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# FINANCIAL STABILITY

CROATIAN NATIONAL BANK

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# Financial Stability

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# Introductory Remarks

Finance plays a key role in the allocation of resources, i.e. the process of transforming savings into investments, and therefore in economic growth and an increase in the overall level of social welfare. At the same time, because financial stability is based on the confidence of financial market participants, it largely depends in turn on their perceptions and behaviour, which are subject to cyclical swings. As financial crises create considerable economic and social costs, the maintenance of financial stability has the character of a public good and is thus an important economic policy objective.

Financial stability is characterised by the smooth functioning of all financial system segments (institutions, markets, and infrastructure) in the resource allocation process, in risk assessment and management, payments execution, as well as in the resilience of the system to sudden shocks. This is why the Act on the Croatian National Bank, in addition to the main objective of the central bank – maintenance of price stability and monetary and foreign exchange stability – also lists among the main central bank tasks the regulation and supervision of banks with a view to maintaining the stability of the banking system, which dominates the financial system, as well as ensuring the stable functioning of the payment system. Monetary and financial stability are closely related – monetary stability, which the CNB attains by the operational implementation of monetary policy, performing the role of the bank of all banks and ensuring the smooth functioning of the payment system, lowers risks to financial stability. At the same time, financial stability contributes to the maintenance of monetary and macroeconomic stability by facilitating efficient monetary policy implementation.

The CNB shares the responsibility for overall financial system

stability with the Ministry of Finance and the Croatian Financial Services Supervisory Agency (HANFA), which are responsible for the regulation and supervision of non-banking financial institutions. Furthermore, owing to the high degree of banking system internationalisation, which is reflected in the foreign ownership of the largest banks, the CNB also cooperates with the home regulatory authorities and central banks of parent financial institutions.

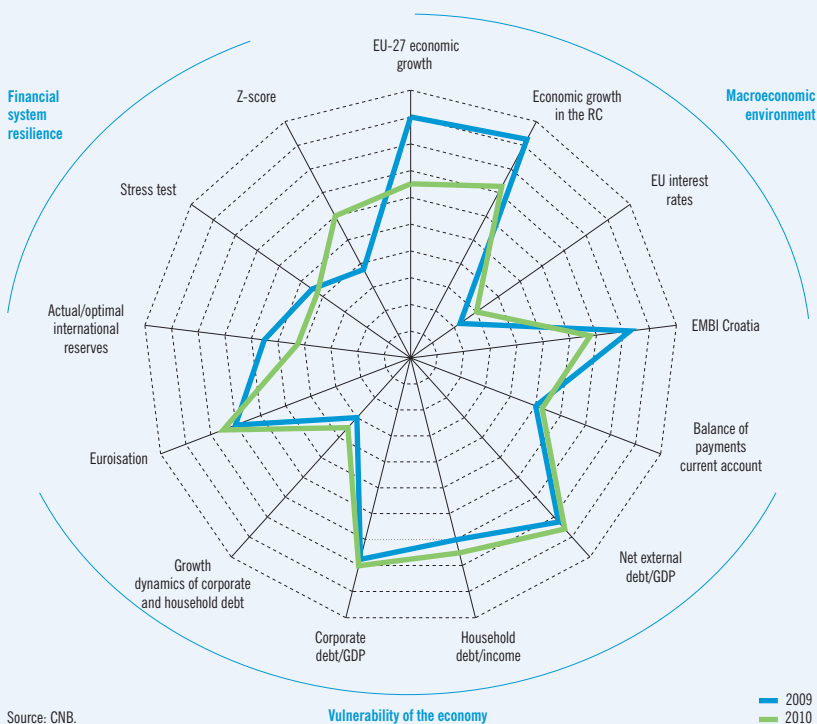
The publication *Financial Stability* analyses the main risks to banking system stability stemming from the macroeconomic environment of credit institutions and the situation in the main borrowing sectors, as well as credit institutions' ability to absorb potential losses should these risks materialise. Also discussed are CNB measures to preserve financial system stability. The analysis focuses on the banking sector due to its predominant role in financing the economy.

The purpose of this publication is systematically to inform financial market participants, other institutions and the general public about the vulnerabilities and risks threatening financial system stability in order to facilitate their identification and understanding as well as to prompt all participants to take adequate safeguards should these risks actually occur. It also aims at enhancing the transparency of CNB actions to address the main vulnerabilities and risks and strengthen financial system resilience to potential shocks that could have significant negative impacts on the economy. This publication should encourage and facilitate a broader professional discussion on financial stability issues. All this together should help maintain confidence in the financial system and thus its stability.



# Overall Assessment of the Main Risks and Challenges to Financial Stability Policy

Figure 1 Financial Stability Map



Source: CNB.

The stabilisation of financial markets and the gradual economic recovery in the environment that started in 2009 and continued into 2010 will reduce risks to the financial system. A combination of less severe shocks in the macroeconomic environment and stronger buffers should enable banks better to cope with the impact of the financial crisis manifested in the steady growth in bad loans and the slightly increased system vulnerability, so that financial sector stability should remain satisfactory.

The main financial stability indicators for Croatia are summarised in Figure 1. The financial stability map shows changes in key indicators of the possibility of occurrence of risks related to the domestic and international macroeconomic environment and vulnerability of the domestic economy, as well as indicators of financial system resilience that can eliminate or reduce the costs should such risks materialise. The map shows the most recent market developments or projections of selected indica-

tors and their values in the comparable period, i.e. the previous year. For each variable, an increase in the distance from the map centre indicates greater risks or system vulnerability and lesser resilience, as well as a greater threat to stability. Hence, an increase in the map area suggests an increase in risks to financial stability, while a decrease in the area suggests their reduction.



Massive monetary and fiscal stimulus measures introduced in late 2008 and early 2009 in the world's largest economies yielded rapid results. As early as the second quarter of 2009, these countries began to recover gradually and exit recession. Projections of various agencies of an economic contraction in 2009 for both Croatia and most EU member states grew steadily worse and the most recent estimates were less favourable than those made in the first half of 2009. However, the recovery achieved has created expectations of a slight economic growth in these countries in 2010. In addition, a cycle of relatively optimistic revisions to economic projections for EU member states has already begun, and the possibility of further increases in projected growth seems reasonable. Croatia's economic recovery lags behind that in the EU as external vulnerabilities still loom large while domestic institutional weaknesses hamper the reallocation of resources to profitable activities. As economic activity has remained stagnant at its low level of early 2009, economic growth expected in 2010 is slight and upward adjustments are not likely.

The monetary and fiscal stimulus measures as well as regulatory interventions taken in the major economies to enhance the liquidity and solvency of financial intermediaries restored the confidence of financial market participants and lowered their risk aversion, which peaked in early 2009. This prompted a recovery of the international capital flows that had collapsed in late 2008, while risk premiums for emerging markets began to drift lower to the pre-crisis levels. Hence, a slight increase in global interest rates, which is expected for the second half of 2010, should not raise foreign capital costs for domestic sectors. Still, the recovery of flows at a global level is unlikely to have a major impact on the availability of foreign capital as external vulnerabilities of the Croatian economy remain relatively high (see Box 1 Global Financial Crisis and Capital Inflows to Central and South Eastern European countries). All this suggests that the macroeconomic environment should improve slightly in 2010 and thus reduce risks to financial stability.

Although Croatia's economic adjustment to a stop in capital inflows somewhat reduced its vulnerabilities, the reduction was sporadic and, in general, rather small. Private sector borrowing slowed down considerably in 2009, particularly that of households, which considerably reduced their debt level. While the private sector adjustment to the lower availability of international capital – through savings increases and investment cuts – was strong, the government deficit rose due to a fall in fiscal revenues. The fiscal expansion offset the increase in private sector savings and maintained the total level of domestic savings unchanged in 2009, at the same time absorbing a substantial portion of foreign savings inflows. In addition to the monetary authorities' intervention that boosted the financial system's foreign currency liquidity in late 2008 and early 2009 in particular, this mitigated the Croatian economic downturn in 2009. Still, due to the fiscal expansion, external vulnerabilities remained relatively high. Under the impact of heightened uncertainty, the currency and interest rate risk exposure of domestic sectors as well as their liquidity risk exposure increased in 2009 due to a slightly shortened maturity of loans. After a sharp growth in the

ratio of non-performing loans to total household and corporate loans in 2009, these two sectors could this year face even greater difficulties in servicing their credit obligations bearing in mind the expected, although slower, debt growth in 2010. This could be affected by the recession's delayed impact on the labour market, which will lower household disposable income, as well as relatively high interest expenses and continued low profitability of the corporate sector. Nevertheless, the stress tests conducted suggest that various combinations of macroeconomic shocks should not significantly reduce households' capacity to service their debt (see Box 4 Household Resilience to Financial and Macroeconomic Shocks).

After the Croatian financial system's resilience was put to a severe test in the first half of 2009, shock buffers again strengthened by the year-end. A rebound in capital flows provided a boost to the level of international reserves of the monetary system relative to their optimal level. Having decreased slightly at the beginning of the year, CNB reserves resumed their upward climb and were higher at end-2009 than at end-2008. The figure looks even better if one remembers that the external debt falling due in 2010 is somewhat smaller than that maturing in 2009. At the same time, the level of banks' foreign assets, which thanks to central bank measures were partly used to stabilise bank operations in the late 2008-early 2009 period of tightened liquidity, was almost completely restored.

The profit earned by the banking sector in 2009, though somewhat lower than in previous years, slightly strengthened the sector's capital adequacy ratio notwithstanding the absence of major capital injections. Due to a combination of the healthier capitalisation level of the banking sector and smaller shocks expected in 2010, current stress test results are somewhat better than the previous ones. Nevertheless, without a strong economic recovery, the quality of banks' portfolios is not expected to improve in 2010, particularly bearing in mind that the impact of the sharp contraction in economic activity in early 2009 and its stagnation at low levels will become evident only in data on the quality of banks' portfolios for end-2009 and in 2010. An increase in banks' insolvency risk is also indicated by the Z-score of the banking sector, which is a result of profits being lower and more volatile.

With more optimistic economic projections for 2010, extremely adverse events that could threaten the baseline scenario are less likely to happen, which has improved risk distribution relative to the first half of 2009. As indicated by stress test results, it should be easier for the CNB in such circumstances to achieve its operational objective – exchange rate stability, which is the main prerequisite of financial stability, bearing in mind that heightened uncertainty was the main threat to exchange rate stability at the time of strong depreciation pressures in late 2008 and early 2009 (see Box 2 Foreign Exchange Market and Monetary Policy in Croatia).

The main source of uncertainty about the 2010 scenario stemming from the international environment is the exit strategy from extraordinary monetary and fiscal stimulus measures in the world's largest economies. Exiting too early or too abruptly

may thwart bank lending and/or lead to interest rate growth, which would undermine the continuation of economic recovery. Furthermore, some Central and Eastern European countries were hit particularly hard by the financial crisis. Those hit the hardest received international support packages and were put under enhanced surveillance by international financial institutions. Although this helped diminish investors' excessive perception of risk for these countries, any renewed escalation of problems in their financial systems could lead to the resurgence of contagion risks and again increase risk perception of the whole region.

With regard to the domestic sphere, the period of unfavourable macroeconomic conditions may have led to the accumulation of significant credit risks in some domestic banks, but the size of these risks is not yet visible in their balance sheets. Their initial response to loan collection difficulties was to extend and re-schedule loan repayment periods. In addition to potential loan delinquencies by the riskier segments of households and non-financial corporations, domestic banks also face risks from the

construction sector, which has a large stock of unsold flats used as loan collateral. The expected steady decline in residential real estate prices, which have fallen only slightly so far, could exacerbate the recoverability of these loans. In this context, it is encouraging that banks have become reluctant to refinance loans to the real estate sector, which will expedite the disclosure of the actual situation in this segment of banks' credit portfolios.

Finally, some risks to financial stability could also arise from possible economic policy mistakes that might spur domestic demand and prevent a change in the growth pattern, which is needed to reduce external imbalances that are still a major obstacle to long-term sustainable growth.

The stated potential risks for 2010 should not give rise to systemic banking system risk, but could result in slight undercapitalisation of certain groups of small banks, as evident from the simulated impact of a more adverse scenario used in the stress tests. This could spur a new wave of capital strengthening and banking sector consolidation.

# Macroeconomic Environment

The easing of the financial crisis and the recovery of global economic growth have created more favourable terms for the gradual strengthening of economic activity in Croatia. Economic policy should restrain the growth in domestic demand. Coupled with a restrictive wage policy and low inflation, this should improve the international competitiveness of the domestic economy and trigger a shift in the growth pattern in favour of strengthening of exports. Accelerated growth coupled with such a demand pattern and continued fiscal consolidation would ensure the country's fiscal sustainability and external solvency, and thus bolster financial market confidence.

The liquidity squeeze in financial markets at the peak of the global financial crisis in the last quarter of 2008 and the first quarter of 2009 halted lending to the real sector, which led to a major global economic downturn (Tables 1, 2 and 3).

An extremely strong and rapid response from the monetary and fiscal authorities of the world's major economies in the form of coordinated monetary and fiscal expansion helped stabilise financial markets and created foundations for a gradual restoration of real sector financing (Table 2 and Figure 2). As a result, international trade recovered and domestic demand in these countries stabilised, so that most of the world's economies emerged from recession in the second and third quarters of 2009.

This gave rise to the expectation that major global regions, which recorded a sharp economic decrease and an increase in unemployment during the crisis, would return to the growth path in 2010 (Table 1 and Figure 3).

Table 1 Economic Growth, Exports and Industrial Production in Selected Developed and Emerging Market Countries

	Annual rate of change in GDP		Quarterly rates of change in GDP, $\Delta Q/Q_{t-1}$		Annual rate of change in exports of goods and services		Annual rate of change in industrial production (seasonally adjusted)	
	2009 <sup>a</sup>	2010 <sup>b</sup>	Q2/09	Q3/09	Q2/09	Q3/09	Q2/09	Q3/09
USA	-2.5	2.2	-0.2	0.7	-9.9	-13.3	-13.2	-9.5
Japan	-5.9	1.1	0.7	0.3	-22.4	-25.3	-27.1	-19.9
EU	-4.1	0.7	-0.3	0.3	....	....	-16.8	-13.8
Germany	-5.0	1.2	0.4	0.7	-23.6	-18.8	-20.5	-16.6
Italy	-4.7	0.7	-0.5	0.6	-23.3	-18.0	-22.9	-16.0
Slovenia	-7.4	1.3	0.6	1.0	-22.8	-19.5	-23.7	-17.9
Slovak R.	-5.8	1.9	1.1	1.6	-24.5	-18.9	-21.7	-11.4
Czech R.	-4.8	0.8	0.1	0.8	-22.0	-16.7	-16.8	-12.2
Poland	1.2	1.8	0.5	0.5	-23.1	-20.1	-6.4	-3.2
Hungary	-6.5	-0.5	-2.0	-1.8	-22.0	-16.8	-22.0	-18.0
Estonia	-13.7	-0.1	-3.4	-3.0	-22.0	-21.5	-32.0	-27.6
Latvia	-18.0	-4.0	-0.8	-4.0	-23.6	-22.2	-18.5	-15.1
Lithuania	-18.1	-3.9	-7.7	6.1	-33.8	-31.3	-20.4	-15.8
Bulgaria	-6.0	-5.9	....	....	-27.2	-17.8	-19.3	-18.4
Romania	-6.2	-8.0	-1.1	-0.6	-21.1	-15.1	-8.8	-5.3
Croatia	-6.1	0.3	0.4	0.3	-21.8	-22.8	-8.3	-9.5

<sup>a</sup> Estimate. <sup>b</sup> Forecast.

