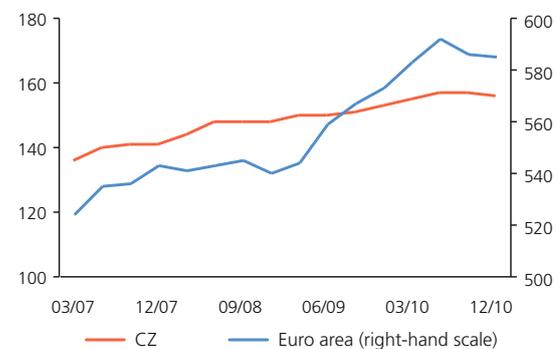


CHART IV.1

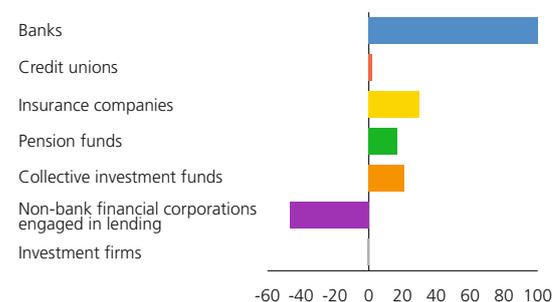
### Depth of financial intermediation (assets of financial corporations as % of GDP)



Source: CNB, ECB

CHART IV.2

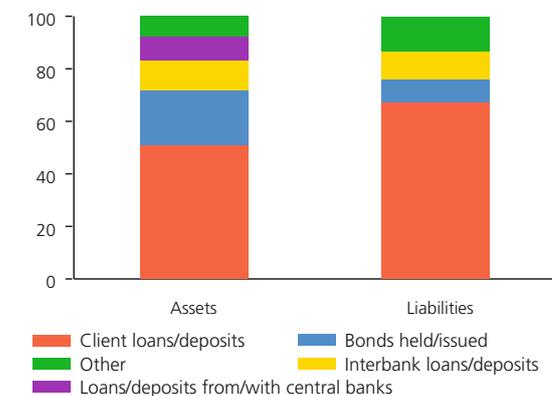
### Change in assets of individual financial sector segments (CZK billions; change between end-2008 and end-2010)



Source: CNB

CHART IV.3

### Structure of banking sector assets and liabilities (% of total assets/liabilities; December 2010)



Source: CNB

## 4 THE FINANCIAL SECTOR

### 4.1 FINANCIAL SECTOR DEVELOPMENTS

The relatively good economic situation was reflected also in the financial sector. The banking sector has sufficient capital and remains highly profitable, but the available credit risk indicators are only partially showing a turnaround in the credit cycle. Insurance companies and pension funds have solid capitalisation and the collective investment funds sector is still recording an inflow of clients. Other financial corporations engaged in lending are continuing to lose market share.

The risks to the financial sector are similar as in the previous year. They include a return of recession associated with the collapse of some large debtors, losses from securities holdings in the event of renewed financial market turmoil (e.g. due to restructuring of the sovereign debt of some overindebted euro area countries), potential liquidity problems in the building society sector and the impact of new regulatory initiatives, mainly indirectly via links to parent companies abroad.

#### The depth of financial intermediation in the Czech Republic increased in 2010

The gradual economic recovery during 2010 had a positive effect on the domestic financial sector. After stagnating for a year the total assets of the financial sector returned to growth, which – together with the very low annual nominal GDP growth – helped to increase the depth of financial intermediation, which reached 156% of GDP at the end of 2010. A similar trend was recorded by the euro area financial sector, where, however, this trend reversed in 2010 H2 as a result of clean-ups of credit institutions through the transfer of bad assets out of the banking sector (see Chart IV.1).

#### The recession was most apparent in a contraction of the total assets of non-bank financial corporations engaged in lending

The global financial crisis and its effects in the Czech Republic in the form of recession affected the assets of the individual segments of the financial sector to different degrees (see Chart IV.2). Financial corporations engaged in lending recorded a sharp fall in market share compared to the pre-crisis period. The other financial sector segments were supported by a recovery of the real economy, a gradual rise in lending and a recovery in the financial markets. This had a particularly large effect on collective investment funds, whose total assets increased compared to the pre-crisis figures, although these funds had experienced a substantial outflow of clients and significant losses on invested assets in 2008 and 2009.<sup>62</sup>

62 See FSR 2009/2010.

### The share of claims on central government in the otherwise conservative structure of domestic banks' balance sheets rose slightly

The balance-sheet structure of domestic banking institutions is characterised by high shares of resident client loans and resident deposits in total assets. Developments in the banking sector are closely linked with those in the domestic real economy, which is highly sensitive to developments abroad. Domestic banks are benefiting from the conservative preferences of households, who favour bank deposits over alternative forms of financial assets. This ensures a significant excess of client deposits over loans. Surplus funds are invested mainly in debt securities (particularly Czech government bonds, which accounts for 65% of debt securities holdings) or allocated in the interbank market or into repo operations with the CNB (see Chart IV.3).

As in other EU countries, the share of claims on domestic central government (chiefly through government bond holdings) has increased over the last two years (see Chart IV.4) owing to a change in the composition of bank assets towards safer instruments. In the case of some strongly overindebted governments, however, exposures to own governments may represent a sizeable risk for which banks may lack sufficient capital reserves, as exposures to domestic central governments usually have a zero risk weight in the current regulatory framework.<sup>63</sup>

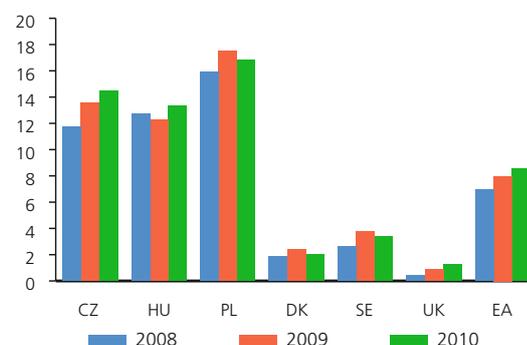
### Balance-sheet and off-balance-sheet items are developing in line with the modest economic recovery

The banking sector's total assets rose slightly in 2010, reaching CZK 4.2 trillion at the start of 2011. Some repercussions of the recession are still evident in the off-balance sheet, but the rate of decline in off-balance-sheet assets and liabilities slowed significantly in 2010 (see Chart IV.5). The decline in off-balance-sheet items mainly reflects a fall in the use of interest rate and currency derivatives and partly also in credit commitments given. In the case of derivative contracts with clients, banks usually enter into an opposite position with a parent or other foreign bank. This strategy reduces the risks associated with open positions arising from derivatives and also allows banks to profit from derivatives trades in the long run. As the use of derivatives by banks is closely linked with economic activity, they can be expected to grow gradually as the economy recovers. The end of 2010 saw a return to annual growth in client loans and a halt in the downward trend in bank commitments given, connected with favourable trends recorded by the Czech Republic's strategic trading partners (see Chart IV.6).

<sup>63</sup> Such exposures must be in the domestic currency of EU Member States and must be financed in that currency. If the bank applies the advanced approach to setting capital requirements for credit risk (IRB) to exposures to central governments, the risk weight may be non-zero (see, for example, Box 11 in section 4.2).

CHART IV.4

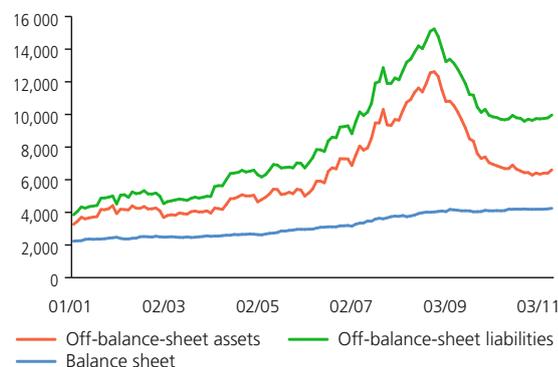
Share of exposures to domestic governments in assets of MFIs excluding central banks  
(%; MFIs comprise credit institutions and money market funds)



Source: ECB

CHART IV.5

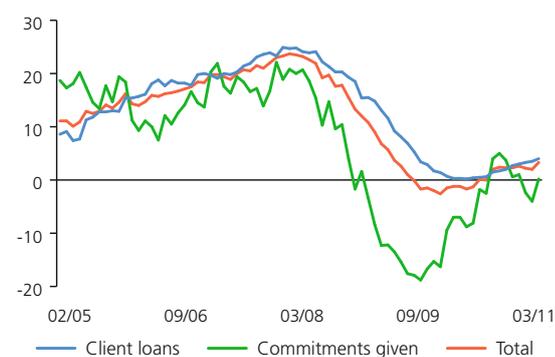
Balance sheet and off-balance sheet  
(CZK billions)



Source: CNB

CHART IV.6

Year-on-year growth in bank loans and commitments given to residents  
(%)

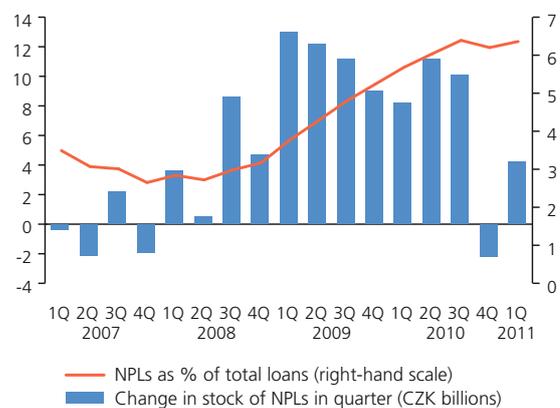


Source: CNB

CHART IV.7

**NPLs in the Czech banking sector**

(client loans; %; CZK billions)

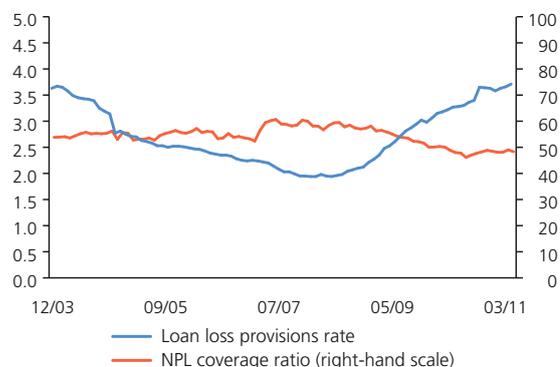


Source: CNB

CHART IV.8

**Provisions and coverage of NPLs by provisions**

(%)



Source: CNB

**Credit risk indicators are sending mixed signals: some are indicating a modest decline...**

The volume of non-performing loans (NPLs) continued growing in 2010. Their share in total loans stabilised at the end of the year and reached 6.4% in March 2011 owing to lower growth in NPLs and a modest rise in total loans (see Chart IV.7).<sup>64</sup> Total provisions followed a similar trend, accounting for 3.7% of the loan portfolio in March 2011. As in 2009, the growth in provisions was smaller than the growth in NPLs. This was reflected in a further decline in the NPL coverage ratio to 48% in March 2011 (see Chart IV.8).<sup>65</sup>

The assumption that the level of provisions is still sufficient is supported by the following findings. First, the share of relatively well secured NPLs – in particular loans for house purchase and secured loans to corporations – increased further in 2010 (see Table IV.1).<sup>66</sup> As provisions are created only for the unsecured part of loans, a lower volume of provisions is needed to cover potential losses. A relevant question in this respect is the quality of collateral, which to a large extent determines the NPL recovery rate. Given the persisting uncertainty in the property market and falling prices in the residential and commercial projects segment (see section 3.2), the collateral on property is not necessarily sufficient. Data acquired from selected banks in the Czech Republic based on a one-off survey suggest relatively high recovery rates over the last two years. The recovery rate for mortgages is around 80–90% and that for loans to non-financial corporations around 85%. However, the recovery rate for consumer credit (which is usually unsecured) is just 65%.<sup>67</sup>

Mortgage loans are usually well collateralised. The LTV ratio for mortgage loans in the banking sector excluding building societies has been fluctuating around 57% over the last two years (54% for building societies). Almost 70% of house purchase loans provided by banks excluding building societies are at least 100% collateralised by real estate.

Second, the available information shows continuing prudent loan classification behaviour by banks in 2010 (as identified last year).<sup>68</sup> The NPL distribution indicates a still high share of claims that are classified as non-performing but are no more than 90 days past due (see Table IV.1). The coverage of NPLs that are more than 90 days past due is more than twice as high as the coverage of all NPLs and exceeds 100% in the banking sector as a whole.

64 2010 Q4 saw a one-off write-off of some NPLs and the transfer of a relatively large volume of primarily corporate NPLs to the non-default category.

65 Last year's FSR 2009/2010 used an NPL coverage ratio in which total provisions figured in the numerator. This ratio is 5–10 percentage points higher than in the case where the numerator only contains provisions for NPLs.

66 Information about the value of collateral for loans to non-financial corporations is not available on the aggregate level. The Central Credit Register maintained by the CNB contains only information about the existence of various types of collateral (property, claims, securities, guarantees, security, etc.). Loans secured by property plus two other types of collateral are considered loans with relatively good collateral.

67 The above data apply to claims where the recovery process had been completed and the debtor probably cooperated with the bank. Banks estimate lower recovery rates for claims where the recovery process had not been completed (70–80% for mortgages, 60–70% for corporate loans and 40% for consumer credit).

68 See FSR 2009/2010, pp. 61–62.

Third, the gradual economic recovery is increasing the probability that some NPLs so classified from the prudential point of view will prove to be viable and will gradually be moved to the standard loan category. The available data on corporate loans suggest that this has increasingly been the case since 2010 Q4.<sup>69</sup>

Fourth, implicit risk weights (calculated as the ratio of risk-weighted assets to total assets) decreased gradually in 2010, as risk-weighted assets grew more slowly than total assets (see Chart IV.9). This ratio was 52.1% at the end of 2009 and only 50.1% at the end of 2010. This was chiefly due to a modest fall in credit risk parameters in banks that use the advanced (internal ratings based, IRB) method for calculating capital requirements.

### ...while others are indicating that credit risks are still highly prevalent

However, the evolution of some indicators casts doubt on the decline in credit risk and the sufficiency of provisions. First, the default rates of non-financial corporations have not yet shown any major decline, and default rates in the segment of loans to households and sole proprietors are rising modestly (see sections 2.2 and 2.3). Second, within NPLs migration is taking place mainly to the most risky NPL category, i.e. loss loans, an insignificant number of which will start to be repaid again (see Table IV.1). If such migration were to occur to a larger extent, the need for additional loan loss provisioning could become a risk going forward. This would have an adverse effect on banks' profitability even if the total volume of NPLs did not rise much further.

Third, if we constructed the required coverage for the end-2010 NPL volumes using the LGD values reported by banks in the joint stress test project (see Box 11 in section 4.2), which were applied to individual relevant NPL segments (21.5% for house purchase loans, 53% for consumer credit and 41% for corporate and other loans), we would arrive at a coverage ratio of 40%, which is still below the reported 48%. However, with higher LGD values (e.g. 10 percentage points higher in each segment), the required coverage would be 50%, i.e. less than the current coverage level. An analogous analysis conducted for the end of 2009 indicated sufficient coverage even for stressed LGD values. This implies that in the event of less favourable developments and higher LGD values, the existing provisions would not provide a very large buffer.

Fourth, in the area of corporate NPLs a later phase of recession is visible where some large exposures are falling into default with a lag. Large loans (over CZK 1 billion) currently account for almost 10% of the NPL portfolio. Moreover, the degree of concentration of corporate portfolios, which was decreasing slightly in 2005–2009, showed a modest rise in 2010. At the end of 2010, the five largest corporate clients accounted

TABLE IV.1

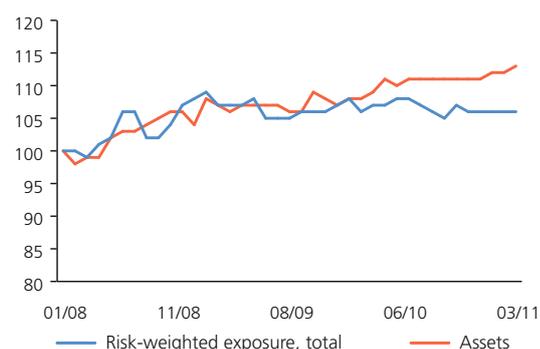
Structure of NPLs (%)				
	Collateralised loans to households and corporations	Non-collateralised loans to households and corporations	Other loans	NPLs, total
2007	26.6	63.8	9.6	100.0
2008	26.8	63.9	9.3	100.0
2009	31.6	59.5	8.9	100.0
2010	36.0	57.4	6.7	100.0
	Non-standard	Doubtful	Loss	NPLs, total
2007	31.5	16.8	51.7	100.0
2008	31.3	15.0	53.6	100.0
2009	37.8	21.0	41.2	100.0
2010	39.1	13.4	47.5	100.0
	Not past due	Up to 3M past due	More than 3M past due	NPLs, total
2007	47.7	7.8	44.5	100.0
2008	45.2	9.2	45.6	100.0
2009	52.9	8.7	38.4	100.0
2010	51.8	9.6	38.6	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.).

CHART IV.9

Assets versus risk-weighted assets  
(index; 31 January 2008 = 100; excluding branches of foreign banks)



Source: CNB

<sup>69</sup> While in 2009 and 2010 H1 the number of non-financial corporations with NPLs reclassified to non-default loans was 270 on average every month, in 2010 H2 the figure was about 340.

TABLE IV.2

Structure of corporate NPLs (%)				
	Large loans to corporations	Small loans to corporations	...	Corporate NPLs, total
2007	5.0	95.0		100.0
2008	3.5	96.5		100.0
2009	3.4	96.6		100.0
2010	9.8	90.2		100.0
	Construction and real estate	Manufacturing	Other sectors	Corporate NPLs, total
2007	16.6	36.2	47.2	100.0
2008	18.6	39.7	41.6	100.0
2009	22.6	39.3	38.1	100.0
2010	29.5	31.9	38.6	100.0

Source: CNB, CNB calculation  
Note: Large loans = > CZK 1 billion

on average for 18.3% of loans to legal entities. In 2009 this share had been 17.8%. As loans to the largest clients are usually less secured or not secured at all, there is still a risk of large losses if several of the largest clients of banks default (see section 4.2).

