



**MAGYAR NEMZETI BANK**

**REPORT  
ON FINANCIAL  
STABILITY**

**APRIL 2008**



# **Report on Financial Stability**

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*Financial stability is a state in which the financial system, including key financial markets and financial institutions, is capable of withstanding economic shocks and can fulfil its key functions smoothly, i.e. intermediating financial resources, managing financial risks and processing payment transactions.*

*The Magyar Nemzeti Bank's fundamental interest and joint responsibility with other government institutions is to maintain and promote the stability of the domestic financial system. The role of the Magyar Nemzeti Bank in the maintenance of financial stability is defined by the Central Bank Act and a Memorandum of Understanding on co-operation between the Hungarian Financial Supervisory Authority, the Ministry of Finance and the Magyar Nemzeti Bank.*

*The Magyar Nemzeti Bank facilitates and strengthens financial stability using all the tools at its disposal and, should the need arise, manages the impact of shocks. As part of this activity, the Magyar Nemzeti Bank undertakes a regular and comprehensive analysis of the macroeconomic environment, the operation of the financial markets, domestic financial intermediaries and the financial infrastructure, reviewing risks which pose a threat to financial stability and identifying the components and trends which increase the vulnerability of the financial system.*

*The primary objective of the Report on Financial Stability is to inform stakeholders on the topical issues related to financial stability, and thereby raise the risk awareness of those concerned as well as maintain and strengthen confidence in the financial system. Accordingly, it is the Magyar Nemzeti Bank's intention to ensure the availability of the information needed for financial decisions, and thereby make a contribution to increasing the stability of the financial system as a whole.*

The analyses in this *Report* were prepared by the Financial Stability, Financial Analysis, Monetary strategy and Economic Analysis as well as the Payments and Securities Settlements Directorates, under the general direction of Péter TABÁK, Director. The project was managed by Márton NAGY, Deputy Head of Financial Stability. The Report was approved for publication by Júlia KIRÁLY, Deputy Governor.

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The Report incorporates the Monetary Council's valuable comments and suggestions following its meetings on 31 March and 14 April 2008. However, the *Report* reflects the views of the contributing organisational units and do not necessarily reflect those of the Monetary Council or the MNB.



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# Overall assessment

**The recent downturn in the US housing market has had adverse effects on the wider economy, due to asset securitisation and the change in global risk appetite**

Losses from defaults on US sub-prime mortgages due to the deterioration in the US housing market have had a major impact on the financial systems of developed countries in recent months. The securitisation, coupled with the sharp fall in investors' risk appetite from historically high levels, has contributed to the rapid transmission of financial contagion and the emergence of higher-than-expected credit losses. The degree to which global markets have been affected is difficult to assess, as analysts must rely on incomplete information about direct and indirect credit market exposures, as well as the scale and distribution of losses across the financial system.

**The risk premium on forint assets has risen and liquidity conditions in domestic financial system has deteriorated**

Due to the high degree of integration across markets, Hungary has also been affected by the re-pricing of risk and the decline in worldwide risk appetite. In addition, the required risk premia on forint assets has risen and the liquidity of the domestic financial system has fallen. The integration of the domestic financial markets and the banking sector drew the attention of authorities responsible for financial stability to the need to strengthen cross-boarder cooperation.

**There has been a disorder in the Hungarian government bond market**

Financial market turbulence has led to a decline in liquidity in the previously relatively unaffected government bond markets in a number of European countries. The weak outlook for the Hungarian economy and the high level of the country's external debt, combined with falling liquidity worldwide, are making domestic securities less attractive to international investors. Should the disturbance of the Hungarian government securities market become persistent, it would represent a significant risk to financial stability.

**The deterioration in banks' liquidity position underlines the need to improve risk management techniques**

Banks' liquid assets have decreased, in addition to a deterioration in funding liquidity. The maturity profile of foreign currency borrowing from abroad has shortened and borrowing costs have increased. As a consequence, competition for domestic funding may intensify. Available data suggest that large foreign banking groups active in the Hungarian market have been less affected by the disturbance in the US sub-prime mortgage market and the related market turmoil, and so they are able to provide a source of liquidity for their subsidiaries. The persistence of the crisis may, however, increase uncertainty. For this reason, domestic banks must make further improvements in liquidity management and develop appropriate contingency plans in order to avert a potential liquidity squeeze.

**The slowdown in US growth may be transmitted to Hungary through the euro area**

The permanent fall in real estate prices had a negative effect on US consumption and, as a consequence, on US economic growth. This effect may be strengthened by the significant losses incurred by some financial institutions due to the US mortgage crisis. Banks in developed countries have been tightening credit standards, which in turn may have an adverse effect on economic performance. Risks to global growth have been exacerbated by the decline in risk appetite, which may weaken economic activity through rising funding costs for banks and increasing lending rates. If the financial system suffers severe damage, the economic effects may feed through to the euro area, given the strong degree of financial integration between the US and the euro

**Hungarian economic growth may experience a prolonged slowdown due to domestic factors**

area economies. In such a situation, Hungary would not be able to remain insulated from the negative impacts of a potential global slowdown.

Fiscal adjustment has reduced sustainability risks in Hungary recently, but economic growth has slowed. Risks to financial stability could arise, if after a demand-driven decline Hungary's potential growth does not return to its previous path due to unfavourable labour market conditions, weak investment activity and falling productivity.

**Adverse economic conditions may lead to the decline in corporate borrowing in 2008...**

Domestic firms are expected to adjust rapidly to unfavourable macroeconomic environment and cost shocks. They may avoid a decline in their profit margins by reducing labour demand, and therefore a marked deterioration in credit portfolios is unlikely. As a result of adjustment, however, investment activity and borrowing to finance investment may remain weak. Banks are expected to pass on cost increases related to foreign borrowing to the corporate sector rapidly in 2008, which may also contribute to a decline in corporate borrowing. However, the substitution of foreign financing by domestic credit may continue, due to interest rates rising less strongly in Hungary than abroad. This, in turn, may mitigate the slowdown in domestic borrowing.

**...and may cause a deterioration in the household credit portfolio**

The financial position of households is unlikely to improve, as a combined effect of a slight increase in real wages and a rise in unemployment caused by corporate adjustment. Consequently, portfolio quality may continue to deteriorate. However, net lending is expected to rise further, although at a somewhat slower rate, as banks will only partially pass through higher borrowing costs from abroad to lending rates.

**Household indebtedness continues to rise**

Household sector debt continued to rise in 2007, explained in part by the convergence process and in part by consumption smoothing. The household debt service ratio may rise further in the months ahead, especially for the lowest-income households with a much higher level of indebtedness than the average. Borrowing has recently been driven by strong loan supply and a competitive environment characterised by increased risk-taking, rather than by economic fundamentals, which is another source of risk.

**Shock-absorbing capacity of the domestic banking sector is adequate, but profitability has fallen and competition dominated by risk-taking has intensified**

The shock-absorbing capacity of the domestic banking sector is adequate. However, profitability and nominal profits in the banking sector declined from a high level in 2007, and are no longer in the upper but rather in the middle range in a regional comparison. Although the subsidiaries of domestic parent banks have strong earnings potential, they may represent possible channels of contagion. Market participants are striving to prevent a further decline in profits by taking higher credit risks than earlier, which is a negative development from a financial stability perspective. Domestic banks are introducing more and more products to the retail market with higher overall risk profiles and are continuously easing the criteria for existing loan products. A typical example of this is the launch of Japanese yen-based lending, the extension of the maturity of outstanding debt and the rise in loan-to-value (LTV) ratios.

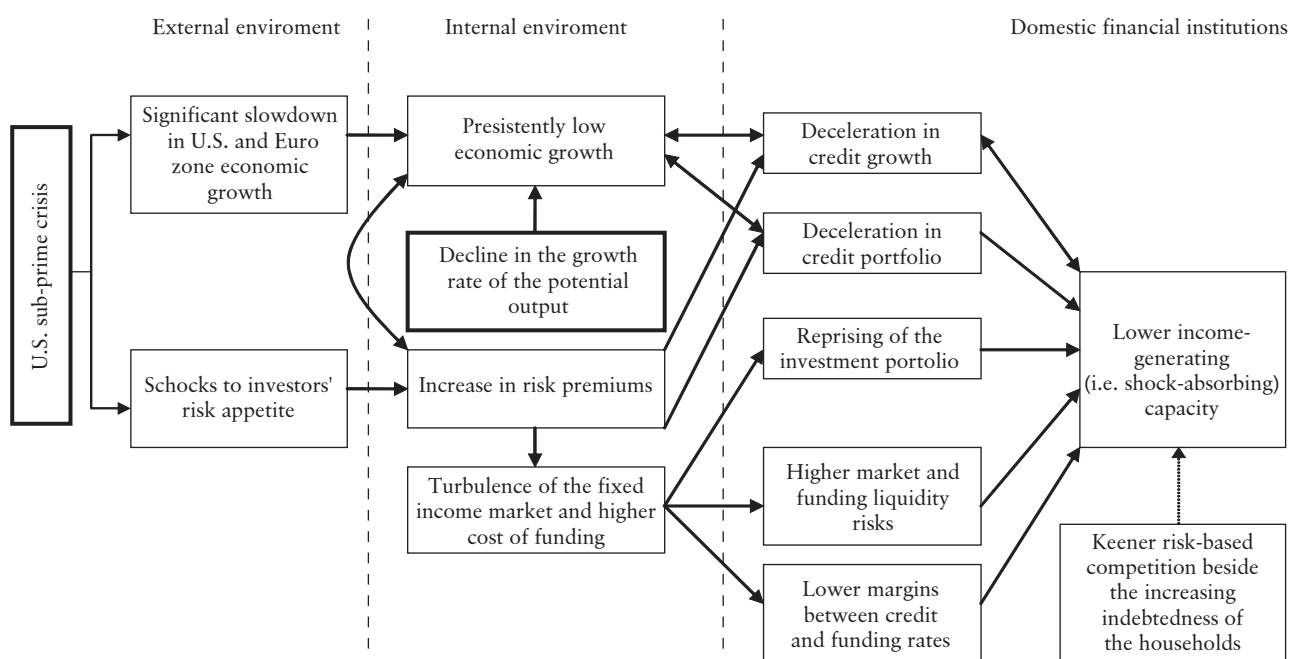
**Compliance with the joint recommendation by the MNB and the HFSA should be important for all banks**

The recommendation, issued jointly by the Magyar Nemzeti Bank and the Hungarian Financial Supervisory Authority in February 2007, has drawn market participants' attention to the prudent assessment and management of credit risk, and emphasised the need to comply with the relevant principles of consumer protection (also in the case of sales through brokers). It is vital that banks adhere to those standards, particularly in the case of Japanese yen loans or other credit facilities convertible to yen that involve higher risks than other products. Compliance with the core principles of responsible lending is in the interests of the banks as well. Although in the short term they may gain a competitive edge by offering higher-risk loans, the initial advantages may disappear over the longer term, and may entail significant costs through a loss of customer confidence.

**A full-information credit registry of household borrowers would also be necessary from a financial stability perspective**

In order to encourage responsible lending, it is essential to create a reliable credit register, where all borrowers' past behaviour could be checked finally. A wider range of information on clients' credit history could contribute to an accurate assessment of the risks facing financial institutions.

**Risk map of the Hungarian financial stability**





# **1 Macroeconomic and financial market risks**





In the *Report on Financial Stability* published in April 2007, we emphasised that financial stability had strengthened as a result of an improvement in the external equilibrium. There was a risk however from the economic slowdown due to fiscal adjustment that imposed a temporary burden on economic agents. One unfavourable development this year is that the low growth rate of the Hungarian economy may persist, due to both external and internal factors.

In the USA, the fall in housing prices is leading to a deceleration in economic growth via the decline in households' consumption expenditure, and this development may adversely affect the performance of other developed economies via the foreign trade channel. It may also add to the risk of slowdown in developed economies that the US sub-prime<sup>1</sup> mortgage crisis has caused major losses to financial institutions in the developed markets, which may entail a lower willingness to take risks, a tightening of lending conditions and thus a deceleration in lending activity. Another unfavourable condition is the decline in global risk appetite, i.e. an increase in the price of risk. This may further weaken lending activity mainly through an increase in funding costs and a rise in interest rates. As Hungary's foreign trade and financial sector are strongly integrated into the developed markets, these effects may quickly appear in the domestic economy and financial system as well.

Another external factor is the increasing vulnerability of the region. The Baltic states, and Bulgaria and Romania are characterised by risks of overheating in the economy and risks of excessive credit growth. These factors may make the region more sensitive to external shocks. Although Hungary has weak commercial and financial relationships with the Baltic states, a sudden slowdown there may affect the Hungarian economy unfavourably through an increase in risk premia. Moreover, a sharp downturn in the Bulgarian or Romanian economy may affect the Hungarian economy not just through risk premia, but also via the direct impact on the financial system.

The deceleration of potential growth can be highlighted as one of the domestic risk factors. Due to fiscal adjustment, economic growth moderated significantly, but sustainability risks declined considerably too. At the same time, there is a risk that, following the slowdown caused by weak demand, economic growth in the years ahead may not be able to return to its earlier path, as a result of unfavourable labour market conditions, subdued investment activity and declining productivity growth.

The risk scenario presented in this Report reflects the risks related to both the escalation of the US sub-prime mortgage crisis and to the lower potential growth of the Hungarian economy.

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<sup>1</sup> In case of sub-prime loans, borrowers usually have poor credit ratings, since they do not have credit histories certifying regular and timely repayments. (In the US, these are typically low-income people, elders, and new immigrants.)

# 1.1 International macroeconomic and financial market environment

*The risks stemming from the external market environment has been increasing markedly. The market turbulence originating from the US sub-prime mortgage loan market is causing massive losses in the global financial intermediary system, and is amplifying the risk of a slowdown in global economic growth through the correction of global imbalances. The increased uncertainty has been leading to a sudden rise in the price of risk and a reduction in the exposure of investors in respect of most asset classes. Meanwhile, the sustained increase in the prices of food, raw materials and energy, as well as the weakening of the price-dampening effects of globalisation results in a global inflation shock.*

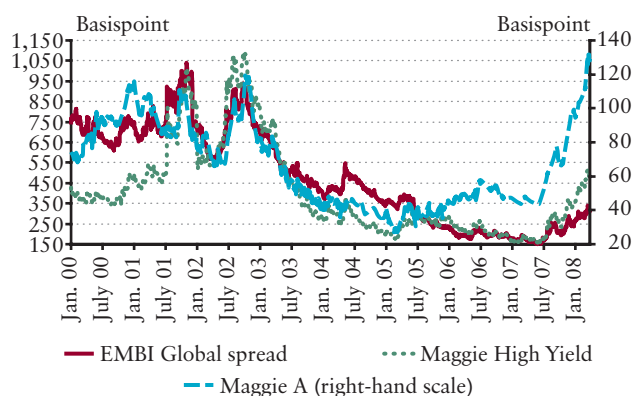
*In Hungary, the financial market turbulence has a negative effect via an increase in risk premia. This can be mainly observed in the rise in forint interest rates, the slight depreciation of the exchange rate and in the increasing cost of foreign funding. Uncertainty is sustained by the fact that a prolonged period of market turbulence may result in a further decline in risk appetite. Another unfavourable development is that due to strong financial integration financial market turbulences can significantly slow down EU growth, which may negatively affect Hungary, too.*

## 1.1.1 THE CAUSES OF THE US SUB-PRIME CRISIS

**In recent years markets have underpriced risk.** Persistently high economic growth and low inflation created favourable conditions for a global increase in investors' risk exposure, whereas the low number of market shocks changed investors' risk perception, and substantially reduced risk premia (Chart 1-1). Given low interest rates and growing prices of traditional investment instruments, investors searching for yield and using financial intermediaries ventured into new and riskier markets, and undertook higher leverage ('releverage'). Seeking new sources of income led to risk-based competition in countries with developed financial intermediary systems. The most typical example was the US mortgage loan market, where the steadily loosening of lending conditions made loans accessible by an increasing number of risky, so-called 'sub-prime', borrowers, i.e. debtors with low creditworthiness. Funding was ensured through the involvement of a wide range of new investors, and creditworthiness was based on the expected further

**Chart 1-1**

**Global risk indicators**



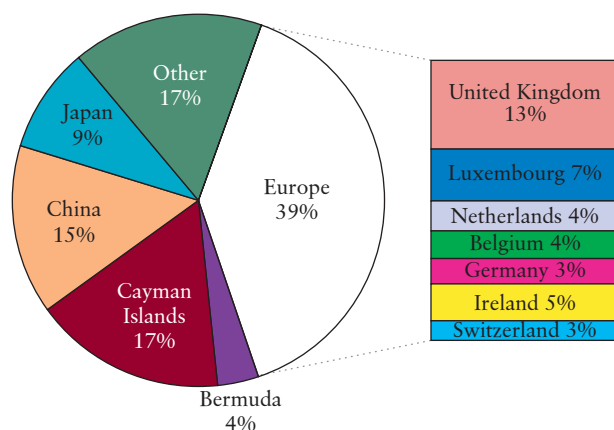
Sources: J. P. Morgan, Datastream.

increase in the price of the residential property that served as collateral.

**As a consequence of securitisation, significant financial risks were spread around the world.** The 'search for yield' strategy accelerated financial innovation, but neither risk management, nor investors' awareness was able to stay abreast of the increasingly complex products. The expansion of lending activity and the spreading of risks were strongly supported by securitisation. The so-called 'originate and distribute' model involved the issuance of structured securities of various credit ratings with packages of loans as coverage. The securities were then sold to investors all around the world (Chart 1-2). The risks spread through securitisation largely contributed to far more significant financial market turbulences than the size of the US sub-prime mortgage market would have justified. This securitisation also entailed maturity transfer: long-term assets were usually funded by short-term liabilities. Using special financial schemes, larger banks removed these assets and their funding from their balance sheets, typically undertaking leverage and providing a guarantee. Securitisation also resulted in a loss of information; final investors were often not aware of the real nature and degree of the risk of the loans underlying the products, which were repackaged several times and rated by international credit rating agencies. The separation of creditors and investors raised a conflict of interest as well, as the creditors and the intermediaries were interested in the increasing of loan volume, irrespective of the growing risks.

**Chart 1-2**

**Foreign holdings (USD 1,500 billion) of long-term U.S. asset-backed securities (ABS), by major investing countries, as of June 30, 2007**



Source: US Treasury.

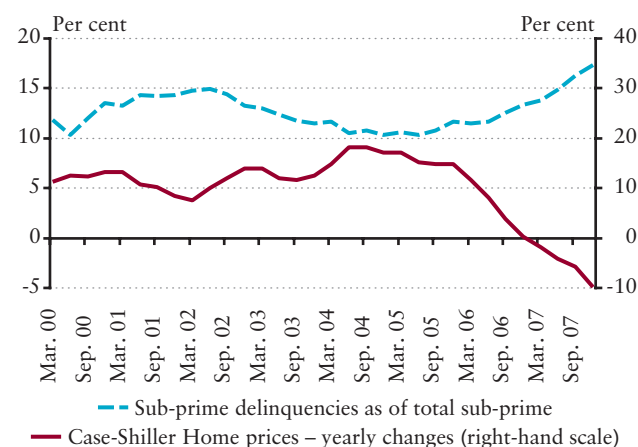
### 1.1.2 CHANNELS OF CONTAGION

**The US mortgage market problems have caused extensive financial market turbulence.** In the United States, the cycle of interest rate hikes which started in mid-2004 and the deceleration in real estate price growth resulted in a gradual increase in the sub-prime mortgage delinquencies (Chart 1-3). Markets were facing these mortgage market problems in early 2007, after the increase in real estate prices came to a halt by the end of 2006. At the end of February, a selling wave hit the markets, which proved temporary at the time. Due to the return of high risk appetite the losses related to the mortgage loan market emerged only in the case of high-risk structured products (Chart 1-4). From May 2007 onwards, however, several alarming news were published (withdrawal of capital or suspension of certain investment funds, mass downgrading of structured loan products, postponement of bond issues, bank losses). When it became clear at the end of July that the US sub-prime mortgage crisis had had a greater-than-expected impact on the banking system and on final investors, credit market turmoil spread to a wide range of money and capital markets.

**The loss of confidence led to certain market segments drying up.** Neither investors, nor regulatory authorities were able to precisely assess the magnitude and concentration of losses. Assessment of losses was complicated by the fact that the price of structured loan products was usually estimated by models, as a significant part of these unique

**Chart 1-3**

**Sub-prime delinquencies as of total sub-prime loans and home price developments in the US**

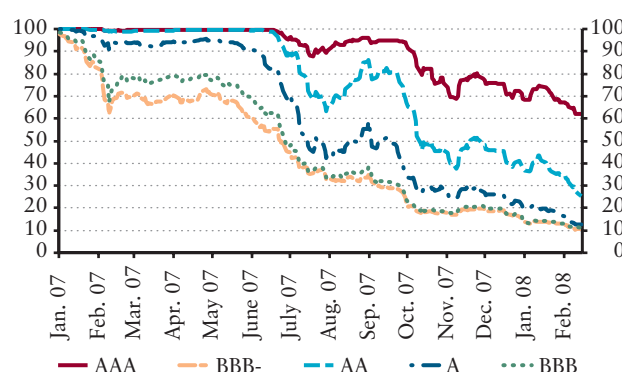


Sources: Mortgage Bankers Association, S&P.

products did not have a secondary market or historical price development. Due to the lack of calculable counterparty risk, banks were not willing to grant credit, thus euro and dollar interbank markets dried up temporarily, and investors fled to government securities. As a result, interbank and government bond yields diverged (Chart 1-7). Although the significant volume of central bank liquidity supply mitigated the tensions on the interbank markets (Box 1-1), in the market of structured products (ABS,<sup>2</sup> CDO<sup>3</sup>), and especially in the case of mortgage-backed securities, liquidity declined permanently, and certain markets dried up. Consequently,

**Chart 1-4**

**ABX-HE indices, by rating, January 19, 2007 = 100**



Note: ABX-HE indices show the value change of CDS (credit default swaps) contracts written on securities backed by U.S. sub-prime loans. The chart depicts the ABX.HE 7.1 series.

Source: Reuters.

<sup>2</sup> Asset-backed securities (ABS) are securities backed by portfolios of homogeneous debt groups (mortgage or motor vehicle loans, credit cards, student loans etc.). These securities are issued by institutions established exclusively for this purpose (SPV).

<sup>3</sup> Collateralised debt obligations (CDO) are special securities backed by bonds, loans or other assets as collateral. By purchasing the CDO, investors assume the risk of the loan or bond portfolio concerned.

investors and banks relying on the issuance of short-term securities faced financing difficulties. Moreover, the price of still available funds also soared and its maturity became shorter. This forced many investors, who tried to access

liquidity in markets not directly affected by the US sub-prime mortgage crisis ('deleverage'), to sell the existing invested assets and liquidate leveraged positions, spreading the turmoil to other markets.

### Box 1-1: Extraordinary multilateral operations by major foreign central banks to handle financial market turbulence

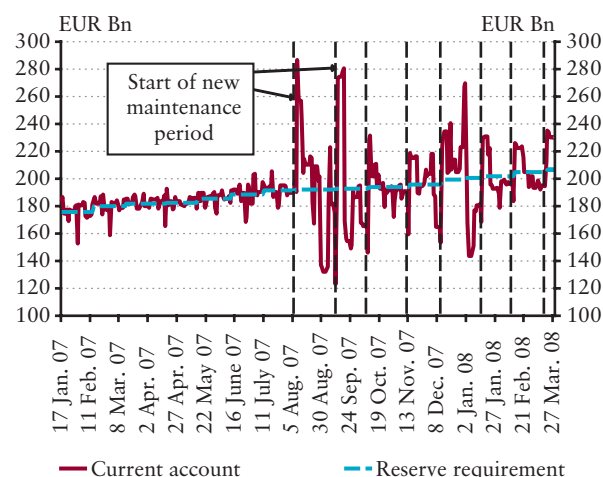
The decline in risk appetite and loss of confidence in the interbank market fuelled by the turbulence emanating from the US sub-prime mortgage loan market had a sudden and aggressive effect on financial markets. The turmoil in the interbank uncovered money market (depo market) and in securities markets triggered immediate intervention by major central banks, which used a wide range of open market monetary policy instruments to handle the market disorders. Central bank measures fall under three main categories:

#### Increase in temporary liquidity allocation

In normal periods, central banks adjust the quantity of liquidity through their open market operations (collateralised loan or repo tenders held on a daily or weekly basis) to be just sufficient for the banking system taking into account the autonomous factors (other technical factors with affecting liquidity) and assuming an even fulfilment of reserve requirements. The panic and change in banks' behaviour first observed in the beginning of August 2007 did not allow certain banks or a part of the banking system to have sufficient liquidity compared to a desired level, as they could not obtain it from the interbank market (Chart 1-5). Therefore, central banks' first reaction to the increase in interbank market yields in August was to raise the amount of liquidity provided to the market. The magnitude of the extraordinary (i.e. higher than justified by autonomous factors) temporary excess liquidity allocation varied significantly across central banks, according to the size of required reserves and the systemic structural liquidity shortage. Central banks (first the ECB, then the Fed, but finally also the Bank of England, the Bank of Japan and several other central banks) only changed the pattern of liquidity provision within the maintenance period and not its average system-level amount. They could not do the latter as even in such (turbulent) periods the longer-term system-level demand (on average in the maintenance period) for central bank money liquidity is not greater than the demand in normal periods, and it has no relation with any other demand for capital or liquidity arising in other segments of the financial sector or in the economy in general. With these measures, central banks calmed the interbank market through psychological effects on the one hand, while temporarily (for a very short time) substituting the supply side of the market with their tenders on the other hand.

Chart 1-5

#### Change in the pattern of fulfilment of required reserves in the Eurosystem



Source: ECB.

#### Extending the maturity of central bank credit operations

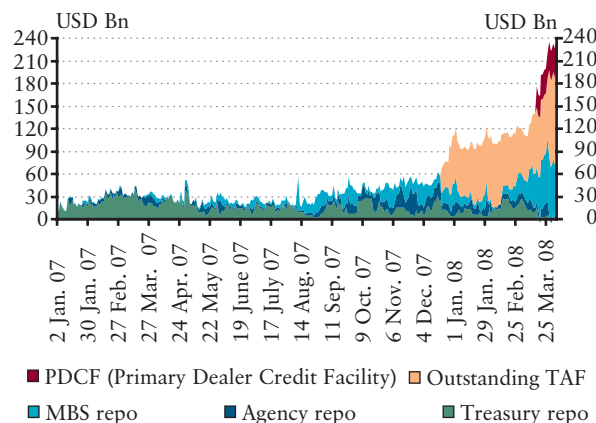
Similarly, the three leading central banks' move to extend maturities was also primarily a measure to calm markets. The ECB significantly increased the stock of its 3-month collateralised loan instrument (which it regularly uses anyway under normal circumstances), simultaneously reducing the amount of liquidity allocated through the 1-week main operation. Reacting to banks' growing concerns due to the end-of-year effect of December 2007, the Fed and the Bank of England also raised the allocation for longer maturities. The former used a completely new 1-month collateralised loan instrument ('term auction facility', TAF), whereas the latter multiplied its existing 3-month repo positions. Obviously, it is true for these central banks as well that the decline in their shorter-term credit (BoE) or the adjustment of other balance sheet items (a considerable decline in the government securities portfolio in the case of the Fed) 'provided room' for increasing longer-term temporary operations.

<sup>4</sup> For a precise understanding and deeper analysis of central banks' reactions it is important to understand the basic principles of the sets of instruments operated by central banks as well as the basic mechanisms of the market for 'liquidity' (central bank money). See Éva Fischer–Gergely Kóczán (2008): Rendkívüli hatósági intézkedések és tanulságai a jelzálogpiaci válság kapcsán (only available in Hungarian), MNB Occasional papers 72.

**Expanding the range of eligible collateral**

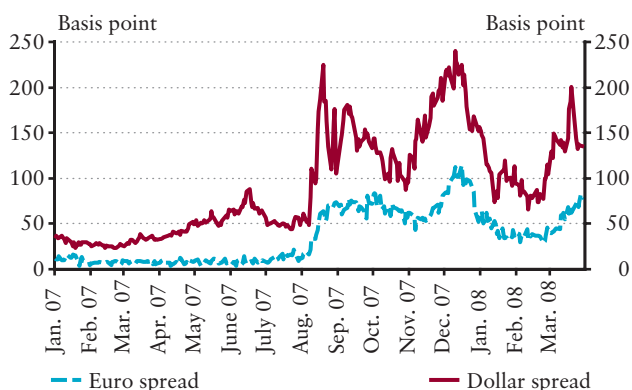
The set of measures that can be considered as the most extraordinary was the significant expansion of the range of eligible collateral (securities and other financial assets) accepted in collateralised credit operations (Chart 1-6). Practically, all Anglo-Saxon central banks were compelled to take this step to calm banks also with easier availability of liquidity because otherwise their conservative range of eligible collateral (containing practically only the best-quality government securities and assets of similar quality), would have become a bottleneck in liquidity allocation. The ECB and the Japanese central bank were not forced to take similar steps, as in their case the range of eligible collateral is very wide even in normal periods (they accept a broad range of securities from a broad range of issuers, including asset-backed securities (ABS) that are most affected in the financial turbulence and, moreover, un-securitised bank loans as well).

Beyond the direct (and sometimes only temporary) management of the turmoil in interbank markets, extraordinary central bank operations did not by themselves achieve lasting successes in preventing general financial market turbulence. It is an important dilemma whether this can be expected of central banks' monetary policy open market operations, since they were basically not designed for permanently helping a part of or the whole banking system in assuming risks or the losses stemming from them. It should also be emphasised that central bank open market operations do not and can not lead to a loosening of monetary conditions, only cuts in the policy rates can do that.

**Chart 1-6****Change in the composition of collateral behind the Fed's temporary open market operations**

Source: Fed.

The MNB's monetary policy instruments are identical with that of major central banks but the Hungarian monetary policy environment is characterised by a liquidity surplus as in all new EU Member States. It implies that the MNB would also be able to carry out any of the above mentioned operations in relation to the domestic banking sector, if it became necessary. However, it was practically not required in any of the emerging markets to apply operations similar to those in developed markets during the turbulence.

**Chart 1-7****Difference of 3-month interbank interest rates and 3 month Treasury bill yields**

Source: Reuters.

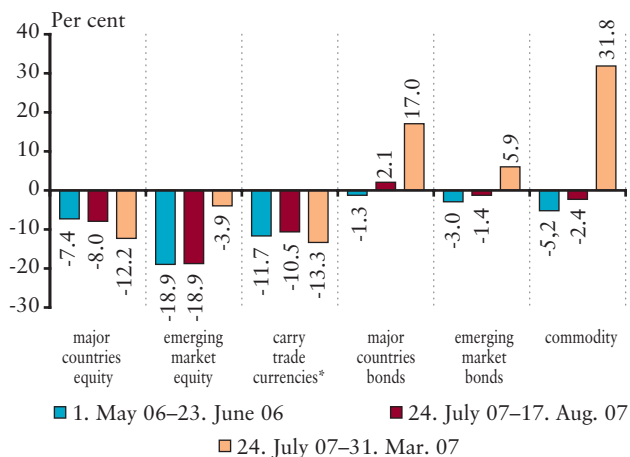
**Normalisation of the markets may be a long process.**

The first market reactions following the US sub-prime mortgage crisis were similar to a traditional risk appetite shock and price movements were similar to the selling wave

which took place in mid-2006 (Chart 1-8). While, in earlier cases, following the repricing of risks, market volatility returned to the previous levels after some months, whereas in the current crisis uncertainty has not declined even after half a year. As in the event of any market shock, investors distinguished among various instruments. In similar turbulent periods, a fall in the price of risky assets can be considered natural, but it was a new phenomenon that the performance of lower-risk assets in many cases was relatively worse than that of their riskier counterparts. This can be explained by the tighter and more expensive liquidity, because investors undertook higher leverage to buy assets with more moderate price movements, and by deleveraging the balance sheets and by fire-sales they triggered a stronger decline in prices of these assets. The significant financial losses, which affected many market participants, the drying up of market segments, the deterioration in certain financial intermediaries' liquidity and the correction of global imbalances may permanently erode investors' willingness to take risks. Therefore, the higher volatility of financial instruments may continue for a longer period of time.

Chart 1-8

## Change in the value of major asset classes (%)



Note: Based on the MSCI World and EM indices, the JPM GBI index, the JPM EMBI index, the S&P GSCI Commodity index, the JPM Maggie HY index.

\* Carry rated currencies are based on the exchange rates of the Hungarian forint, Turkish lira, South African rand, Iceland crown and New Zealand dollar.

Source: Datastream.

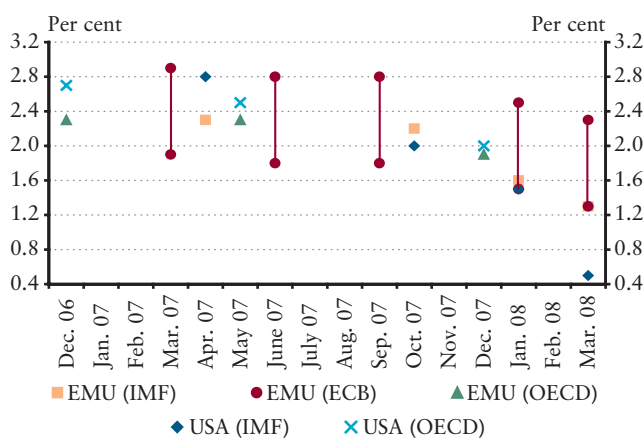
## 1.1.3 REAL ECONOMY EFFECTS

**Risks surrounding economic growth are increasing.**

The US sub-prime mortgage crisis may lead to a recession in the US economy. The fall in real estate prices, the bearish tendency in the stock markets, the deterioration in consumer confidence and the decline in employment all contribute to a deceleration of consumption. US economic policy has also reacted to the recession risks: the Fed announced aggressive interest rate cuts, while the government announced a tax refund package. As far as global economic growth is concerned, it is of key importance to what extent other regions will be able to remain independent from the slowdown in the US economy ('decoupling'). Due to the deepening of financial integration cross-through cross-border investments and ownership observed in recent years the effects of financial market turmoil may spread onto countries which are less integrated with the United States through foreign trade ('recoupling'). As a consequence of financial intermediaries' and investors' exposure, the risk of financial contagion may be particularly strong in Europe. This may be the explanation for the downward adjustments in not only US, but also European growth forecasts since the outbreak of the US sub-prime crisis by international institutions (Chart 9).

Chart 1-9

## IMF, OECD and ECB forecasts for economic growth in EMU and USA in 2008



Sources: IMF, OECD, ECB.

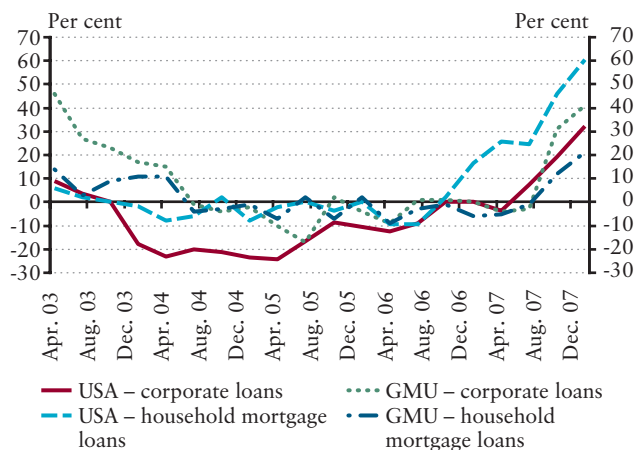
The weakening of European business activity represents a risk for the Hungarian economy.

**Tightening of lending may affect growth unfavourably.**

Due to the financial losses and increasing funding costs, banks have started to tighten their credit standards both for households and the corporate sector (Chart 1-10). Depending on competition in the market, they will probably pass on a part of or the total increase in funding costs to their

Chart 1-10

## Change in credit standards according to Senior Loan Officer Surveys by major central banks



Note: Positive values indicate a majority of tightening banks.

Source: ECB, Fed.

customers. Consequently, loans for banks' customers could become more difficult and more expensive to obtain, while the conditions for issuing securities may also become tighter for corporations<sup>5</sup>. All of this can have a negative effect on

consumption and investment activity, leading to deceleration of economic growth (the so-called 'financial accelerator' effect<sup>6</sup>). In extreme cases, the slow-down of lending may cause a recession by itself.