Sources: Eurostat, CBS, CNB, Bloomberg and OECD.

Table 2 Fiscal Balance and Current Account Balance of Selected Developed and Emerging Market Countries

	Fiscal balance, as % of GDP (ESA 95)			Current account balance, as % of GDP		
	2008	2009 <sup>a</sup>	2010 <sup>b</sup>	2008	2009	2010 <sup>a</sup>
USA	-6.4	-11.3	-13.0	-4.9	-2.6	-2.2
Japan	-3.8	-8.0	-8.9	3.2	1.9	2.0
EU	-2.3	-6.9	-7.5	-1.1	-0.8	-0.5
Germany	0.0	-3.4	-5.0	6.4	2.9	3.6
Italy	-2.7	-5.3	-5.3	-3.4	-2.5	-2.3
Slovenia	-1.8	-6.3	-7.0	-5.5	-3.0	-4.7
Slovak R.	-2.3	-6.3	-6.0	-6.5	-8.0	-7.8
Czech R.	-2.1	-6.6	-5.5	-3.1	-2.1	-2.2
Poland	-3.6	-6.4	-7.5	-5.5	-2.2	-3.1
Hungary	-3.8	-4.1	-4.2	-8.4	-3.0	-3.3
Estonia	-2.7	-3.0	-3.2	-9.3	1.9	2.0
Latvia	-4.1	-9.0	-12.3	-12.6	4.5	6.4
Lithuania	-3.2	-9.8	-9.2	-11.6	1.0	0.5
Bulgaria	1.8	-0.8	-1.2	-25.5	-11.4	-8.3
Romania	-5.5	-7.8	-6.8	-12.4	-5.5	-5.6
Croatia	-1.4	-3.7	-3.0	-9.2	-5.7	-6.0

<sup>a</sup> Estimate. <sup>b</sup> Forecast.

Sources: European Commission, *Economic Forecast*, autumn 2009, IMF, *World Economic Outlook Database*, October 2009 and CNB.

Although the risk aversion of financial market participants decreased sharply after the peak of the financial crisis, financial institutions still face a high level of uncertainty. This stems from dynamic structural changes in the real sector and an adverse feedback of the recession on their losses, the proportions and distribution of which remain unknown, as are the still undefined features of regulatory reform. All these factors will most likely amplify the process of bank deleveraging in the foreseeable future.

In such circumstances, banks are generally still holding back on lending to the real sector and are investing more in government securities, while maintaining liquidity reserves at high levels. The diminished supply of corporate loans is only partly compensated by increased capital market funding. A stronger acceleration of financial flows is somewhat limited by the persistently slow revival of loan securitisation.

In this context, the main risk to sustained recovery of the world's major economies in 2010 is related to the exit strategy within which central banks will have to withdraw the enormous liquidity they have injected to stabilise financial systems, while fiscal authorities should begin exiting temporary fiscal measures and thus stabilise overflowing public debts. If liquidity surpluses are withdrawn too late and public debt stabilisation fails, the fear of future inflation could increase in the largest economies and lead to the rise in long-term yields in the capital market. On the other hand, a too-soon and too-abrupt withdrawal of financial system liquidity and fiscal stimulus could threaten the recovery of loans and domestic demand and stop the rehabilitation of the

Figure 2 Key Interest Rates of the Main Central Banks and Leading Market Interest Rates

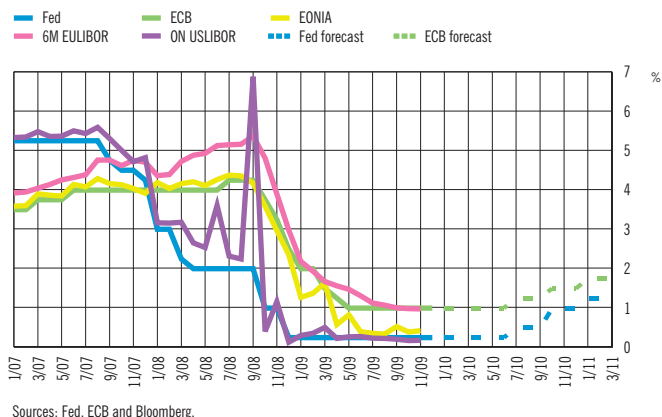


Figure 3 Business and Consumer Confidence Indices

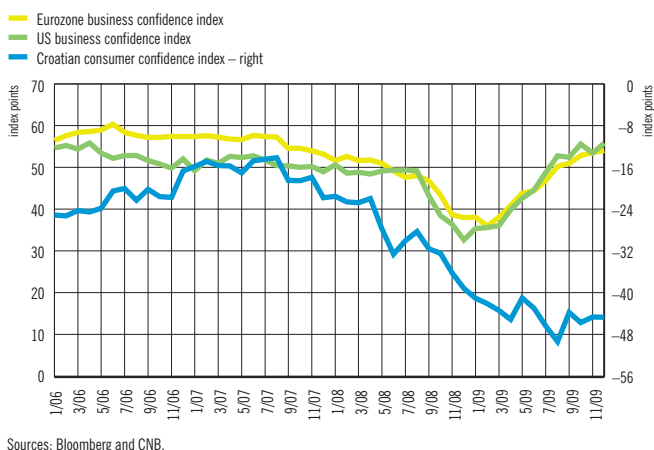


Figure 4 BIS Reporting Banks' Claims on Central and Eastern European Countries,<sup>a</sup> Exchange Rate Adjusted Changes, by Sector

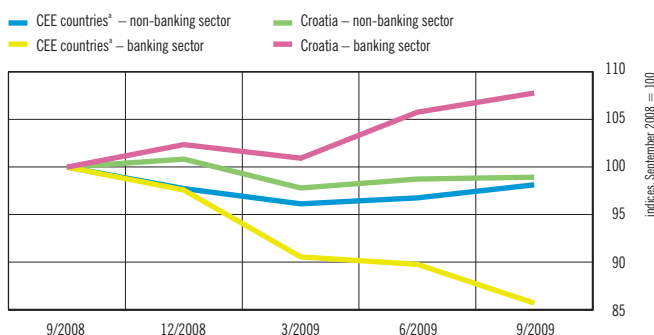


Table 3 Public and External Debt in Selected European Emerging Market Countries

	Public debt, as % of GDP		External debt, as % of GDP	
	2007	2008	2008	Q2/09
Slovenia	23.3	22.5	104	105
Slovak R.	29.3	27.7	57	70
Czech R.	29.0	30.0	38	40
Poland	45.0	47.2	47	54
Hungary	65.9	72.9	78	89
Estonia	3.8	4.6	118	122
Latvia	9.0	19.5	128	133
Lithuania	16.9	15.6	71	77
Bulgaria	18.2	14.1	106	107
Romania	12.6	13.6	53	59
Croatia	33.1	35.1	83	88

Sources: Eurostat and World Bank, *Quarterly External Debt Statistics*.

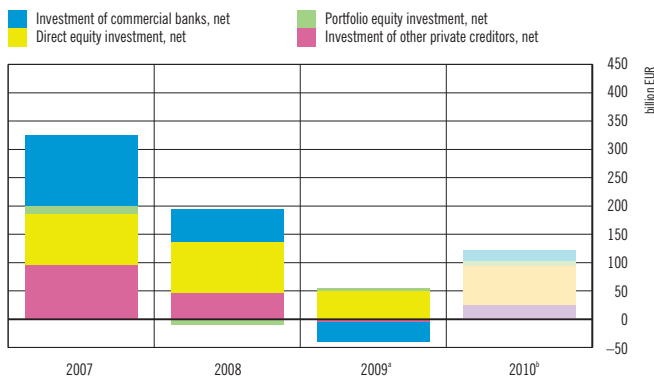
real sector. Both mistakes could raise market concerns about the solvency of countries whose public finances were considerably strained during the recession and thus prompt the sale of their bonds, posing another threat to economic recovery. This danger is particularly great in countries whose banking systems have weakened balance sheets and that rely more on central bank funding. Therefore, they could be destabilised by a precipitate liquidity restraint.

Such stresses in the government bond market could also affect emerging market countries that are heavily reliant on international markets for funding, particularly those with weak economic fundamentals.

The spread of the financial crisis in late 2008 and early 2009 hit most those emerging market countries whose economic growth was based on strong trade integration and export demand as well as those whose growth was fuelled by the expansion of domestic demand financed by abundant inflows of foreign capital. In the former countries, the disruption of global trade led to a collapse in foreign demand, while the halt in foreign capital inflows led to a collapse in domestic demand in the latter countries. The economic downturn was particularly severe in the countries that were exposed to capital outflows and strong downward pressures on the exchange rate due to an extremely weak fiscal position, overwhelming external debt or a weak banking sector, or a combination of the three (Table 1 and Figures 4 and 5).

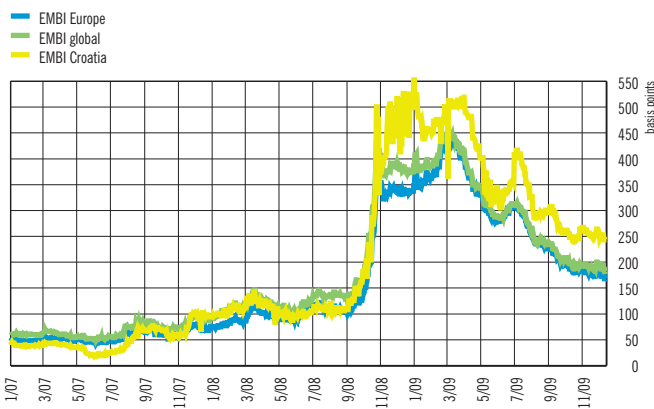
Coordinated international support to the most vulnerable countries prevented the eruption of currency and banking crises in these countries and the spread of the crisis to entire regions. As this restored investor confidence, risk premiums were reduced to a moderate level, which spurred the recovery of capital inflows as well as domestic demand. The recuperation of the

**Figure 5 Capital Inflows to European Emerging Market Countries**



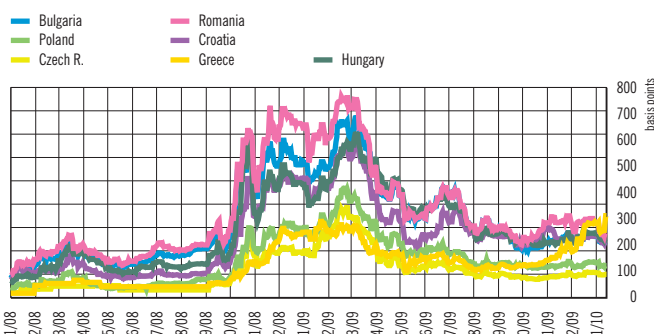
\* Estimate. † Forecast.  
Sources: International Institute of Finance, *Capital Flows to Emerging Market Economies*, October 2009 and Bloomberg.

**Figure 6 EMBI Spreads**



Source: J. P. Morgan.

**Figure 7 CDS<sup>a</sup> Spreads for 5-Year Bonds of Selected Countries**



<sup>a</sup> Credit default swaps (CDS) spread is an annual premium that a CDS buyer pays for protection against credit risk associated with an issuer of an instrument.  
Source: Bloomberg.

world’s major economies in the second and third quarters of 2009 gave a boost to the export demand of more open emerging economies, which stimulated their economic activities. As a result, some of these countries also exited recession in mid-2009 (Table 1 and Figures 4, 5, 6, 7 and 8).

The gradual recovery of emerging market countries also led to a gradual strengthening of the currencies of those countries whose fundamentals were relatively sound and exchange rates flexible. In the process of adjustment to crisis-related external shocks, these countries recorded a sharper depreciation. The same happened in some countries with weaker fundamentals that had to undertake a stronger fiscal adjustment. They thus secured international financial support and bolstered financial market confidence. In countries with weaker fundamentals, the exchange rate initially depreciated and then remained at lower levels, which supported the continuation of real adjustment and improved the fundamentals (Figures 9 and 10).

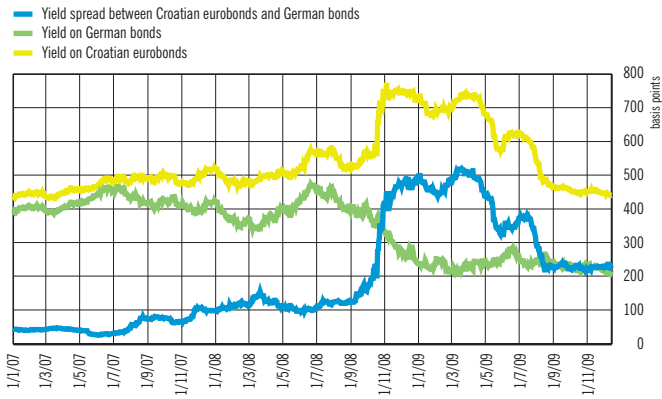
Countries that, largely due to structural reasons, have fixed exchange rate regimes, adjust to external shocks by changing relative prices or by internal depreciation. In these countries, the reallocation of resources implies changes in both relative prices and the wage to profitability ratio in various activities, which triggers the movement of labour and capital to the tradable sector and reduces their external imbalances.

In the countries with extremely large external imbalances and fixed exchange rate regimes, this process, accompanied by unavoidable fiscal adjustments, leads to a sharp and sometimes dramatic drop in economic activity and total employment, often resulting in heightened political instability.

Economic recovery in most of these countries has not yet started and there are substantial risks to their financial stability. This also entails the risk of a possible resurgence of the global crisis through “contagion”, i.e. the spread of instability to other countries in the region. Still, this risk has been reduced substantially, in part because the most vulnerable countries, in which the already strong effects of the crisis are expected to be aggravated, have been identified and put under close surveillance of international financial institutions.

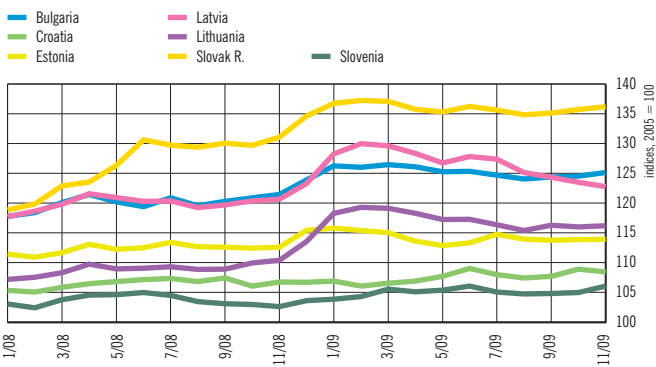
In Croatia, the financial shock caused by substantially reduced foreign capital inflows in late 2008 and early 2009 was eased by the release of a portion of the monetary system’s international reserves. This enabled the government to refinance its maturing foreign liabilities in the domestic market and bridge the period until the new issues of the government’s foreign bonds in June and November 2009. Together with the increased financial support of foreign parent banks to domestic banks, this secured stability of the exchange rate, which depreciated only slightly, and thus preserved both financial and monetary stability (Figures 4 and 11). Notwithstanding, substantially reduced foreign capital inflows, higher risk premiums and a slump in domestic bank lending at a time of heightened uncertainty about funding sources and riskiness of loans, which is evidenced by the rise in lending and deposit rates (Figures 11 and 12) and the tightening of non-price lending terms, led to a sharp reduction in overall

Figure 8 Yields on Croatian and Benchmark German Bonds Maturing in 2014



Source: Bloomberg.

