e. essentially the quantification of a bank's risks – steadily slips below the real level of risks faced by the bank. The true probability that the minimum required capital will not be enough to cover the bank's future losses thus rises above the level required under Basel II. The countercyclical buffer is mentioned directly in Basel III as one of several measures to address “cyclicality of the minimum requirement”. Also, the passage in Basel III summarising the motives for this buffer begins by asserting that “losses incurred in the banking sector during a downturn preceded by a period of excess credit growth can be extremely large” (BCBS, 2011, p. 7); “extremely large losses” here can be interpreted as meaning “losses greater than the minimum requirement is capable of covering with the probability required under Basel II”. The main aim of the countercyclical capital buffer therefore seems to be to help ensure that the probability of future failure of a bank stays close to the level required under Basel

² The relevance of these issues to regulatory practice is illustrated in Skořepa and Seidler (2013), which describes the main features of the approach chosen by the CNB for determining the capital buffer rate based on banks' domestic systemic importance. Some qualitative issues complementary to this article are discussed in Skořepa and Seidler (2014).

³ In reality, however, this logic is significantly impaired by various implementation problems (see, for example, Kiema and Jokivuolle, 2013, and Zimper, 2013).

II when the RWA level is underestimated in the growth phase of the financial cycle.

The buffer based on a bank's systemic importance departs from the logic described above (i.e. the anchoring of the probability of failure for all banks at the level required under Basel II). The point of this buffer is to reduce the probability of future failure of a bank below the level required under Basel II. The main recommendation given in the relevant official documents (BCBS, 2012, 2013) is that the reduction in the probability of failure of a bank by means of this reserve should be commensurate with the bank's systemic importance, i.e. with the costs that the bank's failure would mean for the whole economy. BCBS (2013) calls this recommendation the "expected impact approach": the buffer rate should be set so as to offset the expected impact of the bank's failure, calculated as the probability of failure multiplied by the macroeconomic costs given failure.

We will assume for simplicity that RWAs are measured correctly. The arguments set out above imply that our simulations of the intra-group concurrence of capital buffers will relate primarily to the capital buffer based on systemic importance rather than on the conservation buffer or the countercyclical buffer.

The BCBS's official document on D-SIB capital buffers (BCBS, 2012, p. 8) recognises the possibility of imposing one buffer based on systemic importance on the parent and another on the subsidiary within a (cross-border) banking group: "Home authorities should impose HLA [systemic importance-based capital] requirements that they calibrate at the parent and/or consolidated level and host authorities should impose HLA [systemic importance-based capital] requirements that they calibrate at the sub-consolidated/subsidiary level. The home authority should test that the parent bank is adequately capitalised on a stand-alone basis, including cases in which a D-SIB HLA requirement is applied at the subsidiary level." This provision, however, is pitched at a general level. The aim of the following simulations is to examine this issue in more detail. Specifically, we will try to determine what impacts the imposition of a buffer on a group or subsidiary has on the parent's capital and on the probability of failure of the subsidiary and the group. We will assume throughout that the competent regulators have all the necessary information.⁴

3. ILLUSTRATIVE SIMULATION

In the following simulations, values relating to the group, parent and subsidiary are denoted respectively by the subscripts g , p and s attached to the relevant symbol or abbreviation. The two capital buffer rates we study, B_g and B_s , will be expressed as a percentage of the risk-weighted assets of the bank, i.e. of RWA_g and RWA_s respectively. The parent's share in the subsidiary, w , expressed as a percentage of RWA_s , and the size of the subsidiary relative to the parent, r , expressed as a percentage of RWA_p , will also influence the results. We will assume that compared to the size of the group, direct intra-group accounting exposures are negligible, so that RWA_g can be calculated simply as $RWA_p + RWA_s$. For the sake of simplicity, "minimum capital requirement" will mean a requirement that the bank's capital cover the "conditional expected loss" (BCBS, 2005), i.e. the sum of the actual Basel II minimum capital requirement of 8% meant to cover unexpected losses and a requirement to hold loan loss reserves equal to expected losses.⁵ We abstract from qualitative differences between different types of capital, and in the case of total capital we will assume the properties of common shares. In all cases we will assume that the changes in the size or structure of balance sheets resulting from the imposition of capital buffers are so small, or are realised in such a way, that w , r and RWA are constant for all three entities. The loan loss reserves actually held are equal to the expected loan losses.

We will start by examining the consequences of imposing buffers from the perspective of the necessary increase in capital (through subscription or retention of earnings). We will then move to the issue of the consequences of imposing buffers from the perspective of banks' probability of failure.

3.1 Impact of buffers on the necessary increase in capital

We first need to clarify how the capital of the group, K_g , is derived from the capital of the parent and the capital of the subsidiary, K_p and K_s . The consolidation principle implies that when determining K_g we need to completely exclude the portion of K_s held by the parent. The remaining portion of K_s held by the minority shareholders is not controlled by the group. It should therefore be recognised in K_g only to the extent to which it can be relied upon to meet the

⁴ The impacts of imperfect information on cross-border coordination of macroprudential policies at the general level are analysed in Derviz and Seidler (2012).

⁵ Definition of capital as including also loan loss reserves takes us back to the pre-Basel era. Here we use this definition purely for the sake of simplicity. Separation of loan loss reserves (which are assumed at the same level in all our simulations) from capital would not change our conclusions.

group's loss absorption obligation by covering any losses incurred by the subsidiary or the parent. This idea is expressed in Basel III (BCBS, 2011, paragraphs 62–64) by a capital consolidation rule which says that K_g should be calculated recognising the lower of the following two items:

- (a) the portion of the subsidiary's obligatory capital (including B_s) held by the minority shareholders, and
- (b) the sum that we obtain if, within the group's obligatory capital (including B_g) which relates to the subsidiary, we focus on the portion that is attributable to the subsidiary's minority shareholders.

It is trivial to show that in our simple case (a) will be lower than (b) when $B_s < B_g$.

We will assume from here on that the total capital of the group K_g is exactly equal to B_g plus the minimum requirement applied to the group (where, as stated earlier, this requirement is taken to mean the sum of the actual Basel II minimum capital requirement of 8% and the requirement to hold reserves equal to expected loan losses); in other words, at the group level there is no "surplus" capital. For now let us also assume $B_g = 0\%$ and $B_s = 0\%$. The above-mentioned capital consolidation rule implies that K_g must be replenished through an increase in the *parent's* capital above the minimum requirement applying to the parent alone. For example, let's assume that the minimum requirement (including the requirement to hold reserves equal to expected loan losses) is 9% and that the parent owns 50% of the subsidiary, which is 10% of the size of the parent, so that $RWA_g = 1.1 \cdot RWA_p$ and the requirement applying to the group of 9% of RWA_g corresponds to 9.9% of RWA_p . The subsidiary's minority shareholders – in an effort to retain their 50% share in the subsidiary – have already satisfied half of the requirement applying to the subsidiary (either by providing new capital or by using their share of the subsidiary's retained earnings), thereby contributing capital equal to 4.5% of RWA_s , i.e. 0.45% of RWA_p , to K_g ; the parent's shareholders have already satisfied the requirement applying to the parent, thereby contributing capital equal to 9% of RWA_p to K_g (likewise in the form of new capital or retained earnings of the parent); to make up the remaining portion of K_g of 0.45% of RWA_p , the parent's shareholders must increase the parent's capital (above the minimum requirement applying to the parent alone) by this 0.45% of RWA_p ; the minority shareholders cannot make up this remaining portion of K_g because even if they decided to provide the subsidiary with some capital beyond the requirement on the subsidiary, the above capital consolidation

rule implies that this added capital could not be counted towards K_g . It is clear that if we increase w , i.e. the parent's share in the subsidiary, the capital increase burden will shift further towards the parent.⁶

Let us now allow B_g and B_s to take non-zero values. Chart 1 shows, for $B_g = 1\%$ and for various levels of B_s , w and r , by what amount (in % of RWA_p) the parent's capital must be increased above the level the parent has to attain in order for the group to satisfy the K_g requirement when both buffers are zero.

The results in the chart are intuitive. For $w = 100\%$ (a wholly owned subsidiary) the above-mentioned burden falls fully on the parent in all cases; this burden decreases somewhat as the share of minority shareholders in the subsidiary increases (as w declines). The relative position of the curves corresponding to $B_s = 0\%$ and $B_s = 3\%$ for each level of r (the size of the subsidiary relative to the parent) suggests that imposing B_s will lead to growth in the volume of the subsidiary's obligatory capital held by its minority shareholders, thereby relieving the parent of part of the burden of satisfying the capital requirements applying to the group.

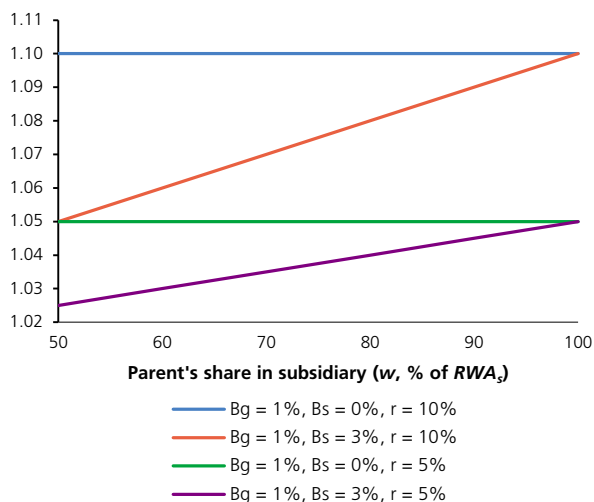
Let us now look at the specific example where the parent's share in the subsidiary is 60% (i.e. $w = 60\%$), the size of the subsidiary is 5% of that of the parent ($r = 5\%$) and the buffer required for the group is $B_g = 1\%$. The imposition of $B_s = 3\%$ will result in an increase in the subsidiary's capital held by minority shareholders (assuming that their percentage share in the subsidiary stays constant). The capital of the group will increase by the same amount, and thanks to this the parent's capital held in the interests of fulfilling B_g can be reduced by the same amount. Chart 1 shows that the capital held at parent level in the interests of satisfying B_g can be lowered specifically from 1.05% of RWA_p to around 1.03%, i.e. by approximately 0.02 percentage point. If RWA_p is at, say, EUR 200 billion, that would mean a decrease of EUR 40 million in the parent's capital held in order to satisfy the K_g requirement. Another (this time extreme) example would be a wholly owned subsidiary ($w = 100\%$), in which case imposing B_s does not lead to any change in the parent's capital.

An important consequence of the above effect for regulatory practice is that the imposition of a buffer on the subsidi-

⁶ We should emphasise that this burden cannot be lifted by converting the subsidiary into a branch. This change will have no effect on RWA_g and so will not reduce the amount of capital of the parent maintained in the interests of satisfying the requirement applying to the group.

CHART 1

INCREASE (IN % OF RWA_p) IN THE PARENT'S CAPITAL AS A RESULT OF IMPOSING B_s
(y-axis: necessary increase in parent's capital in % of RWA_p)



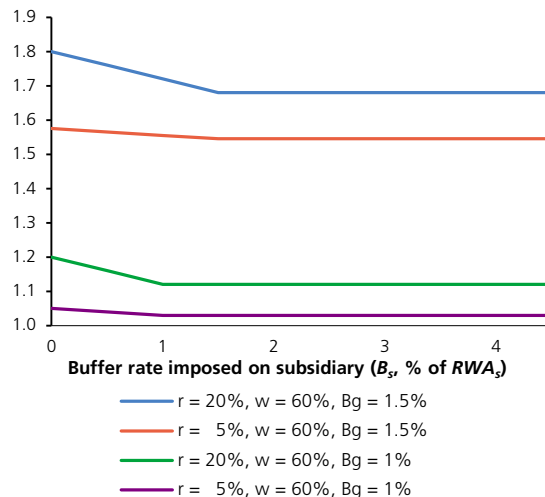
Source: Author's calculations

ary does not change the probability of depletion of capital at the group level (and therefore the desirable capital buffer rate for the group). This is because the increase in the group's capital when the buffer is imposed on the subsidiary (if the buffer leads to a rise in the capital usable for the group at all) is exactly offset by a decrease in the group's capital through a reduction in the parent's capital.

Chart 2 assumes that the parent's share in the subsidiary, w , is 60% and that the relative size of the subsidiary, r , is either 5% or 20%, and illustrates how the necessary level of capital of the parent changes as we change the two buffer rates. With rising B_s , each of the curves in Chart 2 initially declines; a higher B_s therefore reduces the amount of capital of the parent needed to ensure that the group satisfies B_g . However, beyond the kink at $B_s = B_g$ each curve is horizontal, meaning that a further increase in B_s will not generate any further decrease in the necessary level of capital of the parent. This is because under the capital consolidation rule described above, growth in B_s above B_g leads a switch from (a) to (b).

CHART 2

INCREASE (IN % OF RWA_p) IN THE PARENT'S CAPITAL AS A RESULT OF IMPOSING B_g AND B_s
(y-axis: necessary increase in parent's capital in % of RWA_p)



Source: Author's calculations

3.2 Impact of capital buffers on a bank's probability of failure⁷

The simulations in this part will build on a formula for calculating the probability of any given bank (the parent, the subsidiary or the group) recording a loss that exceeds the sum of its capital and loan loss reserves. The literature on the probability of bank failure works mostly with a single systematic risk factor model (Vasicek, 2002). While we will actually work with a pair of two-factor extensions of the single-factor model, we start by briefly outlining the main features of this basic model, including the expression it gives for the probability of failure of a bank. Further details can be found, for example, in Vasicek (2002), Céspedes and Martín (2002) and Martínez-Miera (2009).

First we introduce the following definitions, conventions and assumptions about the bank, be it the parent, the subsidiary, or the banking group as a whole:

- Let's consider just one time period. The bank provides all its loans at the start of this period; at the end of the period the loans should be repaid.
- The bank's loss is due solely to credit risk.

⁷ Given the various differences in the way Basel II and III are applied in practice (Kiema and Jokivuolle, 2013; Zimper, 2013), the bank failure probabilities given below should be taken as lower estimates of the true values.

- The bank's portfolio is composed of a large number N of small loans, each provided to a different obligor. The loans (and therefore the obligors) are indexed by i .

- The profit A_i of obligor i is given by the value of a single systematic factor, X , common to all obligors, and the value of the obligor's idiosyncratic shock, ε_i , according to the following formula:

$$A_i = \sqrt{R} * X + \sqrt{1 - R} * \varepsilon_i \quad (1)$$

Higher values of X can be interpreted as a sign that the economy as a whole (i.e. all obligors) is enjoying "better times". For any two obligors i and j , the square root of R captures the dependence of A_i and A_j on the systematic factor, and it can be shown that if (1) holds, R is equal to the correlation between A_i and A_j .

- X and ε_i are normally distributed with zero mean and unit variance; X and ε_i and ε_j are all mutually independent for all i and j .⁸

- Obligor i defaults if $A_i \leq c_i$ for a certain constant $c_i < 0$; hence

$$PD_i = \text{prob}[A_i \leq c_i]$$

Equation (1) implies that $\text{prob}[A_i \leq c_i]$ will be lower for higher X , i.e. in "better times".

- The exposure at default EAD_i , the loss given default LGD_i , R and c_i are constants and each takes the same value for all i .

- The interest and other income accruing to the bank from a loan granted to obligor i is contained in the nominal value of the loan, which from the bank's perspective is equal to the exposure at default (EAD_i) with respect to obligor i .

- We measure the bank's capital K as a percentage of its RWA. As indicated above, K denotes the portion of the

liabilities in the bank's balance sheet intended to absorb both unexpected and expected losses.

- EAD for the entire portfolio of the bank is equal to the sum of EAD_i over all i and is equal to the RWA of the bank; apart from loans, the bank has no actual or conditional (off-balance sheet) assets. The value of RWA is normalised to 1.

If we use F and G to denote the standard normal cumulative distribution function and its inverse, it can be shown (see Martinez-Miera, 2009) that the above assumptions lead to the following expression for the probability of bank failure, PBF :

$$F \left[\frac{c_i - G(K/LGD_i) * \sqrt{1 - R}}{\sqrt{R}} \right] \quad (2)$$

This probability is increasing in LGD_i , c_i (and therefore also PD_i) and R , and decreasing in K .

