

4 THE FINANCIAL SECTOR

While global financial institutions were significantly affected by the credit crisis, the Czech financial system remained fairly isolated from the global turbulence. Major international banking groups were forced to admit large losses related directly or indirectly to a decline in prices of risky assets, especially bonds backed by defaulting US mortgages.⁵⁸ Czech financial institutions held a minimum amount of such risky assets, mainly because of the strong focus of banks and other financial institutions in the Czech Republic on the traditional (conservative) business model on the as yet unsaturated Czech market.⁵⁹ This focus is reinforced by the prevailing foreign ownership of domestic financial institutions, as foreign owners let their subsidiaries in new EU Member States generate income mainly from dynamically developing retail banking, while administration of securities and derivatives portfolios is typically concentrated in parent institutions or branches in financial centres (London and New York). The stability of the domestic banking sector in times of financial market turbulence has also been fostered by banks' high balance-sheet liquidity, the prevailing financing of credit expansion with primary deposits and thus minimum dependence on funds from foreign markets or parent companies. Moreover, domestic financial institutions do not belong to the global financial groups that have been hardest hit by the crisis.

Despite the above factors, the Czech financial sector will not necessarily remain immune to the current credit crisis. Large domestic banks with a strong surplus of balance-sheet liquidity might become a potential source of liquidity for their foreign parent institutions, which could subsequently affect the financing of the Czech economy. However, lending to parent banks is limited by the regulations. Certain medium-sized banks that do not have a broad deposit base might limit credit expansion and reduce the level of competition in the sector. Increased risk aversion could furthermore cause a decline in some other riskier assets held by Czech financial institutions in their portfolios. Moreover, preliminary signals confirm that some subsidiaries of foreign banks might have tightened their credit standards due to tighter credit policy within the globally operating group in response to the crisis.

The available analyses indicate that the Czech financial sector (and in particular the banking sector) is not exposed to the risk of a crisis similar to the one that hit the US subprime mortgage segment. This is due to very conservative loan-to-value ratios, traditionally higher required debtor creditworthiness, the traditional method of interest rate fixation, less use of external mortgage underwriters and the absence of significant credit securitisation. Nevertheless, it is vital to constantly monitor this area and assess any signs of increasing risks in a timely manner.

⁵⁸ In its Global Financial Stability Report (April 2008), the IMF estimates the total losses of financial institutions related to the US mortgage market crisis at USD 945 billion. This sum is a combination of losses from loans and losses from related securities, with USD 565 billion pertaining to residential mortgage loans and the remaining USD 380 billion to other credit market segments. In a report for the OECD Committee on Financial Markets entitled *The Subprime Crisis: Size, Deleveraging and Some Policy Options* (April 2008), OECD experts estimate the total losses to be considerably lower (USD 422 billion), mainly because they focus only on losses related to residential mortgages. The differences in the loss estimates are also connected with difficult-to-determine assumptions about the recoverability of non-performing assets.

⁵⁹ According to a CNB survey conducted at the start of the crisis in summer 2007, the Czech banking sector's overall exposure to CDOs was about CZK 11 billion, i.e. just 0.3% of assets (of which, moreover, only about 5% were directly related to subprime US mortgages). In the case of insurance corporations and pension funds, the figures were about 0.15% and 0.5% of assets respectively.

4.1 FINANCIAL SECTOR DEVELOPMENTS

The Czech financial sector experienced mostly positive developments in 2007. The banking sector achieved record profits in 2007 and showed continuing strong growth in lending to the real economy. Insurance companies have significant long-term potential for further development in both the life insurance and non-life insurance segments and hold capital above the required solvency margin. Insurance companies and pension funds saw marked growth in the costs of intermediating new contracts. These costs may negatively affect future profitability. Mutual funds are a popular investment opportunity for households. There was growing interest in funds with distributed risks, such as mixed funds, funds of funds and foreign guaranteed funds.

The depth of financial intermediation in the Czech Republic,⁶⁰ as measured by the ratio of financial sector assets to GDP, increased from 133% in 2006 to 142% in 2007. Financial intermediation, as measured by the volume of assets of financial institutions, grew by 17.5% year on year in 2007 (compared to only 7% in 2006). Within the structure of financial system assets (see Chart IV.1), there was a sharp (18%) year-on-year increase in bank assets. A similar rate of growth (19%) was recorded by the activities of investment companies and the domestic mutual funds they administer. Pension funds increased their assets by 14%. Unlike the other sectors, insurance companies recorded a smaller rise in assets (about 6.5%) due to lower growth in non-life insurance. Overall, both banks and insurance companies achieved high returns on assets (1.3%, 3.7%) and equity (24.5%, 21.7%) in the favourable economic growth conditions. The quality of the domestic financial market has improved further since the sales of the state-owned stakes in large banks in 2001–2007, and the activities of other non-bank institutions have undergone further development (see Chart IV.2).

In 2007, the financial sector was shaped mainly by the favourable phase of the business cycle and the expected impacts of the fiscal reform. Also significant was the transition to the Basel II framework in the credit institution and investment firm sectors and the preparation for the new Solvency II framework in the insurance sector. The credit crisis on foreign markets in the second half of 2007 and the first few months of 2008 also had some impact.

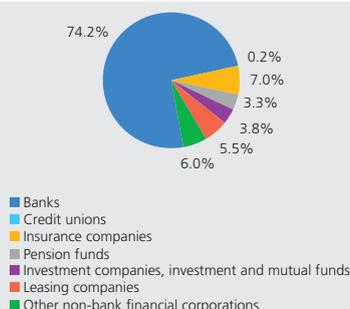
4.1.1 The banking sector

2007 was another successful period for the banking sector. Total assets saw further growth, fostered by a sizeable increase in loans reflecting the favourable economic growth and rising demand for owner-occupied housing. However, growth in house purchase loans to households and a further rise in the rate of growth of loans to real estate companies may become a risk element in the future (see section 3.2). The quality of loan repayment is affected by the disposable income of debtors, property prices and the level of interest rates. A negative trend in any of these areas would probably result in a deterioration in loan quality. Banks as a whole again recorded strong profits. Provided that a sufficient proportion of the profit remains in banks in the form of equity capital, this lays the groundwork for maintaining the sector's stability in the future.

The intensive preparations for the implementation of Basel II and the actual changeover to the new prudential rules in several banks on 1 July 2007 were a significant challenge for the banking sector in 2007. The remainder of the sector took this step in January 2008. Owing to the gradual changeover to Basel II, there was a slight increase in capital adequacy. This reflects the fact that banks made use

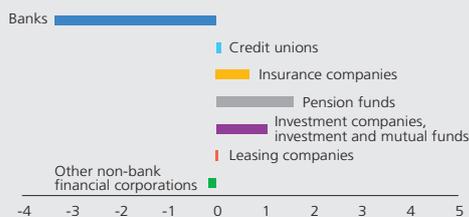
⁶⁰ The regular *Analyses of the Czech Republic's Current Economic Alignment with the Euro Area* (CNB 2007) contain a comparison with the monitored euro area countries.

CHART IV.1
Shares in financial sector assets
(%; 2007)



Source: CNB, CZSO

CHART IV.2
Growth (fall) in shares in financial sector assets
2001–2007
(percentage points)



Source: CNB, CZSO

of the possibility of more accurately assessing the risks they undertake. As expected, this led to a decline in capital charges⁶¹ and more efficient use of capital.

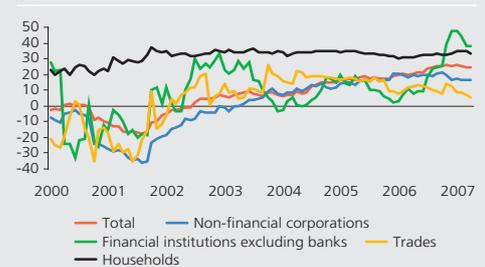
Loans and credit risk

Client loans extended by the banking sector totalled CZK 1,786 billion at the end of 2007. The annual growth rate of loans reached 26.4% (see Chart IV.3), the highest level recorded for the entire period under review, i.e. since 1996. Compared to the end of 2006, the growth rate was up by 6.5 percentage points. However, the annual rate of growth of total loans declined by almost 2 percentage points in 2008 Q1, to 24.5%. Although the current growth remains fairly robust, it is not excessive according to available studies (see section 2.3). As regards the credit structure, non-financial corporations are still the main debtor of banks, with a 42% share of total loans. Loans to households accounted for 37.5%.⁶²

Client deposits, which were 1.3 times higher than client loans at the end of 2007, are the biggest source of loan financing. Financing of client loans by primary deposits in the Czech Republic is more than two times the average in the original EU Member States and 40 percentage points higher than the average in the new EU Member States (see Chart IV.4). At the end of 2006, the new Member States which joined the EU in 2004 or later held client deposits which were 10% higher than the volume of loans granted. By contrast, the old EU Member States sought on average 20% of missing funding sources for loans outside client deposits (on the interbank and capital market). It is this difference in the financing of bank assets that now makes the banking sectors in the new economies, including the Czech Republic, more resilient to the consequences of the mortgage crisis in the USA in the area of balance-sheet liquidity. The Czech Republic is one of the countries where banks' primary funds base is currently large. There are thus two advantages of this large volume of client deposits: protection against any rapid drying up of liquidity on the financial market, and the low costs of such funds compared to other forms of external financing. However, deposit growth (17% in 2007) has been lower than credit growth in the Czech Republic. The ratio of deposits to loans is gradually declining and banks may thus lose the above advantages.

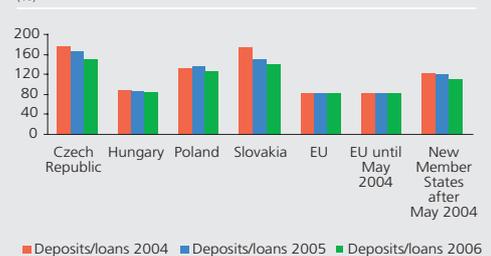
The rise in lending also means a rise in credit risk exposure.⁶³ The ratio of default loans⁶⁴ to total loans was 2.7% at the end of 2007 (see Chart IV.5), down by 0.9 percentage point from a year earlier. This ratio decreased in all sectors of the economy. This was due mainly to the favourable economic environment. The high rate of growth of loans is probably currently resulting in a slight overvaluation of their quality, as expressed by the percentage of default loans.⁶⁵

CHART IV.3
Year-on-year credit growth by sector (%)



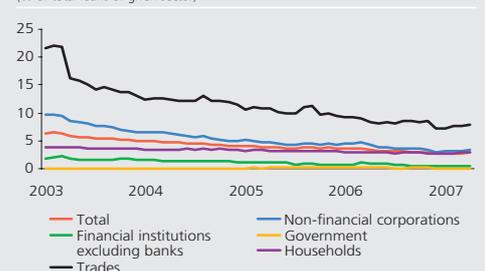
Source: CNB

CHART IV.4
Financing of loans by primary deposits (%)



Source: ECB

CHART IV.5
Default loans by economic sector (% of total loans of given sector)



Source: CNB

⁶¹ Basel II introduces a new category of capital charges for operational risk. Despite the creation of this new category, the banks that adopted the new rules in 2007 recorded capital savings overall, owing to generally lower capital charges reflecting more accurate measurement of other risk types. The share of operational risk capital charges in total capital charges is dealt with in the article *Operational Risk and its Impacts on Financial Stability* in the thematic part of this Report.

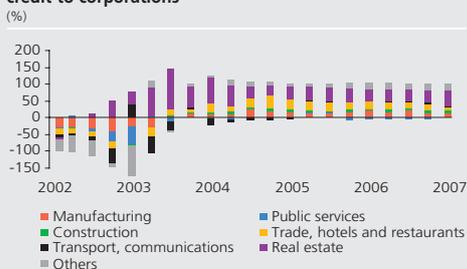
⁶² The remaining 20.5% are loans extended by banks to the government sector, non-banking financial institutions, small businesses and non-residents.