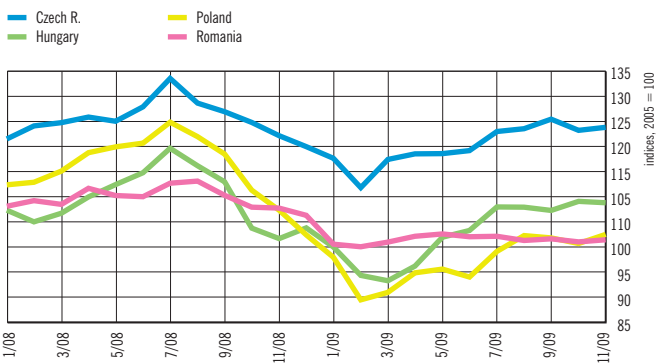
Figure 9 Real Effective Exchange Rates Deflated by Consumer Prices



Note: An increase in the index indicates a real effective appreciation.

Source: BIS.

Figure 10 Real Effective Exchange Rates Deflated by Consumer Prices – Flexible



Note: An increase in the index indicates a real effective appreciation.

Source: BIS.

liquidity and domestic demand. Along with a pronounced drop in export demand, this resulted in a major downturn in domestic economic activity in the second half of 2008 and in the first quarter of 2009 in particular (Figure 13).

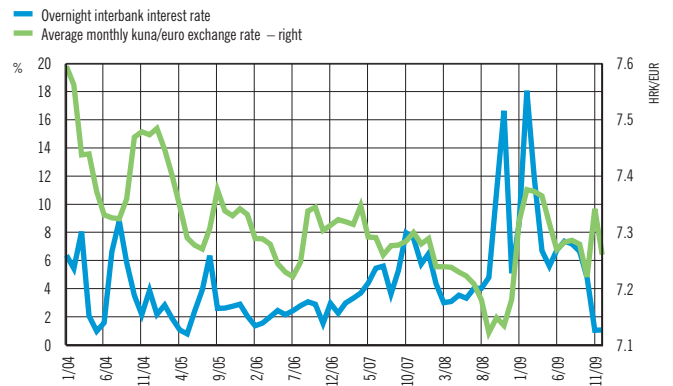
The gradual return of foreign capital inflows in the second and third quarters of 2009, mostly in the form of increased corporate and government foreign borrowing, prevented aggregate economic activity from contracting further. However, since an only slightly improved international environment could not provide sufficient incentive for a strong recovery, economic activity levelled off at a relatively low level (Table 1 and Figure 4).

Export demand is still weak and its response to the recovery in the environment, particularly the main export markets in the EU, will probably be manifested with a time lag.

In addition to a fall in household disposable income and corporate profits, domestic demand is constrained by the continued credit squeeze. Diminished loan supply has been influenced by persistently high uncertainty about the solvency of households and corporations in recessionary conditions. To avoid excessive exposure to credit risk, in addition to higher interest rates, banks resort to credit rationing and turn to highest quality borrowers (as evidenced by a narrower spread between interest rates on corporate and government loans). In response to tighter lending terms, uncertainty generated by the fall in employment and postponement of corporate sector investments, which was due to heavily underutilised capacities and a doubtful future return on investment in the light of higher capital costs, loan demand also declined (Figure 12).

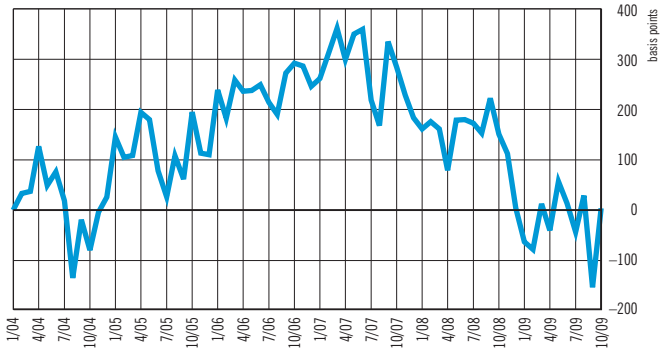
The 2009 decline in export and domestic demand led to a sharp drop in imports (of nearly one fourth). Coupled with a GDP fall of some 6%, this considerably reduced external imbalances in the form of the current account deficit, which was cut by more than 40% in 2009, from 9.2% of GDP to 5.7% of GDP (Figures 13 and 14 and Tables 1 and 2).

Figure 11 Kuna/Euro Exchange Rate and Overnight Interest Rates



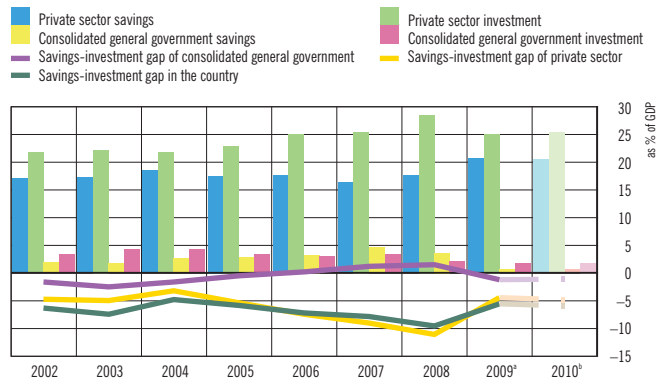
Source: CNB.

Figure 12 Spread between Interest Rates on F/c Indexed Kuna Loans to Corporates with Maturity between 1 and 2 Years and One-Year T-Bills



Sources: CNB and MoF.

Figure 15 Savings and Investment – Total and by Sector



\* Estimate. <sup>a</sup> Forecast.

Sources: MoF and CNB (estimate).

Figure 13 Foreign Capital Inflows and GDP Growth in Croatia

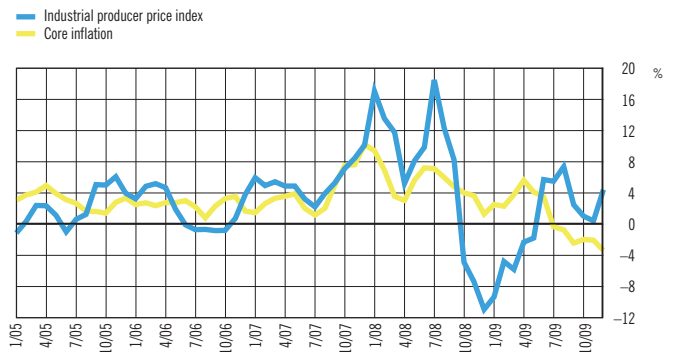


\* Estimate. <sup>a</sup> Forecast.

Note: FDI in the form of loans excludes round tripping transactions. For more details on round tripping, see *CNB Bulletin*, No. 154, Box 4 Round Tripping and Its Impact on Croatian Statistical Data.

Sources: CNB and CBS.

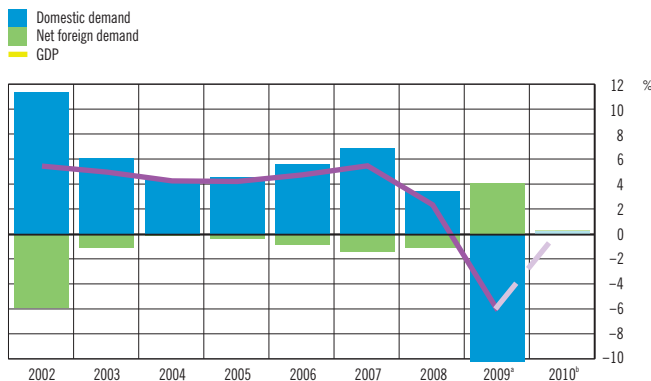
Figure 16 Tradables and Non-Tradables Inflation



Note: Annualised rates of change were derived from monthly changes in the moving quarterly average of seasonally adjusted base price indices.

Sources: CBS and CNB calculations.

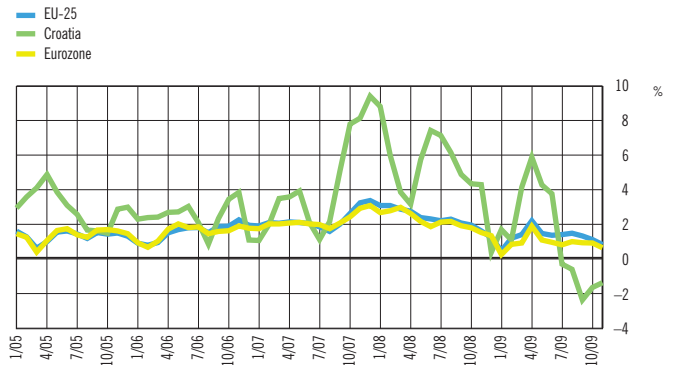
Figure 14 GDP Growth Pattern (contribution to growth)



\* Estimate. <sup>a</sup> Forecast.

Source: CBS.

Figure 17 Core Inflation

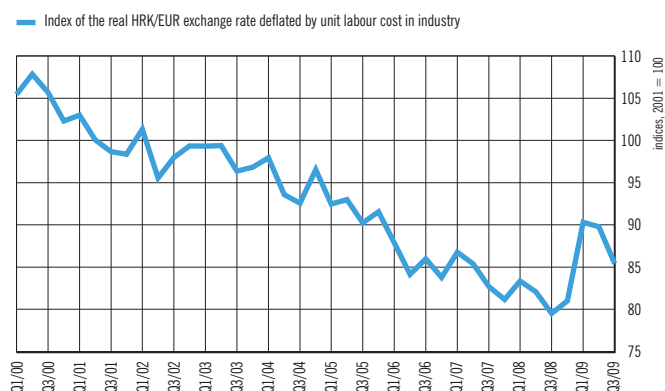


Note: Annualised rates of change were derived from monthly changes in the moving quarterly average of seasonally adjusted base price indices.

Sources: Eurostat, CBS and CNB calculations.

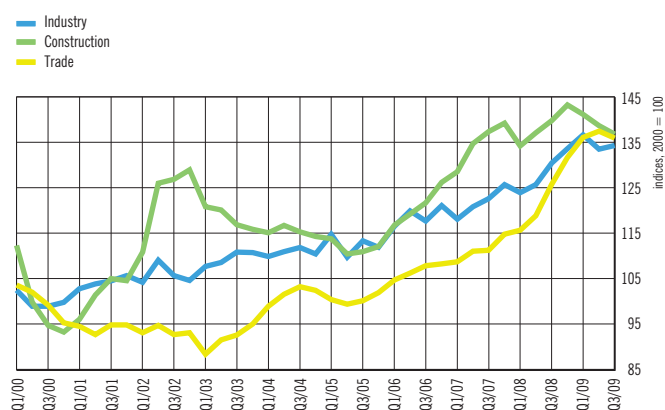


Figure 18 Real Kuna/Euro Exchange Rate



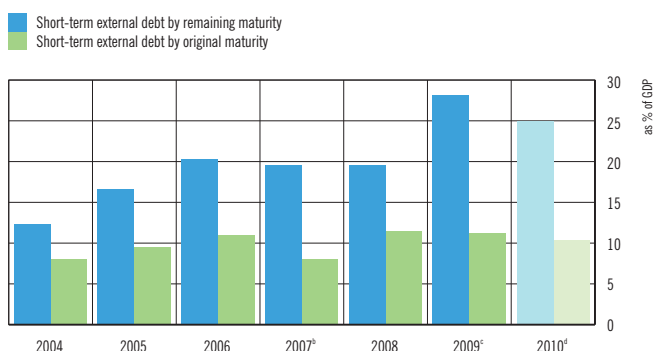
Note: A Fall in the index indicates a real appreciation of the kuna against the euro.  
Sources: CBS, CNB and CNB calculations.

Figure 19 Unit Labour Cost



Sources: CBS, CNB and CNB calculations.

Figure 20 Short-Term External Debt<sup>a</sup>



<sup>a</sup> Short-term external debt by remaining maturity at the end of the current year is the sum of long-term debt maturing in that year and the balance of short-term debt at the end of the previous year. <sup>b</sup> Since end-2007, external debt has been calculated according to the new methodology. <sup>c</sup> Estimate. <sup>d</sup> Forecast.

Source: CNB.

In such circumstances, general government revenues declined sharply. Together with relatively rigid expenditures, this led to a major fall in government savings and growth in its deficit, while the private sector, in which savings went up fast and investments down, bore the main brunt of the real adjustment in 2009 (Figure 15).

At a micro level, the process of adjustment to external shocks was reflected in a gradual fall in the prices of non-tradable goods and services relative to the prices of tradable goods and services, i.e. the slowdown in core inflation in Croatia relative to the EU. This was accompanied by corresponding changes in the relative wage and productivity dynamics, i.e. unit labour costs in the domestic economy vis-à-vis the EU (Figures 16, 17, 18 and 19).

This process would have been much faster without institutional rigidities that contribute to low labour market flexibility, the relatively large and inefficient public sector, and poor creditor protection, as evident from the steep rise in arrears.

The growing illiquidity of the corporate sector indicates its slow adjustment to dwindled demand. In addition to the stated institutional weaknesses, this implies poor management, particularly in government enterprises.

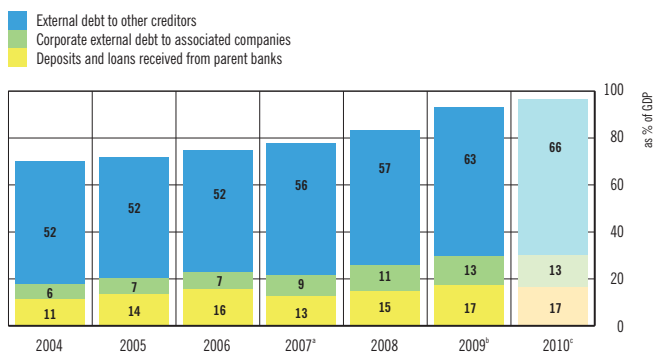
The outlook for the Croatian economy in 2010 is rather uncertain, as evidenced by the fact that official and private forecasts span a relatively wide range, from +1.5% to -2%. This uncertainty also stems from doubts about the pace of addressing institutional weaknesses, which would pave the way for a faster recovery of the healthy parts of the economy. Under the CNB's baseline projection, GDP will grow only marginally, by some 0.3%, while employment will slightly fall, mostly in industries where the decline in demand is of a more permanent nature (construction) and which are undergoing intensive restructuring in response to global trends.

