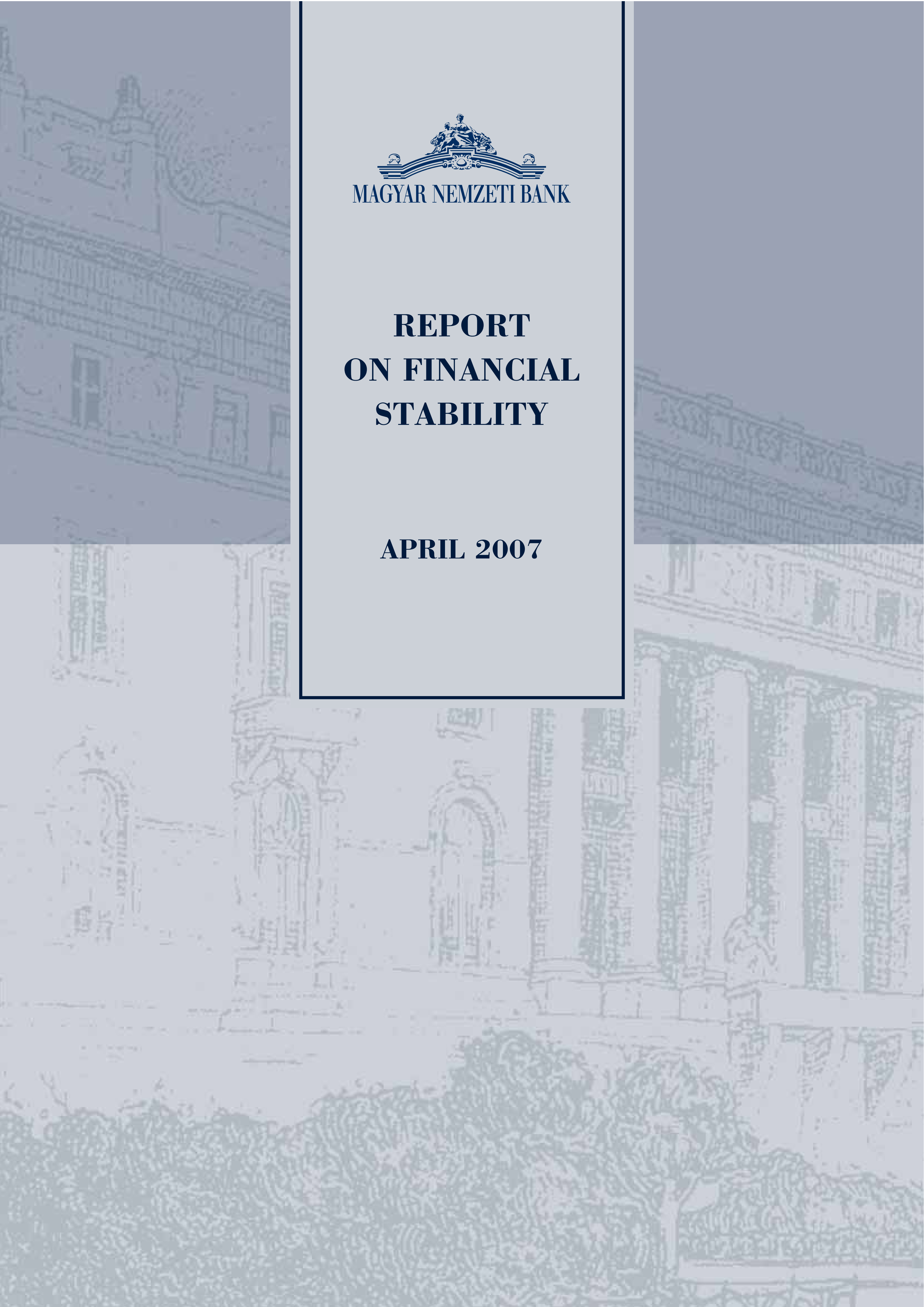

MAGYAR NEMZETI BANK

REPORT ON FINANCIAL STABILITY

APRIL 2007

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 and Risk Management Directorate, the Economics and Monetary Policy Directorate and the Payment System and Currency Issue Directorate. The project was managed by Márton NAGY, Economic adviser of Financial stability, together with Judit ANTAL, Principal economist of Financial analysis and with Sándor DÁVID, Payment system expert of Payment system and currency isssue policy. The Report was approved for publication by Dr. Tamás KÁLMÁN, Director.

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Overview of main risks and issues

On the whole, risks to financial stability have declined

On the whole, the vulnerability of the Hungarian financial system has declined recently, mainly due to the significant improvement in external equilibrium. The system of financial institutions is now facing new risks. Nevertheless, the likelihood of exogenous risks materialising; and the risks emerging from operational aspects are not considered to be overly significant for the time being. Furthermore, the shock-absorbing capacity of the financial system remains strong.

Risks related to the sustainability of economic path are moderating

In the April 2006 issue of the *Report on Financial Stability* the main risk was that imbalances appeared to be gaining ground, paving the way for a fundamental crisis that was likely to result in substantial costs in terms of the real economy and risks to financial stability, mainly because of the rapid growth in the private sector's foreign currency debt. The fiscal consolidation measures announced in the summer of 2006 significantly reduced the likelihood of a correction driven by the market. If the measures contained in the convergence programme are effectively implemented, the general government borrowing requirement may fall significantly in 2007–2008, which, in turn, may be felt for the most part in a decline in the external financing requirement. As the severity of disequilibrium is expected to decline, the rapid build-up of debt of general government and the total economy as a proportion of GDP, which was seen in recent years, is expected to slow down and possibly stop.

Changes in the macroeconomic path carry new risk factors

Due to the new course adopted in fiscal policy, there has been a significant decrease in the probability of the development of a scenario involving the greatest risk factors from the perspective of the real economy and financial stability. Despite this however, the new macroeconomic environment imposes temporary burdens upon economic agents, and therefore confronts the Hungarian financial intermediary system with new risks.

Slower economic growth and the reduction of real incomes effect the financial position of economic agents differently

As far as the financial position of the clients of financial institutions, i.e. firms and households, is concerned, the significant slowdown in growth in 2007 and 2008, the decline in real incomes and the asymmetric nature of these developments are important factors. Notwithstanding the fact that the rise in taxes and contributions applies to the entire corporate sector, the profitability of companies whose production profile relies mostly on the domestic market is likely to suffer the most, due to waning domestic demand. With regard to households, the differences in income loss originate mainly from the natural gas price compensation scheme and from the differences in taxes among the various income categories. As a result of these effects, we expect to see greater reductions in the real incomes of households falling into higher income categories.

Slight decrease in the growth rate of credit demand in the private sector

Changes in the income path and the decline in domestic demand suggest that there will be slower growth in credit demand in the private sector. In our view, however, the extent of this slowdown will be marginal, as we expect a slight correction in investment activity in the corporate sector, and consumption smoothing in the case of households.

Deteriorating loan portfolios in the financial intermediary system

The lower profitability of companies whose production profile relies mostly on the domestic market is likely to result in a further deterioration of corporate loan portfolios. The relapse in the portfolio quality of households is expected to be marginal, as the shock-absorbing capacity of clients in the higher income category, where the decline in real incomes are the greatest, is better than average.

There are two main risk scenarios

The analysis of risk paths primarily depends on the factors which involve uncertainty in connection with the macroeconomic baseline scenario. From the perspective of financial stability there are two main risk scenarios: nominal rigidity of wages accompanied by high inflationary expectations, and a reduction in global risk appetite.

Nominal wage rigidity and high inflationary expectations may lead to reductions in the employment market and to the deterioration of the household loan portfolio

The fiscal adjustment may generate higher inflation expectations over the long run and may lead to faster growth in regular wages. If prices increase more slowly than expected by market players, the increase of wages at a higher rate – due to the weaker demand induced by the deficit-reducing measures – could result in lower profitability in the corporate sector, which in all likelihood will prompt layoffs, due to wage rigidity. On the other hand, in this scenario real income shocks could have an asymmetrical impact on the households affected, meaning that the real income of laid-off workers, and hence their debt servicing ability will be greatly impaired, while the income position of employed people will take a positive turn relative to the basic scenario. According to the findings of the stress tests, the percentage of exposed household portfolios is likely to increase as a result of these two factors.

Unfavourable changes in the global investment environment could lead to higher forint interest rates and depreciation of the exchange rate, and ultimately to higher credit risks in the private sector

While global risk appetite is at an all-time high, there is still a significant probability that any increase in interest rates in the major markets or any other financial shock on an international scale could lead to a sudden drop in risk appetite and to a steady rise in required risk premia on forint investments. Higher yield levels and a weaker exchange rate will lead to higher instalment payments, and ultimately cause a deterioration of household and corporate loan portfolios.

The impact of potential shocks is mitigated by high household interest margins and collaterals

The negative impact on incomes resulting from higher credit risks may be mitigated by the high interest margins and the high proportion of collateralised loans within the portfolio. Despite the fact that collateral requirements are lower for new loans, they are still considered conservative by international comparison.

The financial intermediary system is becoming increasingly sensitive to developments in the real estate market

As the volume of household mortgage loans is rising, the financial intermediary system is becoming increasingly sensitive to developments in the real estate market. Furthermore, the portfolio's high percentage of loans in the corporate sector for financing commercial real estate is another factor which increases exposure to developments on the real estate market.

Moderate market risks

Due to the level of exposure, stress tests indicate minor interest rate and exchange rate risks in the Hungarian financial intermediary system. Liquidity risk is also moderate, which is due largely to the increasing role of long-term foreign loans (mainly from parent banks) in financing.

High profitability and strong shock-absorbing capacity

The profitability of the Hungarian financial intermediary system and its capacity to absorb the shocks from the risks under review remains strong. In order to maintain the high level of profitability over the long run, banks are steadily pushing their lending activities, and taking advantage of potential synergies within the bank group, as well as moving in the direction of foreign expansion. These factors could be positive in the short term, but in the long run they could become a source of vulnerability, due to higher exposure to risky clients, greater dependence on the developments in the economies of host countries and regulatory arbitrage.

High foreign exchange settlement risk can be a potential source of vulnerability

The level of liquidity and operating risks in the domestic payment and settlement systems is currently fairly low. VIBER is the only system showing any signs of an increase in liquidity risk, but this rise is not significant, and therefore has no effect on the vulnerability of the payment and settlement systems and on the stability of financial institutions. On the other hand, foreign exchange settlement risk is currently high enough to demand more attention.

1. Macroeconomic and financial market risks

In the *Report on Financial Stability* published in April 2006 the main risk was that – due to economic imbalances Hungary's economy had embarked upon a path that would prove to be unsustainable over the long run. A recession and substantial increase in the required risk premium stemming from a fundamental crisis would have jeopardised financial stability, in addition to the considerable exposure of the private sector to exchange rate and interest rate risks.

The fiscal package announced in the summer of 2006 significantly reduced the probability of a fundamental exchange rate crisis that would have resulted in substantial additional costs in terms of the real economy. At the same time, according to our analysis based on model simulations, in part due to the structure of the package,[1] the tightening measures impose substantial burdens on economic agents, and they generate new risks as well. Due to higher taxes and social contributions, and higher inflation as well, the real income of households is projected to drop by more than 3 per cent in 2007, and may only rise modestly in 2008. In the corporate sector, higher taxes will push up the cost of capital and the wage costs, which in turn may result in a decline in the level of profitability.

The measures in the stability package may also cause a persistent increase in inflation expectations. It is difficult to judge the presence of such risks: wage and price indicators may be considerably distorted by the rescheduling of wage-payments prompted by the introduction of higher taxes and social contributions, and the timing of price increases to coincide with the time when higher VAT rates took effect. The rapid growth in the payment of regular wages during the second half of 2006, however, may be an indication of higher and more persistent inflation expectations. If no adjustment is possible through the nominal wages (wage rigidity), stagnation of inflation expectations may result in higher real wage costs, and ultimately lead to layoffs.

In addition to macroeconomic risks, risks stemming from changes in the international environment represent another important factor. Although the required risk premium is at historically low levels, there continues to be a substantial risk that an increase in interest rates in the major markets or another international financial shock could lead to a sudden drop in risk appetite and to a permanent increase in expected risk premia on forint investments, i.e. to exchange rate depreciation and higher yield levels.

In our analysis, we attempt to identify those processes that pose the greatest risks from the perspective of financial stability in accordance with the macroeconomic baseline scenario described in the *Report on Inflation* of November 2006 and its February 2006 update, and in accordance with the alternative scenarios that are considered to be the most relevant, as far as financial stability is concerned.

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[1] A box text in our Report on Financial Stability (April 2006) presented an analysis about the possible inflationary and real effect of fiscal tightening through different measures (http://english.mnb.hu/Engine.aspx?page=mnben_stabil&ContentID=7876). The text was based on an MNB Occasional Paper published in 2006, which introduces model simulations and provides an overview on the conclusions of international literature (Ágnes Horváth, Zoltán M. Jakab, Gábor P. Kiss and Balázs Párkányi: Myths and Maths: Macroeconomic Effects of Fiscal Adjustments in Hungary, MNB Occasional Papers 52., http://english.mnb.hu/Engine.aspx?page=mnben_muhelytanulmanyok&ContentID=7963). The international experiences of fiscal tightening were presented in our analysis on convergence processes (Analysis of the Convergence Process (December 2006), http://english.mnb.hu/engine.aspx?page=mnben_konvergenciajelentes).

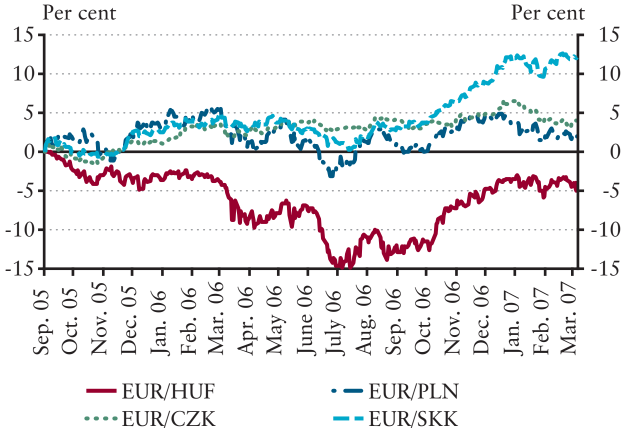
1.1. Changing market environment

In the first half of 2006, the financing requirement of the general government rose to above 10 per cent of GDP. External balance indices suggested that financing requirement at the national level was persistently high, while the financing requirement of the corporate sector decreased and households savings remained unchanged. Moreover, equilibrium problems continued to be significant, and the previously favourable international environment changed for the worse.

Chart 1-1

Exchange rates of Central European currencies

(cumulated, 1 Sept. 2005 = 0)



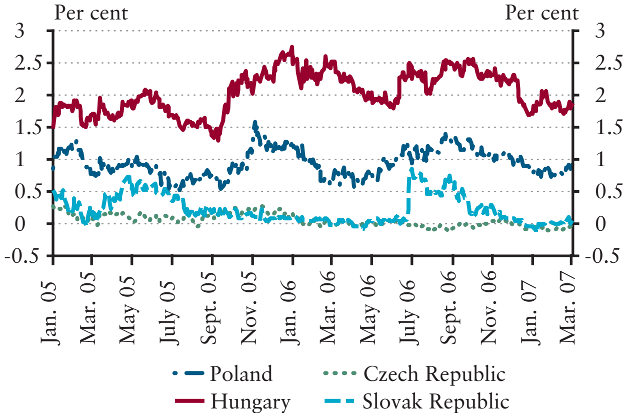
Source: Thomson Financial Datastream.

In the past, robust global risk appetite was able to offset the deteriorating investor sentiment on Hungarian fundamentals for a longer period of time. The consistently high budget and current account deficits, and repeated delays in the introduction date for the euro first increased the long-term forint risk premium and the price of default derivatives (credit default swaps), caused a departure from the other markets of the region, and finally led to a downgrade of Hungary's credit rating. Due to the increased vulnerability of forint investments, the temporary drop in risk appetite during February and May of 2006 led to a depreciation of the forint exchange rate and to higher yields (Chart 1-1). During this period the prices of Hungarian instruments moved in tandem with those of the high-risk countries (Turkey, South-Africa).

Fiscal adjustment in Hungary could no longer be delayed because of the fundamental problems and changes in the external environment, and the fact that the general government deficit in the broader sense could have approached 12 per cent of GDP in 2006, if fiscal policy had remained unchanged. The fiscal measures announced in the summer of 2006 somewhat eased the pressure on forint-denominated instruments, but the correction of the domestic markets took a few months to occur, despite the rapid improvement in global risk appetite. The anticipated growth and inflation shock implied by the announced adjustment programme, higher political risks, further downgrading of the foreign currency debt, as well as implementation risks of reforms were also factors contributing to that correction. In recent years, the credibility of Hungarian fiscal policy had eroded away, as the budget deficit repeatedly exceeded the planned figures, prompting market players to price in significant implementation risks, which prevented a decline in forint risk premia, despite the very favourable external investment environment (Chart 1-2).

Chart 1-2

Development of 5 year implied forward spread 5 years ahead



Source: Reuters and MNB.

In response to the inflation shock triggered by the adjustments, previous increases in costs and the significant depreciation of the forint exchange rate, the central bank increased the policy rate by a total of 200 basis points between June and October of 2006. Rate hikes contributed to the improvement of investor confidence, and despite the sharp increase in short-term interest rates, by the end of the year yields fell back to the levels seen before the turbulent summer events and before the rate hikes.

By December 2006 the forint exchange rate had returned to levels seen at the beginning of the year. In addition to the high forint interest rates in a regional comparison, the fact

Table 1-1

Changes in the rating or outlook of the Hungarian debt over the last two years

Date	Agency	Announcement
6 Dec. 2005	Fitch	downgrade from A- to BBB+, stable outlook
26 Jan. 2006	S&P	negative outlook
22 Feb. 2006	Moody's	negative outlook
23 Feb. 2006	JCR	downgrade from A+ to A
15 June 2006	S&P	downgrade from A- to BBB+, negative outlook
20 Sep. 2006	Fitch	negative outlook
22 Sep. 2006	Moody's	downgrade review
4 Oct. 2006	JCR	downgrade from A to A-
21 Dec. 2006	S&P	stable outlook
22 Dec. 2006	Moody's	downgrade from A1 to A2, stable outlook

Source: MNB.

that two major credit rating institutions (first S&P, then Moody's with a smaller-than-expected downgrade) improved the outlook of the Hungarian debt rating to stable (Table 1-1) also contributed to the stabilisation of domestic markets. Along with the appreciation of the exchange rate, markets priced in the start of an easing cycle by the second half of 2007, after a peak in inflation during the first quarter.

Despite the reduction of the long-term forint premium at the end of 2006, its current level is still considered excessively high in comparison to other countries in the region. Fundamental risks reflected in market prices indicate the vulnerability of forint-denominated instruments. Changes in the external environment may continue to have a major impact on Hungarian asset prices.

1.2. Macroeconomic baseline scenario

Due to the fiscal package announced in the summer of 2006, the financing requirement of the public sector in the broader sense may decline by 5 to 6 per cent of GDP over two years. The deficit reduction – thanks to its dimensions and structure – will have a strong effect on macroeconomic developments in 2007-2008. The announced measures are presumed to influence macroeconomic developments through three channels, apart from the impact on the expectations of economic agents. Firstly, the increase of indirect taxes and regulated prices will generate significant inflation shocks in the immediate future. Secondly, due to the higher taxes and social contributions, and also as a result of the higher inflation generated by the measures referred to above, real household income is projected to drop considerably. The reaction of households to the income shock will be to cut back on consumption to an extent dictated by the expected income path and the liquidity constraints. And thirdly, higher taxes and employers' contributions will result in higher costs in the corporate sector, and consequently in lower profits. The combination of lower profits and lower consumption will have a negative effect on corporate investment, meaning that after the drop in 2006 investment will grow moderately.

Overall, the aforementioned effects will lead to a considerable drop in the growth of domestic demand in 2007 and 2008. Consequently, even though foreign demand is expected to remain strong for quite some time, GDP will drop below its potential level over the forecast horizon and the growth rate of output is projected to settle at around 2.5 per cent in both years (Table 1-2). External demand and growth in exports are also expected to decline, due to lower consumption and investment spending, which in turn will result in reduced external imbalances. Rapid reduction of the general government deficit and the external financing requirement, and the stabilisation of debt indicators may reduce the vulnerability of the economy. At the same time, the drop in the external financing requirement is likely to gain intensity, consistent with the growth sacrifice resulting from the fiscal adjustment. As seen in other countries that have successfully managed to consolidate their fiscal standing, the external financing requirement reduced in countries where output growth was slower during the period of budget reforms.[2]

If the external imbalance and fixed capital formation were to decline concurrently, over the medium term this may slow down potential growth, and consequently could result in a drop in the production capacity of the economy. In this case, sustainability issues will once again be in the limelight, in spite of the fact that debt dynamics are expected to slow or stabilize in the near future.

Table 1-2

Projection of key macroeconomic indicators on the basis of the *Report on Inflation* of February 2007

	Actual		Actual/Estimate	Projection	
	2004	2005	2006	2007	2008
Consumer price index, per cent (annual average)	6.8	3.6	3.9	7.4	3.4
Growth in external demand, per cent	2.4	2	3.6	2.5	2.2
GDP growth, per cent	4.6 (4.4)*	4.2 (4.4)*	3.9 (4.0)*	2.5	2.6
External financing requirement – balance of payments statistics (as percentage of GDP)**	-8.1	-6.0	-5.0	-4.1 ↓	-2.5 ↓
External financing requirement – financial accounts (as percentage of GDP)	-9.8	-8.2	-8.0		

*Note: * Data adjusted for the leap year are given in brackets. ** Due to the uncertainty in measuring foreign trade statistics, starting from 2004 the current account deficit which actually materialised or will actually materialise and the external financing requirement may be higher than the official figures or our projections based on such. We have based our prognosis on the presumption that uncertainty seen in connection with developments in international trade will decline further, and the official external financing requirement will approach the level justified by fundamental developments.*

↓ In our view, the estimated path of the variable in question points to a lower forecast relative to the "Report on Inflation" of November 2006.

Source: MNB.

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[2] For more information, see *Analysis of the Convergence Process* (December 2006); Convergence programme in Hungary in the light of successful fiscal adjustments, http://english.mnb.hu/engine.aspx?page=mnben_konvergenciajelentes.

In the baseline scenario, the most important risk factors from the perspective of the short-term stability of the financial intermediary system are the income and profitability shocks sustained by households and corporate entities. These shocks are important not only in terms of their magnitude, but also because of the asymmetrical effects which they have. As far as stability is concerned, it could have a greater impact if only a narrow segment of households or a narrow segment of the corporate sector were to suffer a massive loss of income or profit, as opposed to a situation in which all economic agents were to suffer similar losses, but of lower degree. In the case of households, when discussing risks it is important to determine which segments of the population are affected by the real income shock (e.g. the lower or higher income segments).

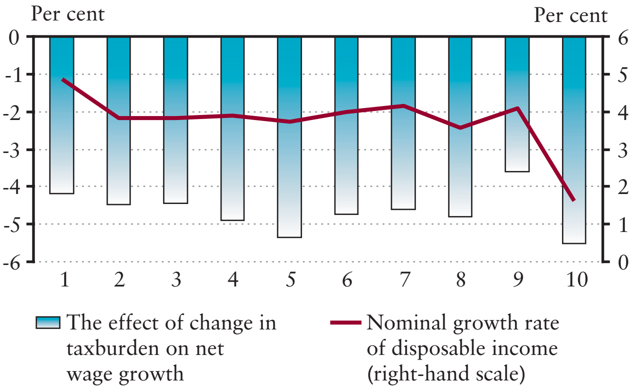
Due to the higher taxes and social contributions, and higher inflation as well, the real income of households is projected to drop significantly, by 3.8 per cent in 2007, followed by growth of 1.7 per cent in 2008. However, the increase in public dues and the natural gas price compensation scheme combined will generate a highly asymmetrical real income shock among the various segments of households.[3]

According to our estimates, the increase in taxes and social contributions[4] will constitute a greater burden for people with medium and higher incomes. In addition to higher taxes, another factor causing substantial deviations is that the ratio of social cash benefits is growing faster than the wages in the various income categories. At the lowest income categories, the majority of income is comprised of government transfers (primarily family welfare benefits and unemployment benefits). Consequently, the nominal growth of disposable income is strongest in this category. In the medium income categories, comprised most of pensioners, the nominal income-reducing effect of higher taxes is offset by the fact that pension contributions are growing faster than wages. At the highest income levels the tax burden is high, however the ratio of cash transfers (pensions and other social benefits) is low, which also means that the growth rate of nominal wages estimated for 2007 is the lowest (1.5 per cent) in this particular category (Chart 1-3).

Chart 1-3

The effect of the nominal increase in disposable income and the changes in the taxes charged to employees on the growth rate of net incomes

(in 2007; per capita income for each decile)



Source: MNB estimate and forecast, CSO Household Statistics Yearbook, 2005.

The asymmetrical effect seen in the nominal wage increases is further exacerbated by the imbalance of inflation shocks,[5] which can be attributed to two factors. One is that the "consumption baskets" differ at the various income levels. In the lowest income categories, surging energy prices and food consumption account for a larger percentage, which also means that inflation is highest in this segment. On the other hand (and this is the dominating factor in 2007), the price charged for natural gas is determined according to the natural gas price compensation scheme in relation to the household's per capita income and the quantity of gas consumed. While in the lower income segments the price of gas may even go down after compensation, in the highest income brackets gas prices may even double (Chart 1-4).

The above factors generate different increases in real incomes at the various income levels. According to our estimates, whereas real incomes are likely to decrease by 3 per cent at the lower income levels in 2007, in the highest income segment the rate of decline in real incomes is expected to surpass 7 per cent (Chart 1-4).

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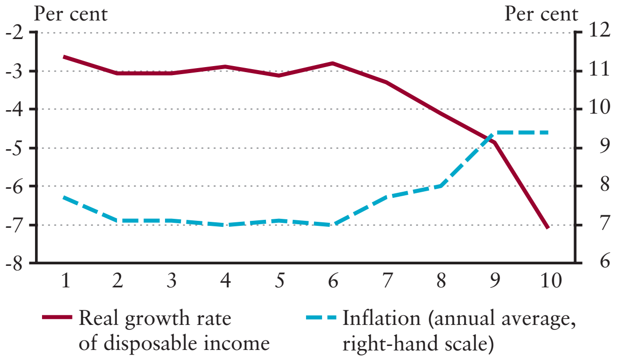
[3] We based our analysis on CSO Household Statistics for 2005. In our simulation we projected the growth of income components estimated for 2006 and 2007 on the per capita income of households. In connection with net incomes, we estimated the impact of changes in taxes and contributions on the actual amount of income at different levels. We also employed a number of presumptions for a simplified approach: (1) We assumed that within a specific income decile, each worker is paid wages close to the average wage commonly paid for that particular decile, which means that the entire decile falls within the same tax bracket; (2) We assumed that the various income components (salary; pension; family welfare benefits; other incomes) are the same in all deciles, and that they are on a rising course consistent with our prognosis and factual estimates.

[4] We based these calculations on the following factors: (1) higher social security and employees' contributions which workers are now required to pay, (2) in connection with the gradual termination of the tax-exemption on minimum wages, the inflation of tax credits; (3) introduction of the solidarity tax; (4) changes in the personal income tax brackets; (5) higher gross average incomes.

[5] In the process of quantifying the inflationary effect for a particular category, we considered the various consumer segments in terms of income stabile, in other words we overlooked any possibility of changes in the consumer structure stemming from lower incomes and higher inflation.