⁶³ In its dominant form, credit risk is the risk of default on a loan or part thereof, or of default on contract leading to delayed repayments. This risk is usually a subject of ratings by external institutions. This issue is dealt with in relation to financial institutions in the article *The Role of Ratings in Financial Sector Stability Assessment* in the thematic part of this Report.

⁶⁴ A default loan is defined by CNB Decree No. 123/2007 Coll., on prudential rules for banks, credit unions and investment firms, as exposure to a debtor in default. A debtor is in default at the moment when it is probable that he will not repay his obligations in a proper and timely manner, without the creditor proceeding to satisfaction of the claim from the collateral, or when at least one repayment (the amount of which is deemed by the creditor to be significant) is more than 90 days past due. The term default loan is essentially equivalent to the former term non-performing loan, which was used in last year's Report.

⁶⁵ The risk of loan default, as expressed by the default rate in the non-financial corporations sector, has been roughly the same since 2002 (see section 2.1). The default rate for total loans to households, monitored since 2007 H2, has also been almost stable (see section 2.2).

CHART IV.6
Shares of industries in total annual increase/decrease in credit to corporations



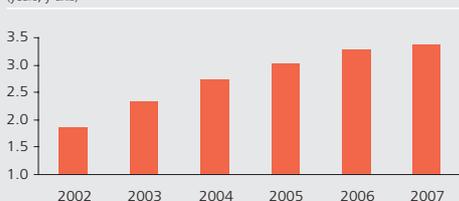
Source: CNB

CHART IV.7
Default loans by industry



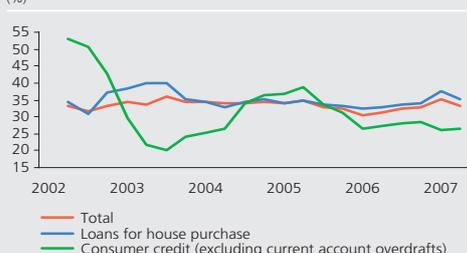
Source: CNB

CHART IV.8
Average age of a mortgage loan



Source: CNB

CHART IV.9
Year-on-year growth in credit to households by purpose



Source: CNB

Loans to non-financial corporations

Demand for products and services of non-financial corporations increases when times are good. Such corporations need considerable external sources of financing. The volumes of bank loans to corporations have been growing since 2004 and amounted to CZK 744 billion at the end of 2007. Manufacturing was the most important debtor in terms of sectors (26%), followed closely by real estate companies (25%).

The rate of growth of bank loans to non-financial corporations decreased slightly in 2007, by 3.7 percentage points to 17%. Based on the developments in the first few months of 2008, it cannot be ruled out that the slowdown will continue. The biggest contributor to the growth in 2007 was the real estate sector with 46% (see Chart IV.6), followed by manufacturing. Loans provided to real estate companies have been growing faster and faster since 2003 H2 and showed record growth of 50% in 2007. Such high growth is consistent with the large increase in demand for new housing construction, which is being supported by a wide supply of bank loans. Given the enormous indebtedness of property developers, this sector and the property market were included in the "property market crisis" scenario of the stress testing of the Czech banking sector (see section 4.2). The results of the test show that the banking sector is sufficiently resilient to the risks associated with potential negative developments in developers' business activities and on the property market.

The favourable economic environment is having a positive effect not only on credit growth, but also on the ability of the corporate sector to repay its obligations. The quality of loans to corporations as a whole, as expressed by the ratio of default loans to total loans, is steadily improving. This ratio declined by 0.5 percentage point last year, to 3.1% in December (see Chart IV.7). Industries with the largest debts, i.e. manufacturing and real estate companies, recorded ratios of default loans to total loans of 4.2% and 1.3% respectively at the end of 2007. In both cases, the ratio of default loans to total loans declined year on year, largely due to large volumes of new loans. The effect of the current strong growth in loans is that the existing loans are relatively "young". If the rate of growth declined as a result of an overall slowdown in the economy or saturation of the given market (a decline in demand for residential and commercial property), the average "age" of the loans would gradually lengthen and the likelihood of repayment difficulties would increase. The average "age" of a mortgage loan is about 3.5 years (see Chart IV.8). This will lengthen if the slowdown in the provision of new loans of this kind observed in 2008 Q1 continues. Mortgage loans are now granted with a maturity of about 20 years on average.

Loans to households

Loans to households grew by 35.1% in 2007, reaching CZK 669 billion at the end of the year. After having slowed slightly in 2006, their rate of growth picked up again, by 4.7 percentage point year on year (see Chart IV.9). In 2007, the growth in total loans was driven mainly by house purchase loans, which accounted for 76.4% of total loans to households and increased by 37.6% in 2007, i.e. 5 percentage points faster than in 2006. By contrast, the rate of growth of consumer credit (26.1%) recorded a slight decline and ultimately led to a decline in the share of consumer credit in the structure of loans by purpose to 18.8%.⁶⁶

⁶⁶ The CNB's internal estimates based on economic models indicate that the current increase in consumer credit is relatively sound, i.e. driven by fundamentals. According to the model, a decline in the rate of growth of bank consumer credit to just above 20% can be expected in 2008.

New loans in 2008 Q1 signal the possible start of a slowdown in new borrowing by households. While loans to households recorded an increase of 24% in the first two months of 2007 compared to the same period a year earlier, the rise in new loans to households was "just" 13% in January and February 2008 compared to early 2007. The volumes of new loans for house purchase rose by 16.3% in the same period (compared to 31.5% a year earlier). New consumer credit even recorded a slight decline in January and February 2008 compared to 2007.

In 2007, the rising indebtedness of households in the Czech Republic was fostered mainly by growing income, ever expanding supply from banks and developers, and the persisting low interest rate environment. Factors common to the new EU Member States include a low initial level of household debt, a preference for owner-occupied housing and a visible change in households' behaviour with regard to consumer credit, as they are ceasing to be afraid of financing their short-term needs with credit if they are short of money. The rate of growth remained higher in the new Member States than in the old Member States in 2007 (see Chart IV.10).

The ratio of default loans to total loans recorded an annual decline of 0.1 percentage point to 2.7% at the end of 2007. The quality of loans to households was affected by the large volume of new loans and the dominant share of less risky house purchase loans. Loans for house purchase are the highest-quality component of the credit portfolio, as expressed by both the ratio of loans in default to total loans and by the default rate (see section 3.2).

Loans for house purchase ended 2007 with a 1.5% share in default loans (see Chart IV.11), which is comparable with the end of the previous year. Mortgage loans (loans fully secured by property) account for about 65% of loans for house purchase. The loan-to-value indicator reached 56% for mortgage loans to households at the end of 2007 (compared to 53% at the end of 2006). Lower-volume loans usually take the form of building society loans not secured by property and special-purpose consumer credit. For several years, the share of default loans has been about 1 percentage point lower for mortgage loans than for unsecured loans. It stood at 1.2% at the end of 2007.

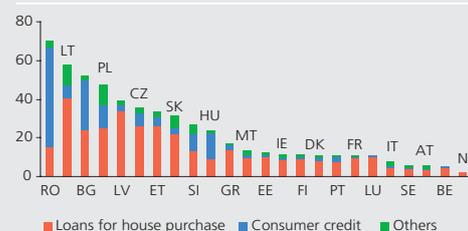
The share of default loans in total consumer credit was 6.6% at the end of 2007, down by 0.7 percentage point year on year. The ratio of credit card credit to consumer credit increased slightly to 8.7% year on year. Its quality is still higher than that of total consumer credit (see Chart IV.12).

The rate fixation period is a potential risk for both banks and debtors. Variable and short-term fixed rates responding flexibly to changes in market conditions are advantageous for clients at a time of declining interest rates. At a time of an unexpected increase in interest rates they generate greater income for banks, while implying an increased burden for clients, which might, in the extreme case, result in default. The moment of change in the rate is usually associated with the option of early repayment, which poses a risk for the bank. If the client refinances the loan after a short period of time at a rival bank, the transaction may, in some cases, become unprofitable for the original bank due to considerable initial costs. The structure of new consumer credit by initial rate fixation period (see Table IV.1) is consistent with the structure by maturity. But the situation is different with loans for house purchase, as the client may usually choose a short initial rate fixation period even for a long-term loan. At the turn of the year, uncertainty regarding the future evolution of interest rates caused new clients to start more strongly preferring a long rate fixation period for mortgage loans. Building societies, whose loan rates are fixed for the entire repayment period, are more active on the long-term loan market.

CHART IV.10

Contributions to annual rate of growth of credit to households in EU Member States

(%; 2007)

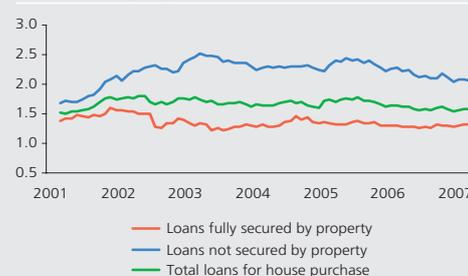


Source: ECB

CHART IV.11

Default loans to households for house purchase

(% of total loans of given type)

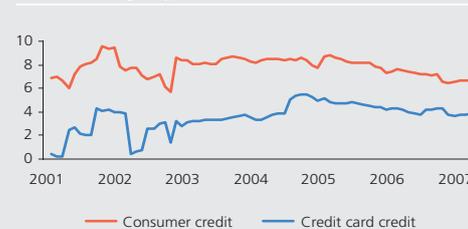


Source: CNB

CHART IV.12

Default consumer credit to households

(% of total loans of given type)



Source: CNB

TABLE IV.1

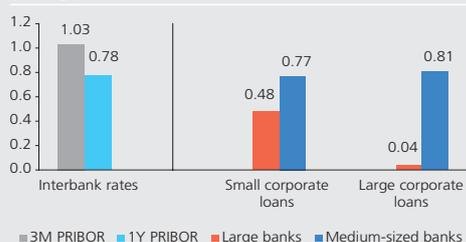
Rate fixation structure of new koruna credit to households

(%)

| | Total | < 1 year | 1-5 years | > 5 years | 5-10 years | > 10 years |
|--------------------------|-------|----------|-----------|-----------|------------|------------|
| Consumer credit | | | | | | |
| 2006 | 100 | 32.3 | 27.2 | 40.5 | n.a. | n.a. |
| 2007 | 100 | 29.9 | 25.9 | 44.1 | n.a. | n.a. |
| Jan-Feb 2008 | 100 | 40.2 | 26.6 | 33.2 | n.a. | n.a. |
| Loans for house purchase | | | | | | |
| 2006 | 100 | 38.7 | 29.1 | n.a. | 7.8 | 24.4 |
| 2007 | 100 | 33.2 | 34.3 | n.a. | 6.6 | 25.9 |
| Jan-Feb 2008 | 100 | 20.6 | 38.1 | n.a. | 7.7 | 33.6 |

Source: CNB

CHART IV.13
Change in interest rates on new corporate loans to households versus change in interbank rates (percentage points)



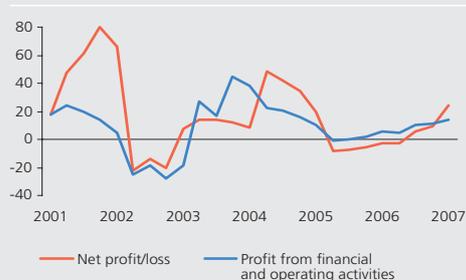
Source: CNB
Note: Change between June 2007 and January 2008; corporate loans with floating rates or fixations of less than one year, covering around 90% of all new corporate loans.

CHART IV.14
Change in interest rates on new house purchase loans to households versus change in interbank rates (percentage points)



Source: CNB
Note: Change between June 2007 and January 2008; the given fixations cover around 95% of all loans for house purchase.