Although the continued gradual recovery of foreign capital inflows has created the conditions to increase credit activity and overall domestic liquidity, banks, though relatively well-capitalised and liquid, are reluctant to increase lending due to their still high risk aversion and the adverse feedback of bad loans on their balance sheets.

In such circumstances, monetary policy efforts to stimulate the economy are constrained by the monetary framework in which the policy of maintaining price stability and financial stability is implemented by maintaining exchange rate stability. As credit expansion in such a regime basically depends on external funding constraints, the recovery of foreign capital flows itself provides the conditions for a gradual easing of lending terms and credit growth in 2010.

Fiscal policy is fundamentally constrained by the fact that any fiscal deficit higher than the estimated 3% of GDP in 2010 could undermine financial market confidence and threaten the regular refinancing of maturing external debt and the financing of the current account deficit, which are projected at 25% and

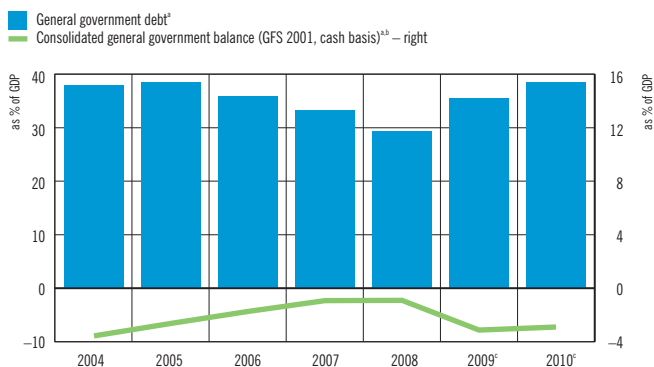
Figure 21 Total External Debt by Creditor



<sup>a</sup> Since end-2007, external debt has been calculated according to the new methodology. <sup>b</sup> Estimate. <sup>c</sup> Forecast. Note: External debt to associated companies excludes round tripping transactions. See note under Figure 13.

Source: CNB.

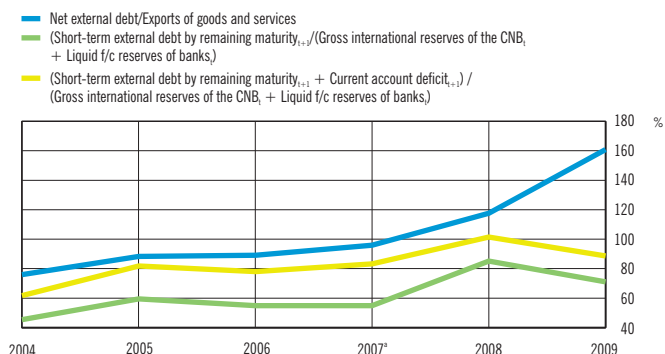
Figure 22 General Government Fiscal Position



<sup>a</sup> From 2008 on, CM is excluded from general government. <sup>b</sup> Data for 2004-2008 were adjusted for changes in arrears. <sup>c</sup> CNB projections.

Sources: MoF and CNB.

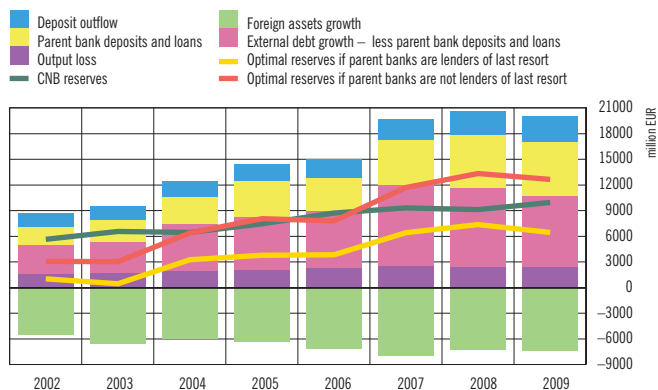
Figure 23 Selected Indicators of External Vulnerability



<sup>a</sup> Since end-2007, external debt has been calculated according to the new methodology.

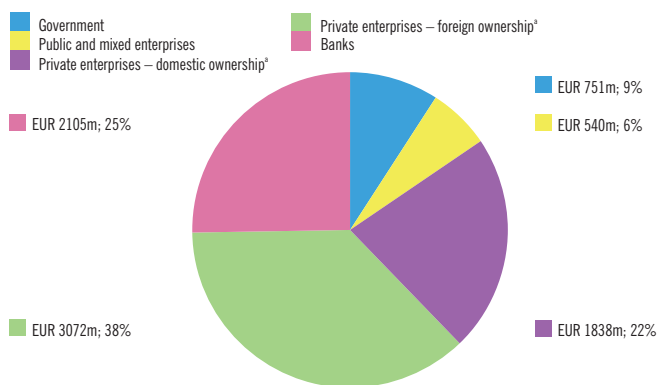
Source: CNB.

Figure 24 Contribution of Individual Components of Optimal International Reserves



Source: CNB.

Figure 25 Projected External Debt Repayment in 2010 by Sector



<sup>a</sup> Including non-banking financial institutions.

Source: CNB.

6% respectively of GDP in 2010 (Figures 20 and 21). Sustainable fiscal deficit and public debt levels, as well as a stable banking system are essential to preserve the confidence of financial markets (Figure 22). In the future, prudent fiscal policy should strive to keep the overall deficit as low as possible and increase the primary surplus at the time of rapid economic growth, thus enabling the pursuit of a counter-cyclical fiscal policy in the downward phase of the cycle or during a new crisis, while maintaining the long-term stability of public finance.

The overall credibility of economic policy and of the institutional framework in general has been strongly enhanced by Croatia's progress in meeting its 2012 target for EU accession.

In such circumstances, the main impetus to growth in 2010 will come from the expected 3% increase in exports due to the recovered growth in Croatia's main export markets in the EU, while domestic final demand will hold steady.

Underpinned by loan allocation, this growth pattern will be influenced by the steady rise in relative prices of tradables and the market reallocation of economic resources to the tradable sector. Although this would result in somewhat slower growth, in the medium run it would help reduce external imbalances, which are the main structural limitations to the Croatian economy, sustainable growth thus being attained.

In 2010, external imbalances in terms of the current account deficit will stay almost the same as in 2009, at some 6% of

GDP. Risks associated with the external deficit financing and refinancing of maturing debt have diminished as capital flows to emerging market economies are expected to continue to rebound through 2010. This is also supported by increased external liquidity reserves of the Croatian monetary system and the fact that some two-thirds of the maturing external debt is accounted for by corporations and banks in foreign ownership, which facilitates access to foreign financial markets (Figures 23, 24 and 25).

## Box 1 Global Financial Crisis and Capital Inflows to Central and South Eastern European Countries

Most European emerging markets recorded substantial foreign capital inflows in previous years. Slowdowns and sudden stops in capital inflows or, in the worst cases, outflows of foreign capital considerably increase the probability of financial crisis in countries that for a long period of time depended on foreign funding. Although triggers for financial crises are usually associated with external shocks, an economy's vulnerabilities in terms of external imbalances and weak macroeconomic and financial indicators increase the likelihood of materialisation of such episodes, as well as their depth and duration. The impact of stops in capital flows to emerging market countries is most often manifested in intense downward pressures on the domestic currency and weaker economic activity.

To identify the factors that determine a country's vulnerability to sudden stops in foreign capital inflows and successfully predict the emergence of this risk a survey of a group of 12 European emerging market countries<sup>1</sup> was conducted for the period from the first quarter of 1996 to the second quarter of 2009. Periods of stops in capital inflows to the countries under review were identified based on an algorithm commonly used in the literature<sup>2</sup> and a logit model was assessed in which a dependent variable takes the value of 1 during a crisis period and 0 in other periods (Table 1). The forecasted value of the dependent variable represents the likelihood of a crisis episode in an individual country in a particular quarter. Out of 429 observations included in the model, 52 or 12% were identified as crisis episodes.

Out of some 30 independent variables that reflect domestic macroeconomic and financial developments, external vulnerabilities and the global economic situation, six variables were selected as their combination performed best in predicting crisis episodes. It was also determined that variables lagged 2 years lead to the best model estimation. This enables the model prediction of the probability of stops in capital flows in the next two-year period (Figures 1 to 12).

The assessed model shows that manifestations of larger foreign capital inflows in the form of growing current account deficits and deteriorated external liquidity increase the likelihood of a crisis episode. Such developments also lead to the acceleration of economic growth relative

<sup>1</sup> Bulgaria, the Czech Republic, Estonia, Croatia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia, the Slovak Republic and Turkey.

<sup>2</sup> Moving annual cumulative values of quarterly net inflows in the BOP financial account relative to GDP were used to identify episodes of stops in foreign capital inflows. For a period to be identified as a crisis episode, at least two of the following three criteria had to be met: a decrease in net inflows relative to the same period in the previous year exceeding 5% of GDP, or at least 1.5 standard deviation, and the annual net inflow in a certain quarter at least 1.5 standard deviation below the average annual net inflow in the whole period under consideration. Beginnings of crisis episodes are quarters preceding the described peaks of crisis episodes in which net inflows decrease by at least 1% of GDP relative to the previous quarter, while the end of the crisis is identified by an increase in net inflows of at least 1% of GDP relative to the previous quarter. See similar in: Calvo, G. A., Izquierdo, A. and Meija, L. F. (2003): *On the Empirics of Sudden Stops: The Relevance of Balance-Sheet Effects*, Inter-American Development Bank, WP, No. 509; Guidotti, P. E., Sturzenegger, F. and Villar, A. (2004): *On the Consequences of Sudden Stops*, *Economia*, Volume 4, No. 2, pp. 171-214.

to growth potential and appreciation of the real exchange rate relative to the trend, which also increases a country's vulnerability to potential stops in foreign inflows. This triggers the increase in local equity indices – a phenomenon that at some point characterised most of the surveyed countries and led to unsustainably high levels of indicators such as the price/earnings per share ratio. The rise in share prices and appreciation of the domestic currency were largely due to abundant inflows of capital that arrived in the countries under review in search of higher yields. In shallow financial markets where supply was limited, these capital inflows pushed up financial assets prices and led to the creation of price bubbles. Upward shifts in key global interest rates in pre-crisis periods also increase the vulnerability of countries dependent on foreign funding as this funding becomes more expensive. At the same time, they reduce the attractiveness of investing in emerging markets relative to developed countries. With a certain time lag, this may trigger a capital flight.

Of all the sample countries, the Baltic states, i.e. Estonia, Latvia and Lithuania, were most affected by the recent global crisis. These countries also had the highest indicator of the probability of a sudden stop in capital inflows on the eve of the global financial crisis. Coupled with a fall in exports, this stop triggered a dramatic current account adjustment. After a long period of large current account deficits, the surveyed countries recorded a current account surplus in 2009 and a sharp downturn in GDP, and are expected to exhibit similar trends in 2010. As this adjustment implies an abrupt attenuation of the external vulnerabilities that aggravated the crisis, the crisis probability indicator rapidly decreased in the following period. This means that a gradual recovery of capital inflows to these countries could begin in the first quarter of 2010 (Figures 1, 2 and 3).

In contrast with the first group of countries, the Czech Republic, Poland and Slovakia did not see a substantial slowdown in capital inflows in late 2008 and the first half of 2009. As these countries had better macroeconomic indicators in previous years, particularly regarding external vulnerabilities, their economic slump was largely caused by a collapse in export demand. On the back of buoyant export demand and substantial monetary and fiscal stimulus, these countries should see a relatively

Table 1 Model Results

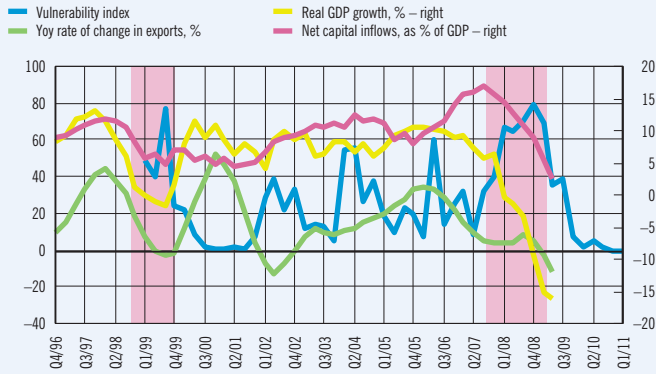
Independent variable <sup>a</sup>	Coefficient
Output gap	0.11
Ratio of international reserves to short-term foreign liabilities	-0.88
Change in 6-month EURIBOR	1.29
Change in the current account deficit-to-GDP ratio	0.86
Percentage change in the share index	2.84
Real exchange rate deviation from trend	-0.12
Constant	-1.20
McFadden R <sup>2</sup>	0.30

<sup>a</sup> All independent variables are lagged two years and significant at the level of 5%.

With a 12.0% vulnerability indicator threshold, the model successfully predicts 75.3% of the total number of periods with no crisis episodes and 76.9% of crisis periods.

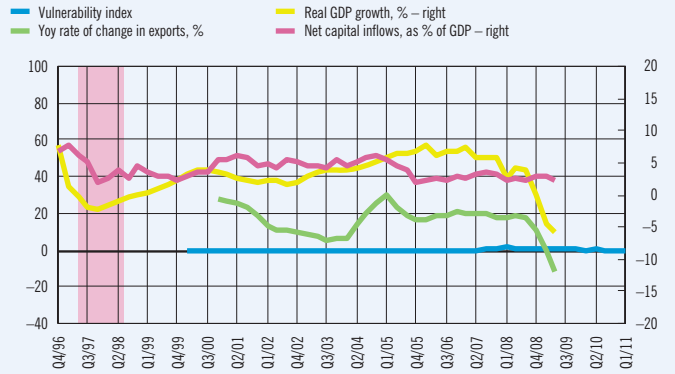
Source: CNB calculations.

Figure 1 Estonia



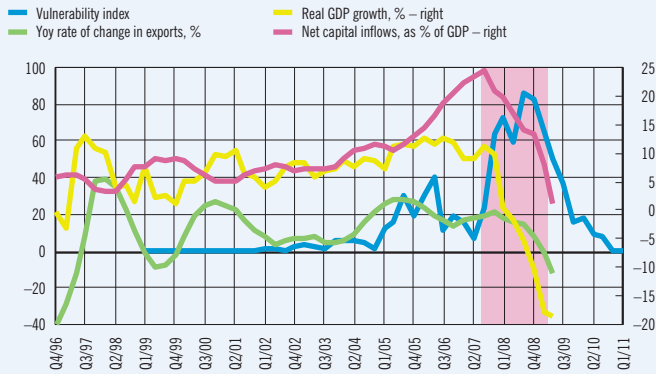
Note: Shaded windows cover identified episodes of stops in capital inflows.  
Sources: Eurostat and CNB calculations.