Chart 1-4

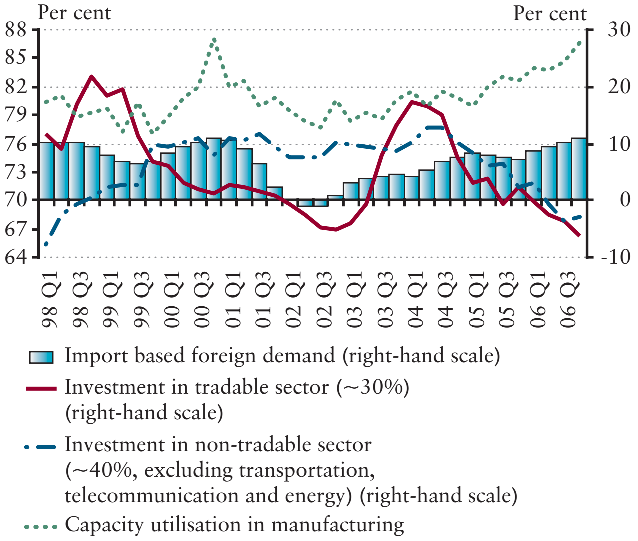
Real increase in disposable income and the rate of inflation calculated based on the consumption basket typical to the income decile according to the per capita income per decile in 2007



Source: MNB estimate and forecast, CSO Household Statistics Yearbook, 2005.

Chart 1-5

Investments and capacity utalisation



Source: CSO and MNB.

As far as the household sector as a whole is concerned, changes in the aggregate wage bill will play a decisive role, in addition to other incomes. Nonetheless, from the perspective of the effect of income shocks on stability it is important to know to what extent the decline in the aggregate wage bill originates from changes in wages and employment. Despite the expected layoffs in the public sector, in 2007 employment in the economy as a whole may drop slightly, by 0.2 percentage points, because the projected 0.3 per cent growth in employment in the private sector may compensate the impact of the layoff of public employees. There are two reasons for this: one is that in the manufacturing industry, in consequence of the capital-labour substitution – a technique which has been employed more and more frequently in recent years – the rate of employment has dropped to such low levels, that we now foresee increasing labour demand. Another is that if external demand remains strong for some time, the number of jobs may increase in the more labour intensive sectors typically providing services to the manufacturing industry.

Higher taxes and social contributions increase the capital and wage costs of employers, which will eventually lead to sacrifices in profitability in the capital and labour intensive sectors. As domestic and external business conditions are on a different path, within the corporate sector small and medium-sized companies predominantly supplying the domestic market are likely to suffer the most in terms of loss of profitability. If external demand remains strong for some time, it could produce a favourable operating environment for the manufacturing industry and for the related service sectors (primarily transport).

However, this is overshadowed by the fact that investments in the manufacturing industry have declined steadily, despite the favourable outlook relating to external business conditions in 2006 and growth in the already high rate of capacity utilisation (Chart 1-5). If the decline in fixed capital formation is attributed to country-specific factors (higher taxes and contributions; uncertain macroeconomic and regulatory environment), and if this trend is expected to last, it could well result in slower export dynamics and lower productivity in the manufacturing industry.[6]

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[6] For more information, see *Analysis of the Convergence Process* (December 2006); Prospects of effective convergence in Hungary – a production function-base approach, http://english.mnb.hu/engine.aspx?page=mnben_konvergenciajelentes.

1.3. Risk scenarios

In addition to the baseline scenario, the *Report on Inflation* in November and its February update also addressed the impact of numerous risk scenarios on the real economy and inflation trends. In the *Report on Financial Stability,* we undertake a more detailed examination of the scenarios which have a greater significance for financial stability, but which have a lower probability of occurring. Changes in the macroeconomic and financial environment can generate significant stability risks primarily through the negative income shocks to households, through considerable deterioration in the profitability of companies, and also through increasing debt service burdens. In respect of the above dimensions, we find it expedient to analyse two risk scenarios. Regarding the first scenario, we examined the possible macroeconomic consequences of higher inflation expectations, and in this context, stagnation of the nominal wage path at a high level. In the second risk scenario we examined the possible impact that a change in the global investment climate may have on exchange rates and interest rates. This includes a separate inquiry into the consequences of global imbalance corrections for the risk premium and for the real economy in general. In the analysis of the risk scenarios, it is important to emphasise that they cannot be addressed independently from the baseline scenario; instead they serve to demonstrate risks which tend to emerge in the baseline scenario, meaning that the analysed impacts may surface cumulatively relative to that scenario.

1.3.1. STAGNATING INFLATION EXPECTATIONS, WAGE RIGIDITY

The macroeconomic baseline scenario is based on the hypothesis that inflation expectations are anchored. It projects a slowdown in wage growth in the private sector amidst loosening labour market conditions. During the second half of last year, wage inflation rose higher despite looser labour market conditions. The strong wage dynamics could be attributed to premium payments brought forward in response to changes in the regulatory environment, as well as the “whitening” of bogus contracts. On the other hand, the rapid growth of regular payments (over ten per cent in the fourth quarter of 2006) may also be a sign of higher inflation expectations.

If it is the case that inflation expectations are not anchored, another potential risk factor is that the high inflation expectations of employers and employees may be incorporated into regular wage contracts. However, faster nominal wage growth may impair the level of profitability of companies in line with slower domestic demand caused by the deficit-reducing measures. Moreover, inflation pressure on the cost side stemming from rapid growth in wages may prompt the central bank to tighten monetary conditions. The corporate sector may counter slower price increases and declining demand by adopting a flexible wage policy and by reducing payments of wages. Still, due to the rigidity typical of nominal wages, there is a risk that the corporate sector will not be able to quickly adjust to the slower-than-expected price increases through slower wage increases. Therefore, the aforementioned events will lead to higher real labour costs and lower profitability. The reaction of the corporate sector to any increase in unit labour costs will be layoffs. Conceding subsequently – and “painlessly” – to wage increases in excess of price increases may be more difficult than it may seem, for these “unintended” wages will be implemented not in response

Table 1-3

Impact of the risk scenario on the macroeconomic processes based on NEM-model simulations

	Alternative scenario – high inflation expectations and wage rigidity		Base scenario	
	2007	2008	2007	2008
Consumer price index (annual average)	7.4	3.6	7.4	3.4
Private sector gross average earnings	10.0	6.8	7.3	7.0
Private sector employment	**-1.5**	**-0.2**	**0.3**	**0.5**
Whole-economy employment	**-1.7**	**-0.3**	**-0.2**	**0.3**
GDP	2.4	2.5	2.5	2.6
Household consumption expenditures	-0.4	1.3	-0.7	0.7
Gross fixed capital formation	2.0	4.0	2.3	4.3

Note: In the simulations we assumed active monetary policy (reacting to CPI dynamics).

Source: MNB.

to growing production, rather under circumstances where the potential of any growth is quite unlikely in the wake of the fiscal measures affecting both demand and supply.

According to NEM-model[7] simulations, if in 2007 the nominal growth rate of the gross average wages in the private sector exceeds the forecast contained in the baseline scenario by close to 3 per cent, and ultimately settles at around 10 per cent, the employment rate in the private sector could decline by 1.7 per cent, instead of the 0.3 per cent growth projected in the baseline scenario (Table 1-3). Since the decline of employment in itself is unable to entirely compensate for the faster real growth in wages, the real disposable income of households is likely to decrease to a smaller extent than in the baseline scenario (3.6 per cent) in 2007. If the decline in the income path at the aggregate level is somewhat lower, households are likely to follow suit and cut their consumption expenses similarly, a little less. According to our model simulations, consistent with the faster growth in the overall wage bill in the private sector, the unit labour costs of companies may rise slightly in 2007. Moreover, the loss in profitability is likely to slow down investment in the sector. As a result of the contrasting impacts of consumption and investment growth, domestic absorption and GDP growth may be around the level indicated in the baseline scenario.

From the standpoint of financial stability, the greatest risk in this scenario is that real income shocks could have a disproportionately strong impact on households. According to simulations, on average for 2007-2008 the decline in real disposable income may be around the level forecast in the baseline scenario, in other words, the aggregate income figure remains unaltered. A similar income path, however, may occur in conjunction with faster growth in real incomes and with substantial reduction in employment. Any increase in unemployment could also increase the number of households suffering from a drastic loss of income.

Rapid growth in wage costs could result in higher unit labour costs in the corporate sector, despite the adjustments made in terms of the workforce. Therefore, the prospect of shrinking profits may primarily emerge in labour-intensive service sectors, which commonly supply the domestic markets, i.e. the companies which are already faced with lower profitability in the baseline scenario, due to flagging domestic demand.

1.3.2. SIGNIFICANT DECLINE IN THE GLOBAL RISK APPETITE

Over the last couple of years, the capital markets have been showing increasing signs of strong risk appetite. The low level of short-term interest rates in the most-developed countries, favourable global growth, the increase of income in oil-rich countries well in excess of the growth rate of consumption, and the surplus savings of the Asian countries have all contributed to greater demand for investment instruments. The world-wide increase in asset prices has forced investors seeking a higher return on their money toward riskier markets and instruments, and hence their risk exposure has kept climbing. This demand considerably decreased the price of risky instruments (Chart 1-6). The liquidity surplus, which characterised the markets, was enough to offset the impact of asset-specific negative shocks. In the absence of any major corrections, the volatility of asset prices fell, which seemingly verified investors' higher risk exposure. While some explanation for the reduction in risk premia is found in the fundamental factors (many emerging countries improved their external balances, reduced foreign debt outstanding, and were frequently upgraded), in some markets the premia are at an all time low, and the high risk exposure of investors represents substantial risks (Chart 1-6).

In this environment various factors could trigger a reduction of risk appetite and a cut-back of risk exposure. One factor is a possible change in the outlook for the US economy. On the one hand, an increase in inflationary pressure could constitute a risk factor. In this scenario, the Fed may further increase the funds rate and – unlike in the last tightening cycle – long-term yields would increase as well, which in turn would result in increasing risk premia, and in the transfer of assets into risk-free instruments. This is what happened in the middle of 2006, when the sudden surge in inflation fears triggered an emerging market sell-off. On the other hand, a slowdown in US growth could be another risk factor. Although this scenario is consistent with lower long-term dollar yields, a 'hard' landing by the US economy would increase the growth risk of other regions, resulting in higher risk premia in the emerging markets.

Another source of fundamental risks are global imbalances. This relies on the common theoretical concept, that the extremely

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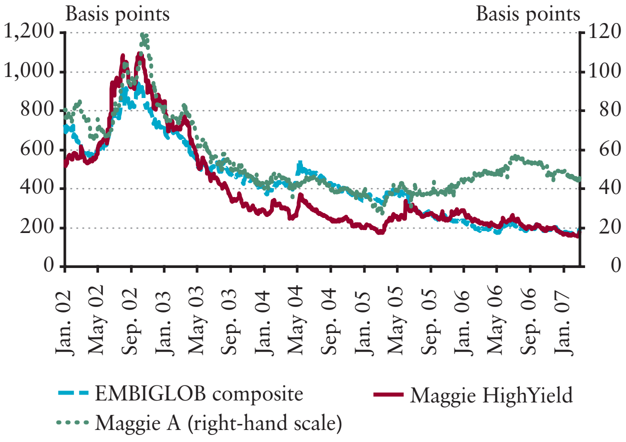
[7] NEM is a quarterly new-Keynesian macroeconomic forecasting model devised by the Magyar Nemzeti Bank. For more information see MNB Occasional Papers 60., http://english.mnb.hu/Engine.aspx?page=mnben_muhelytanulmanyok&ContentID=9279.

Chart 1-6

Global risk indicators



Source: J. P. Morgan-Chase, Thomson Financial Datastream.

high current account deficit of the United States cannot be sustained over the long run, and therefore corrections cannot be avoided. This could be triggered by an internal shock, or by changes in Asian countries' savings behaviour. In all likelihood a potential adjustment would cause the US dollar exchange rate and dollar-denominated assets to depreciate significantly, which in turn may cause a decline in risk appetite.[8] Geo-political risks, which were generously ignored by investors of late (such as terrorist acts, the Middle East conflicts, nuclear programmes) could represent additional risks.

A sustained reduction in risk appetite may also be induced by non-fundamental shocks. Given the current low level of risk premia, the outlook is asymmetrical: there is hardly any room for further reduction, but even just a return to long-term average levels would mean a substantial increase in premia. Due to their high risk exposure, an increase in premia could result in significant losses for individual investors, and weaken risk appetite even further. We saw this type of risk appetite shock in February 2007, when the global fundamental outlook did not change, but a reverse in the long-lasting depreciation trend of the yen triggered a general equity market sell-off, and simultaneously the liquidation of carry-trade investments financed by yen loans, mostly in the emerging markets.[9]

Aside from the magnitude and length of the shock, the impact of a risk premium shock on financial stability depends on how it is divided between exchange rate depreciation and an increase in short-term and long-term forint yields.[10] Monetary policy and the related market expectations will mainly determine which part of the shock will be absorbed by the exchange rate and which part by interest rates. Therefore, the distribution of past shocks is not indicative for the future. In the past, the major part of the premium shocks was absorbed by a temporary rise in short-term forint rates, rather than by the exchange rate. At the same time, the forint exchange rate depreciated persistently to levels weaker than before the shock.

Box 1-1: Risks of global imbalances from a Hungarian perspective

After the second half of the 1990s, large imbalances developed in current accounts in the world economy; in other words, there was a widening gap between investment and savings positions on a national scale, which is commonly referred to as global imbalances. The current account deficit in the United States has reached approximately six per cent of GDP, which is matched by the surpluses of several other economies, mostly from the Southeast Asian region and from oil exporters. At the same time the current account in the euro area and in the whole Europe is close to balance, although it varies among the various countries.

Although the increasing intensity of financial and trade globalisation could in itself bring about large imbalances in investment and savings positions on an international scale, most economist agree that the current situation cannot be sustained for any extended period of time, and that adjustments will have to occur sometime in the future. There is also agreement in that in all likelihood such adjustments will take place parallel with an effective depreciation of the US dollar. However, there is significant uncertainty surrounding the issue as to how and when the adjustments will take place, and at what costs to the global economy.

A recently published MNB occasional paper endeavours to provide a concept for some potential channels for adjustments, and to demonstrate their impact on the world economy and in Hungary.[11] The study uses model simulations and looks into four illustrative shock scenarios, pointing in the direction of corrections, where all scenarios indicate the same level of improvement (0.25 per cent of GDP) in the current account balance of the US over a four-year period (Table 1-4). The four scenarios are: 1) a budget tightening in the USA, which will

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[8] For more information, see Box 1-1.

[9] The turnaround in risk appetite will be apparent when, in addition to decreasing risk exposures, investors start to build up outright short positions in risky assets.

[10] A risk premium shock has the largest effect on the price and yield of forint assets. The risk of default on foreign currency debt will not be any higher, or will increase only slightly. Therefore, we do not expect any major increase in the sovereign spread of foreign-denominated government debt or in the interest rate premium on external foreign currency loans.

[11] Cecília Hornok, Zoltán M. Jakab, and Barnabás Máté Tóth (2006): Consequences of global imbalance corrections for Hungary, MNB Occasional Papers 59., http://english.mnb.hu/Engine.aspx?page=mnben_muhelytanulmanyok&ContentID=9266.

Table 1-4

Impacts of the four different shock scenarios in Hungary

(percentage point deviations from baseline; in case of exchange rates percentage deviation from baseline)

	Fiscal tightening in the US		Housing price shock in the US		Increase in domestic demand in the Asian region		Increase in the risk premium of dollar assets	
	1. year	**4. year**	**1. year**	**4. year**	**1. year**	**4. year**	**1. year**	**4. year**
GDP	-0.02	-0.03	-0.09	-0.01	0.01	0.13	-0.02	0.08
CPI	-0.02	-0.03	-0.03	-0.12	-0.01	0.01	-0.10	-0.12
CA/GDP	-0.03	-0.13	-0.09	-0.17	0.01	0.23	-0.10	-0.51
Short HUF rate	-0.03	-0.18	-0.06	-0.46	-0.07	0.08	-0.12	-0.95
HUF/EUR exchange rate	0.04	0.19	-0.10	-0.15	-0.88	-1.48	0.00	0.61

Note: The simulations are built on the presumption of a monetary policy rule estimated on Hungarian data and unchanged HUF risk premium. The segments of the simulation pertaining to the world economy were prepared with the NiGEM model, while the Hungarian segments were prepared using the Quarterly Forecasting Model of MNB (NEM).

Magnitude of shocks: 1. Fiscal tightening in the US: lasting reduction of the budget deficit by 0.5 per cent of GDP by increasing income tax revenues; 2. US real estate price shock: 9 per cent fall in (nominal) real estate prices; 3. Asian demand shock: an increase in the growth rate of domestic demand in the Southeast Asian region by 1 percentage points annually relative to the baseline scenario; 4. US dollar shock: higher risk premium for dollar assets, which results in the depreciation of the dollar against all currencies by approximately 10 per cent.

diminish the net borrowing position of the USA; 2) a drop in real estate prices in the USA, which will increase the savings position of the households through a wealth effect; 3) faster growth in domestic demand in the Southeast Asian region, which will reduce the net savings position of these economies; and finally, 4) a "crisis-like" scenario producing a sudden decline in world-wide demand for the US dollar, which will contribute to the unwinding of imbalances through an expenditure-switching effect.

As the Hungarian economy maintains closer ties with the euro area as far as international trade is concerned, on general principle the impacts affecting Hungary's economy are similar to those in the euro area, and shocks coming from other economies around the world are felt indirectly. Despite the mitigated effects these events have on growth and inflation in Hungary by comparison to the euro area, due to the country's openness to foreign markets, the consequences of these shocks on the external balance are more significant.

Comparing the various shock scenarios results in two major conclusions. One is that the consequences induced by corrections emanating from the USA – notably, the decline in real economy and a reduction in the rate of inflation – are greater if forced by the market (US dollar shock or real estate price shock), as opposed to if they were results of economic policy action (US fiscal tightening). This is true all the more in light of the factors that cannot be simulated by models, and which tend to manifest mostly in the changes in the expectations of economic agents: a market-driven shock could easily spill over and infect other markets, and may have an unfavourable effect on the expectations of economic agents over the longer run.

Second, the costs of a correction may be reduced if it takes place in part through a fall in Asian countries' net financial savings. Although abandoning the exchange rate peg, and consequently, the appreciation of currencies may be a component of the adjustment process in Asia, a robust and sustained effect on the world economy can only be the result of the currently strongly export-oriented economies gradually embarking on a path of higher domestic demand, and consumption demand in particular. Apart from the fact that this scenario generates inflation pressure, from the perspective of Hungary, and for all of Europe, a correction emanating from Asia has favourable effects, as the unwinding of global imbalances occurs mainly between the current accounts of the US and Asia.

2. Stability of financial institutions

In the *Report on Financial Stability* in April 2006, from the point of view of the financial intermediary system, the primary source of risks was economic agents' rapidly rising indebtedness in foreign currency. If a credible fiscal adjustment were not undertaken, lending in foreign currency may have caused considerable losses to customers and banks as well through the exchange rate and interest rate correction triggered by the market.

The operating environment in the financial intermediary system underwent significant changes last year. Although the indebtedness of the private sector in foreign currency continued to increase, the economy has now embarked upon a path that is considered sustainable over the medium term, thanks to fiscal consolidation, which may decrease the likelihood of huge swings in interest rates and exchange rates. Nevertheless, it is important to point out that the financial intermediary system is now faced with new risk factors as a result of the fiscal adjustments and its structure, as well as the heightened sensitivity seen in the global investment climate.

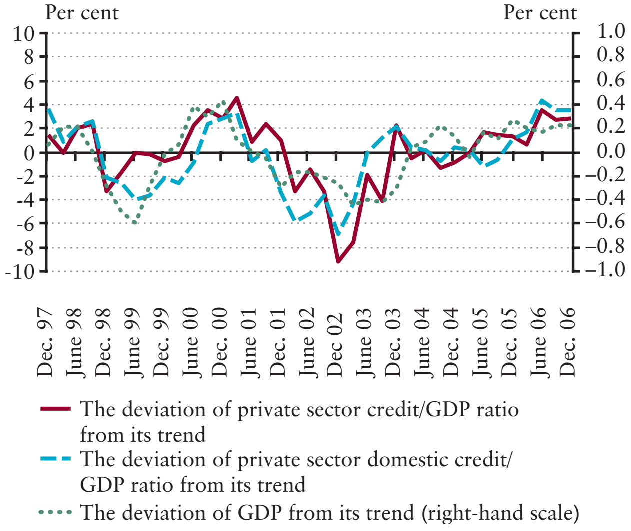
In the macroeconomic baseline scenario, the substantial decline in growth and the drop in real incomes constitute the two major factors. These impacts will further diminish the profitability of the financial intermediary system in the next few years, due to slower growth in credit demand and further deterioration of the private sector's credit portfolio.

In 2006, as a result of the rapid growth in credit demand and the expansive credit supply, the domestic loans/GDP ratio of private sector rose from 52 to 58 per cent by the end of the year, which is more than 3 per cent higher than its own long-term trend (Chart 2-1). The real growth rate of loan stock decelerated during the previous year, but at the end of the year its pace still remained above 11 per cent.[12,13] In 2006, most of the private sector lending was denominated in foreign currency, as a result of which, in respect of all the loans borrowed in the domestic financial intermediary system, the share of foreign currency loans approached the share of the forint loans, in the corporate sector and in the household sector alike (Chart 2-2).

In 2007, following the economic slowdown, we expect the growth rate of credit demand to decline. As a result, the deepening of financial intermediation in Hungary will likely slow down. The drop-off in the growth rate of credit demand may, however, be moderate, due to a correction in investment activity and consumption smoothing. If household consumption is not smoothed relative to the baseline scenario due to any growing precautionary sentiment, or if the willingness in the corporate sector to undertake new investment remains below expectations, the depth of the financial intermediary system may even actually decline.

Chart 2-1

Credit and economic cycles

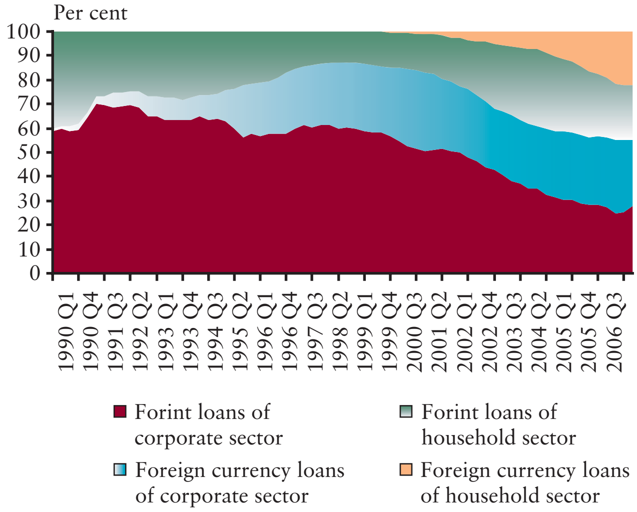


Note: Trend was determined with the HP-filter.

Source: CSO and MNB.

Chart 2-2

Distribution of loan portfolio of domestic financial intermediaries



Source: MNB.

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[12] We corrected the growth rates from the change of exchange rate and inflation.

[13] The level of private sector indebtedness and its dynamics were mainly explained by fundamental factors. For more information, see: Gergely Kiss, Márton Nagy and Balázs Vonnák: Credit Growth in Central and Eastern Europe: Convergence or Boom? MNB Working Papers, 2006/10., http://english.mnb.hu/Engine.aspx?page=mnben_mnbfuzetek&ContentID=9118.

The risks inherent in the macroeconomic baseline scenario are able to influence the quality of loan portfolio of the private sector, in addition to the rate of indebtedness. Nevertheless, it is important to emphasise that these negative factors have a different impact on the financial situation of the various segments of corporate and the household sectors. In the corporate sector, the decline in economic growth may have a varied impact across the different economic sectors. In the case of households, the asymmetrical effect could mean that the real income of high and low income households may develop along different paths.

The risk paths include substantial additional risks to financial stability. In accordance with the first alternative risk path, we simulated the impact of a reduction in the income of households (due to layoffs) on their ability to repay their loans, and in this context, on portfolio quality based on the findings of a survey conducted among households. The risk appetite shock occurring in the secondary risk path affects both companies and households with forint and foreign currency loans. In addition to outlining the impact mechanisms and channels, we will demonstrate – relying on the survey conducted among households – that impact of a shock on portfolio quality depends largely on how the rise in the risk premium is distributed between the rise in forint interest rates and depreciation of the exchange rate.

In relation to the operation of financial institutions, we will focus on three factors aimed at maintaining the level of profitability. Each of these is considered to be small risks, but nevertheless represent potential risk factors. Specifically, they are the effects generated by strong supply pressure,[14] the international expansion of financial intermediaries,[15] and the risks developing under increasing synergies among banks and non-bank members.[16] Finally, we will investigate the potencial source of vulnerabilities in the payment and settlement systems with special focus on the FX settlement risk.[17]

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[14] For more information, see Chapter 1.1.3.

[15] For more information, see Box 2-4.

[16] For more information, see Chapter 2.2.

[17] For more information, see Box 2-5.

2.1. Risks of the banking system[18]

2.1.1. CREDIT RISKS

Risks in the field of corporate lending are on the rise as the fragility of the corporate sector increases due to several factors: this is reflected by both the decreasing level of investment, resulting from cost and demand side shocks, and by rising bankruptcy ratios. In the household sector, real income is decreasing while indebtedness is growing, fuelled by FX loans and mortgage loans. The above tendencies have had a negative impact on loan quality mainly in the corporate segment. Due to its temporary nature, depreciation of the exchange rate did not have a negative impact upon the private sector's loan quality.

In the macroeconomic baseline scenario, the quality of portfolios is expected to drop slightly in the case of households and export-oriented companies, and more markedly in the case of companies which are more sensitive to domestic demand. A drop in employment in the first risk scenario is likely to mainly affect households. However, a risk appetite shock as in the case of the second risk path could have a negative impact on both sectors.

Corporate sector

Narrowing domestic demand and increasing sectoral fragility

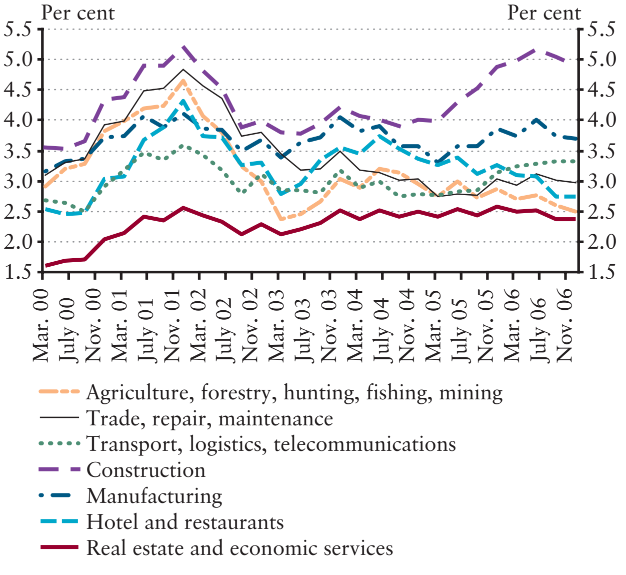
In 2006, in addition to the fiscal package, several other shocks had an impact on the real economic trends and vulnerability of the corporate sector.[19] Over the medium term, the decreased vulnerability of the economy and strong external economic activity have a positive effect, while on the short run the cost-side shocks and the narrowing domestic demand – starting at the end of the last year, but manifesting itself in full in 2007 – have a negative impact.

Developments on the demand side have an asymmetrical effect on the position of the various sectors. In the manufacturing industry, output is growing fast due to strong external demand, while the rate of capacity utilisation is also rising. On the other hand, as a result of slower domestic demand, the contribution of the service sector to GDP is decreasing. Finally, the construction industry is in recession as is indicated by GDP production data, due to decreasing demand from the public sector and from households.

Bankruptcy ratios,[20] which are sensitive to macroeconomic developments, increased last year. In contrast to the rising bankruptcy ratios seen in 2001 uniformly across all sectors, now there is a great deal of diversity between industries (Chart 2-3): the most significant increase took place in the construction industry, while the ratio of bankruptcy cases in manufacturing and in transportation, logistics and telecommunications is also on the rise. Despite growing external demand, the bankruptcy ratio in the manufacturing industry exceeds the aggregate rate, due to problems in certain sub-sectors. As far as the construction industry is concerned, in addition to the demand factors specified above, the long-lasting gridlock problems are also reflected in the high and increasing ratios of bankruptcy proceedings, influencing otherwise viable companies in a negative way as well.