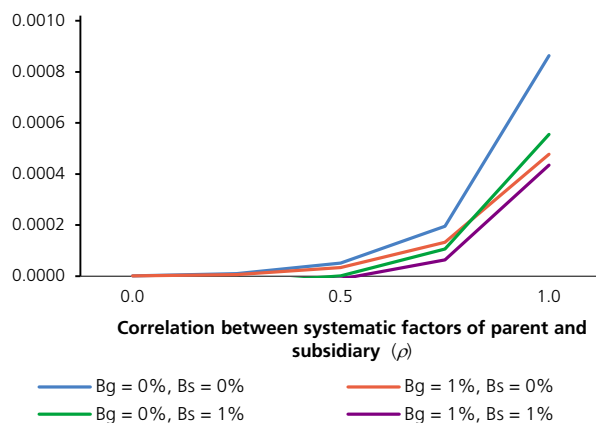
In order to be able to at least roughly estimate the probability of bank failure (2) for various combinations of the two capital reserve buffer rates, we make some further assumptions. For K_g , K_p and K_s we will initially assume a level of 9%, which we obtain as the sum of an expected loan loss of 1% (roughly in line with the long-term average given in Moody's, 2011) and the Basel II minimum capital requirement of 8%. In order to focus on one of the many possible and realistic combinations of values, we will assume that r (the relative size of the subsidiary) equals 5% and w (the parent's share in the subsidiary) equals 60%. We will also assume for simplicity that if the subsidiary is at risk of failure as a result of incurring a loss exceeding K_s , the parent will either cover the necessary difference fully (even though it is not the sole owner of the subsidiary, because $w < 100\%$), or – if such assistance would cause it to fail itself – provide no assistance and let the subsidiary fail. As for the opposite situation, in our model the subsidiary is not capable of helping to cover the parent's loss and therefore cannot be forced to do so by the parent, because any reduction in K_s (for example through a share repurchase) will automatically lead to an equal reduction in the value of the parent's investment in the subsidiary. In other words, a drowning parent has no mechanisms available by which it would increase its chances of survival at the expense of its subsidiary.⁹

8 Assuming that A_i has a non-zero expected value would give rise to no change, because in fact the key parameter in the following calculations is not the expected value itself, but rather its distance from the level (c_i) that leads to failure of the obligor. The assumption of normality (and independence between X and ε_i and ε_j) is in line with most of the literature. Other probability distributions that would better capture the fat tails observed for actual asset returns are investigated, for example, by Chen et al. (2008). Like relation (2), the Basel II internal ratings-based (IRB) approach is based on a normal one-factor model. As actual asset returns deviate from the normality assumption, Basel II contains some features aimed at offsetting the impact of those deviations. For example, the required probability of bank failure is anchored at the very low level of 0.001. This implies one failure every thousand years, which in itself would probably be viewed as an excessively strict solvency standard (Thomas and Wang, 2005).

9 The subsidiary is therefore not capable of reducing the parent's loss by "transferring" part of its assets to the parent and reducing its capital to the corresponding extent. "Bottom-up" intra-group support from the subsidiary to the parent can also take other forms (European Commission, 2008; The Joint Forum, 2012). For example, the subsidiary can supply the

CHART 3

PROBABILITY OF FAILURE OF THE SUBSIDIARY

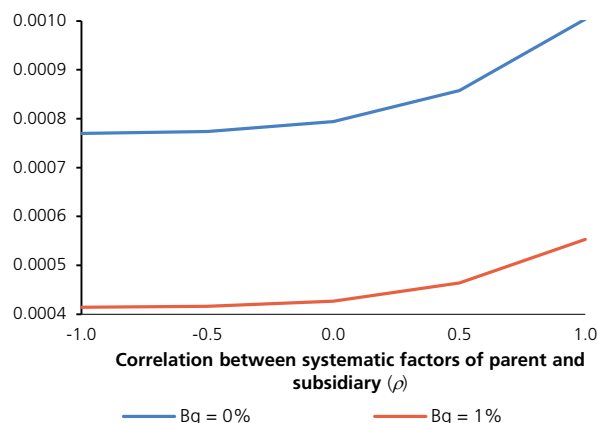
(y-axis: probability of bank failure for subsidiary, PBF_s)

Source: Author's calculations

Note: The chart assumes r (relative size of subsidiary) = 5% and w (parent's share in subsidiary) = 60%.

CHART 4

PROBABILITY OF FAILURE OF THE BANKING GROUP AS A WHOLE

(y-axis: probability of bank failure for group, PBF_g)

Source: Author's calculations

Note: The chart assumes r (relative size of subsidiary) = 5% and w (parent's share in subsidiary) = 60%.

We will determine PBF_s by extending relation (2) to the case of two systematic, mutually more or less correlated factors X_p and X_s (instead of one factor X as in relation (2)), which co-determine the NPL ratios separately for the parent and the subsidiary. The chosen extension of (2) will moreover take into account the fact that the parent is prepared to support the subsidiary in the sense described above. We will achieve this extension by adjusting the two-factor model derived by Céspedes and Martín (2002) in the context of one bank with two portfolios.¹⁰ We will assume correlation ρ between the systematic factors X_p and X_s . This correlation can be interpreted as expressing the extent to which the financial results of the parent and the subsidiary are influenced by the same risk factors as a consequence of similar-

ty of their business models (geographical and sectoral specialisation in lending and suchlike).¹¹

Chart 3 plots PBF_s for selected non-negative levels of ρ and for two levels of B_g and B_s (0% and 1%). For any combination of these two levels of B_g and B_s it holds that PBF_s is increasing in ρ , because with higher ρ it is more likely that the subsidiary will face failure just when the parent also faces failure and is thus incapable of bailing out the subsidiary. If, for any value of ρ , we move from $B_g = 0\%$ to $B_g = 1\%$, PBF_s will fall, because a rise in B_g means higher capital of the parent (i.e. higher K_p) and thus a higher probability that the parent will be capable of helping the subsidiary to avoid failure. This effect, however, becomes negligible for ρ close to 0 (and for cases where $\rho < 0$, which are not shown in the chart).

The determination of PBF_g will be based on another two-factor extension of relation (2), again inspired by the calculations in Céspedes and Martín (2002).¹² The resulting val-

parent with liquidity in the form of a loan. This transaction, if executed "at arm's length", does not in itself cause the subsidiary to incur an immediate loss in the form of a reduction in assets and capital, it merely changes the asset structure of the subsidiary; however, it can cause intra-group contagion in the sense, for example, of a weakening of the subsidiary's credit activity (Derviz and Podpiera, 2006; de Haas and van Lelyveld, 2014) or a reduction in the subsidiary's ability to overcome any future liquidity problems of its own. The subsidiary will of course record a direct loss in the future if the parent proves unable to repay the loan provided by the subsidiary.

¹⁰ This two-factor extension of (2) takes the form of an integral over the values of X_s , while the (minimum relevant) value of X_p is given by the level of X_s thanks to the assumption that the parent will provide assistance to the subsidiary only if it is capable of doing so, i.e. if X_p is sufficiently high in relation to the value of X_s (the lower is X_s , and hence the worse is the situation of the subsidiary, the higher X_p has to be in order for the parent to be capable of rescuing the subsidiary). The integral is solved numerically.

¹¹ An evaluation of empirically relevant values of this correlation is beyond the scope of this article, but we can obtain a rough estimate by looking, for example, at data on the correlation of pre-tax profits. As regards the three largest subsidiaries active in the Czech Republic (Česká spořitelna, ČSOB and Komerční banka), the correlations of the quarterly pre-tax profits of these subsidiaries and their parents over the last decade range approximately between -0.25 and +0.4 (according to data from the Bankscope database and the banks' websites).

¹² This time (in contrast to the calculation of PBF_s) X_p proceeds from X_s thanks to the fact that the values of X_s and X_p must lead to the critical value of X at the whole banking group level. The integral is again solved numerically.

ues of PBF_g are depicted in Chart 4.¹³ As could have been expected, PBF_g is increasing in ρ , i.e. in the similarity of the business models of the two group members. In the extreme case of the two business models being identical ($\rho = 1$), the group gains no diversification benefits and has the same risk properties as the parent and subsidiary separately. Specifically in the case of a zero buffer for the group and $\rho = 1$, PBF_g takes a value of 0.001, which – in line with the basic philosophy of Basel II – corresponds to a PBF of a stand-alone bank with $K = 9\%$ of RWA. The imposition of $B_g = 1\%$ with $\rho = 1$ reduces PBF_g to 0.00055, which is only slightly more than half of the level with no buffer. If instead we choose $\rho = 0$, the imposition of $B_g = 1\%$ reduces PBF_g from 0.00079 to 0.00043.

4. SUMMARY AND CONCLUSIONS

In this article we investigated selected consequences of the imposition of capital buffers on a banking group and/or a subsidiary in such a group. This is a highly relevant topic for all macroprudential and microprudential policy-makers who regulate a banking sector containing parents or subsidiaries of banking groups. First, we explained that of the three types of capital buffers introduced in Basel III, only the buffer based on systemic importance is targeted directly at reducing the probability of bank failure (below the Basel II standard).

Second, by way of example we investigated the situation where only the Basel II minimum capital requirement is imposed on the group, i.e. no capital buffers are imposed on the group or the subsidiary. We demonstrated that given the Basel III group capital calculation rules the group is in this case capable of satisfying the minimum capital requirement imposed on it only if the parent's shareholders increase the parent's capital above the level it would have to report if it were a stand-alone bank. Of course, a side-effect of this increase is a decrease in the parent's probability of failure (below the Basel II standard).

Third, if we assume the imposition of a buffer on the group, the capital increase burden falling on the parent's shareholders shifts partially to the subsidiary's minority shareholders when a buffer is announced for the subsidiary as well. The reason is that the buffer for the subsidiary forces

the minority shareholders to increase the amount of the subsidiary's capital they hold (as long as they want to keep their percentage share in the subsidiary constant), and thanks to that the amount of capital the parent's shareholders have to hold in order to satisfy the group requirement falls. Given the Basel III rules for calculating the consolidated capital of the group, however, this shift of the capital increase burden stops increasing in size when the buffer rate for the subsidiary exceeds the buffer rate for the group. The probability of failure of the group (and therefore the desirable buffer rate for the group) is not affected by the level of the buffer for the subsidiary, because the increase in capital usable at group level due to the imposition of the buffer on the subsidiary (if such an increase occurs at all) is exactly offset by a decrease in the group's capital as a result of a reduction in the parent's capital held in order to satisfy the group requirement.

Fourth, if the parent is prepared to help the subsidiary avert failure and if fairly realistic parameter values are considered (the subsidiary's size is 5% of the parent and the parent's share in the subsidiary equals 60%), the probability of failure of the subsidiary turns out to be similarly sensitive to the buffer rate for the subsidiary as to the buffer rate for the group. This finding speaks tentatively in favour of keeping the power to set capital requirements for subsidiaries at national level. This is because if the group's home regulator does not impose impose a group buffer that would be sufficient from the point of view of the subsidiary's higher required degree of resilience, she – unlike the subsidiary's host regulator – may not be sufficiently motivated to ensure that an adequate buffer is announced for the subsidiary.

This finding also casts doubt on the rationale for the CRD IV requirement that the buffer imposed on a subsidiary on the basis of its systemic importance should not exceed the buffer imposed on the group as a whole.

The results described above are based on a number of simplifying assumptions. Consequently, there are many ways in which future research might make our analyses more realistic and our conclusions more robust. For example, one could change the assumption that the probability distribution of obligors' asset yields is normal. Another option would be to examine a banking group with more than one subsidiary or with a parent that hesitates to provide support to a subsidiary in distress.

¹³ The chart ignores changes in B_s , because the Basel III rules for calculating consolidated capital described above imply that PBF_g does not react to B_s (we assume here that the amount of group capital to which these rules lead is the truly relevant amount of capital for determining PBF_g).

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COLLATERALIZATION AND FINANCIAL STABILITY

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From a general perspective, collateralisation of exposures is a key tool for mitigating the idiosyncratic risks of financial institutions. If, however, the use of collateral in the financial system exceeds a certain threshold it can pose a risk to financial stability. Collateral use is procyclical. Heavy collateral use creates a network of direct and indirect linkages in the financial system, making it more vulnerable to contagion. It also fosters general growth in asset encumbrance in borrowers' balance sheets. This article looks at collateral use, asset encumbrance and related sources of systemic risk and maps out this phenomenon in the Czech financial system.

1. INTRODUCTION

The recent financial crisis exposed the vulnerability of short-term unsecured markets to runs among financial institutions. The subsequent breakdown of these markets contributed significantly to the deterioration in liquidity and credit conditions across the financial system. The related increase in overall risk aversion resulted in financial institutions shifting their activities from unsecured to secured markets. This shift was also encouraged by the newly introduced regulatory framework for the financial system, which provides financial institutions with incentives to use secured funding in preference to unsecured funding in order to foster greater resilience to risks.

Collateralisation is a key tool for mitigating idiosyncratic risks at institution level. However, overdependence of the system on secured funding can have major implications for financial stability. These implications are linked primarily with the sources of systemic risk arising from that dependence in both the time and cross-sectional dimensions.

The main source of the time component of systemic risk is procyclical behaviour by financial institutions. This behaviour is evident from the extent of collateral use over the cycle and is linked with how collateral policy is set. In the upward phase of the financial cycle, institutions accept a broad pool of assets as collateral under relaxed conditions, whereas in the downward phase they tighten their collateral policy. The direct or indirect linkages between financial institutions stemming from collateral and especially from collateral reuse create a network of channels in the system through which negative shocks can spread quickly from one institution to another (contagion). This network risk is, in turn, the primary source of the cross-sectional component of systemic risk. Heavy dependence of the system on secured funding can also generate a risk of excessive asset encumbrance in financial institutions' balance sheets, which limits the markets' ability to price the risk of unsecured

debt. Issuance of covered bonds also causes asset encumbrance. This type of funding does not fall directly under collateralisation. However, covered bonds are secured by assets in the issuer's balance sheet, and from the asset encumbrance perspective this type of funding can create similar risks in the financial system as collateral. These risks imply a need to monitor collateral use not only in individual institutions, but also in the system as a whole.

Although the risks arising from collateral pertain primarily to countries whose financial institutions are highly dependent on market funding,¹ some of them cannot be ignored in the case of the Czech Republic either. There are two main reasons for this. First, Czech financial markets have a relatively limited number of asset types defined as high quality and liquid for regulatory purposes. Second, the Czech financial sector displays some signs of procyclical behaviour (Frait and Komárková, 2013). It is thus vital for the Czech supervisory authority to monitor the potential systemic risks associated with collateral use.

This article examines the systemic risk associated primarily with collateral use and marginally with asset encumbrance. The aim of the article is to assess this risk and discuss the regulatory framework designed to mitigate it, including the use of suitable prudential tools. The article starts by focusing on collateral use and on factors that influence the level of collateral and asset encumbrance in the financial system in general. The following section describes sources of systemic risk arising from collateral. Data from regular reporting by entities supervised by the CNB is used to map out collateral use in the Czech financial system. The extent of collateral use, the types of collateral used and the durations of secured transactions are described and networks of institutions that use collateral are identified. The final

¹ Throughout this article, market funding refers to funds raised on the money and/or capital market.

section offers a list of potential prudential policy instruments that could be used to mitigate the said risks.

2. THE IMPORTANCE OF COLLATERAL AND THE EXTENT TO WHICH IT IS USED

Financial institutions use collateral to mitigate counterparty risk and reduce overall market uncertainty. On one side stands the lender – the collateral recipient. Collateral provides the lender with protection against counterparty default. As the market value of collateral can change over the life of a transaction (market risk associated with pledged/transferred assets), its initial value at the time of the pledge/transfer is subject to a deduction called a “haircut”. The decision to classify an asset as eligible collateral and the decision on the size of the haircut are made by the lender. On the other side of the secured transaction stands the borrower – the collateral provider. By providing an asset to secure the loan, the lender reduces the credit component of the risk premium, i.e. his credit costs. This means collateralisation should benefit both parties.

The extent to which collateral is used depends largely on the financial institution’s business model, i.e. on the structure of its financial sources and on the composition of its assets. The use of secured markets is driven on the one hand by a need for short-term funding and on the other by information asymmetry and risk aversion. Growth in the use of secured transactions was recorded during the recent financial crisis owing to growth in counterparty risk. In countries with highly developed markets, the amount of repos increased and a major shift in market activity from the unsecured to the secured market was recorded (e.g. ECB, 2013).² The crisis saw a change not only in short-term funding, but also in longer-term funding. For example, there was sizeable growth in the issuance of covered bank bonds (bonds covered by credit claims), especially in the euro area (Houben and Slingenberg, 2013). Asset encumbrance therefore generally increased in these countries.