Figure 4 Czech Republic



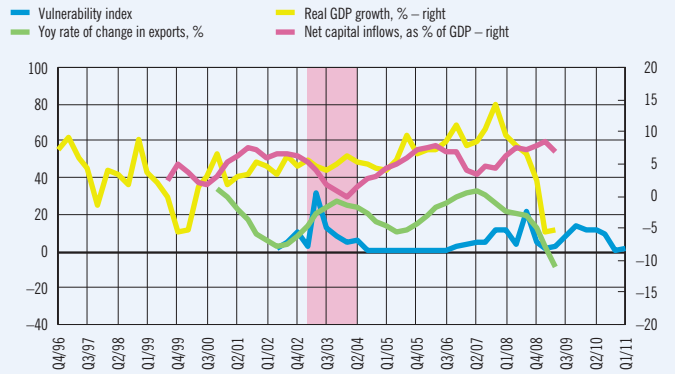
Note: Shaded windows cover identified episodes of stops in capital inflows.  
Sources: Eurostat and CNB calculations.

Figure 2 Latvia



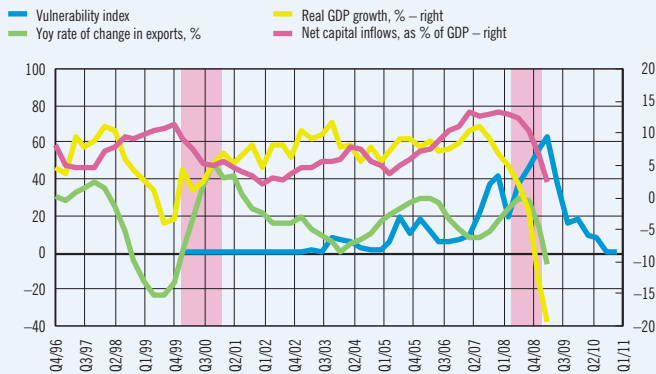
Note: Shaded windows cover identified episodes of stops in capital inflows.  
Sources: Eurostat and CNB calculations.

Figure 5 Slovak Republic



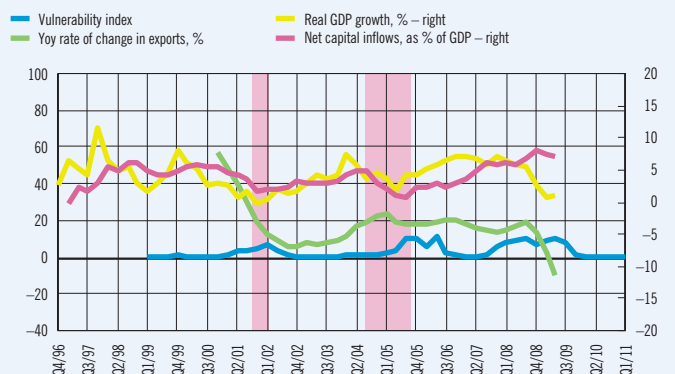
Note: Shaded windows cover identified episodes of stops in capital inflows.  
Sources: Eurostat and CNB calculations.

Figure 3 Lithuania



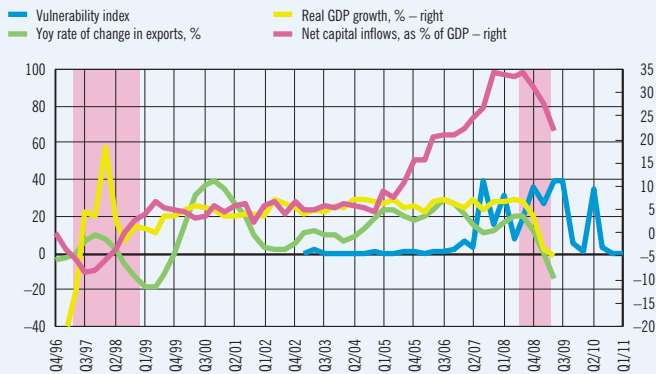
Note: Shaded windows cover identified episodes of stops in capital inflows.  
Sources: Eurostat and CNB calculations.

Figure 6 Poland



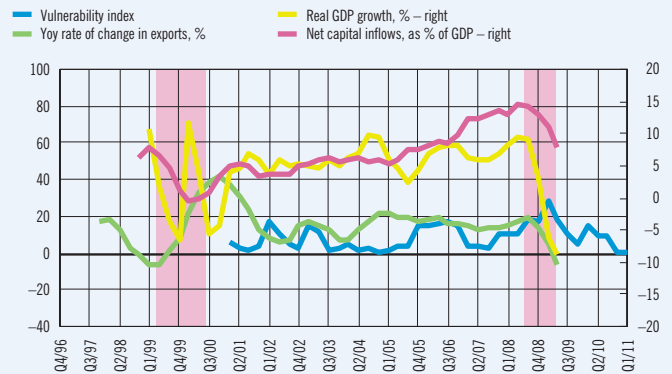
Note: Shaded windows cover identified episodes of stops in capital inflows.  
Sources: Eurostat and CNB calculations.

Figure 7 Bulgaria



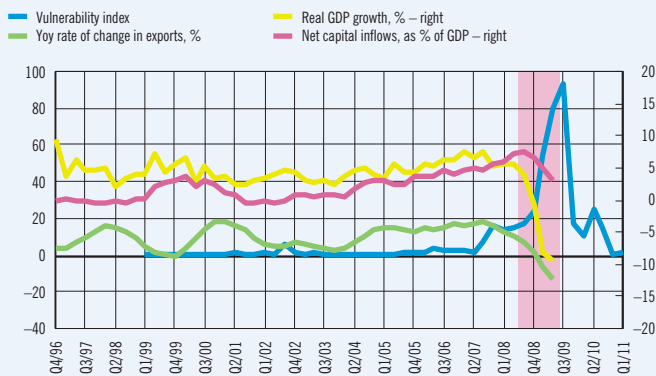
Note: Shaded windows cover identified episodes of stops in capital inflows.  
Sources: Eurostat and CNB calculations.

Figure 10 Romania



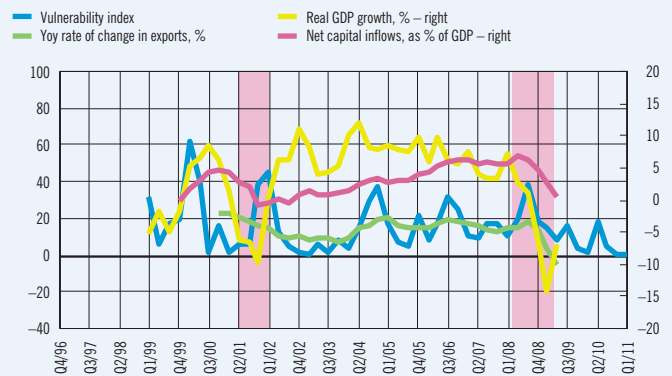
Note: Shaded windows cover identified episodes of stops in capital inflows.  
Sources: Eurostat and CNB calculations.

Figure 8 Slovenia



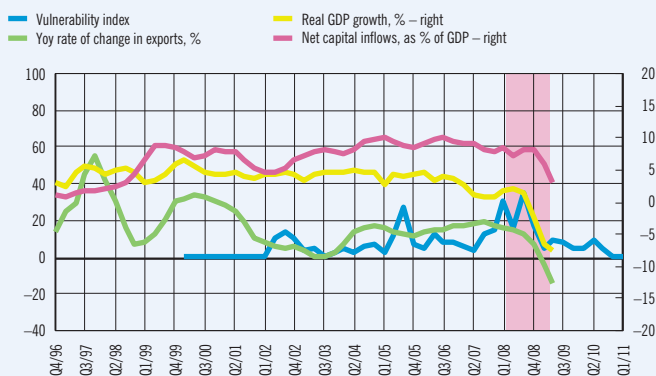
Note: Shaded windows cover identified episodes of stops in capital inflows.  
Sources: Eurostat and CNB calculations.

Figure 11 Turkey



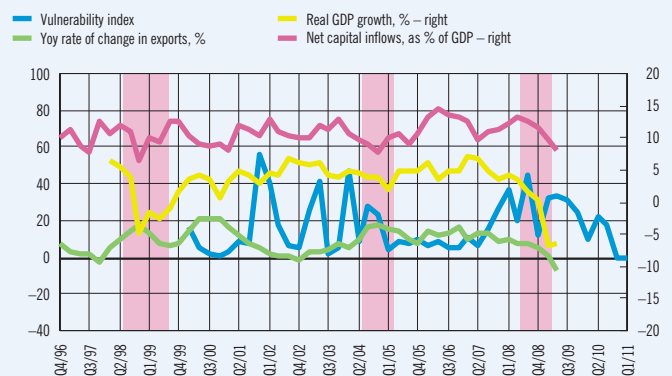
Note: Shaded windows cover identified episodes of stops in capital inflows.  
Sources: Eurostat and CNB calculations.

Figure 9 Hungary



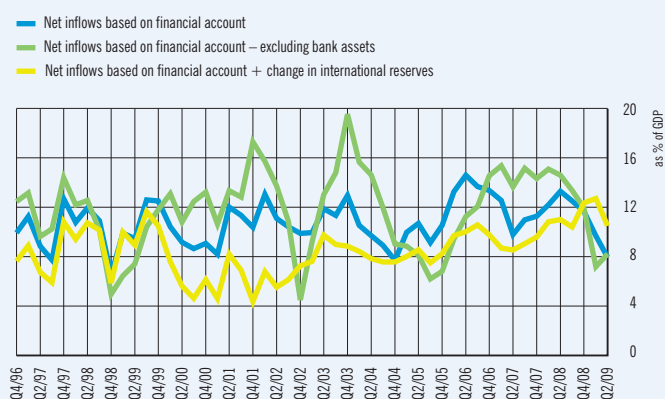
Note: Shaded windows cover identified episodes of stops in capital inflows.  
Sources: Eurostat and CNB calculations.

Figure 12 Croatia



Note: Shaded windows cover identified episodes of stops in capital inflows.  
Sources: Eurostat and CNB calculations.

Figure 13 Net Foreign Capital Inflows to Croatia



Source: CNB.

fast recovery in 2010. Vulnerability indicators for Poland and Slovakia point to a marginal increase in the risk of a sudden stop in capital flows over the next two years, while the probability of such a shock in the Czech Republic remains very small (Figures 4, 5 and 6).

The remaining countries surveyed are between these two extremes. Slovenia and Bulgaria had relatively mild episodes of stops in capital inflows relative to their levels shortly before the financial crisis erupted, while Croatia, Hungary, Romania and Turkey had moderate episodes of stops in foreign capital inflows. A significant fall in exports in all countries in the group compounded the economic decline. The model results show that capital inflows to these countries should resume in early or mid-2010 (Figures 7, 8, 9, 10, 11 and 12).

In the case of Croatia, one may notice that a greater fall in net inflows was avoided thanks to the release of previously accumulated reserves of the monetary system (Figure 13). Although this softened the consequences of the crisis in Croatia, its external adjustments were weaker than in other countries. This is evidenced by the assessed vulnerability indicator, which suggests that the recovery of foreign capital inflows to Croatia could be relatively slow (Tables 2 and 3 in the first section 1 and Figure 12).

## Box 2 Foreign Exchange Market and Monetary Policy Framework in Croatia

In view of the openness and a high level of euroisation of the Croatian economy, the maintenance of exchange rate stability is the CNB's key tool in the maintenance of overall macroeconomic stability. Consequently, the central bank strives to prevent excessive fluctuations in the nominal exchange rate both directly, by means of foreign exchange market interventions, and indirectly, by influencing bank behaviour through administrative and prudential measures. This somewhat mitigates the fluctuations in domestic monetary and credit aggregates, which are in the current monetary framework largely determined by foreign capital inflows (Figure 1).

In addition to foreign exchange market trading, which reflects fundamental factors and their interpretation by market participants, exchange rate movements are in the short run influenced by expectations about future exchange rate trends based on other available information. As these expectations may trigger substantial volatility and even speculative attacks on the exchange rate, which may lead to an exchange rate crisis, it is important to analyse the process of kuna exchange rate formation in the foreign exchange market to increase the effectiveness of the policy of exchange rate stability.

Several groups of variables were used to explain daily changes in the kuna/euro exchange rate. Firstly, daily data on spot and forward trading of domestic banks with domestic sectors and foreign banks, CNB interventions and the foreign exchange position of banks, as an indicator of the overall foreign exchange availability in the banking system, were introduced to the model. As the situation in the money market also affects exchange rate developments through the relative interest rate spread between the kuna and the euro, these variables were also included in the model.

The model results confirm expectations about the impact of individual variables (Table 1). A higher net sale of foreign exchange via prompt and forward foreign exchange trading triggers the appreciation of the kuna. An increase in the spread acts in the same direction, while the opposite

Table 1 Model Evaluation Results

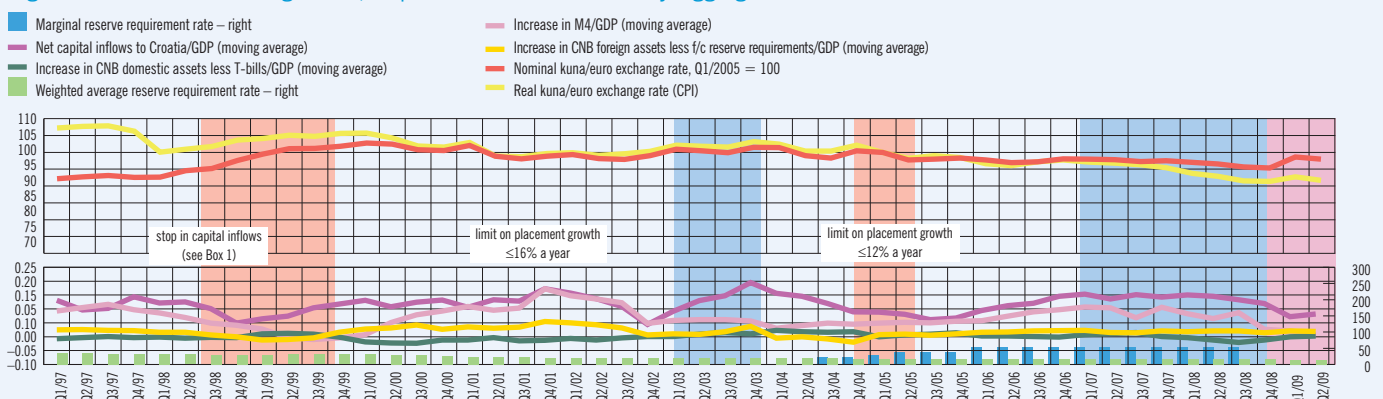
Independent variable	Coefficient
Constant	-0.024286 <sup>a</sup>
Conditional standard deviation of exchange rate	0.290049 <sup>a</sup>
Overnight interbank interest rate spread between Croatia and the eurozone (t - 1)	-0.002900 <sup>a</sup>
Daily surplus liquidity (t - 1)	0.005198 <sup>b</sup>
Net trading of natural persons with domestic banks (t - 1)	-0.0126 <sup>a</sup>
Net trading of foreign banks with domestic banks (t - 1)	-0.00401 <sup>a</sup>
Net trading of legal persons with domestic banks (t - 1)	-0.002 <sup>a</sup>
Total long - short position of the banking sector (t - 1)	-0.00138 <sup>a</sup>
Net forward trading of domestic banks (t - 2)	-0.00207 <sup>a</sup>
Amount of CNB intervention (t - 1)	-0.00048 <sup>a</sup>
Amount of CNB intervention (t - 2)	-0.0018 <sup>a</sup>
Amount of CNB intervention (t - 3)	-0.0025 <sup>a</sup>
Amount of CNB intervention (t - 4)	-0.0026 <sup>a</sup>
Amount of CNB intervention (t - 5)	-0.0022 <sup>a</sup>
Amount of CNB intervention (t - 6)	-0.0012 <sup>a</sup>
AR(1)	0.411742 <sup>a</sup>
AR(2)	-0.221718
MA(1)	-0.378585 <sup>a</sup>
MA(2)	0.387127 <sup>a</sup>
<b>Variance equation</b>	
Constant	0.000195
Square deviation (t - 1)	0.099750 <sup>a</sup>
Variance (t - 1)	0.891827 <sup>a</sup>
Adjusted R2	0.084975

<sup>a</sup> Variable is significant at the level of 5%.