The share of “more risky” sectors (property development, construction) in NPLs, where the value of the pledged property need not correspond to the original expectations at the loan origination (see Table IV.2), is rising in parallel. Exposures to photovoltaic projects cannot be ignored either, as debtors here may get into difficulties with repaying loans due to a change in the legislative framework (see section 2.2).

Insufficient provisioning could represent a higher risk for small and medium-sized banks in particular. Small banks report the lowest NPL coverage ratio, whereas medium-sized banks report the lowest coverage ratio for loans more than 90 days past due (see Chart IV.10). However, this depends on the degree and quality of the collateral.

#### Growth in restructured loans continued in 2010

Loans continued to be restructured at a high rate in 2010. Almost CZK 20 billion in loans to the non-financial private sector was restructured (compared to CZK 11.5 billion in 2009). In the case of forced restructuring, when the restructuring is motivated by a debtor’s worsened ability to repay loans, the bank has to classify the loan as an NPL and create provisions for it. The issue of restructured loans is monitored very closely by supervisors and the available evidence from examinations suggests that there is no major underestimation of the credit risks in this area.

#### Operating profit is still allowing banks to absorb loan losses

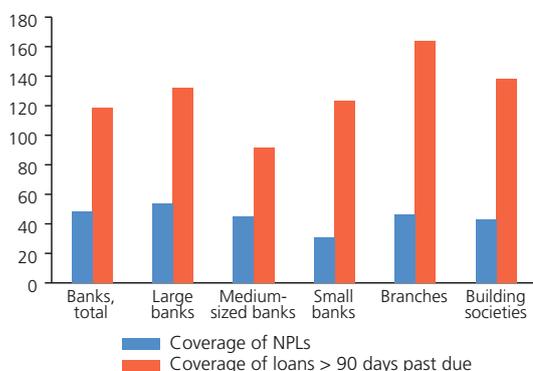
High operating profits<sup>70</sup> allow banks to create sufficient buffers to cover losses from credit exposures. The operating profit of banks in 2010 continued to offset loan impairment losses sufficiently, thereby ensuring a stable level of net profit (see Chart IV.11). Net profit fell slightly year on year to about CZK 56 billion in 2010 (see Chart IV.12). This decline was due mostly to base effects resulting from extraordinary revenues in 2009 Q4, augmented by a modest increase in administrative expenses in 2010 H2. Return on Tier 1 fell by more than 4 percentage points compared to 2009 to 21.8% in 2010.

#### Banking sector profitability should not be threatened even in the event of a monetary policy tightening by the CNB

Although the conservative business model of domestic banks is exposed mainly to the risk of a decrease in loan portfolio quality, as more than 50% of their funds are invested in client loans, this model at the same time generates sufficient income thanks mainly to stable profit components such as net interest income and profit from fees and commissions (see Chart IV.13). Both items showed 5% year-on-year growth in 2010. A stable base of savers, the limited ability of corporations to finance themselves in the market, and to a certain

CHART IV.10

Coverage of NPLs and loans more than 90 days past due (%; March 2011)



Source: CNB

TABLE IV.3

Shares of loans in segments restructured in the given year (%)			
	Non-financial corporations	Households (house purchase loans)	Households (consumer credit)
2007	0.8	0.2	0.1
2008	0.4	0.2	0.1
2009	1.0	0.5	0.9
2010	1.9	0.6	1.6

Source: CNB  
Note: Credit excluding overdrafts and card credit.

<sup>70</sup> Operating profit is calculated as profit excluding loan impairment losses (pre-provision profit).

extent limited competition in the banking sector<sup>71</sup> provides banks with stable interest margins on client loans (see Chart IV.14). Banks also benefit from their function as payment system intermediaries; net income from payment services accounts for one-half of their total profit from fees and commissions. By contrast, net interest income from repo operations with the CNB has been decreasing constantly since 2008 owing to falling monetary policy rates. Similarly, profit from financial revaluation<sup>72</sup> reflected the financial market developments during 2010. It remained positive, but fell by 57% year on year.

According to the available data, net interest income is not affected much by normal movements in the monetary policy rate (see Chart IV.14). The evolution of the interest margin for corporations and households, especially over the last two years, suggests that when monetary policy rates decrease, the margin tends to increase for households and decrease for corporations. Consequently, the expected tightening of monetary policy should not have a major effect on banks' profitability, although a fall in profitability in some small and medium-sized banks with lower shares of client loans in their balance sheets cannot be ruled out.

### The capital adequacy of the banking sector increased further, but potential increased dividend payments are a risk

In 2010, banks increased their capital to the highest level since 2003, above all in the form of retained earnings. The overall capital adequacy ratio (CAR) was 15.5% at the end of 2010 and 15.6% in March 2011 (see Chart IV.15). All banks reported values over 10%. The high capitalisation helped to maintain the banking stability index at slightly higher values than in the previous year despite a rise in credit risk and a slight fall in profitability. The vast majority of regulatory capital consists of high-quality Tier 1 equity (the Tier 1 CAR was 14.1% both at the end of 2010 and in March 2011). As the Czech banking sector reports no hybrid instruments in its Tier 1 capital, Tier 1 is essentially identical to core Tier 1 and also to the common equity Tier 1 planned in Basel III (see Box 7).

Although the capital buffer of the Czech banking sector is relatively large, higher dividend payments from retained earnings, which account for a substantial part of the regulatory capital, could be a risk in the near future. Such a reduction of the capital buffer could be motivated by signs of the end of the crisis and by excessive growth in optimistic expectations about the future. It is important to warn against over-optimistic expectations, as developments abroad, where the problems of some indebted euro area countries are coming to a head, and the evolution of risks in the domestic economy do not yet provide sufficient support for claiming that the crisis is over.

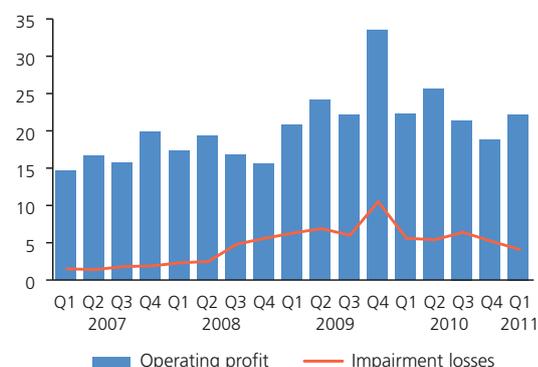
71 The Hirschman-Herfindahl index of banking market concentration was 0.11, as compared to 0.04 for the Austrian banking sector in 2009 (Rumler, F., Waschiczek, W. (2010): *The Impact of Economic Factors on Bank Profits*, Monetary Policy & the Economy Q4/10, OeNB, pp. 49–67).

72 The term "profit from financial revaluation" is used as a shorter version of the correct term "financial asset revaluation gains/losses".

CHART IV.11

#### Operating profit and impairment losses

(CZK billions; quarterly values)

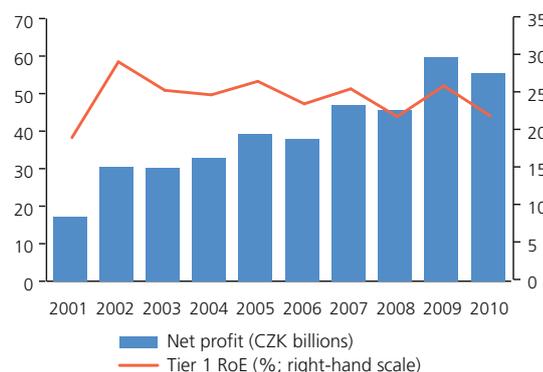


Source: CNB

CHART IV.12

#### Net profit and return on equity

(CZK billions; %)

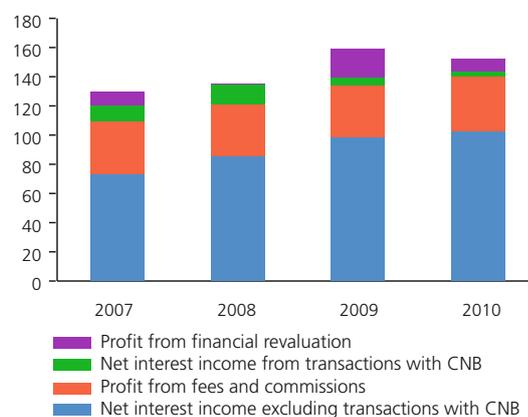


Source: CNB

CHART IV.13

#### Key components of profit from financial activities

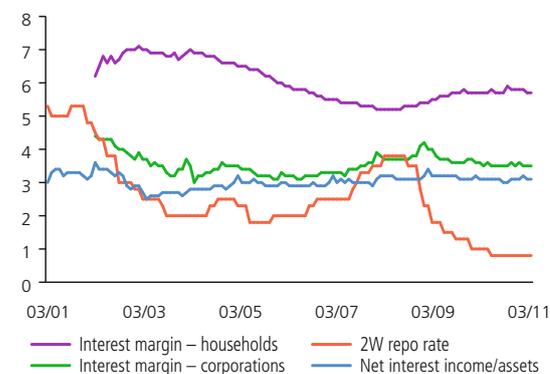
(CZK billions)



Source: CNB

CHART IV.14

**Net interest income, interest margin and the 2W repo rate**  
(%; end of month)



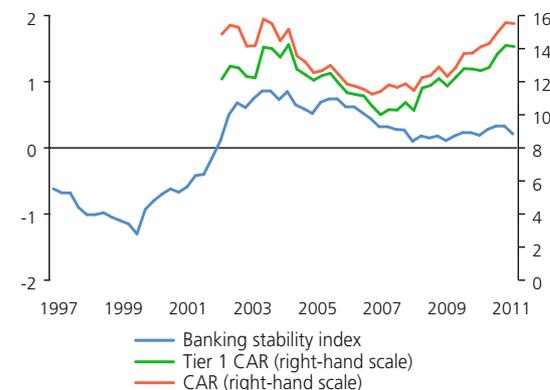
Source: CNB

Note: Interest margin = difference between interest on loans and deposits.

CHART IV.15

**Capital adequacy ratio and banking stability index**

(CAR in %; index in standard deviations from long-term average 1997–2010)

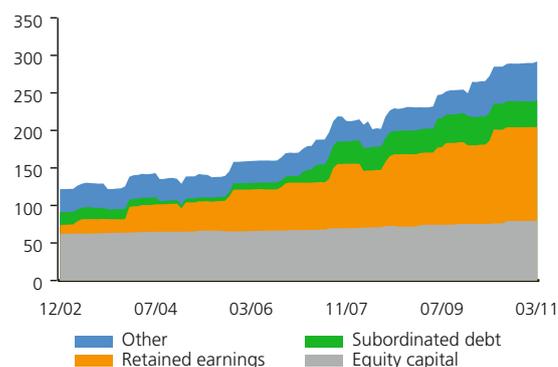


Source: CNB, CNB calculation

CHART IV.16

**Structure of regulatory capital**

(%)



Source: CNB

### Box 7:

#### THE NEW BASEL III REGULATORY FRAMEWORK

In December 2010 the Basel Committee on Banking Supervision issued new recommendations for strengthening the regulation, supervision and risk management of the banking sector (Basel III). The changes can be divided into four main areas.

First, the changes aim to enhance the quality and quantity of capital and generally increase the required minimum capital adequacy ratio (see Chart IV.1 Box). High-quality common equity Tier 1 is given preference over hybrid instruments and subordinated debt, deductions of some items from capital are stricter (for example, some are now only deducted from Tier 1) and the inclusion of minority shares in capital has been restricted. The indicator of minimum capital adequacy measured at the level of total capital is complemented with similar indicators at the level of individual components of capital. To reduce the procyclical behaviour of financial institutions, which contributes to a worsening of the situation in the real economy at times of shocks, Basel III introduces two capital buffers – a conservation buffer and a countercyclical buffer.<sup>73</sup> Both are aimed at forcing banks to limit dividend payments. Financial institutions will have to restrict the distribution of their profits in favour of creating capital reserves to cover potential losses.

Second, in the risk management area there are recommendations to reduce the importance of external ratings in favour of internal credit rating systems. The eligibility criteria for recognised rating agencies have also been made stricter. The global crisis showed that counterparty risk was not being addressed sufficiently. The list of measures dealing with this issue includes, for example, raising the capital requirement to cover counterparty risk and transferring OTC market transactions to markets with a central counterparty.

Third, capital adequacy is to be complemented with a new indicator called the leverage ratio. This ratio is intended to reduce the degree of external financing of the banking sector and to provide additional safeguards against model risk and the risk of measurement error. Initially, the leverage ratio will be used as a supplementary indicator and should be transferred to Pillar 1 after careful revision and calibration.

<sup>73</sup> See the article *Excessive Credit Growth as an Indicator of Financial (In)Stability and its Use in Macroprudential Policy* (Geršl and Seidler) in the thematic part of this report.

Fourth, Basel III introduces two new standards to strengthen liquidity management (see also section 3.1).<sup>74</sup> The liquidity coverage ratio (LCR) focuses on strengthening 30-day liquidity and requires sufficient (at least 100%) coverage of a stress-tested net liquidity outflow by quick assets. The net stable funding ratio (NSFR) focuses on limiting the maturity mismatch of assets and liabilities so that banks do not rely on unstable short-term funds when financing long-term loans.

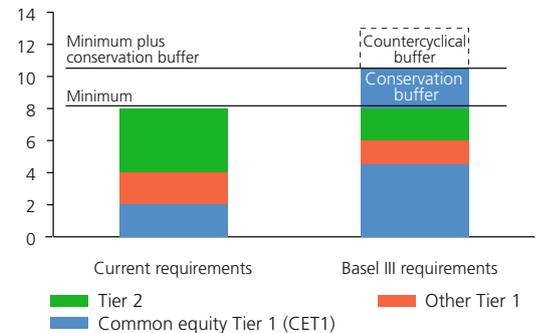
The Basel Committee on Banking Supervision recommends that the measures relating to capital and capital adequacy be applied gradually from 2013 and fully enforced as from 2018. The introduction of the leverage ratio will be preceded by a monitoring period. The period of simultaneous application should start in 2013, and in 2018 the Basel III leverage ratio should be transferred to Pillar 1. The liquidity standards should be introduced in 2015 and 2018 respectively. The Basel III recommendations will be implemented into European law through a directive and regulation on capital requirements (CRD IV). Deviations from Basel III may occur in specific cases, but the overall concept should be preserved.

Estimates of the effects of the changes in the definition of capital and the introduction of the leverage ratio indicate that the Czech banking sector as a whole should not be forced to increase its capital if the current capital level and risk profile are maintained. However, it is possible that some individual banks will need to increase their capital. So far, these estimates are based on data collected in regular reports, which do not contain all the data needed for the calculations. The estimation of the effects of the introduction of liquidity standards on the Czech banking sector requires data outside the framework of regular reporting and will be available during 2011 at the earliest. However, the analyses performed to date indicate, in accordance with the good liquidity position of the Czech banking sector, that compliance with both liquidity standards should pose no major problems to most banks, in contrast to many banks from advanced EU countries.<sup>75</sup>

In connection with the relatively long Basel III implementation period, it is worth mentioning that many countries, especially advanced ones, have decided to require earlier compliance with Basel III, i.e. before the official implementation deadline.

CHART IV.1 BOX

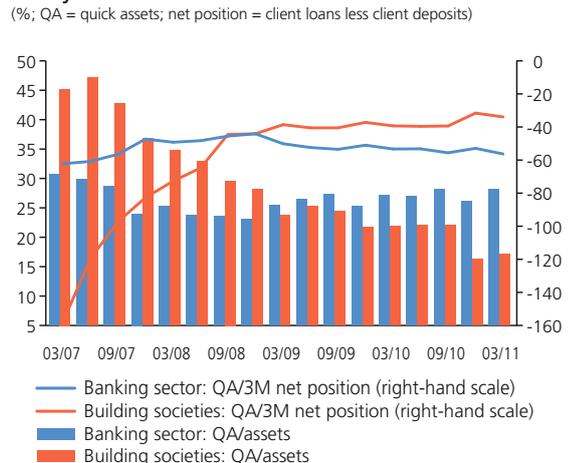
Comparison of capital adequacy ratios: Basel II versus Basel III (requirements in % of risk-weighted assets)



Source: BIS, Bank of England.  
Note: Basel II does not specify an explicit standard of 2% of minimum CET1.

CHART IV.17

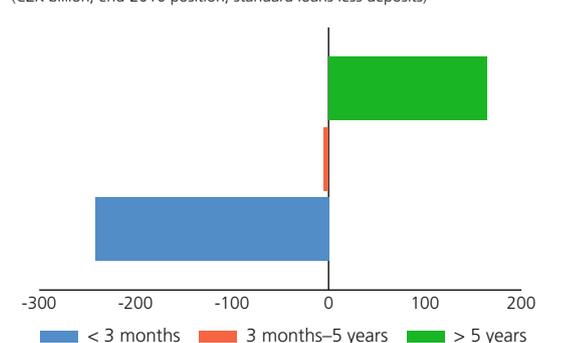
Liquidity situation in the banking sector and building society sector (%; QA = quick assets; net position = client loans less client deposits)



Source: CNB

CHART IV.18

Loan and deposit maturity mismatch: net balance-sheet position in the building society sector (CZK billion; end-2010 position, standard loans less deposits)



Source: CNB

74 BIS: *Basel III: International Framework for Liquidity Risk Measurement, Standards and Monitoring*, December 2010.

75 See the results of the EU's Basel III QIS (EBA website).

TABLE IV.4

## Summary of assumptions for the short-term liquidity ratio

High-quality liquid assets	Weight
Cash	100%
Bonds issued by central banks and general government	
Residents and non-residents with 0% risk weight under Basel II	100%
Non-residents with 20% risk weight under Basel II	85%
Collateral with 0% risk weight under Basel II left to accounting unit less assets transferred in repo trades	100%
Cash outflow	Rate of outflow
Financial liabilities other than deposits repayable within 30 days	100%
Deposits	
Deposits repayable within 30 days	
Insured client deposits	10%
Uninsured client deposits	75%
Deposits of credit institutions	100%
Client deposits repayable in more than 30 days	10%
Commitments and guarantees given	10%
Cash inflow	Rate of inflow
Financial assets other than deposits that are not included in liquid assets and are repayable within 30 days	100%
Loans repayable within 30 days	
Loans to credit institutions	100%
Client loans	50%

Source: CNB, CNB calculation

Note: The table only contains items that are significant with regard to the domestic banking sector. Short-term liquidity ratio = high-quality liquid assets/total net cash outflow over the next 30 days.