Heightened uncertainty about counterparty risk also emerged in the Czech interbank market. The crisis saw a gradual decline in trading volumes on the unsecured market, while activity on the secured market remained stable.³ However, the financial crisis had a much smaller

impact on the Czech money and capital markets than on their counterparts in other countries. This is because the Czech financial system consists mainly of a banking sector which operates in an environment of a structural liquidity surplus and whose main funding sources are client deposits.⁴ This means it has less need for market funding (see sections 3 and 4 of this Report). Repos account for as much as 50% of total transactions in the Czech capital and money markets. However, a large proportion of those transactions are executed by public institutions (see Chart 1). To conduct its monetary policy, the Czech National Bank (CNB) mostly uses two-week classic repos in which it accepts surplus liquidity from commercial banks and provides agreed securities as collateral. Such transactions made up around 20% of all repos in 2013. To manage Treasury liquidity, the Czech Ministry of Finance (MFCR) uses short-term classic reverse repos in which CNB bills and T-bills are used as collateral. Transactions executed by the MFCR accounted for 19% of the total on average in 2013. The following text, however, focuses exclusively on other market participants, especially banks. These participants accounted for around 61% of total repo transactions (and banks alone for 52%). The key importance of banks operating in the Czech Republic is also clear from Chart 1. Aside from their mutual links, banks execute the most repos with non-financial corporations, non-residents and mutual funds.

The degree of use of repos by banks influences their demand for collateral assets. The factors affecting this demand can be either cyclical or structural (Fender and Lewrick, 2013). Cyclical factors are linked mainly with changes in investors’ preferences and risk appetite and with changes in the net supply of high-quality assets (CGFS, 2013). The stock of eligible collateral assets can be viewed as a liquidity buffer to be used in times of market distress as unsecured funding becomes more costly or even unavailable to risky parties owing to high counterparty risk aversion. As the debt crisis in some euro area countries has shown, the level of sovereign risk in financial institutions’ balance sheets also affects access to market funding. Uncertainty about this level can greatly increase domestic financial institutions’ funding costs on unsecured markets and sometimes even hinder their access to the secured market.

Structural factors are linked with changes in the regulation of the financial sector, especially liquidity reforms and

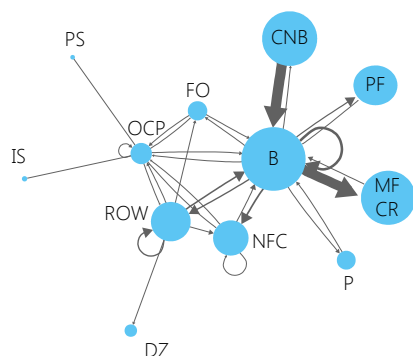
2 Throughout this article, the term repo covers both classic repos and reverse repos as well as the lending and borrowing of securities and the sale of securities with simultaneously agreed repurchase and vice versa.

3 http://www.cnb.cz/en/financial_markets/money_market/mm_turnover/

4 Client deposits accounted for 59% of total assets and 67% of total external funds in the Czech banking sector at the end of 2013.

CHART 1

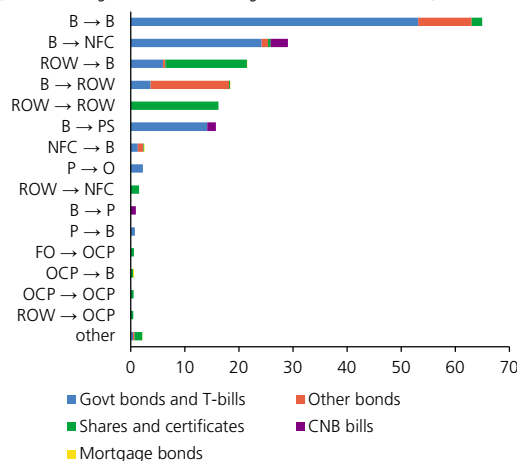
INTERSECTORAL LINKAGES ARISING FROM REPOS

a) Network of linkages
(average in 2013)

B	Banks
OCP	Non-bank investment firms
FO	Natural persons
P	Insurance companies
ROW	Rest of world
MFCR	Czech Finance Ministry
CNB	Czech National Bank
NFC	Non-financial corporations
PS	Pension companies
IS	Investment companies
PF	Mutual funds
DZ	Credit unions

b) Most important linkages by type of security

(end-2013 average, CZK billions, excluding CNB and MFCR transactions)



Source: CNB, authors' calculations

Note: The arrows point in the direction of the transfer of assets used as collateral, while the thickness of the arrows (left-hand chart only) indicates the relative importance of the exposure in the market as a whole. The size of the circles is proportional to the sum of the exposures pertaining to the given sector of the financial system. Other bonds comprise bonds issued by international organisations, local government and the corporate sector.

reforms of derivatives markets. The liquidity coverage ratio (LCR) requires banks to hold a sufficient liquidity buffer of unencumbered high-quality assets to survive a 30-day liquidity stress scenario. Given that in a downward phase of the financial cycle, only highly transparent, highly liquid and easy-to-value assets tend to be regarded as high-quality collateral, this requirement might affect the structure of demand for such assets. Higher collateral demand may also be fostered by stricter regulation of OTC derivatives – both for standardised derivatives subject to an obligation to clear through a central counterparty (CCP) and for bilaterally cleared derivatives subject to no such obligation. Demand might be boosted by a stricter margining regime, in particular one with initial margin requirements.⁵ In addition, variation margin will have a small first-order effect on net demand for eligible collateral assets. However, additional demand might be generated by the precautionary motive. In an effort to maintain a certain variation margin level in periods of increased market volatility, banks might frontload on high-quality assets to hedge against potential margin calls.

There are many estimates of the growth in global collateral demand stemming from the above regulatory reforms

(Heller and Vause, 2012; Singh, 2010; BCBS-IOSCO, 2012, 2013; Lopez et al., 2013; BCBS, 2010, 2012). These estimates differ according to the methodology chosen, the assumptions made and the institutions included in the sample. Although subject to uncertainty, the overall estimate for growth in aggregate collateral demand over the next few years is around USD 4 trillion (CGFS, 2013).

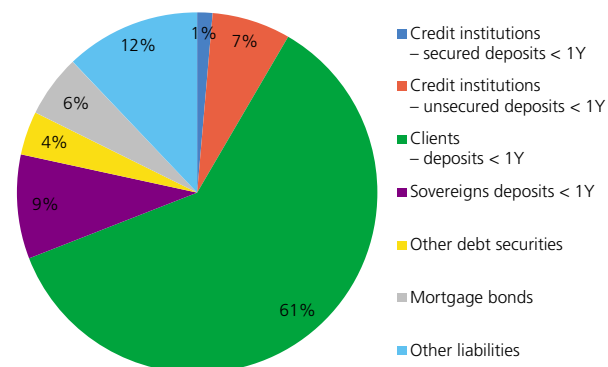
The key question remains how the supply of high-quality assets will react to this additional demand. The supply is to some extent exogenous, as it is affected by the financing needs of sovereigns and non-financial corporations. The exogenous supply has a cyclical component. At times of economic contraction, the supply of high-quality corporate bonds tends to fall, while issuance of government bonds usually rises. If the markets see it as sustainable, government debt can sustain or even increase the supply of high-quality assets at times of market distress. Recent sovereign downgrades, especially in Europe, and the significant decrease in the issuance of securitisation instruments in the USA have prompted concerns about a fall in the supply of high-quality assets. However, there is widespread consensus (Lopez et al., 2013) that aggregate supply is likely to rise and thus offset the current growth in aggregate demand for collateral. For example, IMF (2012) estimates that the advanced economies' sovereign debt will rise by USD 2 trillion by 2016. In addition, Singh (2013) estimates that net issuance of AAA/AA-rated debt by sovereign and corporate issuers will increase the supply by about USD 1 trillion every year.

⁵ Initial margin is a component of the universal two-way margining regime. Above a certain contract value threshold, both parties are required to exchange cash or other high-quality assets held on a separate counterparty account. By contrast, variation margin is one-way and relevant to the loss-making counterparty.

CHART 2

COMPOSITION OF CZECH BANKS' EXTERNAL FUNDS

(% , as of end-2013)

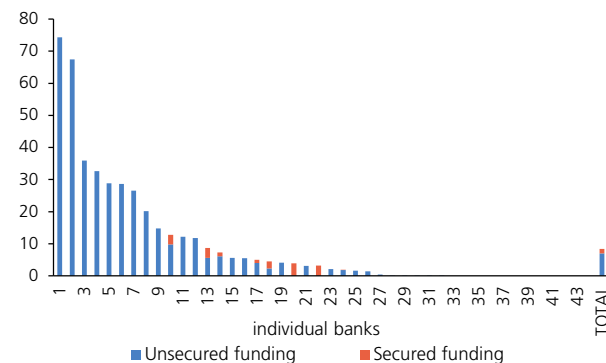


Source: CNB, authors' calculations

CHART 3

SHARES OF FUNDS FROM THE MONEY MARKET IN THE TOTAL EXTERNAL FUNDS OF INDIVIDUAL BANKS

(% , as of end-2013)



Source: CNB, authors' calculations

These estimates point to a sufficient future exogenous aggregate supply of high-quality assets. Nevertheless, some countries may see a temporary mismatch between demand and exogenous supply. This local imbalance might arise due to uneven allocation of collateral assets. The central bank could ameliorate the situation by, for instance, introducing an additional liquidity facility or changing its collateral policy (Debelle, 2011),⁶ or the market may itself adjust. An insufficient supply of high-quality collateral will lead to an increase in the market price, which, in turn, will induce a change in the behaviour of market participants. Market/endogenous adjustment occurs through a number of channels (CGFS, 2013): (1) direct creation of collateralisable assets either through the pooling of high-quality loans earmarked for covering bond issues, which is more common in Europe, or by means of asset securitisation, which is more common in the USA, (2) broadening of the pool of eligible collateral assets, (3) collateral reuse (such as reinvestment and rehypothecation), where collateral is repeatedly pledged or transferred with increasing velocity,⁷ (4) use of collateral swaps, i.e. the exchange of higher-quality collateral for lower-quality collateral.

Demand for collateral in the Czech banking sector is likely to be flat over the coming years. As mentioned above, a conservative business model based primarily on stable client

deposits holds sway in the Czech banking sector (see Chart 2). The ratio of secured funding to total external funds was only around 1% at the end of 2013. There are some differences in the structure of the sources of this type of funding across banks active in the Czech market. In some cases, the share of short-term market funding in total external funds is significantly higher than the 8.4% recorded by the sector as a whole (see Chart 3). However, this mostly concerns branches of foreign banks or banks with low systemic importance. The limited effect of cyclical factors on collateral demand is also indicated by the ratio of client deposits to client loans, which is around 135% on average in the Czech banking sector. A limited effect can also be expected for asset encumbrance. Although covered bonds, in particular mortgage bonds, represent a slightly larger source of funding for the Czech banking sector, they still account for only 6% of external funds (see Chart 2).

Demand for collateralisable assets in the Czech Republic might thus be affected more by the above-mentioned structural factors. Here again, however, a generally marginal impact is expected, at least in the short run. The Czech banking sector holds as much as 29% of its assets as claims on the CNB and in AA-rated domestic government debt securities. Assuming that Czech sovereign debt remains high in quality, the Czech banking sector thus already has quite a large buffer of high-quality liquid assets. The large majority of Czech banks will therefore not need to increase their demand for high-quality assets in order to satisfy the requirements of the new regulatory framework.

However, the supply of high-quality assets denominated in the domestic currency in the Czech financial market is underdiversified. CNB bills and government debt securities account for a large share, and the supply of them is rising as

⁶ This situation applies to Australia and South Africa, for example. The central banks of both these countries are currently introducing new liquidity facilities (for their parameters, see Table 1 in Bech and Keister, 2014).

⁷ A typical example of collateral reuse is a combination of securities lending and repos where the assets lent are then pledged or transferred for the purposes of obtaining an advantageous loan.

sovereign debt grows. In the coming three years, the MFCR plans to issue around CZK 120 billion in government securities in net terms each year (MFCR, 2013). The supply is also made up of a very small number of corporate bonds and equities, net issuance of which is rising over time (see section 3.1). The supply of assets generated by the Czech banking sector is also trending upwards. In particular, growth in mortgage bonds has been observed in recent years. The amount of mortgage bonds in circulation has more than doubled since 2005 and currently stands at around CZK 251 billion. However, the proportion of corporate issues is still very low by comparison with government securities.

All this implies that an imbalance could temporarily arise between the demand for, and exogenous supply of, high-quality assets in the Czech financial market in two cases in particular – if the Czech government were to start cutting the total debt sharply, or, conversely, if it were to start increasing it sharply. In the first case, the market would see a gradual decline in high-quality assets due to a fall in the supply of government debt securities. The second case would also entail a gradual fall in high-quality assets in the market, as sovereign credit risk rises as sovereign debt grows. The supply of government debt securities would rise, but market perceptions of their quality and liquidity would probably change. Faster growth in external demand for Czech government debt, which under certain conditions could crowd out domestic demand, might also create some room for an imbalance to develop between the supply of, and demand for, high-quality Czech assets. Given that most of the debt is issued in the domestic currency, however, this is unlikely to happen at least in the medium term (see section 3.1).

3. COLLATERAL AND SYSTEMIC RISK

As mentioned above, collateralisation is an important tool for mitigating the idiosyncratic risks of financial institutions. Under certain conditions, however, it can also be a source of systemic risk in both the time and cross-sectional dimensions (FSB, 2012).

The cross-sectional dimension of systemic risk might manifest itself in overdependence of the system on secured funding. The benefits of interconnectedness in the form of idiosyncratic risk-sharing between financial institutions could come at the cost of the emergence of other risks, such as contagion risk. Any risk, even if “relatively” collateralised, remains in the financial system and, through collateralisation, merely migrates between financial

institutions. In simple terms, each separate financial institution in the system may be relatively secured, but the system as a whole may become vulnerable to contagion risk. This risk may further increase if the re-pledging chain gets longer (see Singh and Aitken, 2009). In this way, indirect linkages are created in the system. Excessively long re-pledging chains can lead to a situation where the true volume and value of collateral in the system is substantially lower than the volume and value of contractually agreed collateral.

The time dimension is linked with aggregate risk, the main source of which is procyclicality. In the collateral context, procyclicality manifests itself mainly in the types of assets included in the pool of eligible collateral, in the valuation of the underlying assets making up the collateral, in the level of collateral reuse, in haircuts and in the duration of secured transactions. These risks are linked not only with the quality, quantity and type of collateral, but also with the leverage and balance-sheet composition of collateral users. It generally holds that a large quantity of lower-quality eligible collateral assets in an already overleveraged system fosters sudden and sharp changes in the behaviour of collateral users.

The definition of collateral quality derives on the one hand from the regulatory capital and liquidity requirements (EBA, 2013) and on the other from the demands and preferences of market participants. Pretty much any asset – from a simple financial instrument such as a government bond or cash through to a more sophisticated one such as a covered bond (e.g. a mortgage bond) or a structured product (e.g. an ABS or MBS) – can be used as collateral.⁸ A safe and thus high-quality asset has the following characteristics: low credit, foreign exchange and market risk, high market liquidity, limited inflation and idiosyncratic risk, ease of valuation, listing on a securities exchange, and eligibility in the central bank’s collateral policy (BCBS, 2013).

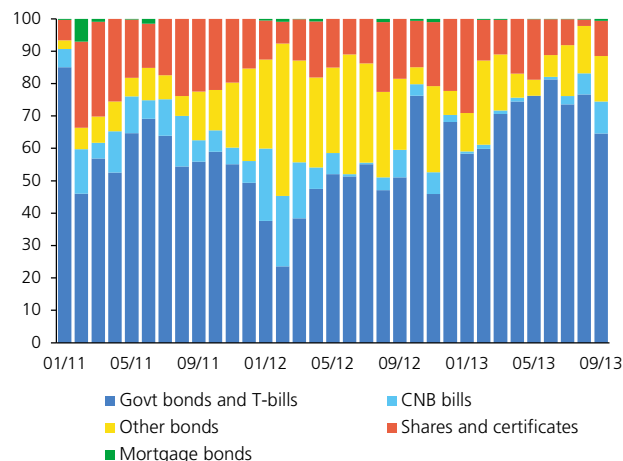
Simple financial instruments are usually associated only with the market risk of the collateral (e.g. the market liquidity and volatility of a government bond) and the credit risk of the issuer. In the case of more sophisticated instruments such as covered bonds, one also needs to include the existence of hidden, often chained risks such as the credit risk of the owners of the assets underlying the

⁸ Structured products are securities whose redemption depends on underlying assets and related cash flows. They are differentiated according to the type of underlying asset: asset backed securities (ABS), mortgage backed securities (MBS), etc.