Chart 2-3

Bankruptcy ratios by industries



Note: number of bankruptcy proceedings initiated during 12 months previous to the given date, for firms operating in ltd. and joint stock company forms.

Source: Opten, CSO, MNB, own estimation.

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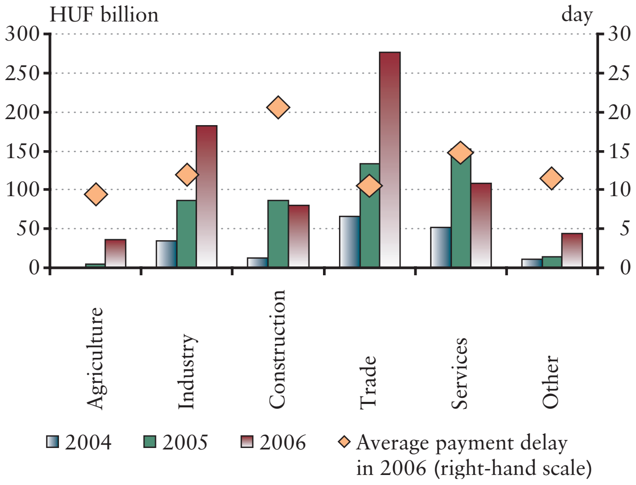
[18] Banking sector is considered without Eximbank, MFB and KELER.

[19] In 2006, the following changes had a negative effect on the non-financial corporate sector: increase of the minimum wage, changes in value added taxes, introduction of the solidarity tax, increase of social security contributions, increase of the simplified entrepreneurial taxation scheme, increases of domestic and foreign interest rates, increasing exchange rate volatility.

[20] Bankruptcy rate is defined as ratio of liquidation due to insolvency initiated in the given period in case of companies with legal personality. Liquidations due to other purposes are not included.

Chart 2-4

Volume of factoring loans and average payment delays by industry



Source: factoring data: Hungarian Factoring Association, payment delays: Dun & Bradstreet Hungária Ltd., own estimations.

Gridlock problems are becoming less and less unique to specific sectors: apart from the construction industry, the late payment of trade credit is becoming a growing problem in trade and in certain sub-sectors of the manufacturing industry. However, the increasing role of factoring is a positive development in this field (Chart 2-4). This tendency also indicates development of debt management techniques, and it is aimed to reduce the magnitude of gridlock.

As far as macroeconomic developments and vulnerability is concerned, our expectations are asymmetrical in both the baseline scenario and the risk scenarios. We expect a substantial decline in sales in the service sectors and in the construction industry, both of which are more sensitive to domestic demand.[21] Furthermore, the rise in labour costs in excess of domestic sales prices results in greater loss in profits in these sectors, although if the rising wages are result of the "whitening" of these sectors, the actual decrease in profit is smaller. Lower profits may lead to a higher number of bankruptcy cases and to an increase in the magnitude of gridlock. The manufacturing industry is presumably less prone to the negative effects of the fiscal measurements, thanks to the robust external demand.

Box 2-1: Stress testing banks' corporate credit portfolio using industry-specific bankruptcy models[22]

The purpose of stress testing is to analyse the impacts of extreme but plausible scenarios and shocks on the banking sector. It has become a popular tool of assessing the vulnerabilities of the banking sector. The underlying research[23], upon which the calculations below are based, links bankruptcy frequency to a macro index. This approach captures two dimensions of credit risk: its dependence on common, systemic risk factors (such as GDP or interest rates) and the impact of the industry (various industries can have different sensitivity to the macro variables, industry-specific shocks occur, etc.).

For the credit risk models we used a dataset, which includes information on bankruptcy and liquidation proceedings initiated against Hungarian companies between 1997 and 2005 (source: Opten kft). We have made estimations for 6 sectors (agriculture, manufacturing, construction, trade and repair, and services broken down into two sub-sectors). We found that the bankruptcy frequency in the various industries was largely influenced by common, systematic risk factors. At the same time, there are substantial differences between industries in the average level, the volatility and sensitivity of the bankruptcy ratio to macro factors (for example, the construction industry is the most sensitive to the business cycle). In most of the industry-specific models 3 variables have significant and robust effect: the bankruptcy ratio is negatively correlated to the GDP gap (the difference between the actual and potential level of GDP), and positively correlated to foreign interest rates and leverage. In other words, there are relatively fewer bankruptcy cases in the expansion phase of the business cycle, whilst higher interest rates and growing indebtedness of firms tend to increase the frequency of bankruptcies. The importance of foreign interest rate is likely to be related to the high share of foreign currency denominated loans.

For stress testing, we perform sensitivity analysis for two macro variables: the GDP gap and foreign interest rates. In the case of foreign interest rates we assume an overall increase of 200 basis points, consistent with the regulatory recommendations and banks' actual practice. With regard to GDP, two shocks were examined, and even the less severe one implies a greater drop in GDP than the decline observed after the introduction of the Bokros package.[24] The shocks are as follows:

- Foreign interest rate1: 50 basis point increase in 4 consecutive quarters;

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[21] According to the survey conducted by the Research Institute of Economics and Enterprises of the Hungarian Chamber of Commerce and Industry, as a result of Government's measures, profits have noticeably decreased in small and medium-sized enterprises.

[22] Due to differences in the methodology, the basic and stress scenarios used in the box differ from the ones discussed earlier in the report.

[23] Valentinyi, Endrész Marianna and Zoltán Vásáry (2007): Stress testing with industry-specific bankruptcy models (mimeo).

[24] Which could provide a historical worst case scenario.

Table 2-1

Results of stress tests

Shock	Expected loss/Capital (per cent)					
	industry-specific models			aggregate model		
	1 year	2 year	3 year	1 year	2 year	3 year
Foreign interest rate1	4.39	8.27	7.72	3.97	7.53	7.02
Foreign interest rate2	6.70	8.94	8.08	6.01	8.07	7.26
GDP gap1	3.63	4.18	4.11	2.76	3.22	3.16
GDP gap2	8.45	9.63	9.49	5.91	6.85	6.73

Source: MNB.

- Foreign interest rate2: 100 basis point increase in 2 consecutive quarters;
- GDP gap1: 2 percentage point drop in 2 consecutive quarters;
- GDP gap2: 1 percentage point drop in 2 consecutive quarters.

We conducted Monte Carlo simulations for the baseline scenario and for the hypothetical shocks. We forecasted the macro environment using several time horizons (1-2-3 years), the corresponding bankruptcy ratios by sectors, and the credit losses on bank portfolios as at the end of 2006. Evaluating the impact of the shocks, we took the losses arising in the shock scenario relative to the base scenario and compared it to the available capital of banks. In addition to the industry specific models we also conducted stress tests by using a credit risk model estimated on aggregate bankruptcy ratios.

According to the results of the stress tests (Table 2-1) even the most significant shock would lead to losses less than 10 per cent of the banking sector's capital. The shocks tend to have long-lasting effect: although they occur during the first 2 or 4 quarters, the implied losses in the banking sector usually peak in the second year, and even in the third year they exceed losses of the first year. There are substantial differences between the calculations made by sector-specific and the aggregate models. Typically, the aggregate model shows lower stress losses.

Based on the results, we find the banking sector to be robust and have sufficient capital to withstand the impacts of the severe shocks we examined. From a methodological standpoint, it is important to point out that the sector-specific credit risk models should be used for stress testing, as the aggregate model may underestimate the effect of shocks.

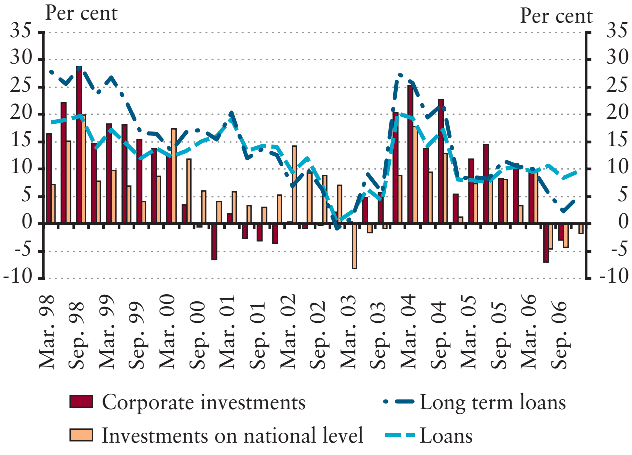
Increasing rate of indebtedness

In 2006, indebtedness of the corporate sector continued to grow at its previous rate, with the ratio of loans (excl. trade credits) to GDP increasing from 51 to 55 percent. The level of leverage continued to decline, despite the sharp increase in the amount of profit withdrawals in the form of dividends.[25] Considering the year as a whole, after correcting for exchange rate changes and industrial price index, foreign loans increased at a rate well above the growth rate of domestic loans.

The growth rate of corporate investments and borrowings, especially long-term loans developed quite in a similar manner recently. Parallel to the drop in investment ratios in 2006, the growth rate of long-term loans also tapered off, while that of the total loan volume remained at 10 percent,

Chart 2-5

Real growth rate of investments and corporate loans



Source: CSO, MNB.

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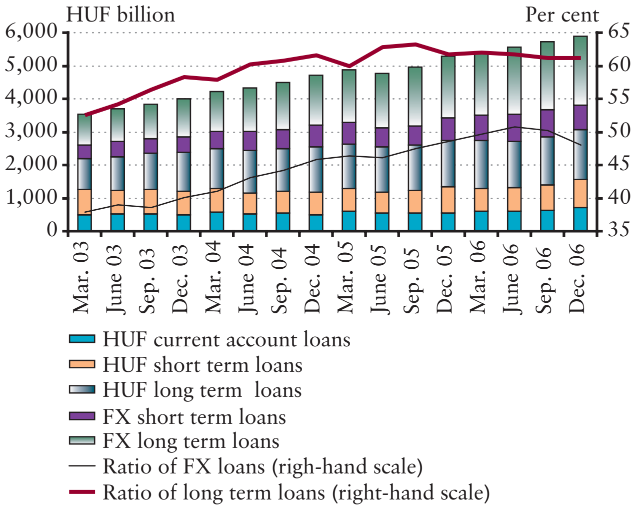
[25] The total loan volumes include loans of non financial firms granted by financial institutions and foreign owners. Due to changes in the methodology of current accounts (off-shore status abolished) the ratio of ownership loans went up considerably during the first quarter of 2006, therefore, we ignored this factor.

mainly due to the increased borrowing for short term to increase liquidity (Chart 2-5). As opposed to total loan volumes, real growth rate of domestic bank loans lessened to a degree, to 8 percent at the end of the year. In the first half of the year the dynamics were determined by FX loans, however, the composition of loans changed to a degree by the end of the year: short-term loans took over from long-term foreign currency loans in terms of growth (Chart 2-6). Due to the high ratio of foreign currency loans, and to their increasing ratio in the sectors without any foreign currency revenues, the net exchange rate exposure of companies and their sensitivity to exchange rate shocks is rising. On the other hand, the temporary fall in the exchange rate during 2006 probably increased exchange rate risk awareness of firms, although in our view there is still room for improvement in this respect.

Chart 2-6

Structure of domestic bank loans of corporates by maturity and denomination



Note: FX loans are on end-2000 exchange rate.

Source: MNB.

In the baseline scenario, over the next two years corporate investment is expected to expand slightly. According to our forecast, external demand will remain strong and that, combined with the high rate of capacity utilisation, is likely to encourage further investment in the manufacturing industry. Thus, we do not expect a further, significant decline of real growth rate of loans. Loan demand may be strengthened by the availability of European Union tenders and also that the ratio of investment financed by loans may go up in certain sectors as a result of a decline in own funds.

Strong commercial property financing[26]

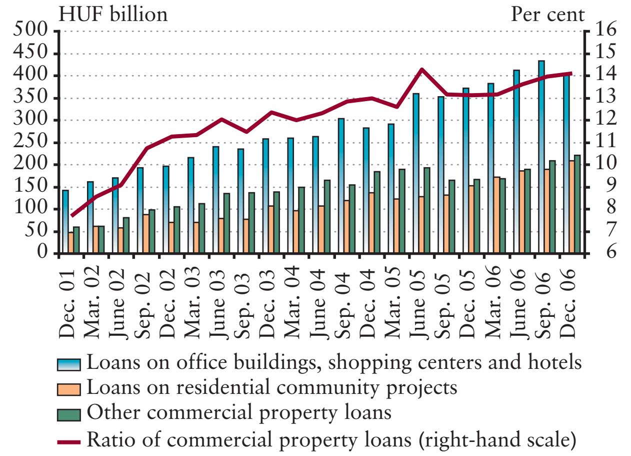
The real estate market is a special case with regard to the stability of the banking sector, as suggested by international experience and by the increasing exposure of the banking sector. The largest risk factor in the real estate market is that price bubbles can easily develop and burst. Prices may easily deviate from their fundamentals which can lead to overly optimistic growth in the market. However, as a result of negative news, optimism may easily disappear, resulting in downward trends on the market.

In corporate lending, extensive and rapidly growing exposure developed to the real estate sector: one-third of all loans were granted to firms operating in real estate and economic services sectors, with real estate development loans totalling about 14 percent of the corporate portfolio (Chart 2-7). The volume of these loans more than tripled during the past 5 years. Among corporate loans, however, exposure to the real estate sector is greater than this, due to loans for other purposes with real estate collateral (construction of own properties,[27] real estate purchases). The volume of loans for residential property development increased most rapidly, where risks tend to overlap with household lending risks as the bank may finance both the real estate developer and the household purchasing the property.

The real estate development loans market is characterised by high and increasing concentration: the market share of the 5 largest banks exceeds 80 per cent on each sub-market at the

Chart 2-7

Composition and ratio of real estate development loans within corporate bank loans



Note: at current prices.

Source: MNB.

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[26] In this chapter on commercial property financing we relied on discussions with major domestic banks present on this market, with the experts of Eston, CB Richard Ellis and E-Build and market reports.

[27] According to Ecostat, the majority of the 100 largest companies operate in their own real estate properties (2004 data).

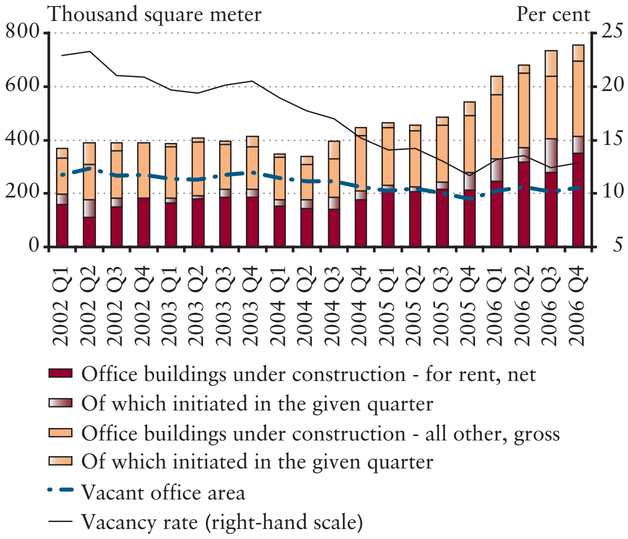
moment. Due to the high concentration, the ratio of commercial property loans to corporate loans is very high in case of some banks, and we consider this to be risky. Competition is stimulated by the increasing significance of cross-border financing which is becoming more and more common for domestic and foreign projects alike. At the same time, however, domestic financial enterprises are not really involved in the competition in this market, as they control only a small ratio of the commercial property loans.

According to findings of the Senior Loan Officer Survey on Bank Lending Practices in connection with loan supply and demand, banks are cautious in their lending practices, while they suggest a relative decline in the market in the near future. Another interesting fact the Senior Loan Officer Survey on Bank Lending Practices has revealed is that banks have been introducing stricter standards and conditions since the beginning of the survey (2003), referring to sector-specific problems as the reason.

We use the link between the new developments and vacancy rates as a main indicator of potential bubble.[28] An increase in new developments in parallel with a growing vacancy rate may be a sign of speculative investments, which is typical in the early phases of price bubbles. At this time we do not see any excessive growth in speculative development in either segment of the market.

Chart 2-8

New and vacant office areas and vacancy rate



Note: category A office buildings in Budapest.

Source: office buildings under construction: E-Build, vacant offices and vacancy rate: CB Richard Ellis.

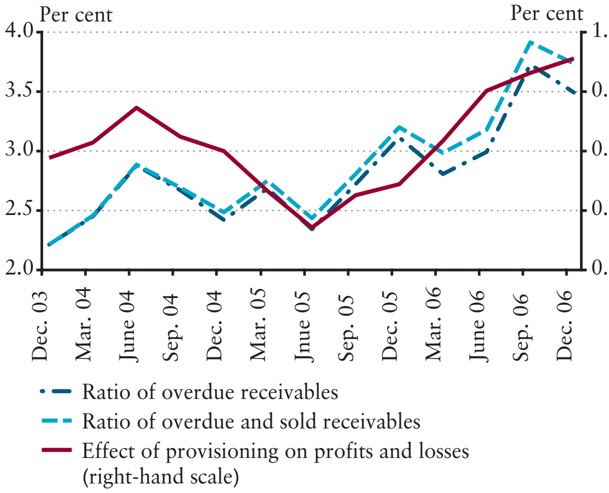
At the moment, we find that new developments are on the rise in each sub-market.[29] Compared to other sub-markets, new office buildings are increasing in a way that may reflect higher risks, as vacancy rates can still be considered high despite their decreasing level (Chart 2-8). While there has already been a noticeable downturn in the residential property development segment, we also expect a slowdown in development on other segments of the commercial property market. As far as office buildings are concerned, the downturn may be related to the expected decline in the profitability and activity of companies operating in the service sector, while in relation to shopping centres the reduction in the real income of households could be a factor. However, in the market of industrial properties the negative domestic developments could be offset by a boost in external economic activity. All things considered, we foresee a slowdown in new projects, which may be accompanied by lower average return on real estate investments and by lower prices as well.

Deteriorating portfolio quality

Last year, portfolio quality deteriorated considerably. The ratio of defaults is still low, although it went up during the year. Additionally, towards the end of the year the number of receivables which are more than 90 days overdue also rose, as well as the number of sold receivables (Chart 2-9). Deterioration of the portfolio quality can be explained partially by idiosyncratic factors, but it is also due to the

Chart 2-9

Ratio of overdue and sold receivables and the effect of provisioning on profits and losses



Note: ratio of receivables overdue for more than 90 days.

Source: MNB.

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[28] The degree of credit risk largely depends on the transparency of the market. In the commercial real estate market, there is no reliable database currently available, and this is especially true in the field of data on real estate prices. The absence of such database makes assessment of credit risks more difficult or more costly for banks. In this respect, the creation of a database on real estate transactions would represent a great step forward.

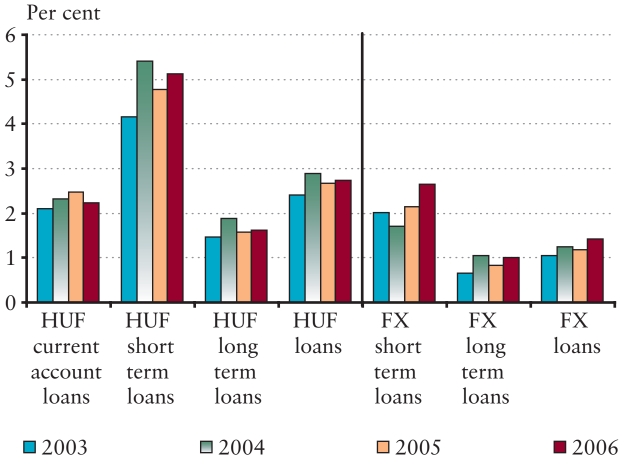
[29] Based on data of E-Build on new developments.

shocks that occurred during the year, which also played a role in the increase of short-term forint loans at the end of the year. Apart from the Government's fiscal package, the rise in foreign and domestic interest rates and temporary depreciation of the exchange rate is reflected in the deterioration of corporate liquidity, and increases of payment delays and defaults.

Examination of the portfolio quality according to maturity and denomination reveals that loan loss provisions are the highest for short-term forint loans, and overall the loan loss provisions of forint loans are consistently higher than for foreign currency loans (Chart 2-10). However, the deterioration of the portfolio in 2006 showed up in short-term loans irrespective of denomination.

Chart 2-10

Loan loss provisioning as a ratio of loans by maturity and denomination

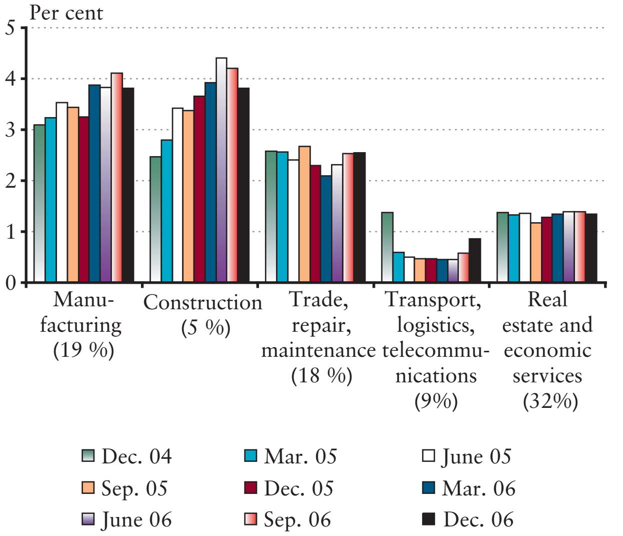


Source: MNB.

Portfolio quality in the various sectors is typically affected by sector-specific factors (Chart 2-11). Portfolio quality – in line with the development of bankruptcy ratios – is considered to be worst in the manufacturing and construction industries. The quality of the loan portfolio in the service sectors is above average, in spite of rapid growth of loan volumes and the growing significance of small and medium-sized enterprises. This may be attributed to the younger portfolio and – in some sectors – to the role of state-backed companies. The portfolio quality of commercial property loans exceeds the average quality of corporate loans, but it deteriorated in 2006, mainly in the case of loans provided for the construction of residential property projects.

Chart 2-11

Loan loss provisioning as a ratio of loans by industry



Note: the ratio of the loans of the given industry to corporate loans is in parenthesis.

Source: MNB.

Our expectations are that declining profitability and investment will result in an increase in problematic loans. We expect the quality of the loans to the manufacturing industry to level out as problems of certain sub-sectors may be off-set by positive impact generated by external economic activities, whereas negative impacts – according to our prognosis – will emerge mainly in the reduction of credit demand. On the other hand, for the construction industry we project a lasting decline in portfolio quality, although it may not have a significant impact, as the sector carries little weight in the portfolio of domestic banks. Deterioration of the overall credit portfolio may occur due to the problems in the service sector. Recently, we have witnessed massive growth in long-term loans among these types of companies, while at the same time investment is declining. In our view, this sector may be the most sensitive to the decline in domestic demand.

We do not foresee any significant additional risks in connection with the first risk scenario of sticky inflationary expectations and rigid wages. The extent of such risks depends on how the effect of the shock will be absorbed among the companies in terms of loss of profits and increase of unemployment. According to our forecast, the loss of profit among small and medium-sized enterprises and in the service sector could be greater in this risk scenario.

The negative impact of a decline in global risk appetite could be worse. Such a shock could have an asymmetrical impact on the corporate sector, depending on the denomination of indebtedness. It is important to point out that such a shock will make its impact felt quickly among debtors with forint or foreign currency loans both, for they are subject to short-term repricing. As small and medium-sized enterprises are historically low on capital, both shocks may have a greater impact in their case. Based on our calculations[30], small and medium-sized companies with foreign currency loans are highly sensitive to any increases in their instalment payments, and any lasting increase, however small it may be, increases the number of unprofitable enterprises.

Households

Slower growth in real income, strong credit demand

As for macroeconomic variables, developments in real incomes and on the labour market and the spending of income have the most direct influence on the credit risks of households.

The growth rate of real incomes dropped substantially last year. During the first half of the year this decline in growth was attributed to the slower increase in nominal wages, and during the second half to the fact that inflation surpassed increases in wages.

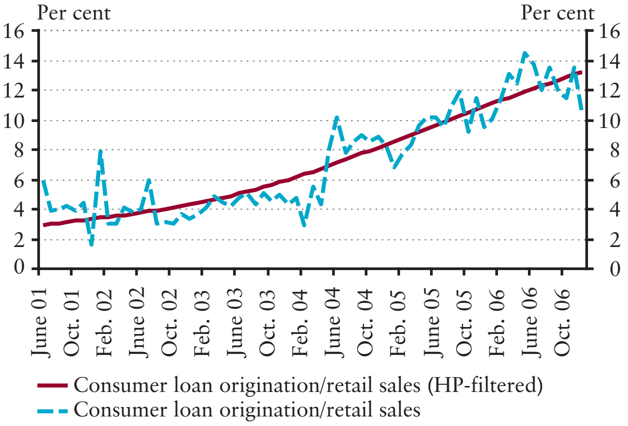
In the labour market, the rate of unemployment kept rising during the first nine months of 2006, before finally coming to a halt in the fourth quarter. Presumably, the rise in unemployment did not have any effect on the credit risks of households, as it resulted from growth in the number of active workers rather than by a tighter job market, as active workers are commonly acknowledged among the unemployed, and not as employed persons.

As far as spending is concerned, retail sales data suggest a significant decline in consumption compared to the strong dynamics seen in the 2004-2005 period, on account of which the level of consumption relative to disposable income has remained the same. Moreover, housing projects continued to decline: in 2006 the number of new homes occupied and the number of building permits issued remained well below the figures from the previous year, but during the whole year a continuous improvement could be experienced, which will materialise in the form of more new homes offered on the market during the second half of 2008 at the earliest.

As a result of the base effect, the growth rate of the household loan portfolio also declined from 21 per cent to 13 per cent in real terms by the end of 2006, in parallel with the slow growth in consumption and investment spending. However, the dynamics of new loans remained high, and therefore the share of consumer purchases and investment financed from loans is gradually gaining ground (Chart 2-12).

Chart 2-12

Ratio of retail sales and new consumer loans in the banking sector



Note: Retail sales are exclusive of vehicles sales, and new consumer loans are exclusive of vehicle loans.

Source: CSO and MNB.

In the base scenario, we assume consumption-smoothing; in other words, the level of consumption relative to disposable income will increase. Expectedly, due to slower but still growing credit demand, the volume of consumption will decrease to a lesser extent than real income. Because only a moderate decline in new loans granted is anticipated, the real growth rate of the loan portfolio will fall only slightly as well.

High household indebtedness versus increasing share of loans with collateral

In 2006, similar to the previous year, foreign currency loans and mortgage loans continued to gain ground in the overall loan portfolio, bringing about changes in the structure of the portfolio as well. By year end, half of the entire household loan portfolio was comprised of foreign currency loans (typically Swiss franc), and close to 60 per cent of loans were secured by mortgage (Chart 2-13).

Changes in the structure of indebtedness have a different effect on the magnitude and direction of credit risks. Households with foreign currency loans are more sensitive to external factors other than those with forint debts, and the borrowers are typically unable to assess these risks due to the

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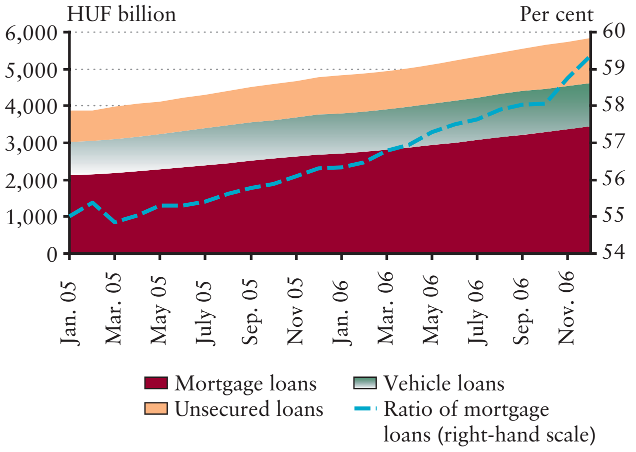
[30] For more information, see Katalin Bodnár (2006): Exchange rate exposure of Hungarian SMEs, financial stability risks of FX lending. Survey results, MNB Occasional Papers 53.