These countries include, for example, Australia, Canada, Spain, Norway, Sweden and Switzerland. In addition, some countries – most notably the United Kingdom, Spain, Switzerland and Sweden – consider some of the Basel III requirements (especially as regards capital) to be insufficient and will require higher standards from their banks.

### The liquidity position of Czech banks is very good, although there are some exceptions in the building society sector

The liquidity situation of the banking sector remains stable, with quick assets accounting for 26% of total assets (see Chart IV.17). Some potential for an increase in liquidity risk exists in the building societies segment, where the share of liquid assets is falling over time and stood at 16% in 2010, i.e. 10 percentage points less than for the banking sector as a whole and down by 6 percentage points year on year. The coverage of the net 3-month position of client loans and deposits with quick assets likewise declined from 41% to 32%. One of the reasons for this gradual deterioration in the liquidity position is the fact that building societies compete with banks in the mortgage market and the maturity of their funds decreases after the binding period as the volume of deposits increases (two-thirds of their deposits). This is reflected in a rising maturity mismatch between assets and liabilities. Claims of over five years exceed long-term liabilities by almost CZK 164 billion (see Chart IV.18).

The weaker liquidity position of building societies compared to the banking sector as a whole is not due to shortcomings in liquidity management, but is primarily related to the configuration of the building savings system. In the event of significant changes in the macroeconomic environment or market conditions, building societies could face an outflow of deposits after the binding period. These are term deposits redeemable at notice of 3 months in nature and make up a significant share of the sector's deposits. This risk is still only potential in nature. Although an increase in withdrawals from building savings contracts was recorded in 2010 H2, the number of new contracts increased at the same time.<sup>76</sup> The increase in the number of new contracts in 2010 H2 exceeded the number of contract withdrawals. This had a positive effect on the share of deposits in the binding period, which rose by 3.3 percentage points between July and December 2010, reaching 33.7%.

Other risks in the building societies sector are linked with the regulation of the spread between interest rates on deposits and loans and the long-term fixation of these rates over the life of the building savings contract. As a result, the room for reaction available to building societies in the event of strong swings in market interest rates in either direction

TABLE IV.5

## Summary of assumptions for the structured liquidity ratio

Assets (calculation for required stable funding source)	Weight
Cash	
Debt securities with maturity up to 1 year	0%
Loans to financial institutions with maturity up to 1 year	
Claims on central banks	
Debt securities issued by government or central bank with maturity over 1 year	5%
Corporate debt securities with maturity over 1 year	20%
Equity instruments	
Loans provided to non-financial institutions with maturity up to 1 year	50%
Precious metals	
Loans provided and claims with maturity over 1 year	85%
All other assets not given above	100%
Liabilities (stable funding sources)	Weight
Tier 1	
Tier 2	100%
Liabilities with maturity over 1 year	
Liabilities with maturity up to 1 year to non-financial institutions	80%
Other liabilities and capital not given above	0%

Source: CNB, CNB calculation

Note: Structured liquidity ratio =  $(\sum \text{funding source} * \text{weight}) / (\sum \text{assets} * \text{weight})$ .

<sup>76</sup> Overall, the reduction of state support approved by the Czech parliament in summer 2010 and repealed by the Constitutional Court in April 2011 did not lead to a sharp enough decline in the return on this product to cause a strong outflow of deposits.

is limited to new contracts. The stable interest rate environment, which should be maintained over the next two years, creates suitable conditions for making changes to the building savings system that would significantly mitigate the current sources of risks in this segment.

### The Czech banking sector as a whole should not have significant problems with the planned liquidity regulation under Basel III

As the data available to the CNB do not enable the two Basel III liquidity requirements to be calculated exactly (see Box 7), the CNB – like other authorities<sup>77</sup> – used an approach based on proxy indicators. A “short-term liquidity ratio” was constructed as a proxy for the LCR and a “structured liquidity ratio” was used to proxy for the NSFR. In both cases the individual items were set as close as possible to the Basel III requirements, with more conservative procedures and weights generally being used in the case of uncertainty. Thus, the indicators calculated using end-2010 data can be interpreted as lower bounds for the actual values. In parallel, the CNB conducted a survey on both liquidity indicators at the level of selected individual banks. The results suggest that domestic banks are ready for the new liquidity regulation.

The short-term liquidity ratio is basically a stress test of liquidity, as it requires 100% coverage of a rapid liquidity outflow from the bank’s balance sheet at the one-month horizon by high-quality liquid assets (see Table IV.4). An outflow of deposits and a restricted inflow of funds are assumed. The liquidity buffer consists basically only of cash, low-risk bonds and other high-quality collateral (e.g. CNB bills obtained in reverse repos). Despite the conservative setting of the rate of liquidity outflow due to sizeable uncertainty about the deposit structure<sup>78</sup>, the value of the indicator for the banking sector as a whole should exceed the 100% level set by Basel III.

The structured liquidity ratio requires that the bank’s available stable funds (i.e. above all retail deposits and long-term liabilities) be at least as high as the required stable funds, which are derived from the asset structure.<sup>79</sup> This indicator aims to maintain stable funding of banks’ balance sheets. The results show that it would be above 110% for the Czech banking sector as a whole.

One of the main characteristics of the banking business is a maturity mismatch between assets (mostly long-term) and liabilities (mostly short-term). Limiting this mismatch to a “reasonable degree” is one of the aims of liquidity regulation under Basel III. The degree of maturity

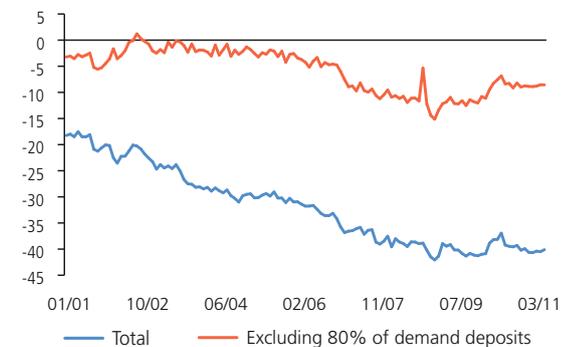
77 For example, IMF: *Global Financial Stability Report*, April 2011, and Riksbank: *Financial Stability Report 2/2010*.

78 The value of this indicator is very much dependent on what proportion of deposits can be regarded as “retail” (stable) and what proportion as “wholesale” (less stable).

79 Securities issued, retail deposits and other deposits with a maturity of over one year are generally considered to be stable funding sources. By contrast, loans from financial institutions maturing in less than one year are regarded as unstable. Bond holdings with longer maturities and high ratings that are traded on liquid markets require a smaller amount of stable funding (20%) than, for example, loans to corporations with a maturity of over one year (100% coverage with a stable funding source).

CHART IV.19

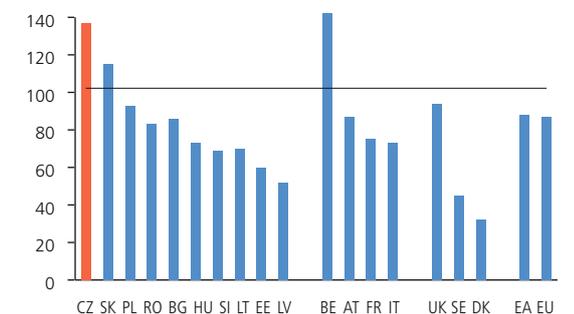
**Asset and liability maturity mismatch in the banking sector**  
(% of assets; cumulative 3M net balance-sheet position)



Source: CNB

CHART IV.20

**Ratio of deposits to loans granted in selected EU countries**  
(%; end of 2010; deposits/loans to residents)

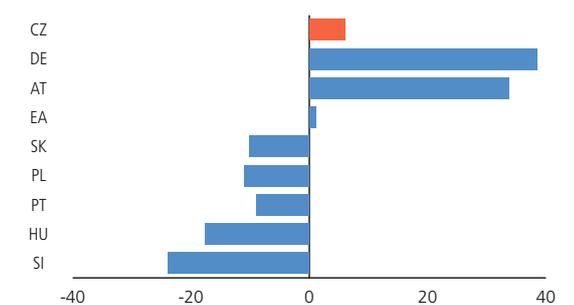


Source: ECB

Note: EA = euro area; EU = average for all EU countries.

CHART IV.21

**Net external positions of banking sectors**  
(% of GDP; end of 2010)



Source: IMF IFS, central banks

Note: Figure for AT is as of the end of 2009.

TABLE IV.6

**Situation of the parent groups of the four largest banks in the Czech Republic**  
(end-2010 data)

	Erste Group	KBC Group	Société Générale	UniCredit Group
Total assets (EUR bn)	206	321	1132	929
Net profit (% of assets)	0.5	0.6	0.3	0.1
Impairment losses (% of assets)	1.0	0.5	0.4	0.7
NPL (%)	7.6	5.2	5.4	6.6
NPL coverage ratio (%)	60.0	79.0	72.0	58.8
Credit cost ratio	155 bps	91 bps	77 bps	123 bps
Capital adequacy (Core Tier 1 ratio, %)	9.2	10.9	8.5	8.6
Ratio of exposure to indebted economies* to Tier 1 (%)	22.5	80.9	32.1	103.6

Source: Bank websites

Note: \* Portugal, Ireland, Italy, Greece and Spain; data as of 31 March 2010.

mismatch is difficult to measure, as, for example, retail deposits on the liabilities side usually have relatively short maturities yet are a very stable funding source. The evolution of selected maturity mismatch indicators shows that maturity mismatch in the Czech Republic is gradually widening because of growth in financial intermediation (credit expansion in the segment of long-term mortgage loans in particular) in a situation of low interest rates, where depositors often prefer to hold deposits in the form of demand deposits (see Chart IV.19).<sup>80</sup>

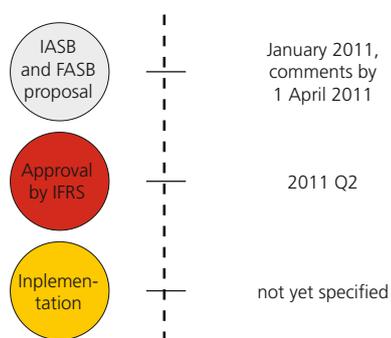
#### Bank funding sources in the Czech Republic are local and stable

One of the reasons why the Czech banking sector is successfully tested even for structured liquidity indicators is its high volume of client deposits, which account for about 70% of total liabilities. The Czech banking sector also maintains a very high deposit-to-loan ratio by international comparison (see Chart IV.20). In addition to deposits, the funding sources include interbank loans and bonds, especially mortgage bonds.

Banks are not dependent on funding from abroad and have long maintained a positive net external position (see Chart IV.21). This means that Czech banks tend to lend to their parent groups. The gross exposure of banks incorporated in the Czech Republic (excluding branches) to their foreign parent groups has long been around CZK 100 billion (i.e. roughly 3% of assets). For the banking sector as a whole it is around one-half of the regulatory limit of 25% of capital, which is, however, applied to net exposure.<sup>81</sup> In this context it is useful to track the position of foreign parent companies and the risks these groups face as a whole. The data for 2010 show that all four foreign groups controlling large banks generated net profits in 2010 despite persisting loan portfolio losses. They are relatively well capitalised, but they face risks associated with exposures to indebted EU countries (see Table IV.6).

CHART IV.2 BOX

**Plan for the introduction of provisioning taking expected loan losses into consideration**



Source: CNB

#### Box 8:

#### SELECTED INTERNATIONAL MACROPRUDENTIAL POLICY INITIATIVES

In response to the financial crisis, the G20 meeting held in London in April 2009 generated a number of initiatives to enhance the stability of the financial system. Reaching a consensus on how to minimise the overall costs of events like the recent financial crisis became a key task for international experts. In addition to the new Basel III framework for bank regulation (see Box 7), the effect of regulation on the business cycle and the potential role of loan provisions in mitigating the procyclical effect

<sup>80</sup> This topic was discussed in detail in the article *Financial Stability Indicators: Advantages and Disadvantages of Their Use in the Assessment of Financial System Stability* (Geršl and Heřmánek) in FSR 2006.

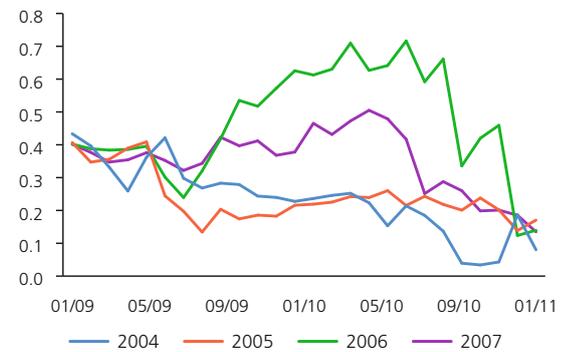
<sup>81</sup> A limit of 20% of capital applied until the end of 2010. Net exposure is calculated as gross exposure minus some deductible items, such as 75% of exposures (80% until the end of 2010) where the counterparty is an EU-based credit institution.

of the existing regulations are frequently discussed.<sup>82</sup> The aim of the measures debated in this area is to introduce mechanisms to reduce procyclicality.<sup>83</sup> Examples include dynamic provisioning, which – unlike the existing regulations in most countries – would reflect expected (i.e. not only realised) loan losses over the business cycle.

Many international and professional organisations are working on creating the new framework. In June 2010, the Basel Committee on Banking Supervision (BCBS) published a comment letter on a proposal by the International Accounting Standards Board (IASB) which contained specific steps to introduce dynamic provisioning.<sup>84</sup> In January 2011, the IASB and the US Financial Accounting Standards Board (FASB), which had previously had conflicting opinions, issued a joint proposal on provisioning favouring better accounting for future credit losses.<sup>85</sup> Under this proposal, loans would be classified into a *good book* and a *bad book* depending on whether the risk management objective is to routinely manage regular repayments or to get back at least a part of the loan when there is high uncertainty regarding repayment. For the first category the expected losses and related provisions would be calculated at the portfolio level, and either the time-proportional expected losses or the losses expected to occur within the foreseeable future (at least 12 months) would be selected, whichever were the higher. The time-proportional expected losses would be calculated either by multiplying the total losses expected for the remaining life of the portfolio by the ratio of the portfolio's age to its expected life (a linear approach), or by converting the total losses expected for the remaining life of the portfolio into annuities and accumulating these annuities for the portfolio's age (an annuity approach). Provisions for bad book loans would be created in the full amount of the expected losses. However, it is currently unclear when the system would be implemented (see Chart IV.2 Box).

CHART IV.3 BOX

**Monthly default rate of corporations by year of loan provision**  
(monthly default rate in %)



Source: CNB, CNB calculation

- 82 In addition to simulations of the hypothetical impacts of dynamic provisioning on US banks' balance sheets during the financial crisis (Fillat J. L., Montoriol-Garriga, J. (2010): *Addressing the Pro-Cyclicality of Capital Requirements with a Dynamic Loan Loss Provision System*, Federal Reserve Bank of Boston Working Paper No. QAU10-4), research has focused, for example, on the provisioning method, the extent of bank loans and discretions in various provisioning regimes and their effect on banks' transparency and risk position (Beatty, A. L., Scott, L. (2009): *Regulatory Capital Ratios, Loan Loss Provisioning and Pro-Cyclicality*, Working Paper, and Bushman, R. M., Williams, C. D. (2009): *Accounting Discretion, Loan Loss Provisioning, and Discipline of Banks' Risk-Taking*, Working Paper, University of North Carolina).
- 83 Procyclicality stems from the accumulation of risks over the business cycle. In a period of economic contraction, banks increase their provisions in response to the deteriorating quality or risk profile of their loan portfolios. This higher provisioning leads to a decrease in capital right at the moment when banks need to increase their capital adequacy. One possible response to this situation is a reduction in lending, which causes the business cycle to deepen further.
- 84 BCBS (2010): *A Comment Letter on Financial Instruments: Amortised Cost and Impairment*, <http://www.bis.org/bcbs/commentletters/iasb27.pdf>.
- 85 IASB (2011): *Supplement to ED/2009/12 Financial Instruments: Amortised Cost and Impairment*, <http://www.ifrs.org/NR/rdonlyres/2BD9895F-459F-43B8-8C4D-AFE8ACA0A9AD/0/SupplementarydocFinancialInstrumentsImpairmentJan2011.pdf>.

TABLE IV.7

**Selected indicators of credit unions as compared to banks**  
(%; 2010)

	Credit unions	Banks
Average interest rate on client loans (1)	7.2	5.2
Average interest rate on client deposits (2)	3.3	1.1
Interest margin (1)–(2)	3.9	4.1
Client deposits/loans	138.5	118.7
Client NPL ratio	10.3	6.4
Coverage of NPLs with provisions	9.3	49.0
Tier 1 capital adequacy ratio	12.6	14.1
RoE	2.1	21.8
RoA	0.2	1.3
Share of sector in client loans	0.6	99.4
Share of sector in client deposits	0.7	99.3

Source: CNB

The CNB discussed the issue of procyclicality of provisions in the Czech Republic in FSR 2008/2009.<sup>86</sup> As the dynamic provisioning system used in Spain was largely supported by analyses of the strongly procyclical behaviour of banks,<sup>87</sup> the question arises whether Czech banks also behave this way when lending. An analysis of loans to non-financial corporations in the Czech Republic by the year of loan provision (vintage analysis) reveals that the default rate observed in the crisis year 2009 is significantly higher for loans provided in years associated with the economic and credit boom in 2006 and 2007 than for loans granted earlier (see Chart IV.3 Box). This confirms the fact that in periods of optimism banks lend to comparatively risky clients that are vulnerable to business cycle fluctuations.