CHART 4

DECOMPOSITION OF REPOS BY COLLATERAL TYPE

(shares in monthly amounts in %)



Source: CNB, authors' calculations

Note: Other bonds comprise bonds issued by international organisations, local government and the corporate sector.

pledged/transferred collateral (the original issuer of the mortgage bond and the owner of the mortgage loan) and the market and liquidity risk of both the instrument itself and the original underlying asset (e.g. the mortgage bond and the pledged property).⁹ In spite of these risks, sophisticated collateralisation instruments are popular among investors. One reason for this is their apparent safety, consisting in overcollateralisation. In overcollateralised transactions, the value of the covering assets often far exceeds the value of the instrument they cover. The instrument can thus gain a higher rating than its own issuer.

Czech government debt securities and CNB bills are the most frequently used forms of collateral in the Czech market. Transactions using this type of collateral usually have a duration of one or two weeks. Equities and corporate bonds are of less significance (see Chart 4). This category is dominated by the equities of Czech issuers, while those of Austrian and UK issuers account for a smaller and steadily diminishing share. Despite the higher market risk attaching to this type of collateral, equity-collateralised transactions often have a duration of longer than two weeks, and a large proportion of them mature in one month or more. The majority of equity-collateralised repos are executed between non-Czech entities and also – due to

the greater affordability of equities – between non-professional customers such as municipalities, private individuals and small non-financial corporations. By contrast, professional participants, such as banks, insurance companies and pension funds, tend to use government debt securities as collateral, mainly because these financial institutions are also the main creditors of Czech government debt. Covered bonds in the form of mortgage bonds are rarely used as collateral in the Czech financial market, even though the overcollateralisation averages 360% for these securities.

The financial sector displays procyclicality in assessing asset quality. In an upward phase of the cycle, lenders tend to be more optimistic about counterparty risk and the soundness of issuers of eligible collateral assets. Lower-quality assets are thus also used in secured transactions, and haircuts are often reduced. The lower haircuts increase the leverage available to borrowers and so additional purchases of collateral assets can be financed (CGFS, 2010). Demand for eligible assets rises, credit spreads and price volatility decrease, and the volume and price of the assets used increases, causing the total collateral value to go up as well. Lenders thus enjoy an increase in disposable funds and the availability of credit expands further. These easy market conditions steadily give rise to a virtuous circle of relatively secured short-term funding, and systemic risks quietly accumulate.

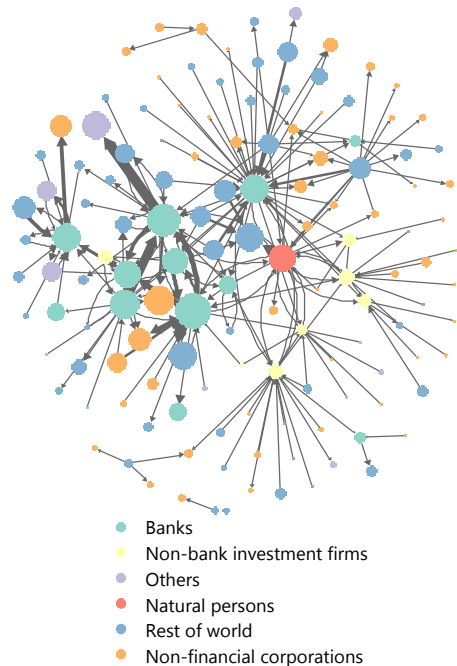
When the financial cycle turns around and risk aversion falls, lenders review their credit conditions. The greater market uncertainty and overestimation of counterparty risk leads them to tighten their collateral policies by narrowing the pool of eligible collateral, tightening the conditions for collateral reuse and setting more conservative haircuts, especially for lower-quality collateral. The number of creditworthy counterparties goes down and the amount of loans provided also decreases.

A rising haircut accompanied by a shrinking pool of eligible collateral can get a borrower quite quickly into liquidity problems. If its business model is based primarily on secured market funding and its collateral buffer is made up mainly of lower-quality assets, it can be very difficult for it to find a new source of funds. On top of that, the liquidity problems of the borrower can easily turn into liquidity problems of the lender. If the borrower defaults, the lender will enter the market to sell the collateral in an attempt to get back the money it lent. If the stock of collateral for sale in the market is relatively large, and especially if it is concentrated mostly in lower-quality assets and the market for those assets is

⁹ One also has to take into account the different legal forms of individual instruments, as different transactions can have the same economic effect, but different legislation means different legal certainty.

CHART 5

NETWORK OF AVERAGE LINKAGES BETWEEN REPO TRANSACTION PARTICIPANTS IN THE CZECH REPUBLIC
(based on the average stock of gross exposures in 2013)



Source: CNB, authors' calculations

Note: Each arrow points in the direction of the transfer of securities in the relationship. The size of the points is proportional to the sum of the values of all transactions executed by the participant. The natural persons sector was consolidated.

already under selling pressure, further sales can put the already squeezed prices of the assets under more pressure. If the asset up for sale has been issued in large volumes and is widespread in the balance sheets of borrowers and lenders, a liquidity spiral may develop (Brunnermeier and Pedersen, 2009).

Falling asset prices impact on financial institutions that hold those assets in their trading portfolios and/or as potential collateral. Fire sales of an asset can cause the entire market to freeze due to an inability to price the asset. If, moreover, failure to repay or direct default by the borrower is correlated with the business and financial cycle (materialisation of systemic risk in the deleveraging phase – see Figure 5 on page 14 of Frait and Komárková, 2012), any sectoral concentration in lending will gain in significance, as will the number of lenders hit by similar problems.

Our analysis reveals that the Czech secured market is highly concentrated and centralised. As Chart 5 shows, most of its participants enter into repo transactions with one and the same counterparty, and most often with one of a small number of banks or non-bank investment firms. Most participants always adopt the same position of collateral

recipient or collateral provider. In 2013, the five largest participants – most of them banks – accounted for around 50% of all repos. These participants therefore play a major role in this market.

The increasing use of secured funding is lifting the level of encumbered assets in financial institutions' balance sheets, giving rise to new questions about the riskiness of this trend. Issuance of covered bonds also causes asset encumbrance, as some collateralisation of exposures occurs with this type of financing as well. Although the collateralised exposures are similar in terms of purpose, they tend to have different contractual forms with often different legal consequences, especially in the event of breach of contract or insolvency. If a borrower goes bankrupt, secured claims have higher priority than those of many other creditors, including the state and small depositors. As only the highest-quality assets tend to be used as collateral, the average quality of the remaining unencumbered assets falls. Information on the true level of encumbered assets is not fully available to the market or is highly distorted. This can render the markets incapable of pricing the risk of unsecured debt adequately.

The literature describes two methods for measuring asset encumbrance ratios (CGFS, 2013), one based on the proportion of secured borrowing in total liabilities (liabilities-side approach) and the other on the proportion of pledged/transferred balance-sheet assets (assets-side approach). Neither method, however, provides entirely adequate information on the encumbrance level. For example, there is not enough information available on overcollateralisation and on initial margins for derivatives transactions. Keeping these caveats in mind, a working group established by the Committee on the Global Financial System (CGFS) estimated the median encumbrance ratio using the liabilities-side approach. Its estimate for 60 large European banks came to 22.5% of assets. Some banks had ratios of less than 10%, while others had ratios of greater than 50%.

The CNB has made its own estimate of asset encumbrance for the Czech banking sector. The calculation takes account of encumbrance due to both collateral use and issuance of covered (mortgage) bonds. At the end of 2013, the ratio of encumbered assets in the total balance sheet of the Czech banking sector was 13.4% when one uses the value of pledged assets serving as the mortgage bond cover pool as the numerator (assets-side approach) and 8% when one uses the value of mortgage bond liabilities as the numerator (liabilities-side approach). In both cases these figures are

trending upwards. By international standards, however, Czech banks have a low asset encumbrance ratio according to these indicators.

4. REGULATION OF BANKS TO MITIGATE COLLATERAL RISKS

The materialisation of the above systemic risks during the recent financial crisis prompted the G20 and the Financial Stability Board (FSB) to pledge to boost the financial system's resilience to sources of risks such as procyclicality and contagion. The debate on potential prudential instruments and their detailed parameters is still going on at international level, but a number of instruments have already been implemented. Some instruments require international agreement on their introduction (for instance the obligation to execute certain transactions via a central counterparty) or at least some coordination within the EU (capital and liquidity requirements), while for others national authorities have full responsibility (for example restrictions on collateral reuse). We should add that the potential measures to limit systemic collateral risks should be complementary and configured so as to reflect both dimensions of financial stability.

The primary purpose of collateral is to mitigate counterparty risk. This is reflected in the setting of capital requirements. Securitised exposures satisfying the eligibility conditions for collateral assets reduce the capital requirement for credit risk.¹⁰ In this regard, BCBS (2010) additionally recommends strengthening the coverage of counterparty risk for off-balance-sheet items by tightening the conditions for computing the value of such exposures using internal models. This is because capital requirements do not in any way reflect collateral reuse despite the fact that the latter de facto reduces the value of collateral. With regard to collateral reuse, Basel III only recommends considering liquidity risk in the event of a need for additional collateral or a call to return collateral. Supervisory authorities should thus monitor the significance of collateral reuse in individual institutions and react via Pillar 2 where necessary.

Banks are also protected from potential losses due to borrower default by the inclusion of collateral exposures in the regulation of excessive exposures, which also applies to off-balance-sheet items. In simple terms, this means that the sum of large exposures subject to the limit includes not only unsecured exposures and commitments to the counterparty, but also the collateral issued by that counterparty and accepted by the bank.

Regulation of the leverage ratio, i.e. the ratio of equity capital to total risk-weighted assets, can be used as a complementary instrument to the capital concept. The use of external funds in the banking sector to fund exposures is closely linked with collateralisation. The leverage ratio limits excessive growth in balance-sheet and off-balance-sheet totals, thereby also limiting procyclicality in the setting and extent of use of collateral. This instrument is already in effect in various forms in the USA and Canada and was also introduced in Switzerland in 2013 under Pillar 2.

New liquidity rules – the net stable funding ratio (NSFR) and the liquidity coverage ratio (LCR) – may also have an impact on the use of external funds in the banking sector. The NSFR, a structural instrument, addresses liquidity risk management in the longer term. It provides incentives for banks to reduce the use of short-term and unstable funding sources in order to make them more resilient in situations of reduced access to market funding. The LCR should have a similar impact on the banking sector. Moreover, it motivates the banking sector to hold high-quality liquid unpledged assets so as to increase its resilience to bank runs and fire sales and ultimately at least postpone any liquidity spiral. Both instruments are laid down in CRD IV and CRR. The LCR will be phased in between 1 January 2015 and 1 January 2019, while the NSFR is scheduled to take effect on 1 January 2018.

Regulation on both the borrower side and the lender side can be used to mitigate collateral credit risk through the use of high-quality assets as collateral. The legislative rules applying to the issuance of debt securities affect the quality of assets provided as collateral. For more sophisticated instruments such as secured debt securities and structured products, rules are usually set for the underlying assets, including an upper limit on the coverage ratio. This limit is effective mainly in optimistic periods, when concerns about the soundness of asset issuers are falling, but it in no way

¹⁰ The conditions of eligibility of collateral assets require collateral to be sufficiently liquid, its value over time to be sufficiently stable and the degree of correlation between the value of the collateral and the credit quality of the obligor to be not too high (Article 194 of the Capital Requirements Regulation (CRR), i.e. Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms).

reduces the effect of overcollateralisation.¹¹ The latter should be accounted for in the prudential assessment of asset quality by lenders both in the setting of collateral policy itself (eligible assets, margins, haircuts) and in the prudential management of that policy (determination of exposure values). In this context, the need to reduce dependence on external credit ratings has been emphasised (FSB, 2007), as “sudden” rating changes trigger waves of market adjustment. High dependence can thus cause global reshuffles of financial institutions’ portfolios. In the case of collateralisation, which usually includes chained exposures, these sudden market changes can mean rapid contagion not only within the financial sector, but also to the real sector. Banks that use internal ratings to determine regulatory capital can, when managing collateral policy, apply their internal methods for estimating the basic parameters (PD, LGD, EAD) based on which borrowers are assigned ratings. However, their use – especially in the case of more sophisticated instruments – significantly limits the requirement regarding the minimum length of the time observations used to estimate LGD and EAD, which must cover a full economic cycle and may not be shorter than seven years.

As mentioned in the previous section, haircut-setting and contractual margining are procyclical. For this reason, it is recommended (CGFS, 2010) that supervisory authorities put in place fixed conversion factors for calculating the value of collateral exposures based on two components. The first component should be conservative and stable over time and should reflect market liquidity and price volatility in the long run. The second component should serve as a macroprudential instrument in the form of a countercyclical add-on.

The new regulatory framework for over-the-counter (OTC) derivatives reacts to the procyclicality in financial institutions’ collateral-setting policy and also to the need to make the links between financial institutions more transparent. The new regulation introduces an obligation to clear all standardised OTC derivative contracts through a central counterparty.¹² For OTC derivative contracts not

subject to this obligation, the new regulation lays down a higher capital and margin requirement if they are to be cleared bilaterally. In the interests of enhanced transparency, the new regulation introduces an obligation for financial institutions to report their derivatives transactions to a trade repository (non-financial corporations inform ESMA).

Enhanced transparency is also vital for the market owing to the ratio of encumbered assets in the financial system. The sharing of information on this ratio makes it easier for unsecured lenders in particular to price the risks they face. On a general level, one possibility is to use Pillar 3, an element of Basel III aimed primarily at increasing market transparency and enhancing market discipline. Disclosure of encumbered assets also forms part of European legislation (specifically Article 443 of CRR), although these disclosure requirements are only applied on a consolidated basis.

There are many potential measures for strengthening financial institutions and ensuring a sounder financial sector. Many of them are now being implemented following the domino effect seen during the 2007–2009 financial crisis. The consequences of the new regulations and their cumulative effect will only become clear in the years to come.

5. CONCLUSION

Demand for collateral has been rising, especially in economies with developed markets. This rise is due both to cyclical effects, in particular rising global risk aversion and related increased interest in secured funding, and to the structural effects of new regulations. Overuse of collateral in financial transactions can have adverse implications for financial stability, such as (i) a higher likelihood of shortages of high-quality liquid local assets, especially at times of market distress, (ii) greater and closer interconnectedness of financial institutions within the system, and (iii) higher asset encumbrance in financial institutions’ balance sheets, which, in turn, exacerbates procyclicality due to haircut-setting, margining and collateral eligibility.

In this article, we set out to assess the relevance of at least some of these risks to the Czech financial sector. Our analysis of data on repo transactions in the money and capital markets revealed that the Czech financial system makes only marginal use of secured funding. The secured market is therefore relatively small, but very concentrated and centralised. Most of its participants enter into secured transactions with one and the same counterparty, and most

11 In the Czech Republic, the Act on Bonds No. 190/2004 Coll. lays down exact rules for claims that can be used to cover the face value and accrued interest on bonds. Specifically in the case of mortgage bond issues, only mortgage claims for which the amount of the loan does not exceed 70% of the price of the pledged property can be used.

12 Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories, also known as EMIR. This regulation entered into force on 16 August 2012, but most of its obligations take effect in 2013 or 2014.

often with one of a small number of large banks or non-bank investment firms, which thus play a major role in this market.

The risk of a temporary shortage of high-quality local assets in the Czech financial system is low from the medium-term perspective. This is because the Czech financial system already holds a large proportion of its assets in the form of high-quality liquid assets. However, the supply of high-quality assets in the Czech financial market is underdiversified, with government debt securities accounting for a large share. A temporary shortage of high-quality assets could arise only if the supply of such securities was to fall or their quality was to deteriorate. The risk of high asset encumbrance in balance sheets in the Czech Republic is also low by international standards and, given the arguments set out above, is unlikely to rise in the medium term.

The risks described above currently give no cause for concern about the financial stability of the Czech financial system. Given their potential seriousness, however, it is vital to continue monitoring them.

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OFFICE PROPERTY IN CENTRAL EUROPEAN COUNTRIES

Michal Hlaváček, Ondřej Novotný, Marek Rusnák

Developments in the commercial property market are an important factor affecting financial stability, especially given their effect on the probability of default of non-financial corporations. This article analyses the development of the office property markets in five central European countries and compares their main indicators with those for Germany. It then formulates a simple model of office property prices in relation to macroeconomic, demographic and structural determinants. The analysis reveals that both demand and supply factors (GDP, inflation and total office space), and partly also the maturity of the credit market, have an effect. Using this model, property prices are identified as having been overvalued in 2006–2008. Except in Hungary, however, office space currently appears to be slightly undervalued.