<sup>b</sup> Variable is significant at the level of 10%.

Source: CNB.

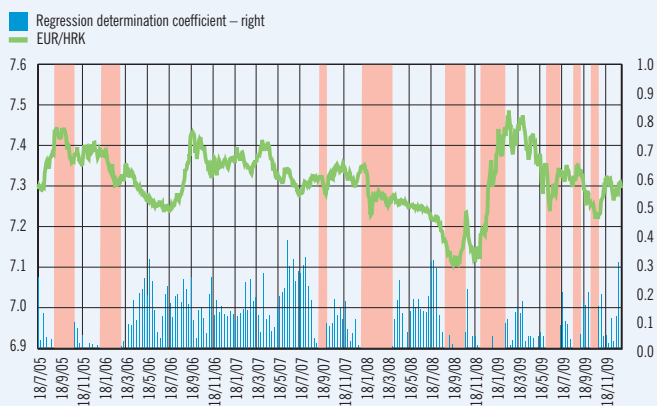
Figure 1 HRK/EUR Exchange Rate, Capital Inflows and Monetary Aggregates



Source: CNB.



**Figure 2 HRK/EUR Exchange Rate and the Coefficient of Determination from the Rolling Window Regressions**



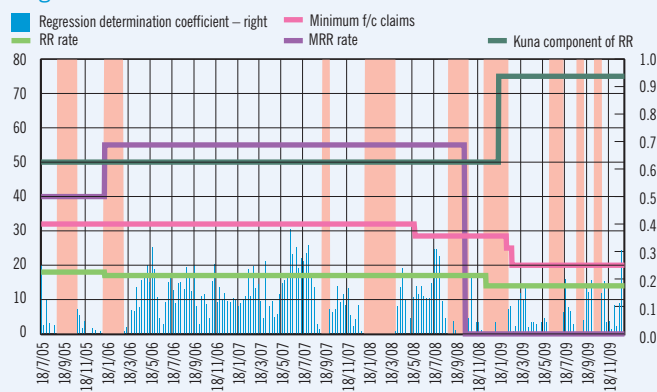
Source: CNB.

effect is produced by an increase in risks, as measured by exchange rate volatility. However, a very low coefficient of determination, i.e. the proportion of the exchange rate variability explained by the model, stresses the importance of the expectations based on other information that cannot be included in the model.

To identify the periods in which such information had a dominant impact on exchange rate trends, a slightly modified model (excluding CNB foreign exchange interventions and the conditional standard deviation of the exchange rate) was assessed at shorter time intervals using a rolling window estimation. As a result, a time series of coefficients of determination was obtained. Episodes when the exchange rate did not depend on transactions in the foreign exchange market and other model variables are shaded in Figure 2, while important events that could explain these sub-periods are shown in Figures 3, 4 and 5.

An episode of a low explanatory power of the model that covers late 2008 and early 2009 can be associated with the spillover effects of the global financial crisis to Croatia and concerns about external debt refinancing, which obviously affected perceptions about exchange rate movements in the future. At the same time, the CNB responded by intervening in the foreign exchange market and implementing a set of measures to increase foreign exchange liquidity of the banking system and ease depreciation pressures (abolishment of the marginal reserve requirement, reduction in reserve requirements, a cut in the rate of the minimum required foreign currency claims, increase in the kuna component of reserve requirements), which is shown in Figure 3.

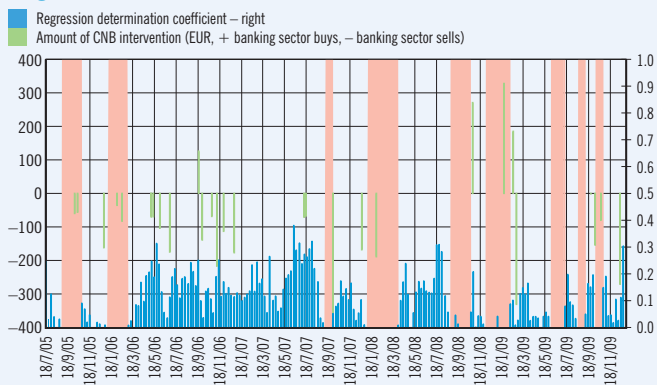
**Figure 3 Prudential and Administrative Measures of the CNB and the Coefficient of Determination from the Rolling Window Regressions**



Source: CNB.

In some episodes it is evident that the relation between exchange rate changes and explanatory variables is weaker in the days preceding a foreign exchange intervention (Figure 4). Central bank actions can thus be explained by changes in the foreign exchange market's response, while model behaviour suggests that the CNB, in addition to directly influencing the exchange rate by its foreign exchange transactions and changes in foreign exchange availability, also affects market participants' expectations. It is also possible that there is an interaction between market participants' expectations about foreign exchange interventions and central bank behaviour that affects exchange rate movements.

**Figure 4 Foreign Exchange Interventions of the CNB and the Coefficient of Determination from the Rolling Window Regressions**

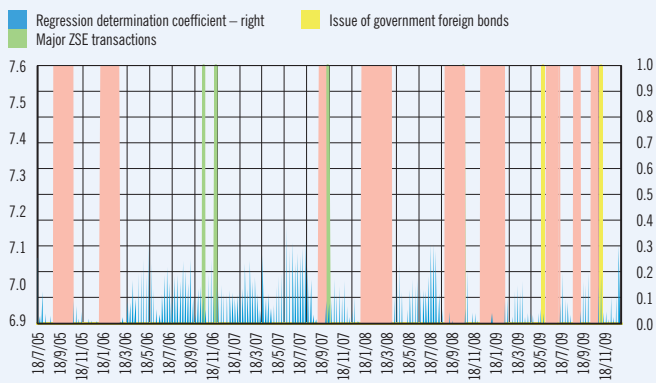


Source: CNB.

Some earlier episodes (in 2007) may be explained by relatively large one-off transactions, e.g. issuance of bonds in foreign markets, the take-over of large companies like INA and Pliva, and participation of foreign and domestic investors in public offerings (Figure 5). These transactions include the conversion of foreign means of payment, due either to capital inflows or changes in the forms of household savings, while their volume creates market participants' expectations of substantial foreign currency inflows to the market, which weakens the correlation between exchange rate movements and variables commonly used to explain them. Government bond issues in foreign markets have a similar effect. Uncertainty about the volume of potential inflows and the method of foreign exchange conversion to the domestic currency change the behavioural pattern in the foreign exchange market so that the coefficient of determination in rolling regressions decreases.

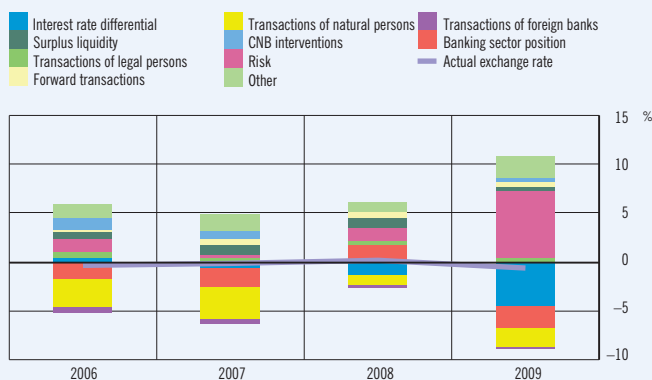
Contributions of the most important variables to changes in the modelled exchange rate in recent years were calculated to determine the extent to which individual exchange rate determinants affect exchange

**Figure 5 Major Transactions on the Zagreb Stock Exchange and the Coefficient of Determination from the Rolling Window Regressions**



Source: CNB.

**Figure 6 Contribution of Main Variables to Modelled Annual Exchange Rate Changes**



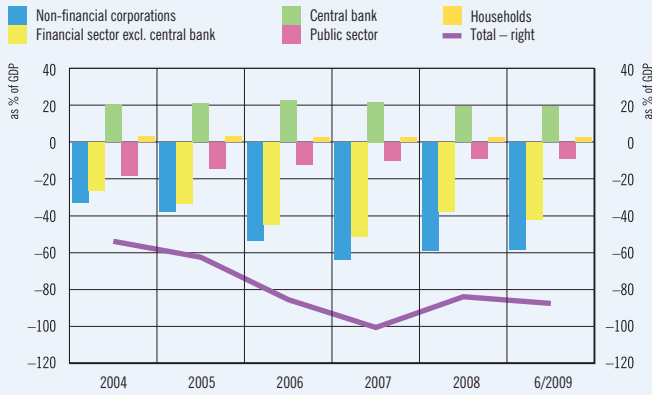
Source: CNB.

rate changes and what their impact would be if the exchange rate was continuously formed on the basis of the model described (Figure 6). Foreign exchange inflows from transactions with natural persons continuously add to the exchange rate appreciation, which is mostly due to inflows from tourism and remittances from abroad. However, this contribution to the exchange rate appreciation decreased in 2008 and, to some extent, 2009, which was due to the increase in the level of euroisation against the background of the global financial crisis. The impact of foreign bank transactions on the exchange rate appreciation was moderate in 2006 and 2007, while it was almost negligible in 2008 and 2009. Net sales of foreign exchange to legal persons, which they mostly used for the repayment of their foreign currency denominated debt and imports payment in the observed period, exerted downward pressures on the exchange rate, while their impact in 2009 was reduced due to a decrease in goods imports. The diminished activity of the foreign banks and corporate sectors is evident in the segment of forward trading as the bulk of its turnover is accounted for by these two sectors. The majority of these contributions held mostly steady in 2008 and 2009, with the exception of the impact of household and corporate transactions. Changes in these transactions somewhat offset each other (lower sale of foreign currency on the part of households and reduced purchase on the part of the corporate sector) so that the strongest contribution to depreciation of the forecasted exchange rate in 2009 came from a risk increase, which reflects significant changes in market participants' expectations.

Only with stronger downward pressures on the exchange rate in 2009 did the impact of central bank measures on exchange rate changes become more prominent. As the higher risk, i.e. exchange rate volatility, added the most to depreciation pressures, the policy of maintaining exchange rate stability proved to be justified: it stopped a negative feedback between increased exchange rate volatility and the further strengthening of depreciation pressures. The model assessed shows that depreciation pressures were mostly restrained by the widening of the interest rate differential. In addition to a decrease in interest rates abroad, the increase in the interest rate differential was due to the rise in domestic money market interest rates triggered by the stop in capital inflows.

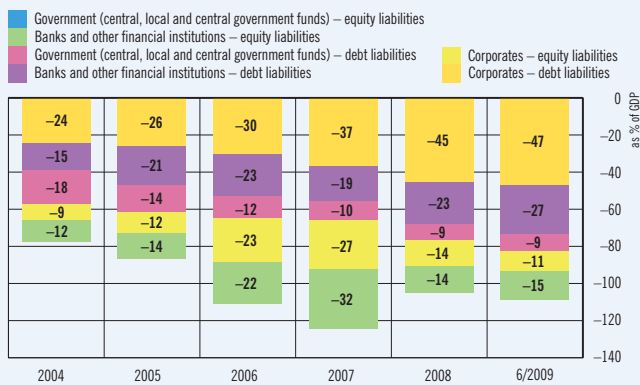
The analysis confirms that foreign exchange interventions should continue to be used to limit excessive exchange rate fluctuations so as to prevent their negative feedback on depreciation pressures. It also shows that, in view of the significant impact of large foreign exchange inflows from abroad on the process of exchange rate formation in the market, it is important to coordinate expectations of key market participants about CNB responses to large capital inflows. Furthermore, the great impact of market participants' expectations on exchange rate movements points to the need to enhance the transparency and credibility of economic policy. All this will become increasingly important with the full liberalisation of foreign exchange transactions and the forthcoming entry to the ERM II, which will change the regulatory environment and increase the country's vulnerability to speculative attacks.

Figure 1 Net Financial Position of Domestic Sectors with respect to the Rest of the World



Source: CNB.

Figure 2 Net Financial Position of Selected Domestic Sectors with respect to the Rest of the World by Equity and Debt Instrument



Source: CNB.

### Box 3 Financial Accounts for Croatia

Financial accounts describe financial relations among institutional sectors of the domestic economy and their relations with the rest of the world. By presenting total inter-sector claims and liabilities of particular sectors and their net financial position, which indicates the sectors that are sources of financial surpluses and the sectors that are sources of financial deficits, financial accounts also provide an insight into financial instruments used in inter-sector financial transactions as well as their currency and maturity breakdown. These constitute key information needed to make an economic analysis for the purposes of economic and business policy makers, for both the public and private sectors. The text below presents a several-year dynamics of certain aspects of intersector financial relations that are particularly interesting for the analysis of financial system stability.

The overall net financial position of all sectors vis-à-vis the rest of the world slightly deteriorated from the end of 2008 to the end of the first half of 2009. Commercial banks continued to increase their net debt liabilities by withdrawing deposits from foreign banks after monetary measures were relaxed, while they increased their deposit-related foreign liabilities. Foreign credit liabilities of other financial institutions also grew in the first half of 2009. The net position of non-financial corporations vis-à-vis the rest of the world remained unchanged as the fall in equity liabilities was offset by the increase in debt liabilities caused by the continued corporate foreign borrowing (Table 1 and Figures 1 and 2).