Chart 2-13

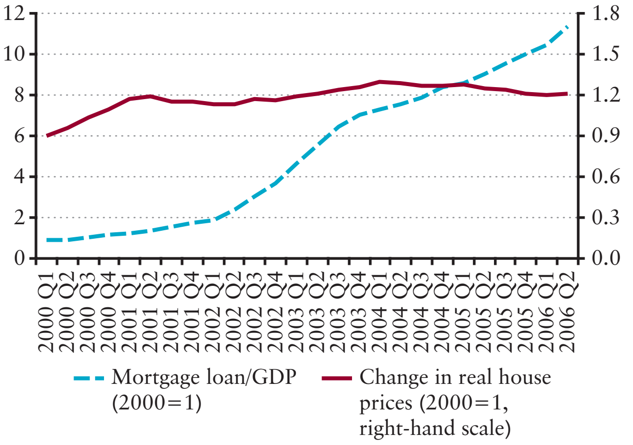
Household loan portfolio by the type of collateral



Source: MNB.

Chart 2-14

Growth rate of mortgage loans and real house prices in Hungary



Source: CSO, Origo, Vadas (2006)[34].

low level of financial knowledge.[31] For them, the most important factor when making a decision in connection with borrowing is the amount of the instalment payments; exchange rate and interest rates risks are not always taken into consideration.

The higher share of mortgage loans within the portfolio, on the other hand, reduces the volume of expected credit losses of the financial sector, as the collateral requirement of banks – although it is falling for new loans[32] – is still considered conservative by international standards.[33] In the case of default, it allows for loan recovery close to the total loan amount, depending on the degree of enforceability of the collateral.

However, it has to be emphasized that the growing share of mortgage security, through the accumulation of concentration, makes the banking sector vulnerable to any fluctuation in real estate prices. Furthermore, in Hungary in the case of default the discounts applied in the process of appraisal of the collateral value should provide protection – in connection with foreign currency loans – not only against any potential fall in house prices, but also against increase in debt amount resulting from potential forint exchange rate weakening. There is a steady oversupply on the housing market and in spite of mortgage loans gaining popularity, in recent years prices have gone down in real terms (Chart 2-14), and no signs of real estate price bubble formation were seen. In our view, this trend will continue in the immediate future; although any drop in prices will not be significant, in other words, in the case of default the collateral is likely to provide adequate cover for the loan in question.

Assuming a given credit demand, the growing popularity of foreign currency denominated loans and mortgage loans will have a positive effect on the debt service burden of households, thanks to their better initial conditions relative to other loans. Despite these favourable developments, households as a sector (not excluding households without a loan) spend 10 per cent of their disposable income on debt servicing: by international comparison, that is close to the average of the countries with higher rates of indebtedness.

Asymmetrical indebtedness structure

Apart from analysing of the aggregate rate of indebtedness, analysing the indebtedness structure focusing mainly on the risks of indebted households vis-à-vis the entire household sector should provide a more accurate picture concerning the credit risk exposure of the financial sector to households. To this end, the MNB has conducted a questionnaire-based survey among indebted households and the findings in the chapters below are based on its results.

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[31] Questionnaire-based survey conducted among households, January 2007, MNB.

[32] A positive development is that mortgage loan insurance is now available in the market. It allows banks to increase the loan to value ratio without increasing the risk, for it is assumed by the insurer instead of the bank.

[33] Banks work with different principles in appraising the collateral value of properties in connection with mortgage loans, nevertheless, in our opinion the overall level of loan security for the portfolio is adequate.

[34] Gábor Vadas (2006): Wealth portfolio of Hungarian households – urban legends and facts (mimeo).

Box 2-2: Findings of the questionnaire-based survey conducted among indebted households

In international practice there are two methods commonly accepted for modelling the credit risks of households. The first relies on the aggregate data of households and the banking sector, while the second approach uses the findings – at a micro level – of a questionnaire-based survey conducted among households to determine the extent of banking sector losses in the case of extreme but plausible shocks.

The greatest drawback in any analysis built on aggregate data is that the clear identification of the impacts of particular stress events is not possible. The main reasons are the lack of information on the share of indebtedness of various income categories, and that the different indicators are applied to the household sector as a whole, rather than to indebted households.

Information obtained from a questionnaire-based survey conducted among indebted households could offer an alternative to aggregate household data. Cross sectional or panel data provide the possibility to determine the level of indebtedness broken down according to income and age categories, drawing up a "risk map" on households, thus producing a more reliable picture on the structure of indebtedness, on the financial situation of indebted households and on tendencies potentially jeopardizing financial stability.

Questionnaire-based surveys are frequently conducted internationally in certain cases for decades, as a common form of support for analyses relating to financial stability. The most notable examples are the central banks of the United Kingdom, the United States, Finland, Norway and Sweden, and as for the CEE countries Poland and Slovakia can be mentioned.

MNB survey

In consideration of the above the MNB has decided to conduct a questionnaire-based survey for a deeper analysis of the rate of indebtedness of households, for which we compiled a questionnaire containing four different sections (financial standing of households, rate of indebtedness, savings and personal characteristics). The survey was conducted by Gfk Hungária in January of 2007. The representative sample consists of 1,046 indebted households of different income categories, covering the entire country. The optimal sample size (1,000 households) was determined in view of reliability and costs.

Constrains and handling potential errors

The most frequently asked question in connection with any questionnaire-based survey is the reliability of the data obtained. On general principle, there is no survey that is absolutely free of errors, for errors cannot be avoided; only efforts can be made to keep them at a minimum. In connection with questionnaire-based surveys the following problems may occur: definition errors, reply errors, and implementation errors. Definition error denotes the complexity of questions and the inaccuracy of answers given; reply error means when, for example, the data subject provides false information for lack of trust or questionable anonymity, or when the answer is declined in large numbers, or if the person interviewed does not have the information necessary. Finally, implementation error means when the interviewer fails to abide by the relevant instructions or is superficial in his/her procedures.

Locating the errors and determining their magnitude is a difficult task at best. In order to minimise the possibility of errors in the survey, we have conducted preliminary tests so as to phrase the questions clearly and in an easily understandable fashion, and we have installed control questions to limit the number of reply errors. Furthermore, to reduce the high number of cases of decline to answer we inserted mandatory questions, meaning that if the household interviewed did not or could not provide and answer, we did not continue the survey, and the household was removed from the sample.

To check the measure of robustness of the surveys we have compared – where possible – the information obtained from the survey with data from other sources. The credit section of the questionnaire appeared to be the best area for this: we ran controls concerning the respective shares of loan products according to the type and denomination, and the amounts of instalment payment of the households. The information received proved to be highly reliable, for it well represents the structure of the loan portfolio and the household loan exposure of the financial sector. Significant deviations were noticed only in a small segment of the instalment payments indicated by the households, and that we have calculated on the basis of other parameters.[35]

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[35] In cases of deviations, we attempted to make adjustments in the amount or the maturity of the loan rather than in the instalment payment, so as not to influence the financial position of the households.

The information received in terms of wealth and income, was treated with caution, as we have seen in surveys conducted elsewhere, it is difficult to involve high-income groups in a questionnaire-based survey, and to obtain reliable information on financial situation and income. As for Hungary, the information provided for surveys is distorted downward. There is no generally accepted technique available handling the uncertainty apparent in income information; however, as simulation results and conclusions are equally sensitive to the size of income, we tried to look into this issue as deep as possible. As the questionnaire contains information for each member of a household (age, education, employment, profession), it allows us to determine the minimum income a certain household of specific parameters should have.[36] Where the income calculated in this fashion was higher than that disclosed, we made an adjustment accordingly (allowing for one category shift, maximum, that is a HUF 20,000 increase). In order to demonstrate the high degree of uncertainty in connection with undeclared income and the sensitivity of our results, we have decided to increase the adjusted household incomes by an additional 10 per cent, and we have repeated all calculations using this new income figure in order to avoid overestimating the risks on account of uncertain income data.

Background information for the evaluation of results

In the questionnaire we set the income limits based on the income deciles of the CSO, so as to be able to compare this data with the results of other surveys. The distribution of the sample was not uniform in these deciles, for the households were slightly under-represented typically in the lowest and highest categories. In order to prevent this uneven spread to influence the evaluation of results, we drew up the sample's own deciles, according to which the results are evaluated.[37]

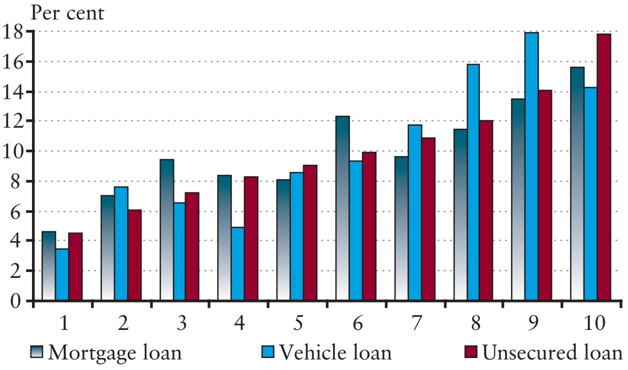
We are currently in the process of drafting an in-depth study to elaborate the results of the questionnaire-based survey and its conclusions relating to financial stability; the estimated date of publication is June 2007.

The financial capacity of the household sector is positive, however, the segments of indebted households and those with savings are markedly different. Less than one-fifth of the indebted households have any savings, and the volume of their financial assets is hardly significant compared to their loan and income. On aggregate, this phenomenon indicates a negative financial position for these households, which in the event of a potential income shock may ultimately lead to a significant increase in non-performing loans due to the lack of financial reserves.

In contrast to financial instruments, a high percentage of borrowers own real assets (real estate and vehicles), which is consistent with the – by international comparison high real estate ownership ratio in Hungary. This phenomenon provides further ground for the expansion of mortgage loans, and it permits households to spend their capital embodied in their real assets without having to sell the asset in question. Thereby, the consumption smoothing carried out in the baseline scenario has the capacity to mitigate the temporary negative impact of the fiscal adjustment measures through the positive impact it has on the growth of the economy. As for the financial sector, any dynamic increase of exposures is accompanied by slightly higher risks through the higher ratio of collateralised loans.

Chart 2-15

Share of household loans in certain income deciles of the indebted households[38]



Source: MNB.

The exposure of the financial sector vis-à-vis households is concentrated at clients in the higher income categories with regard to all types of products (Chart 2-15). This structural imbalance is positive as far credit risk is concerned, as the income-proportionate debt service burden of high income households on average is lower that of the lower income households (Chart 2-16), and this segment has a better overall chance to deal with higher debt service burdens that may occur in a stress event, due to their higher income shock-absorbing capacity (financial margin). Income shock-absorbing capacity or financial margin means the income that remains after the basic costs of living (housing, public utilities and food) and instalment payment deducted from the disposable income and that is available to cover the potential increase of the instalment payment.

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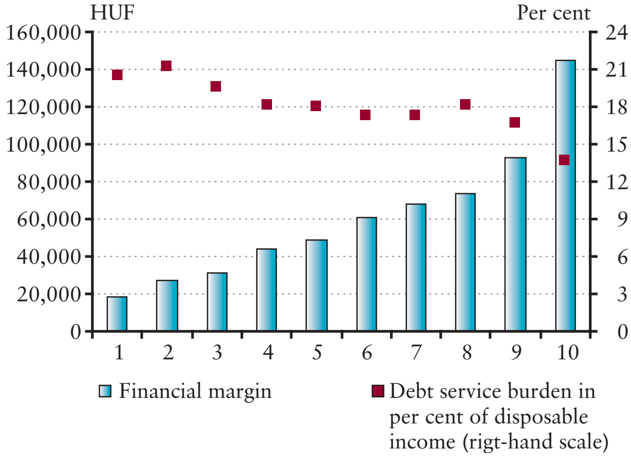
[36] We determined the minimum income for a household based on the prevailing minimum wage, unemployment aid and old-age pension.

[37] Upper decile limits: 1. decile: HUF 87,951, 2. decile: HUF 110,946, 3. decile: HUF 129,169, 4. decile: HUF 148,597, 5. decile: HUF 160,483, 6. decile: HUF 179,149, 7. decile: HUF 190,753, 8. decile: HUF 218,790, 9. decile: HUF 263,483.

[38] Loans are categorised according to their collateral. The notion of mortgage loans comprises housing loans and home equities, while unsecured loans include personal loans, hire purchase loans, credit cards and overdrafts.

Chart 2-16

Debt service burden of indebted households in certain income deciles and their average financial margin



Source: MNB.

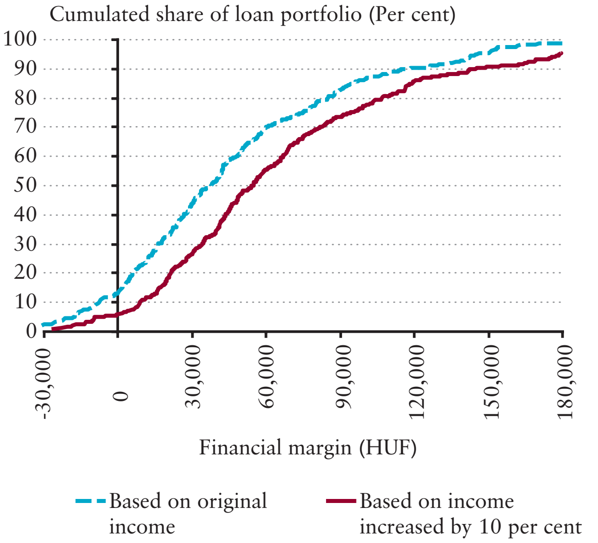
Looking at the household sector as a whole, the debt service burden consumes 10 per cent of the disposable income, but regarding only the indebted households it is 18 per cent on average. However, this image is overshadowed by the fact that the degree of burden varies significantly among households.

From the standpoint of financial stability, risks are found in the indebtedness of households whose liquidity and income position is stretched by the loan, as their financial margin is fairly low and hence their potential to default is higher than the average.

Currently, approximately 4.2 per cent of all indebted households is considered endangered[39] due to their tight positions. In their case, the percentage of instalment payment relative to income is significant, 47.5 per cent on average, and it prevents the accumulation of any reserves. The share of these households in the total household loan portfolio indicates the magnitude of risks of the financial sector. This share is high, approximately 12.9 per cent (Chart 2-17). At the same time, risks are somewhat mitigated by the fact that debt at risk is comprised of mortgage loans for the most part, which are able to provide considerable security in the case of default.

Chart 2-17

Cumulated share of loan portfolio relating to debtors with different financial margin

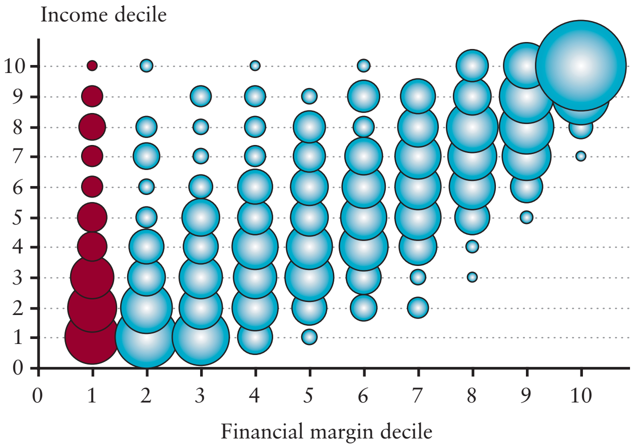


Source: MNB.

Among households with negative or low financial margin there are households from the lower and higher income categories alike. The number of the former is significantly higher than those in the higher income category (Chart 2-18) in the segment declared risky, however, based on credit

Chart 2-18

Number of households broken down according to income and financial margin[40]



Note: The size of the "bubbles" indicate the share of the households within a certain category among the indebted households, in other words, the bigger the bubble the more households can be found in that category.

Source: MNB.

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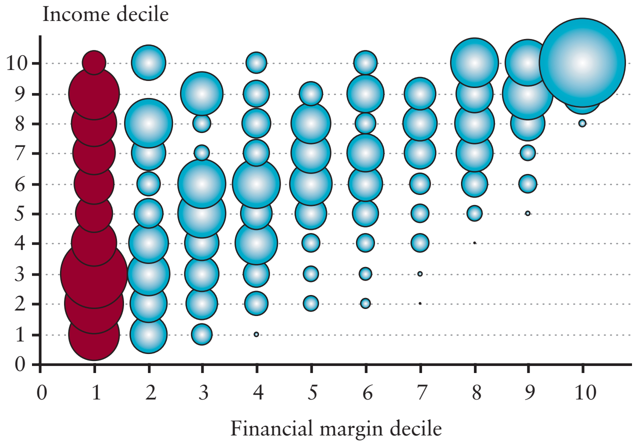
[39] Endangered or risky household and debt at risk means borrowers whose financial margin is negative and their exposure vis-à-vis the financial sector. In this case a negative financial margin does not necessarily mean default.

[40] Financial margin deciles: HUF 10,922, HUF 22,741, HUF 32,539, HUF 43,659, HUF 53,499, HUF 63,901, HUF 76,974, HUF 92,402, HUF 123,753.

Chart 2-19

Share of household loans broken down according to income and financial margin



Note: The size of the "bubble" indicates the share of loans in the certain category within the total loan portfolio, in other words, the bigger the bubble the higher the share of the loans in that category within the total loan portfolio.

Source: MNB.

exposure the difference between the two groups is less significant (Chart 2-19).

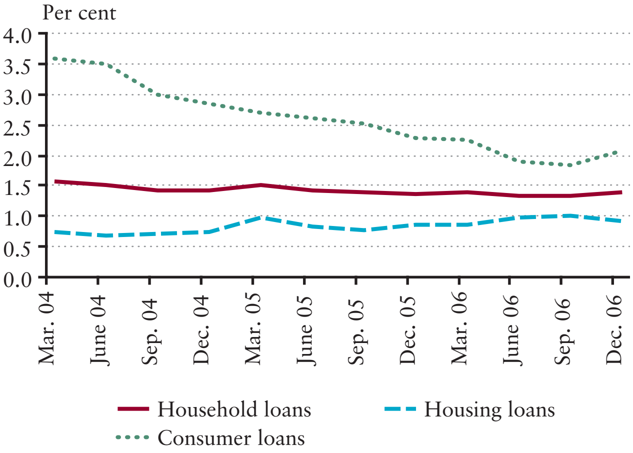
All things considered, the vulnerability of the financial sector is determined mostly by the degree of exposure to households with negative financial margin that – apart from the income of these households – depends largely on the percentage the debt service burden consumes of their income. In determining this factor, the responsibility of lenders is beyond question, but the decision-making process is distorted in that the potential ability of borrowers to service their debts is difficult to ascertain, due to lack of a positive debtor list (where the client has a loan from another provider).

Good household loan portfolio quality in the banking sector, deteriorating prospects

Although there is a slowdown in the improvement of the income position of households, and banks are steadily easing credit conditions, the quality of the household loan portfolio held by banks remains good (Chart 2-20). This phenomenon should be viewed in the light of two factors. On the one hand, the rising number of defaults is offset by the fact that some qualified loans are sold from the portfolio and thus removed from the balance sheet, and on the other hand, because the portfolio continues to grow dynamically, and the origination of home equity loans[41] 'covers up' for the deterioration of the older loans.

Chart 2-20

Percentage of non-performing loans in the total household loan portfolio

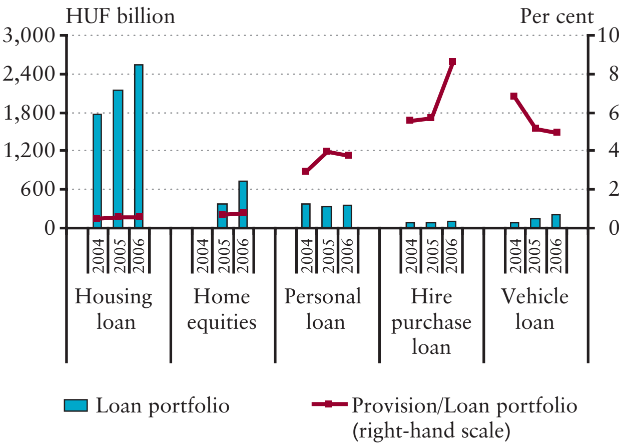


Source: MNB.

In the case of mortgage loans repayment discipline is better than in the case of unsecured loans, which is also indicated by the size of loss provisions on loan amounts set aside for each product (Chart 2-21). However, in connection with unsecured loans the reserves built into the prices allow for higher loss provisions, and the recovery of credit losses within the whole portfolio.

Chart 2-21

Provisions on the various types of bank loans



Source: MNB.

The degree of household loan exposure and credit risks in the upcoming period will be determined by the impact of the fiscal adjustment package and the policy of banks in terms of supply and risk appetite. Triggered by the higher taxes and contributions, and also in consequence of the temporarily higher inflation and the slower growth in gross incomes compared to 2006, the real income of households is projected to drop. On the other hand, real income and repayment capacity may be different in the various income categories on account of two factors. One is that the changes in taxes and contributions will have a different impact on households of different income positions, and the other is that the costs of living will vary at different levels, consistent with the consumption structure of the various income groups, in result of which the income households allocate for debt servicing will change as well.

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[41] Home equity loan: mortgage loan with no specified purpose (contrary to housing loans it can be used for consumption).

As for the household credit risks borne by the financial sector and the share of debt at risk, the impacts generated by baseline scenario trends, or in other words by the asymmetrical real income shock is negative, but the result of our simulation suggests only a slight deterioration in the portfolio. The low impact of the fiscal adjustment is attributed to the asymmetric effects the measures have in the various income categories, more precisely, to the fact that it has the most negative effect on households with higher income. The fiscal adjustment has an impact of 0.3 percentage points on the share of risky households and debt at risk.[42] At 10 per cent higher income the increase is even more marginal, only 0.1 percentage points.

Risks are further mitigated by the fact that close to 80 per cent of the exposures considered risky are secured by mortgage where – assuming that the average of 50 per cent LTV applies – full recovery is a distinct possibility even in the case of default, therefore, actual losses in this sector could only come from vehicle loans and unsecured loans. The risks in vehicle loans are typically felt in the deterioration of the portfolios of financial enterprises, whereas losses from unsecured loans affect the level of profitability of credit institutions for the most part.[43] As regards unsecured loans reserves built into the prices are still so high that they cover the potential losses deriving from credit defaults.

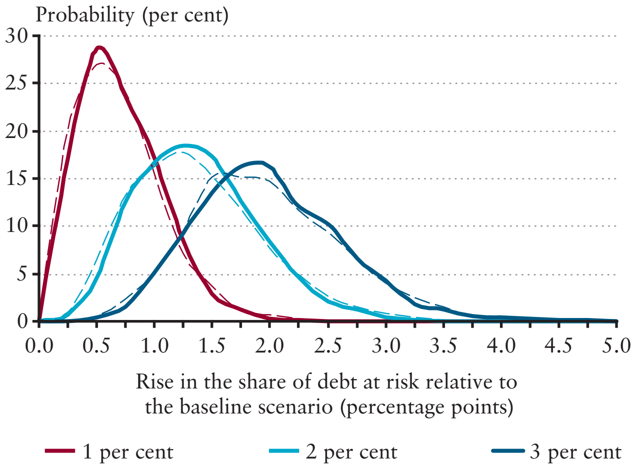
In the first risk scenario, the real income position of various households changes differently. Stagnating inflation expectations and rigid wages could bring about an increase in the income of certain households to a degree higher than expected in the baseline scenario; on the other hand, as the reaction of the corporate sector to the increase in labour cost due to high wage inflation will be to dismiss employees, for the households affected by such layoffs the reduction in real income will be significant.

Only 18 percentage of the indebted households have any financial savings, which means that their ability to continue making the instalment payment as due from their reserves will last a short time, between 1 to 3 months on the average, and if unemployment turns out be longer term, this will cause delays in payment and ultimately potential defaults in the financial sector. On the other hand, households with continued employment will have higher financial margins thanks to the higher nominal wage path.

We examined the impact of the stress event in several different scenarios, as the impact generated by the decline in employment could vary across sectors. We checked how the layoffs affect the ratio of debt at risk within the entire portfolio, by selecting the unemployed workers at random, while in the second instance we determined the maximum share of debt at risk in the wake of the stress event. In this case we mapped out the rate of vulnerability resulting from the involvement of various sectors.

Chart 2-22

Rise in the share of debt at risk relative to the baseline scenario in the event of 1, 2 and 3 per cent reduction in the employment



Note: The dashed line shows the distribution of increase in debt at risk based on 10 per cent higher initial household income. Under 1, 2 (in the first risk scenario) and 3 per cent cut in employment, we have selected at random the group of households 2,000 times, where we have examined – under the assumption that one wage earner is laid off – the number of cases where the loss of income, and its substitution by unemployment aid, led to negative financial margin. In the simulation we also have taken into consideration the increase in nominal wages in the scenario. The simulation is static, in other words, we assume that the worker in question did not find new employment during the period under review.

Source: MNB.

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[42] In the base scenario we project that in the various income categories nominal disposable income will grow at different levels and under different rates of inflation (See Chapter 1.2.).

[43] The negative trend could be slowed down by the introduction of loan constructions combined with different forms of insurance (for instance against unemployment or illness), plus – according to the information obtained by the Senior Loan Officer Survey on Bank Lending Practices – operators are preparing various bridging techniques (term extension, rescheduling) in an effort to better manage their claims from clients in default, and they are offering special products containing grace periods to mitigate the impacts of the fiscal adjustment measures.

In most households, unemployment tends to cause problems relating to loan repayment (Chart 2-22). Based on our simulation model, a 2 per cent reduction in employment in the risk scenario is expected to increase the share of debt at risk by 1.2 percentage points within the entire credit portfolio, in addition to the baseline scenario.

If we maximise the size of debt at risk, in other words, if the shock affects households with the largest loan amounts, the percentage of endangered portfolios could go up 10 percentage points relative to the baseline scenario in the event of a 2 per cent reduction in the employment in this particular risk scenario. The share of defaults in this case is most sensitive to the layoff of workers in the service sector.[44]

If the second risk scenario materialises, this means that the risk appetite of foreign investors drops significantly during the upcoming period. This results in a steady rise in risk premia expected of forint investments, that is to say in a weaker forint and higher yields. This type of shock has a different impact on households indebted in forint or in foreign currency, depending on the ratio it is felt in through these two channels.

The rise in forint yield rates has a different effect on the households indebted in forints, depending on the length of the stress event (higher yield levels emerge in short or long-term yields) and on the repricing of the loans. Assuming an unfavourable scenario, i.e. the shock lasts one year and it is felt in long-term yields as well, on the whole “only” less than 50 per cent of the forint loan portfolio is affected. In consumer lending the rise in forint yields is felt mostly in personal loans, in overdrafts and in credit card interest rates, resulting in higher instalment payments. However, in connection with the latter two products, market operators may decide to absorb a certain part of increased liability costs in the event of a minor rise in the yield level, because of the high reserves built into the prices. In the case of subsidised housing loans contracted before December 2003 an interest rates ceiling was installed, therefore the higher yield does not apply to the loan interest rates, meaning that the payments of these clients are not increased. Housing loans granted subsequent to 2003 are affected by the shock, however, only a proportion of long-term loans is repriced within one year, as half of the portfolio is comprised of loans with interest rates fixed for 5 years.

During the last three years foreign currency loans have become extremely popular and by now 50 per cent of the entire household loan portfolio is comprised of foreign currency loans. If the risk premium shock has the consequence of forint exchange rate weakening, the forint value of exposures denominated in foreign currencies and the amount of monthly instalments will immediately go up by the same rate as exchange rate depreciates, regardless of the product, which will directly result in higher debt servicing burdens for the households in question.[45]

The credit risks of the financial sector, apart from the length of the stress event, could also be influenced by the dissimilarities in the income shock-absorbing capacity of the households with loans denominated in different currencies, but as our survey suggests households with loans denominated in forint or in foreign currency are not significantly different in terms of income position and financial margin.