1. INTRODUCTION

Besides the residential property market, the commercial property market is often mentioned as a factor affecting financial stability. The role of property prices in influencing the probability of default of non-financial corporations is frequently discussed (for the situation in the UK, see, for example, Whitley and Windram, 2003). Loans to firms active in the commercial property sector meanwhile make up a large proportion of total loans to non-financial corporations (according to ECB, 2008, exposures to real estate firms in the euro area accounted for around one-third of all loans to non-financial corporations just before the financial crisis broke out). In addition to the probability of default (PD), commercial property prices also affect the loss given default (LGD) of such loans. At times of crisis, the correlation between PD and LGD can rise sharply.

There are more international institutional investors operating on the commercial property market than on the residential property market, so a higher degree of cross-border contagion can be expected in the former (see ECB, 2008). The most active investors in the EU are based in Germany.

Commercial property can also play a role in the financial cycle, as the relaxing and tightening of collateral constraints can amplify the procyclicality of the financial sector as a whole (see Iacoviello and Neri, 2008). This effect on procyclicality is probably stronger for commercial property than for residential property and standard corporate loans, as the commercial developers sector is much more highly leveraged.

Although the commercial property markets in Central European countries are generally less mature¹ and have lower bank loan coverage, they are developing apace. This is apparent, for example, from the ratio of office completions to the existing stock, which is several times higher than in Germany (see Chart 1²). Consistent with this sharp expansion is rapid growth in borrowing by institutions active in the commercial property market, as evidenced, for example, by a 585% overall rise in loans in the “real estate activity” sector in the Czech Republic between 2002 and 2013. Such fast growth in borrowing, however, implies an increased risk of banks wrongly assessing property development projects and an increased risk of default on such loans. Loans to developers in the Czech Republic are indeed relatively risky. This can be illustrated by the fact that, together with loans to the construction sector, they account for around 14% of total loans to the non-financial sector but a full 27% of total non-performing loans.

Analysis of the commercial property market is complicated by the fact that this market consists of various segments, each of which is specific and affected by different fundamentals. Residential property developed for commercial rental is also sometimes classed as commercial property.³ The main segments of the commercial property market are office, retail, industrial and hotel property. In this article, we focus exclusively on the office property market as

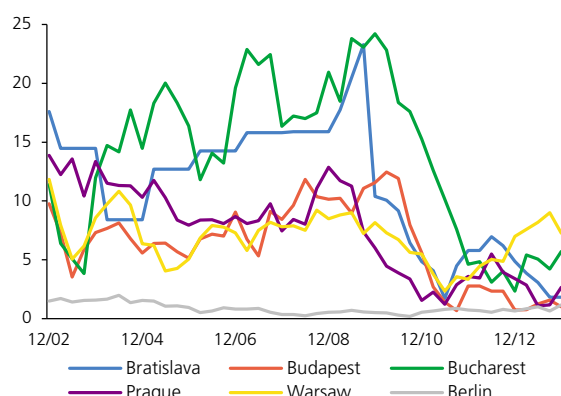
1 This can be illustrated, for example, by total office space per capita compared to Germany (see Chart 3).

2 The higher completion ratios are of course largely due to a low denominator, i.e. low office space per capita (compare Charts 1 and 3). This also explains why the rate of construction was highest in 2002–2006, when the difference in maturity relative to Germany was largest. Similarly, the ratio of completions to the office stock is highest in Romania, which has the lowest office space per capita of all the countries under review.

3 The sale of apartments in property development projects in the Czech Republic is analysed, for example, in Hlaváček, Prostějovská and Komárek (2011). However, most apartments in development projects in the Czech Republic are intended for sale and not for rent and thus do not qualify as commercial property even in the broader sense.

CHART 1

RATIO OF OFFICE COMPLETIONS TO TOTAL OFFICE STOCK
(%, 12-month moving totals)



Source: Jones Lang LaSalle, authors' calculations

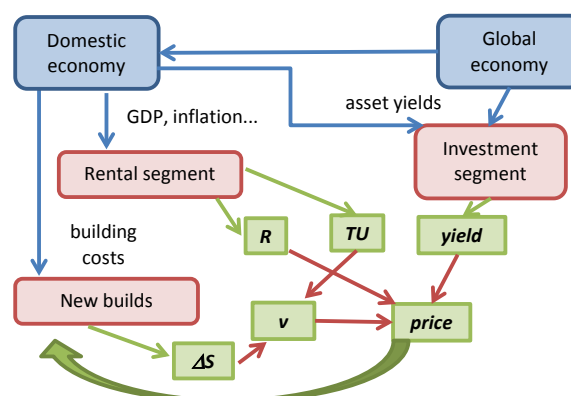
it is the largest and most homogeneous across countries and has the longest time series.

The commercial property market is to a large extent a specific one. Like residential property, commercial property is tied to a particular location and supply is quite inelastic relative to demand. Office property transactions are monitored solely for the "prime" segment of the market, i.e. only for the very best offices meeting a predefined standard. On the one hand, this means that part of the market, including slightly sub-prime types of offices, is not covered by the analysis and there is a shortage of information about it. On the other hand, commercial property transactions are comparable across economies. This makes it easier for multinational companies active in the commercial property market to decide where to invest and allows them to diversify the risks associated with individual economies. From the analytical perspective, the relative "homogeneity" of the underlying asset facilitates cross-country comparisons. One should bear in mind, however, that the analysis pertains solely to the capital cities of the countries examined and that country-wide data are not available.

This article is structured as follows. In the next section we describe the structure and functioning of the office property market and define some of the main market indicators. We then compare these indicators with those in Germany, illustrating the development of the markets in the countries under review and the evolution of the markets over the business cycle. We go on to discuss the literature on the assessment of equilibrium property prices. In the final section, we formulate a simple model for assessing

CHART 2

STRUCTURE OF THE OFFICE PROPERTY MARKET



Source: authors

Note: R denotes rent, TU take-up, i.e. the volume of newly rented space, v the vacancy rate and ΔS the change in the stock (i.e. the volume of completions).

equilibrium and price determinants for the countries under review.

2. DESCRIPTION OF THE OFFICE PROPERTY MARKET

The office property market is made up of three, to some extent separate, but interlinked segments (see Chart 2). The *rental segment* is where the relatively inelastic supply of rental space interacts with the demand for such space. This demand depends strongly on the local economic situation, but also, for example, on foreign investment inflows, as new investors tend to demand prime office space. The main rental market indicators are the average rent in euros per square metre (denoted R) and the total volume of new rentals ("net take-up", expressed in square metres and denoted TU).⁴

The *investment segment* is where transactions in new and used office buildings take place. A large part of the office space in such properties is usually already rented out. Foreign investors – often institutional investors such as real estate investment trust (REIT) funds – are more prevalent than domestic ones in this segment. An important indicator of this part of the market is the prime yield, which depends partly on the yield on domestic and foreign alternative assets (primarily bonds, but also foreign commercial

⁴ Besides net take-up, gross take-up is monitored. It additionally contains renegotiations of existing rental agreements. Another indicator associated with net take-up is net absorption, which is the change in take-up over a given period of time. Net absorption is calculated by subtracting vacant office space from the total stock of office space.

property) as well as on the risk associated with the domestic office market and on the institutional setup, contract enforceability and so on. If we know the rent, the prime yield and the vacancy rate v , we can calculate the price of property transactions P using the following formula:⁵

$$p = \frac{R(1-v)}{\text{yield}}$$

The final segment of the office property market is the *new build segment*, where the new supply of office space ΔS increases as property transaction prices rise.⁶ In addition, the market depends on the situation in the construction sector, above all on building costs, which are driven by wages, material costs and land prices and also by profit margins demanded in the construction industry. New builds consist of greenfield investments as well as refurbishments of existing premises which were used for completely different purposes in the past (brownfield investments, e.g. redevelopment of disused industrial zones) or were not up to the required standard before reconstruction. Given the long-term nature of rental contracts and the time delay between deciding to build and renting out the property, however, part of the supply tends to be uncovered and the vacancy rate v tends to be positive. The following expression holds for the relationship between the vacancy rate, take-up TU and completions:

$$\Delta v = \frac{\Delta s}{s}(1 - v) - \frac{TU}{s}$$

3. OFFICE PROPERTY MARKETS IN CENTRAL EUROPEAN COUNTRIES

When analysing the office property market in the Central European region, one needs to bear in mind its relative immaturity and its convergence nature compared to Western European countries. Despite having recorded sharp growth over the last ten years, total office space per capita in the countries under review is less than half that in Germany (see Chart 3), where a large proportion of investors in commercial property in those countries are based.

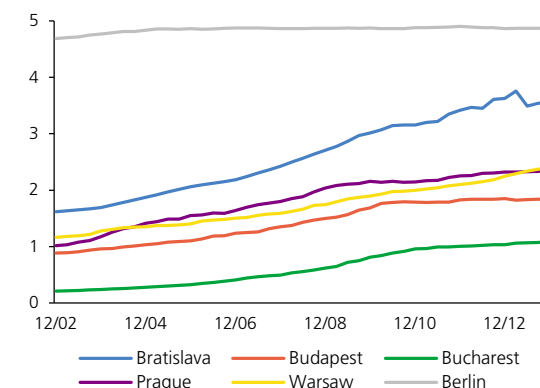
⁵ The prime yield is calculated from realised investment transactions. If no such transactions take place (as happened in the Czech Republic in 2009), the yield is estimated by analysts. The prime yield is computed as the “current yield”, i.e. it reflects only the rental yield and not any capital yields associated with price changes.

⁶ We assume that completions lead directly to a change in the total office stock S . This means we implicitly assume a zero rate of depreciation of existing offices.

CHART 3

OFFICE SPACE PER CAPITA

(m² per capita)



Source: Jones Lang LaSalle, Eurostat, authors' calculations

The least mature market seems to be the office market in Romania. The amounts of total office space in Poland, the Czech Republic and Hungary are relatively comparable. The rather higher figure for Slovakia is due partly to the lower population of Bratislava, but is closest to the figures for Germany.

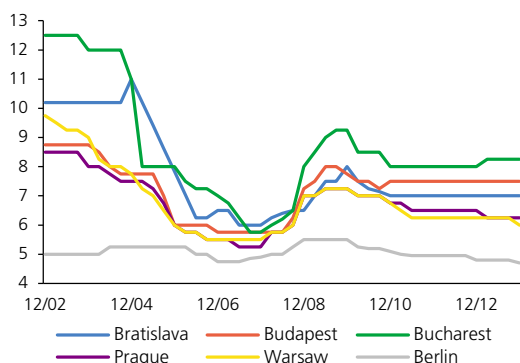
The maturity of the market, which is linked with the risk of office investment transactions, is also reflected in the prime yield (see Chart 4). In all the countries studied the prime yield is significantly higher and less stable than in Germany. For most of the period under review, rental yields were lowest in Poland and the Czech Republic and highest in Romania. The relatively high yield in 2002–2004 was due in part to the above-mentioned low stock of office space manifesting itself in high profitability of this line of business. Yields fell sharply in all the countries in 2005–2007, only to rebound as a result of the financial crisis and the exit of foreign investors from the region. The situation in the investment segment has stabilised somewhat over the last three years, but office property yields are still well above those in Germany.

By contrast, the absolute level of rents across Central European countries is more or less the same as in Germany (see Chart 5). The only exceptions are Poland, where a relative shortage of rental space and solid growth in the local economy is being reflected in higher rents, and Slovakia, where rents are conversely relatively low, possibly due to the above-mentioned higher supply of office property relative to the other Central European countries under review (see Chart 3). Higher rent volatility than in Germany is again apparent in all the countries. The rent cycle is again linked with the impacts of the financial crisis.

CHART 4

OFFICE PROPERTY YIELDS

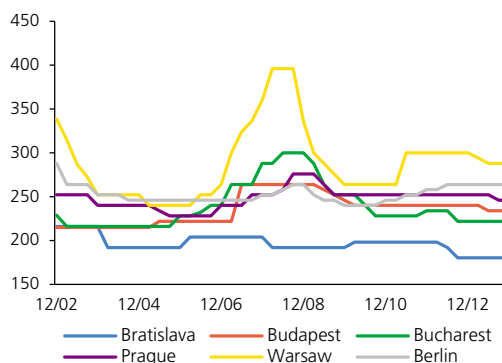
(%)



Source: Jones Lang LaSalle

CHART 5

OFFICE PROPERTY RENTS

(EUR per m² and year)

Source: Jones Lang LaSalle

However, unlike in Germany and partly also Poland, where rents have recently been rising, rents remain flat or falling in the other countries.

The vacancy rate (see Chart 6) has also been moving in line with the market pattern described above. It again is comparatively volatile in Central European countries, partly due to a relatively high new office supply (see Chart 1). Before the financial crisis erupted, vacancy rates dropped to very low levels in Poland and Romania, where a shortage of office space was visible at the time (in Poland due to solid economic growth and in Romania due to a relatively low stock). The declines in the vacancy rates in Slovakia and Hungary were substantially smaller. Since the outbreak of the financial crisis, however, vacancy rates have climbed to high levels throughout the region and have stayed there despite a fall in this indicator in Germany. A high vacancy rate testifies to a relatively high level of risk associated with new office construction and may be linked with a relative slowdown in such activity. Another development worth mentioning, besides the market reaction directly after the outbreak of the financial crisis, is the 5.5 percentage point surge in the vacancy rate in Poland since mid-2011, probably linked with an upswing in completions (see Chart 1).

Chart 7 shows office property prices calculated from rents, office property investment yields and vacancy rates. In line with the previous discussion, the price cycle is influenced primarily by the price bubble that built up between 2006 and mid-2008 and the subsequent deflation of that bubble due to the financial crisis. For most Central European countries, however, the price of office property remains higher than it was before the bubble formed and subsequently burst. The chart shows relatively strong

growth in office prices in Germany (a sizeable 30% since the end of 2009), which is probably a result of a “search for yield” and may signal overinflated prices. Office prices have risen similarly strongly in Poland (by 33% between the end of 2009 and mid-2011), although there they have fallen back slightly in the last two years, and partly also in the Czech Republic, where prices went up by 14.8% between the end of 2009 and mid-2013. In Slovakia, Hungary and Romania, by contrast, prices have recently been relatively stable.

4. LITERATURE REVIEW

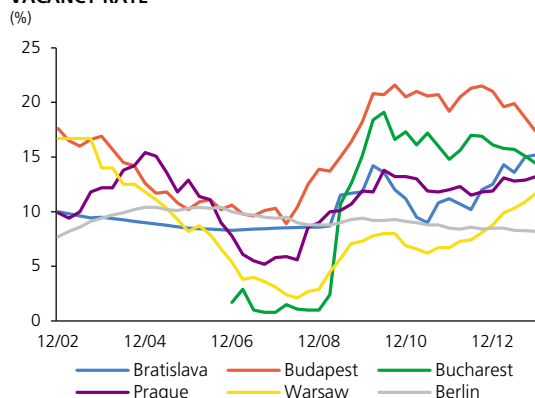
In contrast to residential property analysis, where there is a whole range of sophisticated theoretical models to explain the interaction between prices and procyclical lending⁷ and where a whole range of empirical studies are available for advanced countries and for countries in which the property market is still developing,⁸ the range of available literature for commercial property is very limited despite the importance of this segment for financial stability. The number of studies for advanced economies is far lower. To the best of our knowledge, there are practically no studies covering the Central Europe region, except for periodical descriptive analyses issued by specialised firms (Jones Lang LaSalle, 2013). We present a survey of the main available studies below.

⁷ See, for example, the now almost textbook financial cycle models by Kiyotaki and Moore (2007) and Iacoviello and Neri (2008)

⁸ Residential property prices in the Czech Republic are analysed, for example, by Hlaváček and Komárek (2011).

CHART 6

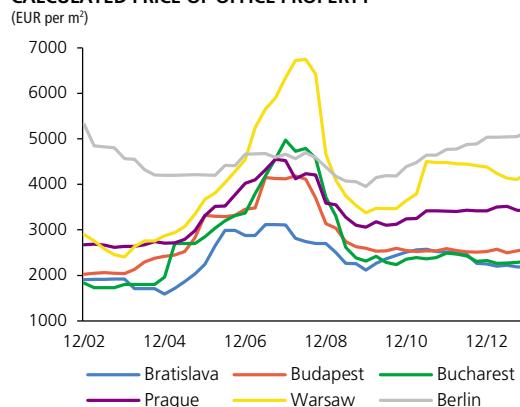
VACANCY RATE



Source: Jones Lang LaSalle

CHART 7

CALCULATED PRICE OF OFFICE PROPERTY



Source: Jones Lang LaSalle, authors' calculations

Davis and Zhu (2004) explore the interaction between commercial property prices and bank lending. They formulate a theoretical model of commercial property cycles in which the supply of commercial property is fixed in the short run. New construction, which increases the supply in the long run, is funded primarily by collateralised bank loans. Cycles in commercial property prices, which influence the credit financing of new construction, depend on exogenous business cycle shocks and on characteristics of the real estate market, which can amplify the shocks. Davis and Zhu (2004) also conduct an empirical analysis based on a sample of 17 developed economies, for which they determine the interaction between commercial property prices, credit and GDP using a panel error-correction model and Granger causality tests. This interaction was particularly strong for countries hit by banking crises in 1985–1995.