CHART IV.15
Year-on-year growth in profit from financial and operating activities and net profit (%)



Source: CNB

The global crisis on financial markets could lead to Czech banks tightening their credit conditions above the yield curve, mainly because of uniform risk management in the multinational banking groups to which Czech banks belong. An analysis of interest rates on new koruna loans showed that the interest rate conditions had tightened only slightly for the corporate sector. This tightening was smaller than the increase in the corresponding yield curve rates. While three-month interbank PRIBOR rates rose by 103 basis points between June 2004 and January 2008, average rates on new corporate loans with floating rates or fixations of less than one year increased only by around 50 basis points. However, some riskier segments (small businesses and consumer credit to households) and also loans for house purchase saw some tightening above the yield curve. Yield curve rates with maturities of over one year rose by about 40 basis points (rising more at the short end), while rates on new loans for house purchase with fixations of between one and five years increased by almost 100 basis points. At the same time, market contacts confirm that a number of segments recorded some tightening of non-interest lending conditions (required collateral, etc.).

New koruna deposits have also shown a gradual increase in rates in recent months. Average new client deposits were remunerated at 1.12% at the end of 2006, 1.42% at the end of 2007 and 1.54% at the end of 2008 Q1. Growth is also noticeable for the generally higher rates on new time deposits. Such rates rose from 2.05% at the end of 2006 to 2.57% a year later. They have continued increasing in 2008, reaching 2.63% at the end of March.

Although the Czech banking sector is dominated by foreign banks, such banks differ in how they raise funds for credit expansion. While the three largest banks and the building societies sector draw on wide deposit bases, medium-sized and smaller banks can rely more on financing from foreign parent banks or the interbank market. An analysis of the tightening interest conditions on corporate loans by bank type reveals that large banks can profit from their relative financial independence of funding from foreign owners and thus increase interest rates less than medium-sized and smaller banks (see Chart IV.13). A similar conclusion applies to loans for house purchase, with the exception of fixations of up to one year (see Chart IV.14). As regards the volume of new loans, an analysis of the data indicates that the share of medium-sized and small banks in total new loans declined slightly in all segments.

Profit and capital

The banking sector generated a record net profit of CZK 47.1 billion in 2007, up by 24% on 2006, which was also a successful year (see Chart IV.15). The main source of profit for most banks was growing income from financial activities. This was in line with the high return on equity (24.5%) and return on assets (1.3%) achieved in 2007.

The growth in profit from financial activities was driven primarily by interest profit, with annual growth of 19% and an almost 64% share of the total profit from financial activities. The ratio of interest profit to non-interest profit has long been around 3:2 in the Czech Republic. The most important share of interest income comes from client loans. In some EU countries, especially the original members, the share of non-interest profit has risen gradually in recent years. In some countries, this component has now exceeded interest profit, which is being depressed by low rates and strong competition.⁶⁷

⁶⁷ In 2006, the share of non-interest profit exceeded 50% in Belgium, France, Germany and Luxembourg, i.e. countries with large banking sectors that significantly affect EU-wide aggregates due to their high weight in the total. These issues and international comparisons in other areas are addressed in more detail in Davidová, P., Komárková, E.: *Český bankovní sektor vs. evropské banky* (The Czech Banking Sector versus European Banks), Bankovníctví 2/2008.

Given the current slowdown in bank lending, interest profit growth can be expected to moderate and its share to decline gradually in the Czech Republic as well. Banks now operate in a competitive environment (especially as regards loans to households) that does not allow them to set their interest rates and fees above a reasonable level.

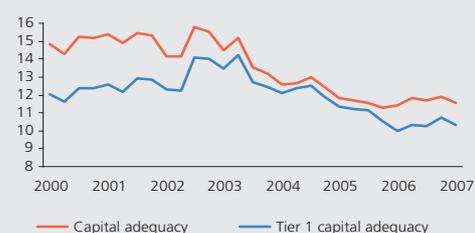
Profit generation is one of the most significant factors strengthening a bank's capital and hence also the financial stability of individual institutions and the sector as a whole. The gradual decline in capital adequacy indicators, which can be observed since 2003 (see Chart IV.16), is due to a combination of rising capital requirements as a result of an expansion in lending and the start of a period of massive dividend payments. At the end of 2007, capital adequacy and Tier 1 capital adequacy reached 11.5% and 10.3% respectively. Both indicators suggest a sufficient level of capital. The slight increase in both indicators in 2007 was related mainly to high net profit generation and a year-on-year fall in dividends paid of 55%. Capital adequacy growth was also aided by the gradual transition of Czech banks to the Basel II framework, which, thanks to more accurate risk assessment, allows the banks that have been governed by its rules since 1 July 2007 to set lower capital charges.

In the set of banks that switched to Basel II in 2007 H2 and were also required to report reference values under Basel I (a total of five banks using the IRB approach to credit risk and having a share in the sector's assets of 48%), the capital charge decreased by 13%–22% in individual months due to the new rules (see Table IV.2). All the banks recorded a decline. The Basel II rules are also more sensitive to the possibility of adding/deducting individual items to/from regulatory capital. Four out of the five banks had to deduct missing provisions from capital as a result of insufficient creation of provisions, which fell short of the expected loss. Capital fell by 4%–5% in the group of monitored banks in individual months by comparison with the Basel I rules. As this decline was smaller than the fall in the capital charge, the resulting capital adequacy ratio under the applicable Basel II Decree was higher than the Basel I reference value. The bands of the capital adequacy ratios for the individual banks calculated under the two approaches partly overlap (see Chart IV.17).

The expected decline in the capital charge and capital cushion materialised in all five banks. In the coming period it will be necessary to assess regularly whether models and processes are set correctly in all banks and whether the capital savings achieved thanks to the new framework correspond to the risk profiles of the individual banks.

The probability of default (PD) and loss given default (LGD) are important indicators under Basel II. Based on data from the five Czech banks that introduced the Basel II IRB approach in mid-2007, the average LGD was around 42%. This parameter was the same for exposures to both the corporate sector and the household sector. If this value and the average default rate based on aggregated data from credit registers⁶⁸ were applied to exposures to households and corporations for the whole banking sector in 2007, the aggregate capital charge for the whole banking sector under the Basel II IRB approach could be calculated. The baseline scenario based on the CNB's official macroeconomic forecast (see sections 2.1 and 4.2) implies a slight rise in the default rate for both corporations and households.⁶⁹ In line with the IBR

CHART IV.16
Capital adequacy (%)



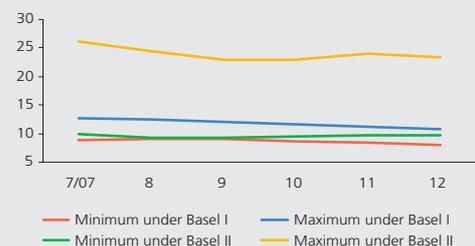
Source: CNB

TABLE IV.2
Selected indicators under Basel I and Basel II
(CZK billions; %, banks required to report under both frameworks)

| | 7/07 | 8/07 | 9/07 | 10/07 | 11/07 | 12/07 |
|------------------|-------|-------|-------|-------|-------|-------|
| Basel I | | | | | | |
| Capital | 105.0 | 104.7 | 104.8 | 104.8 | 95.2 | 100.8 |
| Capital charge | 80.1 | 78.9 | 80.6 | 82.7 | 84.1 | 87.1 |
| Capital adequacy | 10.5 | 10.6 | 10.4 | 10.1 | 9.1 | 9.3 |
| Basel II | | | | | | |
| Capital | 99.2 | 98.3 | 98.7 | 100.3 | 91.4 | 96.5 |
| Capital charge | 68.7 | 68.3 | 69.1 | 69.7 | 67.4 | 68.2 |
| Capital adequacy | 11.6 | 11.5 | 11.4 | 11.5 | 10.9 | 11.3 |

Source: CNB

CHART IV.17
Capital adequacy ratios under applicable Basel II framework and reference Basel I framework
(%, banks required to report under both frameworks)



Source: CNB

⁶⁸ The historical 12-month default rate of non-financial corporations was calculated using aggregate data from the Central Credit Register, which is administered by the CNB and covers the whole banking sector. For the household sector, the default rate was estimated using data from the Banking Client Information Register operated by the Czech Banking Credit Bureau, which contains data for most banks.

⁶⁹ Macroeconomic credit risk models for corporations and households predict an increase in the default rate of around 1.5 percentage points for corporations and around 0.5 percentage point for households at the end of 2008.

approach under Basel II, the regulatory capital charge should therefore increase. While the capital charge for exposures to households should rise by only 2%, the expected increase for exposures to corporations is 10%. The available evidence suggests a negative relationship between the probability of default and economic growth.⁷⁰ Thus, the capital requirement usually increases in an economic downturn, which may lead to restricted lending above all to the corporate sector, further exacerbating the decline in economic performance. However, this effect, often referred to as the pro-cyclicality of Basel II in the literature, is dampened by a sufficient capital cushion exceeding the mandatory capital charges.

The Basel II capital framework was gradually introduced in all EU countries in 2007 (and at the start of 2008). The evaluation of the impact of the new rules is being hampered by the effects of the US subprime mortgage crisis on European banks. Ultimately, the crisis led to significant losses of several large banks, resulting, among other things, in a decrease in their capital adequacy.⁷¹

Building societies

As in the case of bank loans to households, building society loans rose by roughly one-third in 2007, amounting to CZK 180 billion, or 10% of total banking sector lending. As in previous years, bridging loans were the biggest contributor to this growth. Consequently, the share of bridging loans, which are to some extent an alternative to bank mortgage loans, in total building society loans approached 80%. Deposits with building societies grew by 7% year on year to CZK 394 billion in 2007, accounting for almost 20% of total deposits in the banking sector (see Chart IV.18). The ratio of loans to deposits rose to 45% at the end of the year. Building societies currently register around 4.8 million contracts with state contributions and the market can be regarded as almost saturated. Over the entire existence of the system, new loans amounting to CZK 28 billion have been provided on average each year. New standard building society loans have so far been fluctuating around several billion koruna a year.

The smooth development of the building savings system depends largely on the parameters of state support, which amounted to roughly CZK 15 billion in 2007. Over the entire lifetime of the building savings system, accumulated state support of CZK 122 billion, or an average of CZK 10 billion every year, has been provided (see Chart IV.19). The current level of state support in the Czech Republic is high by international standards.⁷² Moreover, the building savings legislation does not allow a significant decrease in public expenditure to be achieved in the short run in the event of a decision to change the parameters of state support. For example, a change in the size of state support would fully manifest itself at a horizon of more than six years. Under the current legislation, building societies can allow their clients to increase the target amount, thereby prolonging the original contracts and letting them draw on state support even after the expiration of the compulsory saving period. Table IV.3 shows that more than 800,000 prolonged contracts with the maximum state contribution of CZK 4,500 existed within the system at the end of the year.

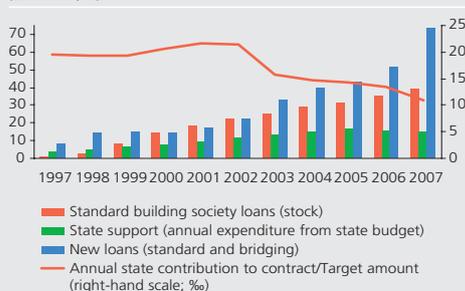
The stability of building societies under the existing system depends on the existence of a significant proportion of "friendly clients" (drawing state support

CHART IV.18
Building society loans and deposits
(CZK billions, %)



Source: CNB, MF CR

CHART IV.19
State support for building savings schemes
(CZK billions, %)



Source: CNB, MF CR
Note: State support estimated for 2007.