We simulated the vulnerability of households holding different types of loans according to the risk premium shock in three scenarios using higher yields and weaker forint exchange rates (Table 2-2).

As a result of yield increases and exchange rate depreciation, the ratio of debt at risk grows faster than the number of households in tight liquidity positions, i.e. the level of concentration based on the loan portfolio increases the vulnerability of the bank portfolios. As the ratio of forint loans with fixed interest rates is relatively high, portfolio quality is more sensitive to exchange rate movements than to higher forint yield rates As a result of the shock, not only will the percentage of debt at risk increase considerably, it is also likely that a high proportion of households which are considered sensitive in the baseline scenario will not be able to pay the higher instalments. Accordingly, portfolio quality could deteriorate spectacularly. In this scenario as well, potential losses from defaults can be mitigated by the high reserves built into the prices and by the fact that a significant proportion of the debt at risk is comprised of mortgage loans. However, the exposure in mortgage loans denominated in foreign currencies increases consistent with the depreciation of forint exchange rate, and it has a negative effect on the LTV and on the recovery of loans.

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[44] The range of products offered by banks grew last year with the appearance of a home loans combined with insurance. In case of unemployment, this insurance provides coverage for payment of instalments for a predetermined period (typically one year) to prevent any interruption in the continuity of payments while in search of a job. If these types of loans gain popularity, the impact of any shock in the labour market on the portfolio could drop.

[45] The potential increase in credit risks could be diminished to some extent by loan constructions with fixed instalment payments, where any drop in the relevant exchange rate affects the maturity of the loan instead increasing the instalment payment. However, these types of loans are not widely used yet.

Table 2-2

Changes in the share of debt at risk in the entire household portfolio relative to the baseline scenario under varying risk appetite shocks

Percentage points	**Based on original income**				**Based on income increased by 10 per cent**			
	Depreciation of forint exchange rate							
Forint yield increase	**baseline**	**10%**	**20%**	**30%**	**baseline**	**10%**	**20%**	**30%**
baseline	0.0	2.8	6.1	8.0	0.0	3.2	3.9	6.6
100 basis points	0.6	3.4	6.6	8.6	0.0	3.2	3.9	6.6
250 basis points	1.1	3.9	7.4	9.1	0.1	3.3	4.1	6.7
500 basis points	1.7	4.5	8.0	9.7	1.0	4.2	4.9	7.8

Note: In the simulation model we used fix interest rates for hire purchase loans, and we did not reprice the subsidised housing loans provided before 2004 according to the interest rate ceiling, as well. However, in the interest rates of the housing loans provided after the tightening of the subsidy scheme, assuming that the interest rate shock has an impact on government security yields as well, we applied the higher yields in all cases, that is an indication that risks are overestimated.

Source: MNB.

2.1.2. MARKET RISKS

Market risk exposure in the banking sector is relatively low, as it is supported by exchange rate, interest rate, and liquidity[46] "top-down" stress tests. Accordingly, financial stability is not exposed to substantial direct market risks in the baseline scenario or the risk scenarios. At the same time, the interest rate and exchange rate risk, which are passed on to the clients, may induce substantial losses indirectly through the quality of portfolios.

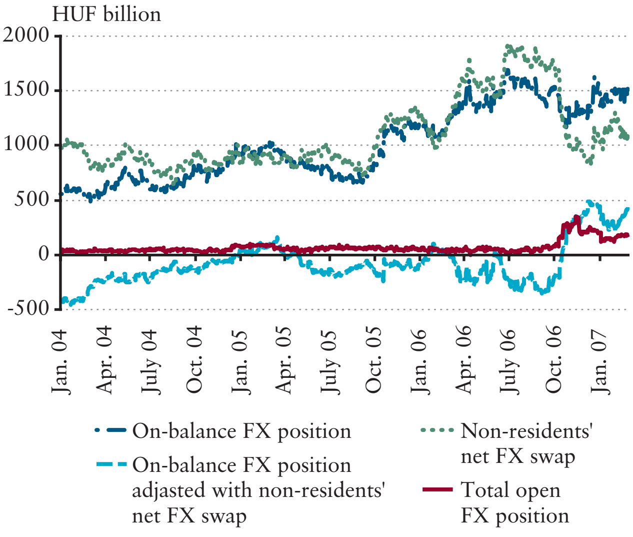
Exchange rate risk

In 2006 international developments had a significant influence on the on-balance sheet position of the banking sector, which were either enhanced or reduced by Hungarian country-specific risks. Early in the year the global market showed signs of growing uncertainty in a previously reliable investor environment, along with signs of fading risk appetite. The first signs emerged as early as in the spring of 2006, followed by a major wave of withdrawal of capital by international investors in the months of May and June. Unfavourable external events were made even worse by a growing sensitivity among investors to weak Hungarian fundamentals. The forint exchange rate became highly volatile before it fell to an all-time low against the euro in the summer. Investor climate changed for the better in August. Moreover, the higher central bank interest rates and the announced fiscal adjustment measures combined to push the forint back up to its previous level by October.

Shifts in net swap holdings of non-residents had a major impact on changes in the on-balance sheet positions. During the times characterised by the withdrawal of capital, manoeuvres against the forint reached an all time high by way of the opening of short forint positions by synthetic forward (spot+swap) transactions, while in the same period the banking sector's on-balance sheet foreign currency position moved in tandem, showing signs of spectacular growth. After the climate settled, in October non-resident investors closed their swap holdings accumulated in the summer, while the balance sheet position, that previously moved in tandem, declined only moderately. Local companies neutralised only a part of the exposures which non-resident investors did not cover, therefore the total open positions increased substantially (Chart 2-23).

Chart 2-23

FX open position of the Hungarian banking sector



Source: MNB.

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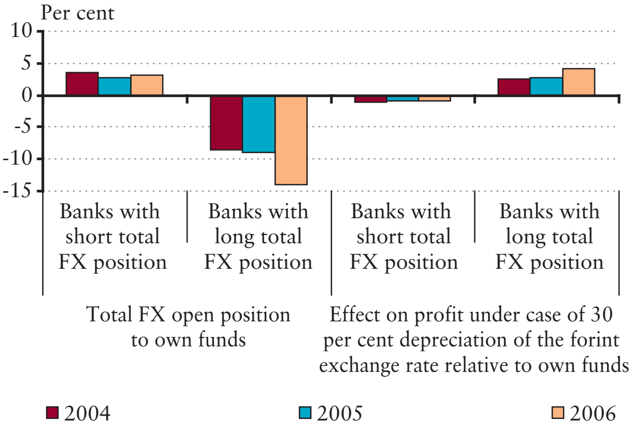
[46] For more information on liquidity stress tests, see Box 2-3.

Top-down stress tests are used to quantify the impact of a potential exchange rate shock. According to the result of the tests even a 30 percent depreciation of the forint would have a marginal effect on bank's earnings (Chart 2-24). As a results, the exchange rate risk of the banking sector remains marginal despite the higher total open positions.

Chart 2-24

The banking sector's exchange rate risk exposure under 30 per cent depreciation



Source: MNB.

In the Hungarian banking sector exposure to exchange rate risk tends to emerge indirectly, fundamentally accompanied with a lasting weaker forint exchange rate. On the one hand, the higher debt service on FX loans increases the credit risk, while on the other hand, the financial position of credit institution could be negatively affected by the costs of hedging of on-balance sheet positions, or hedging would become more difficult.

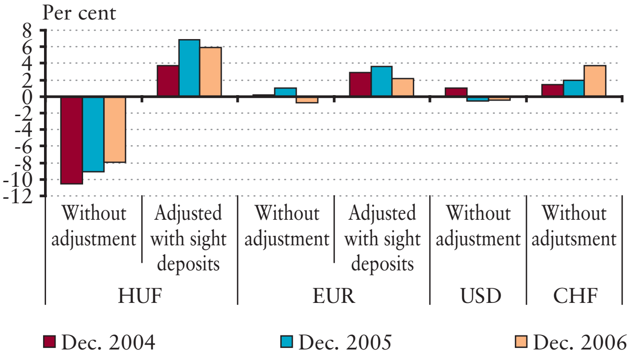
Interest rate risk

Due to the increase in interest rates by the MNB and foreign central banks, the interest rate environment has changed significantly. On the whole, the changes in interest rate conditions remained neutral in terms of the level of profitability of banks.

The banking sector's 3-month cumulated repricing gap is negative, exclusive of CHF, at a considerable level from the perspective of the forint (Chart 2-25). This index adjusted with sight deposits with inflexible interest rates is only USD exposure negative. Theoretically, the positive gap improves the profitability in the event of interest rate increase, while it has a negative effect otherwise, therefore the CHF and EUR repricing gap carries less risk in connection with the additional austerity measures projected. This, however, is not true for forint interest rate risks. After the peak of inflation the market expects the reference interest rate to decline[47], which could be a source of loss to operators in the banking sector due to the positive forint gap. However, as far as the household sector is concerned, banks have relative freedom in repricing, so they can reduce the impact of movements in interest rates if such are considered unfavourable.

Chart 2-25

90-day cumulated GAP of the banking sector



Source: MNB.

The direct impact of the interest rate premium shock originating from changes in the global investment climate is the result of conflicting processes. The higher yield level depreciates the bond portfolios of banks immediately, while the extent of such depreciation depends on the effect the shock has on the relevant benchmark. At the same time, profitability rises thanks to the higher deposit margin earned on sight deposits with inflexible interest rate.

To determine the impact of the interest rate shock on profits we have conducted[48] "top-down" interest rate stress tests[49] (Chart 2-26). During the period of the interest rate shock we assumed a parallel shift in the entire yield curve, by 500 basis points in the case of the forint, and by 200 basis points in the case of EUR, USD and CHF. The results indicate significant exposure only in connection with the forint, although the trend has been sharply downward in recent years. The "maximum" loss resulting from the stress amounts "only" to about two per cent of the equity in December 2006, indicating that the direct interest rate risk exposure of the Hungarian banking sector tends to be minor.

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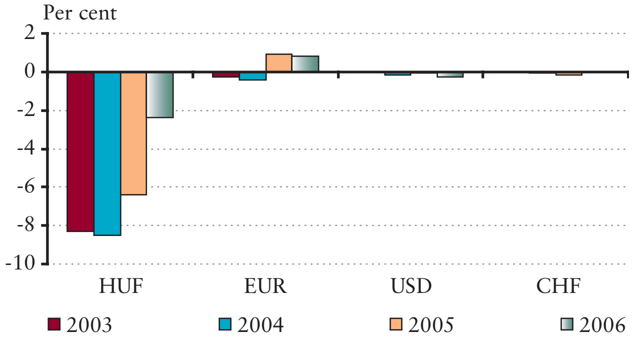
[47] For more information, see Chapter 1.1.

[48] In this process we used the so called adjusted Macaulay duration and convexity calculated from repricing information.

[49] Currently, PSZÁF is leading an effort with the involvement of banks to develop the procedures for "bottom-up" interest rate risk stress tests. We plan to discuss the results in the next *Report on Financial Stability*.

Chart 2-26

Maximum loss estimated based on interest rate risk stress tests relative to equity



Source: MNB.

Nevertheless, it is important to emphasise that, despite a moderate direct impact, a major interest rate premium shock could trigger unfavourable developments from the perspective of stability. Higher financing costs reduce the profitability of financial institutions, as they can pass all changes in interest rates on to their clients, and thus face a larger risk for credit losses, or share the higher costs to the detriment of the profitability of the products.

Liquidity risk

As far as the banking sector's asset side liquidity is concerned, despite the extraordinary credit expansion the share of liquid assets levelled out at around 20 per cent, which is considered positive in terms of system risk. The expansion of liquid assets seen in recent years could be explained by structural liquidity surplus resulting from the shift in state budget financing towards foreign currencies, where no significant decline is expected as long as the ratio of funds obtained from abroad to finance the government deficit remains high due to the high forint interest rates. Following securitisation of the two-week central bank deposits in the beginning of 2007 the efficiency of the redistribution of liquidity among banks may improve, therefore, all things considered, any increase in liquidity risk on the asset side is not likely in the short run.

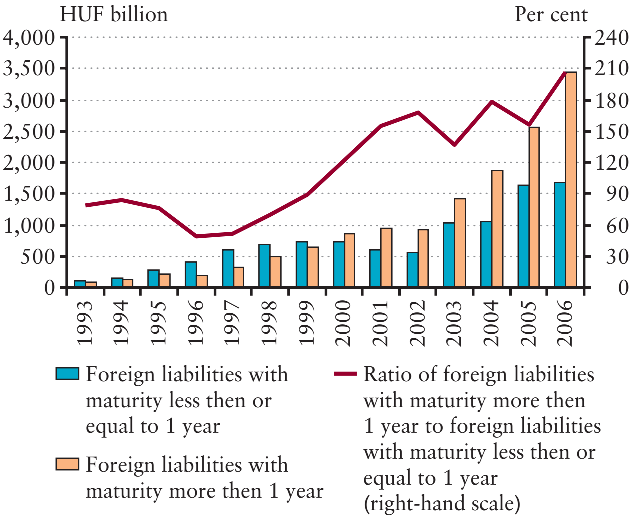
As for Hungarian banks, the liquid asset ratio shows negative correlation to size, while at the same time it is more closely related to the scope of activities of banks. Although in the majority of large banks, asset side liquidity is adequate, in some cases the index sank to a relatively low level on account of rapid credit expansion. The lowest liquid asset ratio is seen at credit institutions which are not engaged in accepting deposits and in mortgage banks, and also in the so called "single-product" banks. At the same time, the liquidity ratio is significantly above average at banks focusing mainly on financial market operations.

As for liabilities side liquidity we have seen positive development in recent years. The dynamic opening of the funding gap[50] as seen previously slowed down considerably during 2006. As a new development, the expansion of the forint funding gap played a dominant role last year in the opening of the entire gap, which was implemented in principle for regulatory reasons. Because of the interest-earnings tax introduced in September as a part of the fiscal adjustment package approximately HUF 250 to 300 billion of household deposits was withdrawn from the banking sector.

The dynamic growth in FX lending drastically changed the liabilities structure (Chart 2-27). The shortage of foreign currency deposits in Hungary resulted in a substantial increase in the ratio of market sources, while the weight of household sources – that was previously considered the most solid – has decreased. This in turn resulted in the increasing volatility of financing sources, which is not favourable from a risk perspective. At the same time, the remarkable growth in long-term foreign liabilities seen last year is a risk reducing factor.

Chart 2-27

Dispersion of foreign liabilities of the banking sector by original maturity



Source: MNB.

As far as partnerships are concerned, the ratio of funds originating from foreign parent banks or from any member of a group they control has an outstanding role, for in our opinion they are factors improving stabilisation.[51] Despite the fact that the ratio of funds from parent banks did not change within the banking sector (around 44 per cent), this ratio is continuously growing (from 47 to 58 per cent) for banks controlled by strategic investors. The largest banks operate using different financing strategies. On general principle, funds from the parent bank play a substantial role, although there are banks with marginal reliance on funds from the parent bank. However, even in the case of these banks foreign ownership presumably facilitates the acquisition of funds on international money markets.

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[50] The funding gap is defined as the ratio of the difference between deposits and loans to loans. In calculating the ratio all MFIs deposits and loans are excluded. The ratio shows the share of the more expensive and often more volatile capital and money market financing.

It is important to stress that an increase in the ratio of volatile sources does not necessarily indicate an increase in liquidity risk in itself. Higher liquidity risk occurs when a bank's stable liabilities are inadequate to finance illiquid asset, therefore, the ratio of stable liabilities relative to illiquid asset[52] provides a more accurate picture on liquidity risks. On general principle, when the index is above 100 it indicates lower liquidity risks, when it is lower than 100 it shows higher liquidity risks. The 110-120 index of the Hungarian banking sector indicates, on the whole, moderate liquidity risks, a fact also supported by the asset side examination of liquidity. Since the stable liabilities/illiquid asset ratio remains solidly above 100 per cent, the Hungarian banking sector can reduce the effect of a potential dry-up in the market due to massive withdrawal of capital, in other words banks have a significant buffer to survive a temporary shortage of funds or substantial increase in costs. In the event of a major or prolonged crisis, however, funding risks generated by long-term assets and short-term liabilities could result in significant losses, and this is true despite the fact that the supply of long-term liabilities has improved considerably in recent years.

Box 2-3: Liquidity stress test for Hungarian banks[53]

The analysis of the liquidity risks of banks in the *Report on Financial Stability* is usually carried out under the assumption of "normal" circumstances. However, the balance sheet or maturity mismatch based liquidity indicators tend to ignore that the liquidity risks of banks could increase abruptly and drastically in stress events on account of the options embedded in their products. This is why it is necessary to examine banks' liquidity shock-absorbing capacity under extreme scenarios.

In this stress testing exercise, we examine the availability of assets at the banks' disposal to withstand a possible narrowing of liquidity. In the stress scenario, we assume a bank-specific liquidity shock that may originate, for example, from a crisis of confidence.[54]

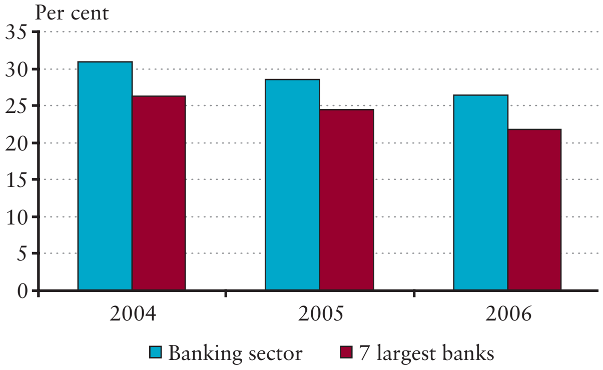
In determining the one-month gap (the difference between cash inflows and outflows), we use different "haircuts" for the different cash inflows, consistent with their degree of probability of repayment, liquidation price, or how much additional funds may be obtained in a repo transaction. Similarly, in connection with cash outflows, we make assumptions regarding the renewability of non-customer funds as well as regarding possible outflows related to contingent liabilities. Accordingly, the main assumptions of the liquidity stress scenario are the following:

- Banks are unable to renew their liabilities from sources other than deposits which are scheduled to expire within one month (primarily interbank liabilities).[55]

Chart 2-28

"One-month liquidity stress ratio" of the banks under review

(group averages)



Source: MNB.

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[51] It should be noted that the findings of empirical studies are contradictory in the respect of whether foreign banks' behaviour strengthens or weakens liquidity risk in times of crisis.

[52] Stable liabilities mean all liabilities, other than short-term interbank instruments, while illiquid assets mean all assets minus liquid assets.

[53] Tamás Balás and Csaba Móré (2007): Liquidity risk in the Hungarian banking sector (mimeo).

[54] A bank-specific liquidity shock (withdrawal of deposits) may originate from factual or assumed credit losses, from downgrading by several notches or from loss of reputation due to other reasons.

[55] As this examination pertains to the ability of banks to withstand liquidity shocks on their own, we did not assume any assistance from the parent bank.

- 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.

- Customers fail to repay their overdrafts.

To measure banks' liquidity stress bearing ability, we use a 1-month "liquidity stress ratio" defined as the maximum possible customer deposit withdrawal within one month which could be covered by banks' liquidity buffers, under the assumption that they can not obtain new funds from external sources (e.g. interbank market).

The exposures calculated by the above-specified method suggest that, despite a moderate decrease in 2006, banks overall still have a high liquidity stress bearing capacity (Chart 2-28). The 1-month "liquidity stress ratio" varies across banks within a broad range, but still the average level remained above 25 per cent for all banks under review and 20 per cent for large banks in each period. However, for banks with the lowest stress bearing ability this ratio stood at 10 per cent or less. In the assessment of results it must not be overlooked that we did not count on any assistance from the parent bank in connection with the liquidity stress bearing ability of banks.[56] Overall, based on the findings of the liquidity stress tests we maintain the opinion that the liquidity risks do not currently jeopardising financial stability.

2.1.3. FINANCIAL POSITION OF THE BANKING SYSTEM

The financial position of the Hungarian banking system is still stable, similarly to recent years. There has been a slight decline in capital adequacy and in the internationally high level of profitability,[57] but this decline was negligible. The fiscal adjustment package has a short-term negative impact on profitability with the base scenario, partly because of the falling credit demand and due to the deterioration of the income position of borrowers. The risk scenarios have a more significant impact through increasing credit losses.

In terms of risks inherent in the operation of financial institutions, it is important to underline that banks put strong pressure on their clients in offering their loans and have started intensive expansion abroad in order to maintain their profitability.[58] Moreover, by intensifying the relations within the banking group, banks also contribute to the increase of risk transfers

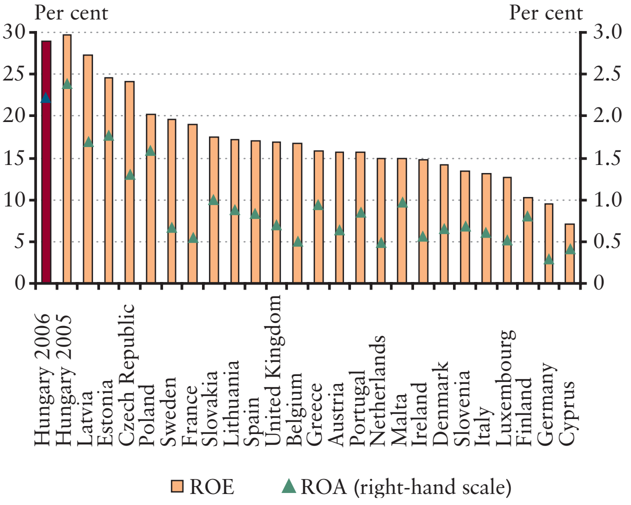
Profitability

In contrast with the tendency of the previous years, the profitability indicators of the banking system decreased in 2006, although the first signs of this tendency appeared as early as the second half of 2005. However, in an international comparison, profitability is still outstanding.

Chart 2-29

ROE and ROA indices in international comparison

(2005)



Source: ECB.

Looking at individual banks, the ROE index decreased from 2005 to 2006 in two thirds of the banks (Chart 2-29).

The most important cause of falling profitability is the near doubling of the loss originating from changes in portfolio quality, as well as the lower profit on financial transactions (Chart 2-29). In 2004 and 2005, the increasing income from financial transactions, stemming from the gains on the revaluation of trading portfolio related to the decreasing central bank base rate played an important role in the improving profitability.[59] In 2006, the central bank base rate increased by 200 basis points in total, which significantly held back profit on financial transactions.

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[56] Another reason why assistance from the parent bank should be ignored is that the initial reason for the shock may well originate from the parent bank.

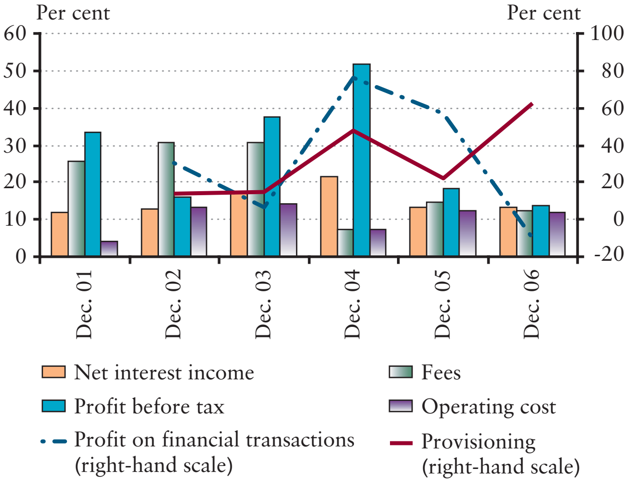
[57] With regard to the profitability assessment, we need to stress that the income from other members of the banking group grew gradually within the total income of the parent bank, so the group-level indicators could even improve.

[58] For more information, see Box 2-4.

There were no major changes in the share of interest and commission revenues in 2006, while within the European Union the interest income to total income ratio was still the highest in Hungary. The internationally outstanding interest margin declined further last year as a result of several factors. The debt expansion within the more risky segments (SME and retail) increased the interest margin, while the lower share of subsidised home loans with extremely high margins granted in 2002 and 2003[60] and higher share of the more expensive interbank and capital market funds financing dynamic lending had a negative effect on net interest income.

Chart 2-30

Variation of the main components of profitability compared to the previous year

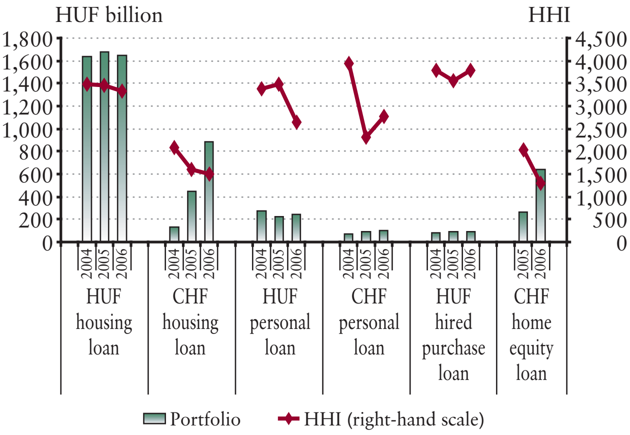


Source: MNB.

The operating efficiency of the banking system continued to improve. The operating costs expressed as a percentage of the total assets have been decreasing for years, although their figure is still much above the EU average. Comparing the expenditures to the total income, Hungary is in the middle range owing to the higher profitability.

Chart 2-31

Concentration of the household loan market of the banking system

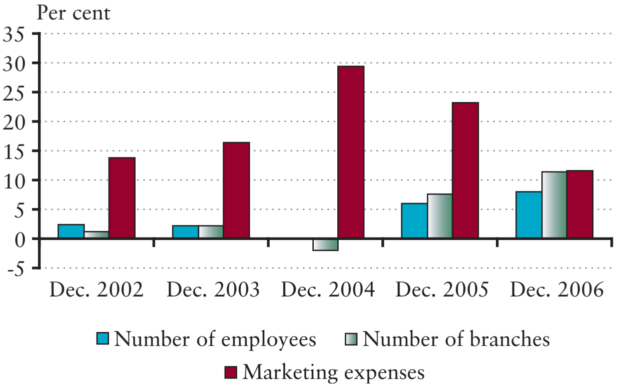


Source: MNB.

The analysis of competition provides a contradictory picture of the Hungarian banking system. Lending to non-financial corporate clients has shown low concentration indicators for years,[61] but in the household segment concentration is still high despite the lower figures (Chart 2-31). A considerable change can be observed only in CHF loans, more specifically in secured loans with lower risk.

Chart 2-32

Increase in marketing expenses, employees and number of network units compared to the previous year



Source: MNB.

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[59] In Chapter 2.1.2, the stress test also showed a high level of HUF exposure in 2004-2005, which corresponded with the profitability index.

[60] For more information, see György Szalay and Gyula Tóth: Housing finance practice, related risks and their management in the Hungarian banking system; *Report on Financial Stability* (December 2003), http://english.mnb.hu/Engine.aspx?page=mnben_stabil&ContentID=3403.

[61] The Herfindahl-Hirschman Index (HHI) is used as the concentration index. It is identical with the square share of the individual market actors. The market is competitive if the index is below 1000, between 1000 and 1800 is slightly concentrated while over 1800 is concentrated.

There is strong competition in the household segment despite the high concentration indices[62], but this typically involves no, or only limited price competition.[63] In order to retain their outstanding profitability, banks have focused more on the extension of their product range, as well as reaching and acquire household clients. In order to achieve this goal, they began to build their branch network intensively, while their headcount figures and marketing expenses grew considerably as well (Chart 2-32).

Risk competition has also become more intensive among banks. Down payments are gradually decreasing in secured loans (housing, home equity and vehicle loans) and these days the LTV may even be higher than 100. More and more banks remit the upfront fees, which helps them acquire clients for a long period with a relatively low sacrifice.

In the past few years, credit institutions have focused not only on product profitability but also on client profitability in which the utilisation of synergies and cross selling play an important role.[64] Expansion abroad also improves the profitability of financial intermediation, but at the same time, it generates some new risks as well.