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<sup>5</sup> The tightening of credit standards has not yet resulted in the slowdown of Euro-zone corporate lending activity, while the growth of household borrowing has already slowed down.

<sup>6</sup> The 'financial accelerator' is a mechanism between the real economy and the financial system. According to negative 'accelerator' the economy decelerates, followed by a tightening in banks' lending conditions, thus resulting in an accelerated slowdown of the economy.

## 1.2 Regional tendencies

As a result of the US sub-prime crisis, global willingness to take risks declined markedly, and the role of fundamentals was revalued significantly compared with recent years. As money and capital markets became more sensitive, risks of contagion increased.

Central and Eastern European countries having current account deficits are more exposed to risks stemming from the decline in risk appetite, than other emerging countries that have substantial current account surplus or stable external position. Within the region, external financing requirement is mainly linked to the rapid growth of private sector indebtedness. In most countries this process can be considered as part of catching-up, although recently signs of overheating have appeared more and more clearly in the Baltic States as well as in Bulgaria and Romania. Consequently, the risk of a possible contagion induced by internal processes in these countries has also increased.

In a regional comparison, Hungary's fundamentals show a contradictory picture. The risks related to the indebtedness of the private sector are much lower than in the countries with signs of overheating, and equilibrium indicators have improved considerably in the last one and a half years as a result of fiscal adjustment. However, as a consequence of the tensions built up in the past, the external financing structure and the risks related to growth prospects, investors consider Hungary to be one of the more vulnerable countries, which is also reflected in high risk premium expected on Hungarian forint investments.

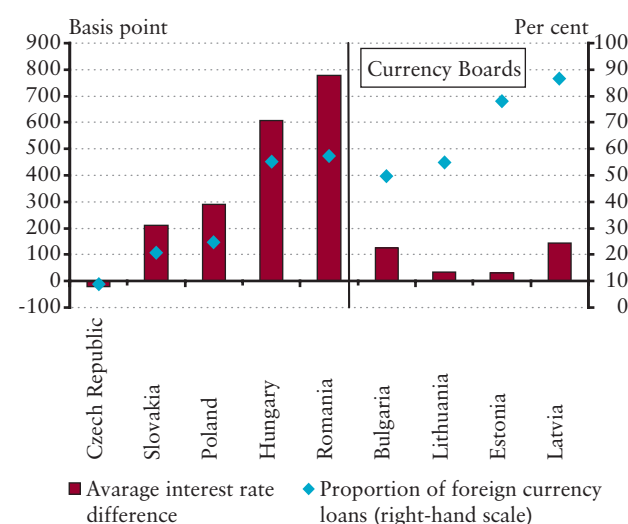
### 1.2.1 RAPID CREDIT EXPANSION IS A GENERAL PHENOMENON

**Household indebtedness is increasing rapidly.** In the Central and Eastern European region loans to the private sector as a proportion of GDP practically doubled in the period between 2002 and 2006, with dynamic growth in loans to households playing a dominant role. The rapid rise in the indebtedness of households and corporate sectors is partly a natural process and constitutes a part of catching-up.

**The rapid rise in the indebtedness of the private sector has led to the emergence of new types of financial risks both for banks and households.** On the one hand, the rise in savings at banks has not kept pace with credit

Chart 1-11

**Proportion of foreign currency loans compared to the total stock of household loans and the interest rate differential**



Note: Interest rate differential: the average difference of domestic 3-month money market rates and euro yields between 2002 and 2006.

Source: National central banks.

expansion, and thus the banking sector's dependency on external resources has increased significantly. On the other hand, in several countries of the region a major part of credit expansion occurred in foreign currencies. This happened in two type of countries: firstly, in those countries where domestic yields significantly exceed the yields of assets denominated in foreign currencies, i.e. where the interest rate differential is relatively high (Hungary, Romania, Poland); secondly, in those countries where, as a result of the pegged or quasi-fixed exchange rate regime, it is 'worth' becoming indebted in foreign currencies even if the interest rate differential is relatively low (the Baltic States and Bulgaria) (Chart 1-11).

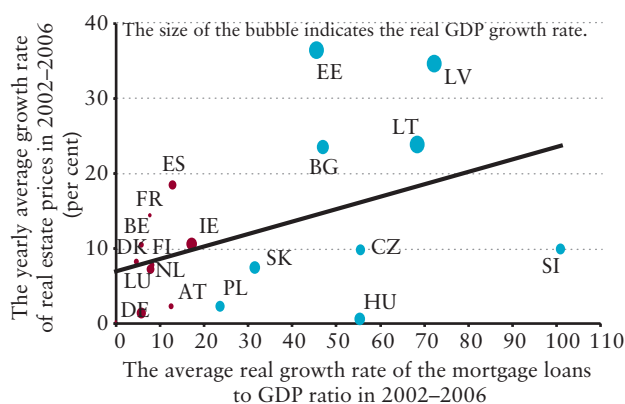
### 1.2.2 CERTAIN COUNTRIES IN THE REGION SHOW SIGNS OF OVERHEATING

**In the Baltic States, as well as in Romania and Bulgaria the probability of the evolution of a real estate price bubble has increased.** While rapid credit expansion is typical of almost the entire region, increasingly clear signs of overheating have started to become visible in recent years in

<sup>7</sup> Region includes the 10 new Central-Eastern European members of the EU.

Chart 1-12

### Growth rates of real estate prices and mortgage loans in the region



Note: AT (Austria), CZ (Czech Republic), BE (Belgium), BG (Bulgaria), DE (Germany), DK (Denmark), EE (Estonia), ES (Spain), FR (France), FI (Finland), HU (Hungary), IE (Ireland), LT (Latvia), LU (Luxembourg), LV (Lithuania), NL (the Netherlands), PL (Poland), SI (Slovenia), SK (Slovakia). No data are available for Romania.

Source: National central banks and statistical offices.

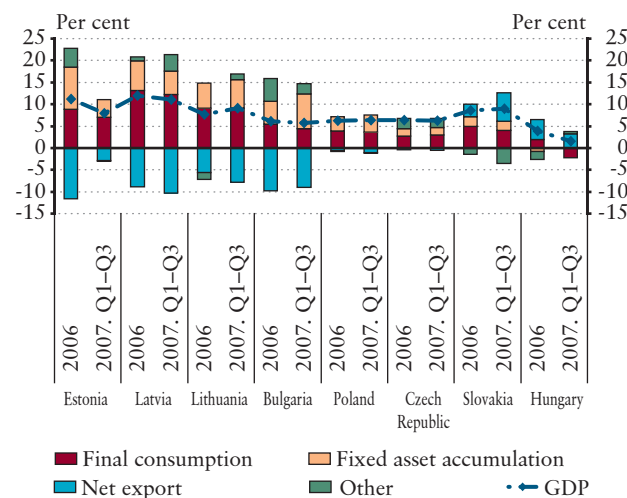
certain countries, mainly in the Baltic States, and recently in Bulgaria and Romania as well. The rapid rise in the households' indebtedness was accompanied by an extremely dynamic increase in consumption on the one hand, and a sharp rise in the demand for real estate on the other. The increase in demand resulted in a very quick growth in housing investment and a considerable real estate price boom, despite the increasing supply (Chart 1-12).

**In these countries, the rapid increase in demand has resulted in extremely high current account deficit and accelerating inflation.** As a result of the robust GDP growth driven by domestic demand (Chart 1-13), employment reached historical highs. In turn, increasingly tight labour market conditions accelerated wage growth substantially. The dynamic expansion of consumption and investment, i.e. domestic demand, and the rise in labour costs increasingly influenced the development of both inflation and external equilibrium. In the countries concerned – with the exception of Romania and Lithuania where the rate of price increase was around 7 per cent – inflation rates in the fourth quarter of 2007 were close to or over 10 per cent, while the current account deficits amounted to 10-25 per cent of GDP in 2006 and 2007.

**In the affected countries the present economic path does not seem to be sustainable, but the room for adjustment is limited for both monetary and fiscal policies.** Increased inflation, the real appreciation within

Chart 1-13

### GDP growth rates and structure



Note: Romania is excluded because of the extreme value of errors.

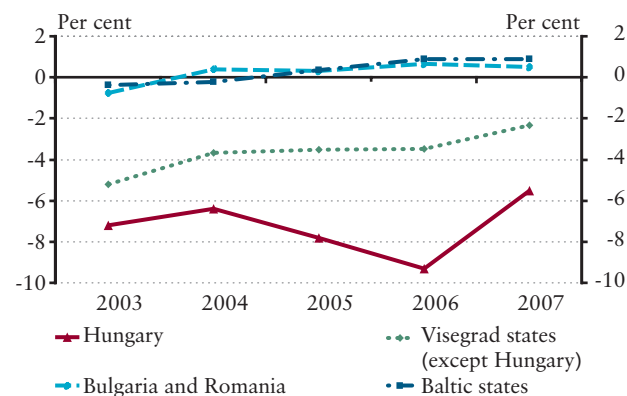
Sources: Eurostat, MNB calculation.

rigid exchange rate systems, the permanent and significant loosening of the external equilibrium and the increasing probability of asset price bubbles are all signs of overheating. While sustainability risks are becoming increasingly obvious, opportunities to adjust are strongly limited in most countries. Given the limitations due to the currency board arrangements in Estonia, Lithuania and Bulgaria the range of possible monetary actions is also restricted by the fact that lending typically takes place in foreign currency. The leeway for fiscal policy, on the other hand, is limited by the fact that the budget balances – even after cycle adjustment – show low deficits or even surpluses (Chart 1-14).

Chart 1-14

### Fiscal balances in certain groups of countries in the region

(as percentage of GDP)



Note: Simple averages of the group member states. If data were not available for 2007, we used the values of the Convergence programmes.

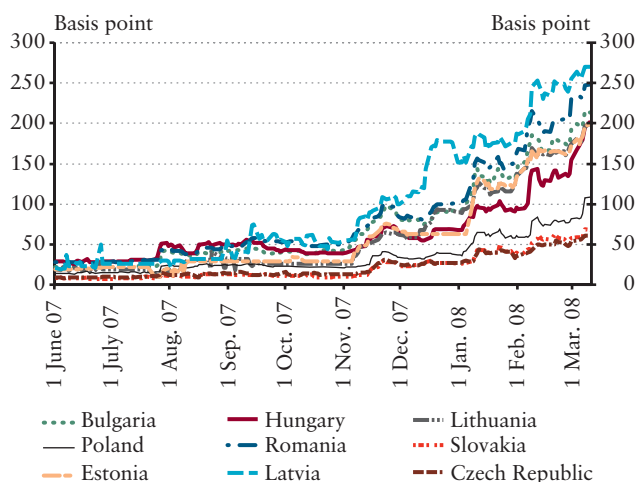
Source: World Bank, national statistical offices.

### 1.2.3 INCREASING VULNERABILITY IS ALSO REFLECTED IN EXTERNAL ASSESSMENT OF COUNTRIES

Since the emergence of the money market turbulence investors have strongly differentiated among countries, which is also shown in the pricing of default risks. In earlier years, investors had an almost unlimited risk appetite and ignored increasing vulnerabilities. However, differentiation can be felt even more strongly since the US sub-prime mortgage crisis and the related financial market turbulence. Compared with other countries in the region, in all the three Baltic States as well as in Romania and Bulgaria CDS spreads, i.e. the premia expected in exchange for assuming the given country's default risk, increased to a significantly greater extent (Chart 1-15). The currency of Romania – the only one of the aforementioned countries with a floating exchange rate system – weakened considerably, and the central bank increased its key policy rate in several steps by total 200 basis points.

Since the onset of the financial market turmoil the credibility of the currency boards also deteriorated. At the peak in December, local interbank market rates were 150 basis points higher in Estonia and Bulgaria and 250 basis points higher in Lithuania than the interbank rates of the euro area.

**Chart 1-15**  
10 year CDS permia in the region



Source: Datastream.

In early 2008, credit rating agencies also notably changed the ratings of the sovereign credit risk of the countries concerned. On 31 January 2008, Fitch Ratings downgraded the outlook of the sovereign credit ratings of Estonia, Latvia, Romania and Bulgaria from stable to negative. On the next day Standard & Poor's announced that it would downgrade Lithuania's debt and change its credit rating outlook to negative.<sup>8</sup> The justification basically called

**Table 1-1**

**Ratings on long-term sovereign debt of regional countries**

Moody's	Estonia			Latvia			Lithuania			Bulgaria			Romania			Czech Republic			Poland			Slovakia			Hungary			S&P; Fitch
	M	SP	F	M	SP	F	M	SP	F	M	SP	F	M	SP	F	M	SP	F	M	SP	F	M	SP	F	M	SP	F	
Aaa																												AAA
Aa1																												AA+
Aa2																												AA
Aa3																												AA-
A1	~															+								~				A+
A2		-	-	~			~		-							~	~	~				~	+	~				A
A3									-										~	~								A-
Baa1				-	-					~															-	~		BBB+
Baa2											-				-													BBB
Baa3										+			~	-														BBB-

Note: M – Moody's; SP – Standard and Poor's; F – Fitch; + – positive outlook; (-) – negative outlook; ~ – stable outlook.

Source: Bloomberg.

<sup>8</sup> In March 2008, with reference to the impending euro area membership, S&P changed the outlook of Slovakia's credit rating to positive, while Fitch, referring primarily to the 2008 fiscal reforms, upgraded the sovereign credit rating of the Czech Republic. Meanwhile S&P changed the outlook of Hungary's credit rating to negative, justifying this move with the increasing risks associated with the success of fiscal adjustment.

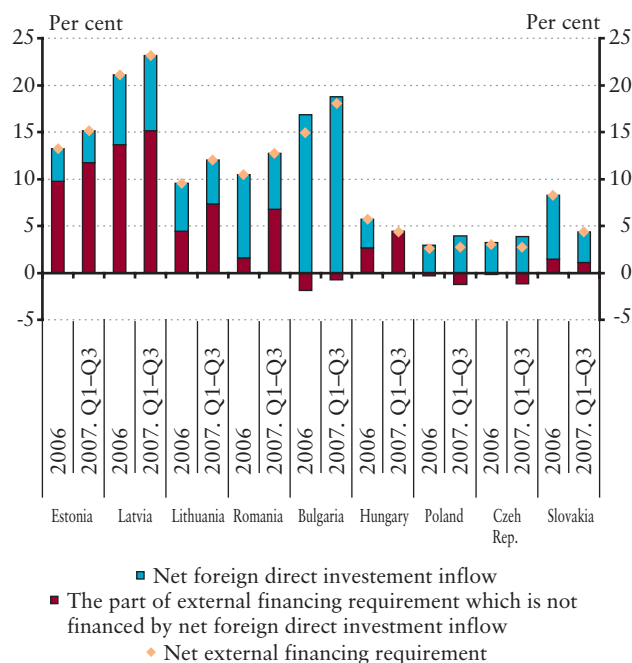
the attention to the aforementioned countries' extremely high balance of payments deficit as well as to the fact that it might become more difficult to finance the external position against the background of the declining global risk appetite (Table 1-1).

### 1.2.4 THE POSSIBLE ADJUSTMENT PROCESS

**In the Baltic States, as well as in Romania and Bulgaria a significant correction is not necessarily the only form of implementing the practically inevitable adjustment.** While in the countries concerned the probability of some form of an adjustment which may even lead to major real economy losses, has clearly increased, however it cannot be ruled out that the unavoidable slowdown will take place 'in a less painful manner' ('soft landing'). In the Baltic countries, especially in Estonia, loan dynamics clearly decelerated from early 2007, and the effect of this was perceptible both in the expansion of consumption growth and in external equilibrium developments. In general, the structure of growth already moved in a favourable direction in 2007 in the countries concerned: in most countries the contribution of consumption to GDP growth slightly declined.

**In several countries the risk of significantly tighter financing possibilities is mitigated by strong direct capital inflows and substantial funding from parent banks.** A permanently high external financing requirement represents a high sustainability risk. However, the chance of a sudden stop in capital inflows is reduced by the fact that in the whole country group, and primarily in Romania and Bulgaria<sup>9</sup>, net foreign direct investment inflow has covered a dominant part of the financing requirements in recent years (Chart 1-16). The role of net foreign direct investment inflows in external financing is the smallest in the case of

**Chart 1-16**  
**External financing requirement and its financing structure**  
(as percentage of GDP)



Source: Eurostat.

Hungary: in 2007 – mostly as a result of one-off items – the net external financing requirement was totally covered by debt generating inflows (Box 1-2). The probability of the financing problems is also mitigated by the fact that a considerable part of the debt generating inflow originates from parent banks. With the higher share of foreign ownership the vulnerability of the banking sector is also lower since parent banks operated in developed countries with sufficient capital adequacy. Reputation risks would probably prevent parent banks to 'let their subsidiaries down'.

#### Box 1-2: The structure of external financing in Hungary

As a result of fiscal adjustment, external imbalances decreased considerably in 2007. However, net external debt reached a record level: growing nearly 8 percentage points, the debt-to-GDP ratio soared to around 40 per cent of GDP.

The increase in non-debt generating liabilities, i.e. the net outflow of direct investment and other equities were behind this dynamic debt

expansion (Chart 17). This process is partly attributable to individual factors: non-residents sold significant quantities of shares in response to the MOL's buy-back of own shares as a defence against its take-over. Non-residents' direct investments, in turn, were significantly reduced by the change in the financing structure of Budapest Airport Rt. following the change of ownership: earlier financing through direct investment was replaced by debt-generating liabilities. These two individual items

<sup>9</sup> It is worth mentioning that in the countries concerned the increase in foreign direct investment inflow partly realized in the form of real estate investments and could have contributed to the evolution of a real estate price bubble.

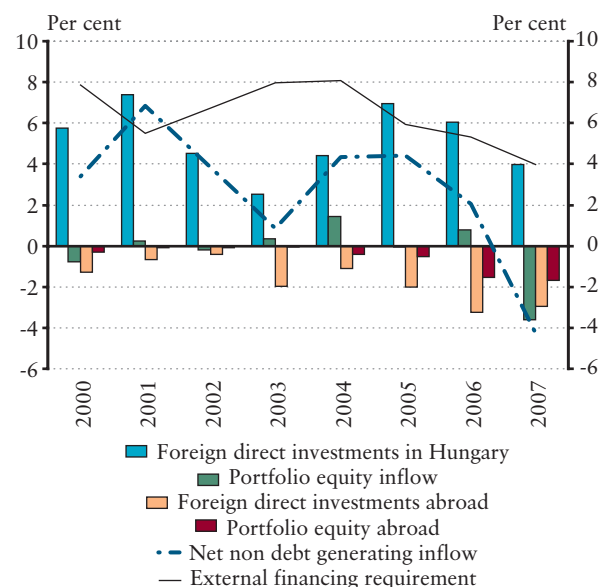
together reduced the non-debt generating capital inflow by approximately 4 per cent of GDP.

At the same time, the shift in the structure of external financing was induced by processes that can be considered more permanent. Following its historical high experienced in 2006, resident companies' foreign direct investments abroad were very high again, reaching an outstanding level in the region. Additionally, in accordance with previous years' trends, domestic institutional investors' investments in foreign equities continued to rise, which is also stimulated by the introduction of the possibility for members of private pension funds to choose from different portfolios.

These developments suggest that the structure of external financing may change permanently. Hungarian companies' direct investment abroad and domestic institutional investors' purchases of foreign equities may stabilise at a higher level, and it is likely that debt generating financing will assume a more important role in the case of companies. Due to the declining external financing requirement, the lower level of the net inflow of non-debt generating capital may finally lead to a deceleration of external debt dynamics, but can still delay a decrease in the external debt ratio. From the investors' point of view, this phenomenon may have a temporarily adverse effect, but in terms of long-term sustainability it is not necessarily a problem, and in some respects it may even be considered as natural.<sup>10</sup>

On the one hand, increasing capital exports may, over the longer term, contribute to a decline in the deficit of the income account and thus to an increase in the gross national disposable income (GNDI). On the other hand, a decline in direct capital inflows is a natural phenomenon, as with the economic transformation progress and the accomplishment of the privatisation the country's direct demand for know-how and technology transfer is diminishing. Moreover, as has been experienced recently, Hungary may become an exporter of working capital to less developed other emerging countries (such as the Ukraine, Romania or Bulgaria). Consequently, the external financing structure of the economy may also converge with that of more developed countries,

**Chart 1-17**  
**External financing requirement and net non-debt generating inflow**  
(as a percentage of GDP)



Source: MNB.

where the decisive role is usually taken by financing with debt generating liabilities. Accordingly, as general government deficit and, in parallel with that, the external financing requirement of the whole economy drops significantly, an increase in the ratio of debt generating financing cannot be considered by itself as harmful.

However, a possible continuation of sluggishness in corporate investments accompanying a rapid debt growth may pose a sustainability risk. With high capacity utilisation, companies' permanently low investment expenditure as a proportion of GDP suggests slower growth over the longer term. The slowdown in growth accelerates debt dynamics, and may have an adverse effect on the ability to pay the debt burden.

## 1.2.5 CHANNELS OF CONTAGION

**The most important channel of contagion may be an increase in the risk premium.** Although in some countries adjustment may occur without a significant correction, a deterioration in the fundamentals and the necessary adjustments make the region more vulnerable and enhance the risks of contagion. A possible increase in the risk

premium and a limitation of external financing sources may constitute the most important channel of contagion.

**The increasing integration of the banking system in the region may also open new channels of contagion.** Beside the risk premium, it is important to emphasise the possibility of contagion through the common parent bank relationships between subsidiaries operating in different

<sup>10</sup> For details on this subject, see the relevant study in the MNB Bulletin to be published on 29 April 2008.

countries and through the subsidiaries of Hungarian banks. In the Baltic countries, Scandinavian parent banks play a dominant role, and local banks typically obtain external financing from these markets as well. At the same time, in the case of Romania and Bulgaria common parent banks and external funding markets<sup>11</sup> make the risk of a spill-over of a potential shock higher due to common parent banks funding sources and some Hungarian banks' exposure through their subsidiaries.

## 1.2.6 HUNGARY IN THE REGION

**As a result of fiscal adjustment, imbalances have abated significantly, but due to tensions built up in the past, the slow growth and rapid increase in external debt, investors continue to consider Hungary as one of the more vulnerable countries.** In terms of its fundamentals, Hungary shows a very complex picture, which differs materially from any other country in the region (Table 1-2). Due to fiscal measures, the general government deficit decreased significantly, and external balances improved to a great extent in 2007. However, despite these favourable dynamics, fiscal deficit and government debt levels continue

to be the highest in the region. While external financing requirement<sup>12</sup> dropped significantly by 1.3 percentage points of GDP, in investors' opinion the structure of financing shifted in an unfavourable direction. A net outflow was observed in non-debt generating capital (direct investment and equity), thus the part of the external financing requirement not covered by direct capital inflows rose to a high level related to other countries in the region (Chart 1-16). In this context, Hungary's external debt, which is high in international comparison, increased rapidly. However, the shift in the financing structure is attributable to a large extent to individual items. Therefore, looking ahead, with a continued decline in the external financing requirement, external debt dynamics may slow down significantly in the near future.

**Risks related to credit expansion are at the same time more moderate than in the Baltic countries, Romania or Bulgaria.** From an investor's point of view, one can consider it a positive tendency in regional terms that the expansion of loans to the private sector is much slower than in the countries that can be characterised by overheating.<sup>13</sup> At the same time, the more restrained private sector credit

**Table 1-2**

### Comparison of the fundamentals of regional country groups

		Baltic states	Romania and Bulgaria	CE-3	Hungary
Credit growth	Equilibrium credit	No			Yes
	The proportion of FX loans	High			Low (except Poland)
	The increase in real estate prices	Rapid			No stress
Equilibrium and debt dynamics	Inflation	High			Low (except Czech Republic)
	Fiscal deficit	Low			Close to 3 per cent
	External disequilibrium	Problem			External financing requirement below 5 per cent
	Non debt type financing	High	Extremely high	High	Low
	Debt dynamics	Rapid	Slow	Slow	Rapid
Growth rate	Growth rate	Extremely rapid			Rapid
	Fixed asset accumulation	Rapid			Rapid
	Real ULC	Rapid increase			Moderate increase

Source: MNB.

<sup>11</sup> Regarding the dependency on external sources, see details in the Chapter entitled Liquidity risk below.

<sup>12</sup> The external financing requirement is equal to the sum of the balances of the current account and the capital account.

<sup>13</sup> For details regarding the identification of excessive credit expansion, see the publication of Analysis of the Convergence Process (2008).  
[http://english.mnb.hu/engine.aspx?page=mnben\\_konvergenciajelentes](http://english.mnb.hu/engine.aspx?page=mnben_konvergenciajelentes)

expansion is the result of rapid household and very moderate corporate indebtedness. Risks from household credit growth are significantly mitigated by the drop in real estate prices in real terms during recent years, i.e. the likelihood of a real estate market bubble has not increased.

**The persistently low level of investments, which is unique in the region, may indicate structural problems.**

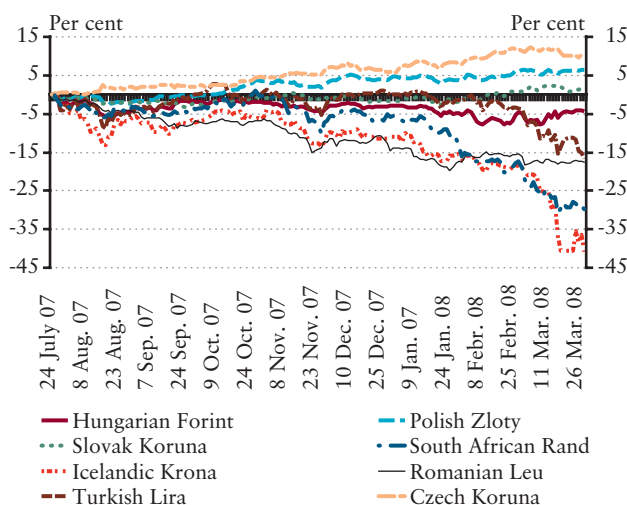
The positive picture stemming from the gradual adjustment of the internal and external equilibrium problems is overshadowed by the deterioration in competitiveness and growth prospects. Investment growth, which has been subdued for a longer period of time against the background of high capacity utilisation, points to deeper structural problems of the economy, and forecasts a permanently slower growth in regional perspective. Longer-term growth problems, in turn, may jeopardise the success of fiscal adjustment,<sup>14</sup> and may make foreign investors more cautious.

**Increasing risk premia show that investors are focusing on high debt ratios and growth problems instead of the improving fundamentals.** Overall, in the last one and a half years equilibrium dynamics clearly moved in a favourable direction, which enhances the shock-absorbing capacity of the Hungarian economy over the longer term. However, as a result of the market turmoil, investors' willingness to take risks has decreased markedly. While in the past years, in a very prosperous international investment environment markets did not 'punish' the unfavourable Hungarian economic fundamentals, the decline in risk appetite resulted in a sudden rise in the expected premium despite improving external balances. In this

**Chart 1-18**

**Emerging market exchange rates against the euro**

(cumulative change, July 24, 2007 = 0)



Source: Datastream.

environment, the high debt ratios accumulating due to past imbalances, the shift of the external financing structure towards debt-generating instruments and the risks related to growth prospects gained higher importance. This is reflected both in the development of the CDS premia (Chart 1-15) and the exchange rate of the forint (Chart 1-18). In recent months, the premia required for the default risk of Hungarian exposures approached the values typical of the most vulnerable countries of the region. The current situation highlights the importance that fiscal consolidation should progress on the designated path and structural measures

<sup>14</sup> See details in the publication entitled *Analysis of the Convergence Process*.

## 1.3 Expected macroeconomic baseline scenario

*As a result of fiscal adjustment, the country's external financing requirement continues to decrease, thus reducing the vulnerability of the economy. However, the economic performance is weakening, and prospects are unfavourable. The export sector's outlook is negatively affected by the risks pertaining to the growth prospects of the developed countries. In addition, domestic demand and, in particular, retail trade and investment continue to be subdued. The corporate sector will react to the unfavourable business conditions and cost shocks in 2008. The adjustment may affect household income unfavourably mainly through wages and employment.*

**In 2007, the growth and inflation outlook of the Hungarian economy gradually worsened.** According to the macroeconomic baseline scenario in the previous *Report on Financial Stability*, in the years after 2007, with the fading out of the direct one-off effects of the fiscal adjustment, economic growth would have picked up again, and inflation would have declined considerably. But the baseline scenario has changed somewhat due to the events and new information from the past one year. Persistently slower growth in Hungarian economy and a consumer price inflation exceeding the central bank's medium-term inflation target can be expected over the entire forecast horizon (Table 1-3).

**The first signs of slowdown can already be detected in the domestic economic activity, although for the time being its magnitude can be considered as moderate.** According to the latest business surveys, companies' business activity prospects are becoming increasingly uncertain. The main underlying reason is that there is a growing chance that the financial turbulence originating from the US sub-prime

mortgage market may set back growth in USA and through that also global growth. The deceleration in the growth rate of the economies of Hungary's main export partners is not notable yet, although the related risks continued to grow. In addition, it is important to emphasise that the realignment observed in recent years in the export structure of the Hungarian economy may mitigate the impacts of global deceleration on the Hungarian economy (Box 1-3).

**In addition to external ones, domestic factors also suggest only a moderate increase in demand by corporations.** No substantial shift in trends was seen in the main indicators of domestic consumption (consumption expenditure, retail sales, and household confidence indices). This may result in a slower and more mitigated upturn in future domestic demand. It poses a risk that, contrary to earlier expectations, the demand effects of the fiscal adjustment may be more permanent.

**Increasing production costs may amplify the adjustment to decelerating demand.** Besides demand components, cost factors of companies have also changed significantly. This is partly caused by the significant increase in international commodity prices, partly by the growing tax and contribution payments due to government measures and partly by the price increases stemming from the changes in the domestic regulatory environment (electricity). In 2008, another cost increasing factor may be the minimum wage rise for skilled employees. An increasing pressure for adjustment of the corporate sector could be prompted if the demand outlook deteriorates further and cost increases become permanent.

**Table 1-3**

**Forecast for key macroeconomic indicators on the basis of the Report on Inflation of February 2008**

	Actual		Actual/Estimate	Projection	
	2005	2006	2007	2008	2009
Consumer price index, per cent (annual average)	3.6	3.9	8.0	5.9	3.6
Growth in external demand, per cent (GDP-based)	2.1	3.9	3.5	2.5	2.5
GDP growth, per cent	4.1 (4.3)*	3.9 (4.0)*	1.3	2.0	3.0
External financing requirement – current account statistics (in percentage of GDP)**	6.0	5.7	↓	↓	↓

Note: \* Data adjusted for working-day variations are shown in brackets. \*\* As a result of uncertainty in the measurement of foreign trade statistics, from 2004 the actual import figure and current account deficit/external financing requirement may be higher than suggested by official figures or our projections based on such figures.

↓ In our view, the expected path of the variable in question points to a lower forecast relative to the Report on Inflation of November 2007.

Source: MNB.

**In particular, the low-income households may be hit hard by slower disinflation and labour market adjustment.** Corporate adjustment affects households mainly through two channels. On the one hand, as a result of corporate adjustment in prices and nominal wages leading to sustained higher inflation and slower growth of nominal wages employees' real wages may increase at a persistently slower rate. This is expected to affect households in different income categories asymmetrically, and potentially having a stronger effect on low-income households. On the other hand, as a consequence of deteriorating corporate profitability, the expected adjustment in private sector employment may result in a decline in total employment. In the baseline scenario, a decrease in employment can be expected in 2008 both in the private and public sectors. The decline in total employment may amplify the aforementioned asymmetrical effect on real incomes, as downsizing may hit the less qualified and lower income strata harder, since in a recession companies start the adjustment in employment by dismissing less qualified labour.

**Weak corporate investment and deteriorating labour market conditions in past years may negatively affect not only the short-term growth prospects, but also future potential growth.** Higher unemployment and restrained increase in real wages may limit the upturn in household consumption in 2008. The negative prospects of the private sector, in turn, may make the medium-term investment outlook worse. In addition, domestic consumption

and investment demand may be adversely affected by the tightening of credit standards and the increase in funding costs as well. Overall, the aforementioned impacts add to the likelihood of slower growth in domestic demand. In addition, more moderate increase in external demand also worsens the medium-term outlook of the export sector. All in all, economic growth is expected to pick up only slowly after bottoming out in 2007. Meanwhile, future potential growth of the Hungarian economy is negatively affected by weak corporate investment observed for several years and an almost constant employment.

**The external financing requirement of the Hungarian economy may continue to fall gradually over the entire forecast horizon.** In 2007, the reduction in the external imbalance exceeded our expectations. The marked decrease in the external financing requirement is mainly attributable to the sharp fall in the general government deficit and the partly related low domestic absorption. A part of these developments is permanent; therefore, in the period to 2009 the external balance relative to GDP may continue to improve. However, an improvement in the external equilibrium beside still weak investment dynamics and stagnating corporate financing requirements could pose a sustainability risk by deteriorating the future growth performance of the Hungarian economy. Consequently, despite the fact that the increase in the external debt of the national economy may come to a halt in 2009, sustainability problems may come to the fore again over the longer term.<sup>15</sup>

### Box 1-3: Changes in the structure of Hungary's exports

Hungary is a small, open economy and its growth prospects are significantly influenced by the international economic environment. In terms of the effect of the US sub-prime mortgage crisis on Hungary, the structure of Hungary's exports is of key importance.

There are several signs that a strong slowdown in economic growth has started in the United States, the impact of which can already be felt in Europe as well, as GDP growth rate dropped in most Member States of the euro area in the fourth quarter of 2007. There also signs of a slowdown in the dynamics of the euro area and German industrial production figures. The euro area Business Climate Indicator and the German IFO indices, which provide a good forecast of processes in economic activity, have deteriorated gradually since mid-2007, and have not shown substantive improvement in recent months either.

Therefore, the US and European economies have certainly started to slow down in the last third of last year but the magnitude of the deceleration of the US economy and its spill-over effects cannot yet clearly be assessed. Due to a slowdown in international economic activity, demand for Hungarian export products and services may weaken. However, the sharp change in the Hungarian export structure, which took place recently, may mitigate the effects on Hungary's economy arising due to the global slowdown that started from the US markets.

The Hungarian economy is strongly integrated into the European Union, as EU Member States account for approximately 80 per cent of Hungary's export of goods (hereinafter export means export of goods) (Chart 1-19). Within that, Germany has the highest importance, with around 30 per cent of Hungarian exports going to Germany. Since

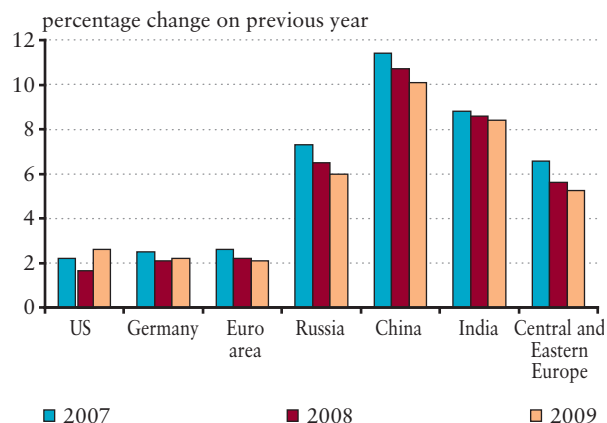
<sup>15</sup> For further details, see the Chapter entitled Risk scenario.

**Chart 1-19****Hungarian export of goods structure according to country groups**

Source: HCSO foreign trade statistics.

Hungary is mainly a supplier to the German economy this may be the reason why the slowdown in the Hungarian industrial production occurred earlier than that of the German industrial production and GDP growth.

At the same time, the shares of Germany, US and the euro area in Hungary's export structure have gradually decreased, and the catching-up economies of Central and Eastern Europe and Asia have come to the fore. The importance of Russia and China has increased largely, but exports to neighbouring countries also grew at a considerable degree. In recent years, the rise in Hungary's exports to these country groups was outstanding even in a regional comparison. As the growth rate of catching-up countries is expected to exceed that

**Chart 1-20****GDP growth forecasts of Hungary's main export partners**

Note: The source for the USA, Germany, the euro area and Central and Eastern Europe is Eurostat. The source for Russia, China, and India is OECD Economic Outlook (December 2007). The growth of Central and Eastern Europe is an average of the GDP growth rates of Czech Republic, Poland and Slovakia weighted by these countries' GDP (current prices).

of developed countries in the future as well, catching-up countries may potentially show strongly expanding demand for Hungarian exports (Chart 1-20).