TABLE IV.3
Overview of building savings system

| Situation as of 31 December 2007 | No. of contracts thous. | Saved amount CZK bn | Average interest rate on deposits % p.a. | Average target amount CZK thous. |
|--|-------------------------|---------------------|--|----------------------------------|
| a) Old contracts without prolongation (until 31 Dec. 2003) | 2,629 | 239 | 2.55 | 207 |
| of which old contracts without state support entitlement | 256 | 26 | x | x |
| b) Prolonged contracts with entitlement of up to CZK 4,500 | 858 | 97 | 2.19 | 352 |
| c) New contracts (since 1 Jan. 2004) | 1,609 | 40 | 1.92 | 263 |
| with entitlement of up to CZK 3,000 | | | | |
| of which new contracts without state support entitlement | 64 | 2 | x | x |
| Contract total – with state support entitlement | 4,776 | 348 | 2.39 | 249 |
| – without state support entitlement | 922 | 28 | x | x |

Source: CNB

⁷⁰ Jakubík, P. (2007): The Macroeconomic Environment and Credit Risk. Czech Journal of Economics and Finance, 1-2/2007, pp. 60–78.

⁷¹ Financial Stability Review, ECB, June 2008.

⁷² In 2007, state support amounted to CZK 3,000 (EUR 112) in the Czech Republic, EUR 88 in Germany (consisting of a housing bonus of EUR 45 and a contribution to the employee saving scheme of EUR 43), EUR 35 at most in Austria and EUR 60 in Slovakia.

without investing in housing) and may be adversely affected by parametric changes in state support for building savings, interest rate movements and changes in other financial market segments and the state's policies towards them. Building societies face a relatively high level of interest rate risk, as they offer fixed contractual rates and have a preponderance of saving clients, or, in other words, an excess of deposits over loans. Over the course of 2007, building societies managed to reduce their interest rate risk by cutting their deposit rates well below 3% in the contract prolongation process. However, only an increase in the loan-to-deposit ratio can bring about a further decline in interest rate risk.

4.1.2 Non-banking financial institutions

Insurance companies

The most important categories on the insurance market are the traditional segments of life and non-life insurance. Life insurance includes permanent life insurance and combined term and permanent insurance (46% of life insurance premiums). Life insurance combined with an investment fund (unit-linked) is gaining popularity (34%). As regards non-life insurance, the most important categories are vehicle liability insurance (30% of non-life insurance premiums), property insurance for entrepreneurs and private individuals (22%), vehicle accident insurance for entrepreneurs and private individuals (21%) and business insurance (20%).

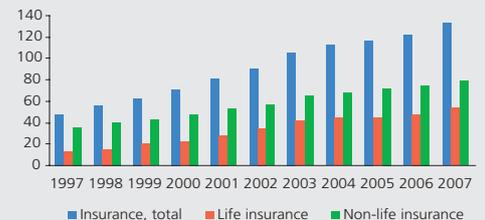
Premiums written rose by 8.9% year on year in 2007. This growth was driven by life insurance (14.6%), especially investment (unit-linked) life insurance. Premiums written in non-life insurance were up by 5.2% (see Chart IV.20).

Previous analyses and international comparisons⁷³ reveal that there is room on the Czech insurance market for further growth over the long run, especially as regards premiums written and financial placement (as a percentage of GDP) in both life and non-life insurance. The ratio of financial investment in non-life insurance to GDP increased from 2.1% to 2.6% year on year. Given the rising volatility of climate change, a gradual reassessment of non-life insurance contracts and a rise in premiums under updated insurance schemes can be expected.

Insurance companies are creating higher technical provisions for life insurance. Claim settlement costs in life insurance rose from 33% to 41% of total claim settlement costs in 2007. Within non-life insurance, vehicle liability (17%), vehicle accidents (16%) and natural disasters (14%) accounted for most of the claim settlement costs. Non-life insurance segments have faced repeated shocks and claim settlement costs, mainly in connection with damage caused by the floods in 2002 and the hurricane in 2007 (see Chart IV.21). In non-life insurance, the ratio of claim settlement costs to technical provisions was usually higher than in life insurance. Premiums written were also higher due to a shorter claim settlement cycle (see Chart IV.22). Selected non-life segments (vehicle accidents, natural disasters, damage to property) require the involvement of reinsurers. Reinsurers accounted for 15% of total claim settlement costs, of which 1% in life insurance and 25% in non-life insurance.

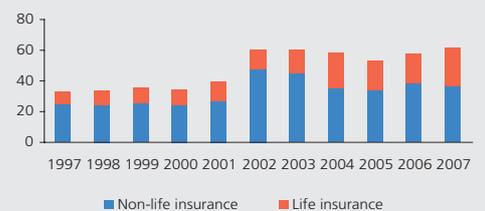
Technical provisions are a source of funds for investment in financial assets. Insurance companies invested 50% of their funds in bonds of banks and international institutions and 6% in reinsurance companies. Other investments were made in mortgage bonds and mutual fund units, property and marketable shares and bonds (see Chart IV.23).

CHART IV.20
Life and non-life insurance (premiums written)
(CZK billions)



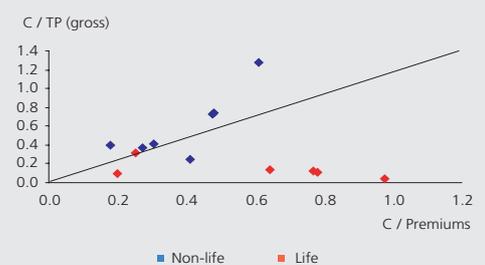
Source: CNB

CHART IV.21
Claim settlement costs
(CZK billions)



Source: CNB

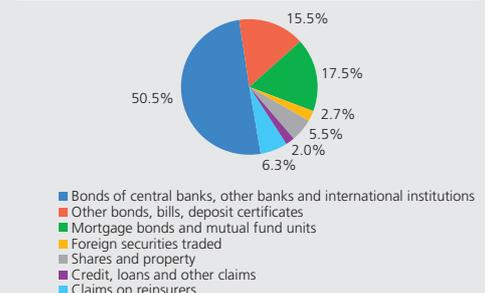
CHART IV.22
Cost ratios of main insurance segments
(coeff.)



Source: CNB

Note: Claim settlement costs (C), technical provisions (TP) and premiums written are at gross value (not adjusted for the effect of reinsurers).

CHART IV.23
Financial investment in assets
(% of financial investments)



Source: CNB

⁷³ Financial Stability Report 2006, CNB.

Insurance companies were compliant with the solvency criteria (according to audited 2006 results), as their internal funds were greater than or equal to the required solvency margin (100%). Under the existing legislation, the aggregate available margin was three times the required solvency margin on the life insurance market and 3.3 times that on the non-life insurance market.

Under the planned Solvency II framework,⁷⁴ a total of 12 domestic insurance companies underwent a solvency calculation under the quantitative impact study (QIS3). The insurance companies had to meet the capital requirements under the new rules – the solvency capital requirement (SCR) in the case of mobilisation of own funds for some of them and the minimum capital requirement (MCR). A total of ten insurance companies met the solvency criterion under the methodology used without additional capital needs. As in the case of stress testing (see section 4.2), it was found that capital requirements for market risks (especially interest rate and equity risks) were most important for life insurance, while the capital requirement for non-life insurance risk was predominant in non-life insurance.⁷⁵

Insurance company stability was fostered by return on equity, which reached 21.7% in 2007, and average return on assets, which was 3.7%. Strongly rising contract acquisition costs acted in the opposite direction. These costs could place a burden on the insurance system in the future (see Table IV.4).

Pension funds

At the end of 2007, a total of CZK 162.4 billion in contributions was registered on the accounts of private pension planholders. State contributions accounted for CZK 21.9 billion of this amount. Funds from employers totalling CZK 16.6 billion, to which the state contribution does not apply, receive preferential tax treatment. Overall, CZK 73.3 billion has been paid in benefits since 1994, of which CZK 48.8 billion as lump-sum settlement and CZK 8 billion as termination settlement. The other items paid include retirement, service, survivors' and disability pensions and other payments.

Contributions from planholders have recently been rising (by 14.2% year on year in 2007). This growth in funds has been supported by the state contribution and tax deductions and by a stronger motivation among individuals to provide for their old age. Benefits paid have also risen quite strongly in the last two years (see Chart IV.24).

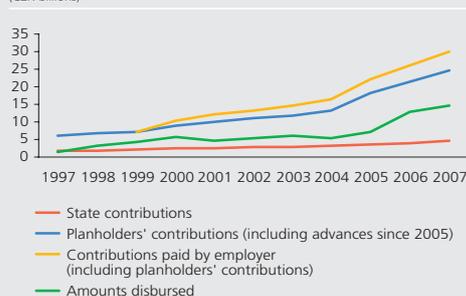
The ratio of pension insurance to GDP was 4.7% in the Czech Republic in 2007, a low figure by comparison with the data available for selected countries (see Chart IV.25). Nevertheless, the number of planholders has increased significantly to 3,936,000 since 2005 (the rates of increase were 11.3% in 2005, 10% in 2006 and 9.5% in 2007). Planholders represent more than one-third of the Czech population.

TABLE IV.4
Insurance contract costs paid to intermediaries (%)

| | 2007 | 2006 |
|---|-------|-------|
| 1. Contract costs for payment in given year | | |
| Year-on-year growth | 17.9 | 8.4 |
| Share in profit after taxation | 159.8 | 121.2 |
| 2. Contract acquisition costs as prepayments | | |
| Year-on-year growth | 43.6 | 22.9 |
| Share in profit after taxation | 43.1 | 26.9 |
| Ratio of costs (1.+2.) to annual premiums written | 19.4 | 17.2 |
| Ratio of costs (1.+2.) to total costs | 8.5 | 8.0 |
| Coverage of total costs by annual premiums (in years) | 2.3 | 2.2 |

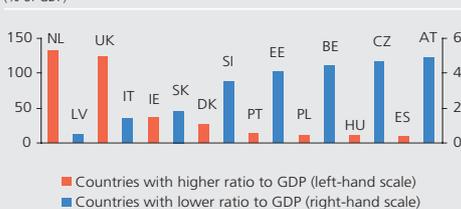
Source: CNB

CHART IV.24
Pension fund sources and amounts disbursed in given year (CZK billions)



Source: CNB

CHART IV.25
Pension planholders' funds (% of GDP)



Source: CNB, ECB
Note: Data for 2006. Selected EU countries.

⁷⁴ The new Solvency II regulatory framework in the insurance industry affects not only the technical risk for life, non-life and health insurance, but also market risks and credit and operational risk. Under a procedure organised by CEIOPS, the QIS3 results for the calibration of the standard formula for calculation of the minimum capital requirement (MCR) and the solvency capital requirement (SCR) were published in November 2007. In 2008, a QIS4 study is under way to recalibrate the capital requirements, technical provisions and other processes in solvency calculation.

⁷⁵ CEIOPS' Report on its Third Quantitative Impact Study (QIS3) for Solvency II, CEIOPS, October 2007. The results of the study for the Czech insurance market are described in Justová, I., Kotaška, M. (2007): *Vyhodnocení výsledků třetího kola kvantitativní dopadové studie (QIS3) za český pojistný trh* (Assessment of the Results of the Third Round of the Qualitative Impact Study (QIS3) for the Czech Insurance Market). *Pojistný obzor* 12/2007.

As in the insurance industry, efforts to win clients led to an increase in contract acquisition costs (including prepayments) in 2005–2007. Intermediaries also made use of the possibility of transferring money to other funds and charged higher amounts for new contracts than in the past. Planholders' contributions rose by 14% year on year, but contract intermediation costs increased by 30% in the 2007 result and another 20% in prepayments. The increase in costs may place a burden on the pension scheme industry in the future (see Table IV.5).