Table 1 Inter-Sector Claims and Liabilities at end-2008 and end-June 2009

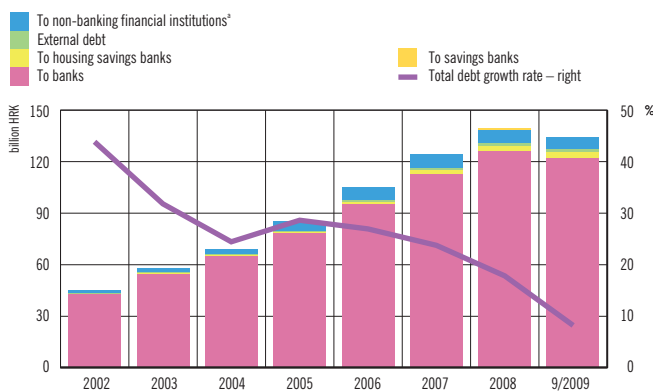
as % of GDP

Liabilities		Claims												Total liabilities	
		Domestic sectors										Rest of the world			
		Corporates		Financial sector		General government		Households		Total					
		2008	6/2009	2008	6/2009	2008	6/2009	2008	6/2009	2008	6/2009				
Corporates	Monetary gold and SDRs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Currency and deposits	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Securities other than shares	0	0	2	2	0	0	0	0	2	2	1	1	3	3
	Loans	0	0	38	39	0	0	0	0	38	39	38	40	75	78
	Shares and equity	34	34	3	3	27	28	17	17	81	81	19	18	100	99
	Insurance technical provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other claims and liabilities	31	31	1	1	5	5	2	2	39	40	11	11	50	51
	<b>Total</b>	<b>65</b>	<b>65</b>	<b>43</b>	<b>44</b>	<b>33</b>	<b>33</b>	<b>19</b>	<b>19</b>	<b>160</b>	<b>161</b>	<b>68</b>	<b>70</b>	<b>228</b>	<b>231</b>
Financial sector	Monetary gold and SDRs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Currency and deposits	15	13	17	18	2	2	48	49	82	82	11	13	93	95
	Securities other than shares	0	0	0	0	0	0	0	0	0	0	3	3	3	3
	Loans	0	0	6	7	0	0	0	0	6	7	24	24	30	30
	Shares and equity	2	2	2	2	7	7	3	4	14	14	16	17	30	31
	Insurance technical provisions	1	1	1	1	0	0	11	12	13	13	0	0	13	13
	Other claims and liabilities	1	1	1	1	0	0	1	1	3	3	1	1	4	4
	<b>Total</b>	<b>19</b>	<b>17</b>	<b>26</b>	<b>28</b>	<b>9</b>	<b>9</b>	<b>64</b>	<b>65</b>	<b>118</b>	<b>120</b>	<b>55</b>	<b>57</b>	<b>173</b>	<b>177</b>
General government	Monetary gold and SDRs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Currency and deposits	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Securities other than shares	0	0	16	16	0	0	0	0	16	16	5	5	21	22
	Loans	0	0	6	8	0	0	0	0	6	8	3	4	9	12
	Shares and equity	0	0	0	0	29	29	0	0	29	29	0	0	29	29
	Insurance technical provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other claims and liabilities	4	4	0	0	0	0	2	2	6	6	0	0	6	6
	<b>Total</b>	<b>4</b>	<b>4</b>	<b>22</b>	<b>25</b>	<b>29</b>	<b>29</b>	<b>2</b>	<b>2</b>	<b>57</b>	<b>60</b>	<b>9</b>	<b>9</b>	<b>65</b>	<b>69</b>
Households	Monetary gold and SDRs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Currency and deposits	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Securities other than shares	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Loans	0	0	39	38	0	0	0	0	39	38	1	1	39	39
	Shares and equity	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Insurance technical provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other claims and liabilities	0	0	1	1	0	0	0	0	1	1	0	0	1	1
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>40</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>40</b>	<b>1</b>	<b>1</b>	<b>41</b>	<b>40</b>
Rest of the world	Monetary gold and SDRs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Currency and deposits	0	0	15	13	0	0	3	3	18	16	0	0	18	16
	Securities other than shares	0	0	19	19	0	0	0	0	19	19	0	0	19	19
	Loans	0	0	1	1	0	0	0	0	1	1	0	0	1	1
	Shares and equity	5	7	1	2	0	0	0	0	6	9	0	0	6	9
	Insurance technical provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other claims and liabilities	4	4	0	0	0	0	0	0	4	4	0	0	4	4
	<b>Total</b>	<b>9</b>	<b>11</b>	<b>37</b>	<b>34</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>49</b>	<b>49</b>	<b>0</b>	<b>0</b>	<b>49</b>	<b>49</b>
Total	Monetary gold and SDRs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Currency and deposits	15	13	32	32	2	2	51	52	100	98	11	13	111	111
	Securities other than shares	0	0	37	37	0	0	0	0	37	37	9	9	46	46
	Loans	0	0	89	93	0	0	0	0	89	93	66	67	155	161
	Shares and equity	41	43	6	6	63	64	20	20	130	133	35	35	165	168
	Insurance technical provisions	1	1	1	1	0	0	11	12	13	14	0	0	13	14
	Other claims and liabilities	40	40	3	4	6	6	6	6	54	55	12	12	66	67
	<b>Total</b>	<b>97</b>	<b>97</b>	<b>168</b>	<b>172</b>	<b>71</b>	<b>72</b>	<b>88</b>	<b>89</b>	<b>423</b>	<b>430</b>	<b>133</b>	<b>136</b>	<b>556</b>	<b>566</b>

Source: CNB.

# Household Sector

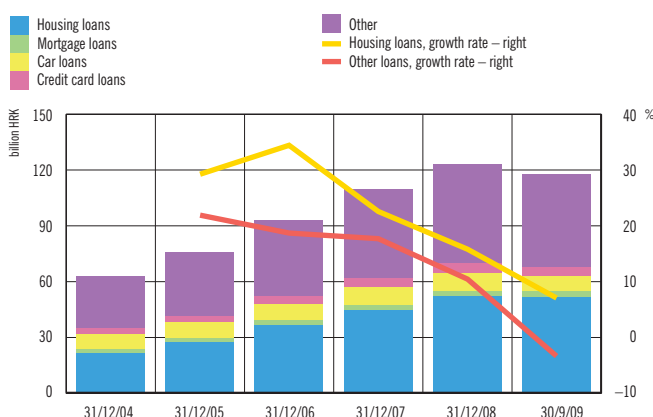
Figure 26 Household Debt



\*Data on household debt to leasing companies and insurance companies are based on estimates.

Sources: CNB and HANFA.

Figure 27 Household Loans by Purpose



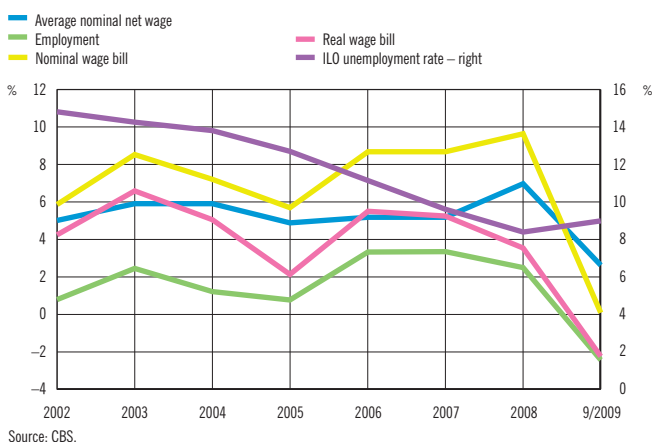
Source: CNB.

Unfavourable labour market developments and harsher lending terms in the first nine months of 2009 put a stop to debt growth and reduced household indebtedness. Household liabilities are not expected to grow substantially in 2010. However, due to the rising currency and interest rate risk exposure, and unemployment risk in particular, the number of households facing difficulties in servicing their credit obligations is likely to continue growing.

The deterioration of the macroeconomic environment in 2009 halted the several-year trend of rapid growth in household debt, which decreased by HRK 3.9bn or 2.8% in the first nine months of 2009. As a result, debt stayed steady at an annual basis (-0.2%), while it grew by 11.4% in 2008 (Figure 26). Weaker household demand for loans was largely due to negative trends in the domestic labour market in the previous year. In the first three quarters of 2009, employment decreased by 2.4% from the same period of 2008 under the impact of the private sector's adjustment to recession (Figure 28), while the average real wage held steady. These adverse trends in the labour market and increased tax burden in the second half of 2009 led to a stagnation in real disposable income on a whole-year basis.

The rise in the lending rates of banks and the tightening of non-interest credit terms contributed to a reduction in household borrowing in 2009. In the first nine months of 2009, the balance of all bank loans decreased, particularly that of car and credit card loans. This led to an annual decline in all loan categories, with the exception of home loans, which grew at a much slower pace than in the previous year (Figure 27). The continuation of negative labour market trends forecasted for the first part of 2010 will further weaken demand for loans. A possible positive impact of economic recovery on household disposable

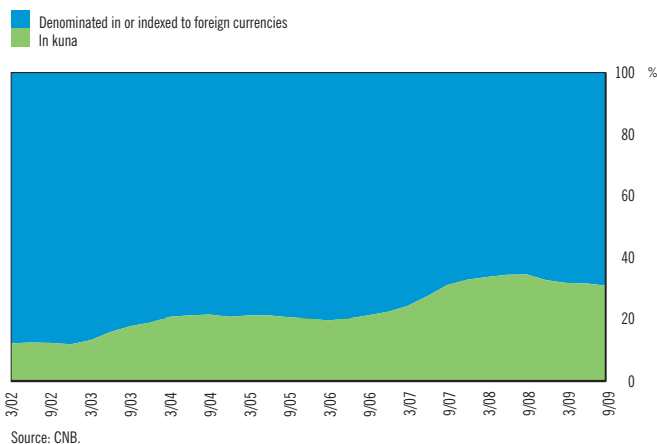
Figure 28 Unemployment, Employment and Wages



income and a parallel decrease in interest rates could give a slight boost to demand in the second half of 2010.

The downward trend in the share of kuna loans in total loans that began in late 2008 continued in the first three quarters of 2009. At end-September 2009, the share of loans denominated in or indexed to foreign currencies in total loans rose to a two-year high of 69.2% (Figure 29). The stagnation of home loans, most of which are linked to exchange rate movements, and a decrease in all other types of household loans in the first three quarters of 2009 increased both the share of home loans in total loans and household exposure to the risk of kuna depreciation. In addition, most other loans granted, e.g. cash and any-purpose loans, were accounted for by loans denominated in or indexed to foreign currencies.

Figure 29 Currency Breakdown of Household Loans



The structure of household loans by interest rate variability stayed almost the same between end-2008 and end-September 2009 (Figure 30). By granting the vast majority of loans with interest rates variable within a year (96.4% of total loans), banks transferred the entire interest rate risk to the household sector. Thus, exposure of households to the risk of increased debt burden due to interest rate movements stayed high in 2009, despite the fact that, in terms of maturity, most household loans are long-term (Figure 31). Furthermore, the maturity of total household loans shortened slightly in the first nine months of 2009 due to the upward trend in the share of short-term loans in the total amount of newly-granted loans (Figure 32). The rise in the share of short-term and more expensive loans in total newly-granted household loans increased loan servicing costs.

Figure 30 Household Loans by Interest Rate Variability

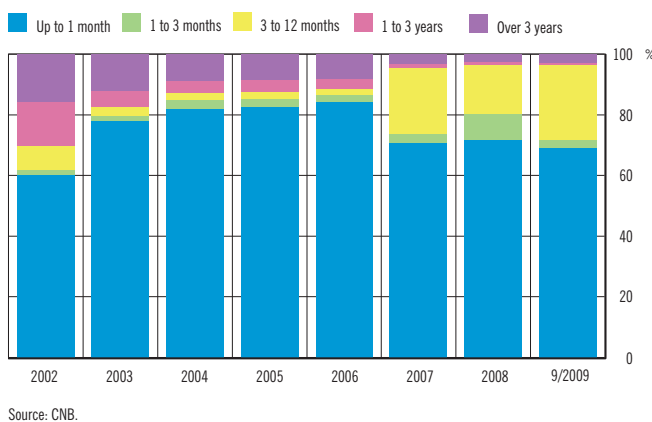


Figure 31 Breakdown of Household Loans by Remaining Maturity

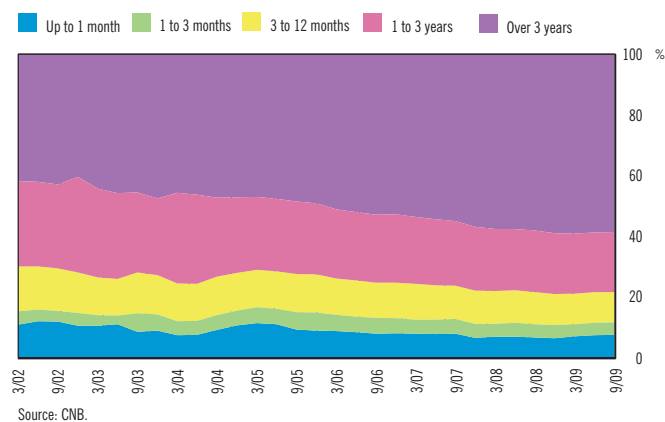
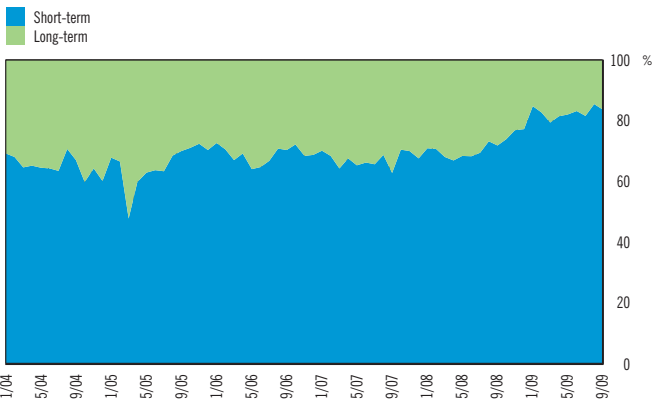
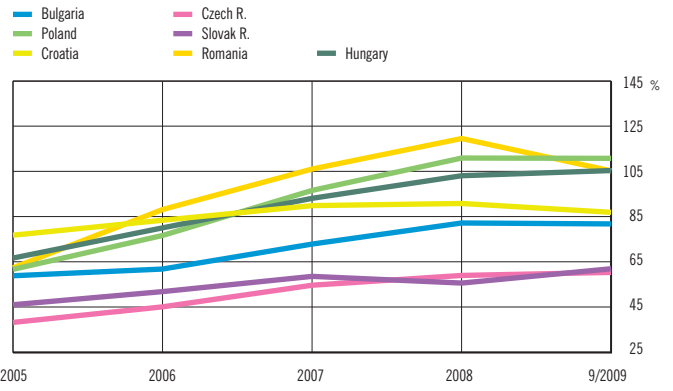


Figure 32 Maturity Breakdown of Newly-Granted Household Loans



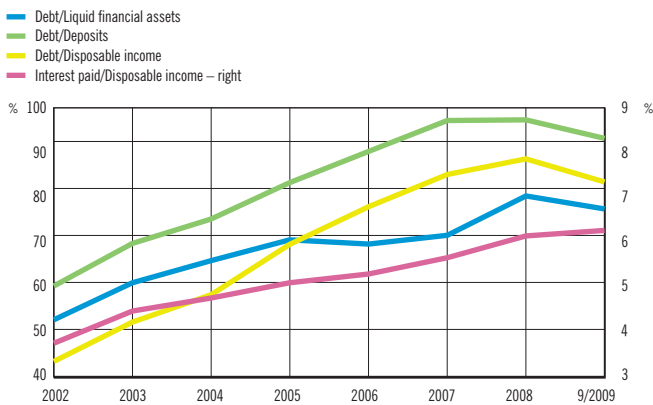
Source: CNB.