In addition to the new regulation of provisions, which relate more to the time dimension of systemic risk, the concept of systemically important (“too-big-to-fail”) financial institutions (SIFIs), which is focused more on systemic risk at a particular moment in time, has found itself at the centre of interest.<sup>88</sup> SIFIs are specific institutions for which there is an increased risk of potential problems spreading to the entire system and in turn the real economy owing to their size, their links with other banks, or the specific nature of the services they offer within the banking sector. At the international level this issue is being addressed by the Financial Stability Board (FSB), which has its secretariat in Basel. One of the still unresolved issues is the identification of SIFIs and their approximate number. A number of methods, based on calculations of the contributions of individual SIFIs to systemic risk, have been created in this area in recent months.<sup>89</sup> According to the available information, the BCBS favours simpler indicators such as bank size and interbank loans accepted and granted.<sup>90</sup> However, although the BCBS will issue a recommendation, the final selection of indicators and the number of SIFIs will be up to the FSB.

86 Frait, J., Komárková, Z. (2009): *Instruments for Curbing Fluctuations in Lending over the Business Cycle*. FSR 2008/2009.

87 Jimenez, G., Saurina, J. (2006): *Credit Cycles, Credit Risk, and Prudential Regulation*, International Journal of Central Banking 2(2), pp. 65–98.

88 The time and cross-sectional dimensions of systemic risk are discussed in more detail in the article by Frait and Komárková (2011) in the thematic part of FSR 2010/2011.

89 For example, CoVaR, which is basically the conditional value-at-risk (VaR) for individual institutions. The conditionality is defined by the VaRs of other institutions in the system – see Adrian, T., Brunnermeier, M. (2008): *CoVaR*, Federal Reserve Bank of New York Working Paper. New York. System externalities can also be approximated by a deposit insurance premium which reflects the risk of default of individual banks, the risk premium and the correlation of defaults in the banking sector – see Huang, X., Zhou, H., Zhu, H. (2010): *Systemic Risk Contributions*, FRB Working Paper. An alternative, game-theoretic concept uses the Shapley value, which formalises the allocation of a collective benefit to individual contributors – see Tarashev, N., Borio, C., Tsatsaronis, K. (2009): *The Systemic Importance of Financial Institutions*, BIS Quarterly Review.

90 Drehmann, M., Nikolaou, K. (2011): *Systemic Importance: Some Simple Indicators*, BIS Quarterly Review.

Notwithstanding the continuing debate about the identification of SIFIs, work is also continuing on the method for regulating them. In November 2010, the participants of the G20 summit in Seoul supported the continuation of preparations in the SIFI area by the FSB and national regulators. The first round of the planned measures focuses on global SIFIs (G-SIFIs) and involves, among other things, an increased loss coverage capacity of SIFIs going beyond the stricter capital requirements set out in the new Basel III rules. The ways to increase this capacity include, for example, a systemic capital surcharge, which would be applied differently to each SIFI beyond the basic capital requirements, and “Co-Co bonds”, which can be converted into shares when a pre-defined price is reached. Regardless of the mix of instruments that will be selected, the additional capacity should correspond to a capital surcharge of 1%–3% according to information from Reuters. The entire package of measures should be approved one year later, at the November G20 summit.<sup>91</sup>

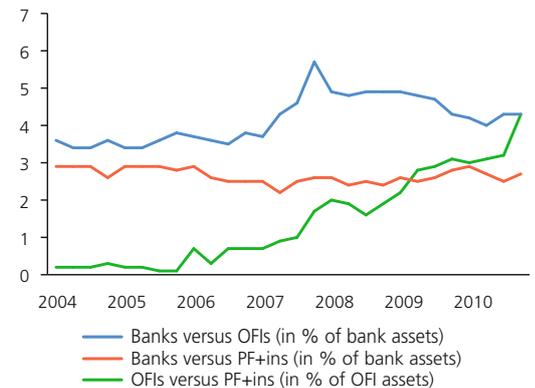
The issue of global SIFIs will affect the Czech banking sector indirectly, through the parent companies of the largest Czech banks – in particular *Société Générale* of France and *UniCredit* of Italy, which ranked among the world’s 20 biggest banks in terms of total assets in 2010.<sup>92</sup>

### Credit unions are displaying a high NPL ratio amid buoyant growth in their deposit base

Despite a similar interest margin as in the banking sector, the absolute level of average interest on deposits and loans indicates that credit unions have long focused on riskier clients (see Table IV.7). This hypothesis is supported by a high ratio of non-performing client loans, which was 11.5% in March 2011, i.e. almost double the figure for banks. The rather disturbingly low coverage of NPLs with provisions (below 10%, as compared to roughly 50% for banks) is maybe partly offset by the requirement to pledge property when the loan is provided, which is the norm in this sector. There is a question as to whether credit unions can operate successfully in the long run with a higher level of risk than banks. Low profitability and relatively concentrated portfolios (the share of the five largest clients exceeds 50% in some small institutions) represent a significant risk for the future if the economy takes a turn for the worse. Although the aggregate Tier 1 capital adequacy ratio of credit unions is a relatively favourable 12.6%, credit unions that report values below 10% currently represent more than 50% of the sector’s assets.

CHART IV.22

**Links between individual segments of the financial sector**  
(sum of all mutual exposures, including asset and credit exposures, in assets and liabilities between sector pairs)



Source: CNB (financial accounts)

Note: OFIs comprise other financial corporations engaged in lending and mutual funds other than money market funds; PF+ins comprises pension funds and insurance corporations.

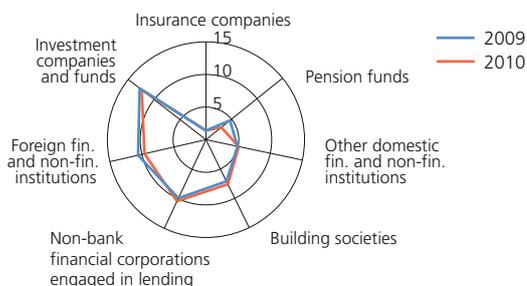
<sup>91</sup> FSB (2011): *Progress in the Implementation of the G20 Recommendations for Strengthening Financial Stability*, [http://www.financialstabilityboard.org/publications/r\\_110219.pdf](http://www.financialstabilityboard.org/publications/r_110219.pdf).

<sup>92</sup> Global Finance (2011): *World's 50 Biggest Banks 2010*, <http://www.gfmag.com/tools/best-banks/10619-worlds-50-biggest-banks.html#axzz1lpsSIT6J>.

CHART IV.23

**Links of banks with other segments of the financial sector**

(CZK billions; value of securities held by banks)



Source: CNB

Note: Value of securities issued by entities over which the monitored banks directly or indirectly exercise a controlling or significant influence. The monitored banks comprise the three biggest domestic banks: Česká spořitelna, Komerční banka and ČSOB. The chart does not contain Hypoteční banka, which is controlled by ČSOB.

Credit unions have a small share in the total client loans and deposits of the credit institutions sector (less than 1%). However, growth in deposits in the credit union sector has been higher than that in banks in each of the last three years.<sup>93</sup> The volume of client deposits in credit unions has almost tripled over the last three years and stood at CZK 20.3 billion in March 2011. Of this, 97% (i.e. CZK 19.7 billion) is insured with the Deposit Insurance Fund.

A situation where deposits are flowing into a sector with a high NPL ratio can be regarded as a potential risk. It is therefore necessary to pay attention to this sub-sector, as any problems there could spread to the rest of the financial system through reputational risk. Moreover, if significant problems of a systemic nature occurred in a majority of credit unions and depositors turned to the Deposit Insurance Fund for compensation, the money in this fund might not be enough to cover all compensation payments.<sup>94</sup>

**Interconnectedness within the financial sector**

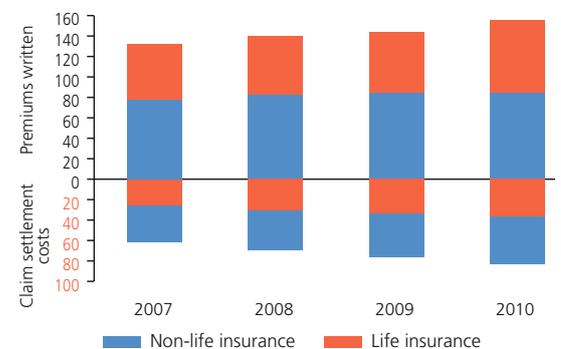
The individual segments of the financial sector are significantly interlinked not only by exposures in the form of mutual deposits and loans, but also by ownership interests (see Chart IV.22). These links are increasing over time. Interestingly, they run not only between banks and other financial institutions, but also between non-bank financial institutions (e.g. pension funds and mutual funds).

Large banks in particular hold various forms of ownership interests in financial and non-financial institutions at home and abroad (see Chart IV.23). Links within the financial sector in the form of financial groups enable banks to cover other segments of the financial sector. This can have a stabilising effect on the profitability of the financial group as a whole. If households and corporations change their financing preferences, or if there are legislative changes in a particular segment of the financial sector, the group as a whole will not necessarily lose its clients. At times of crisis or heightened uncertainty, however, this stabilising mechanism may have a destabilising effect, especially if reputational risk materialises. If an institution in the financial group runs into difficulties and reputational risk materialises, problems could spread from that institution to other parts of the group. The risk of contagion exists not only in cases where a controlling bank has a holding in an ailing company, but also in the case of affiliates which are members of international financial groups.

CHART IV.24

**Premiums written and claim settlement costs**

(in CZK billions)



Source: CNB

<sup>93</sup> In 2010 the volume of deposits in credit unions with a valid licence as of 31 December 2010 rose by almost 70%, while bank deposits grew by only 3%.

<sup>94</sup> At the end of 2010 the Deposit Insurance Fund contained about CZK 18 billion.

### Premiums written remained flat in the non-life insurance sector only

In 2010 the insurance sector recorded no extraordinary changes or events jeopardising its proper functioning and stability. Nonetheless, total premiums written in non-life insurance adjusted for reinsurance edged down close to the levels observed in 2008. Since that year the sector has also included one domestic reinsurer. By contrast, premiums written in life insurance are rising rapidly and claim settlement costs are persistently far below premiums written (see Chart IV.24).

### Funds are mostly invested in debt securities

Debt securities – especially those issued by OECD member countries or their central banks – are still the dominant item within financial placement of insurance companies (see Chart IV.25). Given the volatility in the financial markets, insurance companies often opt to classify them as held to maturity under the amended Act on Accounting, which further stabilises the performance of insurance companies, as financial market fluctuations are reflected in their profit or loss to only a limited extent. Overall, the insurance sector ended 2010 with a high profit of 26% of equity (compared to 21% in 2009).

### The majority of insurance company owners are from the EU

Within the ownership structure of domestic insurance companies as measured by share in equity, the proportion of domestic capital has decreased gradually (by 2.4 percentage points over the last two years, to 22.4%). Owners from EU countries still have the largest share (see Chart IV.26). Although total assets, financial placement and premiums written in the domestic insurance sector are rising gradually, insurance penetration is one of the lowest by comparison with the home countries of parent European financial groups and other EU countries, indicating a still relatively underdeveloped market. This is due chiefly to reserves in the life insurance market, which is not as widely used by Czech citizens as in Western Europe.

### The capital and solvency of Czech insurance companies are sufficient

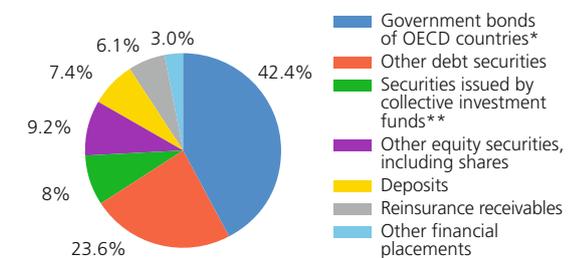
The aggregate solvency of insurance companies operating in the Czech Republic (i.e. their ability to ensure that insurance claims can be settled at any time using their own funds), as measured by the ratio of the available to the required (regulatory minimum) solvency margin, remains very good. Good capitalisation is also indicated by an appropriate share of capital in total assets.

### The impact of the planned changes in the EU regulatory framework on the domestic sector's financial stability will be negligible

Preparations are currently continuing for the new Solvency II regulatory framework requiring a systemic and comprehensive approach to risk management (see Box 9). The current capitalisation of insurance companies and their sufficient knowledge of this European concept, given, among other things, by the ownership structure of the insurance sector, mean that we can expect a smooth transition to the new regulatory framework, further improvements in the risk management system and an increase in the sector's financial stability.

CHART IV.25

Financial placements of insurance companies (%)

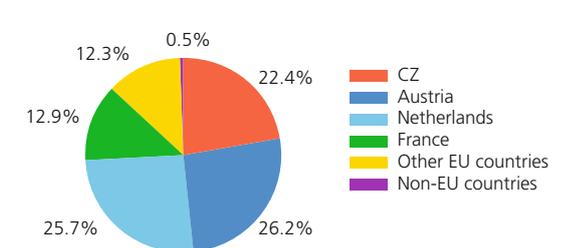


Source: CNB

Note: \* Including bonds issued by central banks  
\*\* Meeting requirements of EC law.

CHART IV.26

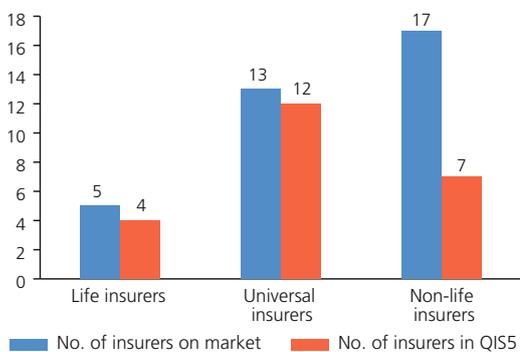
Ownership structure of domestic insurance companies (%)



Source: CNB

CHART IV.4 BOX

## Participation of Czech insurance companies in QIS5

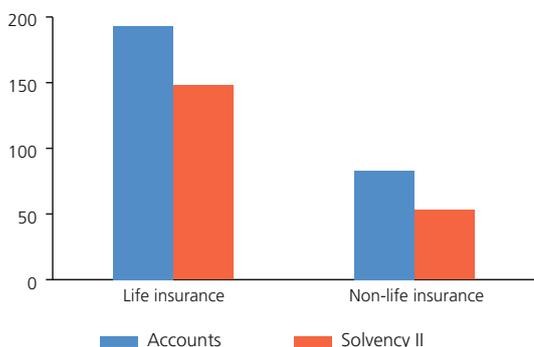


Source: CNB

CHART IV.5 BOX

## Technical provisions according to accounts and according to Solvency II in QIS5

(CZK billions)

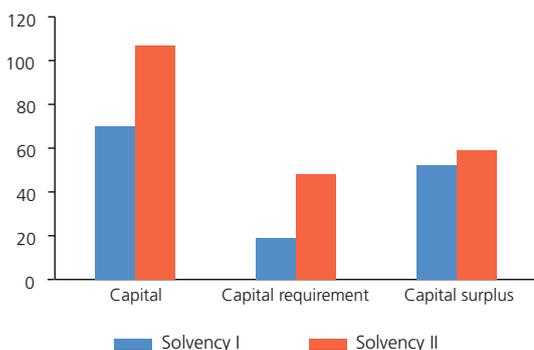


Source: CNB

CHART IV.6 BOX

## Capitalisation according to Solvency I and Solvency II in QIS5

(CZK billions)



Source: CNB

## Box 9:

## SOLVENCY II AND ITS IMPACTS IN THE CZECH REPUBLIC

Solvency II is the new European regulatory framework for the insurance sector. It is based on risk assessment and aims to set new regulatory rules contributing to greater protection of policyholders and beneficiaries and deepening the functioning of the internal insurance market. Like the banking regulation, Solvency II consists of three pillars. Pillar 1 contains quantitative requirements (valuation of assets and liabilities, especially technical provisions, definition of own funds, and calculation of capital requirements). Pillar 2 puts an emphasis on qualitative requirements, above all for reliable internal control systems of insurance companies, including own risk and solvency assessment. Pillar 3 lays down requirements for the treatment of information vis-à-vis supervisory authorities as well as the public.

The fundamental regulatory principles are specified in the Solvency II framework directive<sup>95</sup> of 2009. Discussions are currently under way within the European Commission concerning a regulation specifying the rules in more detail. These rules will be complemented by standards and third-level recommendations dealing with technical details. The European Insurance and Occupational Pension Authority will be responsible for their content and publication. The new regulation is planned to take effect in 2013. The new concept introduces fundamental changes in the regulation of the insurance industry, so it is essential at the preparatory stage to test and assess the potential impacts of the proposed rules on the European insurance market. The fifth round of the quantitative impact study (QIS5) was conducted in autumn 2010. A total of 23 Czech insurance companies (see Chart IV.4 Box), covering 99.5% of the life insurance market and 94.4% of the non-life insurance market, participated in QIS5.<sup>96</sup>

The application of Solvency II means, above all, different valuation of assets and liabilities. There will be a fundamental change in the calculation of technical provisions. Their value will be equal to the expected present value of future cash flows stemming from insurance plus a risk margin. According to the results, this approach can be expected to lead to a decrease of 24% on average in the gross technical provisions of Czech insurance companies

95 Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of insurance and reinsurance (Solvency II).

96 The results of the study for the Czech insurance market are described in Justová, Kotaška: QIS5: Výsledky českých pojišťoven se nevymykají z evropského průměru, Pojistný obzor 1/2011. The European results are described in the EIOPA report on the fifth Quantitative Impact Study for Solvency II.

(see Chart IV.5 Box). The decrease in technical provisions will be reflected in own funds as a revaluation difference, causing an increase in own funds of 52%. As regards asset valuation, it is also worth mentioning that insurance companies will no longer be able to value part of their portfolios at amortised cost under the new regulatory framework.