Davis and Zhu (2009) extend the previous article by studying, on the basis of microeconomic data, how commercial property prices influence individual banks' lending decisions and indirectly also their profitability and credit portfolio quality. The linkage between commercial property prices and bank characteristics is found to be quite strong.

Gyourko (2009) explores the relationship between residential and commercial property prices, for which common demand drivers can be expected. On the basis of data from 32 metropolitan areas of the USA, the article finds that the cycles on the two markets do indeed show commonalities.

Lieser and Groh (2011) examine the determinants of commercial real estate investments using a wide panel of 47

countries, including Central European nations, for the period 2000–2009. These determinants form a broad set of 66 factors ranging from characteristics associated with economic activity and demographics through to those reflecting the maturity of the property market, the depth of the capital market, the quality of the legal framework, investor protection, administrative burdens and regulatory limitations, and the socio-cultural and political environment. By applying panel regression analyses the authors find that commercial property investments are supported by GDP growth, rapid urbanisation and population growth, and conversely are hindered by lack of transparency in the legal framework, administrative burdens on doing business, sociocultural challenges and political instability.

Using data from the UK, Whitley and Windram (2007) present an analytical framework for analysing the financial stability implications of developments in the commercial property sector. This framework includes a model of the real estate sector, a model of borrowing by commercial real estate companies and a model of the probability of default for such companies. Although a simulation using this model framework failed to capture all the cyclicalities of commercial property capital values and bank lending, particularly between 1990 and 1994, almost all this failure can be attributed to the observed shock to the discount rate. The main result of the article is that it demonstrates a link between commercial property prices and defaults by non-financial corporations.

The commercial property market situation is also assessed by the ECB in its Financial Stability Review (usually in section 1). Its method for detecting value misalignments in commercial property markets, described in ECB (2011) and

partly also in ECB (2008), is based on a fairly straightforward comparison of commercial property market indicators – primarily capital values – with their long-term averages.

5. DATA DESCRIPTION AND METHODOLOGY

Our dataset contains quarterly data covering the period of 2002 Q1–2013 Q4 for five countries (the Czech Republic, Poland, Hungary, Slovakia and Romania). Besides commercial property market indicators for the capital cities of those countries, it contains macroeconomic variables (GDP/domestic demand, inflation, unemployment, foreign direct investment inflow, short-term and long-term interest rates and the exchange rate), demographic factors (population size and growth) and a proxy for credit market maturity (the ratio of loans to non-financial corporations to GDP).

On the basis of this relatively wide set of variables, we used only four factors that were at least vaguely significant in our models in order to model property prices.⁹ For these variables we formulated the following error-correction model:

$$\Delta \log p_{i,t} = \alpha + \beta_1 \log s_{i,t} + \beta_2 \Delta \log gdp_{i,t} + \beta_3 \Delta c_{i,t} + \beta_4 \Delta \log cpi_{i,t} + \delta (\log p_{i,t-1} - \gamma_1 \log s_{i,t-1} - \gamma_2 \log gdp_{i,t-1} - \gamma_3 c_{i,t-1} - \gamma_4 \log cpi_{i,t-1}) + \varepsilon_{i,t}$$

where $p_{i,t}$ denotes the office property price index calculated using the formula in section 2, $s_{i,t}$ is the existing stock of office space, $gdp_{i,t}^*$ represents potential real GDP in euros per capita, $gdp_{i,t}$ stands for the output gap as measured by the HP filter, $c_{i,t}$ is the ratio of credit to GDP and $cpi_{i,t}$ denotes the harmonised consumer price index (HCPi). Fixed effects are added to the model to capture unobserved heterogeneity, which is constant over time. The standard errors are robust to heteroscedasticity and are clustered at country level.

The error correction model allows us to model the short-run (β) and long-run (γ) relationships. Coefficient δ denotes the speed at which the model returns to equilibrium. A similar model was used in Davis and Zhu (2004), which studied determinants of commercial property prices based on a sample of developed economies (see the previous section). We should point out that given the small number of observations the results should be interpreted with caution.

TABLE 1

MODEL ESTIMATES

	Long-run relationship			Short-run adjustment		
	coefficient	t-stat	p-val	coefficient	t-stat	p-val
Stock	-0.756	-6.220	0.000	-0.631	-4.850	0.008
GDP	1.546	7.070	0.000	0.381	1.640	0.176
Loans/GDP	0.009	3.390	0.001	0.011	1.640	0.176
CPI	1.040	2.990	0.003	1.065	2.800	0.049
Constant	-7.325	-3.240	0.001	0.006	1.570	0.191
Lagged residual	-	-	-	-0.086	-2.280	0.085
R ² : within		0.391			0.109	
between		0.790			0.085	
total		0.416			0.108	

Source: Jones Lang LaSalle, authors' calculations

In particular, it is important to emphasise that the period under review essentially covers only one cycle in commercial property prices and additionally that structural breaks – linked primarily with low market maturity at the start of the period – can also be expected. It also holds that while the office property market indicator reflects the situation in the capital city of the country (data for other cities are not usually available), the macroeconomic indicators mostly relate to the situation in the country as a whole. Economic misalignments between the capital city and the rest of the country may of course distort the results of the analysis.

That said, we can draw some conclusions. First, only four of the relatively wide set of potential explanatory variables proved to be at least vaguely significant (see Table 1). On the other hand, the estimated coefficients on all these variables were consistent with economic intuition. The stock of office property was shown to have a negative effect on office property prices, i.e. prices fall as supply rises. This effect is rather stronger for the countries under review than for countries with mature commercial property markets, thanks mainly to a shortage of prime office space in Central European countries at the start of the period under analysis. Real GDP¹⁰ proved to be a significant macroeconomic determinant: higher economic development increases prices of office space. The effect of potential GDP was more significant in the long-run relationship, while the cyclical contribution of the output gap was not statistically significant. The maturity of the credit market had a similar effect; in the long-run relationship it fostered higher office prices, while in the short-term one its estimated coefficient had the expected sign but was relatively low in absolute

10 As an alternative to GDP we tested the effect of domestic demand. The results of the model were similar, but the significance of the coefficient on demand was lower.

9 The coefficients on the other variables listed above were not significant.

terms and not statistically significant at the 10% level. The consumer price index, which we used as an indicator of construction costs or general inflation pressures in the economy, turned out to be significant in both the long-term and short-term relationship.

The estimated coefficient δ shows that if office property prices deviate from their long-term fundamental level, they will converge to that level at a rate of around 8.6% a quarter.

The model also allows us to compare the estimated “fundamental” office prices with the actual ones and thus to determine how overvalued or undervalued such property is (see Chart 8). However, given the above-mentioned short length of the time series and the related not very high overall statistical significance of the model (R^2 of the short-term relationship only 11%), these price misalignment estimates are only illustrative and subject to a high degree of uncertainty. Overall, the residuals for individual countries indicate initial undervaluation in 2002–2005, particularly for countries where the market was only starting to develop (Romania), a subsequent bubble in prices until 2008 before the outbreak of the financial and debt crisis, and deflation of that bubble in 2009–2010. At the moment, the price equilibrium assessment varies from country to country. In countries that are maintaining relatively high GDP growth rates in the European context (Poland and Slovakia), office property seems undervalued, while in the Czech Republic, Hungary and Romania prices appear to be close to, or only slightly below, their equilibrium levels. These discrepancies in the assessment of the current market situation across countries can be explained in terms of relative price stickiness, with the estimated degree of overvaluation being driven from below primarily by fundamentals. This, of

course, further increases the uncertainty in the interpretation of overall price misalignment.

The cross-country comparison of the degree of office overvaluation/undervaluation also indicates higher volatility of overvaluation for Romania and Poland than for Hungary, Slovakia and the Czech Republic.¹¹ Looking at the results of similar studies for euro area countries (see, for example, ECB, 2011), the patterns in Central European countries seems similar in terms of the timing of overvaluation/undervaluation, but in most euro area countries the volatility of overvaluation is rather lower.

6. CONCLUSION

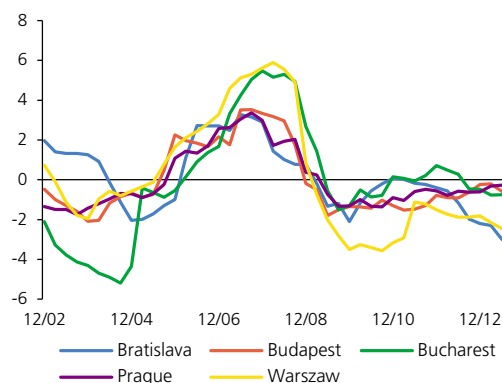
Commercial property, which played a major role in many countries during the financial crisis and which has significantly influenced banking sector indicators and financial stability in general, is becoming increasingly important for Central European countries as well. The commercial property market, which is funded in large part by bank loans, is developing dynamically in these countries. Analysis of the commercial property market will therefore be an important element of financial stability assessment for these countries. This article set out to contribute to such analysis, at least in the office property segment.

Despite the said rapid development, the commercial property markets in these countries are still relatively immature. This is reflected in higher volatility in their indicators than for other EU countries.

Using an error-correction model, we tried to express the dependence of office property prices on macroeconomic, demographic and structural determinants. This analysis indicated that demand factors are significant, demonstrating the statistical significance of GDP and the effect of consumer prices. Supply factors linked with total office space, and partly also the maturity of the credit market as proxied by the ratio of credit to GDP, also seem to be statistically significant. On the basis of the model, property prices were identified as having been overinflated

CHART 8

MODEL RESIDUALS BY COUNTRY (OFFICE PRICE “GAPS”)
(% of price)



Source: Jones Lang LaSalle, authors' calculations

¹¹ For the Czech Republic one can also compare the degree of price misalignment between residential and office property (compare, for example, Chart 8 with Chart V.20). Residential and office property have essentially the same overvaluation/undervaluation profiles. However, the latest “bubble” started to inflate around one year earlier in the office market than in the residential market, and subsequently “deflated” about six months earlier.

in 2006–2008, but office space currently appears to be slightly undervalued.

Given the immaturity of the market and the short time series used, the results of our analysis should be interpreted with caution. Nevertheless, they may lay the foundations for further debate of developments in the commercial property market. This market should play a more prominent role than it has so far in the discussion of financial stability and new regulatory approaches.

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GLOSSARY

Acid-test ratio	This indicator of corporate liquidity can be calculated as the ratio of total current assets excluding inventories to total liabilities. In general, the higher this indicator, the stronger the company's liquidity position. See also Cash ratio and Current ratio.
Balance-sheet liquidity	The ability of an institution to meet its obligations in a corresponding volume and term structure.
Balance-sheet recession	A situation caused by the efforts of market participants to reduce their debt, a resulting drop in demand for loans, and a limited ability to stimulate economic activity through monetary policy. The onset of a balance-sheet recession usually follows a sharp decline in asset prices, when the balance sheets of market participants can record negative equity, i.e. the value of assets is lower than that of balance-sheet liabilities. A typical example is the period following the bursting of the stock and property bubble in Japan during the 1990s.
Bank Lending Survey (BLS)	A survey of bank lending conditions for non-financial corporations and households in the Czech Republic, the pilot round of which took place in 2012 Q1. The survey aims to obtain qualitative information on current perceptions of the situation on both the supply and demand side of the credit market.
Basel III	A new regulatory framework issued by the Basel Committee on Banking Supervision in 2010 which sets standards for capital adequacy of banks and now also for their liquidity. Overall, Basel III introduces stricter rules than the previous framework and came into existence mainly as a reaction to the financial crisis.
Breakdown of banks by total assets	In some charts and tables in the FSR, banks are assigned to groups based on the amount of their total assets. The breakdown of banks into groups is revised at the end of each calendar year. In 2007 and 2008, banks having total assets of over CZK 150 billion were regarded as large banks, banks having total assets of over CZK 50 billion and up to CZK 150 billion were regarded as medium-sized banks and banks having total assets of less than CZK 50 billion were regarded as small banks. In 2009 the total amount of assets necessary for inclusion in the group of large banks was increased to CZK 200 billion and the range for medium-sized banks was changed to CZK 50 billion–CZK 200 billion. The range for small banks was unchanged. As from 2012, the breakdown of banks by total assets is as follows: large banks have total assets of over CZK 250 billion, medium-sized banks have total assets of over CZK 50 billion and up to CZK 250 billion and small banks have total assets of less than CZK 50 billion.
Capital adequacy	The ratio of regulatory capital to total risk-weighted assets. Tier 1 capital adequacy is the ratio of Tier 1 capital to total risk-weighted assets (see also Tier 1).
Cash ratio	This indicator of corporate liquidity can be calculated as the ratio of total funds on accounts and in cash to total short-term liabilities. In general, the higher this indicator, the stronger the company's liquidity position. See also Acid-test ratio and Current ratio.
CERTIS	A payment system processing all domestic interbank transfers in Czech koruna in real time. Banks, credit unions and foreign bank branches are participants in this system.

Collective investment funds (CIFs)

Mutual and investment funds whose sole business activity is collective investment, i.e. collecting funds from investors and investing them. CIFs are broken down by investor type into funds intended for the public (dominated by open-ended mutual funds) and funds for qualified investors, and by asset risk into money market, bond, equity, mixed and real estate funds and funds of funds. Sometimes the category of funds of funds is not listed separately, but is included in the other categories according to the type of funds in which they invest.

Connectivity

An indicator of the degree of interconnectedness of a network element with the other elements (e.g. in a network of interbank exposures); for each bank, connectivity is calculated as the number of relationships with other banks divided by the maximum possible number of relationships and takes values from 0 to 100%. The average connectivity of the entire network is calculated as the average across all banks.

COREP (Common Reporting Framework)

A common reporting framework in the EU, prepared by the European Banking Authority (EBA) for data reporting in accordance with prudential requirements (under CRR). It covers the areas of capital, capital adequacy, risk exposures, operational risk, market risk and credit risk.

Credit default swap (CDS)

A credit derivative in which the buyer of the collateral undertakes to pay the seller periodical fixed payments ("swap premium") for the duration of the contract in exchange for a conditional payment of the counterparty in the case of default of the "reference entity" to which the agreement refers. If default does not occur, the contract terminates at a specified time and the seller only gains a premium for taking on the potential credit risk.

Credit premium

The premium on the return on a portfolio for credit risk.

Current ratio

This indicator of corporate liquidity can be calculated as the ratio of total current assets to total liabilities. In general, the higher this indicator, the stronger the company's liquidity position. See also Acid-test ratio and Cash ratio.

Custody

Banks offer their clients the service of safekeeping and management of securities and settlement of securities transactions on both domestic and foreign markets. The bank opens and maintains a securities owner account for the customer, on which it performs settlement of the customer's capital market trades as instructed by the customer. As the custodian, the bank performs activities directed at preserving the rights attaching to the securities in its custody.

D-SIB capital surcharge (D-SIB capital buffer)

An increase in the regulatory capital requirement for a bank based on its D-SIB value.

D-SIB value

Expresses a bank's relative systemic importance to the domestic economy, i.e. the impacts that distress of this bank would have on the domestic economy by comparison with the impacts of distress of other banks.

Debt deflation

A situation where the real value of the debt of corporations and households rises as a result of falling prices and incomes. This happens primarily in a situation where the decrease in nominal interest rates is insufficient to offset the fall in the rate of growth of incomes.

Default

Default is defined as a breach of the debtor's payment discipline. The debtor is in default at the moment when it is probable that he will not be able to repay his obligations in a proper

and timely manner, without recourse by the creditor to settlement of the claim from the security, or when at least one repayment (the amount of which deemed by the creditor to be significant) is more than 90 days past due.