Under the limits set by law, pension funds should invest the funds they raise from planholders in relatively safe assets. At the end of 2007, 84.8% of assets were invested in bonds issued by general government, deposits with domestic banks and other bonds (see Chart IV.26). 10.4% of funds were invested in shares and units, which can be more volatile. Investments in shares and mutual fund units were less favourable in terms of profit generation. In 2007, funds recorded losses of 6.6% of the acquisition price from investments in shares and 12.5% from investments in mutual funds, i.e. a total of CZK 1.5 billion. The value of funds' assets was adversely affected by the appreciating koruna and rising market interest rates.⁷⁶ According to their balance sheets, annual valuation losses in the total assets of pension funds were CZK 5.6 billion. Profit of pension funds was CZK 4.4 billion. The real performance of their assets was slightly negative as a result of the valuation losses.

The existing pension funds are designed to provide a non-negative annual yield which, after coverage of fund administration costs, should ensure that the client's contribution gains in value owing to continuous efforts by the manager to raise the value of the fund's assets in real terms.⁷⁷ However, growing volatility on the asset market and in particular negative differences between the real value of assets and their acquisition price may have an adverse effect on the funds' assets in the longer run, especially if benefits rise or are paid at a faster pace (primarily lump-sum settlements). Commensurate capital increases by funds' shareholders would be desirable as protection against this risk (see Table IV.5).

Investment companies and mutual funds

In 2007, a total of 18 investment companies were operating on the capital market, three of which were controlled by resident banks. The companies maintained a high RoE of 46.5% and RoA of 25.6%. Investment companies usually administer domestic open-ended mutual funds. The accounts and transactions of these funds are separate from transactions for the company's own account.

Domestic open-ended mutual funds are a form of collective investment designed mainly for individual investors. At the end of 2007, 120 funds, with assets of CZK 191 billion, were active. Of this number, 10 funds, with assets of CZK 77 billion, were money market funds (see Chart IV.27). A total of 66 funds, with assets of CZK 146 billion, were administered through domestic subsidiary banks. Thus, banks contribute significantly to the intermediation of transactions and offer units as an alternative to bank deposits.

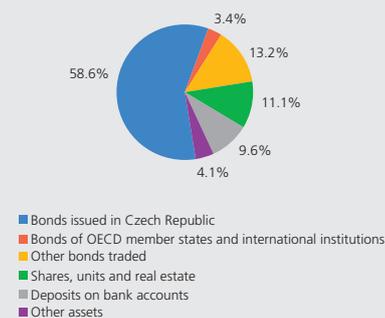
TABLE IV.5
Pension scheme contract costs paid to intermediaries and effect of asset revaluation (%)

| | 2007 | 2006 |
|--|--------|------|
| 1. Contract costs for payment in given year | | |
| Year-on-year growth | 30.2 | 20.2 |
| Share in profit from financial operations | 61.6 | 36.0 |
| Share in profit after taxation | 21.2 | 17.4 |
| 2. Contract acquisition costs as prepayments | | |
| Year-on-year growth | 20.2 | 29.5 |
| Share in profit after taxation | 78.5 | 69.6 |
| Ratio of costs (1.+2.) to annual state support | 95.8 | 88.9 |
| Valuation differences between acquisition price and fair value of assets ^{1/} | | |
| Share in pension funds' capital | -124.3 | 38.3 |
| Ratio to annual state support | -96.2 | 28.7 |

Source: CNB

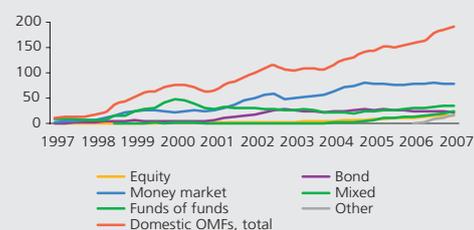
Note: ^{1/} A negative value means that the fair (market) value fell below the acquisition price of the assets.

CHART IV.26
Structure of pension fund investments (%; 2007)



Source: CNB

CHART IV.27
Assets of domestic open-ended mutual funds (CZK billions)

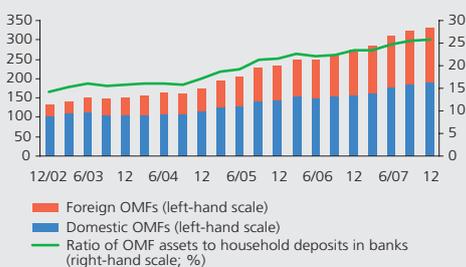


Source: CNB, AFAM CR

⁷⁶ For example, unsecured currency exposures of funds would result in valuation losses of around CZK 1.5 billion if the koruna appreciated by 10%. Further losses would be caused by a fall in market prices of bonds. If interest rates rose by 1%, the valuation losses would be CZK 2.5 billion (see also section 4.2).

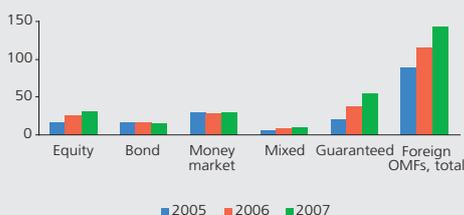
⁷⁷ In recent years the possibility of separating the accounting of planholders' assets from that of the assets of the pension fund's shareholder (manager) has been discussed. The World Bank published a study on pension funds in the Czech Republic: Pilot Diagnostic Review of Governance of the Supplementary Private Pension Fund Sector, The World Bank, January 2007. This evaluation study, prepared at the request of the Ministry of Finance, focused on principles of management in the supplementary pensions sector and should provide recommendations leading to better management and control in the sector and enhanced protection of planholders.

CHART IV.28
Assets of open-ended mutual funds
(CZK billions, %)



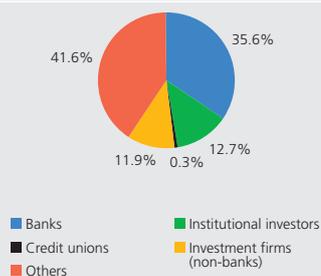
Source: CNB, AFAM CR

CHART IV.29
Assets of foreign open-ended mutual funds
(CZK billions)



Source: AFAM CR and AKAT

CHART IV.30
Structure of investment firm clients by volume of transactions arranged in 2007
(%)



Source: CNB

TABLE IV.6
Activities of leasing companies, other lending companies and factoring and forfeiting companies
(CZK billions; year-on-year change in %)

| | 2005 | 2006 | 2007 | y-o-y change 06/07 |
|---|-------|-------|-------|--------------------|
| Leasing companies | | | | |
| Loans, total | 182.6 | 190.2 | 222.1 | 16.8 |
| Loans to non-financial corporations | 126.8 | 131.2 | 143.4 | 9.4 |
| Loans to households | 53.8 | 57.3 | 76.9 | 34.4 |
| Other lending companies | | | | |
| Loans, total | 54.1 | 62.3 | 74.7 | 20.0 |
| Loans to non-financial corporations | 2.1 | 3.3 | 4.6 | 38.8 |
| Loans to households | 51.3 | 57.5 | 69.1 | 20.2 |
| Factoring and forfeiting companies | | | | |
| Loans to non-financial corporations | 14.2 | 16.9 | 20.4 | 20.6 |

Source: CNB

Foreign mutual funds offer products on the domestic market through registered investment intermediaries and investment firms (see Chart IV.28). The investment itself is carried out by investment companies (funds) registered abroad. The total invested in foreign funds in the Czech Republic in 2007 was CZK 142 billion, 90% of which was intermediated by banks (see Chart IV.29).

As regards the structure of financial investment, bond funds and money market funds lost market share. Clients showed interest in mixed funds and funds of funds. The first investments in new domestic real estate funds were also recorded. There was growing interest in guaranteed funds offered from abroad, which offer a contractual guarantee of return of principal and a minimum yield. The investments in these funds were the highest, almost twice as high as investments in foreign equity funds.

Investment firms

There were 44 investment firms active in the capital market at the end of 2007, of which 31 were non-banks.⁷⁸ Total assets of non-bank investment firms reached around CZK 25 billion in 2007, a moderate increase of 20% compared to the previous year. Loans and other receivables accounted for the largest part (80%) of their assets, owing to the nature of their business. Their profit totalled CZK 890 million at the end of the year. Non-bank investment firms generally achieved higher profitability (RoE 22.2% and RoA 3.6%). The capital ratio of non-bank investment firms was high (average more than 200%, median 25%), but the values were dispersed over a wide range (from 8% through to 5,000%). Non-bank investment firms administered client assets of CZK 393 billion in their balance sheets at the end of the year. As regards the structure of active clients, whose number exceeded 31,000 at the end of the year, other clients prevailed in both management and other relationships, accounting for 40% (see Chart IV.30). Given the nature of the business of non-bank investment firms (frequent changes in trading portfolio positions) and their predominant focus on the Czech financial market, the risk of the current crisis affecting this segment is rather low.

Non-bank financial corporations engaged in lending

There were 223 leasing companies (with assets of CZK 278 billion), 57 other lending companies (with assets totalling CZK 100 billion) and 10 factoring and forfeiting companies (with assets of CZK 24 billion) active on the non-bank credit market at the end of 2007. CZK 222 billion was lent in leasing, of which CZK 143 billion to corporations and CZK 77 billion to households (see Table IV.6). Annual growth in leasing loans (5.3%) had been low by comparison with bank loans (19.9%) in 2006, but these indicators were almost identical at 17% last year. This was probably due to expected changes in the tax reform, which is reducing the tax breaks offered on financial leasing. These tax changes seem to have led to a stocking-up effect. Although leasing loans are used mainly by non-financial corporations (65%), annual growth in such loans was higher for households (34%). Consumer credit, hire-purchase loans and credit card loans from other lending companies totalled CZK 75 billion, the overwhelming majority of which was provided to households. However, their annual growth of 20% was below that of bank consumer credit provided to households (35.1%). Total loans to non-financial

⁷⁸ Nine non-bank investment firms are members of the Prague Stock Exchange and the volume of their trading was CZK 1,456 billion in shares and CZK 2.97 billion in bonds in 2007. While their share trading increased by 20%, their trading in bonds fell by almost one-half compared to 2006. Bank and non-bank investment firms carried out transactions in the two types of instruments totalling CZK 1,998 billion.

corporations backed by receivables were CZK 20 billion in 2007. Their rate of growth picked up slightly, by 1.6 percentage point year on year.

A potential risk arising from the activities of non-bank credit institutions is the fact that they are not subject to direct supervision. Many leasing companies, however, are controlled by banks or other large financial institutions.

4.2 ASSESSMENT OF THE FINANCIAL SECTOR'S RESILIENCE

According to stress tests, the financial sector is currently resilient to market, credit and some specific risks. Only an extreme macroeconomic scenario with significant adverse impacts on interest rates, the exchange rate and GDP growth would necessitate capital injections to ensure compliance with the regulatory limits and maintain sufficient capitalisation in financial institutions. This is particularly true of pension funds, which are very sensitive to market risks according to the tests. The banking sector stability indicator confirms a continuing process of capital optimisation in the banking sector, with unchanged resilience to the main risks. Tests of banks' balance-sheet liquidity indicate that the banking sector is sufficiently resilient to an outflow of deposits and some other hypothetical changes in the financial market. However, only institutions with a strong deposit base withstand the extreme variant of pressures on balance-sheet liquidity.

This section sets out to assess the resilience of the Czech financial sector. This is done using stress tests quantifying the impacts of various shocks on financial institutions as well as some supplementary indicators. In the stress testing, we analyse in particular the effects of alternative model-consistent scenarios. Sensitivity analyses were also performed to assess some specific risks in more detail. This section also presents tests of the banking sector's balance-sheet liquidity for the first time (see Box 7).

The three alternative scenarios were introduced in sections 2 and 3 of this Report: "safe haven", "property market crisis" and "loss of confidence". All the scenarios were defined primarily by the evolution of key macroeconomic indicators such as GDP, inflation, the unemployment rate, short-term interest rates and the exchange rate. They were prepared using the CNB's official forecasting model (see Table IV.7). The other parameters entering the stress tests were derived using the values of these macroeconomic variables with the aid of sub-models and expert estimates based on historical averages or foreign experience. The key parameter for credit risk testing, i.e. the ratio of non-performing loans to total loans, was generated using a credit risk model and a credit growth model.⁷⁹ Parameters from the asset markets, i.e. stock prices, long-term yields and real estate prices, were set by expert judgement (see Tables IV.8 and IV.9).