QIS5 confirmed that Czech insurance companies cover their capital requirements with high-quality (Tier 1) own funds. Despite a strong increase in own funds there was a decline in the average solvency ratio (capital/capital requirement) from 376% to 222%. This was due to a marked increase in the solvency capital requirement (SCR). The ratio of the SCR to the current regulatory requirement was 258% on average. The overall impact of these changes led to a slight rise in the available capital of Czech insurance companies (see Chart IV.6 Box).

In Solvency II, the SCR represents the amount of own funds that would cover unexpected large losses within a one-year time frame with a probability of 99.5%. Non-life underwriting risk, especially the risk of floods, had the largest share in the SCR (see Chart IV.7 Box). Also important were market risk, in particular equity risk, and life underwriting risk (strongly influenced by lapse risk). QIS5 participants drew most attention to the potential overestimation of flood risk in the Czech Republic, but also mentioned that the proposed calculations were too complex and that some methodologies that have a large influence on the resulting solvency were ambiguous.

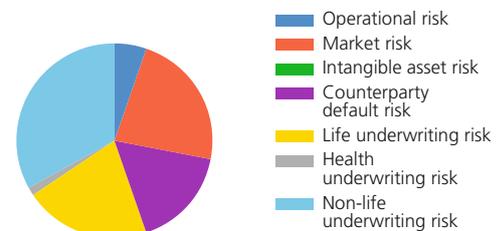
The results of QIS5, which are broadly in line with the European average, suggest that Czech insurance companies have sufficient capital to cover future capital requirements. However, the introduction of Solvency II will necessitate a transition to new risk management and reconfiguration of processes and reporting requirements, all of which will place a sizeable cost burden on insurers.

### The pension fund sector is not sufficiently prepared for the pension reform

Although total assets in the pension fund sector recorded a further marked increase, shareholder assets have yet to be separated from managed planholder assets, which is the main prerequisite for the further functioning of this fund pillar in the planned reform of the Czech pension system. The voluntary pension scheme pillar has a purely supplementary function, as is evident from the overwhelming predominance of lump-sum settlements in the benefits paid to planholders (see Chart IV.27). No annuities market has been launched in the Czech Republic yet either. Such a market would enable planholders to transfer funds in a market environment and at a reasonable cost into a lifelong pension, which is the most important aspect as regards providing for old age.

CHART IV.7 BOX

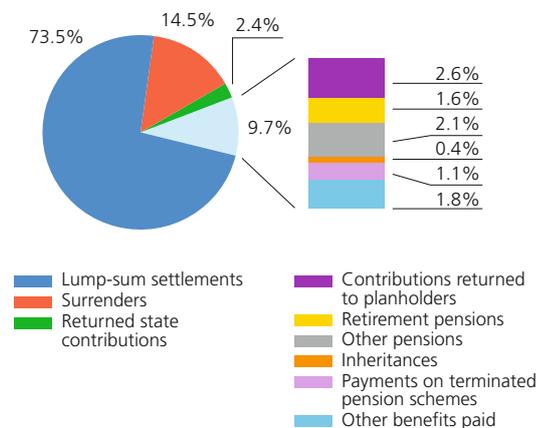
Relative shares of risks in the solvency capital requirement in QIS5



Source: CNB

CHART IV.27

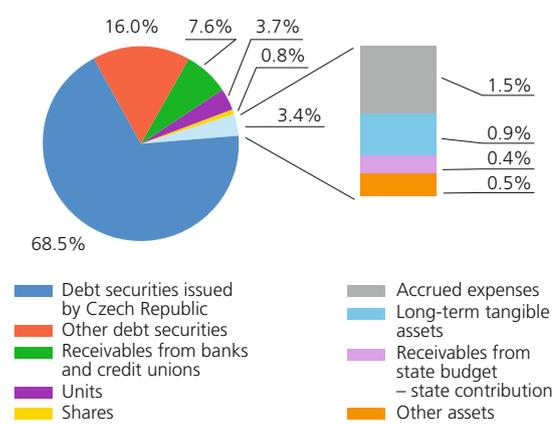
Pension fund benefits (%)



Source: CNB

CHART IV.28

### Pension fund asset allocation (%)



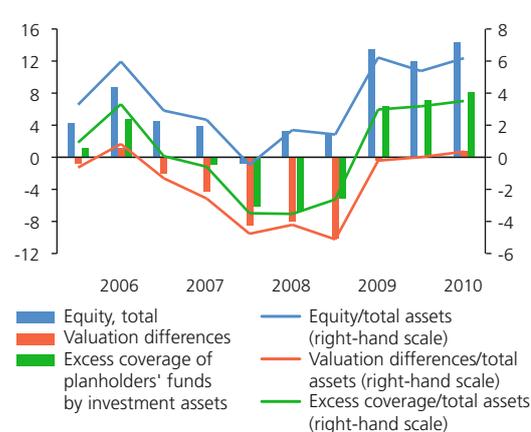
Source: CNB

### The asset structure remains stable

The allocation of pension fund money into assets is conservative under the legislation in force, and its structure does not change substantially (see Chart IV.28). A positive aspect going forward is that the accrued expenses encumbering pension fund balance sheets started to be released gradually in 2009 H2. This item fell by almost 10% in 2010. Moreover, the non-negative yield guaranteed by the private pension insurance act ensured that the results of domestic pension funds at the peak of the financial crisis in 2008 and 2009 were much better than those of pension funds abroad. However, this guarantee is paid for during good times by relatively low yields on invested assets.

CHART IV.29

### Capitalisation of pension funds (CZK billions; right-hand scale in %)



Source: CNB

### Capitalisation stabilised in 2010

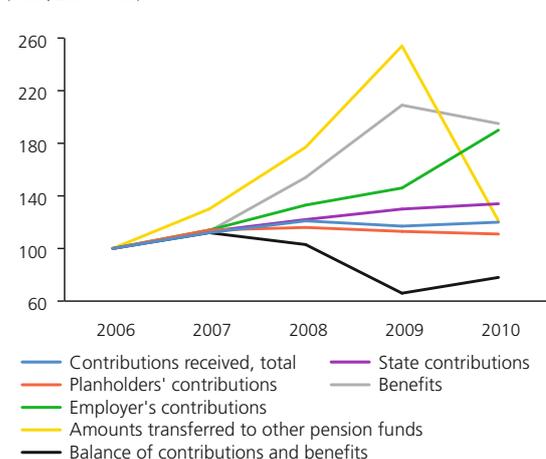
Planholders' funds are the largest item of pension fund liabilities, corresponding to 93% of the balance sheet total at the end of 2010. Equity stabilised above 5% following the crisis period, having even fallen below zero in 2008 (see Chart IV.29). The improvement in capitalisation was due mainly to valuation changes, which moved close to zero also as a result of the introduction of the option of holding selected securities to maturity and thanks to the calmer financial market situation, and therefore lost significance compared to 2007–2009. The prudential mechanism introduced jointly by the CNB and the Association of Pension Funds is also important for maintaining financial stability. It governs regulatory capital and serves as an indicator of a pension fund's financial condition.

### Demographic trends will lead to an increase in payments to planholders

The Czech Republic's large post-war generation, which has had the opportunity to accumulate significant savings in pension funds since private pension insurance was launched in 1994, is now retiring. As a result, the benefits paid to planholders remained high in 2010. The introduction of fees significantly limited the movement of planholders between pension funds to one-half of the figure observed in 2009. While the level of contributions was flat below the 2008 level, the balance of contributions and payments remains considerably lower than before the crisis (see Chart IV.30). Overall, however, pension funds continue to record a net inflow of funds, as the decline in planholder contributions was more than offset by a rise in contributions paid by employers. The total assets of the pension fund sector thus increased to CZK 232 billion. Further growth in total assets, as well as a period of higher payments to planholders, can be expected in the future. From this perspective, it is important that planholders' funds are covered by sufficiently liquid instruments that will store value even in the event of any financial market distress. Such distress is highly probable in the long run, which is what pension funds focus on given the nature of their business (see section 4.2).

CHART IV.30

### Pension fund contributions and benefits (index; 2006 = 100)



Source: CNB

Overall, the risks in the insurance and pension fund sectors remain similar as in 2009 and 2010. The risks for pension funds are increasing in proportion to the increasing volume of assets they manage.

### New collective investment funds were established in 2010

2010 was a relatively favourable year for collective investment funds (CIFs). CIF assets increased continuously during 2010 and exceeded CZK 170 billion in March 2011 (see Chart IV.31). The rise in total assets was due mainly to the establishment of new CIFs. The number of CIFs increased by 31 year on year to 197 at the end of 2010.<sup>97</sup> Most of them were funds for qualified investors,<sup>98</sup> which are currently the fastest growing segment of the CIF sector. The development of the qualified investor segment significantly changed the structure of the CIF sector. While in 2009 funds for qualified investors represented 19% of the sector's total assets, this share increased to 27% at the end of 2010, at the expense of money market funds, which had the largest share in CIF assets until last year. The overwhelming majority of funds for qualified investors are funds investing in real estate, through which investors benefit from a lower legal entity income tax rate of 5% compared to standard commercial enterprises.

### The situation in collective investment funds is stabilising

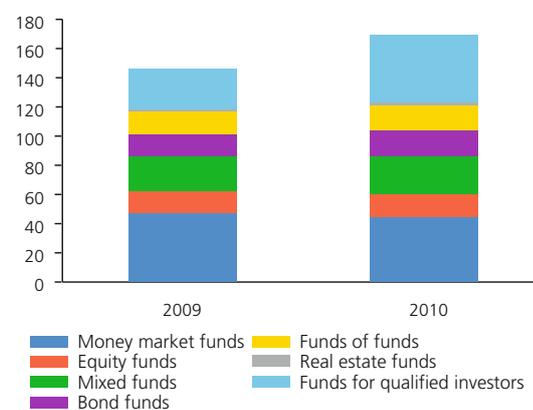
In a context of falling financial market volatility (see section 3.1), most types of CIFs recorded less volatile changes in the value of their units in 2010, in line with the previous trend. Funds of funds and equity funds continued to show volatility, although the latter are expected to be more variable given the usually higher investment risk involved (see Chart IV.32). By contrast, historically low volatility can be observed for money market funds and bond funds. The indicator of volatility of the value of units, which can be interpreted as a measure of investment risk, suggests a turnaround for the better in this sector. The risk of liquidity problems in the event of a sudden outflow of investors from CIFs, identified in FSR 2009/2010, is therefore significantly decreasing over time.

### Collective investment funds are seeing a shift towards higher-yield investments

The relatively favourable trend in the collective investment segment led to an inflow of new investors. This was reflected in positive net sales of units of open-ended mutual funds intended for the public in all fund types except money market funds. The outflow of investment from money market funds is linked with the low interest rates, which are offering investors low returns compared to other investment opportunities. It was reflected in an inflow of investment into other, riskier funds (see Chart IV.33). Thanks to the growth of the stock markets in 2010, equity funds and funds of funds recorded profits on invested capital in 2010. Overall, the net assets<sup>99</sup> of open-ended mutual funds intended for the public increased by CZK 6 billion in 2010.

CHART IV.31

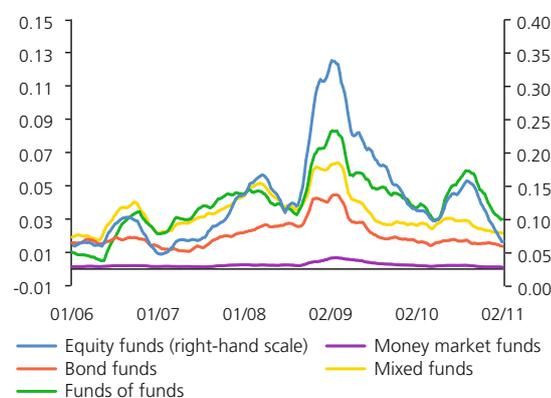
**Collective investment fund structure**  
(CZK billions; assets at the end of 2009 and 2010)



Source: CNB

CHART IV.32

**Volatility of changes in the value of open-ended mutual fund units**  
(annualised standard deviations of week-on-week changes in monthly window; smoothed)



Source: AKAT CR, CNB calculation

Note: The chart excludes real estate funds owing to the absence of a representative sample.

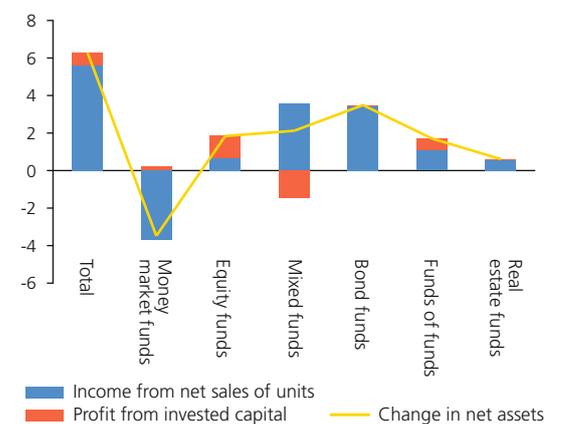
<sup>97</sup> See the list of regulated and registered financial market entities on the CNB website.

<sup>98</sup> Funds for qualified investors are CIFs intended for investors with previous experience in investing in investment instruments.

<sup>99</sup> Net assets represent the difference between funds' total assets and liabilities and are equal to shareholders' equity.

CHART IV.33

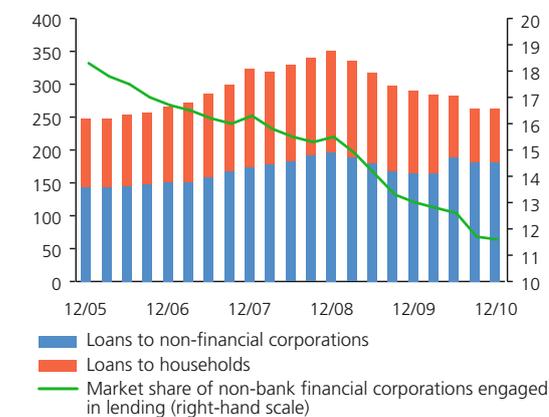
**Decomposition of changes in the net assets of open-ended mutual funds intended for the public**  
(CZK billions; for 2010)



Source: CNB

CHART IV.34

**Loans of non-bank financial corporations engaged in lending**  
(CZK billions; right-hand scale in %)



Source: CNB

Note: Market share in total loans provided to residents by banks and non-bank financial corporations engaged in lending.

### The decline in the lending activity of non-bank financial corporations engaged in lending slowed

For non-bank financial corporations engaged in lending, 2010 was characterised by a continuing but slower decrease in the volume of loans provided. The total volume of loans provided was CZK 262 billion at the end of 2010, down by 10% from a year earlier, as compared to a decline of 16% in 2009 (see Chart IV.34). This decline was driven mainly by lower loans to households, which fell in both 2009 and 2010, to CZK 81 billion at the end of 2010. By contrast, the volume of loans provided by non-bank financial corporations engaged in lending to non-financial corporations rose by almost 10% in 2010 (compared to a year-on-year decrease of 16% in 2009) and stood at CZK 181 billion at the end of 2010. However, part of these loans was due to the financing of photovoltaic power stations, which recorded exceptionally strong growth last year (see section 2.2).

The overall market share of non-bank financial corporations engaged in lending developed in line with the long-running downward trend, reaching 11% at the end of 2010. This trend can be explained by several factors. First, households have long been turning away from the services of non-bank financial corporations engaged in lending in favour of banks. This is particularly true of leasing companies, which account for the largest share of non-bank financial corporations engaged in lending but are usually linked to banks through assets or loans (see Box 10). Second, a long-running shift from financial leasing to operational leasing<sup>100</sup> had been recorded until 2009. Following previous growth, the share of assets financed by operational leasing from members of the Czech Leasing and Finance Association has stabilised at around 26% in the last two years. This trend is underlined by the evolution of the structure of assets held by leasing companies – the share of non-financial assets in total assets has long been rising and currently stands at 14%.

#### Box 10:

#### LINKS BETWEEN BANKS AND NON-BANK FINANCIAL CORPORATIONS ENGAGED IN LENDING

The available data from the Central Credit Register allow the CNB to analyse the links between banks and non-bank financial corporations engaged in lending (hereinafter “NFCEs”). Individual data on 65 companies, whose share in the entire NFCE sector was about 90%, were used to prepare this Box. As many NFCEs are part of bank groups, differences in activity and financing between independent NFCEs and bank NFCEs can be monitored.

<sup>100</sup> Operational leasing allows a movable or immovable item to be used, but unlike in the case of financial leasing there is no transfer of substantial risks and benefits connected with ownership of the asset. Operational leasing therefore *de facto* represents renting and it is not included in the CNB statistics on financial intermediation.

Bank NFCELS can benefit from lower information-gathering costs within the bank group and easier access to financing from the controlling bank. However, the results of the analysis show that bank NFCELS do not have a dominant position in this sub-sector. The share of loans provided by bank NFCELS (most of which are direct subsidiaries of domestic banks) in the total loans provided by all the NFCELS analysed was only 32% at the end of 2010.

One interesting finding is that bank NFCELS are not funded exclusively by banks from the group to which they belong (see Chart IV.8 Box). The average number of banks which bank NFCELS use for their financing is around three. This is comparable to the figure for independent NFCELS. It turns out, though, that the average share of the controlling bank in all bank loans received is increasing over time. At the end of 2010 it stood at 77%. It is also true that banks' exposures to "their" NFCELS are usually among their largest.

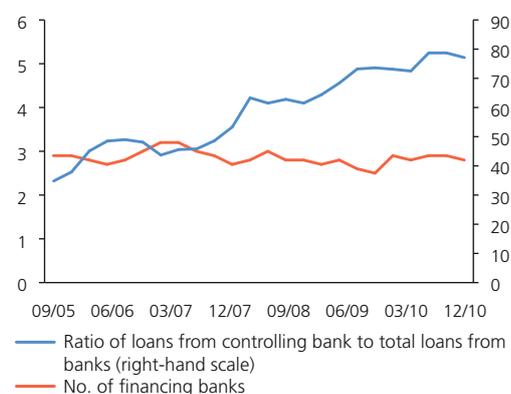
The liabilities side of the NFCEL balance sheet consists mainly of loans received. Their share in total liabilities was almost 60% at the end of 2010. The role of bonds issued is negligible. In the case of bank NFCELS, bank loans represent the majority of loans received, with their share ranging from 80% to 90% over the last two years. The figure for independent NFCELS is lower at around 60%.