Overall, the slowdown in the US and European economies may somewhat be offset by the continued dynamic growth of Asia and Central and Eastern Europe, as a result of which the deceleration originating from the United States may have a more mitigated effect on Hungary than on developed countries.

## 1.4 The risk scenario<sup>16</sup>

*It is important to define a relevant risk scenario in order to test the shock-absorbing capacity of the financial system by using stress tests.<sup>17</sup> Changes in the macroeconomic and financial environment are threatening to the financial system if the clients of the financial system suffer permanent negative income shocks, their loan repayments burdens increase significantly, and their demand for loans falls. These aspects, connected with the risks stemming from the current operational environment of the financial system, appear in the risk scenarios. External risks are related to the US sub-prime crisis, while domestic problems are linked to the possibility of a permanent slowdown of the economy. A simultaneous occurrence of risks may result in a serious deterioration in terms of Hungary's growth performance.<sup>18</sup>*

### 1.4.1 EXTERNAL RISKS

**The global slowdown may cause a significant decline in export demand.** External risks affect the small, open Hungarian economy through various channels. A fall in house prices<sup>19</sup> and an increase in user costs of capital<sup>20</sup> may result in a decrease in the growth rate of the global economy. This may lead to a substantial drop in the demand for Hungarian export products (together with the fall in production and GDP). However, the negative impact of the global slowdown is somewhat mitigated by the fact that lower global demand may result in a decrease of world market prices (and thus in Hungary's import prices as well).

**As a result of the US sub-prime crisis, the risk premium on domestic assets may rise further.** The decline in global risk appetite may increase the risk premium on domestic assets. This may primarily lead to a depreciation of the Hungarian forint's exchange rate that may trigger a monetary policy reaction (increasing interest rates). Moreover, as a consequence of depreciation, production costs will increase (because imported factors of production become more expensive), which would restrain output and fuel inflation. Over the short run, the drop in GDP would be somewhat mitigated by the improving competitiveness of exports.

**Obtaining loans may become more difficult, and user cost of capital may increase.** Borrowing conditions may become tighter for domestic economic agents. This can lead to a further deterioration of growth prospects: in the short run through weakening investment activity affecting the demand side, while over the long run lower capital accumulation may result in a sustained fall in production (see Box 1.4 on the methodology).

### 1.4.2 INTERNAL RISKS<sup>21</sup>

**If growth does not return to its previous levels after the fiscal adjustment that would represent a financial stability risk.** Three factors can contribute to persistently slower growth. On the one hand, unfavourable labour market developments since 2001, the lack of incentives to take up work and the increase in the tax burden stifle activity and employment. On the other hand, corporate investment has shown restrained growth since 2003-2004 due to an instable tax environment and the decline in competitiveness. Finally, the lower contribution of productivity to growth may also hinder real convergence, mainly in the non-tradable sectors. The unfavourable outlook is also shown in business and household expectations surveys projecting a further moderating upswing. In addition, Hungarian growth is slow compared to other countries in the region or even to the old EU Member States.

**The growth of GDP and its demand-side components (consumption, investment) may decline permanently and considerably.** Internal risk factors point to a permanent and significant decline in production. As the slowdown can be permanent, it can have an immediate and strong negative effect on all items of domestic expenditure that depend on economic agents' expectations (consumption, investment). Consumption may decline due to deteriorating income prospects. Similarly, a permanent fall in profitability may also result in a much lower investment demand over the longer term as well. Both factors suggest a dramatic decrease in the demand for loans. A less efficient production sector would trigger an increase in domestic prices (and thus higher

<sup>16</sup> In addition to the baseline scenario, the Report on Inflation of November 2007 and its February 2008 update also addressed the impact of numerous risk scenarios on the real economy and on inflation trends. In the *Report on Financial Stability*, we focus on a more detailed analysis of the scenarios that may have a greater relevance for financial stability, but have a lower probability of occurrence.

<sup>17</sup> For details on the effects of macroeconomic risks on the banking sector, see the Chapter entitled Stress test.

<sup>18</sup> The risks presented here are occurring on top of the baseline scenario; therefore, the effects may appear cumulatively.

<sup>19</sup> The decline in house prices has a significant negative effect on households' consumption.

<sup>20</sup> Due to the increase in the user cost of capital, corporations' financing costs increase considerably.

<sup>21</sup> See details in the publication entitled *Analysis of the Convergence Process*.

inflation compared to the baseline scenario) and a depreciation of the exchange rate.

### 1.4.3 THE JOINT EFFECT OF EXTERNAL AND INTERNAL RISKS

**The simultaneous occurrence of risks may have serious consequences on growth.** If the negative effects of external and internal risk scenarios add up, real GDP growth would fall sharply compared to the baseline scenario. On the demand side, the decline in investment

may be the strongest, but (mainly due to the permanent fall in potential GDP) consumption may also be significantly lower. The deterioration in the external balances may be mitigated by the drop in imports. The cumulated effect of external and internal risks on inflation is nearly neutral. The higher risk premium as the main factor makes the exchange rate depreciate. Household income decreases as a result of a relatively slight decline in employment and a strong fall in real wages. Since wages are rigid over the short run, lower income has its effect mainly from the second year on.

#### Box 1-4: Methodological description of the risk scenario

The simulation of risks was carried out in the Puskas model<sup>22</sup>, which is used to describe the cyclical properties of the Hungarian economy. The economy is hit by various adverse shocks, and the model is simulated to produce the associated risk scenarios. The following shocks were taken into account:

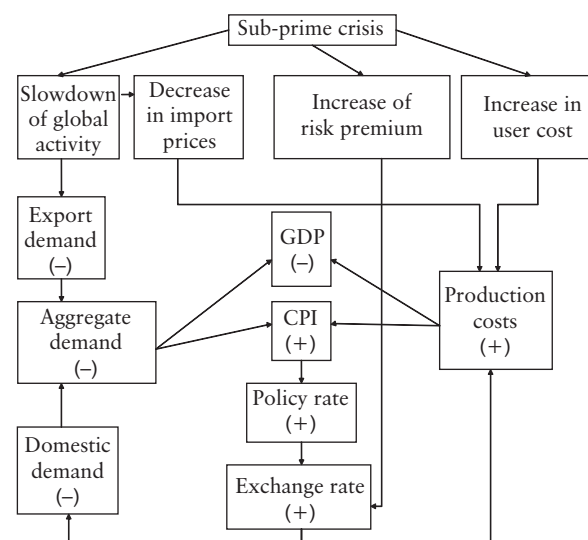
- 20 per cent decline in housing prices in the USA, the United Kingdom, France, Spain, the Netherlands and Ireland;
- 2 percentage point increase in the user cost in the USA, the United Kingdom, France, Germany, the Netherlands and Italy;
- 200 basis point increase in the Hungarian risk premium;
- 1 per cent permanent decline in productivity in Hungary;
- 20 per cent fall in equity prices in Hungary.

The shocks can be divided into two groups: external shocks, attributable to the US sub-prime crisis (Chart 1-21) and domestic shocks, i.e. the permanent slowdown in productivity (Chart 1-22). According to our assumptions, the US sub-prime crisis has the following effects on the Hungarian economy:

- external demand for Hungarian products declines,
- domestic import prices decrease,
- the risk premium of domestic assets increases,
- interest rates on domestic loans increase.

Chart 1-21

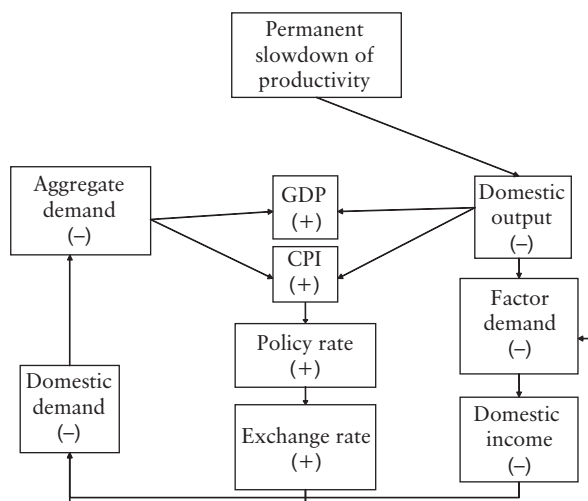
#### Main transmission mechanisms of shocks related to the US sub-prime mortgage crisis in the model<sup>23</sup>



The risks associated with the global slowdown (i.e. the magnitude of the fall in external demand and world market prices) were calculated on the basis of simulations in the NIGEM model. Accordingly, export demand is 1.2 per cent lower than in the baseline scenario, while import prices are 0.2 per cent lower. Other risk factors related to the US sub-prime crisis (which are mainly driven by the decline in global risk appetite and the tightening of lending conditions) are comprised in a 2 percentage point increase of forint-based corporate interest rates compared to the baseline scenario.

<sup>22</sup> For the description of the model see: Zoltán M. Jakab–Balázs Világi: An Estimated DSGE Model of the Hungarian Economy, The Conference of Hungarian Economics Association (December 2007), <http://www.mktudegy.hu/?q=konferencia/program2007>.

<sup>23</sup> Almost all variables in the model are interrelated with all the others. However, in the above chart – in order to render demonstration easier – only the most important effects are shown. The signs in brackets illustrate the net result (increase: +, decline: -) of the various effects, which often move in opposing directions.

**Chart 1-22****Main transmission mechanisms of a permanent slowdown in productivity in the model**

As a total effect of external shocks, in the next two years the Hungarian GDP may be 1.1 per cent lower than in the baseline scenario. The main underlying reason is the drop in export performance as a result of weakening external demand. The jump in the risk premium leads to a depreciation. Opposing effects slightly decrease inflation.

In the model simulations, the slowdown in domestic productivity is represented by a permanent decline in the efficiency of domestic production decelerating the long-term (potential) growth of the Hungarian economy. During model simulations, we assumed a permanent downward shift in productivity by 1 per cent compared to the baseline scenario. Due to the domestic slowdown, GDP will be nearly 2 per cent lower in the next two years, which is mainly attributable to a significant fall in consumption and investment (Table 1-4).

**Table 1-4**

**Difference in the level of major variables in the risk scenario compared with the baseline scenario<sup>24</sup>**

Per cent	US sub-prime crisis				Productivity shock		Total	
	External shock		User cost shock		2008	2009	2008	2009
	2008	2009	2008	2009				
Inflation	-0.2	-0.4	0.0	0.0	0.3	0.1	0.1	-0.3
Exchange rate	-1.8	-1.9	4.1	3.5	0.2	0.5	2.5	2.0
<b>GDP</b>	<b>-0.8</b>	<b>-0.8</b>	<b>-0.3</b>	<b>-0.3</b>	<b>-1.7</b>	<b>-2.1</b>	<b>-2.8</b>	<b>-3.2</b>
Foreign interest rate							1.0	1.0

*Note: The values in the table show the percentage deviation from the level of the baseline scenario in a given period (percentage point deviation in the case of the interest rate and inflation). The user cost of capital shock is the sum of two shocks: the joint increase in the user cost of capital and in the interest rate premium of the forint. Foreign interest rate shows the cost of external financing for Hungarian economic agents.*

*Source: MNB.*

## **2 Stability of the financial system**

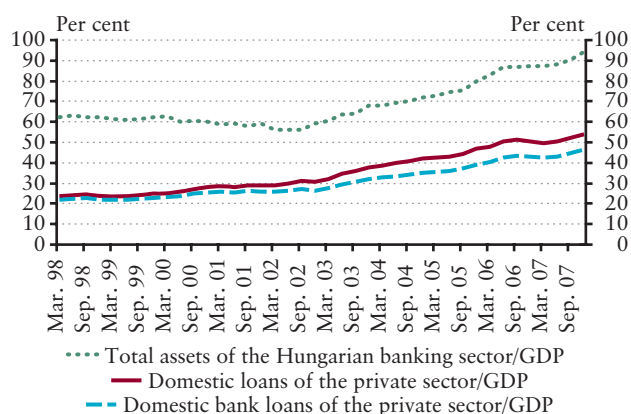




Following a slowdown at end-2006 and in early 2007, the depth of intermediation in the Hungarian financial system started to accelerate again, due to a pick-up in corporate lending and steadily strong household borrowing. The balance sheet total-to-GDP ratio moved very close to 100 per cent (Chart 2-1).

**Chart 2-1**

**Depth of the financial intermediation**



Source: MNB.

The stability of the domestic financial systems has been severely tested recently. The US sub-prime mortgage crisis has caused major adverse impact on investors' risk appetite, the global economy and, hence, the liquidity and solvency of

the European banking system. As Hungary's financial sector (in respect of ownership, funding and investment) and foreign trade is closely linked to the European Union, financial institutions have not been able to avoid the effects of the unfavourable global trends. The above mentioned risk factors are amplified further by the increasingly high vulnerability of certain countries in the Central and Eastern European region and the threat of a permanent slowdown of the Hungarian economy.

The main risk<sup>24</sup> in this unfavourable environment is that, due to a significant drop in risk appetite, the asset and funding-side liquidity positions of the banking system may deteriorate further. Moreover, corporate borrowing may slow down due to decelerating GDP growth and the quality of the banks' private sector (especially the household) credit portfolio may deteriorate. The latter process may be exacerbated by the intensifying risk-based competition in household lending and the increase in household indebtedness.

On the other hand, risk is mitigated by the fact that the domestic financial system has a strong ownership background, its capital position is balanced and its income generation ability remains adequate, even though it is gradually decreasing. The stress test for the risk scenario also confirms that the financial system can absorb the impacts of possible shocks stemming from the operating environment without major difficulties.

<sup>24</sup> In identifying risk factors we relied heavily on the MNB's Senior Loan Officer survey (SLO) conducted in January 2008, the 'Market Intelligence' (MI) meetings held with market participants and the macro-prudential indicators to be worked out. For the details concerning the indicator-set, see the Appendix.

## 2.1 Risks of the banking system<sup>25</sup>

### 2.1.1 LIQUIDITY RISK

*The improvement of the domestic financial markets' liquidity has been stopped due to the negative consequences of the US sub-prime mortgage crisis and the turbulences in the domestic government securities market. Tighter liquidity has manifested itself mainly in price characteristics rather than transaction volumes. The operation of financial institutions and their asset-side liquidity are negatively affected by the significant fluctuations in the liquidity of the financial markets especially in the Hungarian government securities market.*

*The funding (liability-side) liquidity risk of the Hungarian banking system has been increasing markedly due to the deteriorating loan-to-deposit ratio caused by dynamic lending and to unfavourable liquidity conditions in the global markets caused by market turbulences. The banking system has to face a less favourable maturity structure and higher funding costs, which adds to maturity risk and affects profitability negatively.*

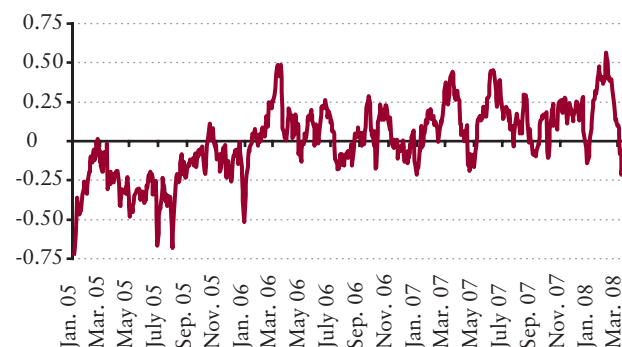
#### Market liquidity

**The sustained expansion in the liquidity of the domestic financial markets has come to an end.** From mid-2005 to the second quarter of 2006 the liquidity index<sup>26</sup> reflected a clear-cut upward trend (Chart 2-2). During this period, the expansion of liquidity on the domestic financial markets was ascribable to high risk tolerance and abundant liquidity at the global level and, in relation to this, increasingly active foreign investors and hedge funds, together with steady growth in assets managed by domestic institutional investors and the growing financial market activity of domestic credit institutions and companies. Increased liquidity was reflected in narrowing bid-ask spreads and a rise in average transaction size, i.e. markets became both tighter and deeper. From 2006 Q2 onwards, the liquidity index usually remained above its long-term average, but its development, however, was also marked by sudden declines in market liquidity on several occasions.

Chart 2-2

#### Liquidity index

(exponentially weighted moving average)



Note: A rise in the liquidity index indicates an improvement in the liquidity of financial markets.

Source: MNB, KELER, Reuters, DrKW.

**In the periods of market turmoil, liquidity decreased suddenly but to various degrees on several occasions.**

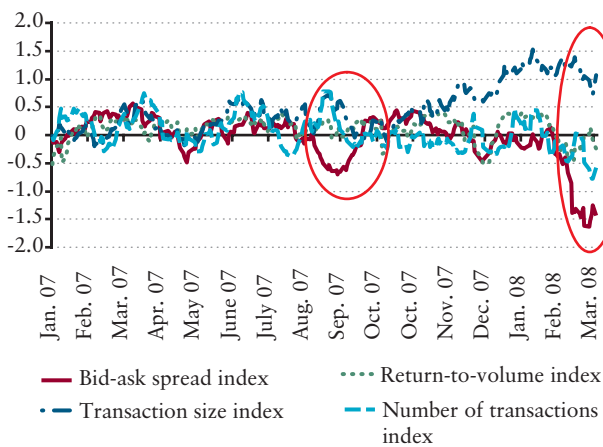
The liquidity index of both the Bank of England and the European Central Bank showed a fall with unprecedented extent and speed in August 2007, while the drop in the MNB's liquidity indicator at the same time was not extraordinary compared to its earlier fluctuations.<sup>27</sup> In early March 2008, however, during the liquidity crunch in the domestic and global government bond markets, however, the value of the domestic liquidity index dropped significantly within a short period of time. Even so, market liquidity did not decrease to its all-time low level which was registered in mid-2005. The underlying reason for this was that the liquidity of financial markets reached a historical peak in late February 2008.

**A common characteristic of turbulent periods is that the decrease in the liquidity of the Hungarian financial markets was mainly reflected in the tightness (i.e. an increase of transaction costs), while the depth of the market did not deteriorated significantly.** The time series of liquidity sub-indices shows that one common characteristic of the decline in liquidity in August and

<sup>25</sup> In the analysis the banking system does not include Eximbank, MFB and KELER.

<sup>26</sup> Trends in the liquidity of domestic financial markets can be measured by means of a liquidity index which related to the four domestic financial markets which are critical to the operation of financial institutions (i.e. the HUF/EUR spot FX market, the HUF/USD FX swap market, the secondary market of Hungarian government bonds and the interbank unsecured money market). The index is generated through aggregating (applying un-weighted averaging) of the normalised daily time series of four indicators captured with the various dimensions of liquidity. The tightness of financial markets is captured with the bid-ask spread; market depth and resilience are captured with the price impact (return-to-volume ratio) indicator, the average transaction size and the number of transactions. As the liquidity index is generated by aggregating of normalised time series, it has no unit; its average value in the period under survey is zero and a rise in it suggests increasing market liquidity. For details, see the relevant study published in the April 2008 issue of the MNB Bulletin.

<sup>27</sup> For details, see Bank of England (2007): Financial Stability Report, October 2007, and European Central Bank (2007): Financial Stability Review, December 2007.

**Chart 2-3****Liquidity sub-indices***(exponentially weighted moving average)*

*Note: Similarly to the liquidity index, an increase in the liquidity sub-indices suggests an improvement in the given dimension of liquidity.*

*Source: MNB, KELEK, Reuters, DrKW.*

September 2007 and in early March 2008 was that in both cases the bid-ask spread index reached historically low levels (Chart 2-3). This indicates a considerable widening of the

bid-ask spreads in the Hungarian financial markets, i.e. a significant deterioration of tightness. The deepening of the market offset the deterioration of tightness in August/September 2007, because during this period both average transaction size and the number of transactions rose. In early March 2008, not only the tightness, but also the number of transactions changed for the worse direction. Due to historically high average transaction sizes, however, turnover in the domestic financial markets did not decrease significantly.

**In March 2008, when the government bond market was experiencing liquidity problems, a deterioration in the tightness of the market was observed in several market segments.** A continuous rise in the liquidity index was interrupted again in early March 2008. The liquidity problems in the government bond market were mainly reflected in the widening of the bid-ask spreads with an outstanding extent (Box 2-1). Although to a lesser extent, this process emerged in not only the government bond market but also on other major domestic financial markets, due to general market sentiment, the expectations and complex positions of market participants.

### Box 2-1: Liquidity problems in the government bond market in early March 2008

#### Operation of the HUF government bond and interest rate swap (IRS) market

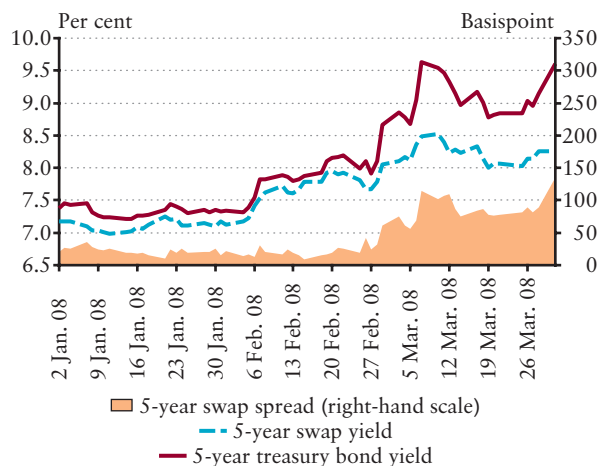
The Hungarian government bond and HUF IRS market is rather fragmented. In the secondary market of the HUF-denominated government bonds the most important market makers are the primary dealers. They are the participants that can participate in government bond auctions held by the Government Debt Management Agency (ÁKK). Thus, they are the first holders of new government bond issues. The other agents in the market (e.g. domestic and foreign institutional investors) can buy Hungarian government bonds via these participants. In contrast, in the IRS market it is investment banks in London that function as market makers and manage the bulk of the HUF IRS turnover. Currently, there are no foreign banks among the primary dealers of the Hungarian government bonds (the majority of the foreign market participants find it hard to meet the entry criteria that are rather tough by international standards). As a result, the relationship between the Hungarian government bond market and IRS market is rather weak, since, in contrast to the case in developed financial markets, these two markets feature a different group of market makers.<sup>28</sup>

#### Events in the domestic government bond and IRS markets in early March

On the last day of February and in the first week of March 2008, yields on the government bond market rose significantly and the government bond and IRS yield differential (i.e. the swap spread) increased to an unusually large extent (Chart 2-4). In respect of the events preceding this development, it is worth noting that from early 2007 onwards, swap yields typically exceeded government bond yields (negative swap spread), but at end-September/early-October 2007 this relationship changed, and in January 2008 government bond yields were already 20 to 30 basis points higher than swap yields. The 20 to 30-basis point swap spread alone did not offer an opportunity for arbitrage deals, since the two markets are only loosely linked, and due to transaction costs and the few number of market players active in both markets, no mechanism necessarily exists which could automatically narrow swap spreads.

In early March, intraday trends in government bond yields and swap spreads showed extremely high volatility for all maturities. During period primary dealers experienced a total absence of bid offers for

<sup>28</sup> For the operation of and the relationship between the government bond market and the IRS market, see Csaba Csávás, Gergely Kóczán and Lóránt Varga (2006): Main participants of the domestic financial markets and their typical trading strategies (A főbb hazai pénzügyi piacok meghatározó szereplői és jellemző kereskedési stratégiái), MNB Occasional Papers 54, [http://www.mnb.hu/Engine.aspx?page=mnbbhu\\_mnbtanulmányok&ContentID=8765](http://www.mnb.hu/Engine.aspx?page=mnbbhu_mnbtanulmányok&ContentID=8765) and Csaba Csávás, Lóránt Varga and Csaba Balogh (2007): The forint interest rate swap market and the main drivers of swap spreads (A forint kamatswappiac jellemzői és a swapszpredek mozgatórugói), MNB Occasional Papers 64, [http://www.mnb.hu/Engine.aspx?page=mnbbhu\\_mnbtanulmányok&ContentID=10028](http://www.mnb.hu/Engine.aspx?page=mnbbhu_mnbtanulmányok&ContentID=10028).

**Chart 2-4****5-year treasury bond yield, swap yield and swap spread***(treasury bond yield – swap yield)*

Source: MNB.

government bonds on a number of trading days. Primary dealers themselves did not quote prices or if they did, they used very wide bid-ask spreads (20 to 30 basis points as opposed to the 6 to 8 basis points on ordinary business days). However, according to the available data, turnover exceeded usual volumes (standing above HUF 400 billion several times, which was nearly twice the average daily turnover of February 2008) on nearly every trading day in early March. Thus, evidences suggesting a significant drop in market liquidity seem to be contradicted by turnover data. But this apparent contradiction is misleading, due to three reasons. Firstly, it is likely that foreign participants generated higher-than-usual turnover among themselves during this turbulent period. Secondly, the higher-than-usual average transaction size may have compensated for a part of the significant decrease in the number of domestic transactions. Finally, as we suggested in the chapter entitled Market liquidity, high turnover alone does not assure market liquidity. The steep drop in the bid-ask spread index in early March shows that the government bond market experienced serious liquidity problems during this period, despite of the high average daily turnover.

#### Causes behind the rise in government bond yields and the widening of the swap spread

Technical and fundamental factors both played a role in the stoppage of the ordinary operation of the domestic government bond market and an unusually high rise in yields in early March.

1. In early March, owing to the global liquidity problems the banking sector had to face (in consequence of the US sub-prime crisis), a general characteristic of the international financial markets was that

risk premium on all riskier instruments rose, together with a simultaneous and significant decline in the liquidity of government securities markets. Although this phenomenon was experienced in the riskier Member States of the euro area and in a few emerging markets as well, long-term yields rose to a greater extent in Hungary than seen in other markets. Thus, international trends alone do not explain the extent to which yields rose and liquidity dropped in the domestic government bond market.

2. Due to the restructuring of their portfolios (i.e. the replacement of government securities with equities), pension funds did not appear on the buyer side despite the higher yields, whereas in the past they had tended to stabilise the price of government bonds by purchases when yields were higher.

3. During this period, foreign participants were not actively present either as buyers or as sellers in the government securities market. This was also confirmed by reports from custodians, according to which the government security portfolios held by foreigners did not decrease significantly after 29 February 2008. Even after yields had risen, neither foreign banks nor foreign funds emerged on the demand side of the market, because they did not want to or were not able to burden their balance sheets with purchases of government securities (unlike swap deals, purchased bonds are balance sheet items that requiring financing).

4. In their purchases of government bonds since end-2007, primary dealers and domestic credit institutions hedged their interest rate positions in the swap market, looking for protection against rises in yields. This is because during the months before March 2008, they encountered continuous pressure from sellers (both foreigners and domestic pension funds), which, in addition to a rise in yields, resulted in a larger government security portfolio. Because of the hedging transactions they concluded, an increase in bond market yields was accompanied by a simultaneous rise in swap market yields (Chart 2-4). If, however, swap spreads widen, the position incurs losses, and when a certain loss limit (stop-loss limit) is exceeded, investors must close their positions (sale of bonds and conclusion of a reverse swap deal). This, however, given the prevailing subdued demand in the government bond market, generated a sharp rise in bond yields and a further widening of swap spreads.

5. In January and February 2008, some market participants had been expecting narrowing swap spreads and took positions similar to the ones described in the previous paragraph (purchase of government bonds and deal of a corresponding swap transaction) also for speculative purposes, which could have been profitable if spreads had narrowed. During the period starting from 2005, the historical peak of swap spreads was 20 to 30 basis points. It is this past experience that might have made some market players believe that spreads would narrow.

6. Although the rise in long-term yields was intensified by numerous technical factors, stronger investor confidence in Hungary would have prevented such a rise in yields or such a significant drop in the market liquidity. Had that been the case, there must have been buyers entering the market because of the rising yields. The absence of significant interest from domestic institutional investors, foreign real money investors or hedge funds despite

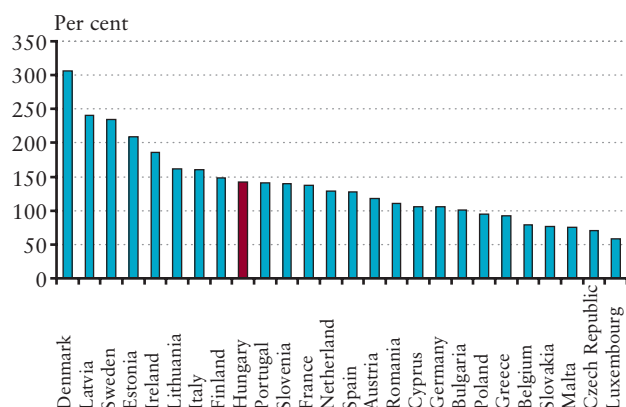
markedly growing yields suggests that the majority of the market participants sensed a significant increase in risks of HUF investments. Overall, the unfavourable growth outlook for the domestic economy and the high level of external debt, combined with lower global liquidity, have created an increasingly adverse climate for domestic securities in the context of competition for international investors.

## Liquidity of the banking sector

**The asset-side liquidity position of the banking system has weakened.** The liquid assets-to-total assets ratio, which used to steadily stand around 20 to 22 per cent, dropped to 16 per cent by end-2007. This process mainly affected the HUF liquid assets, reflecting a fall in the structural liquidity surplus (Chart 46 in the Appendix). Another unfavourable development concerning the operation of financial institutions and their asset-side liquidity is the strong fluctuation of the financial markets' liquidity, especially related to the government bond market.

**Chart 2-5**

**Loan to deposit ratio in comparison to EU member states (2007)**



Note: Loan to deposit ratio = total customer loans to total customer deposits.

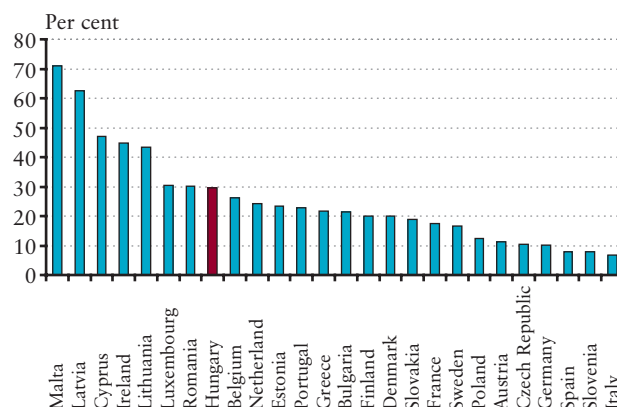
Source: ECB.

**Due to a deteriorating loan-to-deposit ratio caused by rapid lending dynamics, dependence on foreign funds is increasing further.** The acceleration in lending growth and turbulence on the money markets cause an unfavourable shift which is detrimental in several respects. Expansion of lending activity entails a deteriorating loan-to-deposit ratio and a massive widening of the funding gap<sup>29</sup>. Savings

rechannelled by investment funds to banks can only partially counterbalance moderate growth in household deposits<sup>30</sup>. Although a 142 per cent loan-to-deposit ratio is not outstanding by international standards, it has been continuously rising (Chart 2-5). This leads to an increasing proportion of foreign funds in the financing of the lending activity. Foreign funding within the external financing is approximately 30 per cent, which is not extremely but relatively high (Chart 2-6).

**Chart 2-6**

**Foreign funds of the banking systems as per cent of total external funds in EU member states (2007)**



Source: ECB.

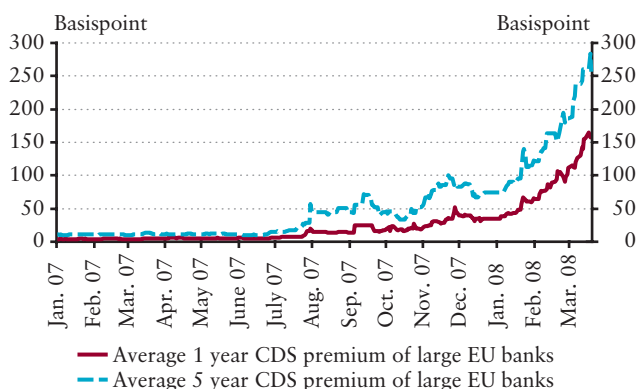
**Banks in the euro area have been relying to an increasingly large extent, on short-term funding.** There has been strong differentiation between short-term and long-term foreign funding in terms of risk premia on the developed markets. Currently, the 3-month TED spread (the difference between the 3-month interbank interest rate and the 3-month risk-free interest rate) and 1-year CDS (credit default swap) premia exceed the level of July 2007 by 50 to 60 and 120 to 130 basis points, respectively (Charts 1-7 and 2-7). By contrast, 5-year CDS premia, used to estimate the long-term funding costs, have increased by 250 to 260 basis points since July 2007.<sup>31</sup> Robust growth in CDS premia is

<sup>29</sup> Funding gap: (Loans to clients – deposits from clients)/loans to clients. It signs the percentage of loans to clients unfunded by deposits from clients.

<sup>30</sup> For details, see the Chapter on the Risks of the non-bank financial intermediary system.

<sup>31</sup> We must be cautious when drawing conclusions from CDS premia changes since the turmoil affecting the market confidence has lead to large gap in the price of structured credit derivatives and the underlying assets. As a result, CDS premia must be viewed as upper estimates of risks.

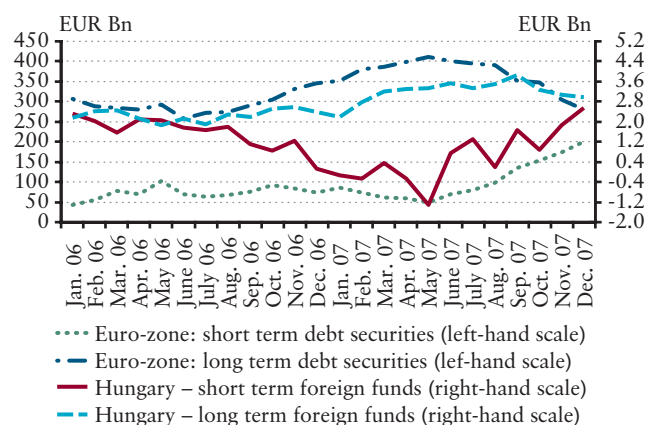
attributable to rising credit risks on the one hand, and the weaker confidence in credit derivatives' ratings by credit rating agencies on the other hand (Chart 2-7). Trying to avoid the high price of liquidity from becoming anchored, the banking system in the euro area has responded to the gap in the costs of short and long-term funding, i.e. differences in liquidity conditions over various time horizons, by shortening the securities issuance (Chart 2-8).

**Chart 2-7****Cost of short-term and long-term foreign funding**

Note: Large EU banks: ABN Amro, Deutsche Bank, Commerzbank, Dexia, Dresdner Bank, Fortis, Unicredit, ING, HSBC, UBS.

Source: Datastream.

**Due to the high proportion of foreign and/or parent bank financing, the Hungarian banking system is not isolated from unfavourable global trends.** In 2006, the increase in the average maturity of foreign liabilities was seen as a positive development. However, from May 2007 onwards, the weight of short-term foreign liabilities started

**Chart 2-8****12-month change in short-term and long-term funds**

Note: Euro area: Net issues (EUR billions; transactions during the month; nominal values) of debt securities issued by Euro area residents (fixed composition) by original maturity and currency.

Source: ECB, MNB.

to increase again (from 32 per cent in late May to 38 per cent at the end of the year) (Chart 47 in the Appendix). The substitution of client deposits, i.e. the most stable type of funding, with foreign and/money market funding adds alone to risk, while shift towards short-term maturities affects maturity mismatch adversely.

**The cost of foreign funds and the total cost of funding have grown by 150 to 180 basis points and 40 to 50 basis points, respectively mainly due to market turmoil.**

In addition to the deterioration in the maturity structure of funding, another unfavourable fact is that any rise in interest rates of foreign interbank markets is immediately reflected in Hungarian banks' funding costs. Due to the short, typically 90-day, re-pricing periods, the existing foreign liabilities are also re-priced quite quickly. Based on short-term interbank rates and CDS premia, the cost of foreign funds has increased by 150 to 180 basis points since early 2007, due to a lesser degree to a rise in the key policy rate of the ECB and the Swiss central bank (50 and 75 basis points, respectively) and to a greater degree to rising risk premia (100 to 125 basis points). This, however, may vary considerably from one bank to another, subject to the size of available liabilities from clients and the pricing strategies of the parent bank. The banking system's total cost of funds has grown by 40 to 50 basis points, due to the 30 per cent weight of foreign liabilities.