The impacts of the individual alternative scenarios can be compared with the most probable path of the economy, as expressed in the baseline scenario. This is based on the CNB's official February 2008 macroeconomic forecast and assumes a slowdown in GDP growth in 2008, gradual appreciation of the exchange rate and a higher inflation rate, which, however, will start to decline in Q2.⁸⁰ As the baseline is not a shock scenario, the stress tests in this case use the average predicted values of the macroeconomic variables for 2008 (see Tables IV.8 and IV.9).

TABLE IV.7
Calibration of baseline and alternative scenarios
(2008 averages)

| | Baseline | Scenario A | Scenario B | Scenario C |
|---------------------------------|----------|------------|------------|------------|
| Real GDP growth (%; y-o-y) | 4.1 | 2.4 | 0.3 | 2.8 |
| Inflation rate – CPI (%; y-o-y) | 6.2 | 7.0 | 5.3 | 8.0 |
| Unemployment rate (%) | 6.0 | 6.3 | 6.7 | 6.3 |
| 1Y PRIBOR (%) | 3.8 | 2.8 | 1.5 | 8.7 |
| CZK/EUR exchange rate | ... 1/ | 25.6 | 27.0 | 30.5 |

Source: CNB

Note: 1/ In 2008, the baseline expects a correction of the record values initially and then a slight appreciation

TABLE IV.8
Scenario type and shock size in bank stress test

| Scenario type | Baseline | Scenario A | Scenario B | Scenario C |
|--|-----------|------------|------------|------------|
| Change in CZK interest rates | -0.2 p.p. | 0.1 p.p. | -0.9 p.p. | 4.4 p.p. |
| Change in EUR interest rates | -0.8 p.p. | -1.4 p.p. | -0.4 p.p. | -0.4 p.p. |
| Change in CZK/EUR exchange rate (- appreciation) | - | -6.7% | -0.4% | 20.1% |
| Loan default rate | 4.2% | 5.2% | 6.9% | 4.9% |
| Total credit growth | 16.4% | 9.9% | 14.6% | 4.9% |
| Interbank contagion risk | x | x | x | x |
| * Change in property prices (+ rise, - fall)* | 15% | 0% | -30% | -5% |

Note: Changes in parameters represent the difference between 2007 Q4 and 2008 Q1, or, in the case of the baseline, between 2007 Q4 and the average for 2008.

TABLE IV.9
Scenario type and shock size in insurance company and pension fund stress test

| | Baseline | Scenario A | Scenario B | Scenario C |
|--|-----------|------------|------------|------------|
| Change in CZK interest rates | -0.2 p.p. | 0.1 p.p. | -0.9 p.p. | 4.4 p.p. |
| Change in EUR interest rates | -0.8 p.p. | -1.4 p.p. | -0.4 p.p. | -0.4 p.p. |
| Change in CZK/EUR exchange rate (- appreciation) | - | -6.7% | -0.4% | 20.1% |
| Increase in default loans (reclassification) | 4.2% | 5.2% | 6.9% | 4.9% |
| Change in share value | 0% | -15% | -15% | -15% |
| Change in property prices (+ rise, - fall)* | 15% | 0% | -30% | -5% |
| Increase in I(1) (risk of epidemics) | 3% | 3% | 3% | 3% |
| Increase in NI(1) (risk of climate change) | 50% | 50% | 50% | 50% |

Note: 1/ Insurance company test only.

Note: Changes in parameters represent the difference between 2007 Q4 and 2008 Q1, or, in the case of the baseline, between 2007 Q4 and the average for 2008.

⁷⁹ Both models are described in detail in the thematic article *Credit Risk and Stress Testing of the Banking Sector in the Czech Republic* in the 2006 Financial Stability Report.

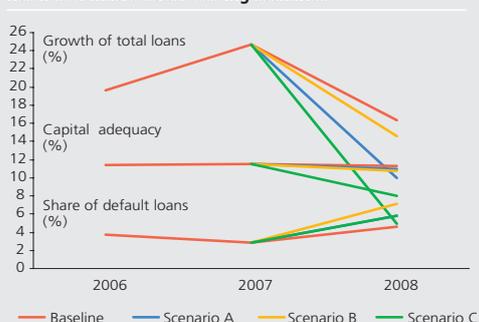
⁸⁰ The baseline scenario is described in detail in the CNB's Inflation Report, I/2008, February 2008.

The overall effects of the shocks – also referred to as losses – are expressed in both absolute and relative terms (relative to capital or past profits).⁸¹ It is also assumed that the individual financial institutions generate profits at the level of the average of the last few years, which could be used to cover the losses resulting from the shocks.⁸² The allocation of profit to cover losses would continue until the original capital adequacy ratio was reached again, provided that the volume of profit allows this.

The methodology and results of the stress tests for banks were described in the previous Financial Stability Reports. Compared to last year, the calculation of interest rate risk by currency was refined (detailed calculation for the bond portfolio in koruna and in foreign currency) and the effect of a decline in real estate prices was included for the first time.

The CNB first published the methodology and results of stress tests for insurance companies and pension funds in its 2006 Financial Stability Report.⁸³ The insurance company stress tests apply the currently valid solvency calculation and capital adequacy conversion to allow comparison of the results with banks. The capital requirements relate to equity capital and are calculated separately for life and non-life insurance. Stress testing of insurance companies captures the same market risks⁸⁴ and credit risk (or risk of counterparty default) resulting from the individual scenarios as in the case of the banking sector. Moreover, the test for insurance companies includes shocks specific to the insurance sector. In the case of non-life insurance the shock concerns climate change and the property consequences of natural disasters (the risk of catastrophic events). The hypothetical shock to life insurance is associated with the risk of occurrence and consequences of epidemics. The life insurance shock was defined as an increase in premium reserves, premiums written or gross technical provisions depending on the category of life insurance. These items were in all cases increased by 3%. In non-life insurance, the shock for the scenario was set as a 50% rise in gross claim settlement costs in a reference (usually three-year) period and was derived from historical experience (the insured losses during the floods in the Czech Republic in 2002). Where current reserves or payments by reinsurance companies are not sufficient for insurance companies and the required solvency margin would fall, the uncovered part of the effect of the shock represents the capital requirement. The tests take into account the participation of reinsurers within the scope laid down for the solvency calculation.⁸⁵

CHART IV.31
Results of macro stress testing scenarios



Source: CNB

Note: Growth in total loans is defined as the average annual rate of growth. The share of default loans relates to the estimation of the loan volume at the end of 2007.

⁸¹ These are "gross" losses representing the overall impact of the shocks. The banking sector as a whole can continue to generate profit even in the event of such gross losses if it is able to generate sufficient income to cover them. The stress tests incorporate the response of financial institutions to the negative effects of the shocks. It is therefore assumed that financial institutions will use profits (or the income generating them) as a first line of defence against a drop in capital adequacy.

⁸² This is a relatively optimistic assumption, as weaker demand for financial services can be expected in addition to a decline in the value of asset holdings and higher costs due to the fall in quality of the loan portfolio in the event of adverse economic developments. This would lead to a slowdown in activity of financial institutions, affecting both interest and non-interest income.

⁸³ Central banks and authorities supervising insurance companies in numerous EU countries are currently engaged in stress testing of insurance companies. Similar tests are also part of the International Monetary Fund and World Bank's reports under the Financial Sector Assessment Program (FSAP). The International Association of Insurance Supervisors has issued recommendations for stress testing of individual insurance companies.

⁸⁴ The calculation of the effect of the exchange rate shock in the test should be viewed as approximate, since it is based on only partial information on foreign currency assets and instruments. However, relatively low foreign currency liabilities exist in the balance sheets of insurance companies.

⁸⁵ The effect of shocks on insurance companies' claim settlement costs could be fully transferred to reinsurers. In the Solvency I stress testing, the calculation of the required solvency margin includes minimum coverage by insurance companies themselves of 50% for non-life insurance and 85% for life insurance.

The pension fund tests include market risks (interest rate, equity and exchange rate risk) and counterparty default risk (credit risk) and are similar to the tests applied to insurance companies.

Interest rate risk is the most important market risk in the pension funds segment. Unlike last year, when it was based on aggregate data, the calculation of the effect of an interest rate shock is based on detailed data on the debt instrument portfolios of the individual institutions. These data (including the currency, maturity and coupon of the individual instruments) enable very precise calculation of the portfolio's value in the event of interest rate changes. Separate koruna and foreign currency portfolios were used to analyse the impacts of the alternative scenarios.

Impact of alternative scenarios on the banking sector

The impact of scenario A ("safe haven") on the banking sector is relatively moderate compared to the effects of the other scenarios (see Table IV.10). The total effects of the shocks would be CZK 53 billion (roughly 24% of the banks' capital), or 112% of the average annual profit in the last five years. Under this scenario, losses in the banking sector would be driven by an increase in credit risk, especially for non-financial corporations (around 53% of the total losses). This is due to the strong koruna, which would cause problems with loan repayments in the export-oriented corporate sector. However, the decline in GDP growth would also be reflected in households' income and their ability to repay their obligations. The default rate for the overall portfolio would rise from 2.8% to 5.8%. This would be a combination of an increase from 3% to 7.9% for corporations and a rise from 2.7% to 3.1% for households. As regards market risks, certain losses would be suffered in the event of currency appreciation. Any interbank contagion would result in further – albeit limited – losses. After the allocation of disposable profit, the capital adequacy ratio would fall from 11.5% to 11%, remaining high above the regulatory minimum (see Chart IV.31).

The impact of scenario B ("property market crisis") is slightly higher than that of the previous scenario. The overall effects amount to CZK 57 billion (120% of average profit). Capital adequacy would decline from 11.5% to 10.8%, also remaining high above the regulatory minimum (see Chart IV.31). Under scenario B, the losses would again be driven mainly by credit risk vis-à-vis non-financial corporations. However, greater defaults would also be recorded in the household sector owing to the decline in property prices. The aggregate default rate would rise to roughly 7.1% in 2008.

Scenario C ("loss of confidence") would have the strongest impact on banking sector stability. This is an extreme scenario, with the total effects of the shocks reaching CZK 118 billion, or 250% of the average profit in recent years. A capital injection of CZK 38 billion would be needed to keep capital adequacy at the regulatory minimum. The losses would be driven by interest rate and credit risks. Owing to long currency exposures, the strong depreciation of the koruna would not cause losses, but the upward pressure of the weak currency on prices would lead to high interest rates and losses due mainly to a decrease in bond prices. The high interest rates and a decline in GDP would result in a rise in the default rate for corporations and households to around 5.8% in 2008.