The data allow us to test the hypothesis that bank NFCELS recorded a smaller decrease in lending to corporations and households than independent NFCELS during the economic recession in the Czech Republic thanks to their advantageous position within bank groups. The results of the analysis show that the decline in loans provided by bank NFCELS in 2009 and 2010 was indeed lower than in the case of other NFCELS (see Chart IV.9 Box).

A risk of contagion of the impacts of a deterioration in the financial condition of bank NFCELS to their controlling banks can be identified on the basis of an analysis of the relationship between bank NFCELS and their controlling banks. This risk stems from the aforementioned exposure of controlling banks to bank NFCELS. In addition to this direct channel, an indirect channel can be identified whereby a deterioration in the financial condition of bank NFCELS could have a negative effect on the reputation of the entire bank group (reputational risk).

CHART IV.8 BOX

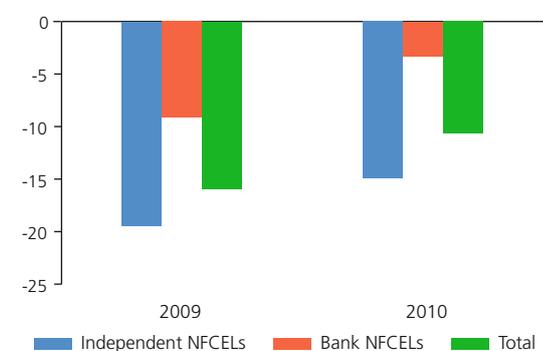
**Funding of NFCELS that belong to bank groups**  
(number of banks; right-hand scale in %)



Source: CNB

CHART IV.9 BOX

**Year-on-year change in loans provided by NFCELS to residents**  
(%)

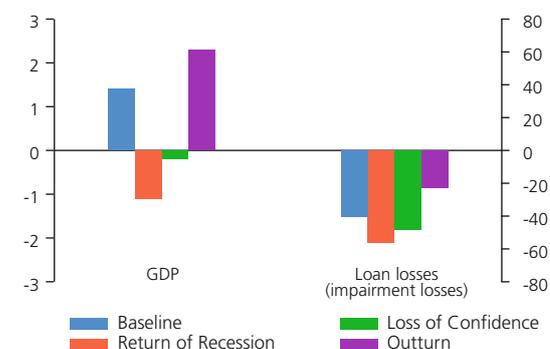


Source: CNB

CHART IV.35

**GDP and credit losses: last year's scenarios versus 2010 outturns**

(year-on-year real GDP growth in %; loan losses in CZK billions, right-hand scale)

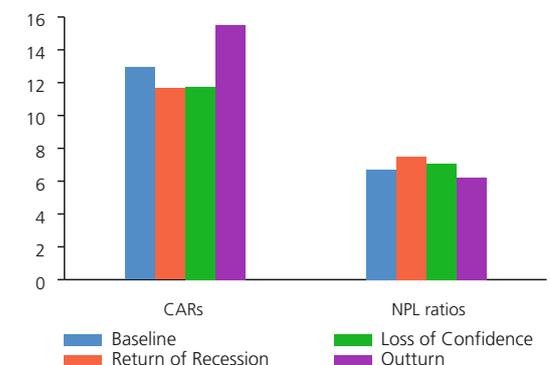


Source: CNB

CHART IV.36

**CARs and NPL ratios: last year's scenarios versus 2010 outturns**

(%)



Source: CNB

**4.2 ASSESSMENT OF THE FINANCIAL SECTOR'S RESILIENCE**

The section below assesses the financial sector's resilience using stress tests. The results confirm that the banking and insurance sectors in the Czech Republic are as a whole sufficiently resilient to risks arising from potentially adverse developments in the economy and in the financial markets in 2011–2012. The pension fund sector has limited capital and in the event of financial market turmoil shareholders would have to supply new capital. The selected ad-hoc sensitivity scenarios indicate that, should certain supplementary shocks materialise, some financial institutions would incur losses requiring a sizeable increase of capital. Tests of banks' balance-sheet liquidity indicate that the banking sector is highly resilient to strong liquidity shocks.

**The situation in 2010 was in line with the Baseline Scenario, but the impact of the risks was smaller in reality**

In addition to the *Baseline Scenario*, FSR 2009/2010 considered two other adverse economic scenarios (*Return of Recession* and *Loss of Confidence*). Macroeconomic developments did not deviate significantly from the *Baseline Scenario* based on the official CNB forecast of May 2010. The exchange rate continued to appreciate against the major currencies, short-term interest rates continued to decline modestly and inflation still rose slowly within the bounds of the inflation target. Economic growth was higher in 2010 H2 than originally expected. This was favourably reflected, among other things, in lower credit losses of the banking sector (see Chart IV.35).

Compared to the previous year's *Baseline Scenario*, the relatively favourable economic developments were also reflected in a lower non-performing loan ratio and a generally higher capital adequacy ratio of the banking sector (see Chart IV.36). Capital adequacy was significantly strengthened by retained earnings. The more favourable banking sector developments compared to the assumptions of the tests were due not only to better-than-expected macroeconomic developments, but also to the conservative calibrations of the models used in bank stress tests, which slightly overstate the risks for prudential reasons.

**The banking sector stress test methodology is being gradually developed and refined**

The banking sector stress test methodology has gradually been enlarged to better capture the impacts of shocks and combinations thereof. Compared to FSR 2009/2010, which presented and described the main changes in the stress test methodology (consisting in dynamisation of the tests and extension of the test horizon to two years), this year's tests have been refined above all in the area of risk testing in the individual segments of the non-financial corporations sector. The credit risk of the nine basic segments (based on the NACE classification) affects bank balance sheets according to their exposures to these segments. This more precisely captures the transmission of shocks from the real economy to banking institutions' portfolios. The credit growth models have also been recalibrated and the PD and LGD risk parameters have been refined according to data reported by banks under the joint

stress testing project (see Box 11). In addition, since February 2010 the banking sector stress tests have been conducted quarterly and their results published on the CNB's website.<sup>101</sup>

### Box 11:

#### JOINT STRESS TESTING BY THE CNB AND SELECTED BANKS

In 2009 the CNB supplemented its aggregated (top-down) macro-stress tests with (bottom-up) micro-stress tests, which are conducted semi-annually jointly with selected large banks in the Czech Republic and focus on credit risks.<sup>102</sup> The fourth round of joint stress testing took place in February and March 2011 on the data as of 31 December 2010 and was based on the macro-stress test scenarios of February 2011. The baseline scenario of the joint tests was only slightly more optimistic than the *Baseline Scenario* considered in this Report. Based on the decline in GDP, the stress of the adverse scenario is comparable with the *Renewed Recession* scenario.

The baseline scenario of the joint tests assumes a modest decline in credit risks for corporate exposures and a weak increase for retail portfolios (see Table IV.1 Box). The total impact of this scenario over the one-year horizon of the test, however, leads to increases in expected loan losses and also in capital requirements. If the capital requirements for the other non-tested segments and the amount of regulatory capital did not change, the aggregate capital adequacy ratio of the participating banks would fall slightly, from 15% to 14.8%. The adverse scenario assumes a greater rise in credit risks for all the portfolios tested, leading to a larger decrease in capital adequacy to 12.8% (see Table IV.2 Box). Given the resulting capital adequacy estimates well above the 8% regulatory threshold, the results of the current round indicate that the participating banks are sufficiently resilient to adverse loan portfolio developments.

Given the two-year duration of the joint stress test project of the CNB and the selected banks, we can compare the estimates of the basic risk parameters of the previous rounds of tests (the PD parameter in particular) with the subsequently reported actual outturns and verify how conservatively the estimated PD levels for the individual scenarios are set. The results of these comparisons for the individual periods indicate a modest overestimation of the risks in the baseline scenario and a greater overestimation of the risks in the adverse scenario (see Chart IV.10 Box).

TABLE IV.1 BOX

#### Approximate rise in PD for individual portfolios (%; EAD weighted)

	Actual situation as of 31 December 2010		Baseline scenario	Adverse scenario
	PD (%)	LGD (%)	PD (%)	PD (%)
<b>Corporate exposure categories</b>	2.53	41.09	2.30	4.49
– large enterprises	1.71	39.96	1.56	3.03
– small and medium-sized enterprises (SMEs)	3.36	41.03	3.04	5.94
– specialised credit exposures	2.18	44.56	1.97	3.93
<b>Retail exposure categories</b>	3.16	31.09	3.70	4.98
– retail-assessed SMEs	4.15	44.03	4.22	6.96
– loans for house purchase	2.33	21.50	2.76	3.42
– other loans to individuals	5.11	53.07	6.11	8.58
<b>Institutions</b>	0.22	35.21	0.25	0.34
<b>Central governments</b>	0.03	25.82	0.03	0.07

Source: CNB

TABLE IV.2 BOX

#### Capital adequacy ratio for constant regulatory capital level (CZK millions)

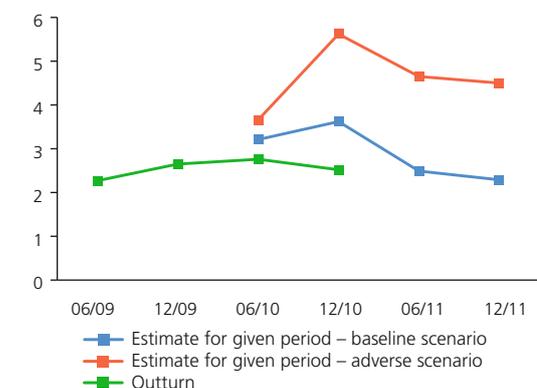
	31 Dec. 2010	Capital requirement		Adverse scenario	Change (%)
		Baseline scenario	Change (%)		
Capital requirements, total (including other risks)	128,041	129,810	1.38	150 776	17.76
Regulatory capital	240,429	240,429	0	240,429	0
Capital adequacy ratio (%)	15.02	14.82	-0.2 p.p.	12.76	-2.27 p.p.

Source: CNB, CNB calculation

101 [http://www.cnb.cz/en/financial\\_stability/stress\\_testing/index.html](http://www.cnb.cz/en/financial_stability/stress_testing/index.html). The tests are processed in February, May, August and November and published the same month, except for the May tests, which are included in the Financial Stability Report, usually issued in June.

102 Two more banks joined the joint stress tests in 2010 (the project thus currently has eight participants) and the test methodology was extended to include the *Institutions* and *Sovereign* portfolios. For more detailed information about the joint stress testing project and the selected banks see Box 8 in FSR 2009/2010.

CHART IV.10 BOX

**Comparison of estimated PDs with outturns for corporate exposures (%)**


Source: CNB, CNB calculation

TABLE IV.8

**Assessment of the impact of the alternative scenarios on the financial sector as a whole**

		Baseline Scenario	Asymmetric Developments	Renewed Recession
<b>Total impact of shocks (CZK bn)</b>	Banks*	-26.1	-46.6	-66.6
	Insurance companies	-7.7	-18.2	-27.0
	Pension funds	-1.9	-12.6	-9.4
	<b>Total in CZK billions</b>	<b>-35.7</b>	<b>-77.4</b>	<b>-103.0</b>
	<b>Total in % of assets</b>	<b>-0.8</b>	<b>-1.7</b>	<b>-2.3</b>
<b>Need for capital injections</b>	Banks	0.0	0.8	17.3
	Insurance companies	0.0	0.0	0.2
	Pension funds	0.7	11.4	8.2
	<b>Total in CZK billions</b>	<b>0.7</b>	<b>12.2</b>	<b>25.7</b>
	<b>Total in % of GDP</b>	<b>0.02</b>	<b>0.33</b>	<b>0.70</b>

Source: CNB, CNB calculation

\* The figure for banks is the average for 2011 and 2012.

Similar conclusions can be drawn for the retail portfolio sector. A detailed comparison of the estimates with the actual outturns of the selected variables in the aggregate stress tests was published in FSR 2009/2010,<sup>103</sup> with the conclusion that the model is calibrated on the correct – i.e. pessimistic side – and slightly overestimates the risks for prudential reasons.

**The default rate in the non-financial corporations segment is now calculated on the basis of microeconomic data**

The default rate of non-financial corporations is a flow indicator of newly created NPLs in the non-financial corporations segment over a certain period (12 months as a rule) expressed as a percentage of the initial portfolio. The stress tests use the estimate of this indicator for the period ahead to calculate loan losses and to estimate the evolution of capital requirements for credit risk. While in previous FSRs the default rate was calculated on the basis of aggregate data, this Report (see section 2.2) applies a more precise calculation based on data on individual corporate debtors taken from the CNB's Central Credit Register. The default rate calculated in this manner is slightly lower than the rate calculated using aggregate data.

**The *Renewed Recession* stress scenario had the biggest effect on the stability of the financial sector**

Turning to the assessment of the impact of the stress tests on the financial sector as a whole, the *Renewed Recession* scenario, which captures a fall in economic activity and adverse developments in the financial markets, had the strongest impact of the alternative scenarios presented in this Report (see section 2.1). Although this scenario generates smaller losses than the *Asymmetric Developments* scenario in the pension funds sector, the overall impacts on the financial sector as a whole are dominated by the results of banks and insurance companies (see Table IV.8). The aggregate impact on the entire sector would be just above 2% of assets and the capital injections into the entire sector would total almost CZK 26 billion (less than 1% of GDP).

**The *Baseline Scenario* indicates a slight decline in risks for the corporate sector and a rise in risks for the household sector...**

The stress tests of the banking sector are traditionally the most important component of stress testing. Alternative macroeconomic scenarios are defined for these tests using the quarterly evolution of key macroeconomic variables (GDP, inflation, unemployment, etc.) over the next eight quarters, which are generated by the CNB's official forecasting model. Other relevant parameters of the scenarios are estimated using submodels linked to macroeconomic developments or are set by expert judgement (see Table IV.9). Based on the evolution of the key risk parameter for credit risk, i.e. the expected default rate

<sup>103</sup> See the thematic article *Stress Test Verification as Part of an Advanced Stress Testing Framework* (Geršl, Seidler) in last year's FSR 2009/2010.

in 2011 and 2012, it can be judged for the main credit segments of bank portfolios that for the *Baseline Scenario* the corporate sector risks will decrease gradually, whereas the household risks will again increase slightly this year (see sections 2.2 and 2.3).

### ...but the stress scenarios would result in pronounced growth in credit risk and related loan losses in the banking sector

In the alternative scenarios, the banking sector is exposed to relatively significant loan losses resulting from rising credit risk parameters. The risk costs, as measured by the amount of expected losses due to loan impairment in the initial portfolio of non-default claims (the loan loss rate), could increase from 1.1% for 2010 to around 3.5% in the *Renewed Recession* scenario. The impact of shocks is the greatest in this scenario, as high loan and market losses associated with a marked fall in adjusted operating profits lead to an accounting loss for the banking sector as a whole in 2012 (see Table IV.10). The impact of interbank contagion remains minimal in all the scenarios owing to the relatively low connectivity between domestic banks.

### The capital adequacy of the banking sector exceeds the regulatory minimum in all the scenarios

The capital adequacy ratio exceeds the regulatory minimum of 8% in all the scenarios (see Chart IV.38). Tier 1 capital adequacy is roughly 1 p.p. lower than total capital adequacy. In the stress scenarios, however, the capital adequacy ratio might drop below 8% in several banks due to losses, and shareholders would be forced to increase their capital. In the *Asymmetric Developments* scenario, two banks would get into this situation and the topping-up of the capital adequacy of these banks to the required threshold would require capital injections amounting to CZK 750 million (i.e. about 0.3% of regulatory capital and less than 0.1% of GDP). In the more radical *Renewed Recession* scenario, the number of banks would increase to 11 and the capital injections would exceed CZK 17 billion (6% of regulatory capital and 0.5% of GDP).

### Extraordinary dividend payments would be a risk should the stress scenarios materialise

The sensitivity analysis of all three alternative scenarios assumes that banks will change their behaviour regarding their targeted capital adequacy levels. In the standard case it is assumed that banks will endeavour to maintain the initial level of capital adequacy, which is currently quite high (15.6% in March), when deciding on profit distribution. The variant of the scenarios including the assumption of "extraordinary dividend" payments reflects the risk that banks, expecting favourable future developments, will decide to downsize their existing capital buffers to the level prevailing in the pre-crisis period (2004–2007) and will pay out extraordinary dividends in 2011 H1 without simultaneously increasing their capital in any other way.