**The availability of FX funding is weaker than that of HUF funding.**

A rise in the weight of less stable liabilities may pose a truly serious risk if the stable components of liabilities are insufficient to finance illiquid assets. Although the high stable-funding to-illiquid-assets ratio, characterizing the Hungarian banking system, decreased somewhat in 2007, it remains high at 107 per cent. While the stable HUF funding surplus is significant (at 114 per cent), the availability of foreign exchange funding financing robust FX lending has become even more limited: stable FX liabilities cover only 63 per cent of illiquid FX assets. In addition, as maturities are shortening, the renewal risk of funding is also becoming higher; and no substantial improvement is expected in the unfavourable maturity and funding cost structure before the calming of global financial turbulences. The tightening funding position lends special importance to the liquidity trends of foreign parent banks, which play a key role in the funding of subsidiaries (approximately 50 per cent of foreign liabilities are provided by owners). Although, according to the information available to us, the majority of the foreign banking groups present on the Hungarian market are only slightly affected by the US sub-prime mortgage crisis and thus are able to provide liquidity for their subsidiaries, but a persistence of market turmoil may add uncertainty to the current situation. In a situation of this nature, it is very

important for domestic banks to have a liquidity emergency plan to be protected against a potential crisis. To ensure this, frequent revision and testing of liquidity plans is needed, taking into consideration of the effects of the current market turbulence and building up group-level co-ordination.

## 2.1.2 CREDIT RISK

*The performance of the corporate sector is fundamentally determined by declining domestic demand and strong foreign demand. Demand and cost shocks have led to smaller corporate profits, subdued capital investment activity and higher corporate vulnerability. Despite a slowdown in economic growth, indebtedness has continued to increase both from foreign and domestic sources. There is a dynamic increase in the foreign currency denominated loan portfolio of domestic banks, which leads to an increase in exchange rate risks. The quality of the portfolio has deteriorated significantly in the construction industry and among micro-enterprises, reflecting the sensitivity of these sectors to domestic trends. Although the unfavourable macroeconomic outlook and the passing on of rising costs of funds to clients may weaken credit demand in the future, due to rapid corporate adjustment on the labour market, the portfolio is likely to deteriorate to a lesser extent.*

*Households have decreased their consumption to a smaller degree than their income position is worsening, which is financed from a lower saving rate, using up previous savings and significant net borrowing. Consumption smoothing leads to higher-than-expected net borrowing. This is facilitated by increasingly keen risk-based competition, reflected in product innovation (Japanese yen-based loans) and the easing of lending conditions (longer maturities, higher LTVs). As indebtedness rises, the repayment burden increases as a ratio of income, which is, in the case of the poorest households with practically no savings, approaching a critical level. The quality of the household loan portfolio has been deteriorating slightly, which, in turn, necessitates increasing loan loss provisioning. In the future, despite increasing real wages, rapid corporate adjustment to adverse macroeconomic conditions may, through higher unemployment, weaken the income position of the household sector, the quality of the household loan portfolio and households' demand for loans. Lending is, however, unlikely to lose momentum due to strong credit supply pressure, which is manifest, in addition to a risk-based competition, in the fact that the rising costs of funds are only passed on slowly and partially in the household loan market.*

## Corporate sector

### Slowing growth, rising costs

**Trends in the corporate sector are fundamentally determined by falling domestic and strong foreign demand.** In line with expectations, the cost and wage shocks triggered by the government's fiscal adjustment package mainly hit companies operating in the domestic market. Still strong, but decreasing external demand and increasingly severe export competition, however, have tempered the previous optimism in the manufacturing industry as well. Of the industries that sell in the domestic market, it is mainly the construction industry and agriculture where default risks are rising; but risk is moderately on the rise in market services as well.

**The profit of the domestic companies decreases, the growth rate of capital investment is low.** Mainly in the market services sector as a respond to the declining unit labour cost-based profit in early 2007, a slow labour market adjustment started, initially affecting incentive bonuses, then the hours worked and finally also employment. At the same time, the rise in risk premia due to financial turbulences may affect adversely the profitability of manufacturing companies with foreign loans, as the cost of foreign sources rises faster than in that of domestic ones. As capital investment is a key factor in respect of lending and lending risks, the private sector's reaction to the 2006 fiscal adjustment package and other cost shocks is unfavourable. Over the past year there was no significant growth in corporate investment, or where there was, it concentrated only on specific sectors. The above trends in profits and investments lead to the moderation in corporate borrowing requirement; thus, credit demand mainly finances liquidity needs.

**Although vulnerability has increased, so far bankruptcy rates in the various sectors have not reacted to macroeconomic developments.** The bankruptcy rate has remained stable at a high level in the construction industry and declined slightly in the services sectors (Chart 12 in the Appendix). That is, the bankruptcy rate increased as a response to the shocks in 2006, and then only a slow correction commenced. (For the sensitivity of the bankruptcy rate to shocks, see Box 2-2.)

**Macroeconomic trends and vulnerability are expected to continue to develop unfavourably.** In 2008, labour market adjustment of the corporate sector may be much

stronger, but despite this no significant rise in corporate profits can be expected in the baseline scenario. The modest increase in household consumption will mainly impact sectors selling in the domestic market, while rising energy

and gas prices will affect all sectors adversely. Weaker foreign demand, on the other hand, may have a negative effect on the production and capital investment of the manufacturing industry.

### Box 2-2: Interaction between the corporate bankruptcy rate and the macro-environment

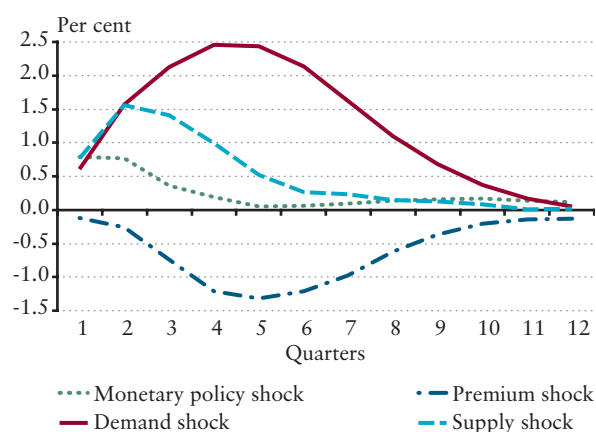
Corporate loans represent a significant share of the asset portfolios of banks in Hungary. Consequently, changes in the quality of the corporate loan portfolio have a major impact on the profitability and capital position of banks and, hence, on the stability of the financial system. The analysis presented here examines the vulnerability of the banking system stemming from changes in the corporate credit portfolio's riskiness.<sup>32</sup>

For this analysis, we used a structural vector autoregressive (SVAR) model. This framework enables one to examine the dynamic responses of the variables included in the system to an appropriately identified shock and the interactions that emerge between these in the periods following the given shock. The functions thus generated are called *impulse response functions*. These show the extent to which variables depart from their baseline level as a result of the given disturbance.

For this analysis four-variable models were employed in all cases. Each model used three macroeconomic variables and one that measured the aggregate portfolio quality. The macro-variables constituting the basis of the models are as follows: the three-month interbank (BUBOR) rate, the spot EUR/HUF exchange rate, the consumer price index (CPI) and GDP. The aggregate corporate bankruptcy rate is used to proxy the risk characteristic of the credit portfolio. The time series utilized for the analysis contains quarterly observations for the period 1995-2006. Overall, four scenarios were identified, two of which stem from the financial and two from the non-financial side of the economy. From a financial perspective, we examined the impacts of monetary tightening measures and a rise of the HUF risk premium. Thus, we first analysed an unexpected rise in short-term interest rates which leads to appreciation of the EUR/HUF exchange rate. In the second case, a rise in the risk premium results in HUF depreciation, which the central bank attempts to stop by raising the base rate. The two real economic shocks include a fall in the GDP on both the supply and demand sides. The difference between the two shocks is that the former exerts downward pressure on prices, while the impact of the latter is exactly the opposite.

In all four cases, the size of the shock was identical to one standard deviation of the error component of the shock variable. This corresponds to an approximately 0.15 per cent decrease in GDP in the case of real shocks, a 0.9 per cent depreciation in the case of a premium

**Chart 2-9**  
Impulse response function of bankruptcy rates following the four macro shocks



Note: The values of the function show the deviation from the baseline in terms of percentage.

Source: MNB.

shock and a 35 basis point interest rate increase in the case of a monetary policy shock.<sup>33</sup>

The immediate effects of both demand and supply shocks are roughly the same (Chart 2-9). However, with respect to its maximum impact, the bankruptcy rate rises to a higher level, to approximately 2.5 per cent above the baseline, in the case of a demand shock. The corresponding figure for supply shocks is around 1.5 per cent. Another major difference between the two real shocks is that while the impact of a supply shock disappears relatively rapidly, it takes nearly 11 quarters for the rate to return to the baseline after the demand shock. For a supply shock this only takes 6 quarters.

An unexpected monetary tightening immediately raises the bankruptcy rate by 0.8 per cent. Although the response is quite rapid, the impact of a higher interest rate is rather short-lived; the bankruptcy rate returns to the baseline before the end of the first year. After a shock to the risk premium, the bankruptcy rate slowly starts decreasing, reaching the maximum impulse value in the fifth quarter, 1.2 per cent below the baseline. The shock exerts its influence for 10 quarters. Thus, a negative

<sup>32</sup> Zoltán Vársány (2008): Financial Stability and the Macroeconomic Environment, MNB Working Papers, forthcoming.

<sup>33</sup> As the impulse response functions are derived from a linear relationship, the effect of larger shocks can simply be calculated by multiplying the responses obtained here.

premium shock – presumably because the more depreciated exchange rate has a positive effect on the profitability of exporting companies – reduces the bankruptcy rate, i.e. it improves portfolio quality over the medium term. It should be noted, however, that the result pertains to the entire period surveyed rather than the current situation. As the share of FX loans in debts started to grow only in the second half of the period under review, in respect of the entire period, the favourable impact of the exchange rate via exports still outweighs the negative impact of the exchange rate via open net FX positions.

In addition to the above, we also studied the dynamic response of the bankruptcy rate in the model to the shocks implied by the risk scenario

**Chart 2-10**

**Impulse response function of the bankruptcy rate in the risk scenario**



*Note: The values of the function show the deviation from the baseline.  
Source: MNB.*

described earlier (Table 1-4). To do this, we calculated how the value of the impulse response function of the bankruptcy rate would change if the impulse response function fell to an extent shown in Table 4 in the first period following the shocks. We performed such calculations for a decrease in GDP (a 2.8 decrease compared to the baseline) and for forint depreciation (2.5 depreciation compared to the baseline), and finally added up the bankruptcy rates thus calculated. Although a SVAR can be used to measure the impact of shocks of any size in this manner, it should be noted that the larger they are, the more likely that the results will be biased. In our opinion, the results thus obtained provide an acceptable estimate of the bankruptcy rate changes as a result of the shocks in the risk scenario.

The bankruptcy rate in the combined risk scenario (Chart 2-10) rises by 12 per cent above the baseline value immediately following the shock, and then, reaching its maximum value, by close to 25 per cent above the baseline value during the second period, and finally, it reverts to the pre-shock level by the middle of the second year. Thus, due to these shocks, the aggregate bankruptcy rate grows by nearly one quarter of its value. Of the two shocks, the productivity-induced decline in GDP is undoubtedly the more profound. Although a depreciated forint reduces the instances of bankruptcies in this case too, its counterbalancing impact in comparison to the negative affect stemming from a decrease in GDP is significantly smaller.

We can conclude that real shocks exert a significantly stronger (negative) impact on corporate bankruptcy rates than financial shocks do. Within these, a negative demand shock has the most profound effect in terms of both the maximum value and the length of the impulse response.

## Further rise in indebtedness

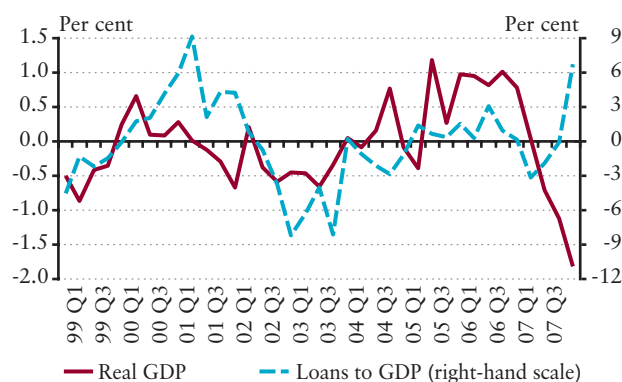
### Indebtedness in the corporate sector is on the rise.

Contrary to past tendencies, corporate indebtedness is moving countercyclically, departing from GDP growth (Chart 2-11), and as a result, the GDP-proportionate credit portfolio now exceeds 65 per cent. One reason behind the deviation of GDP growth and loans-to-GDP is that the decrease in the GDP growth rate is explained by the public sector and not by corporate activity. Despite the significant increase, the loans-to-GDP ratio still falls behind the euro-area average (80 percent), but it exceeds the level found in a number of Central and Eastern European countries.

**Although the share of external sources in total liabilities has been on the rise, it remains low by international standards (Chart 2-12).** Domestic

**Chart 2-11**

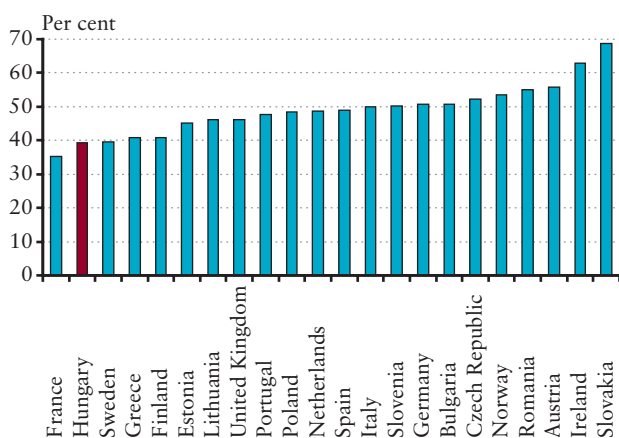
**Loans to GDP and GDP – deviations from trend**



*Note: Deviation from trend was calculated from seasonally adjusted data. Thus, the chart represents the cyclical components of the time series.  
Source: HCSO, MNB.*

Chart 2-12

## Ratio of external sources to liabilities in EU countries (2006)



Source: Eurostat.

corporations rely more heavily on non-debt liabilities than enterprises in other European countries do. However, it should be noted that this share has been changing: with debt on the increase, the share of non-debt external liabilities has been declining. This may represent a permanent change in the external financing structure of corporations, bringing it closer to the financing structure of developed countries.<sup>34</sup>

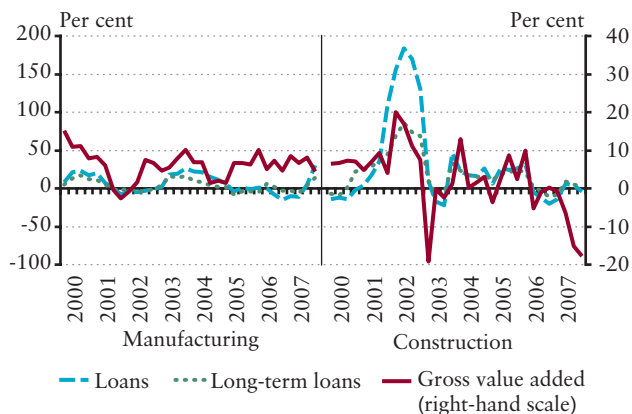
## Borrowing exceeds expectations

**Enterprises have increased their borrowing from both domestic and foreign sources.** The loan volume of corporations grew by 21 per cent in 2007, adjusted for exchange rate changes, and within that foreign loans rose by 29 per cent. In line with earlier expectations, borrowing from domestic banks declined in 2007 Q1, followed by a significant correction during the rest of the year. The portfolio adjusted for exchange rate changes rose by 14 per cent during the year, while annual net borrowing adjusted for exchange rate changes was 28 per cent higher than in 2006 as a whole. In the case of loans from domestic banks, cheaper foreign currency loans, mainly for longer maturities, have clearly been taking the lead: the volume of long-term HUF loans has been dwindling, while by contrast, EUR and CHF-based lending has been outstandingly high. This results in a rise in the loan portfolio fuelled by foreign currency lending which develops differently from economic growth and capital investment dynamics at both the national economic and sectoral levels (Chart 2-13).

**One of the underlying reasons for the stronger-than-expected rise in domestic loans is that companies are**

Chart 2-13

## Increase of gross value added and real growth rate of domestic bank loans to the manufacturing and construction sectors



Note: Loans are deflated by the industrial price index, loans to construction industry are corrected with the buyout of loans by the government.

Source: HCSO, MNB.

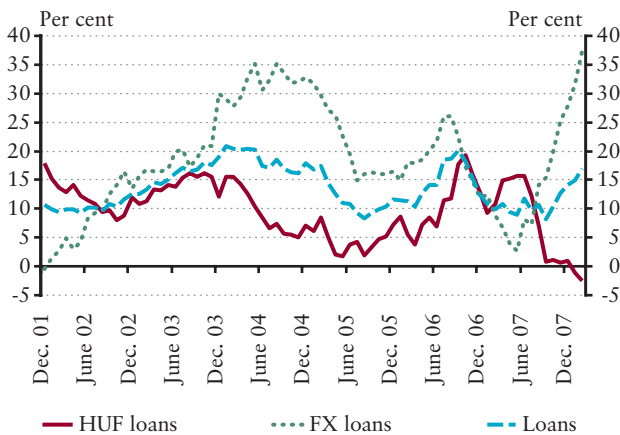
**partially replacing their foreign loans with domestic ones.** As regards the manufacturing sector, the gap between real economic indicators and the growth rate of loans from domestic banks seems to be narrowing, which means that manufacturing companies are now financing production and capital investment with domestic bank loans to a larger extent than in the past. These loans do not necessarily finance domestic activities however: international companies may also raise loans from domestic banks through their subsidiaries in Hungary, to finance the operations of their subsidiaries abroad. Furthermore, the interest rate premia on domestic loans over both interbank interest rates and the interest rates of similar loans in the euro area have decreased markedly, suggesting that for the time being banks are not passing on the costs of funds to clients, i.e. borrowing from domestic banks is becoming cheaper compared to foreign funds. According to the MNB's Senior Loan Officer survey of January 2008, both new and existing clients may be charged higher interest rates in 2008. If this continues to occur only partially, i.e. domestic corporate loans become relatively less expensive than their foreign counterparts, domestic credit demand is unlikely to weaken.

**The significant increase in foreign exchange loans is due mainly to differences in instalments, and the intention of natural hedging plays a smaller role.** If companies with natural hedges raise foreign exchange loans, this reduces exposure to the exchange rate. On the other hand, a rise in the number of clients without foreign exchange income or with low exchange risk awareness adds to credit risks. However,

<sup>34</sup> For details, see the relevant study to be published in the 29 April 2008 issue of the MNB Bulletin.

Chart 2-14

## Growth rates of HUF and FX loans from domestic banks



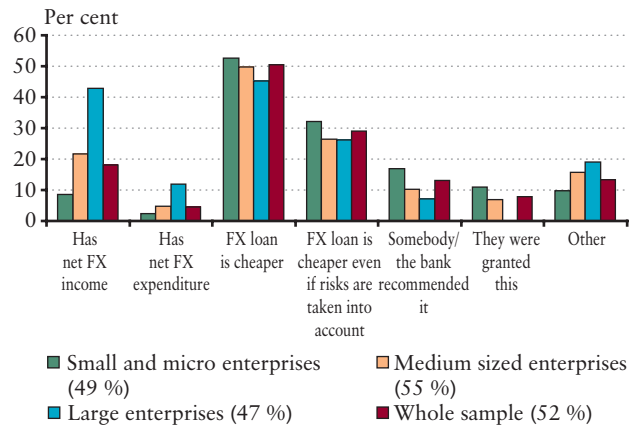
Note: Adjusted for exchange rate developments (recalculated at December 2000, end-of-month exchange rate) HUF loans are corrected with the governmental buying-out of loans.

Source: MNB.

based on the relationship between the growth of FX loan volume (Chart 2-14) and the change in the exchange rate we draw the conclusion that a large proportion of the companies do not use FX loans for the purpose of natural hedging, but rather because of the difference in interest rates. Higher exchange rate volatility, on the other hand, decreases demand for FX loans over the short term. According to a questionnaire survey conducted on behalf of the MNB among corporations in 2007,<sup>35</sup> companies that accumulate FX debts without a natural hedge are in the majority. The primary reason for raising FX loans is their lower costs: half of the FX debtor companies decide on FX loans because of the difference in instalments compared to HUF loans, and only 25 to 30 per cent take both risks and costs into consideration (Chart 2-15). It should be noted that a significant proportion of companies raise debt in foreign currency in order to be able to finance their expenses in foreign currencies. Furthermore, the questionnaire survey also reveals that the majority of the companies claim that they have no appropriate means at their disposal to manage foreign exchange risk: they think available tools are either costly or complicated. Finally, they do not expect such a shift in the exchange rate as a result of which

Chart 2-15

## Motives of FX borrowing based on a survey



Note: Enterprises asked could give more than one reason to have FX debt, so the sum of columns is not 100 per cent. Groups of firm size are based on number of employees. The numbers in parentheses show share of firms having FX debt in the given size category.

Source: MNB survey.

they would incur substantial losses, i.e. major exchange rate volatility would represent an unexpected shock to them.

**Borrowing is expected to moderate in 2008.** The pricing of the rising cost of funds in lending rates may first occur in the case of products with a low margin, i.e. in the corporate market.<sup>36</sup> Due to the prevailing macroeconomic environment and rising lending rates, lending to the manufacturing sector may slow down. Lending to the construction industry is likely to be subdued, owing to industry-specific problems. By contrast, lending to the services sector may remain moderate and continue to serve the financing of liquidity. On the other hand, the declining growth of domestic bank loans can be partially counterbalanced if raising interest rates influence domestic loans to a smaller degree than foreign loans, i.e. if substitution continues.

## Commercial property financing

**From the perspective of increasing domestic bank loans, the real estate sector has been assuming an increasingly strong importance.**<sup>37</sup> A dominant part of the

<sup>35</sup> The survey, focusing on indebtedness, foreign exchange rate exposure and trade credits, was conducted among non-financial enterprises between July and October 2007. A total of 681 companies answered all the questions. We worked in co-operation with derive Kft. on preparing the questionnaire, while actual surveying was conducted by MKIK-GVI. The detailed results of the survey are being processed at the moment.

<sup>36</sup> For more details about the causes, see the Chapter on The financial position of the banking system.

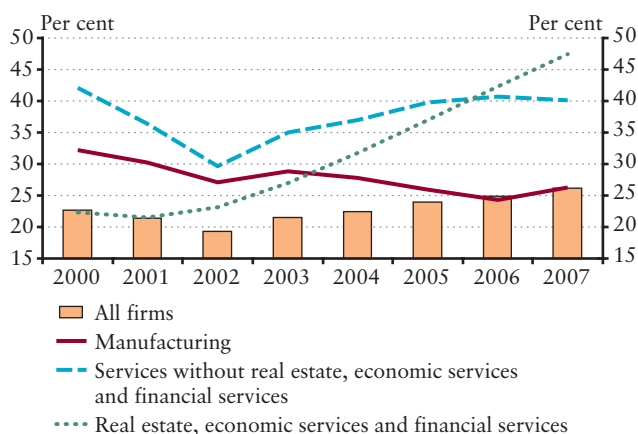
<sup>37</sup> By 'real estate sector' we mean the enterprises included in the 'Real estate and business services' industry based on the applicable TEAOR (Standard Classification of Economic Activities) code. Such enterprises include businesses engaged in real property development, selling, sale and purchase, letting and maintenance and operation, real estate agencies, entities engaged in the management of real property or providing business services (letting, IT activity, research, development, services supporting business operation). On the other hand, the category of the construction industry sector includes businesses engaged in construction works. It is worth noting that, for the time being, there does not seem to be any correlation between the indicators of the construction industry and the real estate and business services sector. This may be due in part to the fact that the majority of the problems in the construction industry emerge in connection with state-financed projects, and in part to the fact that construction industry companies do not infect businesses in the real estate sector significantly.

net increase of the loan volume and 35 per cent of the overall loan portfolio are linked to businesses operating in the real property sector. Compared to other sectors, this credit market is more concentrated, and considering the fact that loans are sizeable here, loans to the real property sector within the individual bank loan portfolios carry special risks. The sectoral loan-to-gross added value ratio has doubled over the past 5 years and grown to become the highest among industries (Chart 2-16). This indicates that businesses in this sector rely on the domestic banking system more than others. Accordingly, trends in the real property sector have an important influence on the banking system.

**For the time being, credit risk of the property sector is difficult to assess.** The indicators of the sector (bankruptcy rate, portfolio quality) are rather good, with risks clearly rising only in the field of residential property construction. With regard to the office property market, which accounts for a large portion of commercial property loans, expected growth in the rate of vacancy did not occur, despite a dynamically increasing real estate portfolio. Risks and growth are moderate in the market of real property for logistics purposes and shopping malls. The US sub-prime mortgage market crisis may also exert influence on the domestic economy through the commercial property market (via expected yields and the foreign parent companies of enterprises operating in the sector). Due to the significant weight and concentration of loans extended to the real property sector, this may affect the largest banks adversely.

**Chart 2-16**

**Ratio of domestic bank loans and gross value added in sectoral breakdown**



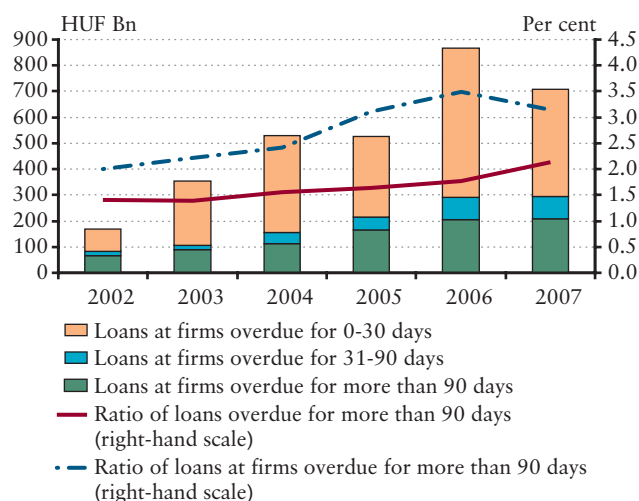
Sources: HCSO, MNB.

**Substantial deterioration in the portfolio quality of loans to the construction industry and micro-enterprises**

**There has been no significant change in the quality of domestic banks' loan portfolio.** Although the proportion of loans overdue for more than 90 days has risen, that of receivables from defaulting debtors, following a rise in 2006, has declined (Chart 2-17). This contradicting process hints that, although on the whole exposure towards bad debtors is smaller, the quality of the loans owed by such customers has been deteriorating. This may reflect a smaller likelihood for the recovery of bad debts.

**Chart 2-17**

**Volume and ratio of overdue loans**



Note: When aggregating loans, we consider only loans overdue, when aggregating firms, all loans to enterprises which have at least one overdue loan are totalled.

Source: MNB.

**The portfolio quality of the loans of the construction industry and micro-enterprises is outstandingly poor.**

The loan loss reserves-to-gross credit portfolio ratio continued to rise steeply (Box 2-3). The significant deterioration in the credit portfolio of micro-enterprises is, however, a new phenomenon. A rapid rise in the amount of loan loss provisioning is likely to be attributable to the intensive loan supply experienced in this category earlier and the fact that, of the various types of corporations, it is micro-enterprises that are the most vulnerable. Thus, these are the most likely to suffer from the disadvantages of fiscal adjustment.

**Due to rapid corporate adjustment to the unfavourable macroeconomic environment, credit risks will only rise moderately in 2008.** This year, the quality of the credit portfolio will not deteriorate in the manufacturing industry. By contrast, risks remain significant in the construction industry. The impact of falling profits has so far been moderate in the services sector. If adjustment in the number

of employees continues, unfavourable macroeconomic processes will again affect the credit portfolio of the household sector the most. Despite the economic downturn, no rise in credit risks is expected in the agricultural sector, as EU subsidies have made the income of companies operating in this sector more predictable.

### Box 2-3: Credit risks in the construction industry

Although the weight of the construction industry is small both in domestic production<sup>38</sup> and corporate lending, its recent problems are strongly reflected in both macroeconomic processes and the credit risk of the banking system. This sector is the most susceptible to macroeconomic shocks, which is due, in part, to its dependence on government contracts and, in part, to the high number of subcontractors. Irrespective of the type of the shock that may occur, this gives rise to faster contagion here than in any other industry. Although construction industry output has been declining only since 2006, the bankruptcy rate of the sector has been exceptionally high for years and its trends have been on an upward path, which is also reflected in the

quality of the portfolio (Chart 2-18). If economic growth remains sluggish, risks will not decline in the future and, hence, the quality of the portfolio will not improve either. The sharp rise in loan loss provisioning reflects preparation for risks, however, we would not rule out the emergence of further substantial losses.

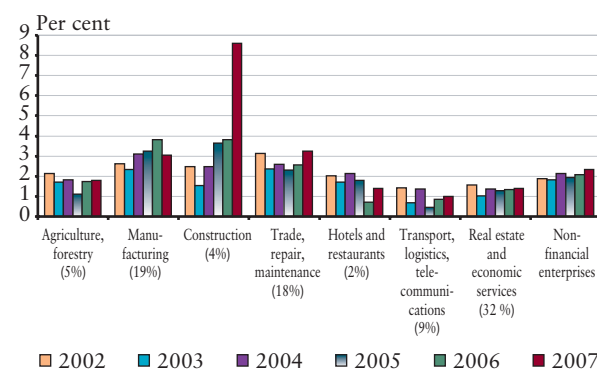
While portfolio quality deteriorated to a large degree, the growth rate of borrowing has not slowed down significantly, despite the presumed decline in both credit demand and supply. This may be due to construction companies participating in projects financed by the private sector. Market information confirms that bankruptcies and gridlocks are common mainly in the case of state-financed projects, while credit risk is likely to be smaller and borrowing is heavier in the case of private sector-financed projects. Another reason is bank guarantees, which prevent banks from exiting the financing of companies in the short run.

In 2007, a questionnaire survey was conducted among corporations. The survey also covered trade credits, and underscored the seriousness of the problems caused by construction industry gridlocks. In the construction industry payment deadlines for accounts receivable exceed the corporate average significantly and they are also looser in the case of accounts payable than in other sectors (Chart 2-19). Longer payment deadlines necessitate higher trade credit volumes and add to the related risks in the sector.

The survey also confirmed information on lax payment discipline in the construction industry. This sector had the highest proportion of companies that, during the two years preceding the survey, regularly

**Chart 2-18**

### Loan loss provisioning as a ratio of loans by industry



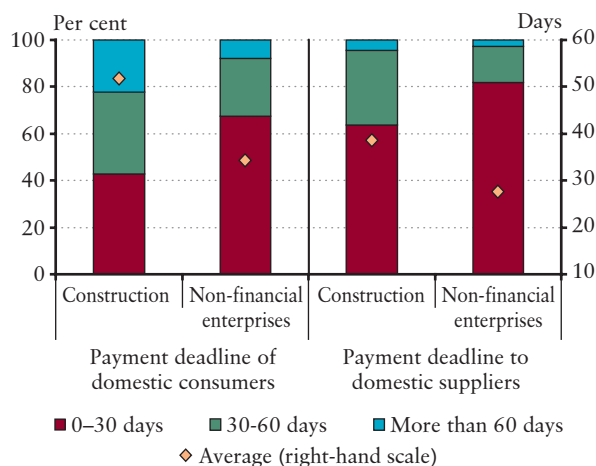
*Note: The Q4 2007 share of the sector in corporate loans is shown in brackets.*

*Source: MNB.*

<sup>38</sup> For the macroeconomic performance of the construction industry, see Box 1.1 in the Report on inflation, November 2007.

Chart 2-19

### Payment deadlines in the construction industry and in the corporate sector



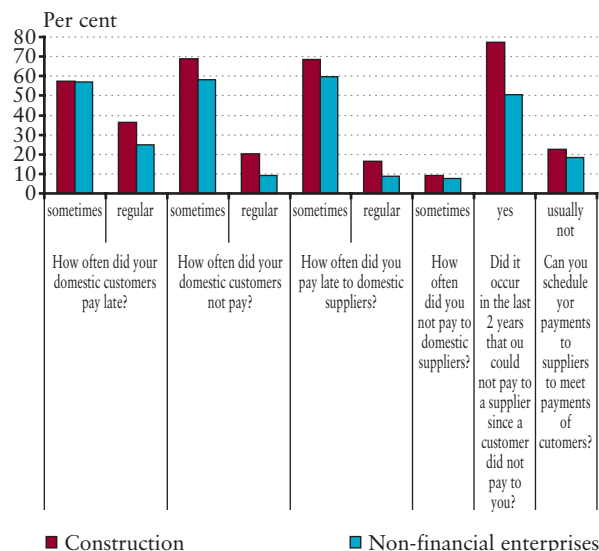
Note: The columns show the ratio of respondents in each category.

Source: MNB survey.

experienced the late payment of or default on domestic accounts receivable and those who, due to such delay, were also late to settle accounts payable (Chart 2-20). It also had the highest proportion of companies that, during the year preceding the survey, experienced an increased frequency of late payment: 82 per cent of construction industry companies and 57 per cent of all sample companies experienced this.<sup>39</sup> In order to prevent the late payment of or default on

Chart 2-20

### Payment discipline in the construction industry and the corporate sector



Note: The columns show the ratio of respondents in each category.

Source: MNB survey.

domestic accounts receivable, a higher number of construction industry companies resort to factoring than in the overall sample. We deem factoring a favourable development from the perspective of credit risks, because it may mitigate further losses in the sector.

## Household sector

### Decreasing real wages, worsening labour market conditions

**Contrary to expectations, declining real wages affect lower-income households significantly as well.** The fiscal adjustment package exerted an asymmetric impact on households with different income levels. As a result, disposable real income fell to a lesser extent in the lower income categories than in households with higher income. At the same time, higher-than-expected inflation, especially the rise in food prices hit lower-income households harder, due to the different consumer baskets.

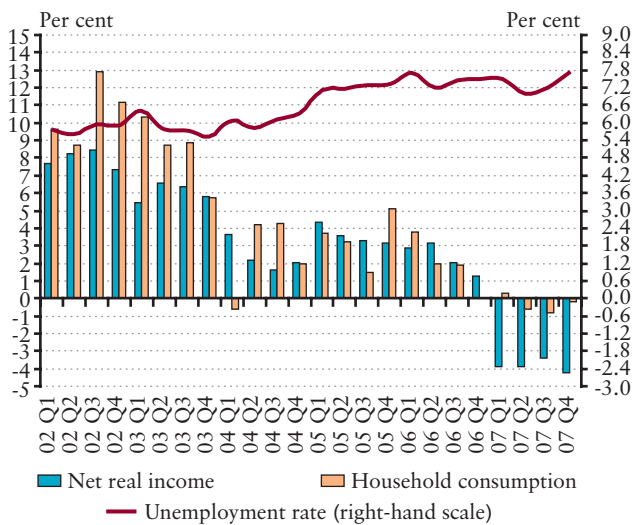
**Weakening corporate profit outlook fosters deteriorating employment conditions.** While prior to

end-Q3, companies had responded to deterioration in their income position by cutting back on bonuses and hours worked, signs of adjustment through workforce were also discernible in the final quarter<sup>40</sup> (Chart 2-21). The unemployment rate started to climb in December, and in January the proportion of unemployed rose to over 8 per cent. This is a rather unfavourable development from a stability point of view, since the loan repayment ability of households is very sensitive to unemployment, which is also confirmed by stress tests.

**The income position of households will remain unfavourable.** Expectations are for a moderate rise in real wages in 2008. However, rapid corporate adjustment to unfavourable macroeconomic conditions may lead to a further rise in unemployment. On the whole, these two opposing impacts will not improve the income position of the sector.

<sup>39</sup> The above information was also confirmed by other sources. In their survey entitled 'An SME Review – July 2007: The business situation and debts of small and medium-size companies', MKIK GVI and Volksbank also found that the proportion of the companies with the largest average amount of receivables or debts and the largest average amount of receivables from other companies were the highest in this sector and rose further in 2007.