Impact of alternative scenarios on the insurance sector

All three scenarios would cause negative effects in the insurance sector, ranging from CZK 9.8 billion (around 85% of the average profit in the last two years) under scenario A to CZK 6.1 billion (54% of profit) under scenario B and a relatively strong impact of CZK 19 billion (167% of profit) under scenario C, due to market shocks, credit risk and the specific risks tested (see Table IV.11). To balance any losses, insurance companies would use pre-tax profits (which are assumed to reach the average of the last two years in the absence of shocks) and equalisation

TABLE IV.10
Results of bank stress tests
(capital adequacy, % and p.p.)

| Scenario type | Baseline 2007 | Scenario A 2007 | Scenario B 2007 | Scenario C 2007 |
|--|------------------|--------------------|--------------------|--------------------|
| Capital adequacy (CAR) ^{1/} | 11.5 | 11.5 | 11.5 | 11.5 |
| Results for chosen scenario type | | | | |
| Overall impact of shocks (p.p. CAR) | -2.1 | -2.8 | -3.0 | -6.3 |
| Interest rate shock | 0.2 | 0.1 | 0.6 | -2.6 |
| Exchange rate shock | -0.1 | -0.2 | 0.0 | 0.5 |
| Credit shock | -2.0 | -2.4 | -3.3 | -3.6 |
| ... households | -0.5 | -0.5 | -0.5 | -0.5 |
| ... non-financial corporations | -1.0 | -1.5 | -2.0 | -0.6 |
| Interbank contagion ^{2/} | -0.2 | -0.2 | -0.2 | -0.7 |
| CAR before profit allocation | 9.4 | 8.7 | 8.5 | 5.2 |
| Profit allocation (p.p. CAR) ^{3/} | 1.8 | 2.3 | 2.2 | 2.8 |
| Post-shock CAR | 11.3 | 11.0 | 10.8 | 8.1 |
| Capital injection (% of GDP) ^{4/} | 0.0 | 0.1 | 0.1 | 1.1 |
| Share of banks with negative capital after shock ^{5/} | 0.0 | 0.0 | 0.0 | 14.9 |

Notes:

- CAR means the capital adequacy ratio defined in accordance with the relevant CNB regulations (in particular those governing the capital adequacy of banks and other prudential business rules).
- Test integrated with interbank contagion and expected level of loss given default (LGD) 100% and chosen probability of the banks' failure (default) on the basis of the CAR.
- The scenarios assume that in the absence of shocks each bank would generate profit (or loss) equal to the average for the previous five years and that it would use any profit (income) as a first line of defence against a declining CAR.
- The capital needed to ensure that each bank has a post-shock CAR of at least 8%.
- Market share of banks with negative capital after the impact of the assumed shocks (as a percentage of total assets).

TABLE IV.11
Results of insurance company stress tests
(capital adequacy, % and p.p.)

| Scenario type | Baseline 2007 | Scenario A 2007 | Scenario B 2007 | Scenario C 2007 |
|---|------------------|--------------------|--------------------|--------------------|
| CAR ^{1/} for insurers as a whole (%) | 13.3 | 13.3 | 13.3 | 13.3 |
| Overall impact of shocks from exposures (p.p.) | | | | |
| Interest rate shock | 1.2 | -3.0 | -1.7 | -6.3 |
| Exchange rate shock | 1.3 | -0.1 | 1.3 | -5.7 |
| Credit shock | -0.3 | -0.6 | 0.0 | 1.9 |
| Equity shock | -0.2 | -0.2 | -0.3 | -0.4 |
| Property price shock | 0.0 | -2.1 | -2.1 | -2.1 |
| Overall impact of shocks in insurance (p.p.) | 0.3 | 0.0 | -0.7 | -0.1 |
| Life insurance | -0.4 | -0.5 | -0.4 | -0.5 |
| Non-life insurance | -0.1 | -0.1 | -0.1 | -0.1 |
| ...motor vehicle insurance | -0.4 | -0.4 | -0.4 | -0.4 |
| ...climate change, natural disasters, property | -0.2 | -0.2 | -0.2 | -0.2 |
| CAR before allocation of profit and eq. provisions | -0.2 | -0.2 | -0.2 | -0.2 |
| Allocation of profit and equalisation provisions (p.p.) | 14.1 | 9.9 | 11.2 | 6.5 |
| Post-shock CAR (%) | 12.8 | 12.7 | 12.8 | 10.4 |
| Capital injection (% of GDP) | 0.2 | 0.2 | 0.2 | 0.3 |

Note: 1) Calculation for June 2007, derived for illustration from bank capital adequacy methodology in 2006.

TABLE IV.12
Solvency and insurance company test results
(%)

| Insurance type | | Total | Life | Non-life |
|--|-------|-------|------|----------|
| Baseline scenario | SOLVE | 315 | 301 | 327 |
| Post-test SOLVE | | 286 | 290 | 283 |
| Required/available solvency margin | | 35 | 34 | 35 |
| Scenario A | SOLVE | 315 | 301 | 327 |
| Before allocation of profit and eq. provisions | | 249 | 286 | 220 |
| Post-test SOLVE | | 284 | 288 | 280 |
| Required/available solvency margin | | 35 | 35 | 36 |
| Scenario B | SOLVE | 315 | 301 | 327 |
| Before allocation of profit and eq. provisions | | 268 | 326 | 222 |
| Post-test SOLVE | | 285 | 289 | 281 |
| Required/available solvency margin | | 35 | 35 | 36 |
| Scenario C | SOLVE | 315 | 301 | 327 |
| Before allocation of profit and eq. provisions | | 200 | 125 | 260 |
| Post-test SOLVE | | 250 | 217 | 276 |
| Required/available solvency margin | | 40 | 46 | 36 |

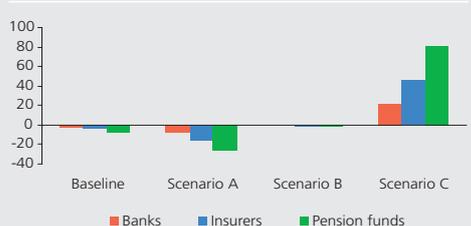
Source: CNB

TABLE IV.13
Impact of shocks in pension fund stress tests
(capital adequacy, p.p.)

| Scenario type | Baseline | Scenario A | Scenario B | Scenario C |
|---------------------------------|----------|------------|------------|------------|
| Overall impact of shocks (p.p.) | 0.5 | -5.8 | 0.5 | -16.7 |
| Interest rate shock | 1.1 | -0.2 | 4.6 | -20.3 |
| Exchange rate shock | -1.0 | -2.3 | -0.1 | 7.2 |
| Credit shock | 0.0 | 0.0 | 0.0 | 0.0 |
| Equity shock | 0.0 | -3.3 | -3.2 | -3.4 |
| Property price shock | 0.3 | 0.0 | -0.7 | -0.1 |

Note: Calculation for June 2007, derived for illustration from bank capital adequacy methodology in 2006.

CHART IV.32
Potential impact of exchange rate shock from open exposure
(% of 2007 current profit)



Source: CNB

Note: CZK appreciation (Baseline, A, B) and CZK depreciation (C); impact before potential hedging with currency instruments.

TABLE IV.14
Ratio of mortgage loan value to property (collateral) value
(LTV in %)

| Year | Weighted av. | Lower decile | Median | Upper decile |
|------|--------------|--------------|--------|--------------|
| 2005 | 43 | 17 | 49 | 81 |
| 2006 | 43 | 27 | 53 | 74 |
| 2007 | 45 | 38 | 55 | 65 |

Source: CNB

Note: Banks including building societies.

provisions (in non-life insurance), if available, to prevent a decline in solvency in life and non-life insurance below the set minimum of 100% or to prevent a decline in capital adequacy.

Insurance companies would be able to withstand the extreme stress ensuing from specific shocks (climate change, epidemics) with an impact of CZK 60 billion in settlement costs at a horizon of three or more years (even though this figure exceeds the clean-up costs of the 2002 floods by roughly one-third). This is thanks to the volume of technical provisions, the spreading of claim payments over several years, the involvement of, and payments by, reinsurance companies, and part payment of losses by policyholders. Insurance companies are capable of responding to an increasing frequency of climate change manifestations and potential rising losses and claim costs by changing their procedures, particularly in non-life insurance. Not even the extreme scenario C combined with the other shocks would cause solvency to drop below the minimum of 100%.

The stress test results indicate that the insurance company sector as a whole would be able to withstand even relatively strong shocks, taking into account current capitalisation, technical provisions and the utilisation of collateral. The worst result was recorded under scenario C, with the strong interest rate and equity shock manifesting itself most in life insurance provided by universal insurers. The extent of the impact of the combination of adverse shocks is clearly visible in the solvency ratio before allocation of profit and equalisation provisions (see Table IV.12).

Impact of alternative scenarios on the pension fund sector

The stress testing of pension funds suggests that they are highly sensitive to unfavourable economic developments and do not always have a sufficient capital cushion to cover market risks. Given the high sensitivity to interest rate risk, the largest losses would be recorded if scenario C, which assumes a surge in interest rates, were to materialise (see Table IV.13). The aggregate effect of the shocks on the funds would be very strong if this shift in the yield curve were to be accompanied by currency appreciation and a decline in the value of share holdings. The losses under scenario C would run to 175% of last year's (average) profit and would require relatively extensive capital injections.

In addition to interest rate and equity risks, pension funds are relatively sensitive to exchange rate movements. Owing to an excess of foreign currency assets over foreign currency liabilities, they are exposed to a risk from stronger appreciation of the koruna (see Chart IV.32).

Sensitivity analysis: credit risk and the role of real estate prices

From the point of view of financial institutions, residential and commercial real estate is not only an investment instrument, but also collateral, especially for loans to households and corporations. The buoyant growth in loans for house purchase and loans to developers, often secured by real estate, raises the question of what the effect on banks' credit risk would be if an increase in unpaid loans was accompanied by a decline in the prices of real estate used as collateral in the event of a mass sell-off.

The stress tests assume that new default loans have a loan-to-value (LTV) ratio of 100%.⁸⁶ This is quite a radical assumption, as the average values are about 45% for

⁸⁶ If the standardised approach is applied, only collateral fulfilling the condition of over-securing is acceptable according to the prudential rules (Basel II and a CNB decree define the relationship between the value of real estate and the exposure such that the value of real estate must significantly exceed the exposure and fully cover the principal, interest and fees). The exposure can be divided into a secured part and an unsecured part, but no specific LTV is defined for the secured part. The current rise in real estate prices in the Czech Republic, and hence the increasing collateral value, reduces the risk of banks incurring losses in the event of voluntary sales of pledged real estate by debtors.

both loans for house purchase and loans to corporations secured by real estate (see Table IV.14). Moreover, the continuing property price growth is further decreasing the LTV ratio for existing loans. On the other hand, it can be assumed that entities that obtained loans equalling the value of the collateral do not have sufficient reserves and also face higher interest rates and are more prone to default owing to the riskier nature of such loans.

A simple sensitivity analysis of loans for house purchase assumes that an increase in the share of loans in default would be accompanied by a fall in real estate prices of the same extent.⁸⁷ Problem debtors or banks themselves would sell the collateral on the real estate market, which, in the event of high volumes, would cause property prices to decline. This simple test demonstrated the banking sector's high resilience to a mortgage loan portfolio shock given the above-mentioned radical assumptions. Taking into account aggregate loan developments, the banking sector should withstand an increase in the share of default mortgage loans in total mortgage loans of up to 25% if the return on the voluntary sale of the pledged real estate was at least 75% of its value (see Chart IV.33).

In the model-consistent stress tests, a property price decline can be incorporated into the calculation of the effects on capital. In the aggregate calculation, this represents a partial indirect effect of credit risk. Scenario B – "developers in crisis" – assumed a relatively pronounced shock on real estate prices, so its effects are the strongest. Although the scenario assumed a one-off slump in prices of 30%, the impact on credit risk and capital adequacy was very low (see Chart IV.34).

Sensitivity analysis: the role of interest rate risk

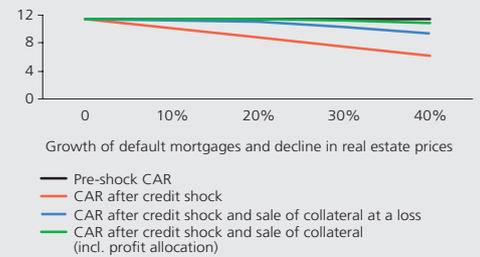
As regards scenario C ("loss of confidence"), a sensitivity analysis of the impact of a smooth increase in the interest rate on banks, insurance companies and pension funds was performed. The tests assume a shift at the long end of the yield curve of one-half, i.e. the increase in long-term interest rates (five years or more) is one-half of the increase in short-term interest rates. The sensitivity analysis showed that the capital adequacy of the banking sector would fall below the regulatory minimum if short-term interest rates rose by more than 4.4 percentage points (see Chart IV.35). By contrast, pension funds are much more sensitive. If we assume a hypothetical capital adequacy ratio of 8% for pension funds, their capital would fall to zero if interest rates picked up by around 4 percentage points and no additional capital injection was provided.