However, in the variant of the adverse scenario *Renewed Recession* with extraordinary dividend payments, the capital adequacy ratio of the banking sector would fall below the 8% threshold (see Chart IV.39). After paying extraordinary dividends, banks would enter the period of

TABLE IV.9

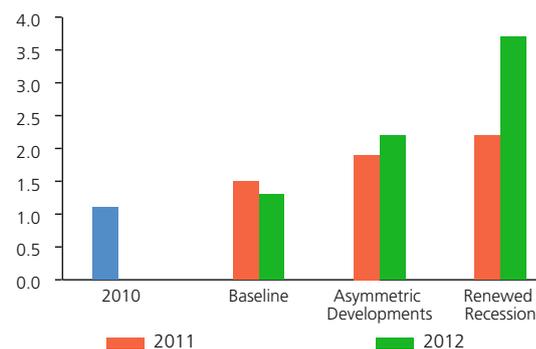
Key variables in the individual scenarios  
(average for given years)

	Actual value	Baseline Scenario		Asymmetric Developments		Renewed Recession	
	2010	2011	2012	2011	2012	2011	2012
<b>Macroeconomic variables</b>							
GDP (y-o-y %)	2.3	1.5	2.8	0.5	0.7	0.4	-4.1
CZK/EUR exchange rate	25.3	24.1	23.4	23.9	27.1	24.7	27.7
Inflation (%)	1.5	1.9	2.2	2.1	3.0	1.9	2.4
Unemployment (%)	9.3	9.1	8.6	9.4	10.4	9.3	12.0
Nominal wage growth (%)	2.0	3.7	5.4	1.0	2.6	0.6	2.1
Effective GDP growth in euro area (%)	3.0	2.3	2.2	2.1	2.0	2.0	-1.6
<b>Credit growth (%)</b>							
Total	3.5	3.9	4.8	1.2	-2.3	2.5	-6.0
Corporations	-0.3	2.7	4.3	1.6	-0.4	1.7	-4.3
Households	7.0	6.4	6.7	1.2	-4.8	-0.8	-9.6
<b>Default rate (PD, %)</b>							
Corporations	4.7	4.0	3.3	4.8	5.2	5.9	8.0
Loans for house purchase	4.4	5.0	4.3	5.3	5.8	5.5	7.0
Consumer credit	6.1	5.9	5.1	6.2	6.9	6.5	8.4
<b>Loss given default (LGD, %)</b>							
Corporations	45.0	45.0	45.0	48.9	53.3	49.5	72.6
Loans for house purchase	22.0	23.1	22.1	27.6	37.1	30.5	50.7
Consumer credit	55.0	54.5	51.6	55.7	61.0	55.4	68.6
<b>Asset markets (%)</b>							
3M PRIBOR	1.3	1.3	2.1	2.4	4.2	2.3	4.7
1Y PRIBOR	1.9	1.7	2.3	2.8	4.4	2.8	4.8
5Y yield	2.7	2.9	3.0	4.5	6.4	4.9	7.7
3M EURIBOR	0.8	1.6	2.6	2.5	3.6	1.6	3.8
1Y EURIBOR	1.4	2.0	2.9	2.8	3.8	2.5	3.9
5Y EUR yield	1.9	1.8	1.9	2.7	3.8	3.4	5.5
Change in res. property prices	-3.0	-3.5	2.8	-12.4	-4.0	-18.1	-15.2
Change in share prices	9.6	-5.0		-20.0		-40.0	
<b>Banking sector earnings</b>							
Adjusted operating profit (y-o-y %)	-0.4	-2.3	-1.7	-17.9	-3.0	-22.7	-6.6
<b>Insurance sector</b>							
Fall in premium written for motor vehicle insurance (%)		10.0		10.0		10.0	
Gross damage due to three floods (for whole sector, CZK bn)		24.0		24.0		24.0	

Source: CNB, CNB calculation

CHART IV.37

Risk costs of the banking sector  
(impairment losses as % of initial non-NPL portfolio)



Source: CNB, CNB calculation

TABLE IV.10

## Impact of the alternative scenarios on the banking sector

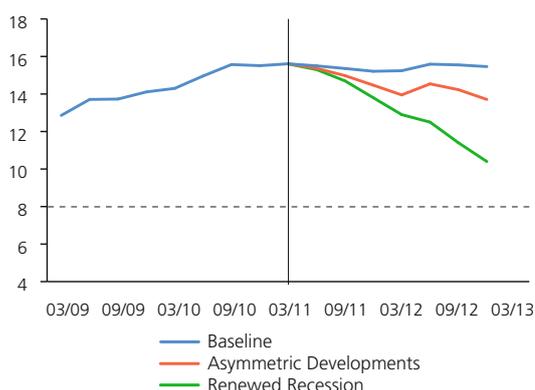
	Baseline Scenario		Asymmetric Developments		Renewed Recession	
	2011	2012	2011	2012	2011	2012
<b>Expected credit losses (minus sign for losses)</b>						
CZK billions	-26.6	-27.6	-30.5	-45.4	-33.6	-75.4
% of assets	-0.6	-0.6	-0.7	-1.1	-0.8	-1.8
<b>Profit/loss from market risks</b>						
CZK billions	2.9	-1.0	-12.2	-4.9	-18.9	-4.4
% of assets	0.1	0.0	-0.3	-0.1	-0.4	-0.1
<b>Interbank contagion</b>						
CZK billions	0.0	0.0	0.0	-0.1	0.0	-0.8
% of assets	0.0	0.0	0.0	0.0	0.0	0.0
<b>Earnings for covering losses (adjusted operating profit)</b>						
CZK billions	78.1	76.7	65.7	63.6	61.9	57.7
% of assets	1.8	1.7	1.5	1.5	1.5	1.4
<b>Pre-tax profit/loss</b>						
<b>CZK billions</b>	<b>54.4</b>	<b>48.1</b>	<b>22.9</b>	<b>13.2</b>	<b>9.4</b>	<b>-23.0</b>
<b>% of assets</b>	<b>1.3</b>	<b>1.1</b>	<b>0.5</b>	<b>0.3</b>	<b>0.2</b>	<b>-0.6</b>
<b>Capital injections</b>						
CZK billions	0.0		0.8		17.3	
% of regulatory capital	0.0		0.3		5.9	
% of GDP	0.0		0.0		0.5	

Source: CNB, CNB calculation

CHART IV.38

## Capital adequacy ratios in each scenario

(%)



Source: CNB, CNB calculation

significantly adverse developments in 2011 H2 with a lower capital buffer. In this extreme case, 13 banks would get into a situation of insufficient capital adequacy and necessary capital injections would total CZK 39 billion (13% of the current regulatory capital level and more than 1% of GDP).

### The test of portfolio concentration confirms significant impacts of potential bankruptcy of the largest debtors

As in FSR 2009/2010, a concentration stress test was carried out under the *Renewed Recession* stress scenario. This test involves bankruptcy of three largest debtors of each bank at the end of 2011. This scenario predicts the highest credit risk growth (see Table IV.9). It is an extremely implausible scenario, with a probability many times lower than even the crisis in the Czech Republic in the late 1990s, and its stress strongly exceeds all the routinely used stress scenarios.

The test was again performed for two alternative LGD assumptions, i.e. an LGD of 100% (reflecting the fact that loans to large debtors are often unsecured) and an LGD equal to the standard 45% for the corporate segment (reflecting the possibility that large firms have assets that would be used to meet creditors' bankruptcy claims). The test results are similar to last year's and indicate that with a 100% LGD the capital adequacy ratio of the banking sector would fall to the 8% threshold at the end of 2011 and drop dramatically below this threshold in 2012 (see Chart IV.40). However, we assess the test results as positive, as the stress involved is extremely high.

### Ad-hoc sensitivity analyses capturing selected risks indicate that the banking sector is relatively resilient

The following exposures were identified as relatively risky in previous sections: (a) exposures to certain sectors, especially property development, construction and transport, (b) exposures to photovoltaic projects, which may run into loan repayment problems because of a change in state support, (c) exposures to highly indebted governments (debt of more than 80% of GDP). A number of sensitivity analyses reflecting these risks were performed in the *Asymmetric Developments* scenario.

In the case of sectoral risks, the (already relatively high) default rate in selected sectors (Real Estate activities NACE L, Construction NACE F, and Transport and Storage NACE H) was raised by expert judgement to approximately double the original level for 2011 Q2–2012 Q2. This modified scenario would lead to higher losses (see Table IV.11), but the banking sector as a whole would withstand this risk very well, with a capital adequacy ratio of 13% at the end of 2013 and slightly higher capital injections totalling CZK 1 billion.

Other ad-hoc analyses were performed by assuming impairment of selected exposures (with provisioning in 2011 Q3). Impairment of 50% was assumed for exposures to the largest property development projects (see section 3.2). Another sensitivity scenario assumes similar impairment of claims on photovoltaic projects. Impairment of 30%

was assumed for exposures to indebted countries.<sup>104</sup> The results show that the banking sector is resilient to individual risks, although it would incur accounting losses in 2011 in the event of problems regarding photovoltaic power stations and above all in the event of impairment of claims on indebted countries (see Table IV.12). Moreover, the banking sector would withstand the stress of simultaneous impairment of all three types of exposures with capital adequacy of 9.3% at the end of 2012 and capital injections totalling CZK 20 billion.<sup>105</sup>

### A reverse stress test shows that a protracted decline in GDP is the main risk

There are a number of combinations of risk factors that would cause the capital adequacy ratio of the banking sector as a whole to fall to the regulatory threshold of 8% at the end of 2012. The analyses above show that such combinations include the payment of extraordinary dividends, the collapse of banks' largest debtors in a relatively adverse macroeconomic environment, and a decline in the values of selected exposures to selected sectors or countries assuming a high loss given default (e.g. an LGD for claims on indebted countries of 50%).

If we focus on macroeconomic developments only, the most significant risk to the banking sector would be a sharp decline in GDP of about 8% (and a related rise in the unemployment rate to just under 20%) in 2011 and 2012. Assuming that other macroeconomic variables develop in line with the *Baseline Scenario*, such a shock would cause the capital adequacy ratio of the banking sector as a whole to fall to the regulatory threshold of 8% at the end of 2012. Such an adverse economic scenario would not only cause high loan losses, but also lead to a drop in adjusted operating profit and accounting losses for the banking sector as a whole in both 2011 and 2012.

### Liquidity shocks are now linked to developments in the macroeconomic scenarios

The two-round macro-stress-testing model presented in FSR 2009/2010 was used to test banks' liquidity risk. However, the liquidity tests have been better integrated with the aggregate tests of banks. In the current version, the liquidity shocks are linked to the macroeconomic stress scenarios and can therefore be presented as ad-hoc extensions incorporating the liquidity aspect.

By comparison with last year's methodology, modifications have been made to the first round of the impact of the shocks on banks' balance sheets.<sup>106</sup> While last year's model defined the first round "merely"

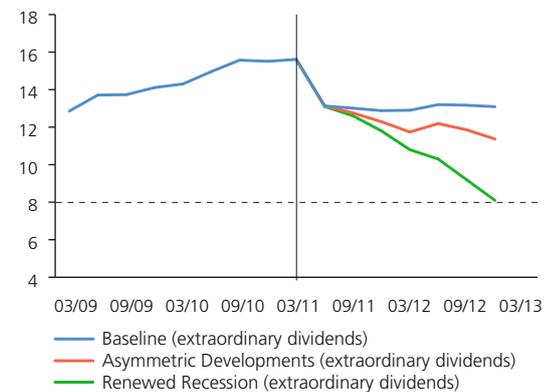
<sup>104</sup>The government debt of the following countries will probably exceed 80% of GDP this year or the next: Belgium, Canada, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Portugal, the United States and the United Kingdom.

<sup>105</sup> Simultaneous materialisation of all three risks has a non-linear effect on the banking sector and the capital injections needed in such a scenario are generally higher than the sum of the injections in the individual sensitivity scenarios.

<sup>106</sup> The liquidity stress testing methodology is described in detail in Geršl, A., Komárková, Z., Komárek, L. (2011): *Models for Stress-Testing Czech Banks' Liquidity Risk*. CNB Working Paper, forthcoming.

CHART IV.39

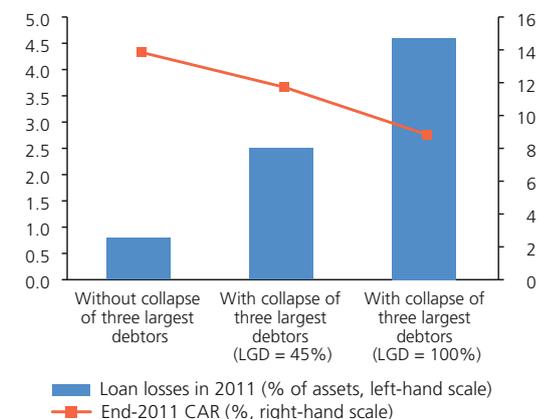
Capital adequacy ratios in each scenario in the event of extraordinary dividend payments (%)



Source: CNB, CNB calculation

CHART IV.40

Results of the concentration stress test (in Renewed Recession scenario)



Source: CNB

TABLE IV.11

Results of the ad-hoc stress test with growth of risk in selected sectors

(in Asymmetric Developments scenario)

	Asymmetric Developments		...including growth of risk in selected sectors	
	2011	2012	2011	2012
<b>Expected credit losses (minus sign for losses)</b>				
CZK billions	-30.5	-45.4	-37.9	-50.7
% of assets	-0.7	-1.1	-0.9	-1.2
<b>Average default rate</b>				
Construction (NACE F)	15.4	16.4	27.4	19.2
Transport and storage (NACE H)	13.3	14.1	23.8	16.6
Real estate (NACE L)	6.3	6.7	11.6	8.0
<b>Capital adequacy ratio</b>				
total (% , end of period)	14.5	13.7	13.9	13.1

Source: CNB, CNB calculation

TABLE IV.12

Results of sensitivity analyses (in <i>Asymmetric Developments</i> scenario)						
	Indebted countries		Developers		Photo-voltaics	
	2011	2012	2011	2012	2011	2012
<b>Credit and market losses</b>						
CZK billions	-42.8	-50.3	-42.8	-50.3	-42.8	-50.3
% of assets	-1.0	-1.2	-1.0	-1.2	-1.0	-1.2
<b>Losses on analysed exposures</b>						
CZK billions	-93.0	0.0	-17.5	0.0	-26.8	0.0
% of assets	-2.2	0.0	-0.4	0.0	-0.6	0.0
<b>Interbank contagion</b>						
CZK billions	0.0	-1.4	-0.1	-0.2	-0.3	-0.8
% of assets	0.0	0.0	0.0	0.0	0.0	0.0
<b>Earnings for covering losses (adjusted operating profit)</b>						
CZK billions	63.4	51.9	65.1	60.3	64.7	58.2
% of assets	1.5	1.2	1.5	1.4	1.5	1.4
<b>Pre-tax profit/loss</b>						
CZK billions	-72.4	0.2	4.7	9.8	-5.2	7.0
% of assets	-1.7	0.0	0.1	0.2	-0.1	0.2
<b>Capital adequacy ratio</b>						
total in %	12.9	11.6	14.0	13.1	13.8	12.7
Tier 1 in %	11.5	10.3	12.6	11.8	12.4	11.4
<b>Capital injections</b>						
CZK billions	1.7		3.6		4.8	
% of regulatory capital	0.6		1.2		1.6	
% of GDP	0.0		0.1		0.1	

Source: CNB, CNB calculation

as a potential liquidity gap in the balance sheet caused by a higher requirement to finance assets with lower funds, this year the first round also includes a reduction in the value of some assets in order to make the test more realistic. The application of this additional effect leads to an immediate fall in the bank's original liquidity buffer,<sup>107</sup> worsening its financial position when closing the liquidity gap.

The liquidity gap now also takes into account the results of the credit and market risk stress testing. Banks that incurred accounting losses in the stress scenarios face a greater outflow of liquidity than profitable banks. In sales of illiquid assets, account is taken of the quality of the bank's assets as measured by the credit portfolio risk costs (see Table IV.13). The second round of shocks, stemming from a rise in reputational and systemic risk caused by banks' efforts to close the liquidity gap, remained the same as in last year's methodology. Both scenarios were applied individually to 22 banks resident in the Czech Republic (i.e. excluding foreign bank branches).

#### The *Renewed Recession* scenario would cause liquidity problems, but these would not be systemic in nature

Banks were tested at the one-month horizon for a combination of idiosyncratic and market risk (see Table IV.14). The *Renewed Recession* stress scenario had a larger impact on the balance sheets of most banks. Banks lost more than 50% of their original liquidity buffers on average during the test. The causes are mixed across banks. Large banks faced a wider liquidity gap in the two scenarios owing mainly to their higher sensitivity to the shock to drawdown of credit facilities (see Chart IV.41). The test results show that banks are highly sensitive to a decline in the value of government bond holdings. Growth in the credit risk of Czech government bonds, be it due to domestic fiscal problems or due to contagion from abroad, would significantly worsen the liquidity position of Czech banks. Government bonds are usually held as liquid assets that can be used quickly in the event of sudden and unexpected balance-sheet fluctuations.

Although the conditions of the scenarios were set fairly strictly, the banking sector would withstand the simulated stress. In both scenarios, four banks would fully exhaust their liquidity buffers and, in an effort to close the liquidity gap, would be forced to raise extra funds by selling assets with maturities of over one month, albeit at a considerable loss. The results of the cross-bank liquidity stress test complemented and essentially confirmed the results obtained by applying the new liquidity ratios inspired by Basel III (see section 4.1). The low resilience of the banks that exhausted their liquidity buffers during the test was mainly due to their low initial buffer values, low client deposit-to-loan ratios and high credit facilities in relation to their balance-sheet structures.

<sup>107</sup> The liquidity buffer (LB) consists of quick assets, securities and claims maturing within one month (including claims payable on demand). Quick assets are defined as the sum of cash, claims on central banks, bonds issued by governments or central banks and claims on other financial institutions payable on demand.

TABLE IV.13

#### Dependence of selected liquidity shocks on estimated bank balance-sheet indicators in the stress tests

Estimated RoA in 2011 (%)	Bank run	
	Asymmetric Developments	Renewed Recession
< -2%	10%	15%
-2% – -1%	8%	13%
-1% – 0%	6%	11%
0% – 1%	4%	9%
1% – 2%	2%	7%
> 2%	0%	5%
Estimated risk costs 2011 (%)	Reduction in value of assets sold before maturity	
	Asymmetric Developments	Renewed Recession
< 1%	10%	25%
1% – 2%	30%	45%
2% – 3%	40%	55%
> 3%	50%	65%

Source: CNB, CNB calculation

### The capital of the pension fund sector is significantly lower than that of the other sectors of the financial market

The current stress tests of pension funds focus on relevant risks and model losses on asset holdings in the event of adverse developments in the financial or property markets at the one-year horizon. The tests assume that 85% of the 2010 income, currently recorded under equity, will be allocated to planholders in 2011 H1. In line with the long-term trend of low pension fund returns,<sup>108</sup> we do not expect the 2011 income to contribute to an increase in equity.