Default rate	The 12-month default rate is the ratio between the volume of liabilities of debtors which defaulted over a 12-month reference period and the volume of liabilities of all entities existing at the start of that period. The default rate can also be defined analogously in terms of the number of entities which defaulted over the reference period.
Deleveraging	A process consisting in the reduction of leverage, i.e. the reduction of indebtedness, which decreases the profitability of economic agents, but also the degree of risk associated with them.
Downward liquidity spiral	An inverse relationship between market risk and funding liquidity risk. A downward liquidity spiral may be triggered by a single financial institution which has insufficient liquidity and is unable to borrow on the money market. In this case, it might attempt to sell some of its assets. If tensions exist on the market for the given asset, the financial institution may cause the price of the asset to fall rapidly through aggressive attempts to sell (a "loss spiral"). The fall in the asset price affects the balance sheets of all holders of the asset and, owing to a rise in haircuts and margin calls, results in more and more attempts to sell and more and more price declines (a loss of market liquidity, a "margin spiral").
Eligible collateral	An asset accepted to ensure fulfilment of an obligation to the central bank.
Equalisation provision	The equalisation provision is set aside for individual areas of non-life insurance and is intended to equalise increased insurance claim costs arising due to fluctuations in loss ratios as a result of facts independent of the will of the insurance company.
Euro area effective GDP growth	GDP growth in the 14 euro area countries weighted by Czech exports to those countries.
Financial repression	Policies and instruments that allow the government to fund its debt cheaply at the expense of domestic creditors by borrowing from them via banks, insurance companies and pension funds at artificially low interest rates or by imposing an inflation tax on them.
Forbearance	A practice where banks, instead of recognising a deterioration in asset quality and reporting a loss, "restructure" the loan, for example by extending the repayments over a longer time horizon, allowing the debtor temporarily to pay interest only, or otherwise changing the lending conditions so that the debtor does not have to acknowledge open default.
G-SIB value	Expresses a bank's relative systemic importance to the global economy, i.e. the impacts that distress of this bank would have on the global economy by comparison with the impacts of distress of other globally important banks.
Gross government borrowing requirement	The net government borrowing requirement plus redemptions and repurchases of government bonds maturing in the given year, repayments of EIB loans, repurchases and exchanges of government bonds maturing in future years, and revaluation of funding reserves.

Herfindahl index (HI)	The sum of the squares of the market shares of all entities operating on a given market. It expresses the level of concentration in the market. It takes values between 0 and 10,000. The lower the HI, the less concentrated the market.
Household insolvency	A situation where a household is unable to cover its current expenditures by its current income and the sale of its asset holdings. Insolvency is defined in legal terms in Act No. 182/2006 Coll., on Insolvency and Methods of Resolution Thereof.
Interest rate spread	Also interest rate differential; the spread between the interest rate on a contract (deposit, security) and a reference interest rate.
Interest rate transmission channel	One of the channels of the monetary policy transmission mechanism. It acts such that, for example, an increase/decrease in monetary policy interest rates leads first to an increase/decrease in interest rates on the interbank market. Consequently, there is an increase/decrease in the interest rates announced by banks for the provision of loans and the acceptance of deposits. The result is a downturn/upturn in investment activity as a part of aggregate demand and ultimately a decrease/increase in inflation pressures.
Institutional investor	Either (a) a bank executing trades in investment instruments on its own account on the capital market, an investment company, an investment fund, a pension fund or an insurance company, or (b) a foreign entity authorised to carry on business in the same fields in the Czech Republic as the entities listed under (a).
Jump-to-default risk	The risk of sudden default that arises before the market can reflect that risk in prices.
Leverage	See Leverage ratio.
Leverage ratio	The new CRD IV/CRR rules define the leverage ratio as capital to risk-weighted assets. The term leverage is also often used in financial economics. There, however, capital is the denominator in the ratio (e.g. assets/capital or debt/capital). When we say that a bank has high leverage, we generally refer to the definition consistent with the assets/capital ratio. However, such a bank has a low leverage ratio.
Liquidity	Money in the broader sense (cash, short-term assets quickly exchangeable for cash, etc.).
Loan-to-value (LTV) ratio	The ratio of a loan to the value of pledged property.
Loss given default (LGD)	The ratio of the loss on an exposure in the event of counterparty default to the amount owed at the time of default.
Macroprudential policy	A key component of financial stability policy. It focuses on the stability of the financial system as a whole. Its main objective is to help prevent systemic risk.
Marginal lending facility	A facility enabling banks to borrow overnight liquidity from the CNB in repo operations. A bank is entitled to access the lending facility if it asks for the transaction to be made no later than 25 minutes prior to the end of the CERTIS accounting day. The minimum volume is CZK 10 million and amounts exceeding this threshold are provided without further restrictions. Funds provided under this facility are charged interest at the Lombard rate.
Market liquidity	The ability of market participants to carry out financial transactions in assets of a given volume without causing a pronounced change in their prices.

Monte Carlo simulation	A numerical technique based on repeated random sampling. It employs a large number of simulations of a particular random variable to determine its approximate distribution and thus also the most likely value it can take.
Mortgage refinancing	The process whereby a mortgage debtor accepts a new loan from a different lender than the one from which he received the original loan and uses it to repay the original loan. He thus becomes a debtor of the other lender, but usually under more favourable conditions. This is usually possible only at the end of the original loan's fixation period.
Mortgage refixation	The process whereby at the end of the fixation period of a mortgage loan the debtor selects the length of the new fixation period and negotiates new conditions for this period with the creditor. In this case, the identity of the creditor does not change.
Natural population increase	The difference between the number of live births and the number of deaths in the same period of time in a given area. See also Total population increase.
Net financial assets	The difference between the sum of financial assets and the sum of liabilities.
Net international investment position	The surplus of financial assets over financial liabilities of residents vis-à-vis non-residents.
Non-performing loans	A loan is non-performing if at least one of the following two situations occurs: a) the debtor is unlikely to pay its credit obligations in full without recourse to actions such as realising security, b) the debtor is past due more than 90 days on a credit obligation. For details, see Article 178 of Regulation (EU) No 575/2013 of the European Parliament and of the Council. Non-performing loans are further broken down into substandard, doubtful and loss loans in deteriorating of quality quality. Also called loans in default or default loans.
Overnight segment	The money market on which overnight funds are traded.
PRIBOR	The reference interest rate on the interbank deposit market for deposit sales. Reference banks quoting the PRIBOR must be important participants in the interbank market.
Price-to-income	The ratio of the price of an apartment (68 m ²) to the sum of the annual wage in a given region over the last four quarters.
Price-to-rent	The ratio of the price of an apartment to the annual rent. The price-to-rent ratio is the inverse of the rental return.
Property asking prices	Property sale asking prices in estate agencies. Asking prices should be higher than transaction prices. Property asking prices in the Czech Republic are published, for example, by the CZSO and the Institute for Regional Information (which also publishes data on market rent supply prices). See also Property transaction prices.
Property developers/developments	Companies/projects whose aim is to build a complex of residential and commercial property. Property developers' work includes choosing an appropriate site, setting up a project, obtaining the necessary permits, building the necessary infrastructure, constructing the buildings and selling the property. Developers also often organise purchase financing for clients and frequently lease or manage the property once it is built (especially in the case of commercial property). Given the combination of construction activity and speculative

property purchases, developers' results are strongly dependent on movements in property prices.

Property transaction prices	Prices of actual transactions on the property market, which should be the closest to actual market prices. The CZSO has been publishing two types of data on property transaction prices since 2011. Prices based on Ministry of Finance statistics from property transfer tax returns and published by the CZSO are the older source. These data contain time series from 1998 and are available in a relatively detailed breakdown (by region, degree of wear and tear and type of property). On the other hand, they do not include transactions which are not subject to property transfer tax (i.e. primarily transactions in new property) and the index is published with a lag of at least half a year. The second, new source of data on property transaction prices is data from CZSO surveys in estate agencies. They cover new property, but are not available in such a long time series and such a detailed breakdown. See also Property asking prices.
Quantitative easing	A method for implementing monetary policy in a situation where the central bank is no longer able to lower its monetary policy rate because it has already reduced it almost to zero. Quantitative easing involves the central bank buying assets from commercial banks and thereby creating a sizeable stock of free reserves with those banks. The purpose of this type of policy is to strengthen the balance-sheet and market liquidity of the banking system and minimise the risk of growth in interest rates due to insufficient liquidity. Japan has applied quantitative easing in the past decade, and the US Fed, for example, is to some extent pursuing a similar policy at present.
Recovery rate	The percentage of the amount of a non-performing loan recovered by a creditor, e.g. by foreclosure.
Rental return	The ratio of the annual supply rent to the asking price of the apartment. It is the inverse of the price-to-rent ratio.
Risk premium	The risk premium an investor demands on investments in riskier financial instruments.
RTGS	Real-time gross settlement, i.e. each transaction is processed and settled on-line in real time. The CERTIS payment system operates on this principle.
Search for yield	A situation where economic agents attempt to make up for generally low asset yields by seeking riskier-than-usual investments that yield a premium in return for the increased risk. Such behaviour may increase the future risks to the financial system.
Secondary market	The market on which existing securities are traded.
SKD	Short-Term Bond System. The system is used for issuing and registering all book-entry securities with maturities of up to one year and for settling trades in these securities. At present, T-bills and CNB bills are registered in SKD. The system enables sales of securities, repos and sell and buy operations, as well as pledges and exchanges of securities.
Solvency	Solvency in the insurance sector is the ability of an insurer to meet its insurance obligations, i.e. to settle eligible insurance claims arising from insured losses. Solvency II – a new regulatory framework prepared by the European Commission – is a set of rules for European insurance companies and reinsurers laying down quantitative requirements, qualitative requirements, prudential rules, compliance with market discipline and disclosure duties.

Sovereign risk	The risk that a government will default on its obligations, leading to national bankruptcy or restructuring of government debt.
Systemic risk	The risk of the entire financial system or market collapsing.
Technical interest rate	The interest rate used by insurance companies to calculate premiums in life insurance. The technical interest rate represents the increase in the value of life insurance provisions to which the customer is entitled under the policy (the guaranteed share in the returns on financial investment). The maximum technical interest rate is laid down in a decree.
Technical provisions	Under the Act on Insurance, an insurer must set aside technical provisions to meet insurance obligations which are either likely to be incurred or certain to be incurred but uncertain as to amount or as to the date on which they will arise.
Tier 1	The highest quality and, for banks in the Czech Republic, also the most significant part of regulatory capital. The dominant components of Tier 1 are equity capital, retained earnings and mandatory reserve funds.
Too big to fail	A financial institution is “too big to fail” if the markets and the public believe it is so important to the economy that the state will spare no effort or expense to rescue it (stop it going bankrupt) if it gets into distress.
Value-at-risk	The size of loss, with predefined probability, which a bank may suffer when holding a current portfolio for a certain period if market factors (e.g. interest rates, exchange rates) develop unfavourably.
Yield spread	Also yield differential; the spread between the yield on a bond and the yield on a reference (“benchmark”) bond.

ABBREVIATIONS

ABS	asset backed securities
AEX	Amsterdam Exchange index
AFS	available-for-sale (financial assets in the “available for sale” accounting category)
ARAD	database of aggregated time series administered by the CNB
ASM	available solvency margin
ASW	asset-swap spread (difference between the swap yield curve and the government bond yield curve)
AQR	Asset Quality Review
BCBS	Basel Committee on Banking Supervision
BdF	Banque de France
BIS	Bank for International Settlements
bp	basis point
BRCI	Bank Register of Client Information operated by Czech Credit Banking Bureau
BRICS	Brazil, Russia, India, China and South Africa
BRRD	Bank Recovery and Resolution Directive
BSIC	Banking Supervision Information Centre
CAC 40	benchmark French stock market index
CAD	Canadian dollar
CAR	capital adequacy ratio
CB	central bank
CBCB	Czech Banking Credit Bureau
CCA	contingent claims analysis
CCB	countercyclical capital buffer
CCMA	Czech Capital Market Association
CCP	central counterparty
CCR	Central Credit Register operated by the CNB
CDS	credit default swap
CEE	Central and Eastern Europe
CERTIS	Czech Express Real Time Interbank Gross Settlement System
CESR	Committee of European Securities Regulators
CET1	Common equity Tier 1
CGFS	Committee on the Global Financial System
CIFs	collective investment funds
CIS	Commonwealth of Independent States
CLFA	Czech Leasing and Finance Association
CNB	Czech National Bank
CNCB	Czech Non-Banking Credit Bureau
COSMC	Czech Office for Surveying, Mapping and Cadastre
CoVaR	conditional value-at-risk
CPI	Consumer Price Index
CRB	Commodity Research Bureau Index (Reuters commodity index)
CRD	Capital Requirements Directive
CRR	Capital Requirements Regulation
CZU	Czech Technical University
CZ	Czech Republic
CZEONIA	Czech OverNight Index Average (reference O/N interest rate on the interbank market)
CZK	Czech koruna
CZSO	Czech Statistical Office
DAX	Deutscher Aktien Index

DD	distance to default
DGSD	Deposit Guarantee Schemes Directive
DJStoxx50	Dow Jones EURO STOXX 50, the main European stock index, comprising 50 corporations
DJ UBS	Dow Jones commodity index
D-SIB	domestic SIB
D-SIFI	domestic SIFI
EA	euro area
EAD	exposure at default
EBA	European Banking Authority
EBIT	earnings before interest and taxes
EBITDA	earnings before interest, taxes, depreciation and amortization
EC	European Commission
ECB	European Central Bank
ECM	error correction model
EDP	Excessive Deficit Procedure
EEA	European Economic Area
EFFAS	European Federation of Financial Analysts Societies
EFSS	European Financial Stabilisation Facility
EFSM	European Financial Stabilisation Mechanism
EIB	European Investment Bank
EIOPA	European Insurance and Occupational Pensions Authority
EMBI	Emerging Market Bond Index
EMEs	emerging market economies
EMIR	European Market Infrastructure Regulation
EMU	Economic and Monetary Union
EONIA	Euro OverNight Index Average (reference O/N interest rate on the interbank market)
ESA 95	European System of Accounts
ESCB	European System of Central Banks
ESFS	European System of Financial Supervision
ESM	European Stability Mechanism
ESMA	European Securities and Markets Authority
ESRB	European Systemic Risk Board
EU	European Union
EU-12	euro area as of 2001–2006
EUR	euro
EURIBOR	Euro InterBank Offered Rate (reference interest rate on the interbank market)
EWMA	exponentially weighted moving average
FASB	Financial Accounting Standards Board
FCI	financial cycle indicator
FDI	foreign direct investment
Fed	Federal Reserve System
FRA	forward rate agreement
FSAP	Financial Sector Assessment Program
FSB	Financial Stability Board
FSR	Financial Stability Report
FSSA	Financial Sector Stability Assessment
FTSE 100	Financial Times Stock Exchange Index
GARCH	generalized autoregressive conditional heteroskedasticity
G7	France, Italy, Japan, Canada, Germany, the United States and the United Kingdom
GBP	pound sterling
GCPs	groups of connected persons
GDI	gross disposable income

GDP	gross domestic product
GSCI	Goldman Sachs Commodity Index (S&P commodity index)
G-SIB	global SIB
G-SIFI	global SIFI
G-SII	global systemically important institutions
HB index	Hypoteční banka property price index
HBS	Household Budget Statistics
HCPI	Harmonised Consumer Price Index
HP	Hodrick-Prescott filter
HTM	held-to-maturity
HQLA	high-quality liquid assets
HUF	Hungarian forint
IASB	International Accounting Standards Board
IBEX	Iberia Index (benchmark stock market index – Spain)
IBRD	International Bank for Reconstruction and Development
IF	investment firm
IFRS	International Financial Reporting Standards
ILO	International Labour Organisation
IMF	International Monetary Fund
IMF IFS	IMF International Financial Statistics
IP	investment position
IRB	Internal Rating Based Approach, a Basel II bank capital adequacy approach
IRI	Institute for Regional Information
IRS	interest rate swap
JPY	Japanese yen
LB	liquidity buffer
LCR	liquidity coverage ratio
LFS	Labour Force Survey
LGD	loss given default
LIBOR	London InterBank Offered Rate (reference interest rate on the interbank market)
LTD	loan-to-deposit
LTI	loan-to-income
LTRO	Longer-Term Refinancing Operation
LTV	loan-to-value
LOLR	lender of last resort
MA	monthly adjusted
MBS	mortgage-backed securities
MCR	Minimum Capital Requirement – the minimum required capital for calculation of the solvency of insurance companies and reinsurers
MF CR	Ministry of Finance of the Czech Republic
MFI	monetary financial institution
MiFID	Markets in Financial Instruments Directive
MLCX	Merrill Lynch Commodity Index
MLSA	Ministry of Labour and Social Affairs
MNB	Magyar Nemzeti Bank (the Hungarian central bank)
NACE	General Industrial Classification of Economic Activities
Nikkei	stock market index (Tokyo)
NPL	non-performing loan
NRCI	Non-bank Register of Client Information operated by Czech Non-Banking Credit Bureau
NSFR	net stable funding ratio
OeNB	Österreichische Nationalbank (the Austrian central bank)
O/N	overnight