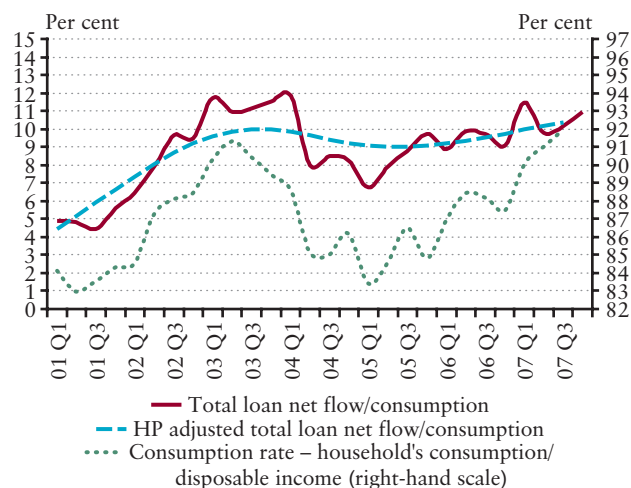
<sup>40</sup> Currently, this is only discernible in the public sector and the construction industry, because the fiscal adjustment package is likely to have affected them the most.

**Chart 2-21****Changes in net real wages, unemployment and consumption on a yearly basis**

Source: HCSO and MNB.

**Accelerating credit demand, increasingly aggressive risk-based competition – the emergence of JPY-denominated loans**

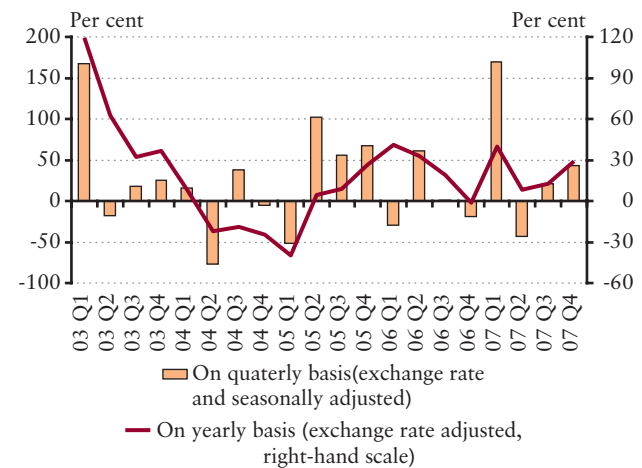
The consumption rate is rising while consumption is increasingly financed by credit. A rise in the net borrowing-to-consumption ratio is a natural phenomenon

**Chart 2-22****Households' consumption, net borrowing and consumption rate**

Source: HCSO, MNB.

which is fundamentally linked to the process of convergence (Chart 2-22). This process was arrested by the delayed impact of a significant increase in real wages in 2002, as households became less dependent on loans to maintain or increase their consumption level. In line with a deceleration of growth and a fiscal adjustment-driven drop in real income, the consumption rate started to increase again, in which, however, consumption smoothing through borrowing also played an important role.

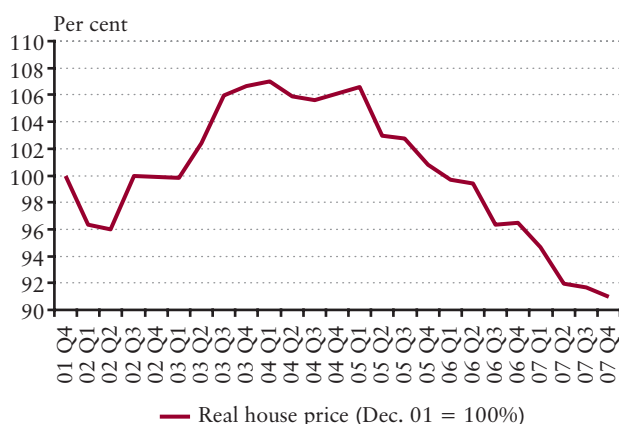
**Total net borrowing shows a robust increase.** Contrary to expectations, the growth rate of net borrowing has been accelerating as shown by both short- and long-based indices (Chart 2-23). This can be attributed predominantly to a higher-than-expected drop in real wages and a strong credit supply pressure. Within lending, foreign currency based lending for consumption purposes is undoubtedly the most dominant. Over 80 per cent of new originations in the banking system are foreign currency based; the corresponding figure for financial enterprises is even higher. Due to consumption smoothing, demand for foreign currency based home equity loans is especially strong.<sup>41</sup>

**Chart 2-23****Growth rate of household's net borrowing**

Source: MNB.

**The increase in the share of mortgage loans in the loan portfolio may mitigate credit risk.** From the perspective of the financial system, the availability of real estate collateral reduces losses. However, due to the increasing concentration related to the real estate market, the financial intermediary system may become more vulnerable to changes in the prices

<sup>41</sup> Under the current Hungarian practice the categorisation of consumer and housing loans is not necessarily based on their effective utilisation. According to some estimates, as much as 30 per cent of subsidised housing loans, available from 2002 onwards, were used to finance consumption, while FX-based home equity loans are often used for housing purposes, because administration related to borrowing and utilisation is much simpler, while regarding the pricing, differences between the two types of loans are diminishing.

**Chart 2-24****Changes in real house prices**

Source: Origo.

of residential property. Nevertheless, this phenomenon does not imply any significant risk. Neither house prices nor their movements suggest the development of a price bubble (Chart 2-24).

**The risk tolerance of Hungarian credit institutions has grown markedly.** Domestic banks have launched an increasing number of products with higher risk profiles and are loosening the lending conditions of their existing products at the same time. These two tendencies are signals of increasingly keen risk-based competition. In risk-based competition, banks strive to increase their respective market shares by taking higher credit risk.

**Chart 2-25****Composition of new credit contracts to households by their denomination**

Source: MNB.

**The most important development in product innovation is the emergence of JPY-based loans in the banks' product range.** Currently two banks are offering JPY-based loans to retail costumers. The popularity of the product is aptly illustrated by the fact that JPY-based loans accounted for around 8-10 per cent of all new loan contracts (Chart 2-25). In the case of housing and home equity loans the corresponding figures are even higher. Its share in the portfolio is, however, still around 1 per cent. There is a risk that due to the fierce competition other banks may also launch similar products, helping JPY-denominated loans to gain ground (Box 2-4).

**Box 2-4: Risks involved in JPY-based lending**

The emergence of JPY-based lending is unequivocally attributable to lower nominal interest rates, which allows lower instalments for borrowers, while the interest rate margin earned by banks does not decrease. In the part, CHF-based loans succeeded in replacing EUR loans for the very same reason. In Austria a similar rise in the role of JPY-based loans was witnessed around the turn of the millennium; however, Austrian clients had converted nearly all their JPY-based loans into CHF by 2004. As a result, currently the share of JPY-based loans does not exceed 1 per cent of the entire portfolio.

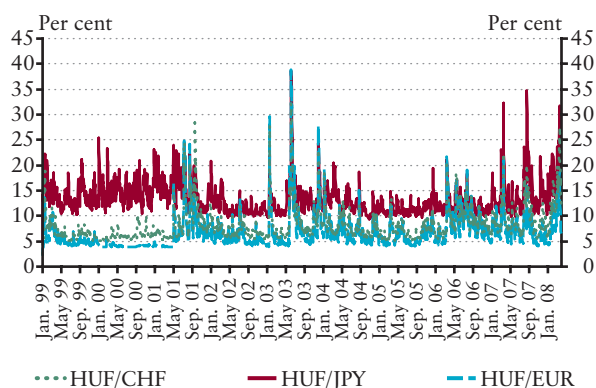
Over the past years the exchange rate of the Japanese yen against Hungarian forint has been rather volatile compared to the Swiss franc or the euro. The reason for this is that the fundamentals of the European economies and the Japanese economy are not closely related, and Japanese yen is one of the major foreign currencies used for financing carry trade transactions based on the interest rate differential. In order

to illustrate the volatility of the exchange rate of the Japanese yen, we use (GARCH) volatility computed from exchange rate data for the period between January 1999 and January 2008.

Based on GARCH volatility, it can be seen that the exchange rate of the JPY was more volatile than the CHF or the EUR (Chart 2-26). This suggests that JPY-based loans and, hence, future changes in instalments denominated in JPY, entail substantially higher exchange rate risks.

To determine the impact of the volatility of foreign exchange and interest rates on internal rate of return (IRR) of various foreign currencies, we used a simulation. We compared the IRRs of annuity loans starting monthly between 1 January 1990 and 1 February 1998, with a maturity of 10 years, a 3-month re-pricing period and LIBOR + 3.5 percent interest rate. In the simulation the IRR can be considered as an

Chart 2-26

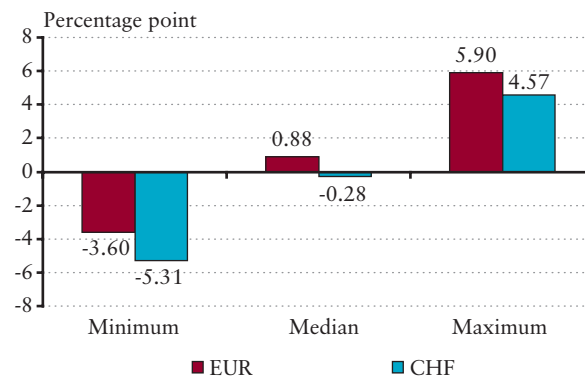
**GARCH volatility on some currencies' exchange rate to HUF**

Source: MNB.

ex-post cost of borrowing (APR) implying historical movements in exchange and interest rates.

Our results show that JPY-based loans did not always have a lower IRR than EUR-based ones. On the contrary, compared to CHF-based loans, JPY-based ones more often proved to be more expensive (Chart 2-27). Extreme values are especially conspicuous, suggesting a large degree of standard deviation and IRRs that are even twice as high as the average rate.

Chart 2-27

**Monthly interest rate advantage of JPY-based loans over other foreign currencies by their IRR**

Source: MNB.

In their joint recommendation,<sup>42</sup> the HFSA and the MNB drew the attention of financial institutions to the higher systemic risks posed by JPY-based loans. Apart from describing the higher risks associated with the Japanese yen, the two supervisory bodies put forward a proposal concerning the requirements for the assessment and management of these risks. In addition to the above, consumer protection considerations also form an important part of the recommendation, emphasising the dissemination and adoption of responsible lending practices.

**The spread of combined products in the market increases upside risks to stability.** Combined products in the household market are mostly unit-linked facilities or facilities combined with building society savings. Their common characteristic is that clients only pay interest to banks, while capital is accumulated in the linked product. In the case of foreign currency loans, exchange rate risk is higher with both products because – in contrast to annuity loans – the exchange rate prevailing at the date of maturity applies to the entire amount of the loan. As regards unit-linked products, a change of yields realised in the linked investment is another risk factor.

**As well as product innovation, the ongoing loosening of lending standards and conditions is another manifestation of risk-based competition.** The US sub-prime crisis prompted price and non-price based tightening of lending conditions overseas and in a number of European countries. In contrast, according to the MNB's lending survey, domestic banks are generally easing their lending

standards. Owing to the more relaxed conditions (higher LTVs, longer maturities) clients with low financial literacy may take on higher risk than their actual risk-bearing capacity. To avoid over-indebtedness it would be reasonable to establish a positive debt registry containing also information on retail clients with no problems servicing their debts.

**Net borrowing continues to grow in 2008, albeit at a slower rate.** In the macroeconomic baseline scenario, a moderate improvement in real wages and an unchanged level of consumption should theoretically decrease reliance on loans. It should be emphasised, however, that increase in unemployment and households' expectations regarding their future income position involve considerable uncertainty. Strong credit supply, i.e. risk-based competition, and the slow and only partial passing-on of the rising financing costs to debtors in the household market may increase net borrowing.<sup>43</sup> As a combined effect of demand and supply factors, a rise in net borrowing is likely

<sup>42</sup> For the joint recommendation of the MNB and HFSA, visit: [http://english.mnb.hu/engine.aspx?page=yen\\_recommendation](http://english.mnb.hu/engine.aspx?page=yen_recommendation).

<sup>43</sup> For more detail, see the Chapter on 'The financial position of the banking system'.

to continue, albeit at a slower rate. This may be strengthened by the fact that residential property ownership among Hungarian households is high even in international comparison, which provides ample room for further increase in mortgage lending.

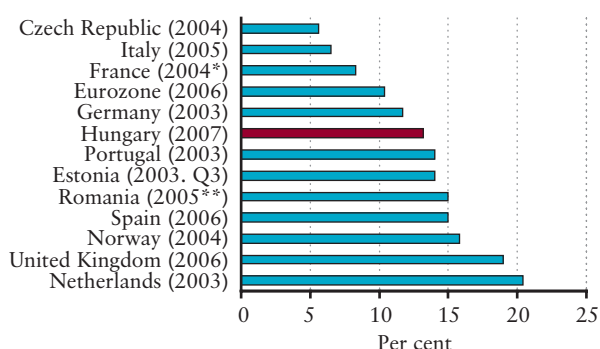
### Increasing indebtedness, especially in the lower income segment

**Heavy borrowing entails increasing household indebtedness.** As a proportion of GDP, the 28 per cent indebtedness of Hungarian households is significantly lower than the 55 per cent average in the euro area. By contrast, the 33 per cent financial obligations-to-financial wealth ratio already exceeds the 27 per cent benchmark level.

**Along with extremely strong lending, the debt service burden of household sector is increasing substantially.** The 13 per cent indicator as at end-December 2007<sup>44</sup> was a significantly higher value than the 10 to 11 per cent value in the euro area.<sup>45</sup> It must also be taken into consideration that the average level obscures some of the facts: there are significant differences between the individual countries. Thus, there are countries where the debt service burden is twice the Hungarian figure (Chart 2-28). The following factors contribute to a moderate rate of growth in the debt service burden: lower instalments due to foreign currency loans gaining ground, lengthening mortgage loans and banks' reluctance to pass on to clients the increasing costs of funds

**Chart 2-28**

**Households' debt service burden relative to disposable income in an international comparison**



Sources: National central banks, ECB, BIS, OECD and MNB.

\* Only mortgage loans. \*\* To annual wages.

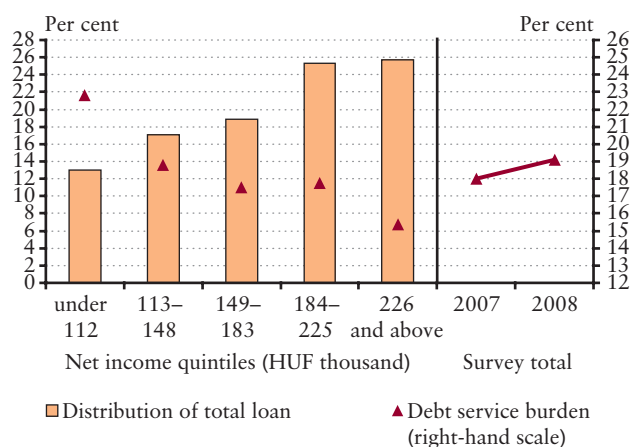
resulting from the recent sub-prime crisis. If the latter increases, growth in the repayment burden may also accelerate.

**The debt service burden has been also increasing among debtors.** Compared to aggregate indicators, a clearer picture can be obtained by analysing the structure of indebtedness.<sup>46</sup> The growth of debt service burden of indebted households is nearly identical with the aggregate data of the entire household sector. In the case of indebted households, the debt service burden increased from 18 per cent to 19.1 per cent (Chart 2-29).<sup>47</sup>

**The debt service burden of the low income families is at a high level.** The financial sector's exposure remains concentrated in higher income households, which is favourable from a structural point of view, as the debt service burden ratio is the lowest in this segment. It must be pointed out, however, that the debt service burden is by far the highest for the lowest income families.

**Chart 2-29**

**Distribution of total loan and debt service burden by income quintiles based on the survey**



Source: MNB survey.

**In parallel with the unfavourable income position, the ability of households to absorb shocks is weakening.** Households are considered to be endangered or at risk when their cost of living and the amount spent on repayment exceed the total income of the households, and thus their

<sup>44</sup> As regards the evaluation of the indicator, it is important to note that pre-payments due to loan conversions may affect the level considerably, leading to overestimation. From 2008 onwards, information on pre-payment will also be available, enabling to make new estimates.

<sup>45</sup> Apart from the data refer to different periods, the estimates are usually calculated by different methods makes the comparison difficult. For example the level of the indicator is likely to be significantly affected by accommodation costs (e.g. acquisition of residential property with a loan or renting).

<sup>46</sup> Conducted for the first time in 2007, the questionnaire survey covered only the households with debt from financial intermediaries. In order to monitor the changes, data collection was repeated in early 2008. Information on the structure of indebtedness provides a more accurate picture concerning the credit risks exposure of households.

<sup>47</sup> A survey entitled 'The Structure of the Indebtedness of Households' was conducted by GfK Hungária in January 2008 on commission from the MNB.

**Table 2-1****Proportion of endangered households and loans based on the survey**

	Share of endangered households		Share of endangered loan portfolio	
	2007	2008	2007	2008
Negativ shock absorbing capacity without adjsument	4.7	8.1	12.9	18.7
12 month cumulative negativ margin > 2 month instalment	2.6	6.1	6.2	15.1
Negativ shock absorbing capacity after 10 per cent increase in income	2.2	5.0	5.7	14.3

Source: MNB survey.

ability to withstand shocks is negative.<sup>48</sup> In the previous survey, less than 5 per cent of households holding some 13 per cent of all loans were regarded as endangered. According to the survey conducted in 2008, the proportion of risky households has risen above 8 per cent, with their share in loans approximating 19 per cent (Table 2-1 and Chart 2-30).

**It should be stressed that the negative sock absorbing capacity does not necessarily mean default on payment.** If we only consider those households to be risky where 12-month cumulative negative margin is higher than twice<sup>49</sup> the amount of the monthly instalment, then the picture is much more favourable. The share of endangered households and their loans fall further if income is increased by 10 per cent. This adjustment can be justified because the income stated in the survey is very likely to be downwardly biased<sup>50</sup>.

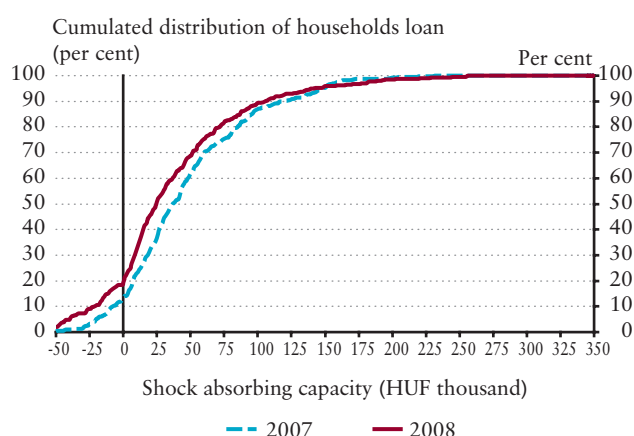
### The savings of indebted households are decreasing.

The fact that a substantially lower proportion of indebted households accounts for a significantly lower amount of financial savings is also attributable to the deterioration in the income position. While, according to the previous survey, 19 per cent of the households had savings, this year only 12 per cent of the households had any savings (Chart 2-31). This, in turn, means that the majority of indebted households have no financial reserves to resort to in the event of an income shock. It is especially noteworthy that only 4 per cent of households with the lowest income have some sort of financial savings. It is equally striking that the average financial reserves of indebted households with savings have dropped to half compared to the previous year.

The debt service burden of households is more sensitive to exchange rate movements, than to increases in interest rates.

**Chart 2-30**

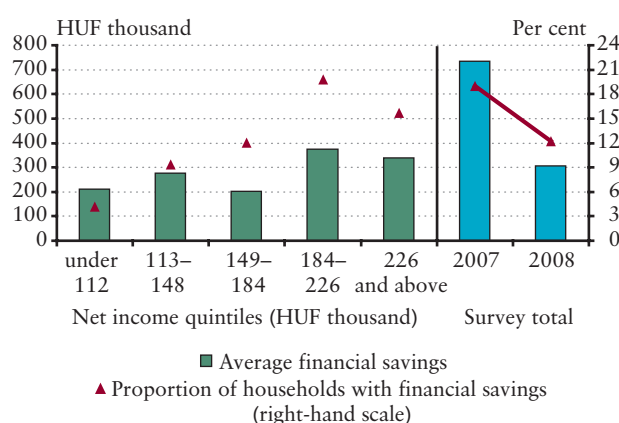
### Cumulated distribution of household loans by the shock absorbing capacity of individual households based on the survey



Source: MNB survey.

**Chart 2-31**

### Proportion of households with financial savings by net income quintiles and their average financial savings based on the survey



Source: MNB survey.

<sup>48</sup> Ability to absorb income shocks means that income, net of costs of living and the initial amount of the instalment, is available for covering a rise in instalments, and its extent is the margin.

<sup>49</sup> Categorisation based on negative margin alone does not take into account the correlation between its extent and the amount of the instalment. In order for this issue to be tackled, risky households should be defined according to the common banking practice which does not consider one failure to effect repayment as default.

<sup>50</sup> This is reflected in the fact that the majority of the respondent households supposed a lower instalment-to-income ratio than could be calculated on the basis of their disclosed income.

**Table 2-2****Debt service burden sensitivity of the indebted households based on the survey***(in percentage of disposable income)*

	Extent	Depreciation of EUR/HUF			
		0%	10%	20%	30%
Rise in foreign interest rates	0 bp	19.1%	20.1%	21.1%	22.1%
	100 bp	19.5%	20.6%	21.6%	22.7%
	200 bp	20.0%	21.1%	22.2%	23.3%
	300 bp	20.5%	21.6%	22.7%	23.9%

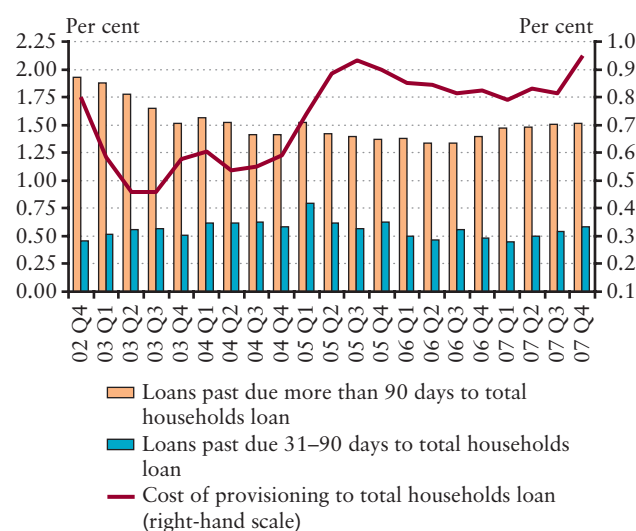
Source: MNB survey.

The result derived from the survey's data suggest that the impact of a considerable rise in foreign interest rates on the debt service burden is significantly lower than the impact of adverse movement in exchange rates (Table 2-2). Depreciation affects monthly debt servicing costs in a straight-line way, rendering the exchange rate risk taken by households more important, while the interest rate movements have an affect only after the next repricing period. In additional, banks have the opportunity to consider the pace and the extent of passing on the increasing financing cost to their clients.

**Quality of the household loan portfolio**

**The slow deterioration in the quality of the household loan portfolio continues.** Currently, risk premia offer more than sufficient coverage for a higher amount of loan loss provisions. Despite the strong lending growth, the proportion of loans overdue more than 90 days has been on the rise for five straight quarters (Chart 2-32). The picture is rendered even bleaker by the fact that an increasing number of banks have adopted the practice of automatically selling loans overdue more than 90 days to work-out companies. If this is taken into account, they would increase the above proportion further. While prior to 2007 Q3 the deterioration in the income position of households had not resulted in an increase in the provisioning cost-to-loans ratio, in the fourth quarter of 2007 the ratio was at its highest in the last five years, despite the spectacular growth in the loan portfolio.

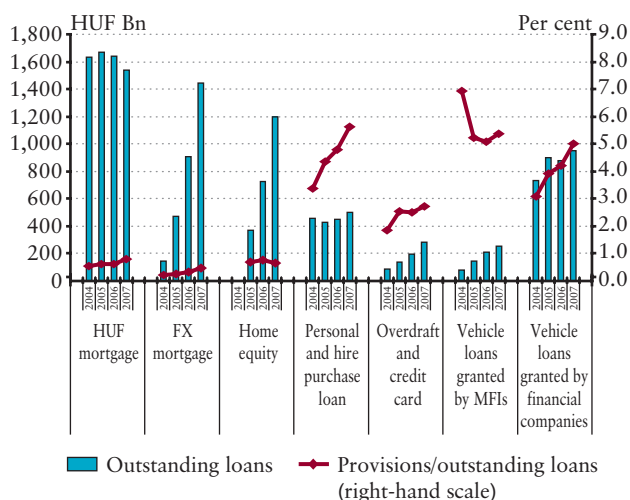
**Marked increase in the number of new defaults recorded by the credit bureau registry.** As the number of loans overdue more than 90 days increased, defaults recorded in the

**Chart 2-32****Major quality indicators of the domestic bank loan portfolio**

Source: MNB.

Central Credit Information System (KHR, formerly BAR) also rose by a robust 50 per cent in one year. This occurred against a background of significantly stricter conditions for registration in KHR. The stricter regulations mean that the number of the defaulted debtors registered in the system is now lower than it would be if the previous rules were still applied.

**Despite the expanding portfolio, loan loss provision coverage has been increasing.** Although as a rule the largest provision is required for unsecured loans, provisioning had already risen markedly in connection with

**Chart 2-33****Provisioning on various household products**

Source: MNB.

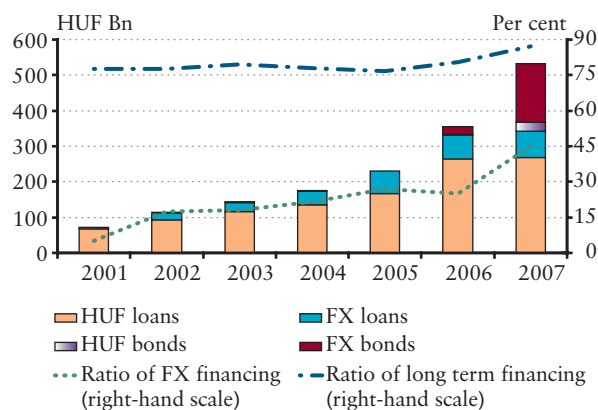
housing loans as well by the end of 2007 (Chart 2-33). No rise in provisioning coverage was seen in home equity.

**The quality of the portfolio is expected to deteriorate further in 2008.** Unfavourable changes in the macroeconomic baseline scenario, the natural ageing of the credit portfolio and a high level of indebtedness of lower-income households increase the likelihood of further deterioration in the portfolio. In order to meet growth expectations, banks are willing to lend to riskier clients with increasingly favourable conditions, which automatically presupposes larger amounts of provisioning.

**Box 2-5: Credit risk of local municipalities**

The exposure of the banking system to local governments rose sharply in 2007, although the exposure to municipalities still represents a small proportion in the balance sheets of banks. The credit and the bond portfolio increased by a total of 50 per cent in 2007, but this increase is linked exclusively to bonds issued by local governments. In this segment, the exposure assumed by banks saw an eightfold increase in the span of one year (Chart 2-34). Due to the significant growth and the perception of related risks, this topic is worth special examination.

The rising need for financing was due, mostly, to fears concerning the tightening regulation of bond issuance. This has increased local governments' demand for bond financing in connection with their preparation for future expenses and EU subsidies. At the same time, demand for credit shifted towards demand for bonds, since bond issuance does not fall under the scope of the Act on Public Procurement. Accordingly, municipalities have more discretion in using the funds raised from bond issuances than they do in the case of borrowing. On the other hand, the results of the MNB's lending survey conducted in January 2008<sup>51</sup> reveals the tendency of municipalities to put the funds raised from long-term, typically foreign currency based (mainly CHF-denominated) bond issuances in HUF deposits. In this way they create reserves for expected future expenses while realising the spread between HUF and CHF interest rates.

**Chart 2-34****Exposure of domestic banks to local municipalities**

Source: MNB.

In our opinion, credit risk in this sector is moderate, but rising. A major factor adding to credit risk is that the CHF-based bonds issued recently expose municipalities to exchange rate risks for a long period, for which they are likely to be unprepared. In addition, bond issuances without any investment plan makes debt recovery uncertain and does not

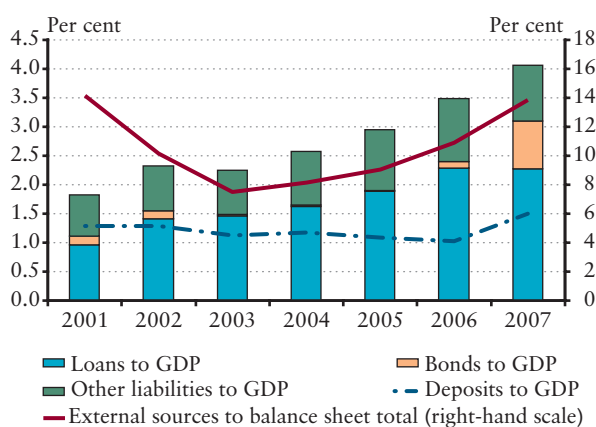
<sup>51</sup> For details, see the MNB's Senior Loan Officer survey published in March 2008, [http://english.mnb.hu/Engine.aspx?page=hitelezesi\\_felmeres&ContentID=10804](http://english.mnb.hu/Engine.aspx?page=hitelezesi_felmeres&ContentID=10804).

prevent municipalities from using the proceeds to finance their day-to-day operation. The high concentration<sup>52</sup> of the municipality financing market, which prompts new entrants to provide financing under rather generous conditions, is also a factor adding to credit risks. It follows from the above that profit from municipality financing is negligible, and moreover, as from the perspective of banks the margin between funding and loan is negative, therefore the business line may well become a loss-maker in the short run. By contrast, banks offer several other services to municipalities where they can increase their profitability.

Nonetheless, banks consider municipality financing to be safe and profitable. One of the reasons behind this is the negligible default risk, as in the case of delinquency they expect a bail-out by the state. Another risk-mitigating factor is a wide variety of collaterals. Nevertheless, according to the opinion of market participants, a large proportion of marketable real estates is already used as collateral. Loan recovery could be ensured in the case of lending secured on municipality revenues. However, even municipalities involved in bankruptcy (debt settlement) procedures have to fulfil their fundamental duties, which may delay the repayment of lenders' claims.

A rising but still moderated level of municipal indebtedness mitigates credit risks (Chart 2-35). The Act on Local Governments puts a cap on the annual amount of municipality financing. Pursuant to this Act, the ceiling of the annual debt-generating commitment of municipalities is 70 per cent of their own revenues appropriated for the year, less the short-term liabilities paid for the year. They continue to remain well

**Chart 2-35**  
**Indebtedness and deposits of local municipalities**



Source: MNB.

below this threshold still. The picture is, however, distorted somewhat, as borrowing by local government-owned companies cannot be taken into consideration due to a lack of consolidated data on this field.

As a summary we believe that current trends in local government financing lead to a build-up of risks. Although the losses from default are low based on historical empirical evidence, the sizeable FX exposure of municipalities may lead to problems and higher default frequencies may be accompanied with an uncertain recovery of losses.

### 2.1.3 MARKET RISK

*The exchange rate and interest rate risks of the banking sector are low. In the coverage of exchange rate risks, however, more and more significance is attributed to the currency swap market whose smooth and efficient operation is crucial for the stability of the banking sector.*

#### **The forint/foreign currency swap market plays a major role in the coverage of exchange rate risk.**

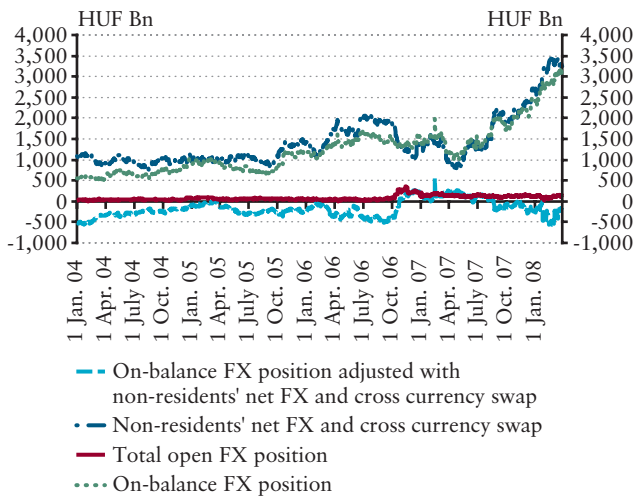
**The total open foreign currency position of the banking sector is steadily low.** Since the second quarter of 2007 the banking sector's open on-balance sheet foreign currency position has shown spectacular growth. The banking system as a whole typically converted forint and euro

liabilities into loans denominated in Swiss francs. However, the banking sector largely neutralises its on-balance sheet position against the forint by foreign currency swap transactions<sup>53</sup> with non-resident investors, and transactions with local companies (Chart 2-36).

**The currency swap market plays a major role in the hedging of the exchange rate risk.** The currency swap holdings of non-residents from transactions with local credit institutions have increased substantially. The sharp increase in the net swap stock of non-residents resulted from the turn of positions against the forint and diminishing global risk appetite. Through synthetic forward transactions built up by means of foreign currency swaps (spot + swap), non-resident investors open short forint positions on the one hand, and on the other hand, reduce the previously un-hedged part of the exchange rate risk attached to their government securities

<sup>52</sup> The share of the five participants with the highest exposure including loan and bond portfolio is 91 per cent. The corresponding figure for the market for municipality bonds is 97.5 per cent.

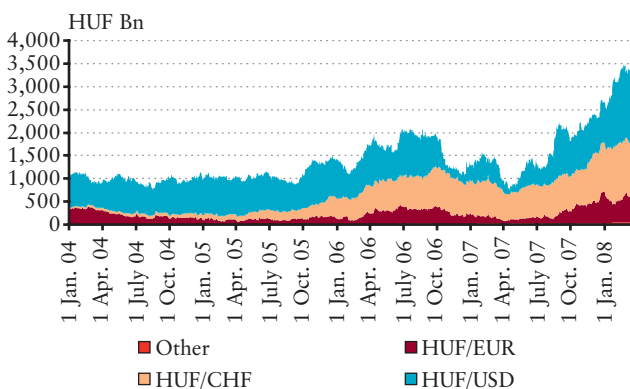
<sup>53</sup> An increase in the swap stock stands for swaps with a long forint spot leg from the point of view of non-residents.

**Chart 2-36****FX open position of the banking sector**

Source: MNB.

portfolio. The purchase of government securities hedged and financed by the rollover of short term FX swap transactions is, at the same time, the opening of an interest rate position speculating on decreasing yields.

**The swap portfolio is dominated by HUF/CHF and HUF/USD swaps.** Non-resident investors primarily carry out their speculative and liquidity management operations in the liquid HUF/USD market (Chart 2-37). By participating in the HUF/USD swap market the banking sector not only has an opportunity to provide services to its non-resident clients, but also to convert forint liabilities into net USD loans.

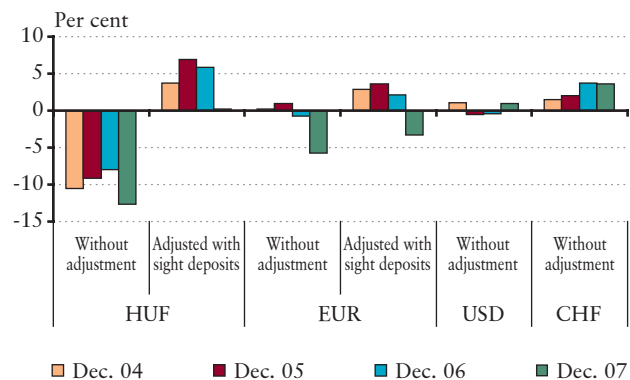
**Chart 2-37****Denomination structure of the non-residents' net forint currency-swap stock**

Source: MNB.

Furthermore, the banking sector is able to reduce its exchange rate risk from loans denominated in CHF by longer maturity HUF/CHF swap transactions, and by means of transactions with the combined use of HUF/USD and USD/CHF swap transactions. Accordingly, the HUF/CHF net swap stock has shown a significant growth as well.