The total equity available to the funds is sufficient for the situation modelled by the *Baseline Scenario*. After the application of the *Asymmetric Developments* and *Renewed Recession* scenarios, which work with greater levels of stress, pension funds' equity would fall to very low levels and would not even be sufficient to cover the losses in the *Asymmetric Developments* case (see Chart IV.42). Given the existing prudential mechanism agreed between the Association of Pension Funds and the CNB after the problems in 2007–2009 (see section 4.1), shareholders would have to increase the funds' capital in both stress scenarios – by CZK 11.5 billion in the *Renewed Recession* scenario and by CZK 8 billion in the *Asymmetric Developments* scenario.<sup>109</sup>

The test results show that foreign exchange risk is the biggest risk to pension funds in the *Baseline Scenario*, as 14% of the sector's assets are allocated in foreign currency (see Table IV.15). Bond revaluation losses<sup>110</sup> and losses on shares and units play the key role in the *Asymmetric Developments* and *Renewed Recession* scenarios. The risks arising from property price changes are negligible in both stress scenarios. However, the scenarios differ fundamentally in respect of exchange rate risk, as a depreciation of the koruna during the assumed *Renewed Recession* would lead to part of the losses being covered by an increase in the value of the foreign currency portfolio. In the *Asymmetric Developments* scenario, this effect will not arise and the overall outcome will be worse despite smaller other market risks.

### Ad-hoc sensitivity analyses reveal a significant impact of regulatory risks and possible liquidity problems

The measure initiated by the CNB allowing pension funds to classify part of the bonds in their portfolios as held to maturity turns out to be a significant help for pension funds. If the funds experienced a liquidity crisis and were forced, under the conditions of the individual stress scenarios, to revalue this part of the portfolio in line with its current market value, their losses would rise by a further CZK 5–6 billion.

<sup>108</sup> See *Selected Financial Stability Indicators*.

<sup>109</sup> In the calculation of the necessary capital injections, we assume that pension funds should have capital of at least 4% of assets.

<sup>110</sup> In the *Baseline Scenario*, as in the insurance company tests, bond revaluation only reflects interest rate risk due to growth in the swap curve amid an unchanged spread between swaps and government bonds. By contrast, the stress scenarios assume a widening of this spread, due, for example, to a decline in sovereign credit quality or a higher liquidity premium as in October 2008.

TABLE IV.14

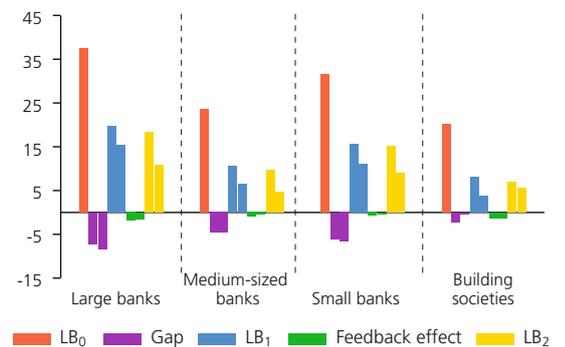
Scenario type and shock size in the bank liquidity test

Scenario type	Asymmetric Developments	Renewed Recession
Bank run (average for banks, %)	5	10
Drawdown of credit facilities (credit lines, % of volume)	20	10
Share of short-term claims on banks that will become unavailable (%)	50	100
Share of short-term claims on other clients that will become unavailable (%)	20	30
Reduction in value of government bonds eligible as collateral in CNB liquidity-providing operations (%)	20	30
Reduction in value of other securities (%)	20	40
Reduction in value of assets sold before maturity (average for banks, %)	30	50

Source: CNB, CNB calculation

CHART IV.41

Results of the liquidity test  
(%; share in original total assets)

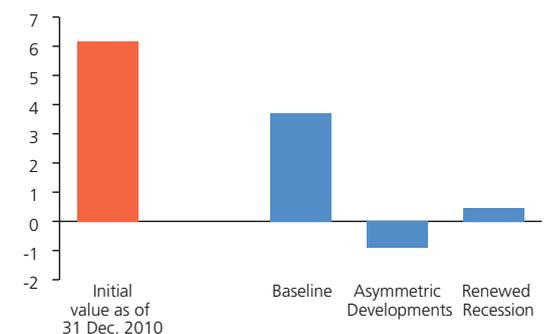


Source: CNB, CNB calculation

Note: The first column of each pair of identically coloured columns expresses the value for the *Asymmetric Developments* scenario and the second expresses that for the *Renewed Recession* scenario. Gap = liquidity gap. Feedback effect = additional stress caused by banks' reactions in markets. LB<sub>0</sub> = initial liquidity buffer; LB<sub>1</sub> = buffer after first round of shocks; LB<sub>2</sub> = final liquidity buffer.

CHART IV.42

Estimate of the capitalisation of pension funds  
(CZK billions)



Source: CNB, CNB calculation

TABLE IV.15

## Results of the pension fund stress tests

	Baseline Scenario	Asymmetric Developments	Renewed Recession
<b>Equity (as of start of 2011)</b>			
CZK billions	14.4	14.4	14.4
% of assets	6.2	6.2	6.2
<b>Allocation of 2010 earnings for policyholders</b>			
CZK billions	-3.9	-3.9	-3.9
% of assets	-1.7	-1.7	-1.7
<b>Bond revaluation gains/losses</b>			
CZK billions	-0.3	-8.0	-8.9
% of equity	-2.2	-55.7	-62.3
<b>Gains/losses from changes in share and unit value</b>			
CZK billions	-0.5	-2.1	-4.2
% of equity	-3.7	-14.7	-29.4
<b>Exchange rate gains/losses</b>			
CZK billions	-1.0	-2.2	4.2
% of equity	-6.7	-15.6	29.0
<b>Gains/losses from changes in property value</b>			
CZK billions	-0.1	-0.2	-0.4
% of equity	-0.4	-1.7	-2.6
<b>Impact of risks on equity</b>			
CZK billions	-1.9	-12.6	-9.4
% of assets	-0.8	-5.4	-4.0
<b>Equity (as of end of 2011)</b>			
CZK billions	8.6	-2.1	1.1
% of assets	3.7	-0.9	0.5

Source: CNB, CNB calculation

TABLE IV.16

## Ad-hoc sensitivity analysis in the pension fund tests

(additional shocks in individual scenarios)

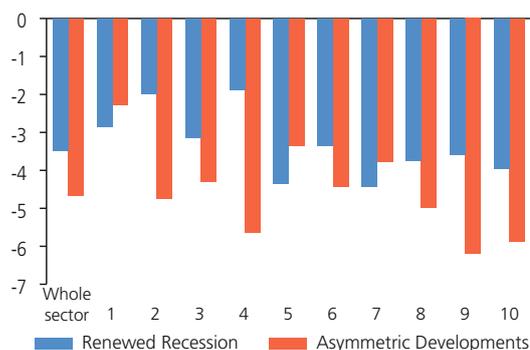
	Baseline Scenario	Asymmetric Developments	Renewed Recession
<b>Release of deferred costs in 2011</b>			
CZK billions	-3.5	-3.5	-3.5
% of assets	-1.5	-1.5	-1.5
<b>Revaluation of instruments held to maturity</b>			
CZK billions	-0.2	-5.2	-5.7
% of assets	-0.1	-2.2	-2.4
<b>Equity (as of end of 2011)</b>			
CZK billions	4.9	-10.8	-8.1
% of assets	2.1	-4.7	-3.5

Source: CNB, CNB calculation

CHART IV.43

## Capitalisation of individual funds after application of the stress scenarios, including the ad-hoc extension

(as % of total assets of fund; anonymised)



Source: CNB

Note: The figures for the individual funds 1–10 are ranked by resulting equity.

In an ad-hoc sensitivity test, this assumption was extended to include the impact of regulatory risk. Given the insufficient preparedness of pension funds for the pension reform, we assumed a faster release of all deferred costs into the profit and loss account in 2011 (see Table IV.16). The results of the extended test for individual pension funds show that owing to their similar investment profiles and balance sheet structures, all pension funds would have to top up their capital (see Chart IV.43). Total capital injections would rise to CZK 20 billion in the least favourable *Asymmetric Developments* scenario. However, this is an extreme stress assuming a simultaneous impact of all risk factors.

### Stress tests of insurance companies confirm the good resilience of this sector

As with the other financial sectors, the stress tests of insurance companies were conducted for three alternative scenarios – the *Baseline Scenario*, *Asymmetric Developments* and *Renewed Recession* – using end-2010 data. As with the pension fund tests, the insurance company tests assume a one-year horizon. The methodology has been further refined compared to FSR 2009/2010. The tests now use more detailed data reported to the CNB in a joint stress testing project of the CNB and selected insurance companies (see Box 12). Some non-life insurance risks (motor vehicle insurance risk and catastrophic flood damage risk) are also tested in addition to market risks.

As expected, bond revaluation risk had the largest impact of the assumed market risks. Given the size of the stress, equity risk also had a significant impact. The total impact of the risks (including insurance risks) on the available solvency margin (ASM) in the strongest *Renewed Recession* scenario would be about CZK 26 billion, which corresponds to 7.5% of assets (see Table IV.17). Taking into account projected earnings from insurance activities in 2011 and planned dividends, the available solvency margin would drop from CZK 58 billion (16.6% of assets) to CZK 34 billion (9.5% of assets). The impacts of the *Asymmetric Developments* scenario and the *Baseline Scenario* are smaller. The insurance sector can be regarded as stable despite these losses. The estimated solvency indicator of the whole sector for the individual scenarios, expressed as the ratio of the disposable to the required solvency margin, does not fall below the regulatory minimum of 100% in any of the scenarios, suggesting sufficient risk coverage. Some insurance companies could fall below the regulatory solvency threshold in isolated cases in the *Renewed Recession* scenario, but would require capital injections of only around CZK 220 million.

#### Box 12:

#### JOINT (BOTTOM-UP) STRESS TESTING BY THE CNB AND SELECTED INSURANCE COMPANIES

Along the lines of the joint stress testing project of the CNB and selected banks (see Box 11), a similar project was launched for insurance companies in 2010. Its aim is to assess the ability of insurance companies to absorb the impacts of possible adverse

economic developments. This box summarises the results of the second round of joint stress testing, conducted in April 2011. The participants were selected insurance companies whose share of the domestic market based on gross premiums written was more than 90% in 2010.

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 line with the principles of Solvency I), at the one year horizon. The investment risks examined were equity risk, assets and liabilities interest rate risk, real estate risk, foreign exchange risk, credit risk and the risk of a decline in government bond prices, and the non-life insurance risks were motor vehicle insurance premium risk and the risk of claims due to natural catastrophe. The adverse scenario for insurance companies followed the *Unexpected Recession* stress scenario applied to the banking sector in February 2011, with risk factors relevant to insurance companies.<sup>111</sup> For insurance companies the scenario was extended to include a 10% decline in premiums written for motor vehicle insurance at the same level of costs as in 2010. In addition, the extended scenario tested how the capitalisation of insurance companies would be affected if floods occurred at the same time. The extended scenario thus contained a series of three floods, two of which were local with claims corresponding to a roughly five-year return period and one with claims corresponding to a 50-year return period. The tests used data as of 31 December 2010.

The aggregate results show that thanks to sufficient available capital, the sector as a whole, represented by the participating insurance companies, would absorb the impacts of large movements in risk factors, including simultaneous floods (see Chart IV.11 Box). The sector stays relatively high above the 100% solvency threshold even after the application of significant shocks. The resulting available solvency margin at the one-year horizon was affected not only by the impact of the shocks in the test and by the loss of insurance companies so generated, but also by the value of dividends planned to be paid in 2011 (see Chart IV.12 Box). The aggregate impact of the shocks for assets and liabilities interest rate risk and the risk of a decline in government bond prices has a dominant role in the loss caused by the impact of the stress scenario (see Chart IV.13 Box). The asset-side impact of these shocks for individual insurance companies depends largely on the proportion of bonds classified

<sup>111</sup> We assumed a 40% reduction in the value of shares, a 20% fall in property prices, an increase in the swap (IRS) curve of about 2 p.p., an increase in the government bond yield curve of about 4 p.p., a depreciation of the koruna of 13% and an increase in the spread of corporate bonds relative to their rating.

TABLE IV.17

## Results of the insurance company stress tests

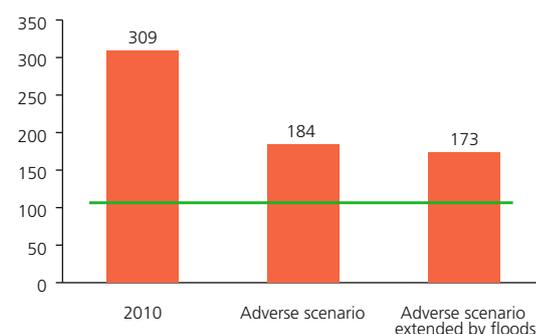
	Baseline Scenario	Asymmetric Developments	Renewed Recession
<b>ASM (as of start of 2011)</b>			
CZK billions	58.08	58.08	58.08
% of assets	16.58	16.58	16.58
<b>Bond revaluation gains/losses</b>			
CZK billions	-2.49	-10.22	-14.41
% of ASM	-4.28	-17.59	-24.80
<b>Gains/losses from change in technical provision</b>			
CZK billions	0.30	1.06	1.07
% of ASM	0.51	1.83	1.84
<b>Gains/losses from changes in share and unit value</b>			
CZK billions	-0.70	-3.63	-7.53
% of ASM	-1.20	-6.25	-12.97
<b>Exchange rate gains/losses</b>			
CZK billions	0.39	0.10	-0.35
% of ASM	0.66	0.16	-0.60
<b>Gains/losses from changes in property value</b>			
CZK billions	-0.11	-0.49	-0.76
% of ASM	-0.19	-0.85	-1.31
<b>Gains/losses from fall in non-life insurance premium</b>			
CZK billions	-2.46	-2.46	-2.46
% of ASM	-4.24	-4.24	-4.24
<b>Gains/losses from catastrophic flood damage</b>			
CZK billions	-2.60	-2.60	-2.60
% of ASM	-4.48	-4.48	-4.48
<b>Impact of risks on ASM</b>			
CZK billions	-7.68	-18.24	-27.05
% of assets	-2.19	-5.21	-7.72
<b>Planned dividends for payment in 2011</b>			
CZK billions	-16.25	-16.25	-16.25
% of assets	-4.64	-4.64	-4.64
<b>Projected earnings from insurance activities in 2011</b>			
CZK billions	16.99	16.99	16.99
% of assets	4.85	4.85	4.85
<b>Other impacts (tax)</b>			
CZK billions	-1.86	-0.20	1.30
% of assets	-0.53	-0.06	0.37
<b>ASM (as of end of 2011)</b>			
CZK billions	49.29	40.38	33.08
% of assets	14.07	11.53	9.44

Source: CNB calculation

Note: ASM = available solvency margin.

CHART IV.11 BOX

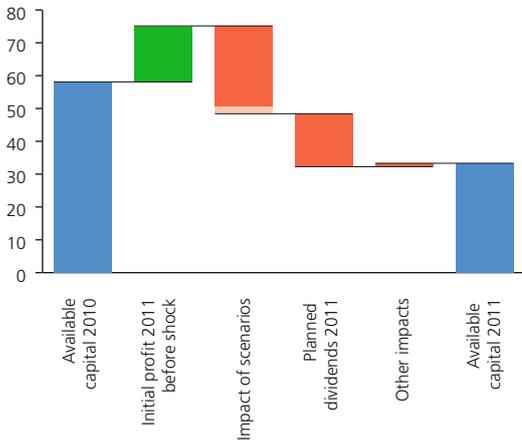
## Solvency ratio for the adverse scenario extended by flood scenario (%)



Source: CNB

CHART IV.12 BOX

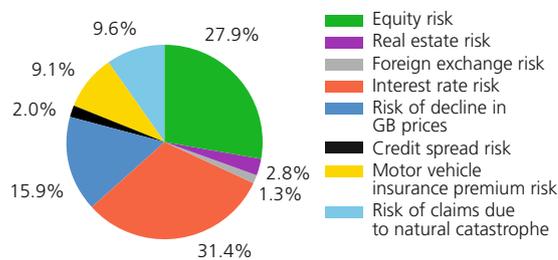
**Change in the available solvency margin**  
(CZK billions)



Source: CNB  
 Note: In the *Impact of scenarios* column, the impact of the floods is indicated by the wave pattern.

CHART IV.13 BOX

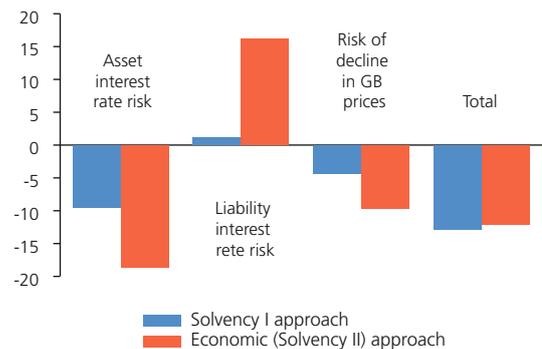
**Shares of individual risks in the decrease of the available solvency margin caused by the impacts of the shocks**



Source: CNB

CHART IV.14 BOX

**Comparison of the impacts of the scenarios for interest rate risk and the risk of a decline in government bond prices on the change in capital in relation to the valuation approach**  
(CZK billions)



Source: CNB

as held to maturity valued at amortized costs. The interest rate sensitivity of the book value of technical provisions under Solvency I is relatively low. The significance of the impact of the shock for the risk of a decline in government bond prices is also related to the fact that government bonds account for 46% of the investment allocation of the participating insurance companies. Although the volume of equity positions is low, its impact is also significant owing to the size of the equity shock. The relatively small result of the shocks for the risk of floods compared to the other risks shows that insurance companies have well-structured reinsurance programmes for catastrophic claims caused by floods in respect of the tested scenario.

The stress test was also extended to include 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 valued at amortised costs, were valued at fair value and exposed to a shock in the economic view. On the liability side, the interest rate sensitivity of the value of insurance liabilities was estimated with respect to the defined stress. The effect of the shocks for interest rate risk and the risk of a decline in government bond prices rose significantly for assets and liabilities separately, but the overall impact on the change in capital is almost the same for the participating insurance companies as under Solvency I (see Chart IV.14 Box). The same does not apply for many of the individual results of insurance companies. Some recorded a decline in interest rate sensitivity under the Solvency II principles, while others recorded an increase. This difference is due mainly to the structure of insurance companies' assets and insurance liabilities, the accounting classification of assets, and asset and liability management policy.