OECD	Organisation for Economic Cooperation and Development
OFIs	other financial intermediaries
OIS	overnight indexed swap
OLS	ordinary least squares
OMF	open-end mutual fund
OMT	Outright Monetary Transaction
OMX	stock market index for the Stockholm Stock Exchange
OR	operational risk
O-SII	other systemically important institution
OTC	over-the-counter (outside regulated markets)
p.a.	per annum
PBTDA	profit before taxes, depreciation and amortization
PD	probability of default
P/E	price-to-earnings ratio
PIIGS	Portugal, Italy, Ireland, Greece and Spain
PLN	Polish zloty
PMC	pension management company
PMG	Pooled Mean Group
PMI	Purchasing Managers' Index
pp	percentage point
PPI	Producer Price Index
PRIBOR	Prague InterBank Offered Rate (reference interest rate on the interbank market)
PSM	propensity score matching
PX	Czech stock market index
QA	quick assets
QE	quantitative easing
QFA	quarterly financial accounts
QIS	quantitative impact study
RCG	regulated consolidated group
RGDI	real gross domestic income
rhs	right-hand scale
RMBS	residential mortgage-backed securities
RoA	return on assets
RoE	return on equity
RoS	return on sales
ROW	rest of the world
RTGS	real time gross settlement
RWA	risk-weighted assets
SA	seasonal adjusted
S&P500	Standard & Poor's, a US stock index comprising 500 corporations
SCR	solvency capital requirement – the minimum solvency requirement for risks undertaken by insurance companies and reinsurers
SCS	systemic capital surcharges – additional capital requirements against systemic risks
SEK	Swedish krona
SIB	systemically important bank
SIFI	systemically important financial institution
SILC	Statistics on Income and Living Conditions
SKD	Short-Term Bond System
SKK	Slovak koruna
SMEs	small and medium-sized enterprises
SOLUS	association of legal entities – register of debtors
SRF	Single Resolution Fund

SRM	Single Resolution Mechanism
SSM	Single Supervisory Mechanism
TBTF	too big to fail
USA	United States of America
USD	US dollar
VaR	Value-at-Risk
VA	value added
VaR	value-at-risk
VAT	value added tax
VECM	Vector Error Correction Model

COUNTRY ABBREVIATIONS

AT	Austria	IT	Italy
AU	Australia	JP	Japan
BE	Belgium	KO	Korea
BG	Bulgaria	LT	Lithuania
BR	Brazil	LU	Luxembourg
CA	Canada	LV	Latvia
CN	China	ME	Mexico
CY	Cyprus	MT	Malta
CZ	Czech Republic	NL	Netherlands
DE	Germany	NO	Norway
DK	Denmark	NZ	New Zealand
EE	Estonia	PL	Poland
ES	Spain	PT	Portugal
FI	Finland	RO	Romania
FR	France	RU	Russia
GR	Greece	SE	Sweden
HR	Croatia	SI	Slovenia
HU	Hungary	SK	Slovakia
CH	Switzerland	TR	Turkey
IE	Ireland	UK	United Kingdom
IN	India	US	United States
IS	Iceland		

FINANCIAL STABILITY INDICATORS – PART 1

	2008	2009	2010	2011	2012	2013	2014			
							Jan.	Feb.	Mar.	Apr.
Macroeconomic environment										
ME.1 Real GDP growth (year on year, %)	2.9	-4.4	2.3	1.8	-0.9	-0.9				
ME.2 Consumer price inflation (average annual index growth, %)	6.4	1.1	1.5	1.9	3.3	1.4	1.3	1.1	1.0	0.9
ME.3 Public finance deficit/surplus/GDP (%)	-2.2	-5.8	-4.7	-3.2	-4.4	-2.9				
ME.4 Public debt/GDP (%)	28.7	34.6	38.4	41.4	46.2	46.1				
ME.5 Trade balance/GDP (%)	0.7	2.3	1.4	2.4	3.8	5.1				
ME.6 External debt in % of banking sector external assets	134.4	135.4	137.7	146.9	142.7	129.0				
ME.7 Balance of payments current account/GDP (%)	-2.1	-2.4	-3.9	-2.7	-2.4	-1.0				
ME.8 Monetary policy 2W repo rate (end of period, %)	2.25	1.00	0.75	0.75	0.05	0.05	0.05	0.05	0.05	0.05
Non-financial corporations										
NC.1 Return on equity (%)	9.4	8.0	9.0	9.0	8.4	8.5				
NC.2 Debt (% of total liabilities)	49.0	49.3	50.3	51.3	52.7	53.8				
NC.3 Credit indebtedness (% of GDP)	40.7	39.1	38.6	39.3	39.7	39.8				
NC.4 – loans from Czech banks (% of GDP)	21.6	20.8	20.4	21.6	21.9	22.4				
NC.5 – loans from Czech non-bank financial corporations (% of GDP)	5.0	4.5	4.8	5.0	6.3	7.0				
NC.6 – other (including financing from abroad, % of GDP)	14.1	13.7	13.4	12.6	11.5	10.3				
NC.7 Interest coverage (pre-tax profit+interest paid/interest paid, %)	11.4	10.3	12.4	12.5	12.7	12.1				
NC.8 12M default rate (%)	2.9	4.0	4.3	3.0	1.9	1.9				
Households (including sole traders)										
H.1 Debt/gross disposable income (%)	50.0	51.4	53.5	56.9	58.4	61.5				
H.2 Debt/financial assets (%)	30.9	31.4	30.9	31.4	31.0	30.9				
H.3 Net financial assets (total financial assets – total liabilities, % of GDP)	55.7	59.6	63.0	64.9	68.2	71.2				
H.4 Debt/GDP (%)	26.3	28.7	29.7	31.3	32.3	33.1				
H.5 – loans from Czech banks to households (% of GDP)	21.0	23.9	25.3	26.4	27.2	28.1				
H.6 – loans from Czech non-bank fin. corporations to households (% of GDP)	3.6	3.0	1.7	1.8	1.8	1.7				
H.7 – loans from Czech banks to sole traders (% of GDP)	1.1	1.1	1.1	1.0	0.9	0.5				
H.8 – loans from Czech non-bank fin. corporations to sole traders (% of GDP)	0.8	0.7	0.7	0.6	0.5	0.5				
H.9 – other (including financing from abroad, % of GDP)	-0.2	0.1	0.9	1.5	2.0	2.4				
H.10 Net interest expenses/gross disposable income (%)	1.2	1.6	2.0	2.0	2.0	2.0				
H.11 12M default rate (% excluding sole traders)	3.4	5.0	4.9	4.3	3.8	3.6				
Financial markets										
FM.1 3M PRIBOR (average for period, %)	4.0	2.2	1.3	1.2	1.0	0.5	0.4	0.4	0.4	0.4
FM.2 1Y PRIBOR (average for period, %)	4.2	2.6	1.9	1.8	1.5	0.7	0.6	0.6	0.6	0.6
FM.3 10Y government bond yield (average for period, %)	4.6	4.8	3.9	3.7	2.8	2.1	2.4	2.3	2.2	2.0
FM.4 CZK/EUR exchange rate (average for period, %)	25.0	26.4	25.3	24.6	25.1	26.0	27.5	27.4	27.4	27.5
FM.5 Change in PX stock index (% year on year, end of period)	-52.7	30.2	9.6	-25.6	14.0	-4.8	-3.0	0.1	4.5	4.4
Property market										
PM.1 Total change in residential property prices (transaction prices, % year on year)	9.2	-8.0	-0.4	0.9	-0.3	0.5*				
PM.2 Change in apartment prices (asking prices according to CZSO, % year on year)	19.2	-8.8	-3.1	-5.3	3.1	2.0			3.0	
PM.3 Number of property market transactions (houses and apartments, COSMC entries, % year on year)	11.9	-9.0	-3.8	-23.9	-10.9	-6.9				
PM.4 Apartment price/average annual wage	5.2	4.2	4.1	4.0	3.8	3.8				
PM.5 Apartment price / annual rent (according to IRI)	23.8	22.9	21.9	21.7	21.3	21.6			21.2	

* Estimate for 2012 H1; only for family houses and apartments (around 77.5% of index).

Note: Owing to data revisions, some historical values of the indicators may not be comparable to those published in previous FSRs.

FINANCIAL STABILITY INDICATORS – PART 2

	2008	2009	2010	2011	2012	2013	2014			
							Jan.	Feb.	Mar.	Apr.
Financial sector										
FS.1 Financial sector assets/GDP (%)	136.0	141.1	142.9	149.9	156.0	169.5				
FS.2 Shares of individual segments in financial sector assets (%)										
FS.3 banks	77.3	77.2	77.4	78.1	77.2	78.1				
FS.4 credit unions	0.2	0.3	0.4	0.5	0.7	0.5				
FS.5 insurance companies	7.1	7.5	7.9	7.6	7.8	7.3				
FS.6 pension management companies and funds	3.7	4.1	4.3	4.3	4.6	4.7				
FS.7 collective investment funds	2.8	2.8	3.1	2.9	3.6	3.8				
FS.8 non-bank financial corporations engaged in lending	8.6	7.6	6.5	6.2	5.8	5.3				
FS.9 investment firms	0.4	0.5	0.5	0.4	0.4	0.4				
Banking sector										
BS.1 Bank assets/GDP (%)	104.0	107.9	109.4	115.7	120.0	132.4				
BS.2 Assets structure (% end of period)										
BS.3 loans to central bank	7.7	9.4	9.4	8.7	8.3	12.9				
BS.4 interbank loans	10.3	10.5	11.3	10.4	10.0	9.1				
BS.5 client loans	50.8	50.3	50.6	50.5	50.0	49.8				
BS.6 bond holdings	20.0	21.2	21.1	21.9	24.0	21.7				
BS.7 – government bonds	12.5	14.1	14.9	16.3	18.2	15.7				
BS.8 – Czech government bonds	11.0	12.8	13.8	15.1	16.8	14.5				
BS.9 other	11.2	8.7	7.5	8.4	7.7	6.5				
BS.10 Liabilities structure (% end of period)										
BS.11 liabilities to central bank	0.9	0.1	0.0	0.1	0.2	0.0				
BS.12 interbank deposits	10.6	10.4	10.7	11.2	8.9	11.3				
BS.13 client deposits	64.2	66.6	67.3	65.9	68.3	67.2				
BS.14 bonds issued	9.0	8.8	8.4	8.4	8.0	8.3				
BS.15 other	15.2	14.1	13.5	14.4	14.5	13.1				
BS.16 Client loans/client deposits (%)	79.1	75.5	75.2	76.6	73.2	74.1				
BS.17 Sectoral breakdown of total loans (%)										
BS.18 non-financial corporations	40.9	37.2	35.9	35.9	35.4	34.5	34.5	34.4	34.1	
BS.19 households	38.9	42.7	44.2	43.8	44.3	43.4	43.2	43.5	43.5	
BS.20 sole traders	2.1	2.0	1.9	1.7	1.5	1.5	1.4	1.4	1.4	
BS.21 others (including non-residents)	18.1	18.0	18.1	18.6	18.8	20.6	20.8	20.7	20.9	
BS.22 Growth in loans (% end of period, year on year)										
BS.23 total	16.4	1.3	3.5	6.0	2.4	6.5	5.9	4.7	4.5	
BS.24 non-financial corporations	14.1	-7.8	-0.3	6.1	0.9	3.8	2.6	1.6	0.6	
BS.25 – real estate activity (NACE L)	25.5	-5.9	6.0	11.5	0.7	6.3	3.0	1.5	0.3	
BS.26 households	20.9	11.1	7.0	5.0	3.6	4.5	4.7	4.8	4.8	
BS.27 – loans for house purchase	20.1	11.5	6.4	6.1	4.8	5.2	5.3	5.3	5.3	
BS.28 – consumer credit	22.8	9.8	7.3	-1.6	-0.7	0.4	0.6	0.8	1.0	
BS.29 sole traders	10.4	-1.4	-5.4	-5.5	-5.0	1.0	1.0	1.0	1.8	
BS.30 Non-performing loans/total loans (%)										
BS.31 total	3.2	5.2	6.2	6.0	6.0	5.9	5.8	5.9	6.5	
BS.32 non-financial corporations	4.2	7.9	9.0	8.2	7.4	7.1	7.1	7.1	7.2	
BS.33 households	2.7	3.8	5.0	4.9	5.1	5.0	5.0	5.0	5.0	
BS.34 – loans for house purchase	1.6	2.5	3.2	3.2	3.4	3.3	3.3	3.3	3.3	
BS.35 – consumer credit	6.7	8.4	11.7	11.3	12.3	12.2	12.3	12.4	12.2	
BS.36 sole traders	8.2	10.8	12.4	12.4	13.7	13.0	13.0	13.1	12.9	
BS.37 Coverage of non-performing loans by provisions (%)	58.1	50.1	46.8	49.0	49.5	51.6	52.3	52.3	47.7	
BS.38 Aggregate LTV for housing mortgages	43.3	56.4*	56.3	57.0	58.7	59.4				
BS.39 Capital adequacy (%)	12.3	14.1	15.5	15.3	16.4	17.1				
BS.40 Tier 1 capital adequacy (%)	11.7	12.7	14.1	14.2	15.9	16.8				
BS.41 Leverage (assets as a multiple of Tier 1)	15.8	15.1	14.1	14.0	13.5	12.9				
BS.42 Leverage ratio (Tier 1/assets, %)	6.3	6.6	7.1	7.1	7.4	7.7				
BS.43 Return on assets (%)	1.2	1.5	1.3	1.2	1.4	1.3	1.2	1.2	1.1	
BS.44 Return on Tier 1 (%)	21.7	25.8	21.9	19.3	21.4	18.4				
BS.45 Quick assets/total assets (%)	23.1	25.3	26.1	26.9	29.1	30.6	30.9	31.4	31.6	
BS.46 Quick assets/client deposits (%)	35.9	38.0	38.8	40.8	42.5	45.6	46.2	46.2	46.5	
BS.47 Net open position in foreign exchange/capital (%)	0.1	0.2	1.3	0.3	0.3	0.5				
BS.48 Net external position of banking sector (% of GDP)	6.6	6.2	5.7	4.9	7.5	5.0				
BS.49 Banking sector external debt/banking sector total assets (%)	15.2	12.0	12.2	12.3	10.3	14.1	13.9	12.9	12.5	

* The definition of mortgages was changed in 2009.

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FINANCIAL STABILITY INDICATORS – PART 3

		2008	2009	2010	2011	2012	2013	2014			
								Jan.	Feb.	Mar.	Apr.
Non-bank financial corporations											
NI.1	Share in financial sector assets (%)	22.1	22.0	21.8	21.1	21.7	21.0				
Insurance companies*											
NI.2	Premiums written/GDP (%)	3.4	3.6	3.9	3.8	3.8	3.8				
NI.3	Solvency of insurance companies: life insurance (%)	248	295	354	302	313					
NI.4	Solvency of insurance companies: non-life insurance (%)	459	449	353	331	401					
NI.5	Change in financial investment of insurance companies (%)	7.0	6.1	3.5	1.6	5.1	1.8				
NI.6	Return on equity of insurance companies (%)	18.5	26.9	34.1	13.0	17.8	14.6				
NI.7	Claim settlement costs/net technical provisions (life, %)	15.3	15.4	15.2	16.8	17.4	17.6				
NI.8	Claim settlement costs/net technical provisions (non-life, %)	59.3	62.1	68.4	61.4	58.1	66.3				
Pension management companies (PMCs) and PMC funds											
NI.9	Change in assets of funds managed by PMCs (%)	14.7	12.6	7.7	6.5	10.4	8.9				
NI.10	Nominal change in value of assets of PMC funds**	0.3	4.5	-0.8	-0.6	5.3	-5.5				
Collective investment funds											
NI.11	Growth in net assets (= equity; year on year, %)	...	-0.6	13.1	-3.4	17.2	20.5				
Non-bank financial corporations engaged in lending											
NI.12	Growth in loans from non-bank financial corporations engaged in lending (%)***										
NI.13	total	8.4	-17.1	-12.4	1.5	-3.6	-3.0				
NI.14	households	6.7	-19.7	-41.9	6.5	-2.5	-1.3				
NI.15	non-financial corporations	12.8	-15.5	6.8	0.5	-3.1	-3.2				

* The indicators cover domestic insurance companies only.

** Change in the assets of PMC funds adjusted for contributions and benefits.

*** The classification of loans provided by non-bank financial corporations engaged in lending was changed in 2010.

Note: Owing to data revisions, some historical values of the indicators may not be comparable to those published in previous FSRs.

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