**Low interest rate risk**

**Even though the interest rate risk<sup>54</sup> of the banking sector is increasing slightly, its level still can not be considered high.<sup>55</sup>** Due to high amounts of short-term deposits, the HUF and EUR re-pricing gap has opened up considerably in the negative range (Chart 2-38). Consequently, following adjustment with sight deposits with inflexible interest rates, the HUF re-pricing gap is low; however, it is now in the positive range. The 90-day cumulated EUR gap is low negative, while the value of the USD re-pricing gap, due to an increase in net USD loans, is low positive.

**Chart 2-38****90-day cumulated GAP of the banking sector**

Source: MNB.

**Risks related to the exposure to the capital market has been increasing**

**The financial turmoil may result in losses, mainly through the government bond portfolio.** The banking system's exposure to the capital market, i.e. the aggregate stock of government securities for sale and held to maturity, mutual fund shares and shares quoted on the stock exchange, amounts to 7-10 per cent of total assets. The overwhelming majority of this portfolio consists of government bonds. As the duration of the HUF-denominated government bond

<sup>54</sup> Interest rate risk includes both on-balance sheet and off-balance sheet items.

<sup>55</sup> In case of an interest rate drop a positive gap reduces profitability, while in case of an interest rate increase it improves profitability.

portfolio exceeds two years, in the event of a persistent and significant increase in HUF yields, the banking sector could suffer losses on the government bond stock, with the extent depending on the share of government bonds covered by interest rate swaps or other derivatives and the accounting standards applied by banks. At the system level, heavy losses can occur if non-residents begin to sell their government bonds, the risk premia increase significantly, and the financial turmoil resulting in sustained, significant price changes leads to a depreciation of the portfolio held to maturity.

## 2.1.4 FINANCIAL POSITION OF THE BANKING SYSTEM

*There has been a significant decline in the profitability of the banking sector, but the existing profitability level still allows the banking sector to accumulate an adequate level of capital to ensure its capital adequacy. The most important causes of declining profitability are the increased cost of funds, the narrowing spread due to stronger competition, the dynamic increase of operating costs and the negative effect of provisioning.*

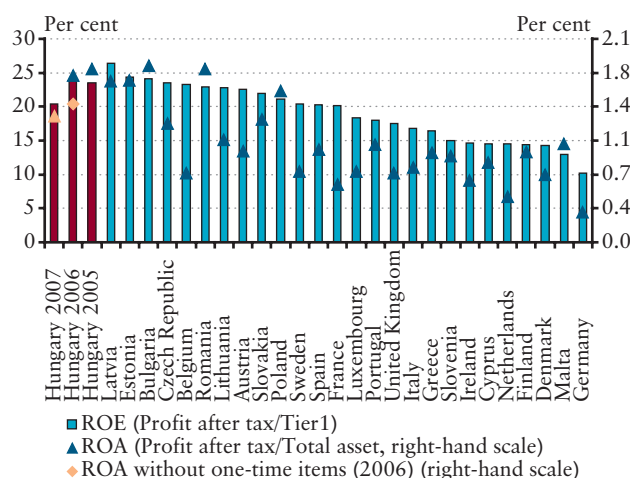
*Several factors lower the profitability prospects of the banking sector. Some of these factors include macroeconomic effects, strong, risk-based competition and changes in and transfer of the cost of funds. The expected persistently low rates of economic growth may result in the falling credit demand by corporate clients and a slight decline in the portfolio. While lending still remains strong, the household loan portfolio could deteriorate as corporations adapt to the unfavourable macroeconomic environment by reducing their labour force, and risk competition among banks continues. The passing on of the increasing cost of funds to corporate clients is expected to be fast-paced, bringing about a further decline in credit demand, while the process remains slow and partial for household clients, which may result in a narrowing spread.*

## Turning-point in profitability trends

**Although profitability indices are falling, their level is still adequate.<sup>56</sup>** On the other hand, the ROE index in Hungary lags behind the typical values for other countries in the region, and is at the same level as in some countries with a developed banking sector (Chart 2-39). As for the ROA index, the local banking sector is still far ahead of the developed countries, while it falls significantly behind some emerging countries. The decline in profitability indices is not solely an event of last year: in 2006 the profitability

Chart 2-39

### ROE and ROA in international comparison (2006)



Sources: ECB, MNB.

indices of the Hungarian banking sector were propped up by several one-off items. Had the time series been adjusted for these items, falling indices would have been seen as early as 2006.

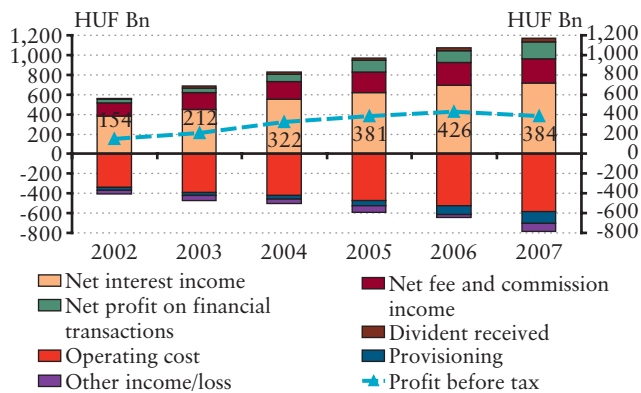
**For the majority of banks, ROE is either shrinking or stagnating.** According to the distribution of ROE indices the individual performance of banks is predominantly within the 20-30 per cent range depending on their market share, and it indicates a decreasing level of extreme values<sup>57</sup>. Looking at individual banks, the ROE index decreases or stagnates in two thirds of the banks, and those showing signs of considerable improvement can equally be smaller, specialised banks or large, universal banks. The nominal value of profit falls and the rate of growth for costs and expenses are twice as high as the rate of growth recorded on the income side (Chart 2-40). Examining the income side the only increase to be observed is that of the profit on financial transactions, primarily due to profits realised from investment services.

**Interest income continues to be the main source of revenues, and as a result profitability remains vulnerable.** The income structure of the Hungarian banking sector has a low diversification rate compared to European standards: interest income constitutes nearly two-thirds of total profits, while the share of fees and commissions is low. Consequently, the stagnating level of interest income has had a crucial impact on the profitability position of the banking sector. Spreads came under pressure from both the expense

<sup>56</sup> Even though the calculation of profitability indicators is based on international standards, comparability is distorted by local data, which reflect preliminary, unconsolidated, individual banking data.

<sup>57</sup> For distribution of banks' total assets by ROE see Chart 50 in the Appendix.

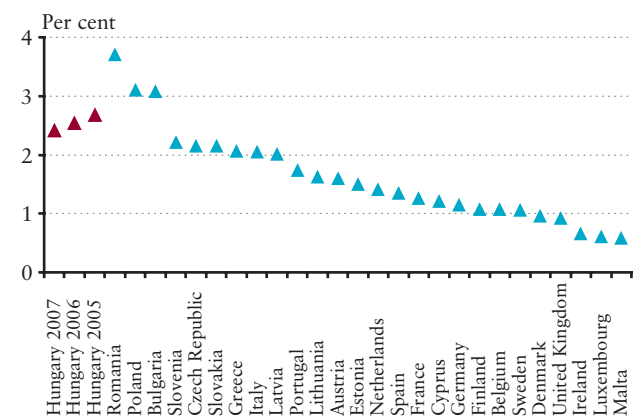
and the income side. The funding structure of the local banking sector is deteriorating; while the funding role of the household and corporate segments is diminishing and there is an increased reliance on more expensive foreign funds – typically from parent banks and other credit institutions – and funds from local credit institutions. Resulting from this unfavourable condition, interest expenses are increasing due to the general foreign inter-bank interest rate increase, and this is also fuelled by the financial market turmoil and the rise of the expected forint yield level elevated by higher risk premiums. As the banking sector either does not pass on the majority of the increased expenses to its clients or if it does it is to a lesser degree, interest rate premiums are on the decrease. Profits from household lending are further mitigated by the increased role, and thus commissions, of financial intermediaries: for certain products half of the new loans are now provided through this sales channel. As a result of fiscal adjustment, the indebtedness of households are on the rise due to consumption smoothing, but it has become a typical practice that households have replaced loan products with higher business profits with typically FX based home equities, putting further pressure on the interest income.

**Chart 2-40****Profit before tax and its main components**

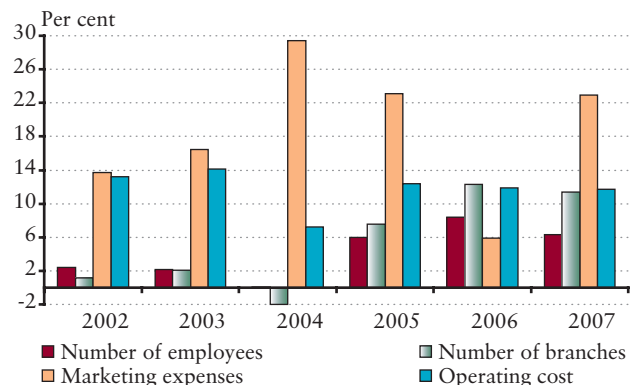
Source: MNB.

**Instead of increasing efficiency, the banking sector is intensifying risk-based competition.** On the one hand, the cost-to-total asset ratio is improving, but its level is still too high by international standards (Chart 2-41). The improvement in the ratio is largely due to the fact that the still significant rate of increase in costs was surpassed by the growth rate of the loan portfolio, and the deepening of financial intermediation. The spectacular profitability in recent years did not prompt the banking sector to take any

substantial measures that would improve efficiency. Instead of improving efficiency, the banking sector has attempted to maintain its profitability by exerting strong supply pressure on its clients. In order to cope with the intensifying competition in the household financing market, the banks have worked intensively on developing their networks,<sup>58</sup> which has resulted in an increasing number of employees and they increase their marketing outlays to attract more clients (Chart 2-42). Risk-based competition has also become more intensive among banks, which is reflected by a range of increasingly risky products and more relaxed lending conditions. Due to the intensifying risk-based competition

**Chart 2-41****Efficiency of the banking sector (cost-to-total asset ratio) in international comparison<sup>59</sup> (2006)**

Sources: ECB, MNB.

**Chart 2-42****Increase in the number of employees, the number of network units, marketing expenses and operating cost compared to the previous year**

Source: MNB.

<sup>58</sup> The picture is more complex due to the fact that the population to one branch ratio in the EU-27 (2006: 2216 persons) is less than in Hungary (2007: 2979 persons), Hungary is to be found in the middle of the ranking among the EU-27 countries.

<sup>59</sup> Local indices are calculated from preliminary, unconsolidated, individual banking data.

and the maturing loan portfolio, the negative effect of provisioning on the net result grew more intense as well. In terms of stability, we consider stronger risk-based competition a negative factor: the short-term profitability benefits it may bring could dissipate over the long run as risks materialise, and likewise, significantly lower lending may lead to a deterioration in banks' profitability and capital position, i.e. the shock-absorbing capacity of the banking sector.

**In 2008, the profitability<sup>60</sup> of the banking sector may further deteriorate in the baseline scenario.<sup>61</sup>** The profitability of the local banking sector is expected to continue to decline, as a result of the unfavourable macroeconomic and money market environment, the increasing vulnerability of households and stronger risk-based competition. The substantial lending potential of the subsidiaries of local banks may have a positive impact on profitability of the local banking sector. Nevertheless certain intragroup contagion channels<sup>62</sup> via subsidiaries may increase the vulnerability of the domestic banking sector to exogenous shocks.

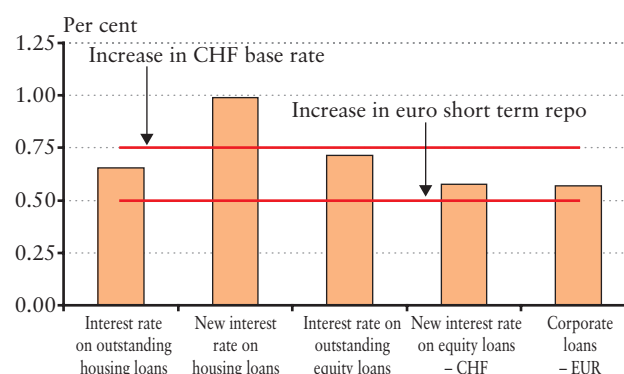
**Corporate lending may slow down due to the weakening economy while supply pressure by banks may still maintain household lending growth.** The deterioration in the international and local outlook for economic growth has a direct impact on processes in the banking sector. Slower economic growth in the foreign markets and the consequent downturn in the Hungarian economy, where growth is going through a prolonged low right now, may result in weaker corporate lending demand due to sagging growth in investments. The slight correction in real wages, and the slowing of the economy which may lead to a rise in unemployment, may result in an overall negative impact on the income position of households, which in turn may lead to worsening in the quality of the loan portfolio. The strong supply pressure of banks on the household segment is expected to result in sustained high lending growth rates, but greater lending risks from more intense risk-based competition may lead to further deterioration in the quality of the loan portfolio.

**Increased risk premium may lead to financial losses.** Even though domestic banks have no direct exposure to the US sub-prime mortgage market crisis, they are feeling its indirect effects, such as the increased risk premium and high volatility. The increased risk premium may lead to financial losses in certain unsecured banking positions. The domestic government security market showed signs of shrinking

liquidity in March 2008, accompanied by substantially higher yields and an unusually wide swap spread.<sup>63</sup> Certain banks may have suffered losses due to this.

**Increasing funding costs can be transferred to corporate clients to a greater degree than to household clients.** Due to the prolonged, deepening financial market turmoil, the costs of funding may continue to rise. This increase in the cost of funds is largely due to the higher risk premium, and to a lesser degree, is the result of the increase in base rates of the ECB and the Swiss National Bank. The subsidiaries of certain parent banks may experience an even greater increase of the cost of funds, and additionally, renewing the liabilities of their parent banks may become more risky. Stronger competition in deposit collection and increased risk premiums for forint assets also manifest themselves in an increase in deposit interest rates as well. The increase in the cost of funds is expected to remain high in the long run, and if banks fail to pass this cost on to the clients or absorb some of the costs themselves because of their strategic goals to retain or obtain market share, they will end up with a shrinking spread. On the other hand, if they do transfer the increased cost of funds, depending on the extent to which they transfer it and the specific client involved, profitability, portfolio quality and credit demand will all be impacted. Interest rate statistics indicate that only a limited amount of the cost of funds has been passed on (Chart 2-43). Projections indicate a prolonged rise in the cost of funds which is expected to increase the extent to which costs will be passed on. Keen competition and the resulting low margins may induce a fast and large revaluation for corporate

**Chart 2-43**  
**Change in interest rate of household and corporate loans between January of 2007 and January of 2008**



Sources: ECB, MNB.

<sup>60</sup> Free of one-off effects.

<sup>61</sup> Some of the listed channels are based on the lending survey conducted by the MNB in March, 2008, and consultations with market participants ('Market Intelligence').

<sup>62</sup> For details, see MNB Report on Financial Stability (April 2007) Box 2-4, visit: [http://english.mnb.hu/Engine.aspx?page=mnben\\_stabil&ContentID=9555](http://english.mnb.hu/Engine.aspx?page=mnben_stabil&ContentID=9555).

<sup>63</sup> For more information on the events of the government security market please refer to Box 2-5.

loans, while milder competition in the household market resulting in higher margins combined with banks' market share growth strategies may necessitate a slower and partial adjustment.

**The shock-absorbing capacity of households is decreasing, resulting in higher credit risks.** Increased exchange rate/interest rate volatility may have a direct impact on portfolio quality because of the high foreign currency share of household loans which predominantly lack natural hedging, and an increasing number of households, especially within the lower income segments, reach such a level of indebtedness, which, in the event of a potential exchange rate or interest rate shock may ultimately lead to a significant increase in non-performing loans.<sup>64</sup>

**Rearrangement of the household loan portfolio continues to the detriment of higher income products.** It has become a typical practice in recent years, and the tendency is expected to continue in 2008 as well, that households replace their higher margin, thus higher instalment payment loan products with typically longer term, FX-based home equities, which produce lower business profits for the banks. Some of the HUF-based, subsidised housing loans, which previously provided a higher margin for banks, will be re-priced in 2008. If the escalating interest environment induces growth in instalment payments on these loans, households may replace a part of even these loans with FX-based home equities.

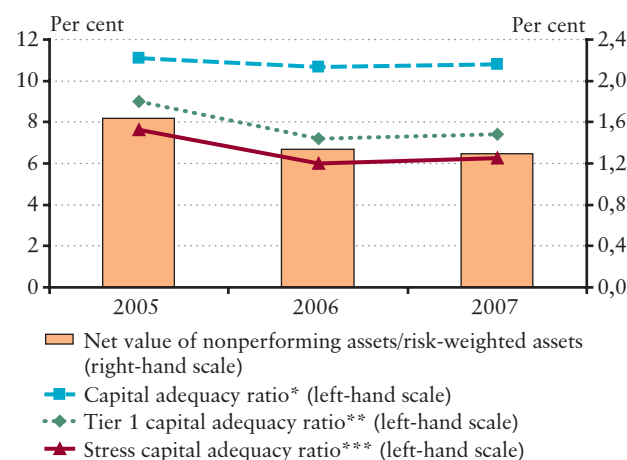
**Subsidiaries have strong growth potential, however, they may be served as a contagion channel.** Subsidiaries of domestic banks typically have high lending growth and profitability potential, which may have a stabilising effect on the domestic banking sector. However, certain countries in the region have started to see signs of an overheated economy, and any potential correction may have an adverse effect on domestic banks if their subsidiaries suffer a profitability shock on their own local markets.

## Stable capital position

**The capital adequacy of the banking sector is stable.** Taking into account estimated reinvested profits<sup>65</sup> as well, the capital adequacy ratio (CAR) of the banking system has dropped only slightly and is still at a sound level. So far, the banks have successfully replenished their capital needs through domestic capital accumulation from their profits. The Tier 1 capital adequacy ratio and the stress capital

**Chart 2-44**

**Banks' capital adequacy ratios (with expected reinvested earnings)**



Notes:

\*  $\text{Total own funds for solvency purposes} / (\text{Minimum capital requirement} * 12.5)$

\*\*  $(\text{Tier 1 capital after deductions}) / (\text{Minimum capital requirement} * 12.5)$

\*\*\*  $(\text{Tier 1 capital after deductions} - \text{net value of non-performing loans}) / (\text{Minimum capital requirement} * 12.5 - \text{net value of non-performing loans})$

Source: MNB.

adequacy ratio values show a modest improvement (Chart 2-44).

**Banks actively manage their capital position.** Individual capital adequacy ratios unadjusted by estimated reinvested profits exceed the minimum 8 per cent level in all cases. Banks which typically keep an 8-10 per cent ratio have a growing market weight. Larger credit institutions actively manage their capital, and they make a conscious effort to keep it above the legal requirement by 1-2 percentage points. Smaller banks which need to keep a substantially higher capital level for compliance with large exposure limits typically have a ratio significantly exceeding the legally required minimum.

**The capital allocation position may become unfavourable.** A potential future problem may occur if the domestic banking system receives a lower priority in the capital allocation decisions of the parent banks. This could happen primarily as a result of consistently slow economic growth, decelerating lending growth rates and shrinking profitability. Financial market turbulences have not impacted the capital position of domestic banks, and have not jeopardised the solvency of parent banks.

<sup>64</sup> For more information please refer to the Households section of the Credit risks chapter.

<sup>65</sup> Banks use different strategies in terms of reinvesting profits. Certain banks generate retained earnings from their after tax profits, others pay dividends, and in turn, the owner makes the amount available to its subsidiary in the form of equity or subordinated debt.

## 2.1.5 STRESS TEST

*Stress tests are used to analyse the impacts of the alternative risk scenario on the banking sector. According to the results of stress tests the alternative risk scenario would not trigger substantial losses at the level of the banking sector; its capital*

*adequacy would remain satisfactory even under the stress scenario. Nevertheless, results for certain banks show a possibility of substantial losses. The major source of losses would be the credit risk in the corporate and the household loan portfolio. (For the methodology of stress testing, see Box 2-6.)*

### Box 2-6: The methodology of the stress test

The aim of stress testing is to quantify the amount of losses/profits individual banks and the banking sector as a whole, would realise in the baseline and the shock scenarios described in the 1.3 and 1.4 chapter. The impact of the shock was measured as additional losses/profits realised in the shock scenario relative to the baseline scenario. When evaluating the results of the stress test, the calculated losses are always compared to the regulatory capital of the banks, because the capital is assumed to cover unexpected losses due to extreme shocks. Stress testing was done in an integrated framework in the sense, that the impact of the same consistent scenarios was calculated through all risk channels considered important for the exercise. However, potential correlation between the channels cannot be accounted for. This is a static exercise: we assumed the exposures and capital values at the end of 2007 would not change throughout the entire 2-year time horizon. Thus we did not account for any possible variation in the composition and size of the portfolios, the possible impact of future profitability on the size of the capital, or any possible changes in the re-pricing structure or in the foreign currency open positions, etc. In our calculations we considered the impacts through the following channels:

- Changes in the value of the corporate and household credit portfolio under the shock scenario. In this regard, losses are calculated in the usual way, as the product of exposure at default, probability of default and loss given default ( $EAD \cdot PD \cdot LGD$ ). To estimate conditional PDs, the results of two papers were relied upon. The model<sup>66</sup> used for estimating corporate PDs links industry-specific and aggregate bankruptcy ratios to the macro environment. In the paper the GDP, the exchange rate and its volatility, the foreign interest rate and corporate leverage ratio have the biggest impact on credit risks. To estimate PDs for the household loan portfolio we used a model based on

information gained from a household survey<sup>67</sup>. This model can calculate the effects of disposable income of households, unemployment, exchange rates and interest rates.

- To calculate banking book interest rate risks we applied a duration-based approach distinguishing between forint and foreign currency exposures. We assumed a parallel shift in the yield curve and prompt, complete repricing, and neglected any risks associated with options.
- The effects of exchange rate changes are examined on the FX open positions of the banking sector. In addition, credit risk models also take into account the impact of exchange rate changes.
- With the 2-year time horizon we applied we were unable to include trading book market risks in the analysis, where the relevant time horizon is 1-2 week.

Another shortcoming of the approach is our inability to forecast future profits. In addition to capital, profits could be also used as a significant buffer to absorb the losses caused by a shock. In addition, we had to take assumptions for certain parameters. As it is shown later the results are sensitive to these assumptions, especially to the one on the magnitude of change in the LGD (loss given default) due to the shock.

We used a model based on financial margin calculations for the household portfolio, and industry-specific models for the corporate portfolio. In both cases our assumption was that the LGD would increase by 10 percentage points compared to the baseline scenario. For interest rate and exchange rate risks we considered the changes in the value of the banking book and open foreign exchange positions respectively.

<sup>66</sup> For more information please refer to Marianna Valentinyi-Endrész and Zoltán Vásáry (2008): Macro stress testing with sector specific bankruptcy models, MNB Working Papers 2008/2. [http://english.mnb.hu/Engine.aspx?page=mnb\\_mnb\\_fuzetek&ContentID=10829](http://english.mnb.hu/Engine.aspx?page=mnb_mnb_fuzetek&ContentID=10829)

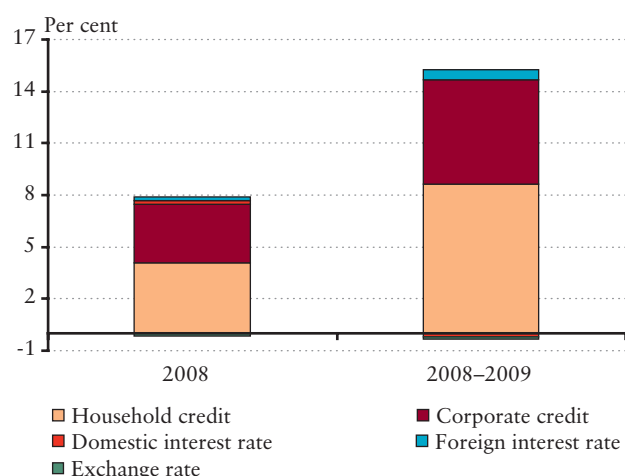
<sup>67</sup> For more information please refer to Dániel Holló-Mónika Papp (2007): Assessing household credit risk: evidence from a household survey, MNB Occasional Papers 70. [http://english.mnb.hu/Engine.aspx?page=mnb\\_muhelytanulmanyok&ContentID=10497](http://english.mnb.hu/Engine.aspx?page=mnb_muhelytanulmanyok&ContentID=10497)

**The shock in the risk scenario<sup>68</sup> would consume more than 15 per cent of the banking sector's capital<sup>69</sup> over 2 years (Chart 2-45).** As a result the capital adequacy ratio<sup>70</sup> of the banking sector would fall from 9.9 per cent (2007 end of year value) to 9.1 and 8.4 per cent by 2008 and 2009, respectively. This means that the aggregate CAR would stay above the regulatory minimum (8 per cent), however, as we will see, the potential impact for individual banks may vary within a wide range.

**The shock impacts the banks primarily through their credit losses, while the losses due to the interest rate risks in the banking book and exchange rate risks are negligible.** Credit risks continue to account for the biggest losses of the banking sector. As for market risks, the mild

**Chart 2-45**

**Losses-to-regulatory capital by risk types in the risk scenario**



Note: 2008 indicates one-year, and 2008-2009 indicates 2-year cumulated effects.

Source: MNB.

forint depreciation has a small but positive effect due to the long FX positions. Repricing losses caused by foreign interest rate changes are low, because there is a small repricing gap for the foreign currency items (the assets are of long maturity but their repricing period is short). Although for forint items the exposure is larger, the interest rate projections of the two scenarios do not differ significantly.

**The results are highly sensitive to changes in the LGD.<sup>71</sup>** Several studies have shown that apart from bankruptcy probabilities, LGD also moves with the business cycle. Thus, due to substantial drop in GDP forecast in the risk scenario, loss ratios are expected to increase. Therefore, LGD is assumed to rise by 10 percentage points relative to the baseline scenario, and this assumption is in line with the available (although scant) international evidences. When the LGD is assumed to stay unchanged, the impact of the shock is by two-third lower.

**Losses in the risk scenario vary significantly among banks.** The possible impacts of shock scenarios relative to the baseline are examined for a two-year time horizon. Banks representing a substantial percentage of the market would suffer a loss of 10-20 or 20-30 per cent of their regulatory capital due to the shock (Table 2-3). Two banks representing 5.8 per cent of the market would face over a 30 per cent loss of their regulatory capital. In the stress scenario the smallest loss ratios are assumed by a relatively large number of banks representing 30 per cent of the market assets. These are typically banks with small credit portfolios and/or they are over-capitalised.

Despite the shock, the capital adequacy ratio of the majority of banks remains above 8 per cent. The capital adequacy ratios of 6 banks representing nearly one-third of the market drops slightly under 8 per cent due to the losses suffered over

**Table 2-3**

**Number of banks and their market share according to losses/ regulatory capital**

	Loss / capital			
	0-10%	10-20%	20-30%	30%-
Number of banks	14	12	7	2
Market share (%)	30.8	49.2	14.1	5.8

Note: Losses cumulated over 2 years.

Source: MNB.

<sup>68</sup> For the impact on the households' credit risk of a depreciation larger than that assumed in the risk scenario, see Table 6.

<sup>69</sup> In the case of corporate credit risk this does not capture the full impact, because due to the persistence of macroeconomic processes it takes at least another year until the shock's effect fades out.

<sup>70</sup> The use of the traditional, Basel I capital adequacy-based analysis is justified because, even though the new EU capital requirement directive (CRD) is in effect from 2008, the relevant data is still not available.

<sup>71</sup> In the base scenario the following LGD values are assumed: corporate loans: 50 per cent; household mortgage loans: 10 per cent; automobile loans: 30 per cent; other household loans without collateral: 70 per cent.

**Table 4-2****Capital adequacy ratio<sup>72</sup> of banks after the shock**

	Capital adequacy				
	0-4	4-6	6-7	7-8	8-
Number of banks	1	3	2	6	24
Market share (%)	5.1	3.2	3.4	33.1	55.0

Source: MNB.

the two-year time horizon, while the capital adequacy of two additional banks drops slightly more substantially, to a level of 6-7 per cent (Table 2-4). The capital adequacy ratio deteriorates more drastically for only four banks with relatively small market share, representing 8 per cent of all banking assets. This means that the majority of banks have sufficient capital buffer to absorb the impact of the shocks.

On the other hand, there might be some, even relatively substantial, participants in the market, which are sensitive to the shock investigated. To assess the impact of the shock, one has to take into account that future profit can also act as a buffer. As reliable profit forecasts are not available, this was disregarded in the analysis. Furthermore, parent banks might provide capital if that is needed.

<sup>72</sup> The simulation is static, we compare the value of the regulatory capital (at the end of 2007) minus the losses over 2-years, and the risk weighted assets at the end of 2007.

## 2.2 Risks of the non-bank financial intermediary system

Regarding the 2007 activities of financial enterprises, three main processes should be underlined: prospects for further expansion are weakened by the slow economic growth rate, credit risks rose, as a result of the strong dependency on funds from banks liquidity risks increased. However, it is a positive factor that their product structure has shifted from the predominantly of vehicle financing towards a healthier, more diversified portfolio. Savings placed with institutional investors continue to play an increasingly important role; and the deteriorating international market liquidity situation further emphasises the significance of funds channelled back to the banking sector through the deposits of investment funds. Portfolio restructuring of institutional investments, particularly in the case of private pension funds, entails a decrease of their demand for Hungarian government securities, but this shrinking demand is not expected to have a significant impact on market yields and exchange rates.

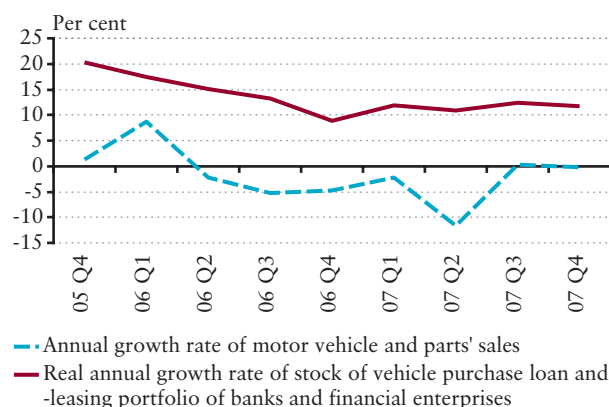
### 2.2.1 DETERIORATING PORTFOLIO QUALITY, BUT A FAVOURABLE SHIFT IN THE PRODUCT STRUCTURE OF FINANCIAL ENTERPRISES

**The slow restructuring of the activity of financial enterprises continues.** While household vehicle financing (still representing more than half of total claims) shows only a moderate increase, the home equity and home leasing portfolio is increasing dynamically. In 2007 home equity loans increased by nearly 28 per cent (excluding exchange rate effects). The home leasing, launched at the end of 2005, attracts potential clients because of the special tax benefits it offers (including the option of VAT reclaim and real-estate transfer free of duty), thus a steady increase can be projected for the product provided these benefits remain. As for corporate financing, in addition to the outstanding growth of real-estate financing, commercial vehicle loans and equipment financing also represent a growing share in the portfolio, while factoring activity showed only moderate increase in 2007. The share of leasing remained around 70 per cent of corporate financing. In 2008, as a result of moderate economic growth and a further decrease projected for new car sales, a slowdown in lending by financial enterprises and a further drop in the share of vehicle financing can be expected.

**The portfolio of household vehicle loans shows a moderate increase, and its risks remained.** Vehicle sales,

**Chart 2-46**

**Real annual real growth rates of vehicle sales and vehicle financing**



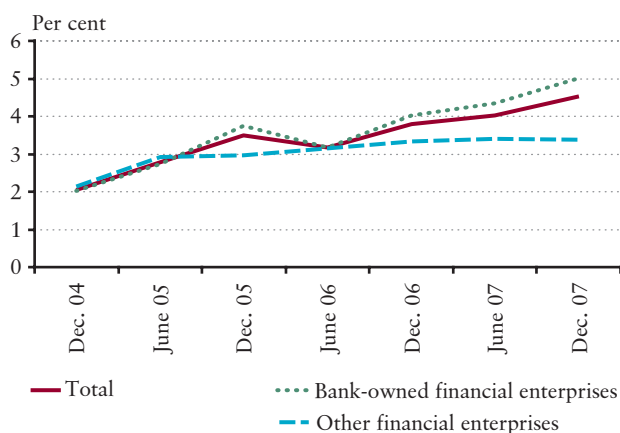
Source: MNB.

which are the determinant for the evolution of vehicle financing prospects, are stagnating. Still, after it hit the bottom last year, household vehicle financing provided by the financial intermediary system has increased by nearly 12 per cent in real terms this year (Chart 2-46). The growing share of second-hand vehicle financing combined with the growing share of the financing of high value vehicles in new vehicle sales has compensated for the shrinking number of new vehicle sales. Thanks to the substantial growth of corporate vehicle fleet financing and commercial vehicle financing, total vehicle financing provided by financial enterprises increased by 18 per cent excluding exchange rate effects.

**Despite the decline in deterioration of portfolio quality, financial enterprises appear to have relatively favourable profitability measures.** Portfolio quality is continuing to decline, and household loans in particular were characterised by a growing number of overdue payments (Chart 2-47). The proportion of loans overdue more than 90 days and provisions are both on the rise. Nevertheless, the financial results of financial enterprises do not reflect the decline in portfolio quality. The sector's total profits before tax amounted to nearly HUF 55 billion, representing a substantial, 27 per cent increase compared to the previous year. Favourable profit figures imply that the pricing of products is appropriate and adequate to cover the losses from the increasing number of defaults, and that a large number of enterprises have reached economies of scale. On the other hand, figures might not perfectly reflect actual losses because

Chart 2-47

Proportion of loans overdue more than 90 days in the loan portfolio of financial enterprises



Source: MNB.

of sales of non-performing loans and because the tax regulations do not provide incentives for financial enterprises to account provisions reasonably.

**The liquidity risks of financial enterprises depend on the banking sector providing their funds.** The activities of financial enterprises are financed mainly by the Hungarian banking sector (75 per cent of the sector's funds are provided by Hungarian banks), while the role of foreign financing is significant as well, particularly for institutions belonging to international financing groups. Thus the liquidity situation of domestic banks and the international money market are key determinants of the growth potential of financial enterprises. Banks pass on the growing cost of funds to the financial enterprises they finance, which may result in shrinking margins or increasing client interest rates. In terms of maturity, the maturity of assets and liabilities is balanced, so renewal risk is low.

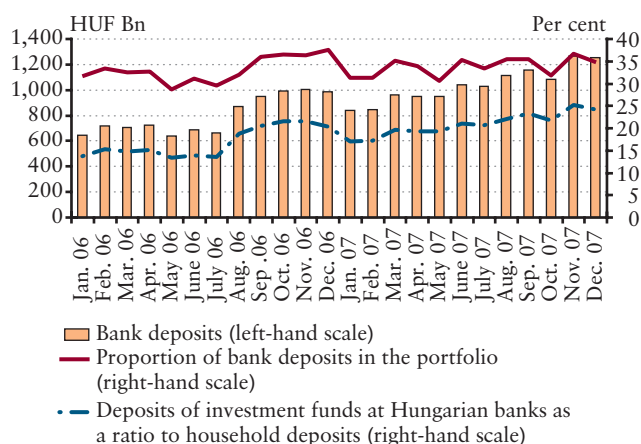
**In some banking groups, the risks of financial enterprises may considerably increase the group-level credit risk through proprietary and financing links, but the increase of risk is moderate at the level of the total banking system.** The linkage of financial enterprises with the banking system is very tight. Almost 65 per cent of total client claims are provided by enterprises belonging to Hungarian banking groups. The role of financial enterprises is most important in household financing: more than 17 per cent of total household claims of the financial intermediary sector are granted by financial enterprises, while their share in corporate financing is less than 4 per cent. Their importance in the banking groups is varying, in some cases nearly 50 per cent of the groups household portfolio is granted by the financial enterprises of the group.