Box 2-4: Advantages and risks of expansion abroad from the point of the large bank groups operating in the region

It is a new tendency in the banking sector that financial service providers expand abroad in order to maintain their high profitability (OTP, MKB). This trend is in line with the regional expansion strategy observed in several EU banking groups as well. This process may imply positive effects for the banking groups involved, but additional risks to stability may also occur. This box text reviews the main impacts of regional expansion on financial stability from the aspect of 'home countries'.

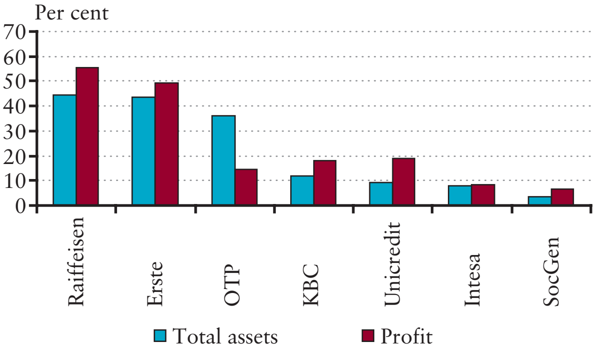
Advantages of foreign expansion

The first phase of acquisitions abroad targeted mainly at the countries in Central Europe, and later, or in part parallel with that, it also extended to Southeast Europe as well as Russia and the Ukraine. The main driving force behind this process was the high growth potential of the banking markets in the target countries, which is based on their convergence towards the more advanced EU Member States in terms of economic development and financial depth. The relative importance of the Central and Eastern European region for the relevant banking groups has increased in the past few years as a result of the fast growth of the banking markets in the region and continuing acquisitions. There are large differences between the analysed banking groups in terms of the coverage of the countries of the region, which mostly reflects the differences in their foreign expansion strategies.

In terms of stability, it is favourable that group-level profitability may increase especially when the growth potential on the home market becomes limited. The size of this positive impact depends on the synchronisation between the economic cycles of the home and host countries too.[66] Apart from the cyclical differences, expansion on foreign markets may also contribute to increasing economies of scale at the banking group. Another important motivation of banks' expansion towards the 'East' is the high profit margin compared to their home markets. This is illustrated by the fact that the contribution of the subsidiaries in this region to the group-level profit is usually higher than the share of subsidiaries in the total assets of the group (Chart 2-33).

Chart 2-33

Share of the subsidiaries in the region in group total assets and their contribution to group profits[65]



Note: 2005 figures, except OTP (2006).

Source: bank reports and RZB Group 'CEE Banking Sector Report' (2006).

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[62] For more information, see: *Report on the survey of the lending practices of the banks conducted among credit managers.* http://english.mnb.hu/Engine.aspx?page=hitelezesi_felmeres&ContentID=9425.

[63] For more information on competiton in HUF loan and deposit market, see: József Molnár, Márton Nagy and Csilla Horváth: A Structural Empirical Analysis of Retail Banking Competition: the Case of Hungary, MNB Working Papers, 2007/1., http://english.mnb.hu/Engine.aspx?page=mnben_mnbfuzetek&ContentID=9409.

[64] For more information, see Chapter 2.2.

[65] We must note that the comparison based on asset and profit shares is distorted for OTP because in 2006 the assets of the consolidated banks are contained fully, but their profit is only contained partially in the reports

[66] For the relevant Hungarian banking groups, e.g., the deceleration of economic growth based on fiscal adjustments may be offset with the larger business growth potential on foreign markets.

Risks involved in foreign expansion

Apart from an improvement in long-term growth and profit-generation potential, expansion abroad also involves additional risks for the stability of parent banks and home countries. Below we provide a brief of overview of these risk factors:[67]

- **Macroeconomic risks of host countries:** The typically higher macroeconomic vulnerability of the host countries in the CEE region may increase the average risk of the credit portfolio of the banking groups, especially in the case of non-EU countries. This category includes the risks related to fast credit expansion and considerable external imbalances, which are present in several countries of the region. This potentially negative impact may be even stronger if the subsidiaries operating in more risky countries have a significant share in the assets of the group and a significant contribution to the group results.

- **Correlation of the risks of group members:** The possible shocks affecting all host countries – e.g., shrinking global liquidity, capital outflows, exchange rate deprecation – and 'contagion' within the banking group starting from individual problems may lead to a correlated increase of credit losses in the group.

- **Risks implied by the integration of subsidiaries into the group:** Upgrading of the typically less advanced risk management systems and operation of subsidiaries is a lengthy process, therefore the transition period may result in higher risk exposures.

- **Too fast foreign expansion:** Credit and operational risks may increase if foreign expansion takes place too fast compared to the risk management and managerial capacities and capital accumulation capabilities of the bank.

- **Risks arising from the regulatory and supervisory environment:** Risks to stability may also increase because in some non-EU countries, the prudential regulations and supervisory standards are still lower than in the financially more advanced Central and Eastern European countries.[68] In addition, the exposure of these countries to the regulatory shocks with an unfavourable effect on the banking sector is typically higher. While these measures may prove to be favourable in terms of host country financial stability, from the perspective of the banking groups operating on the market they may lead to higher volatility in lending and profitability.[69]

Regulatory and supervisory challenges

The additional risks inherent in the activities of cross-border banking groups create new challenges for home country regulators both in terms of their preventive activities as well as the establishment of a framework for crisis management.

On the one hand, regular exchange of information is required between the supervisory authorities of the home and host countries for the evaluation of risks involved in the activities abroad for micro-prudential purposes.[70] It is equally important that the macro- prudential financial stability analyses should include the evaluation of risks inherent in activities abroad, both in regular monitoring and stress testing exercises. Finally, as a result of banks' foreign expansion, the previous framework of crisis management had to be re-evaluated, which also calls for close co-operation between the national supervisory authorities and central banks.

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[67] Note that the purpose of this analysis is to review the new risk factors involved in activities abroad and not to evaluate such risk exposures.

[68] See the EBRD Index of Banking Reform by country, in EBRD Transition Report 2006, http://www.ebrd.com.

[69] Good examples for these regulatory shocks are the rapid expansion in lending and regulatory steps for holding back FX loans in the last few years.

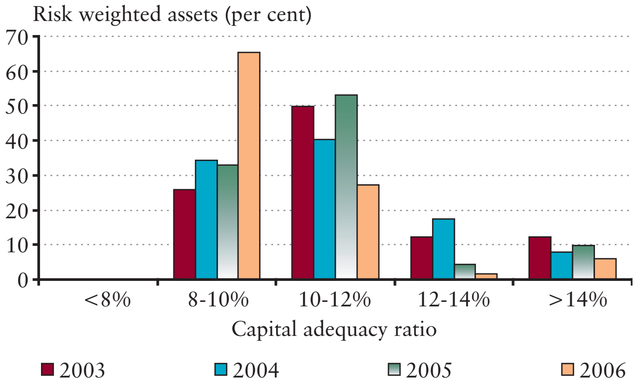
[70] In order to promote this principle, HFSA has entered into co-operation agreements with the partner authorities of four countries to date where the Hungarian banks have subsidiaries (Bulgaria, Croatia, Romania and Slovakia).

Capital position

Taking also into account the estimated reinvested profits, the capital adequacy ratio (CAR) of the banking system decreased only slightly in 2006 and still represents a sound figure. While the CAR for all banks is higher than 8 per cent, the total assets-based market share of banks with lower than 10 per cent ratios has nearly doubled (Chart 2-34).

Chart 2-34

Dispersion of banks' risk weighted assets by capital adequacy ratios

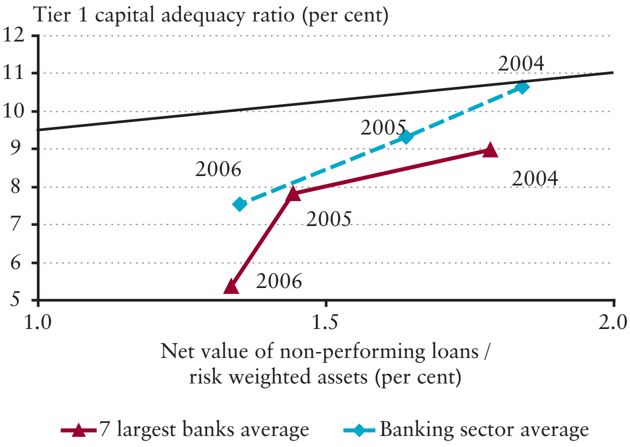


Source: MNB.

However the CAR calculated with Tier1 capital[71] and the stress CAR decreased significantly. The reason for this spectacular decline is not the increase of risks, but rather that the banks used Tier2 capital elements for the expansion of their activities instead of Tier1 capital. The Tier1 CAR over 7 per cent is not an extremely low index in international comparison, therefore we do not consider it as a significant risk in terms of stability (Chart 2-35).

Chart 2-35

Adjusted primary capital index of the banking system



Source: MNB.

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[71] This calculation is different form the international practice, because the investments in the financial sector and the limit excesses are deducted from the Tier1capital, therefore it results in lower figures.

2.2. Risks of the non-bank financial intermediary system

In 2006, the operation of non-bank financial institutions was determined by the interest- and exchange rate fluctuation, the adjustment package of the government and the subsequent legislative and taxation changes. From a financial stability point of view, the most important risks can be observed again in the vehicle financing activity of financial enterprises; in 2007 projections indicate an increase in their losses as a result of the deteriorating income position of households and companies.[72] On the other hand, the increasing integration of banks and non-bank financial institutions also deserves attention. Apart from the positive impact of synergies, this may lead to risk re-allocation, concentration and intensification within the groups. The increasing size and complexity of financial groups and the appearance of cross-border activity are important challenges for regulators and supervisors as well.

2.2.1. FINANCIAL ENTERPRISES

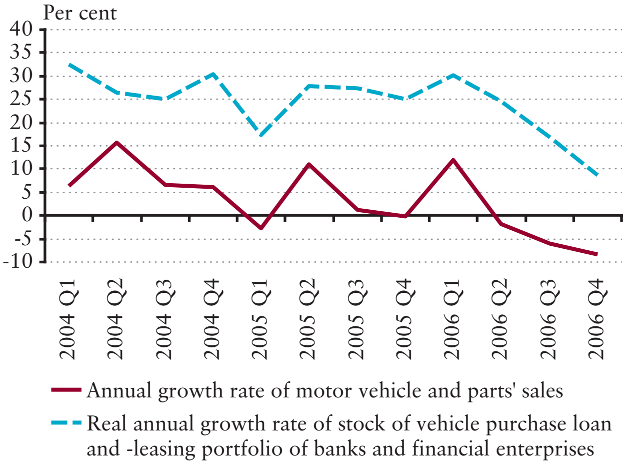
Expected increase in credit losses

In line with the evolution of the number of car sales, the real growth rate of vehicle financing by financial enterprises has been gradually slowing down in the past two years. The annual growth rate of the loans outstanding dropped below 10 per cent by the end of 2006 (Chart 2-36). Still, nearly 70 per cent of the total receivables relate to vehicle loans, rendering the sector rather vulnerable to changes on the vehicle market. On the other hand, there are signs that this one-sided product structure has begun to shift: in the financing of non-financial companies the share of factoring, equipment and commercial vehicle leasing and real estate financing is growing; while within household claims representing 53 per cent of the portfolio home equities are increasing rapidly. Leasing of homes has also been introduced, although for the time being their amount is very small.

As a result of declining consumption and the projected increase in liquidity problems of companies in 2007, projections indicate stagnation in vehicle financing and a decline in the portfolio. In the corporate segment, the demand for factoring is expected to increase, while in household finance the share of mortgage loans may further increase because of consumption smoothening. In total, a continuing slow restructuring of the portfolio can be expected which may lead to a healthier, less concentrated product structure over long term.

Chart 2-36

Annual real growth rate of vehicle sales and vehicle financing



Source: CSO, MNB.

However, for the time being, the credit risk of financial enterprises is dominated by the vehicle loan portfolio. There has been strong market competition in the vehicle market in the last few years, as a result of which riskier financing instruments were introduced. These instruments have been retained, and moreover, the average maturity of loans is also increasing (there is a growing number of loans with original maturity over 5 years). As a result of low down payment ratios the asset coverage of loans is not sufficient during the major part of their duration since the market value of the financed vehicle goes below the actual value of the principal debt in a short time. With a decrease in the number of new vehicles sold, the proportion of second-hand vehicle financing is increasing, and asset coverage here is even worse.

The continued increase in the share of non-performing loans (overdue more than 90 days) clearly indicates the deterioration of the portfolio of financial enterprises (Chart

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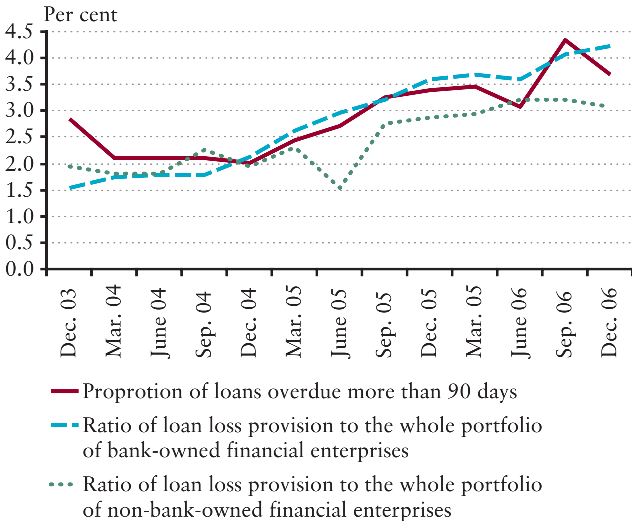
[72] Market risks in the activity of financial enterprises are low because the refinancing loans granted by banks to them are perfectly matched to their claims in terms of exchange rate, interest rate and repricing structure.

Chart 2-37

Proportion of loans overdue more than 90 days and the ratio of loan loss provision to the whole portfolio of financial enterprises



Source: MNB.

2-37). In parallel with the declining portfolio quality, the ratio of loan loss provision to total loans has been also increasing over the last two years. The provision coverage of the portfolio is adequate at the sectoral level, but there are significant individual differences.[73] The ratio of provisions to the portfolio in financial enterprises belonging to banking groups is normally higher than that of the other companies in compliance with the stricter group-level rules.

Based on the survey of households, we could also conclude for vehicle loans that households with negative or very low income shock tolerating capability (lowest deciles) have a high proportion of loans.[74] Based on the first risk scenario, the rise in unemployment would only have a very low effect on debt at risk. On the other hand, in the event of a risk appetite shock described in the second scenario although the growth of interest rate would only have a slight effect the weakening of the forint exchange rate would significantly increase the share of loans at vulnerable households. In contrast with mortgage loans, the asset coverage of vehicle loans is much worse, which can only add to credit losses in each case.[75] Through various financing and ownership relations, the credit risk of financial enterprises increases the credit risk of banks significantly.

Profitability is sufficient for the time being, but losses are expected to increase

The return on assets of financial enterprises (ROA calculated with profit before tax) is decreasing moderately from a high value as a consequence of narrowing interest margins and growing loan loss provisions.

In 2006, the total profit before tax of the enterprises belonging to banking groups contributed to the profits of the respective banking groups by nearly 7 per cent, with quite considerable differences. As the enterprises owned by banks account for more provisions, their average profitability is lower than that of the enterprises not belonging to banking groups.

In 2007, the competition on the shrinking market of vehicle loans will probably become even stronger, and as a result the continued use of risky constructions, a decline in fees and charges applied to clients, and high agent commission rates can be expected. Together with the forecast increase in credit losses and smaller portfolio increases, this will most probably lead to a lower margin and an increase in the number of enterprises showing losses, as a result of which a growing number of companies specialised in financing of new vehicles will have to make a choice between the modification of their scope of activity, entry into foreign markets or, in an ultimate case, exit from the market.

2.2.2. RISKS RELATED TO THE ACTIVITIES OF INSTITUTIONAL INVESTORS

The role of non-bank financial institutions is increasing in households' savings

Institutional investors play a very important role in financial intermediation through the collection and re-channelling of household savings. In 2006, in addition to developments in the market environment, their operation was also fundamentally affected by the regulatory and fiscal changes related to the adjustment measures, in particular the 20 per cent interest- and capital gain tax introduced on 1 September 2006, as the yield of investment units and life insurance contracts purchased until that date remain exempted from the tax. In July and August, driven by tax avoidance, HUF

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[73] The accounting and prudential regulations applicable to financial enterprises are significantly more lenient than those applicable to banks and the current tax regulations do not provide incentives for the companies to account provisions reasonably. In most enterprises the provision ratio does not reflect the actual losses at all and even worse, many enterprises do not account for provisions at all.

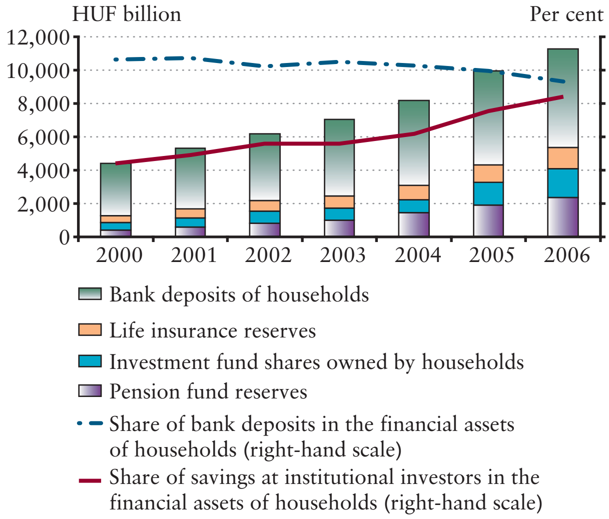
[74] Vehicle loans amount to almost 20 percent of total household claims of financial intermediaries (banks and non-banks). More than 80 percent of this stock is granted by financial enterprises.

[75] Detailed description of the results of the questionnaire is in Chapter 2.1.

300 billion of bank deposits were transferred from the banking system to non-banks, the greater part into investment fund units and a smaller amount into life insurance. As a result, the share of savings at institutional investors further grew in the financial assets of households (Chart 2-38). However, this restructuring of savings does not mean that the banking system lost all these funds, because the investment funds channelled back a considerable portion of these savings to banks in the form of deposits placed by them. On the other hand, examining the individual level there were some banks which were not able to keep these funds within their banking groups.

Chart 2-38

Household savings placed with banks and institutional investors



Source: MNB.

The increase of bank deposits from investment funds is a trend that had already started earlier. In several large banking groups, typically facing a relative shortage of funds, the deposits of the group's investment funds have become an important liquidity factor. Although at a higher cost than direct household deposits, they represent stable long-term funding for banks. On the other hand, in the case of the typically deposit placing guaranteed funds, money market funds and real estate funds the investment policy of the fund itself and the underlying instruments both justify holding of bank deposits.

Over the next two years, the decrease in the available income of households and the diminishing tax advantages will have detrimental impact on the growth of institutional savings. However, in the baseline scenario, in the second half of 2007 the decreasing forint interest rates may lead to more favourable retrospective yields for investment funds, which may launch some gradual restructuring from bank deposits to investment funds again. Guaranteed funds are expected to increase their market shares in the next few years, as a result of which the volume of household funds channelled back to banks may rise again.

Deepening of group-level intermediation leads to increasing risk transfer within groups

The interpenetration of non-bank financial intermediaries and banks has clearly intensified in the Hungarian financial sector. Both the number and types of relations within and between financial groups are increasing, and their integration is becoming deeper. In recent years the most striking change is the deepening co-operation between banks and insurance companies ('bankassurance concept'), which seems to be accelerating at the level of Hungarian affiliates since 2005.

Synergies lead to greater efficiency, sales volumes and profitability increases at the group level. However, the monitoring of risk sharing between institutions, assessment of risks inherent in complex products, calculation of the performance of individual institutions are becoming more complicated, operational risks are increasing, and the close relations between group members generate reputation risks towards each other.

Although clients bear the direct risk of savings placed with institutional investors, some of the risks are run by the financial institution itself, or they might be channelled to banks e.g. through guarantees. In respect of the increasingly popular investment funds with guaranteed yield and/or guaranteed capital, the guarantees are typically issued by the bank of the same group, therefore, the risk is transferred to the bank. Based on the underlying investment strategies and the currently low guaranteed yields, at the time being they do not generate considerable additional risks for the bank of the group. In case of life insurance companies, the guarantor is the insurer itself, therefore, the risk occurs at the insurance company. The available guaranteed yield (technical interest rate) is limited by legal regulations. This yield is low for new contracts, but the generation of higher guaranteed yields undertaken in the older contracts, which still have a large share in the portfolio because of their long maturity, could represent problems, stimulating insurance companies to change their current investment structure characterised with a high proportion of government securities.

In recent years, several banks have come up with special life insurance combined mortgage loan products. In terms of these contracts only the interest of the loan is paid directly to the bank by the client, while the principal is collected in a life insurance savings contract and is paid to the bank by the insurer upon the maturity of the loan (or on the pre-defined repayment dates). The insurance could be a simple general savings-type life insurance, but loans combined with unit-linked life insurance contracts are also available on the market. These contracts involve a significant risk because the value of the saving securing the loan heavily depends on money- and capital market trends. As the majority of such loans are FX-based while the unit-linked investment is normally put into forint instruments, the client assumes an FX exchange rate risk, as well as the market risk of the investment instrument. Accordingly, this type of combined product may significantly increase the credit risk of the bank. At present, the portfolio of loans combined with such instruments is still small, and therefore from a financial stability viewpoint the risk is small, but more attention must be paid if such constructions are used with increasing frequency.

The opposite direction of risk-transfer, namely the transfer of credit risk from banks to life insurers is currently represented only in the tie-in sale of insurance products where the insurance comprises an additional coverage for the loan (e.g. life-insurance, home-insurance, insurance against unemployment required or optionally offered to the loan), but this transfer only represents normal risk exposure for the insurers. The number of securitisation and credit-derivative contracts, which are widely used on foreign markets, is very low in Hungary, so still we do not have to expect significant amount of risks transferred this way.

Apart from risk transfer, another reason why the composition and performance of the investments behind the savings placed with institutional investors are important is that they influence the general trust in financial intermediation, the allocation of financial savings of households, and also have significant impact on money and capital markets.

Over the last few years, institutional investors followed a rather risk-averse investment policy, i.e. they kept a high proportion of low-risk instruments (government securities, bank deposits) in their portfolio. However, it seems that all three investor groups have begun to move towards a more diversified portfolio containing more risky instruments. The reasons behind this move include that life insurance companies must generate the guaranteed yield indicated above, pension funds must compete increasingly in terms of yields, the relative shortage in government securities on offer, as well as some important changes in legislation, too.

In the case of life insurance contracts, unit-linked products (where the client bears the whole risk of the investment) represent an ever increasing share; and there is a much more diversified portfolio behind their reserves than behind the reserves of traditional life insurances. As for investment funds, the flow between the various types of funds is fundamentally influenced by the retrospective yields and the risk appetite of investors. The outstanding growth of real estate funds in the last two years was the result of their favourable retrospective yields, but in consequence of the rapid growth the proportion of real estates decreased in their portfolio. The main concern about these funds is that there are too few low-risk real estate investment opportunities with acceptable yields on the Hungarian market, which may increase the dispersion of yields and lead to capital extraction.

A portfolio restructuring with the biggest impact should be expected in the case of private pension funds. According to the modified legislation, from 2007 private pension funds may choose to form different investment portfolios instead of the current single portfolio model, and from 2009 it will be a mandatory requirement for them to do so. In the new system, the savings of fund members kept in their individual pension accounts will be automatically invested into three portfolios involving different risks, depending on the expected number of years outstanding until the retirement date of the individual. The primary difference between these portfolios will be the share of equity investments. The members may decide to alter the type of portfolio automatically offered to them, but in the last five years they cannot choose the so called “growth portfolio” containing the highest rate of equity investments.

The new system will encourage funds to make use of the alternative investment opportunities more intensively, which gives the chance to earn higher yields in the long term. The limitation applicable for the last five years before retirement protects fund members from major losses in their last active periods, although this will give less room to offset any losses realised in an earlier unfavourable market environment as well.

As the private pension funds are important actors on the Hungarian government securities market, it is an important issue how the introduction of optional portfolios will affect their government securities holdings, and subsequently the yield of government securities. In the next few years, the equity investments of the funds are expected to rise significantly, while the share of government securities within the portfolio might be reduced from the current, approximately 70 percent by 15-20 percentage points. A decline in demand in case of a quick transition could boost government securities yields. However, as the rise in yields would have an unfavourable impact on the funds themselves, and as the transition can also be carried out gradually, without selling considerable volume of government securities, assuming reasonable behaviour by market participants we do not expect any considerable increase in government securities yields. On the other hand, the increase in the demand for shares would affect the Hungarian Stock Exchange only to a small extent, as the greater part of the demand would rather be reflected in the purchase of foreign shares.

Considerable income transfer towards the banking system

The fees and commissions paid by institutional investors to the banks and the groups' asset managers, custodians and other service providers represent considerable income transfers. The cross-selling of related products generates additional revenue both when it is a partnership within the same banking group or with an institution belonging to a different financial group.

Life insurance companies generally have good profitability. However, when (in many cases) the legal owner of the Hungarian insurance company is the foreign parent holding company and not the Hungarian bank of the same group, their profits are not included in the result of the Hungarian bank, but through cross-selling of products and from other forms of synergy they can create significant extra income for the Hungarian bank as well.

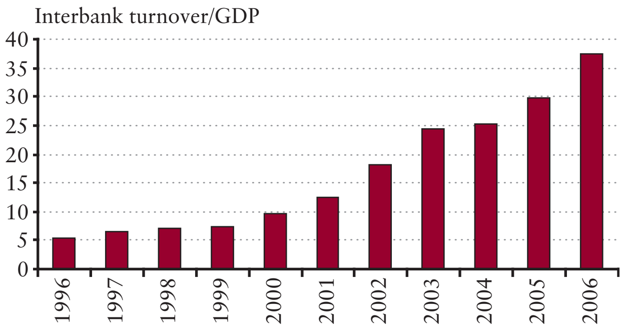
2.3. Risks of the payment and settlement system[76]

The inter-bank payment turnover is settled by VIBER and ICS (Interbank Clearing System), operated by MNB and GIRO Zrt., respectively. In 2006, the MNB systems (VIBER and the central bank's home accounting system) managed 93 per cent of the payments turnover in value while 99.6 per cent of the volume was processed in the ICS system.

The aggregate turnover of these systems is dynamically growing each year both in terms of value and volume. The aggregate turnover was 29.8 times GDP in 2005 and 37.6 times in 2006 (Chart 2-39).

Chart 2-39

Annual payment turnover compared to GDP



Source: CSO, MNB.

With regard to the three designated domestic payment systems (VIBER, ICS and KELER)[77], the liquidity risk has slightly increased only in the VIBER. The money and FX market turnover (domestic and off-shore HUF) has seen increasing volume in the last few years, and (depending on the chain of settlement banks involved) may finally reach the forint accounts kept with Hungarian banks. The (forint) money and FX market turnover is settled primarily in a few Hungarian banks with low balance sheet totals, and with potential liquidity risks. However, this risk is manageable, so it does not fundamentally influence the vulnerability of the systems. The operational risk[78] is still relatively small in the payment systems, and their availability ratio is higher than 99 per cent.

Beyond the fact that the settlement of FX market transactions (which do not contain exclusively forint related transactions) may involve potential liquidity risk in VIBER, it may also involve an other type of (credit) risk at the same time, namely, the so-called settlement risk[79].

2.3.1. VIBER

Liquidity risk

The VIBER architecture excludes the credit risks, as based on the gross settlement principle, it only settles transactions if in which enough funds are available. However, liquidity risk (temporary liquidity shortage) may emerge, and a liquidity shortage may lead to queuing, or even gridlock, as well as the rejection of uncovered transactions at the end of the day. Liquidity management is the responsibility of VIBER participants, but they are supported with the services of the system in this task (central queue management, gridlock resolution, priority management, intra-day credit facility, real-time messages and monitoring functions).