The high sensitivity of the bond portfolios of insurance companies and pension funds to interest rate changes is due to their term structure. Whereas in life insurance the investments are usually in long-term instruments, the term structure in non-life insurance is determined by the different nature of creation of insurance provisions and claim settlement. A unit shock would manifest itself chiefly in a fall in the value of medium- and long-term bonds, most of all in the life insurance portfolio and also for pension funds (see Chart IV.36).

Box 7: Stress testing of banks' balance-sheet liquidity

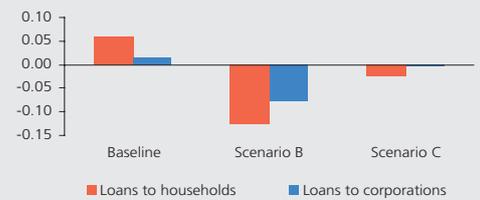
The turbulence afflicting world financial markets since the summer of 2007 underlined the key significance of balance-sheet liquidity for ensuring the

CHART IV.33
Simple test for mortgage loans (%; 2007)



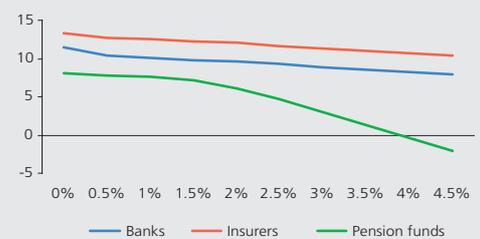
Source: CNB
Note: Scenarios of additional defaults as 10–40% of mortgage loans becoming default loans. Banks or clients would sell collateral at 90–60% value.

CHART IV.34
Impact of change in property prices on credit risk (capital adequacy; p.p.; 2007)



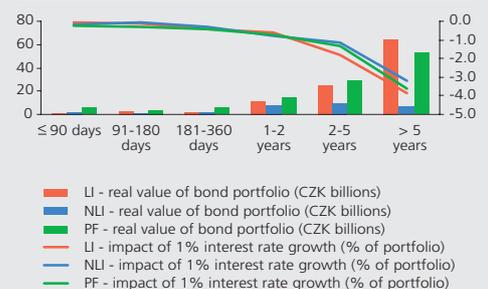
Source: CNB
Note: Scenario A does not assume any change in property prices.

CHART IV.35
Smooth change in interest rate for selected scenario (capital adequacy; %, 2007)



Source: CNB
Note: Calculation for scenario C.

CHART IV.36
Sensitivity of bond portfolio to change in interest rates (by maturity basket; CZK billions; %, 2007)



Source: CNB
Note: Impact of 1% interest rate growth derived from net bond portfolio value (right-hand scale). Residual maturity of portfolio derived from modified duration. LI - life insurance, NLI - non-life insurance, PF - pension funds.

⁸⁷ For example, a rise in the volume of default loans of 20% would result in a property price decline of 20% according to this very simplified assumption.

TABLE IV.1 (Box)

Scenario characteristics and shock sizes in stress test (%)

| Bank run | Variant | |
|--|---------|------|
| | Strong | Weak |
| Withdrawal of demand deposits per day | 5 | 2 |
| Withdrawal of time deposits per day | 1 | 0.5 |
| Liquid assets: available per day | 95 | 95 |
| Other assets: available per day | 1 | 1 |
| Fall in prices of liquid assets (govt bonds) | 0.5 | 0.5 |
| Fall in prices of other assets | 0.5 | 0.5 |

Source: CNB

TABLE IV.2 (Box)

Summary of stress test results after ten days of stress

(values express situation of average bank)

| Selected indicators | Pre-shock | | Post-shock | | | |
|-----------------------|----------------------|----------------------|----------------|--------|--------------|--------|
| | Value ^{iv)} | Rating ^{v)} | Strong variant | | Weak variant | |
| | Value | Rating | Value | Rating | Value | Rating |
| LA/A ⁱ⁾ | 24.00 | 2.44 | 12.39 | 3.15 | 22.72 | 2.39 |
| LA/FL ⁱⁱ⁾ | 26.35 | 1.85 | 13.98 | 3.08 | 25.21 | 2.22 |
| LA/DD ⁱⁱⁱ⁾ | 46.27 | 2.31 | 17.18 | 3.34 | 29.99 | 2.83 |

Source: CNB

Note:

i) liquid assets to total assets,

ii) liquid assets to total financial liabilities,

iii) liquid assets to total demand deposits,

iv) value given in %,

v) assessment of size of indicator (1 = low risk, 4 = high risk),

rating thresholds set according to international values.

CHART IV.1 (Box)

Resilience of individual banks to outflow of balance sheet liquidity

(x-axis: number of days bank could withstand outflow of balance sheet liquidity; y-axis: number of banks)



Source: CNB

efficient operation of the banking sector.⁸⁸ The drying-up of market liquidity on many financial markets caused problems with financing of the balance sheet and off-balance sheet activities of several banks. This prompted regulatory and supervisory authorities to discuss balance-sheet liquidity management policies with the supervised entities, with the aim of reducing the risk of such a situation recurring in the future. Stress tests, which to some extent can help banks to assess the potential negative impact of unlikely stress scenarios on their liquidity positions and subsequently set a protective cushion against potential liquidity risk, are one of the sub-instruments of liquidity risk management.

Simple stress testing of banks' balance-sheet liquidity is also the focus of this box. Only an illustrative stress test was applied, involving a few very simplifying assumptions (no distinction is made between the business models of the individual banks, different maturity types are used for individual assets and liabilities, the test uses only historical data and does not account for the response by the central bank and other implications for the financial markets).⁸⁹ This test serves as an introduction to the methodology of balance-sheet liquidity stress testing, which has not previously been carried out in the analyses of the Czech financial sector's stability. The test was applied separately to 37 banks active on the Czech market. It attempted to answer the question of whether each of the banks is able to withstand a marked outflow of its balance-sheet liquidity for 21 days,⁹⁰ assuming that liquidity cannot be obtained externally (from the central bank, another bank or another sector). Liquidity outflow is expressed as a loss of clients' confidence in the bank, as reflected in panic deposit withdrawals (a bank run, see Table IV.1 Box). Gap analysis, based on expected cash flows comparing the expected inflows from the liquidation of selected assets and expected outflows from deposit withdrawals, was used to quantify balance-sheet liquidity. The test examines whether the inflow of liquidity for each bank equals or exceeds its potential outflow, i.e. whether a non-negative gap is maintained.

Three basic liquidity indicators were chosen for the assessment of balance-sheet liquidity (see Table IV.2 Box).⁹¹ The starting scenario involves an outflow of each bank's liquidity, as reflected in panic deposit withdrawals current deposits. This scenario has two variants, a strong one and a weak one, consisting, respectively, in withdrawals of 5% and 2% of existing demand deposits per day and 1% and 0.5% of existing time deposits per day. The daily percentage of withdrawals was set according to past domestic and foreign experience (for example, it was 3.5% in the case of IPB shortly before the imposition of conservatorship and around 5% in the case of Northern Rock in the UK). The scenario is supplemented with other risks taking the

⁸⁸ A bank's balance-sheet liquidity expresses its ability to meet its obligations in a corresponding volume and term structure.

⁸⁹ The assessment of balance-sheet liquidity was applied only to three basic liquidity indicators and the test uses a simplified model of a bank's balance sheet. The assumptions do not include interbank contagion or lack of confidence in the banking system as a whole.

⁹⁰ The maximum time for monitoring of the effects of the stress situation on the banks was set at 10 and 21 days by expert judgement. It is usually chosen according to the type of scenario selected (e.g. a week in the case of a failure of a major payment and settlement system, two months to simulate a deep and sudden crisis, etc.).

⁹¹ Instead of the "liquid assets" indicator, "assets with a maturity of up to 7 or 30 days" were also used in the tests. As the results were similar, they are not presented in the box.

form of a decline in market liquidity and a fall in asset prices.⁹² A decrease in the value of liquid assets (government bonds) and non-liquid assets of 0.5% every day is assumed (see Table IV.1 Box).

The results of the test after ten days of stress (see Table IV.2 Box) show a considerable decline in the selected indicators for the average bank under the "strong" variant. The "weak" variant did not lead to a significant decrease in the average value of the monitored indicators. The chart (see Chart IV.1 Box) provides an answer to the question above – whether the bank is able to withstand an outflow of balance-sheet liquidity for 21 days. It shows that 18 monitored banks would be able to withstand a strong outflow of liquidity for 21 days despite the very strong assumption underlying the test. As regards the "weak" variant, only three banks would not be able to withstand the outflow of balance-sheet liquidity.

An alternative indicator of banking sector stability

The 2006 Financial Stability Report featured a thematic article introducing an alternative indicator of banking sector stability – the banking sector stability index. This index was constructed as a weighted average of sub-indicators of the financial soundness of the banking system and includes the standard areas used in many financial soundness indicators (e.g. the IMF indicators). The sub-indicators of capital adequacy, asset quality, profitability, balance-sheet liquidity, currency risk and credit risk are constructed using financial ratios and normalised so as to express the number of standard deviations from the historical average. All partial indicators were converted such that an increase means an improvement and a decrease means a deterioration.

The aggregate banking stability index continued to decline slightly in 2007 (see Chart IV.39). This was due chiefly to a continuing decline in balance-sheet liquidity and an increase in interest rate risk amid broadly unchanged profitability, capital adequacy and asset quality (see Charts IV.37 and IV.38). As in the previous year, this result can be interpreted as a consequence of credit expansion in a situation of relatively low interest rates. Credit expansion causes balance-sheet liquidity to decline and intensifies the time mismatch between assets and liabilities, thereby contributing to a rise in interest rate risk. Asset quality, measured by the share of default loans, does not deteriorate despite the credit expansion, as the rise in default loans is diluted by the growth in new loans.

Overall, the evolution of the index can be viewed as a reflection of the optimisation of capital and its return towards the historical average in a situation of a credit boom rather than as a decline in the banking sector's resilience to shocks. This is confirmed by comparison with the results of the standardised stress test (see Chart IV.39). Capital is sufficient to cover the losses given the current quality and management of assets. However, the process of optimising capital utilisation may raise certain questions regarding future developments. A cooling of the economy would lead to a rise in default loans, which would affect profitability. Capital optimisation would be replaced by a slowdown in credit growth and possibly a forced increase in capital to maintain capital adequacy, as indicated by the results of the stress tests of the alternative scenarios.

CHART IV.37

Sub-indicators of banking sector stability (standard deviations from historical average)



CHART IV.38

Sub-indicators of banking sector stability (standard deviations from historical average)

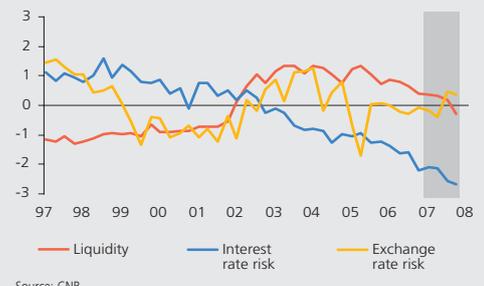


CHART IV.39

Banking sector stability index (standard deviations from historical average; capital adequacy in %)



⁹² Generally speaking, a bank attempts to balance the inflows and outflows of liquidity at different asset basket maturities, at the same time holding sufficiently liquid assets in case of an unexpected mismatch in the balance sheet. If such a mismatch occurred and the bank tried to remove it by means of a large sell-off of assets, it could result in a decline in the prices of those assets given insufficient elasticity of demand.