## 2.2.2 INCREASING IMPORTANCE OF FUNDS CHANNELLED BACK TO THE BANKING SECTOR BY INSTITUTIONAL INVESTORS

**Re-channelling of savings to the banking sector may become a significant factor in the liquidity management of banks.** Savings placed with non-bank financial intermediaries account for a growing share in the financial assets of households, which actually exceeds the share of bank deposits. The process affects the value of the financial assets of households and their net financing ability and, in addition, amidst the current volatile market conditions the yield and market value of these savings are hectic. On the other hand, the banking sector is suffering from the loss of household deposits, which are the cheapest and most stable source of funding. Part of these savings is channelled back to the banking sector through the deposit placements of investment funds. To exploit this process, large universal banks are increasing their own investment fund products on a continuous basis. The market share of funds managed by fund managers owned by banks is over 90 per cent. At the end of December, 2007, the total amount of bank deposits of investment funds was HUF 1,200 billion, comprising 35 per cent of their total portfolio (Chart 2-48). The bank deposit placements of investment funds has reached a steady high level in the last few years; amounting to some 24 per cent of the household deposits of the banking sector. The most popular type of funds is the capital and/or yield-guaranteed investment funds; and in the current situation their role is expected to grow even more. The total assets accumulated by these funds are deposited to the bank of the group. Money market and real-estate funds are also significant depositors.

Chart 2-48

Bank deposits of investment funds and their share in the portfolio



Source: MNB.

**Stronger activities of institutional investors increase the banking sector's income from fees and commissions.** Funds deriving from investment funds are relatively stable and their costs are higher than the costs of household deposits, but still lower than those of foreign funds. The effect of institutional savings on the profitability of the banking sector is observed in other factors as well: on the one hand, guaranteed investment constructions could represent a source of risk for the guarantor banks. On the other hand, the growth of funds managed generates an income for the banks through the related asset management and custodian management fees, and through other fees and commissions.

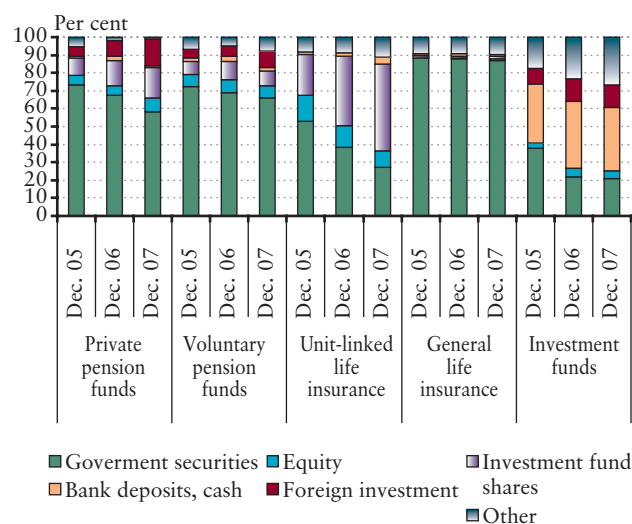
### 2.2.3 PORTFOLIO RESTRUCTURING OF PENSION FUNDS LOWERING THE SHARE OF GOVERNMENT SECURITIES

**Although private pension funds are lowering their demand for government securities, the change is expected to have only marginal impact on yields over the long run.** Examining the portfolio composition of institutional investors, a broad restructuring process is apparent, which is shifting the portfolio away from government securities towards share-type investments and foreign investments (Chart 2-49). In this regard, the most drastic changes concern the private pension funds. According to the amended legislation<sup>73</sup>, from 2007 onwards private pension funds are allowed to offer different investment portfolios with optionally selected risks as opposed to the previous, single portfolio model; and from June 30, 2009 it will be a mandatory requirement for them to do so, which is expected to decrease the proportion of government securities and increase the weight of equities and foreign investments.

The share of government securities has already dropped considerably, which may be a sign of preparation for the conversion, but the majority of pension funds will start their conversion to the new system in the next few quarters. In our view, this portfolio restructuring has a low probability of affecting yields on government bonds and the HUF exchange rate only and the impact will only be temporary, because portfolio restructuring has already been partially accomplished, the probability of extremely rapid restructuring is low, and the expected yield impact may already have been built in the prices set by market participants. Additionally, over the long run the total supply of government securities will decrease more than the demand of pension funds decreases.

Chart 2-49

#### Portfolio structures of institutional investors



Source: MNB.

<sup>73</sup> Act LXI of 2006 on the amendment of certain financial acts and government decree 234/2006.

## 2.3 Risks of the payment and settlement systems<sup>74</sup>

The financial market crisis has not had any impact on the domestic payment and security settlement systems. According to internal estimations, the central settlement engine of VIBER has adequate capacity to withstand a potential increase in financial market turnover. However, it is important to note that the operational risk of VIBER has increased. The MNB is formulating an internal action plan to address the issues of more frequent disruptions of the central engine and deterioration in availability indicators. A positive development for the securities clearing and settlement infrastructure is the legal separation of the central counterparty (CCP) function. This ensures that the crystallization of the credit (principal) risk inherent in the CCP no longer jeopardizes the normal functioning of the central securities depository.

### 2.3.1 VIBER (REAL TIME GROSS SETTLEMENT SYSTEM)

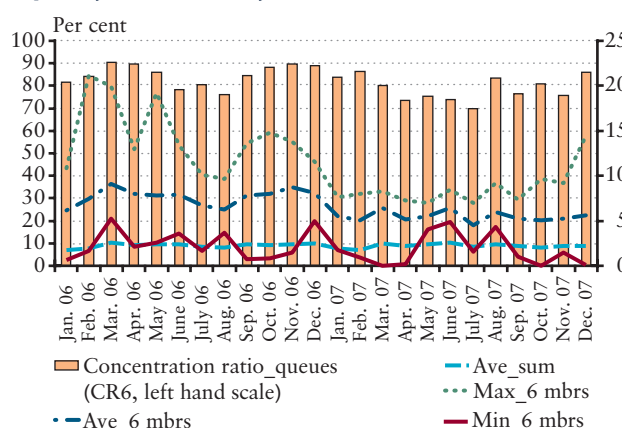
#### Liquidity risk<sup>75</sup>

The average turnover-to-liquidity ratio<sup>76</sup> is stable. VIBER has been characterised by a fairly high level of concentration both in credit and debit turnover for years. The same credit institutions have the highest shares in both the credit and the debit turnover value, and the list of the top six banks has not changed for years. Nevertheless, these VIBER participants have a more modest share in liquidity. Turnover in VIBER grew slightly compared to 2006, but in parallel with this, the average liquidity of the system's participants also rose. The turnover-to-liquidity ratio calculated for the six banks with the highest debit turnover (representing nearly 68 per cent of the annual total value of debit transactions) shows signs of stabilization as opposed to previous years (Chart 2-50).

As opposed to 2006, at the end of the day there were no rejected items due to insufficient liquidity in 2007.<sup>77</sup> Instead of the two-week deposit the MNB started to issue two-week bills as its key monetary policy instrument. In contrast to the previous practice regarding two-week deposit,

Chart 2-50

Share of the six VIBER-participants with largest turnover in monthly queues, their monthly turnover/liquidity ratio (average, minimum, maximum) and the monthly average turnover/liquidity ratio in the system

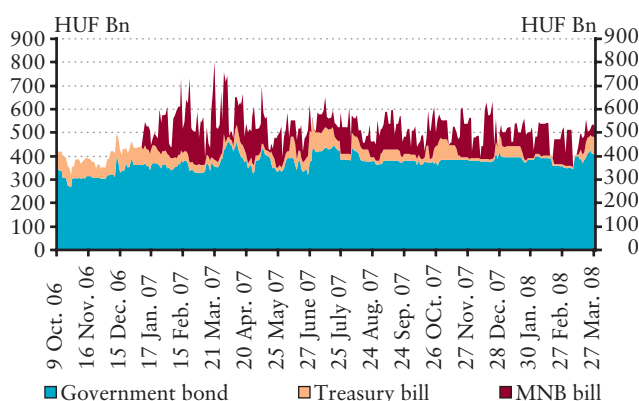


Note: Start-of-day balance adjustments and central bank payments are excluded. Queue-calculation is based on the value of the transactions at the top of the queues.

Source: MNB.

Chart 2-51

Value and composition of eligible assets pledged by counterparties to MNB



Source: MNB.

<sup>74</sup> Of the systems special ('overseer') attention is paid to VIBER, operated by the MNB, the Inter-bank Clearing System (ICS), operated by GIRO Ltd., and the securities clearing and settlement infrastructure operated by KELLER Ltd. In addition, the MNB monitors payment activity processed in other systems (e.g. card payments). However the interbank settlement of these transactions is often relating to the overseen payment systems.

<sup>75</sup> On the basis of the gross settlement principle, VIBER settles only transactions which have sufficient funds available. Thus, under normal operating conditions the system excludes credit risks; however, liquidity risks may still arise.

<sup>76</sup> In VIBER the turnover to liquidity ratio is the ratio of settled transactions compared to the liquidity available for the participants of the system (including opening account balance and intra-day credit line in total).

<sup>77</sup> An internal analysis showed that most end of day rejections in 2006 were primarily due to inadequate end-of-day co-ordination mechanisms between the participants, and the lack of use of built-in transaction and liquidity management VIBER functions.

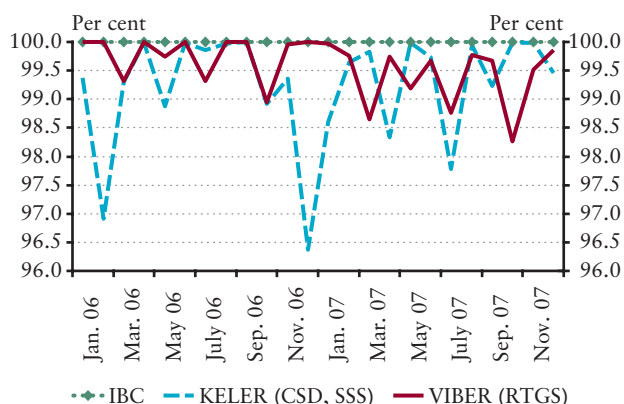
credit institutions can now pledge these two-week MNB-bills as collateral for their intra-day and overnight central bank borrowing (Chart 2-51). Several of the six banks with the largest VIBER turnover have made use of this, which, in turn, increased their intra-day liquidity. This could account for the fact that compared to 2006, the value of queues in VIBER decreased.

## Operational risk

**Operational risk has increased.** The annual average availability ratio of VIBER was 99.39 per cent in 2007, which represents a substantial deterioration compared to the 99.77 per cent ratio in 2006. There were seven months when the monthly availability ratio dropped under 99.7 per cent (Chart 2-52). Central disruptions lasting more than two hours occurred twice (in March and in October). The analysis of the disruptions found out that not only did the number of incidents increase, but several times it lasted until late business hours to solve the incidents, though the beginning of the incidents themselves occurred later. In addition, the length of the incidents started to shift towards longer disruptions.

Chart 2-52

### Availability in the overseen systems



Note: Due to differences in the nature of the overseen systems and in the calculation methodology directly comparing the above availability ratios can be misleading.

Source: MNB.

**In order to reduce operational risk, the MNB is developing an action plan.** As a result of the joint work of VIBER participants and the MNB a long-awaited, voluntarily inter-bank agreement is expected to be implemented in the near future. This will define, on a contractual basis, compensation rules for customer transactions posted after customer cut-off time with bank-to-bank SWIFT message standard (i.e. transactions initiated by foreign banks at their forint correspondents). In addition, to address the issues of

central disruptions and deteriorating availability indicators in VIBER, the MNB is formulating an action plan with the objective of improving the service level of the system. Among other issues, the program is intended to revise the operating environment of VIBER, to strengthen the quality checks used for change management and incident management purposes, and to review the testing processes. Moreover, there are plans to revise the VIBER's hardware, software and network environment, and to review external and internal service level agreements.

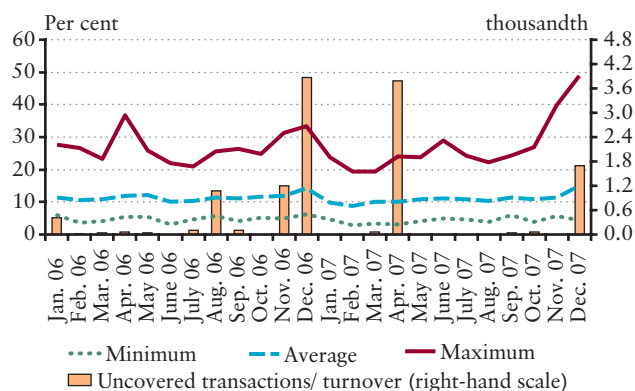
## 2.3.2 INTERBANK CLEARING SYSTEM

### Liquidity risk

**The liquidity risk is negligible.** In Interbank Clearing System (ICS) the value of uncovered transactions is low, in addition, the average value of the turnover is significantly lower than the available liquidity (Chart 2-53). The liquidity surplus of ICS is partly due to the fact that credit institutions are subject to monthly reserve requirement, so they are obliged to maintain a monthly average amount on their account, and their daily closing account balance forms part of the available liquidity of ICS. On the other hand, they can pledge eligible securities as collateral in order to obtain an intraday credit line from the central bank. Participants usually keep those securities pledged for more than one day. The biggest change in the future transaction and liquidity management of both ICS and VIBER direct participants may be that, thanks to the intra-day settlements to be introduced as a part of the InterGiro project, the two systems will work in parallel meaning that they will compete for the intraday liquidity of members.

Chart 2-53

### Liquidity needed for settling ICS-turnover as a percentage of available liquidity (average, maximum, minimum), and uncovered transactions as a percentage of turnover



Source: MNB.

## Operational risk

**The operational risk is low.** The ICS system exhibits rather high operational reliability. Due to the duplicated hardware components and communication channels potential technical failure and line disruptions do not have an impact on the availability of the system.

### 2.3.3 KELER

#### Credit and liquidity risk

**Due to regulatory intervention contagion risk has decreased.** The securities clearing and settlement system operated by KELER Ltd. is a system where cash settlement is mostly dependent on VIBER. Thus liquidity problems arising in VIBER can easily spread to the infrastructure operated by KELER Ltd., and similarly, contagion (shortage in securities) can work in the opposite direction as well. The Hungarian Financial Supervisory Authority and the MNB (as the overseer) focused on the issue of security settlement fails, as they occurred more often in 2006 and 2007. Due to the intervention of these authorities, KELER Ltd. modified its terms and conditions to be more resilient against settlement fails of the participants of the system.

**Separation of central counterparty function is ongoing.** Due to the integrated infrastructure, KELER Ltd. faces credit risk as a central counterparty (CCP). Based on international and domestic recommendations, a project has been launched to separate the credit risks inherent in the CCP function from the central security depository (CSD) activity (Box 2-7). This project is expected to be completed as of 1 January 2009.

#### Operational risk

**In terms of stability, availability is considered to be adequate.** During the operation of KELER Ltd., the number service disruptions experienced directly by clients had a similar frequency as during the previous year, but their duration appeared to decrease. As a result, the availability ratio which reflects service disruptions felt directly by clients, increased to 99.4 per cent, which is an improvement compared to its figure last year (99.1 per cent). In terms of stability, this level of availability can still be considered adequate. In order to reverse the negative trends experienced in recent years, KELER Ltd. continued to implement measures targeting improvement of its operational reliability in 2007.

#### Box 2-7: Legal separation of the central counterparty function

The trading environment of securities transactions has many participants and stakeholders. Service providers include trading platforms (stock exchanges) and other (non-regulated) markets (Chart 2-54). In addition, a central counterparty can also be present in certain markets. It places itself between the trading parties in order to guarantee fulfilment of the obligations undertaken by the parties. Services related to securities transactions include the clearing and the settlement of transactions, as well as other value added services for security owners (e.g. related to corporate events). The security issuance is another important function. Ancillary banking services can supplement clearing and settlement (e.g. securities lending). There are several institutions abroad performing all or part of these functions in an integrated model (e.g. international central securities depositories, e.g. Euroclear and Clearstream, and national clearing and security depositories. None of the national ones are known for performing the central counterparty function). Of all the functions listed above the central counterparty function is the only one which assumes taking credit (principal) risk which can be unpredictable and unforeseeable in size.

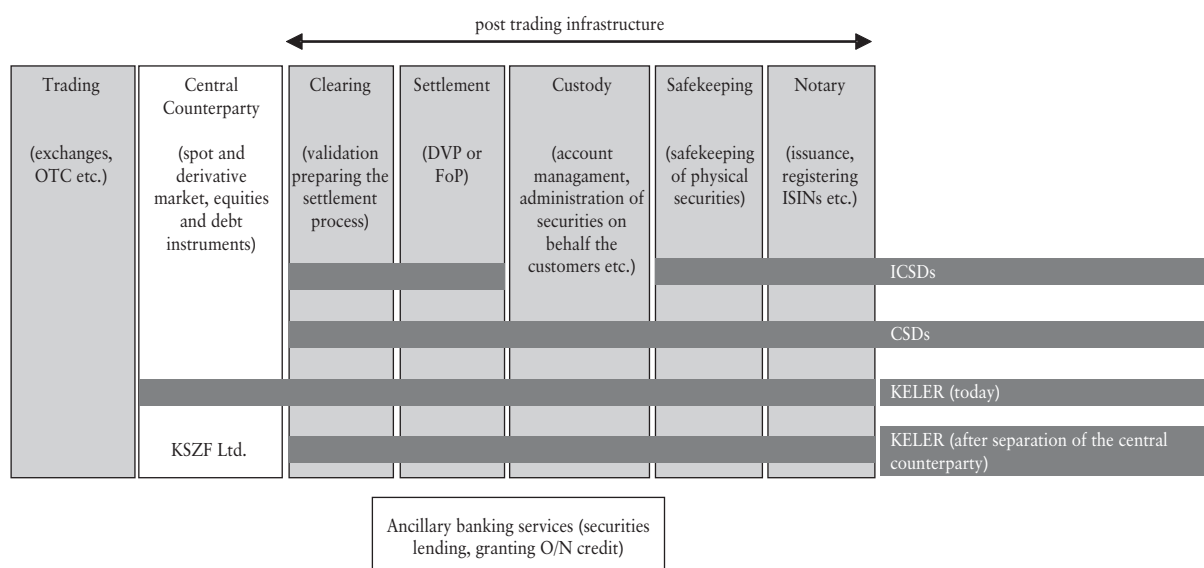
At present, as a specialised credit institution KELER Ltd. acts not only as a central counterparty, but also as a central securities depository and

settlement system. It acts as a central counterparty for stock exchange transactions, i.e. spot securities trades, which have been increasing dynamically in terms of volume in recent years, and also for derivative trades; guaranteeing settlement with its capital base for the counterparties involved.

In 2002-2003 the European Central Bank (ECB), in view of the EU entrance and future changeover to the euro, prepared a comprehensive assessment of the activity of KELER Ltd. along with the examination of the central securities depositories and settlement systems of all other countries joining the EU in 2004. Discharging the securities depository function and the central counterparty function as a single legal entity raised some serious risk considerations. According to the assessment, if a central counterparty has to stand for an obligation that equals or exceeds its capital base, using up its own funds or getting insolvent, as a consequence, the functioning of the central securities depository could be disrupted as well. In 2002 the ECB recommended the separation of the central securities depository and the central counterparty functions into two legally independent entities, and in 2003 in its final assessment report suggested appropriate risk management tools. The MNB was assigned to select the best way to solve the situation and to follow up the implementation.

Chart 2-54

## Overview of the different functions along the post-trading infrastructure value chain



Explanation: white: principal business (credit risk), grey: providers are agents (no credit risk), black: national and international examples.

Source: Deutsche Börse Group: The European Post-Trade Market. An introduction.

The MNB subsequently started negotiations. Considering the risks involved the MNB supported the idea of separation of the central counterparty and central securities depository functions of KELER Ltd. into two legally independent companies (these companies would be KSZF Ltd. as the central counterparty, and KELER Ltd.). This opinion was strengthened by the detailed oversight assessment of KELER Ltd., conducted in 2005-2006. In order to provide proper regulatory support for implementation of the separation concept, in 2005 the central bank initiated amendment of the Act CXX of 2001 on Capital Markets. The final deadline for separation is 1 January 2009.

The proposal to establish an independent corporation to cover the central counterparty function was approved. According to the decision, KELER Ltd. will retain the central securities depository and settlement

functions. In order to minimise the costs associated with separation, apart from the legal act to provide guarantee for counterparties of a trade KSZF Kft. will outsource all its operations to KELER Ltd. The capital base required for KSZF Kft. will be secured by KELER Zrt. in the form of an unconditional guarantee for obligations of KSZF Kft. with regards to CCP activity. The unconditional guarantee covers a limited amount defined by contract; and on a yearly basis, the amount will be reviewed and compared to the capital of KELER Ltd. stated in its yearly report, in order to ensure that the minimal capital required for the operation of the central securities depository is available at all times. Obviously, the unconditional guarantee received by KSZF Ltd. from KELER Ltd. is only the 'last resort' in providing a buffer against counterparty (credit) risk. The primary and secondary lines of defence are individual collaterals and collective guarantee funds deposited by clearing members.



## **Appendix: Macro-prudential indicators**

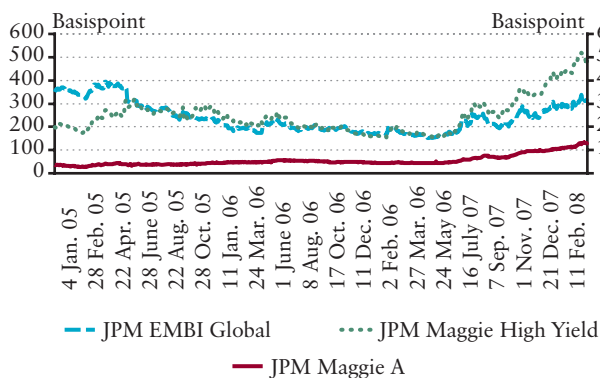




## 1 Risk appetite

**Chart 1**

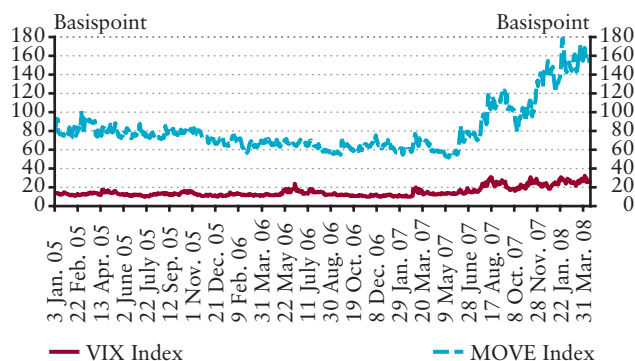
### Primary risk indicators



Source: Datastream, JP Morgan.

**Chart 2**

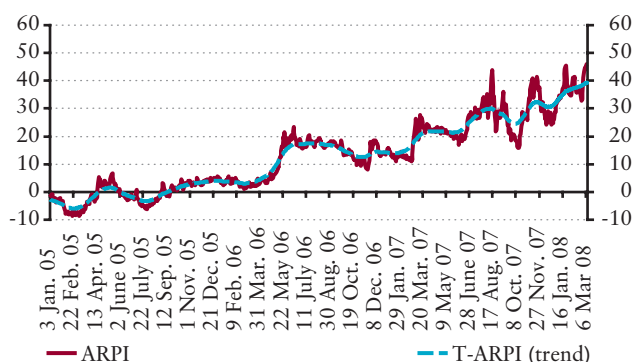
### Implied volatility of the primary markets



Source: Datastream, Bloomberg.

**Chart 3**

### Dresdner Kleinwort indicator



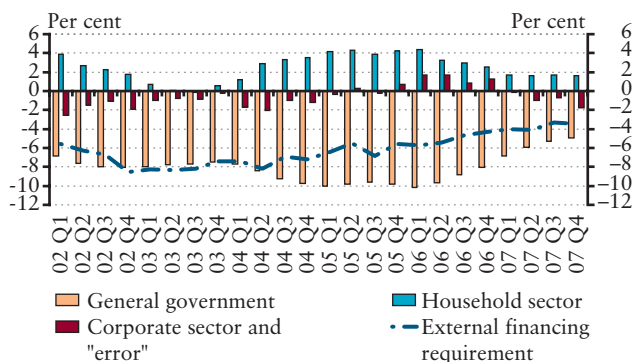
Source: DrKW.

## 2 External balance and vulnerability

**Chart 4**

### Net financing capacity of the main sectors and external equilibrium in percentage of GDP

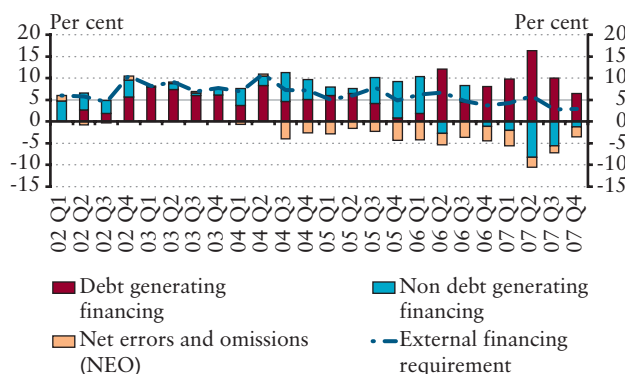
(seasonally adjusted)



Source: MNB.

**Chart 5**

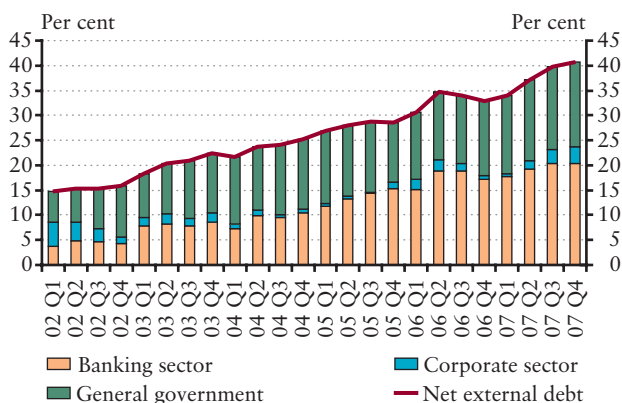
### External financing requirement and its financing in percentage of GDP



Source: MNB.

Chart 6

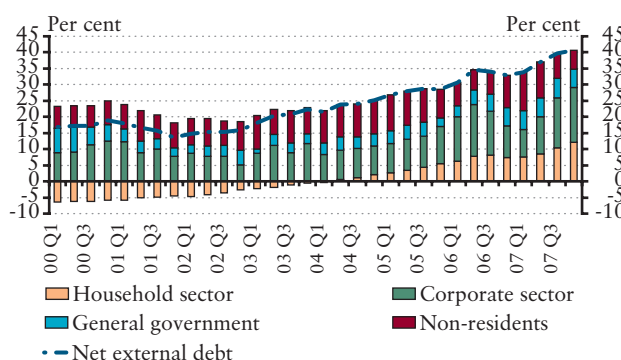
## Net external debt in percentage of GDP



Source: MNB.

Chart 7

## Open FX position of the main sectors in percentage of GDP



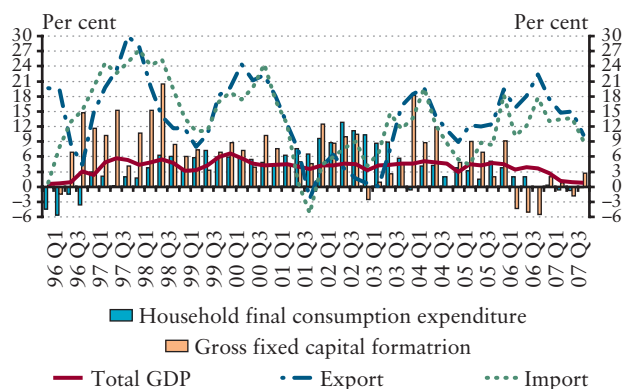
Source: MNB.

## 3 Macroeconomic performance

Chart 8

## Growth of GDP and its main components

(annual growth rate)

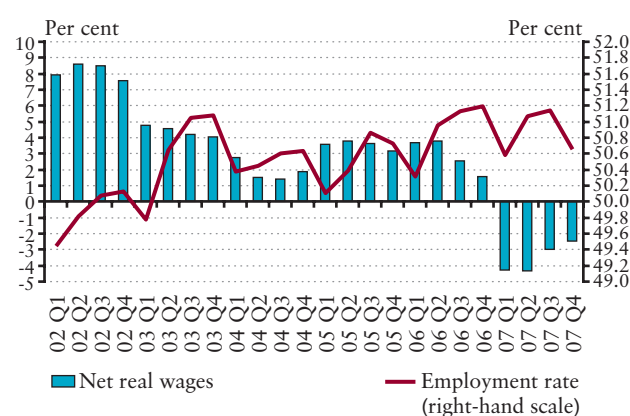


Source: HCSO.

Chart 9

## Employment rate and net wage developments

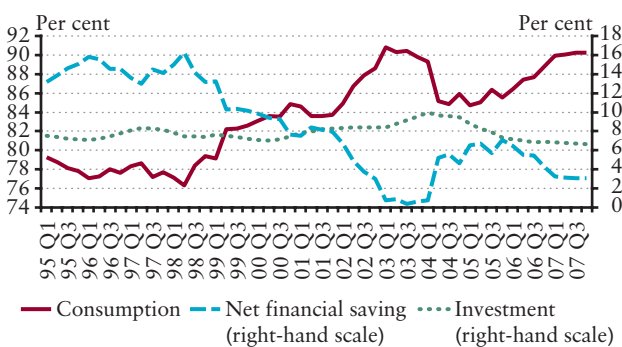
(annual growth rate)



Source: HCSO.

Chart 10

## Use of household income as a ratio of disposable income

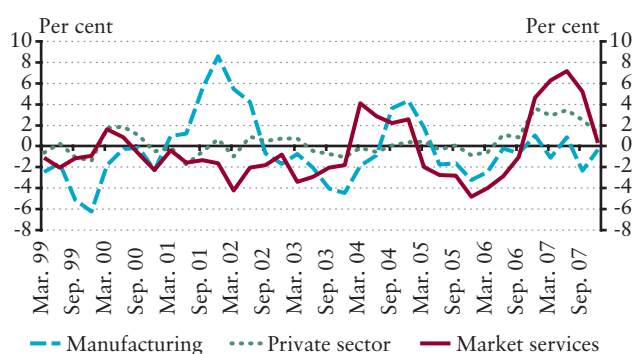


Source: HCSO, MNB.

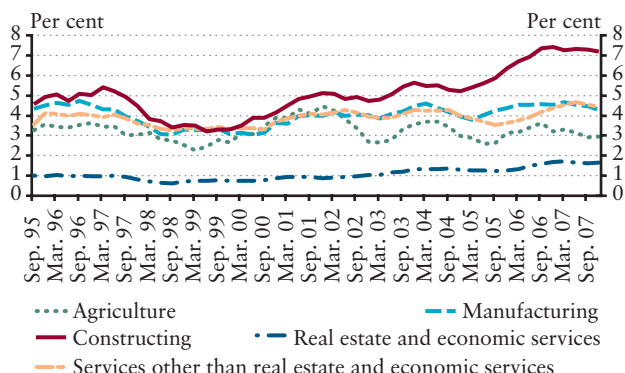
Chart 11

## Corporate real unit labour cost in the private sector

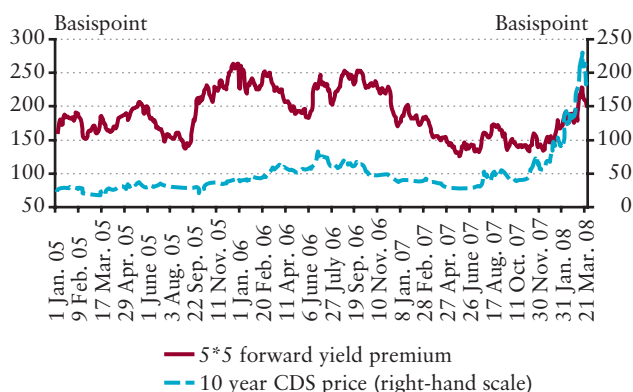
(annual growth rate)



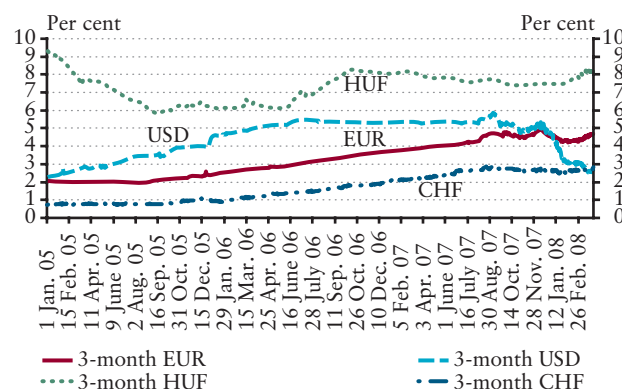
Source: HCSO, MNB.

**Chart 12****Sectoral default rates**

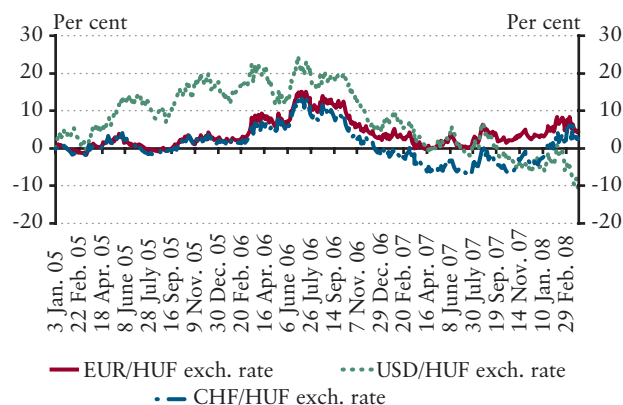
Source: Opten, HCSO, MNB.

**4 Monetary and financial conditions****Chart 13****The long-term default risk and forward premium of Hungary**

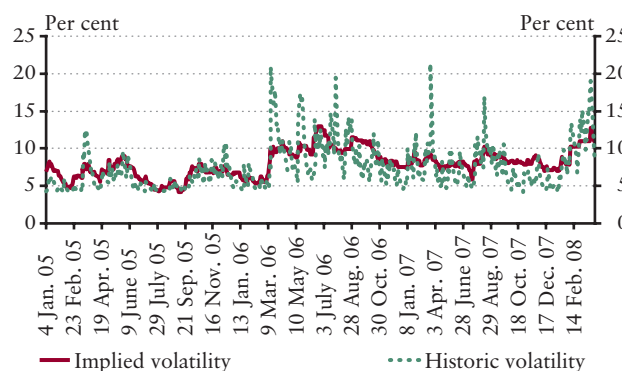
Source: Datastream, Reuters.

**Chart 14****Three-month EUR, USD, CHF and HUF money market interest rates (LIBOR and BUBOR fixing)**

Source: Reuters.

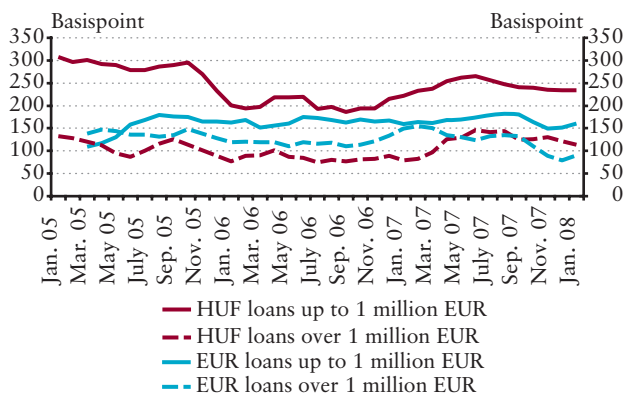
**Chart 15****Forint/euro, forint/dollar and forint/franc exchange rates compared to January 3, 2005**

Source: Reuters.

**Chart 16****Volatility of the forint/euro exchange rate**

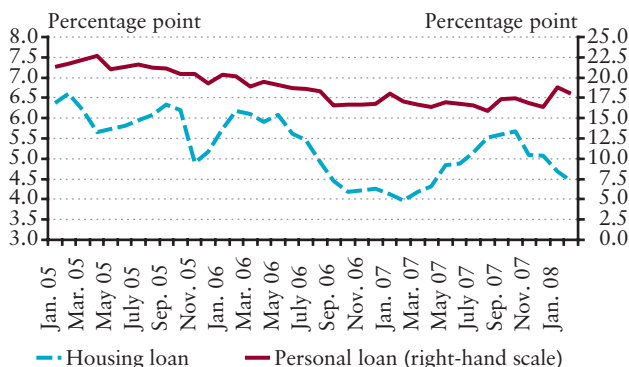
Source: Reuters, MNB.