In 2006, the average daily payment turnover – also including the turnover of ICS – was 3.75 times the daily liquidity (i.e. the total of the bank's account balance and its credit line). This indicator varied between 3.36 and 4.45 on a monthly basis, while in 2005 the coverage ratio was 3.05 on average. The indicator increased because the 36.8 per cent increase in turnover was accompanied with a lower, 10.1 per cent increase in liquidity.

The analysis of the data of banks with the largest turnover provides a better picture about liquidity risk. The active participants in the money market are typically banks which do not have the highest balance sheet totals. During the year,

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[75] In Hungary, there are three systemically important systems. These systems are the following: VIBER (Real-time Gross Settlement System) operated by the central bank for large value, urgent payments, BKR (Inter-bank Clearing System) operated by GIRO Elszámolásforgalmi Zrt. for retail payments and the securities clearing and settlement system operated by KELER Zrt., which currently also includes the functions of the Central Securities Depository (CSD) and the Central Counterparty (CCP). MNB acts as settlement agent for ICS and KELER.

[76] Liquidity risk in the payment systems: the risk that one of the parties obliged to pay does not fulfil his payment obligation when due either in part or in full.

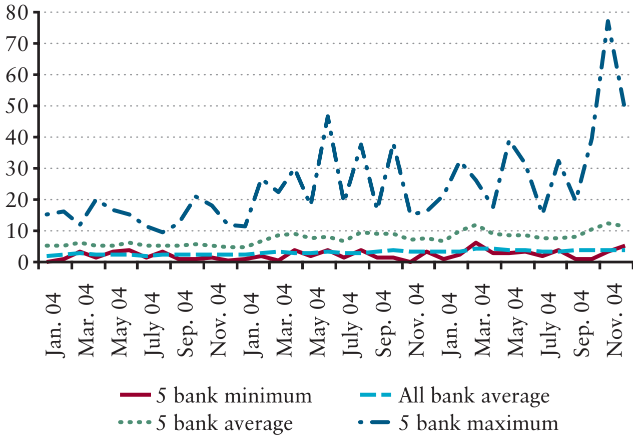
[77] Operational risk of the payment systems: the risk that the payment and/or settlement system does not work at all or partially because of inadequate or malfunctioning of the IT systems, erroneous internal processes, human negligence or external factors (e.g. deliberate damages or a natural disaster).

[78] For more information, see Box 2-5.

the annual average coverage ratio of the five banks with the highest turnover (63 per cent of the total turnover) was 9.4. It is unfavourable that the coverage ratio is increasing compared to the previous years and it varies between larger extremes (Chart 2-40).

Chart 2-40

Average coverage of the five banks with the highest turnover and extreme coverage figures compared to the average coverage of all banks



Source: MNB.

The uncovered payment orders are put in a queue by the system. The total of transactions in the queue increased more than the payment turnover increased and approximately 85 per cent of them were concentrated to the five banks with the highest turnover, which was higher than their overall participation in the turnover

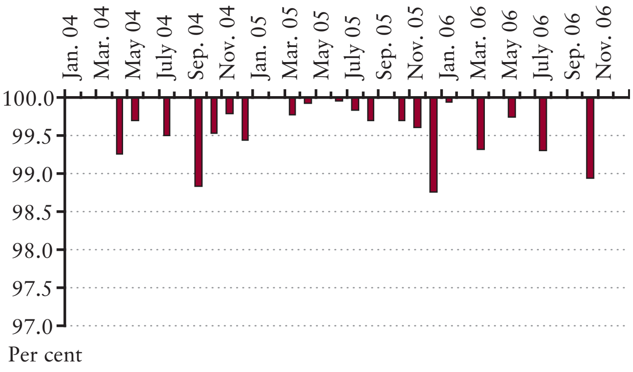
The intra-day queues relate to the increase of average (and largest) individual values and distribution of payment orders during the day. Banks with high turnover generally initiate their orders later, however there was no congestion at the end of the day. Only 6-7 per cent of the turnover was recorded in the last hour of business day. In terms of liquidity, the degree of queuing and coverage are acceptable yet. However, it is detrimental that in 2006 the number (26 items) and value (HUF 218 billion) of uncovered items rejected at the end of the day increased.

Operational risk

The availability of VIBER was 99.77 per cent last year, which corresponded to the availability level of the previous years (Chart 2-41). The 5-hour disruption was caused by one late start and five shutdowns during the day. No system disruption lasted more than two hours. Apart from unavailability, there were some specific errors too, which only slowed down the service. Operational problems did not impose a threat on the completion of the business day. The contingency system did not have to be used at all.

Chart 2-41

VIBER availability



Source: MNB.

Box 2-5: FX settlement risk management in Hungary[80]

In April 2006, the MNB launched a survey on FX settlement risk arising in the Hungarian banking sector. The MNB distributed the questionnaire to 15 banks, which proved to be the most active based on their FX turnover data and covered more than 95 per cent of the market.

The settlement risk in general means that the clearing and settlement arrangements do not guarantee for a bank that the completion of the sale side of its transaction should only be effected only if the asset purchased by it has been delivered. If the underlying assets are various currencies, there is an FX settlement risk. Similarly to other types of credit risk, the FX settlement risk can be characterised by its source (the counterparty, its liquidity features and creditworthiness), size and duration.

A bank's exposure while settling a FX transaction equals the face value of the currency purchased and lasts from the time a payment instruction on the delivery of the currency sold can no longer be cancelled unilaterally, until the time the reconciliation of the messages on delivery of the currency purchased proves that the purchased amount has been received with finality. The exposure also includes unsettled transactions. This exposure may be mitigated with different

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[80] The second MNB report is expected to be published in May. The first report is available on the MNB website: Magyar Nemzeti Bank (2001): Management of FX settlement risk in Hungary.

Table 2-3

Data on actual durations of exposures by chosen currency pairs for 5 banks subject to most of the FX settlement exposures in the Hungarian banking sector

(2006)

Sold currency	Purchased currency	Actual durations of exposures (hours)				Time difference (hours)
		Max.	Min.	Average	Std. deviation	
CHF	HUF	24.5	4.5	12.9	10.2	0
HUF	CHF	26.0	24.0	24.5	0.7	0
EUR	HUF	3.5	1.0	1.1	1.0	0
HUF	EUR	26.0	24.0	24.5	0.7	0
USD	HUF	6.0	0.0	1.8	2.6	-6
HUF	USD	26.0	1.0	20.3	10.8	6
EUR	USD	20.0	0.0	14.3	8.1	6
USD	EUR	22.0	12.0	16.6	3.8	-6

Note: The difference between the time zones of the sold and purchased currencies.
Source: MNB.

clearing and settlement arrangements requiring conditional settlement or bilateral or multilateral agreements enforceable by law, which reduce the amounts to be settled. It follows from the definition of the exposure that the duration of risk in terms of a currency pair lasts from the time of remittance of the sold currency until the receipt of the purchased currency has been reconciled.

The preliminary results of the survey showed that in the Hungarian banking sector the FX transactions are settled via traditional methods (via correspondent banks involving settlement risk). The surveyed credit institutions face an average daily FX settlement exposure of USD 7,423.2 million[81] amounting 6.6 per cent of GDP in 2006 at current prices. The individual figures showed that the majority of the FX settlement risk was concentrated at a small number of credit institutions. If the exposure the banks with the highest shares face is compared to the equity capital, it turns out that the exposure is several times the Tier1 capital as well as the regulatory capital. The survey did not only indicate that the FX settlement risk was concentrated according to the Hungarian banks bearing it, but also that it is related to a small number of counterparties. Most of those counterparts are foreign financial institutions including many parent banks.

Similarly to findings of the survey in 2000 in the case of the analysed currency pairs the average duration is longer than one day, but still remaining within two days.[82] Looking only at the data of the Hungarian banks active on the FX markets and therefore carrying a considerable percentage of FX settlement risk (Table 1), we found that whenever HUF was purchased and often-used currencies (such as EUR or USD) were sold, the settlement risk lasted only for a few hours. On the other hand, in a reverse relation the duration was around 20 hours, which was mostly due to the morning reconciliation procedures and the assumption that payment instructions sent to VIBER could no longer be cancelled after the system's opening.

In its previous report, the MNB provided specific recommendations to be followed by the banks based on which only a few small steps have been taken by the banking sector. However, the settlement limit has been already introduced in all the banks taking part in the questionnaire exercise, but the banks themselves admitted that they applied 'looser' risk management principles in setting such limits. This is due to two facts: 1) Hungarian banks still consider the FX settlement risk arising only and ceasing already at the value date; and 2) parent banks play a very important role among Hungarian banks' counterparties and nearly 50 per cent of the interviewed banks do not consider their own parent banks risky. Management of the FX settlement risk within the value date cannot be justified based on the timing of reconciliation (morning following the value date). This means that the FX transactions cease to use up limits even before the bank makes sure of final receipt of the purchased currency. Only two of the interviewed banks charged back the unsettled transactions to the settlement limit, and these banks are not among those with the highest shares in FX settlement risk.

The completed questionnaires and interviews suggest that banks are ignoring the recommendations of the MNB and willing to take FX settlement risk several times to equity capital as a result of two factors. On the one hand, the realisation of the FX settlement risk is too abstract, and thus Hungarian banks do not think of it as a real threat, and on the other hand, according to their applied risk management principles, their parent bank can be seen as a risk-free counterparty. This may explain the situation that the Hungarian credit institutions consider the estimated benefit too small compared to the expected costs in the case of most of the MNB recommendations.

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[81] As we found some uncertainty in the data collected in the questionnaire (FX settlement risk exposure and duration), it is important to note that each conclusion of the analysis should be treated with caution because any interpretation of collected information strongly depends on the quality of the underlying data.

[82] The weekends and occasional public holidays were not taken into account, so the duration could be even longer.

2.3.2. ICS

Liquidity risk

Liquidity risk in ICS is negligible, because the turnover is significantly smaller than the available liquidity. As in the framework of ICS settlement the incoming payments of a bank also cover the outgoing ones, it is sufficient to cover the net liabilities. Banks in credit positions may send their transactions without providing additional coverage, because the incoming payments themselves generate sufficient liquidity for their settlement. In addition, for banks in debit positions the liquidity requirement for their settlement obligations is much lower than they currently have in the system. This is due to several factors. As ICS and VIBER work without overlapping business hours, the participants do not have to share their liquidity between the two systems. Based on the mandatory reserve requirement, they must keep the required monthly average reserve balance, as components of which their daily closing balances are included in the liquidity available in ICS. On the other hand, they have access to the credit facility of the central bank as additional component of their liquidity, covered by eligible assets. Of course, these collaterals during the ICS business hours are not negotiable they cannot be used for settlement of securities transactions which means that the opportunity cost of pleding of these papers is close to zero.

Beyond the calculations based on the data resulting from the above normal operation, the simulation exercises executed by the central bank concerning the ICS showed that the system has ample liquidity compared to the required liquidity level and in general it would be able to stand the fall of the largest 10 participants, generating approximately 70-90 per cent of the turnover. Based on these facts, it may be firmly stated that the probability of the roll-on effect of individual liquidity problems in ICS is negligible.

Operational reliability

The ICS system has rather high technical reliability. Because of the duplicated hardware components and communication channels, the technical faults and line unavailability cannot have any impact on the availability of the system; therefore it was 100 per cent for the last two years.

2.3.3. KELER

In the securities clearing and settlement system operated by KELER Zrt. primarily operational risks – i.e. risks arising from deficiencies in IT systems or adequate controls, human errors or management failures – can trigger potential vulnerability, in particular because the Hungarian post-trading securities infrastructure is highly integrated.

Operational risk

The regular monitoring of the operation of KELER Zrt., its assessment against international standards[83] and the conclusions of its auditors have all focused on operational risks inherent in the system. The management of operational risks is of high priority because, on the one hand, they can exacerbate liquidity and settlement risks and on the other, they can also cause direct disruptions in the services provided for its participants (issuers, investors).

Direct service disruptions occurred more frequently and for longer periods of time during the daily operation of KELER Zrt. in 2006 than in 2005. Consequently, the operational reliability of the integrated system and the availability ratio indicating direct service disruptions for participants was 99.1 per cent in 2006, lower than in the previous year (99.5 per cent). From a stability aspect, this level of availability may still be acceptable.

In order to stop the observed negative tendency, and to strengthen its operational reliability KELER Zrt. began to take steps in 2006, including, inter alia, the testing of business continuity and disaster recovery plans, the improvement of business continuity infrastructure conditions and the methodological revision of the management and evaluation procedures applied to operational disruptions.

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[83] The result of the comprehensive assessment was covered in the *Report on Financial Stability* (April 2006), http://english.mnb.hu/Engine.aspx?page=mnben_stabil&ContentID=7876.

Integrity of the Hungarian securities clearing and settlement infrastructure

The securities clearing and settlement infrastructure is uniquely integrated in Hungary even in an EU comparison. As a Central Securities Depository, KELER Zrt. blocks the securities as collaterals of central bank loans granted for monetary policy operations and for payment system purposes in favour of the central bank. As a single institution, KELER clears securities transactions concluded on the Budapest Stock Exchange. It also acts as a Central Counterparty for both spot and derivative transactions, so in case a system participant defaults, KELER guarantees settlement with its own capital, too. Since the post-trading securities infrastructure is operated by a single company, under extreme market conditions the Central Counterparty function of KELER may jeopardize the operation of the Central Securities Depository and this disturbance may potentially spill over to systemically important payment systems (VIBER, ICS). Consequently, the potential risk arising from the integrity of KELER can be eliminated by fully separating the Central Counterparty and Central Securities Depository function. In order to foster this separation, KELER began working on the separation of these functions in 2006, with the involvement of the organisations concerned (MNB, Ministry of Finance).

In summing up, it may be concluded that the measures promoting the effective management of operational risks and the work related to the separation of KELER functions still did not have a favourable effect in 2006. These measures will strengthen the stability of the securities clearing and settlement system primarily the mid-term perspectives.

2.3.4. MEASURES INCREASING THE STABILITY OF THE PAYMENT AND SETTLEMENT SYSTEMS

Regulatory activity

Last year, three decrees of the Governor of the MNB, relevant for the stability of the payment and settlement systems, were published. The Decree of the Governor of the MNB No. 2/2006 (II.15.) supplements the provisions of the Act on the Capital Markets applicable to the business terms and conditions and other regulations of organizations providing clearing house activities and to the guarantee and collateral systems operated by them. At the same time, on the basis of decision of the Monetary Council it also ensures that the provisions of these regulations also comply with the principles and requirements stated in the 'Recommendations for securities settlement systems' issued by CPSS-IOSCO in November 2001.

In addition, the Decree of the Governor of the MNB No.11/2006 on the requirements of the business terms and conditions and other regulations of automated clearing houses was prepared taking into account the principles and requirements stated under several applicable international recommendations, including, e.g., the BIS publication 'Core Principles for Systemically Important Payment Systems' published in January 2001 and the guidelines of ECB related to TARGET.

Finally, in respect of payment services new regulations were issued in November 2006: Government Decree No. 227/2006 (XI. 20) on payment services and electronic payment instruments and the Decree of the Governor of the MNB No. 21/2006. (XI. 24.) on carrying out payment transactions, the latter closely related to the government decree. The legislative work included among others the comprehensive review of the previous regulations, with special consideration to the practical problems and proposals raised by the market participants since the regulations adopted in 2001, the development of payment methods and payment instruments, the purpose of making easier bank changes and the full complience with EU law in respect of credit transfers between Member States and transactions executed by electronic payment instruments.

Fees and charges

The policy of the central bank regarding fees and charges aims to improve the efficiency of payment and settlement systems and boost competition between market participants. However, these efforts could not be felt by the clients of credit institutions at all, or only very slightly, even in 2006.

The banks did not follow MNB's practice in the gradual reduction of the VIBER fees charged to them and left the fees of their VIBER transfer services unchanged.

Earlier ICS applied fees and charges depending on the value of transactions which were converted into fixed fees by gradually combining the minimum and maximum values. The MNB thought that the profit margin of these fees was too high and, acting in its overseer's role, it achieved that the key owners of the automated clearing house (a few commercial banks) reduce the expected profit margin and introduced a mechanism in 2007, whereby any amount over the expected profit is returned to the client in the form of fee refund.

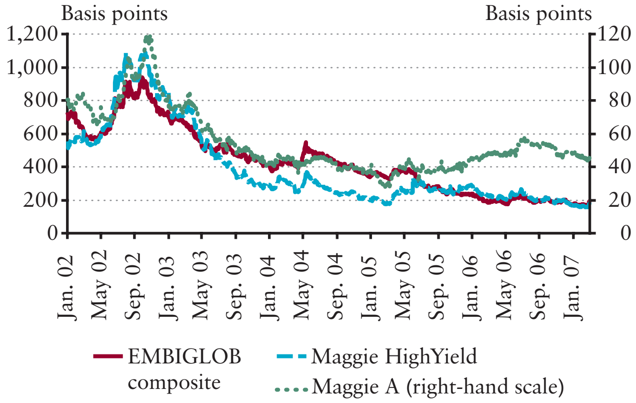
In 2006, KELER signed the European Code of Conduct for Clearing and Settlement promoted by the European Commission. In addition to increasing integration between central securities depositories of the European Union and promoting mutual account management conditions between them, the objective of the Code is to foster competition through achieving transparency of service prices and facilitating the comparison of these prices. Ultimately, greater competition can lead to lower fees and charges.

Appendix

Macroeconomic and financial market environment

Chart 1

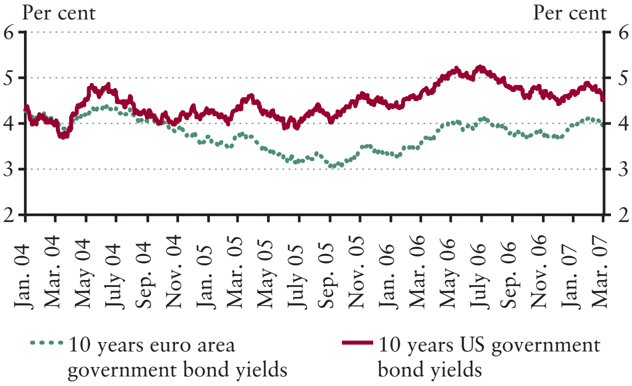
Global risk indicators



Source: J.P. Morgan-Chase, Thomson Financial Datastream.

Chart 2

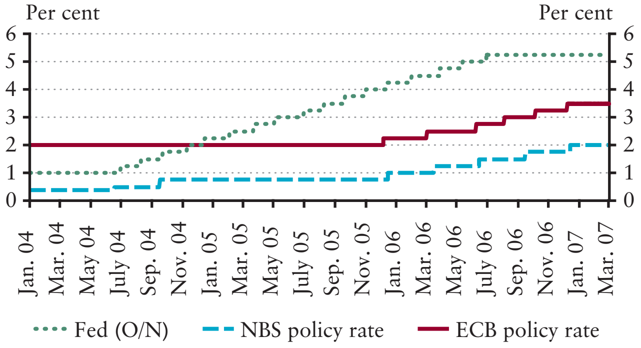
Long-term USD and EUR bond yields



Source: Thomson Financial Datastream.

Chart 3

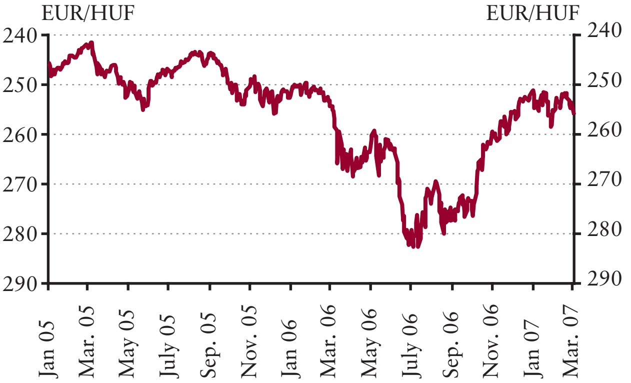
Policy rates of the Fed, the ECB and the NBS



Source: Thomson Financial Datastream.

Chart 4

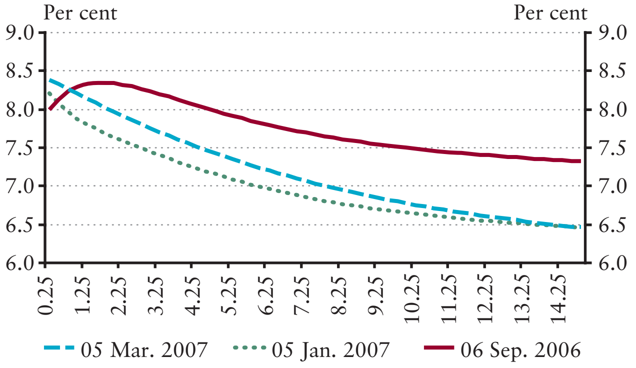
The exchange rate of the forint



Source: MNB.

Chart 5

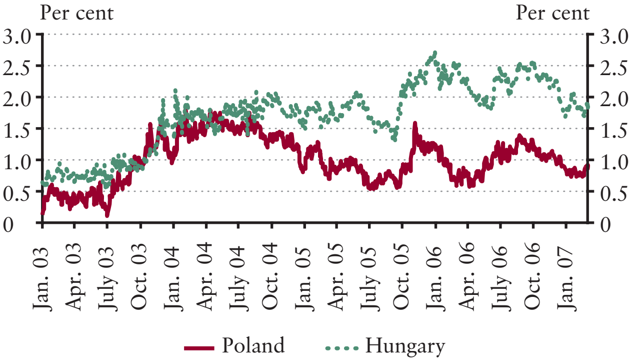
The development of the zero-coupon yield curve



Source: Reuters and MNB.

Chart 6

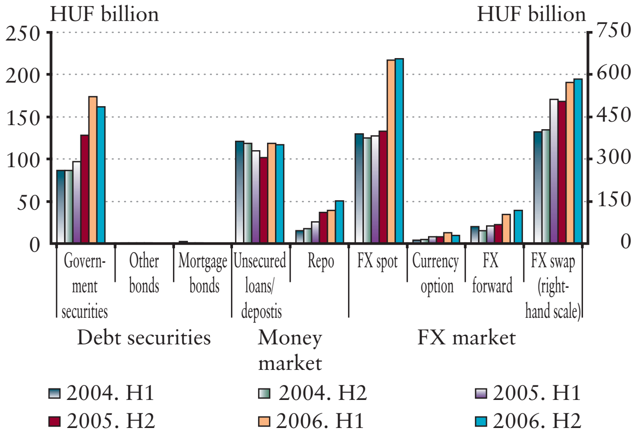
Development of 5 year implied forward spread 5 year ahead



Source: Reuters and MNB.

Chart 7

Average daily secondary market turnover of certain segments of Hungarian financial markets

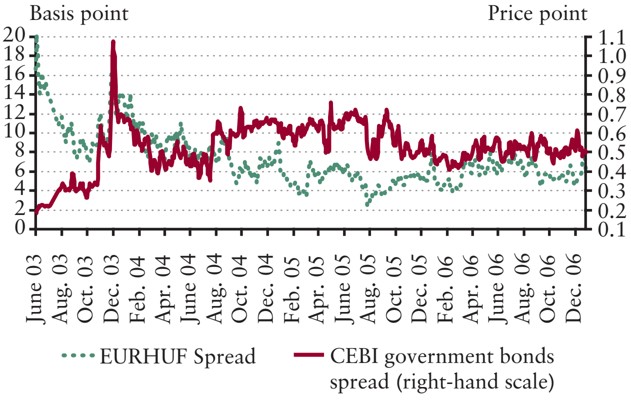


Source: MNB.

Chart 8

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

(5-day moving average)

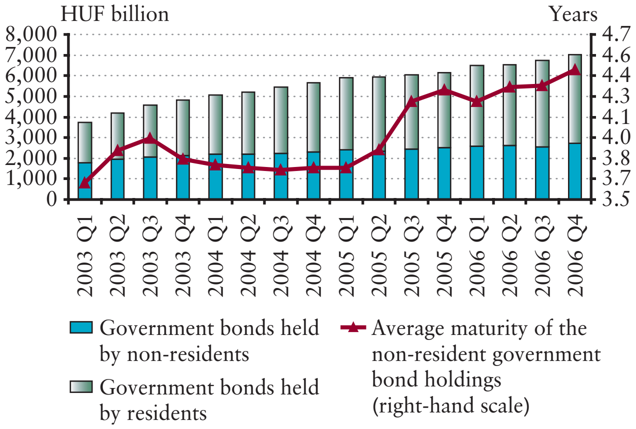


Source: Reuters, DRKW.

Chart 9

Distribution of the outstanding amounts of the HUF government bonds by resident/non-resident

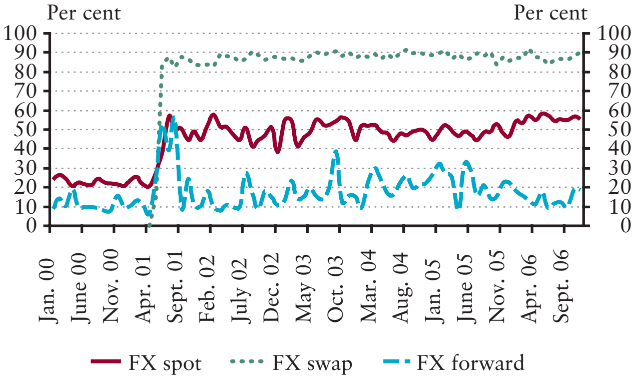
(average of daily outstanding amounts)



Source: ÁKK Ltd., MNB.

Chart 10

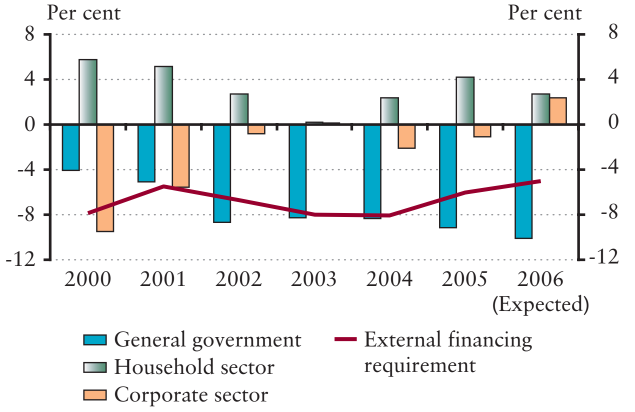
Share of non-resident market participants in the Hungarian FX market turnover



Source: MNB.

Chart 11

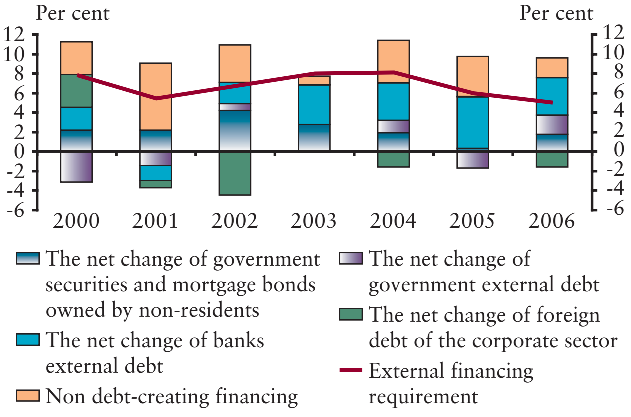
Net lending of sectors and the external financing requirement as a proportion of GDP



Source: MNB.

Chart 12

External financing requirement and its financing as a percentage of GDP



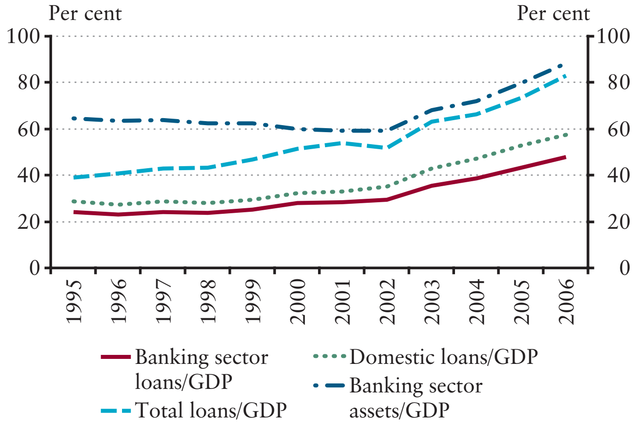
Source: MNB.