Chart 17

**Interest rate premium of new loans to non-financial enterprises***(over 3 month BUBOR and EURIBOR, respectively, 3 months moving average)*

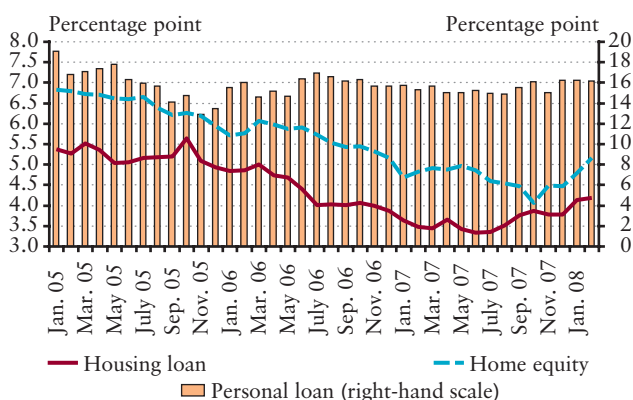
Source: MNB, Euribor.

Chart 18

**Interest rate premium of new HUF denominated loans to households***(over 3 month BUBOR)*

Source: MNB.

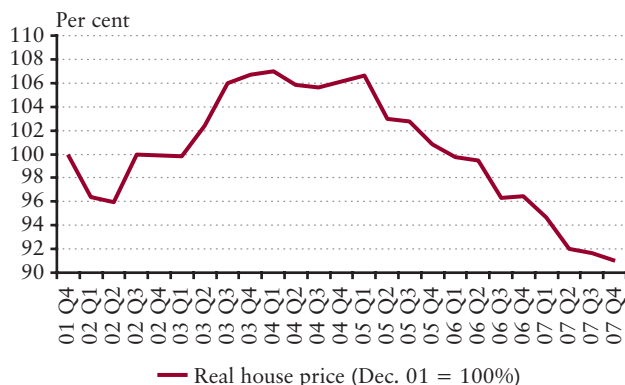
Chart 19

**Interest rate premium of new CHF denominated loans to households***(over 3 month CHF LIBOR)*

Source: MNB.

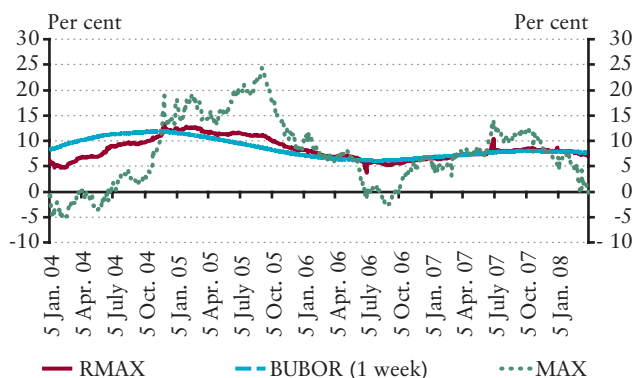
**5 Prices of instruments**

Chart 20

**House prices**

Source: Origo.

Chart 21

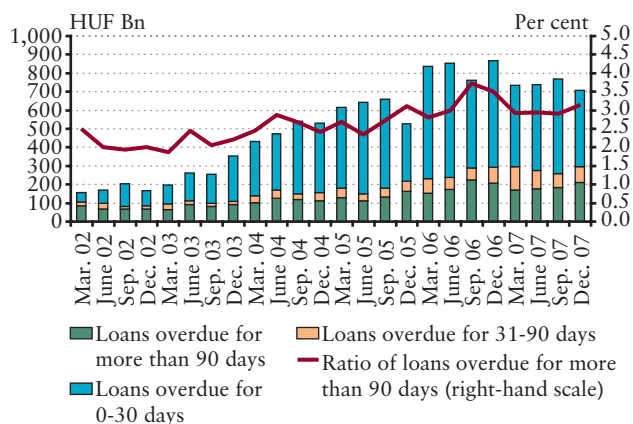
**Annualised yields on government securities' indices and money markets**

Source: ÁKK, portfolio.hu, MNB.



Chart 27

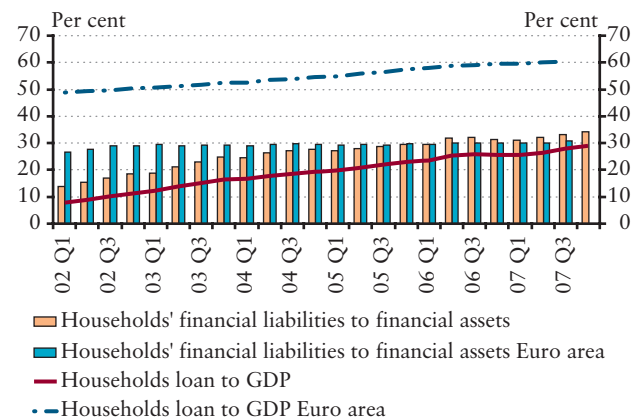
## Overdue loans in the corporate portfolio of the banking sector



Source: MNB.

Chart 29

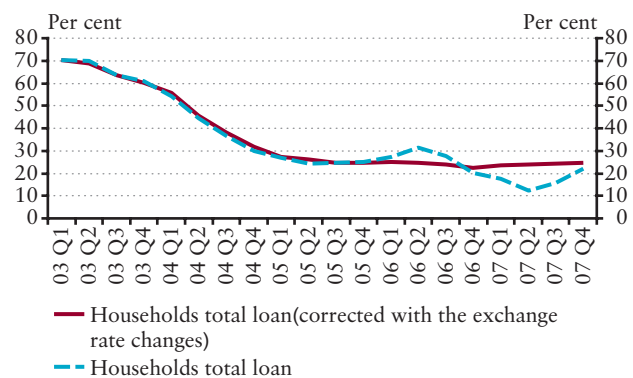
## Indebtedness of households in international comparison



Source: ECB, MNB.

Chart 31

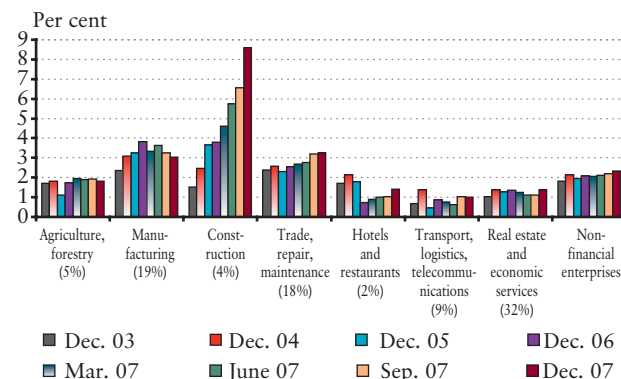
## Annual growth rate of household loans



Source: MNB.

Chart 28

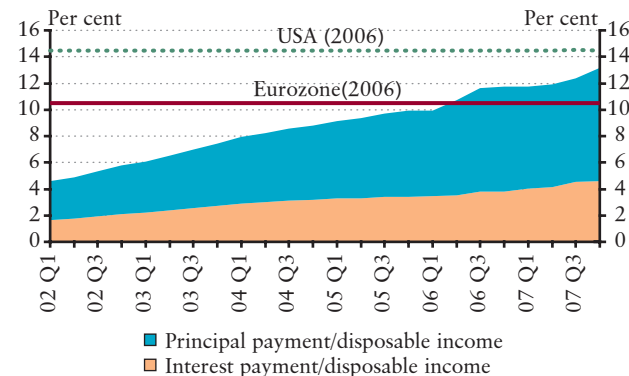
## Provisioning on loans of non-financial corporations by industry



Source: MNB.

Chart 30

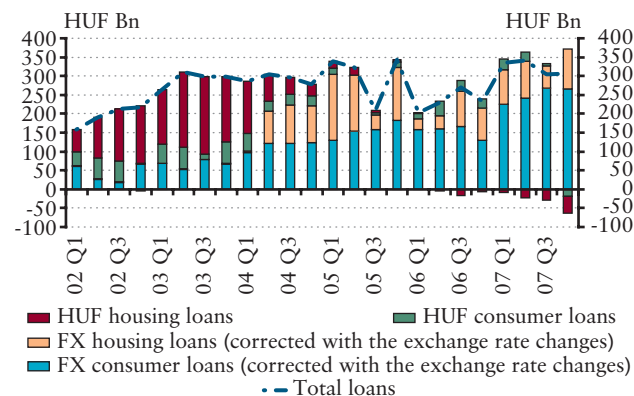
## Debt service burden of the household sector as a ratio of disposable income



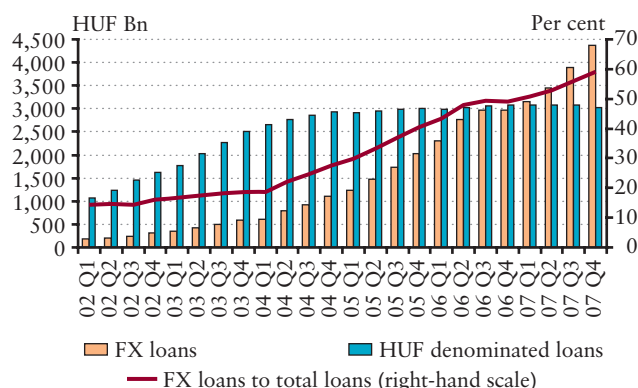
Source: Fed, ECB, MNB.

Chart 32

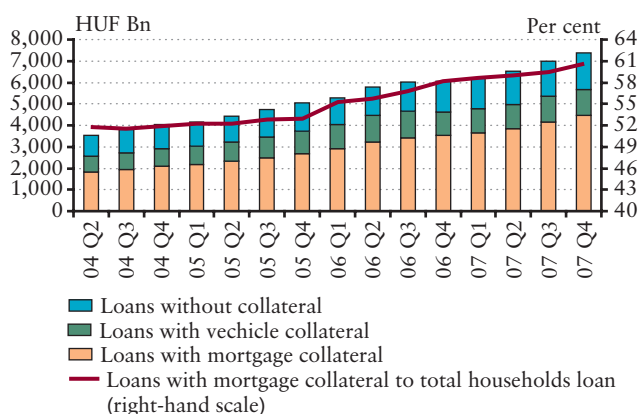
## Net quarterly change of bank loan volumes of households by main products and currencies



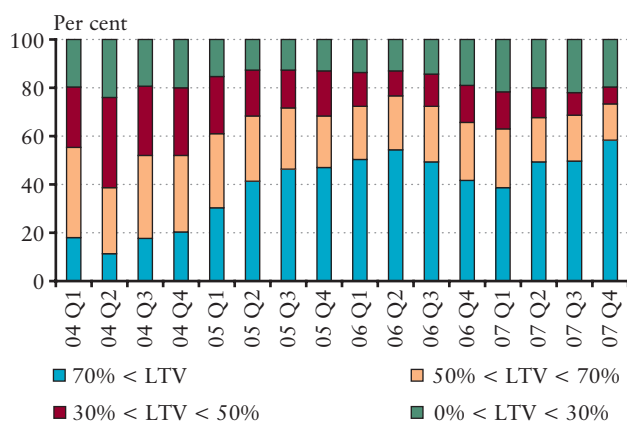
Source: MNB.

**Chart 33****Household loans distribution by denomination**

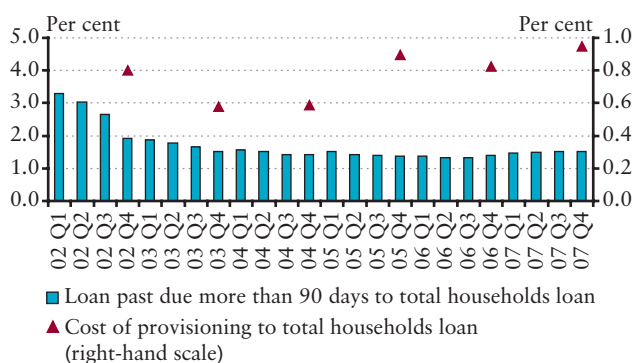
Source: MNB.

**Chart 34****Household loans distribution by collateral**

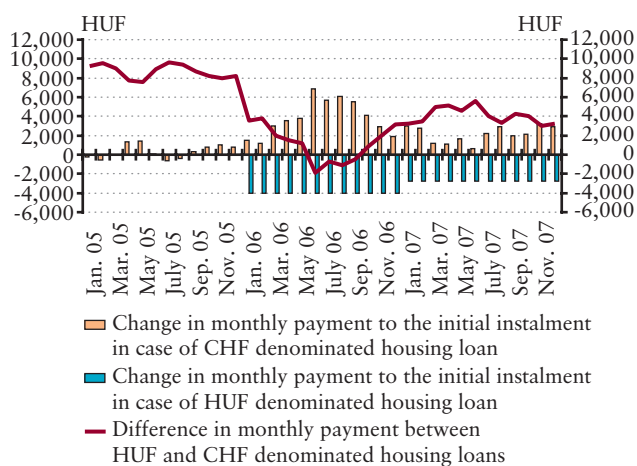
Source: MNB.

**Chart 35****Household new housing loans distribution by LTV**

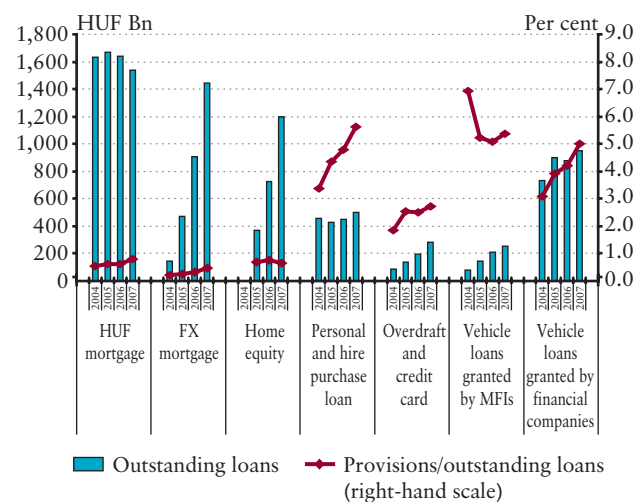
Source: MNB.

**Chart 36****Quality of the households' portfolio**

Source: MNB.

**Chart 37****Comparison of the instalment payments of CHF and HUF denominated housing loans**

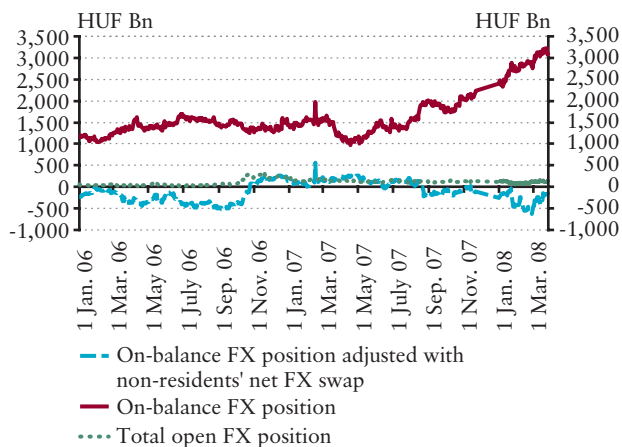
Source: MNB.

**Chart 38****Provisioning on loans of households**

Source: MNB.

Chart 39

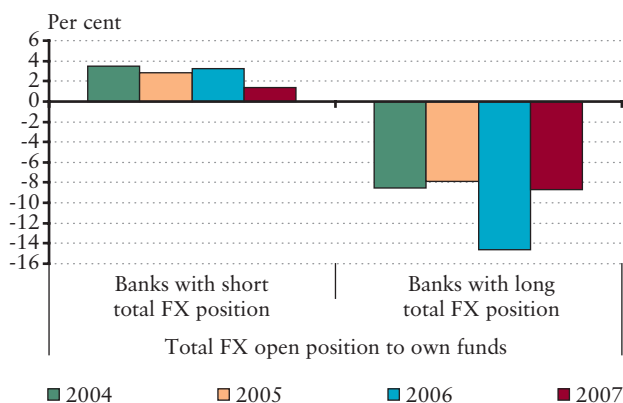
## FX open position of the banking sector



Source: MNB.

Chart 40

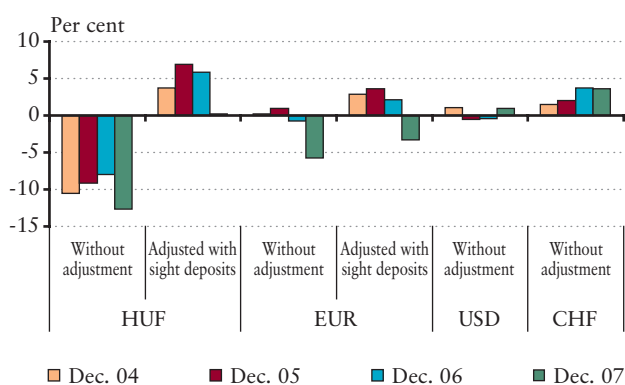
## The banking sector's exchange rate exposure



Source: MNB.

Chart 41

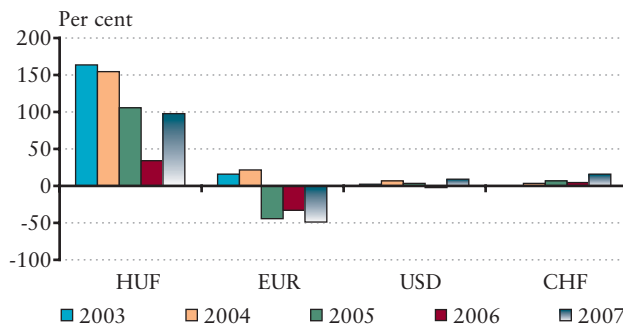
## 90-day re-pricing gap of the banking sector



Source: MNB.

Chart 42

## Interest rate exposure as a ratio of equity

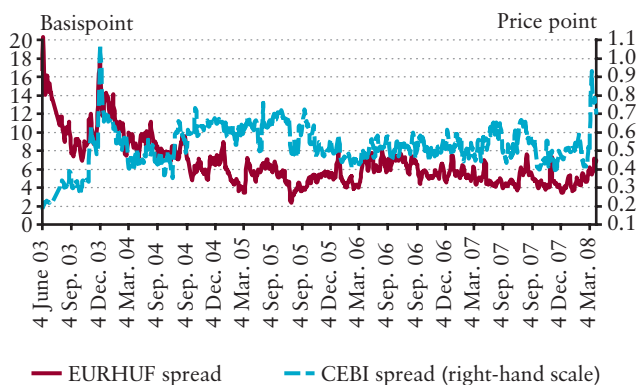


Source: MNB.

Chart 43

## Bid/ask spread in the spot FX market and the government bond bid/ask spread

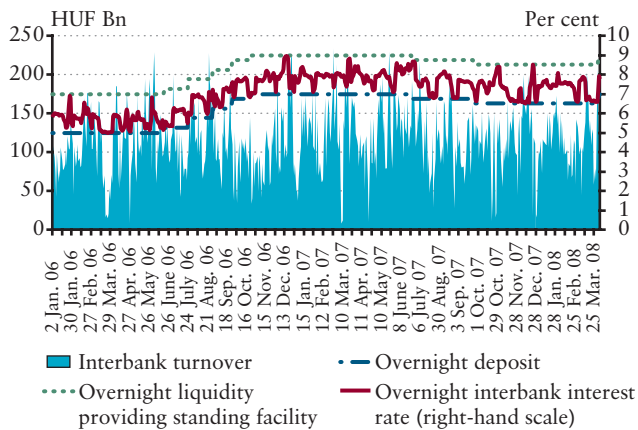
(5 day moving average)



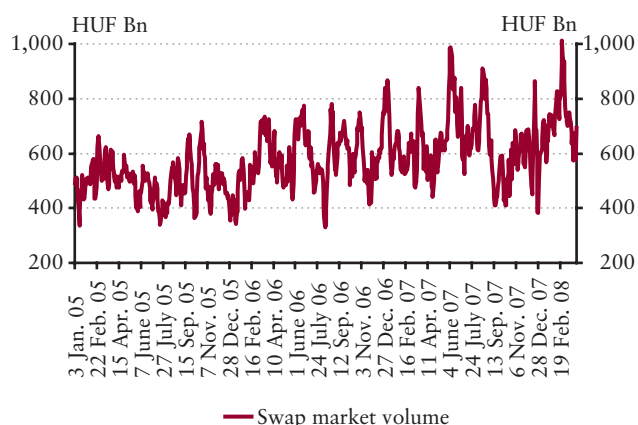
Source: Reuters, DrKW.

Chart 44

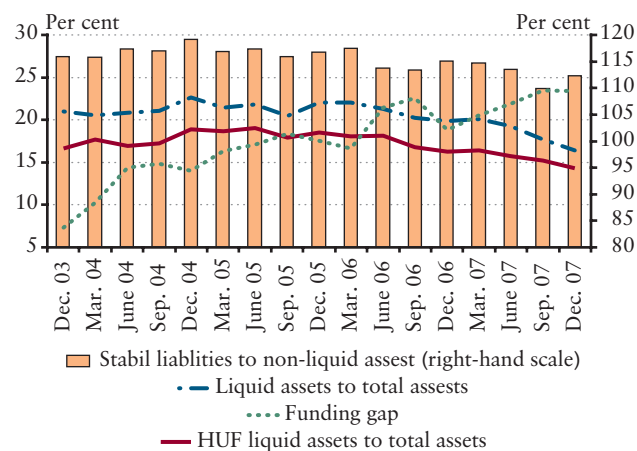
## O/N interbank turnover without collateral and interest rates



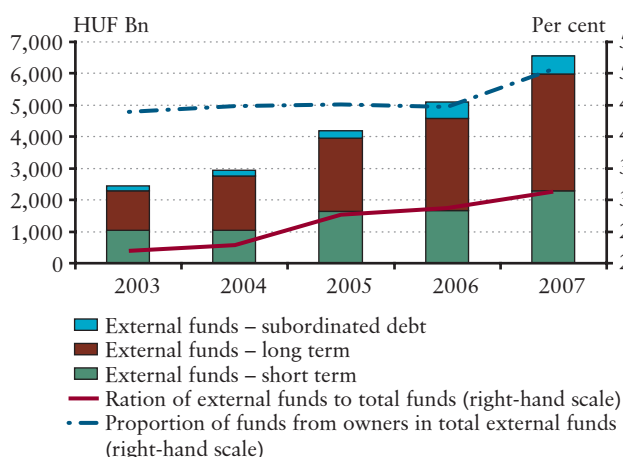
Source: MNB.

**Chart 45****FX swap market turnover**

Source: MNB.

**Chart 46****Liquidity ratios of the banking sector**

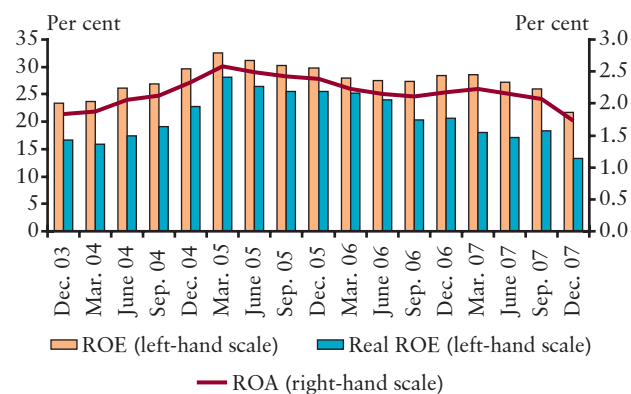
Source: MNB.

**Chart 47****External funds of the banking sector**

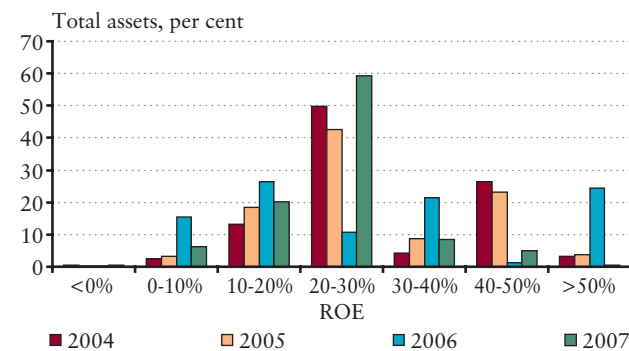
Source: MNB.

**Chart 48****"One month" liquidity stress indicator of the banking sector**

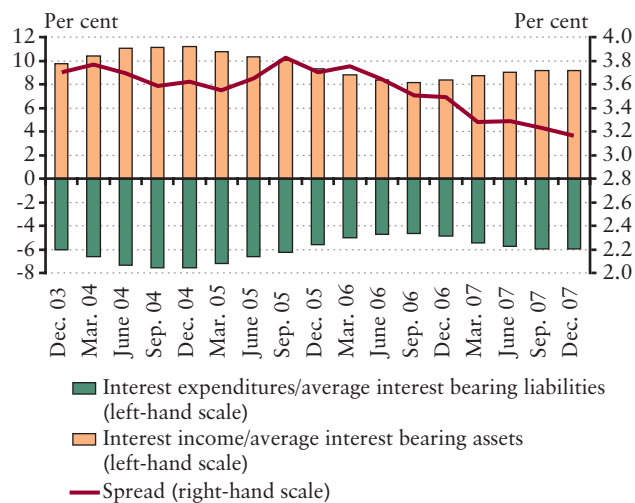
Source: MNB.

**Chart 49****ROA, ROE and real ROE of the banking sector**

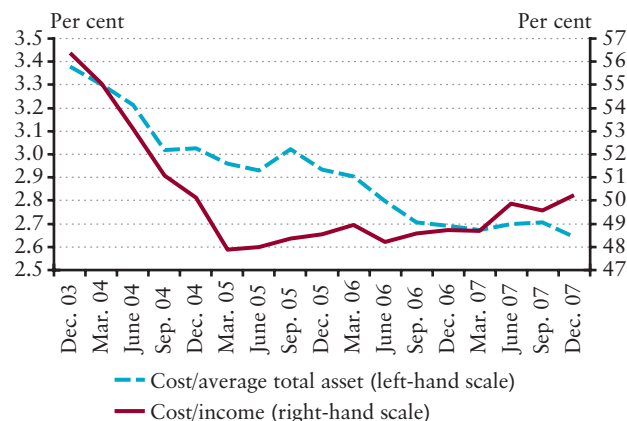
Source: MNB.

**Chart 50****Dispersion of banks' total assets by ROE**

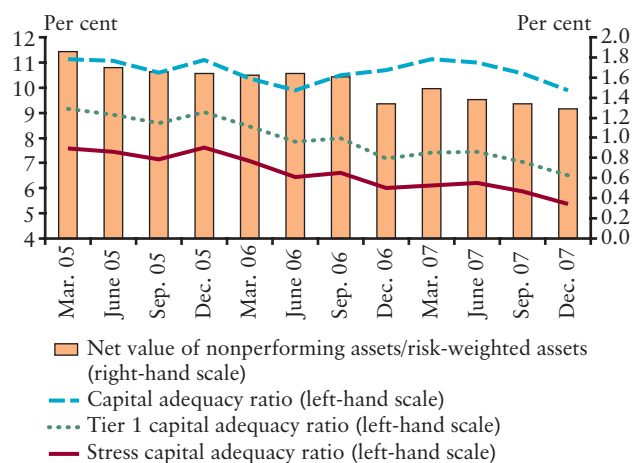
Source: MNB.

**Chart 51****Banking sector spread and its components**

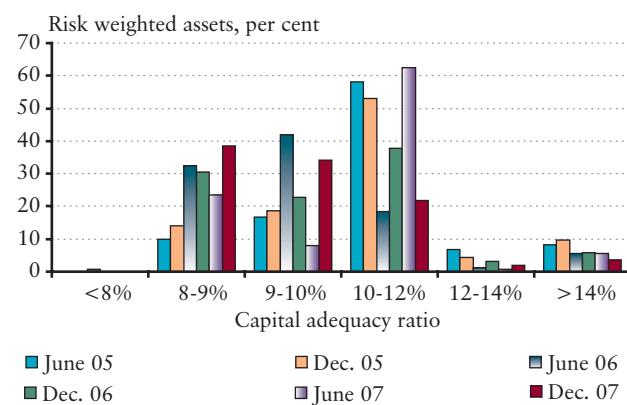
Source: MNB.

**Chart 52****Operating efficiency indicators of the banking sector**

Source: MNB.

**Chart 53****Banks' capital adequacy ratios**

Source: MNB.

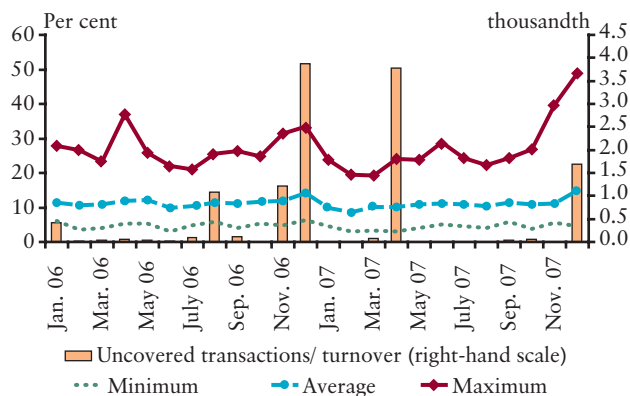
**Chart 54****Dispersion of banks' risk weighted assets by capital adequacy ratios**

Source: MNB.

## 7 Risks of the payment systems

**Chart 55**

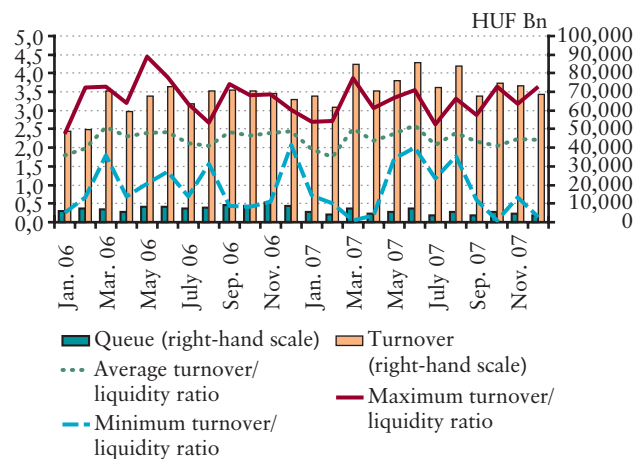
**Liquidity needed for settling ICS-turnover in the per cent of available liquidity and uncovered transactions in the per cent of the turnover**



Source: MNB.

**Chart 56**

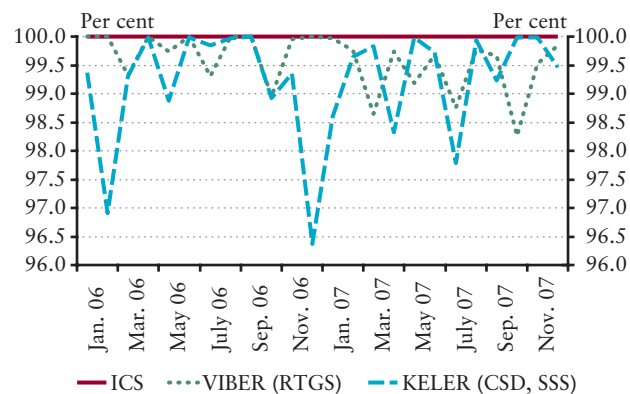
**Monthly turnover/liquidity ratio (VIBER) and monthly turnover and queue statistics**



Source: MNB.

**Chart 57**

**Availability of domestic overseen systems (ICS, KELER, VIBER)**



Source: MNB.

# Notes to the appendix

The chart date (e.g. 2007) means the end of the year (the 31st of December) if it not indicated otherwise.

## **Chart 1:**

The increased value of the indicator indicates declining risk appetite or increasing risk aversion.

## **Chart 2:**

VIX: implied volatility of S&P 500.

MOVE: implied volatility of US Treasuries (Merrill Lynch).

## **Chart 3:**

The increased value of the indicator indicates declining risk appetite or increasing risk aversion.

## **Chart 4:**

General government: according to SNA methodology.

Corporate sector and "error": the financing requirement of corporate sector is calculated as a residual, so it includes errors.

External financing requirement: adjusted by the difference caused by imports brought forward on account of EU accession and by the import increasing impact generated by customs warehouses terminated due to EU accession and Gripen acquisitions.

## **Chart 5:**

The sum of components of the financing does not equal to the financing requirement because of the high volume of the "Net errors and omissions" in the Balance of payments statistics.

## **Chart 10:**

The disposable income is estimated by MNB using the consumption, investment and financial savings data of households.

## **Chart 12:**

Number of bankruptcy proceedings of legal entities, summed according to the date of publication, cumulated for 4 quarters, divided by the number of legal entities operating a year before.

## **Chart 13:**

The spread of the implied 5-year forint interest rate in 5 years time versus the euro. The 10-year maturity government bond credit default swap spreads in Hungary.

## **Chart 16:**

Historic volatility: weighted historic volatility of the exchange rate (GARCH method).

Implied volatility: implied volatility of quoted 30-day ATM FX options.

## **Chart 25:**

FX loans on December 1999, end of month exchange rate, HUF loans are corrected with the governmental buying-out of loans.

## **Chart 26:**

FX loans on December 1999, end of month exchange rate.

## **Chart 39:**

An increase in the swap stock stands for swaps with a long forint spot leg. Based on the daily FX reports of credit institutions. Calculated from swap transactions between credit institutions and non-resident investors. The MNB does not hold responsibility for the accuracy of the data. Revisions due reporting errors and non-standard transactions might lead to significant subsequent modifications of the data series. The data series does not include swap transactions between specialized credit institutions, cooperative credit institutions, branches and non-resident investors.

## **Chart 42:**

We used the so-called adjusted Macaulay duration calculated from re-pricing information. In case of positive exposure the parallel upwards shift in the entire yield curve results in losses.

## **Chart 43:**

The EUR/HUF spread was calculated from the best bid-ask prices of the Reuters' electronic trading system.

The government bond market spread is the Central European Bond Index (CEBI) HUF governments bond bid-ask spread of the Dresdner Kleinwort Wasserstein (DRKW).

**Chart 45:**

Based on forint-FX deals by domestic banks, according to the trading date. 5 day moving averages. Transactions among resident credit institutions are not duplicated.

**Chart 48:**

Stress scenario: we assume a bank-specific liquidity shock that may originate, for example, from a crisis of confidence. Main assumptions:

- Banks are unable to renew their liabilities from sources other than deposits which are scheduled to expire within one month (primarily interbank liabilities).
  - Customers withdraw the part of credit lines due within one month, or redeem the part of guarantees due within one month.
  - Banks can obtain additional funds by using their liquid assets with only a "haircut" varying for each asset.
- o Customers fail to repay their overdrafts.

The 1 month liquidity stress ratio shows the maximum possible customer deposit withdrawal within one month that could be covered by banks' liquidity buffers, under the assumption that they can not obtain new funds from external sources (e.g. interbank market).

**Chart 49:**

ROE = pre-tax profit / average (equity - balance sheet profit).

ROA = pre-tax profit / average balance sheet total.

Interim data are annualised!

Pre-tax profit: previous 12 months.

Average balance sheet total: mean of previous 12 months.

Average (equity - balance sheet profit): mean of previous 12 months.

Deflator: previous year same month=100 CPI (%).

**Chart 50:**

Pre-tax profit.

**Chart 51:**

Interim data are annualised!

Interest income: previous 12 months.

Interest expenditure: previous 12 months.

Average interest bearing assets: mean of previous 12 months.

Average interest bearing liabilities: mean of previous 12 months.

**Chart 52:**

Cost: previous 12 months.

Income: previous 12 months.

Average total asset: mean of previous 12 months.

**Chart 53:**

Capital adequacy ratio: total own funds for solvency purposes/(minimum capital requirement\*12,5).

Tier 1 capital adequacy ratio: (tier 1 capital after deductions)/(minimum capital requirement\*12,5).

Stress capital adequacy ratio: (tier 1 capital after deductions - net value of non-performing loans)/(minimum capital requirement\*12,5 - net value of non-performing loans).

Capital adequacy ratio, tier 1 capital adequacy ratio, stress capital adequacy ratio: 2007 end data is NOT corrected with expected reinvested earnings.

**Chart 56:**

Start-of-day balance adjustments and central bank payments are excluded.

**Chart 57:**

Due to differences in the nature of the overseen systems and in the calculation methodology comparing the drawn availability ratios can be misleading.

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