Indicators of financial stability in the banking sector

Chart 13

Financial Depth Indicators

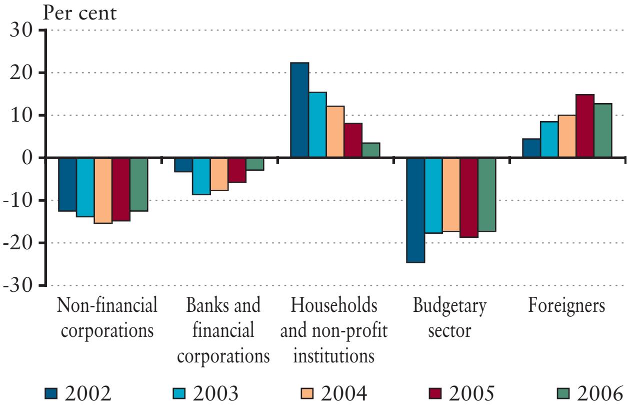
(in per cent of GDP)



Source: CSO and MNB.

Chart 14

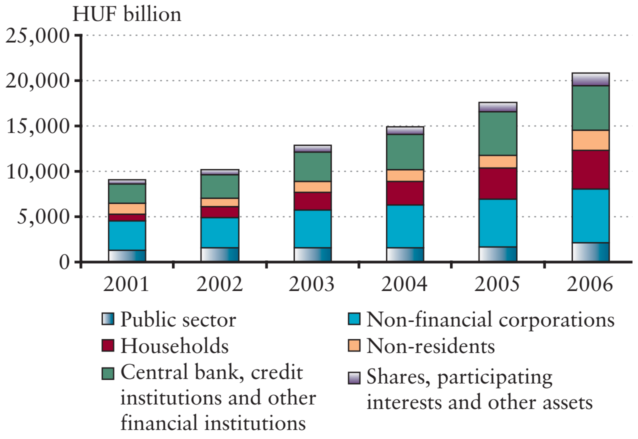
Net financial positions of different sectors vis-à-vis domestic banking sector



Source: MNB.

Chart 15

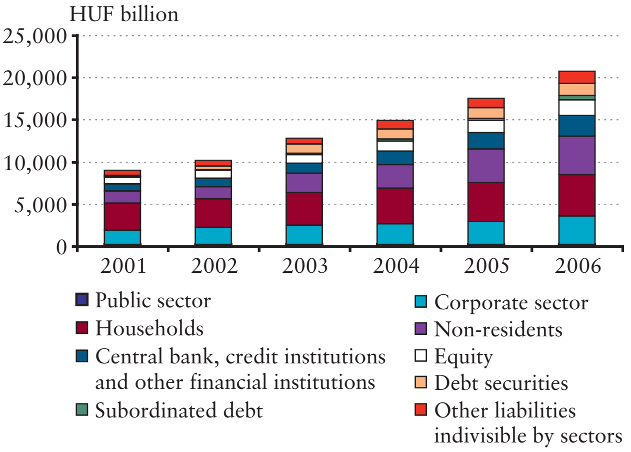
Banking sector assets



Source: MNB.

Chart 16

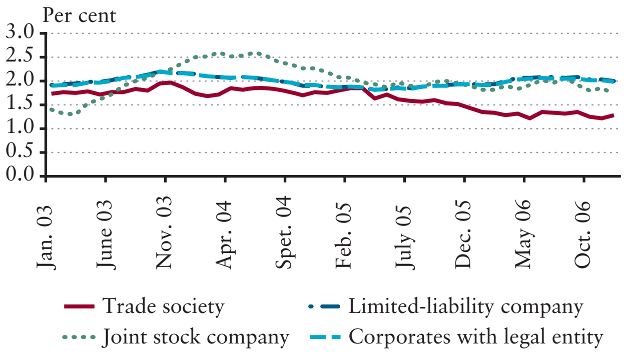
Banking sector liabilities



Source: MNB.

Chart 17

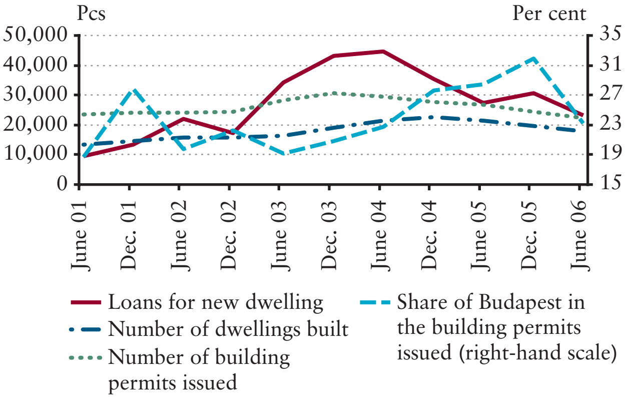
Annual bankruptcy rates for incorporated business



Source: Opten Kft. and CSO.

Chart 18

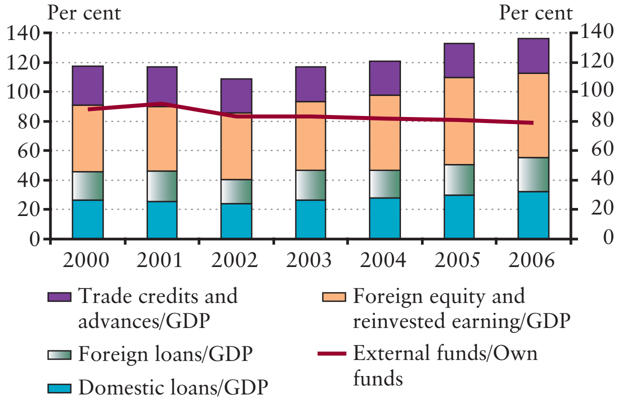
Housing market indicators



Source: CSO and DEM.

Chart 19

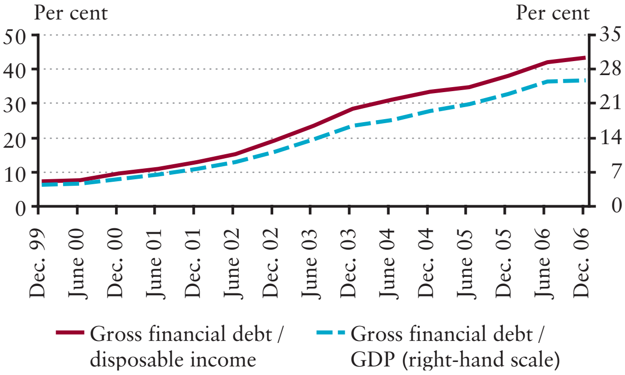
Indebtedness of non-financial corporations



Source: MNB.

Chart 20

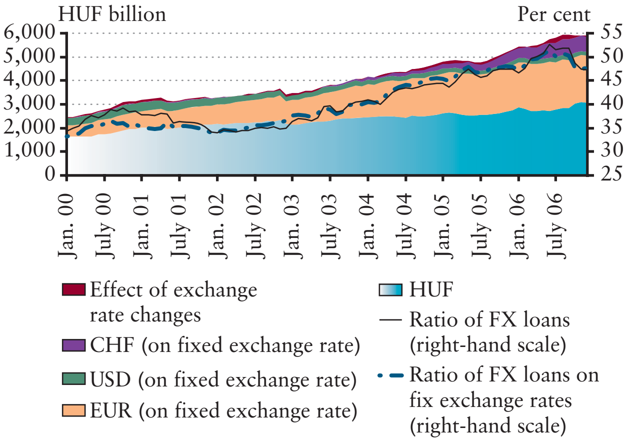
Household sector's indebtedness



Source: CSO and MNB.

Chart 21

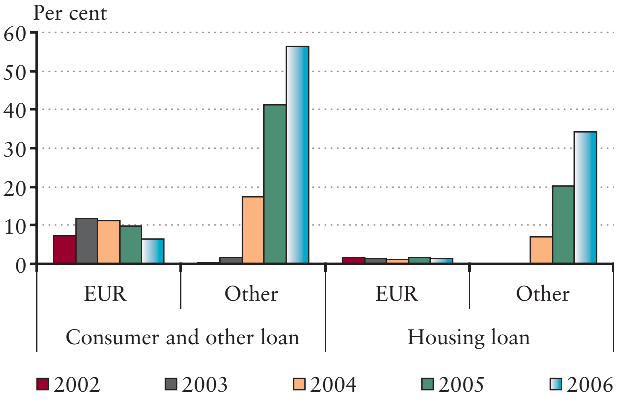
Denomination structure of the non-financial corporations' domestic lending



Source: MNB.

Chart 22

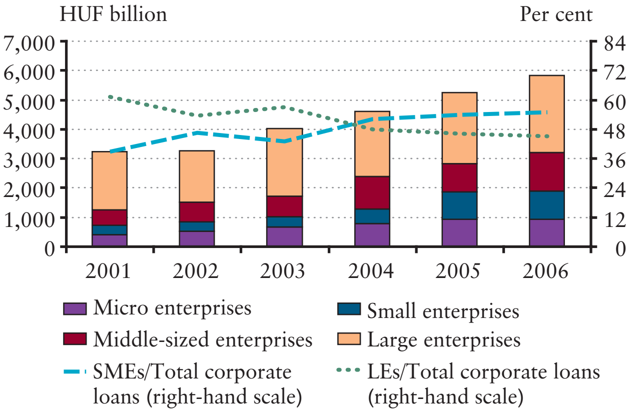
Denomination of household banking loans



Source: MNB.

Chart 23

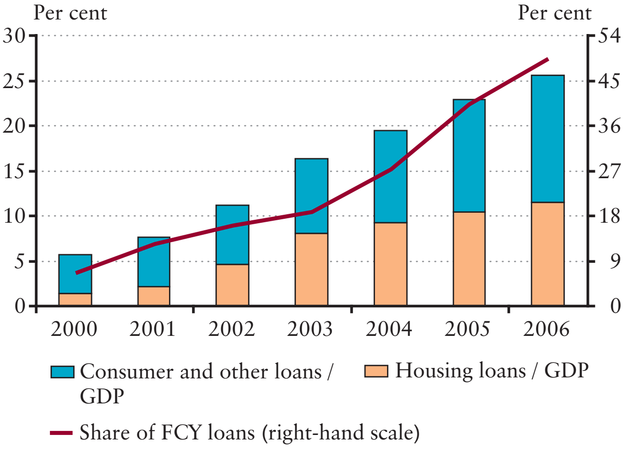
Distribution of non-financial corporate lending by company size



Source: MNB.

Chart 24

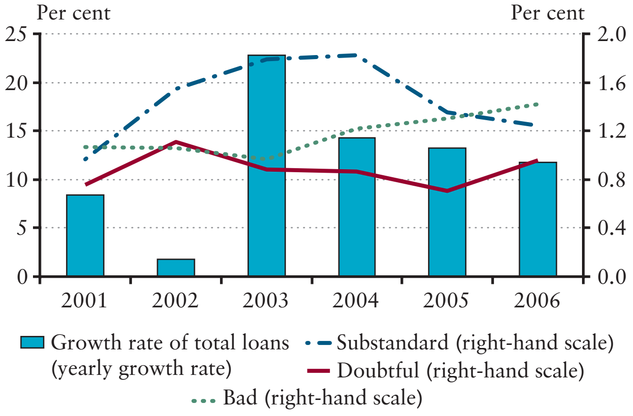
Growth and composition of household loans



Source: CSO and MNB.

Chart 25

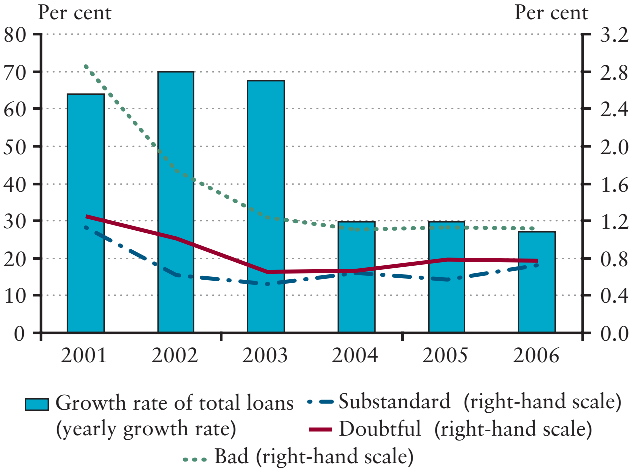
Portfolio quality of loans to non-financial corporations



Source: *MNB.*

Chart 26

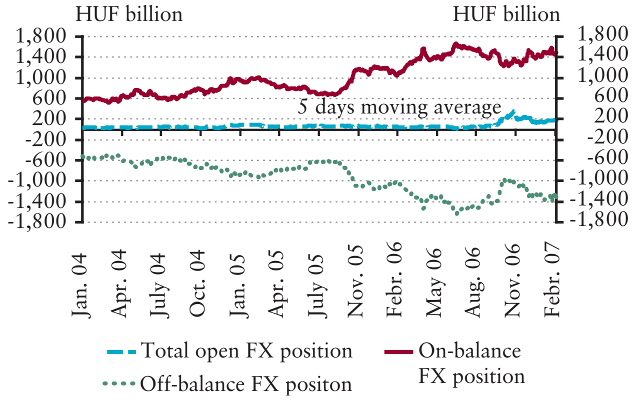
Portfolio quality of loans to households



Source: *MNB.*

Chart 27

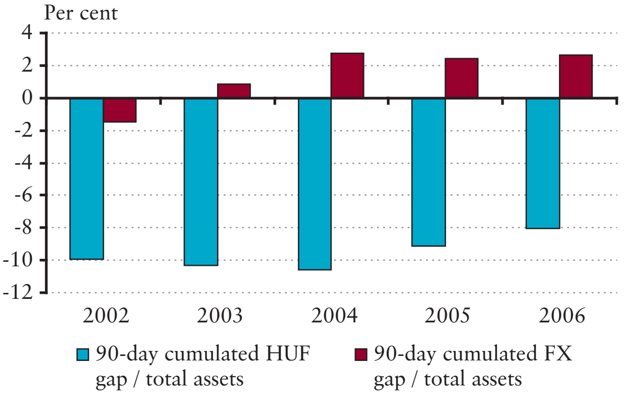
FX position of the banking sector



Source: *MNB.*

Chart 28

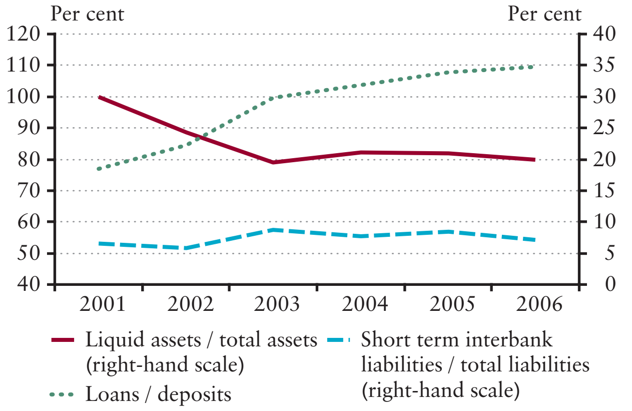
Banking sector interest rate risk



Source: *MNB.*

Chart 29

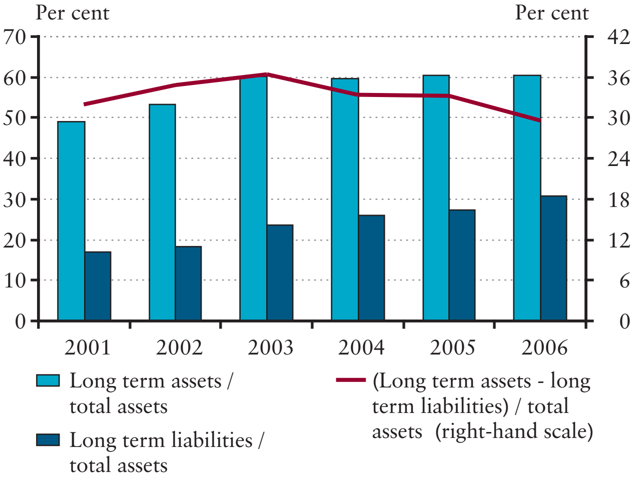
Liquidity indicators of the banking sector



Source: *MNB.*

Chart 30

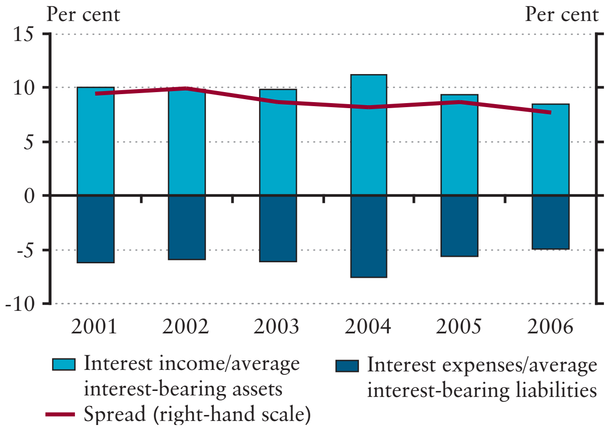
Long-term assets and liabilities of the banking sector



Source: *MNB.*

Chart 31

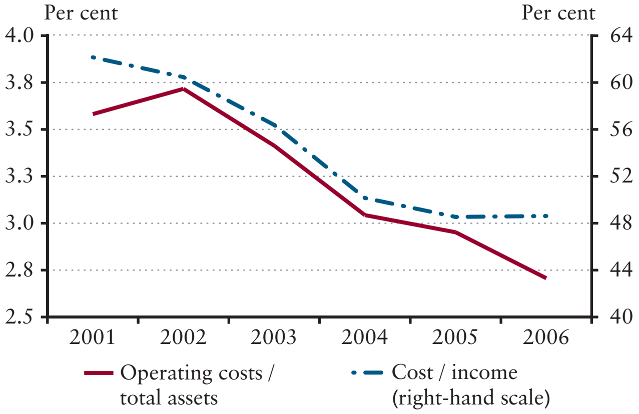
Spread and its components



Source: MNB.

Chart 32

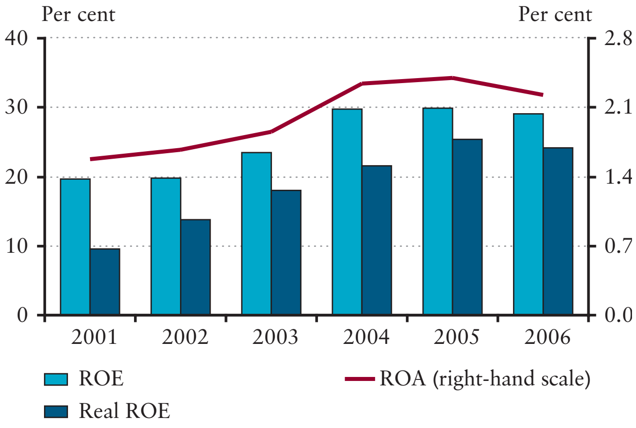
Cost-efficiency indicators of the banking sector



Source: MNB.

Chart 33

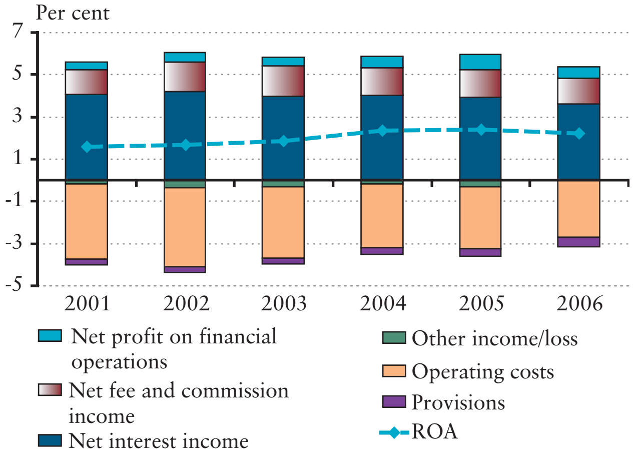
Banks' return on assets and return on equity



Source: MNB.

Chart 34

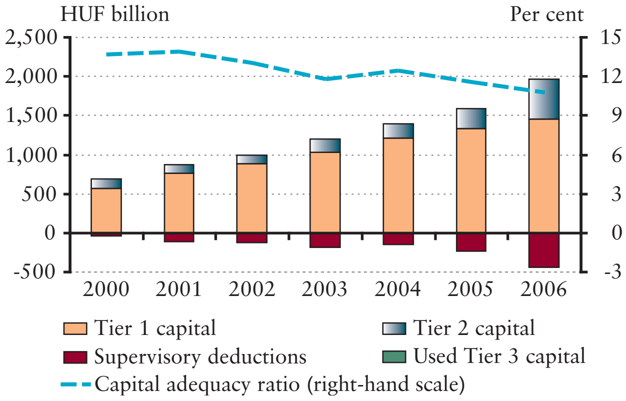
Components of pre-tax profit as a ratio of balance sheet total



Source: MNB.

Chart 35

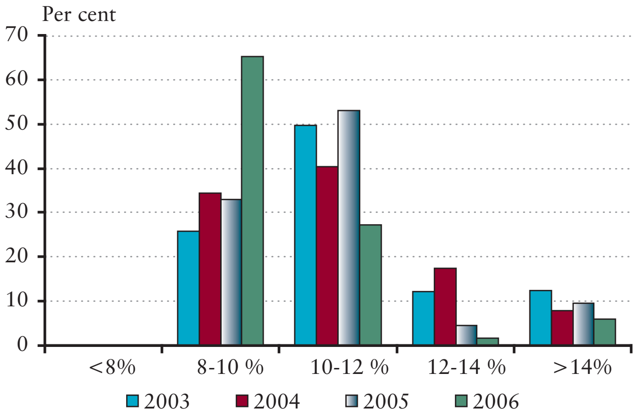
Banking sector own funds and capital adequacy



Source: MNB.

Chart 36

Dispersion of banks' risk weighted assets by capital adequacy ratios



Source: MNB.

Notes to the Appendix

The chart date (..., 2005, 2006) means the end of the year (the 31st of December) if it not indicated otherwise.

Chart 1: EMBI Global Composite – the index of sovereign and quasi-sovereign issuers' USD-denominated bonds, as calculated by JP Morgan-Chase.
MAGGIE – the index of euro-denominated government and corporate bonds as calculated by JP Morgan-Chase.

Chart 8: The EURHUF 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 spread of the Dresdner Kleinwort Wasserstein (DRKW).

Chart 13: Domestic loans – loans to non-financial corporations and households.
Total loans – domestic and foreign loans to non-financial corporations and households.

Chart 14: As a proportion of the balance sheet total.

Chart 15: Up to May 2001, private entrepreneurs are included in the corporate sector, as of June 2001, the are classified into the household sector. Up to May 2001 the household sector contains only household data

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Chart 17: Number of companies against which bankruptcy and liquidation procedures were initiated during the previous 12 months, as a percentage of the total number of companies.

Chart 22: The line termed 'other' contains loans denominated mainly in Swiss franks.

Chart 23: Due to a change in the definition of small, medium and micro-enterprises, the 2005 data are only partially comparable to earlier ones.

Chart 24: Consumer credit: including overdraft and loans granted for the purposes of purchasing securities.
Denomination of loans provided by financial enterprises is based on MNB estimation.

Chart 27: The positive value denotes a long FX position.

Chart 29: Liquid assets: cash and settlement accounts, T-bill and T-bond holdings, securities issued by the central bank, short term deposits and short term claims on foreign banks.

Chart 30: Liabilities with maturity over a year: excluding shareholders' equity and provisions.

Chart 31: Spread: Interest income/average interest-bearing assets – Interest expenses / average interest-bearing liabilities.

Chart 32: Income is the sum of net interest income, net non-interest income, net profit on financial operations and dividends received.

Chart 33: ROE: Pre-tax profit / (average shareholders' equity – Profit or loss for the financial year). ROA: Pre-tax profit / average balance sheet total.

Chart 35: Until 05/2001 deductions due to holdings in and subordinated loans granted to credit institutions, financial enterprises, investment firms and insurance companies were subtracted from Tier 1 capital.

Report on Financial Stability
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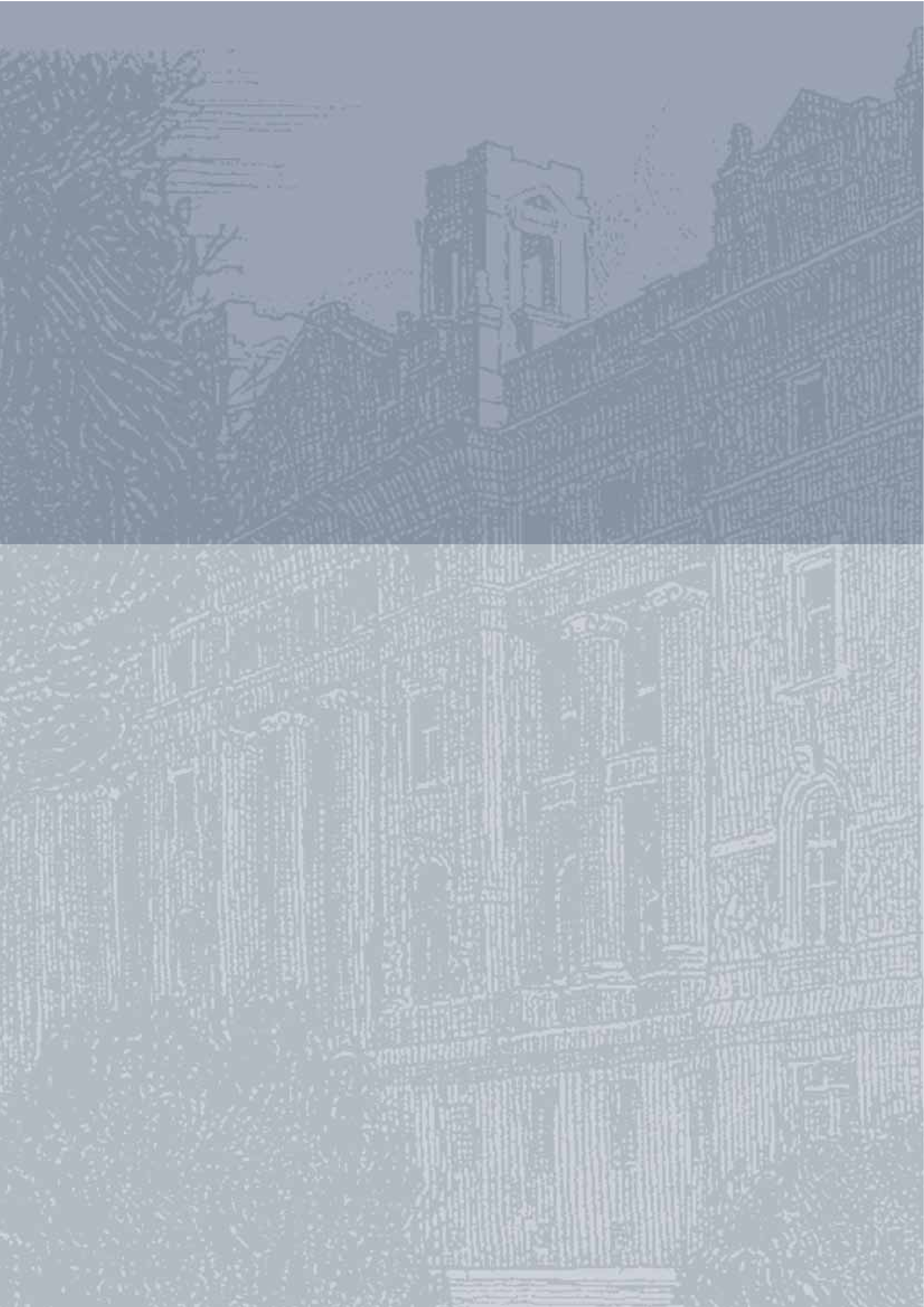Print: D-Plus
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