Figure 35 Household Loan-to-Deposit Ratio in Selected Central and Eastern European Countries



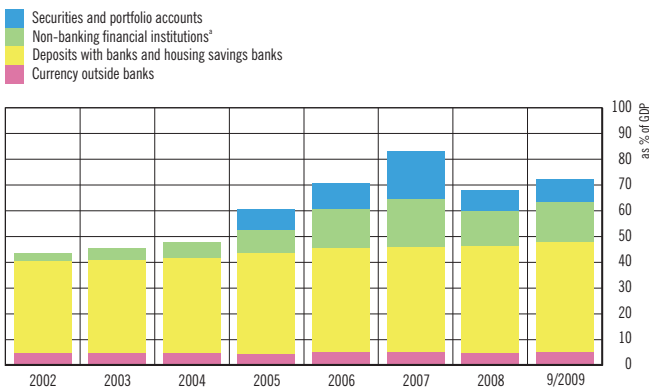
Sources: CNB and central banks of the countries observed (BNB, NBR, NBP, CNB, NBS and MNB).

Figure 33 Household Debt and Debt Burden



Sources: CNB, HANFA and CDCC.

Figure 34 Household Financial Assets



<sup>1</sup> Data on household claims against open-end and closed-end investment funds are based on estimates.

Sources: CNB, HANFA and CDCC.

The parallel recovery of the domestic capital market increased the value of assets that households invested in securities and investment funds (Figure 34). Hence, the share of debt in liquid financial assets,<sup>1</sup> deposits and disposable income of households dropped markedly from end-2008 to end-September 2009. Still, the ratio of interest payments to household disposable income deteriorated due to the upward movement in lending rates that began in late 2008 and continued for most of 2009.

Although the downward trend in employment should slow down in 2010, nevertheless the average nominal net wage will probably be slightly lower, resulting in a decline in household disposable income. This dynamics of disposable income will induce households further to reduce consumption and postpone the purchase of durable goods, particularly in the residential construction sector. Despite expectations that the amount of new loans will fall and the upward trend in interest rates reverse, household debt and debt burden indicators could also worsen. Together with the still negative labour market indicators in 2010 and the existing interest rate and currency risk, this will further erode households' capacity to service their debt regularly and raise the share of bad loans in total bank placements to this sector (see Box 4 Household Resilience to Financial and Macroeconomic Shocks).

<sup>1</sup> Household financial assets exclude foreign cash and deposits with foreign banks since their level cannot be precisely estimated.

## Box 4 Household Resilience to Financial and Macroeconomic Shocks

Relative indicators of household debt in Croatia are still comparatively good despite the several-year upsurge in household debt and the significant currency and interest rate risk. Still, aggregate data hide the information about vulnerable segments of households, particularly about the potential impact of macroeconomic shocks on their vulnerability. Therefore, it is important to see the distribution of income and debt burden among households, i.e. the debt concentration of potentially vulnerable households. To understand the developments in the number of vulnerable households and the potential impact of the financial crisis on bad household loans, the text below considers indicators of household vulnerability<sup>1</sup> on the basis of micro data on household sector debt from the Household Budget Survey (HBS).<sup>2</sup> Also analysed was household vulnerability to the materialisation of various adverse macroeconomic scenarios.

Households with the lowest disposable income per household member are usually the most vulnerable among indebted households. The analysis of HBS data shows that the percentage of indebted households in the lowest (and thus most risky) income brackets<sup>3</sup> was relatively small and steadily decreased in the period between 2005 and 2008. The share of total household debt held by households in the three lowest income brackets also decreased. The financial margin,<sup>4</sup> i.e. income available after subtracting the amount of annual loan payments and the at-risk-of-poverty threshold is another useful instrument to identify potentially vulnerable households. In terms of this concept, 15.9% of all indebted households were vulnerable at the end of 2008. At the same time, the debt held by vulnerable households accounted for 14.3% of this sector's total debt. This was less than in previous years, with the proviso, however, that the tendency for this proportion to reduce visibly slowed down. A decline in banks' exposure to risky households corresponded relatively well with the dynamics of bad household loans in the observed period.

1 *Household Credit Risk in Croatia: An Analysis Based on the Household Budget Survey* (2009) was prepared by the Institute of Economics, Zagreb and the Croatian National Bank.

2 The Household Budget Survey (HBS) is carried out annually by the Croatian Bureau of Statistics and gathers data on individual types of household income, assets and consumption.

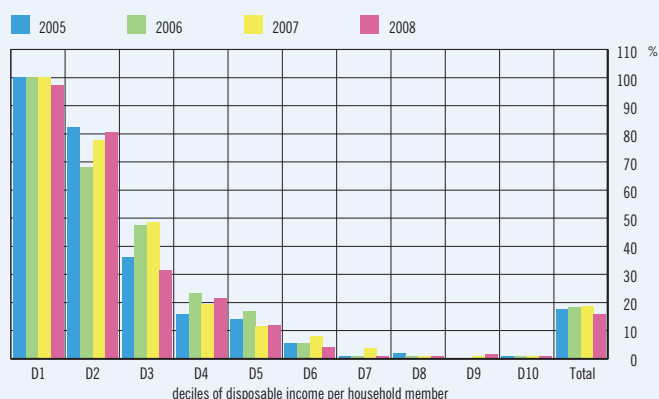
3 The total number of households included in the survey was divided according to disposable income per household member into ten groups equal in number.

4 The financial margin ( $FM_i$ ) is the income reserve available to a household after subtracting from annual household disposable income ( $HDI_i$ ) the at-risk-of-poverty threshold ( $RPT_i$ ) for a household with a certain number of members and the amount of annual loan payments ( $LP_i$ ). The at-risk-of-poverty threshold is determined for each observed household by multiplying the at-risk-of-poverty threshold for a one-person household, which is published by the CBS for each reference year, by equalised household size, in which the household head is given the coefficient 1, every other adult aged 15 and over is given the coefficient 0.5, and every child under 15 years of age is given the coefficient 0.3. A negative financial margin shows that a household with its existing disposable income has difficulties in servicing its debt, and probability of default ( $p_i^d$ ) for this household equals 1.

$$FM_i = HDI_i - RPT_i - LP_i$$

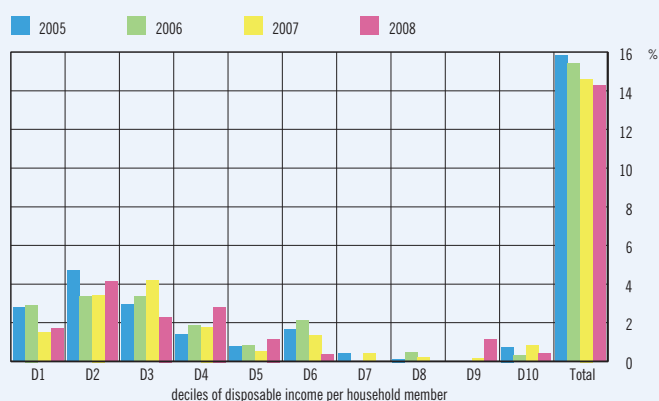
$$p_i^d = \begin{cases} 1 - FM_i < 0 \\ 0 - FM_i \geq 0 \end{cases}$$

Figure 1 Share of Households with a Negative Financial Margin in the Total Number of Indebted Households by Income Decile



Sources: CNB and EIZG.

Figure 2 Estimate of Banks' Exposure at Default Based on Loans to Risky Households by Income Decile

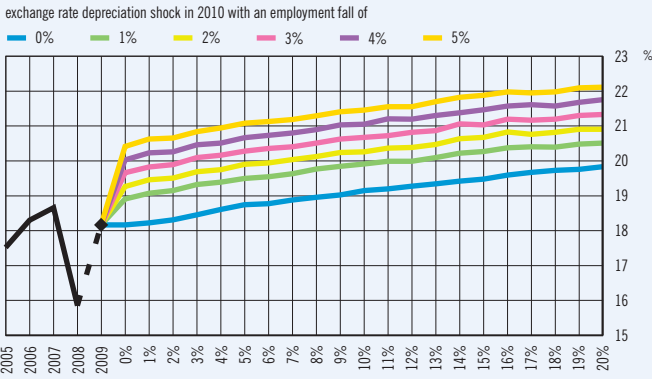


Sources: CNB and EIZG.

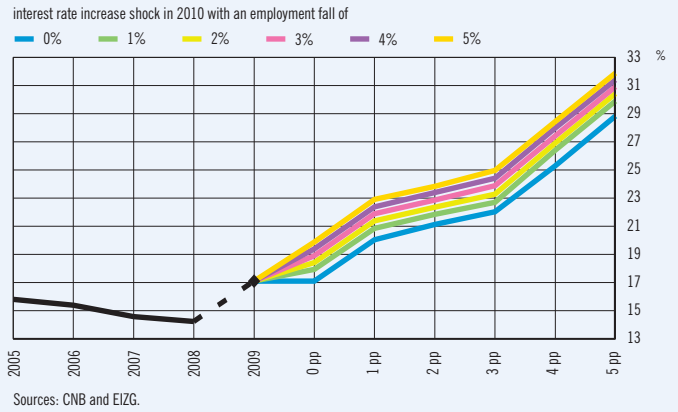
The spillover effects of the global financial crisis to the Croatian real sector in late 2008 and early 2009 increased financial and macroeconomic risks whose materialisation has already impaired households' debt servicing capacity. Negative labour market trends in 2009 and a parallel growth in households' exposure to currency and interest rate risk are expected to increase the number of vulnerable households and the share of their debt in the total sector debt. Within household stress testing, simulations of shocks arising from a fall in employment, exchange and interest rate changes as well as their combinations were conducted to assess the potential dynamics of banks' exposure to vulnerable households. To ensure easy reference and clearly outline economic policy options, individual scenarios use combinations of two shocks (employment and exchange rate or employment and interest rates); although in reality all three shocks usually occur together, as was the case in 2009. The impact of an individual shock on debt-servicing capacity and the share of bad loans granted to households were approximated by the number of households whose financial margin became negative after the simulated shock and the share of their debt in total household debt to the banking sector (exposure at default, EAD).



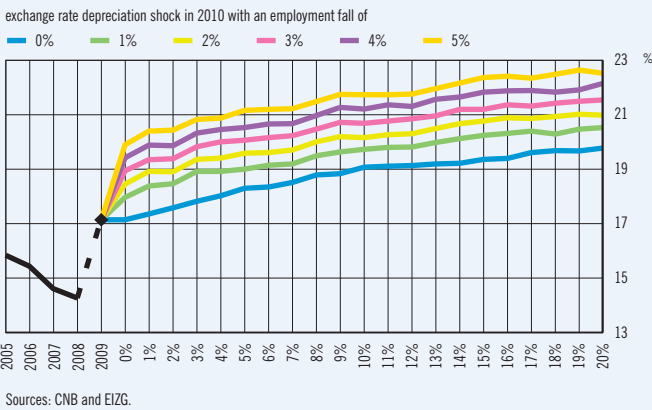
**Figure 3 Share of Vulnerable Households in the Total Number of Indebted Households after the Combined Impact of Employment and Exchange Rate Shocks**



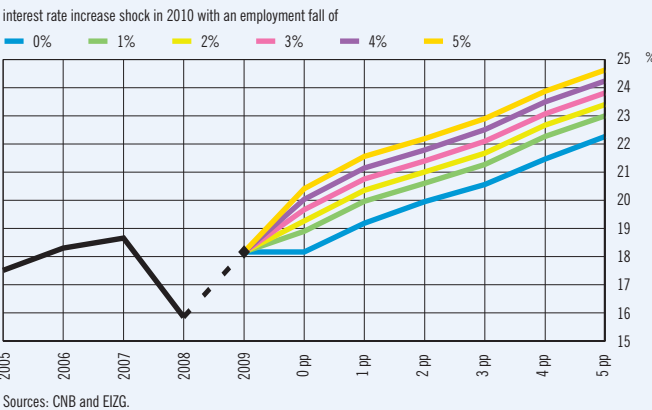
**Figure 6 Share of Vulnerable Households' Debt in Total Sector Debt after the Combined Impact of Employment and Interest Rate Shocks**



**Figure 4 Share of Vulnerable Households' Debt in Total Sector Debt after the Combined Impact of Employment and Exchange Rate Shocks**



**Figure 5 Share of Vulnerable Households in the Total Number of Indebted Households after the Combined Impact of Employment and Interest Rate Shocks**



The impact of a labour market shock on the household financial margin is expressed as the fall in annual household disposable income, while a shock of exchange rate depreciation and an interest rate increase reduces the financial margin of indebted households due to the rise in the amount of annual loan payments. The effects of these shocks on potential losses of the banking sector in the next two years<sup>5</sup> were simulated on the basis of HBS data on household income and loans in 2008. Uncertainty about the distribution of the unemployment burden, exchange rate depreciation and an interest rate increase within the household sector was also taken into account. For each scenario, a large number of simulations<sup>6</sup> was performed in which burden increase was distributed randomly among households. The average impact of each individual simulated shock, or of a combination of them, was calculated from these simulations.

The simulations conducted show that the share of households with a negative financial margin in the total number of indebted households may have exceeded 18% in 2009, which is close to its 2007 level. At the same time, the share of their debt in total debt could soar to over 17%, which is above the level recorded in previous years. Furthermore, simulations for 2010 suggest that vulnerabilities of indebted households could increase further and that the extent of this increase will depend on a particular combination of shocks. A 1 percentage point increase in the share of debt held by vulnerable households could be brought about by an employment decline of some 2%, a kuna depreciation of some 5% or an interest rate increase of close to 0.5 percentage

<sup>5</sup> Assumed intensities of shocks simulated for 2009 were calibrated according to the CNB estimate of the dynamics of the variables used in 2009, i.e. according to the most recent available data on interest rates on newly-granted bank loans. For 2010, several intensities of each individual shock were simulated, some of which are highly unlikely but plausible.

<sup>6</sup> 1000 and more.

points.<sup>7</sup> It should be borne in mind that the impact is not linear and in particular that it depends on the actual combination of these three shocks. Observing historical fluctuations in these macroeconomic variables, it is obvious that the 2009 increase in the share of debt held by vulnerable households was equally triggered by an interest rate increase of 0.4 percentage points and an employment decline of some 2% in 2009 relative to 2008.

The findings on the impact of individual shocks suggest that simulated combinations of a parallel fall in employment and an increase in loan payment amount due to exchange rate depreciation have a slightly lesser effect on the loan repayment capacity of indebted households than the combination of an employment decline and an interest rate increase. Under the worst-case scenarios,<sup>8</sup> the first combination of shocks would push the debt share held by vulnerable households to some 22%, while this share would be close to 32% in the case of the second combination of shocks.

The analysis conducted showed that, despite substantial household debt, the simulated financial and macroeconomic shocks have a relatively moderate impact on households' capacity to meet loan repayments on time. The simulated 2009 increase in the share of debt held

by vulnerable households is somewhat lesser than the increase in the share of bad loans granted to this sector in the same period. The results presented should be taken with a grain of salt due to the possibility that households facing difficulties in adjusting to lower income begin to delay their debt payments even before their financial margin becomes negative, as well as due to a potential bias of the HBS data and possible errors that could result from implicit assumptions underlying the simulations.

As it is not expected that the upward trend in bank lending rates will continue through 2010 and as no significant exchange rate depreciation is envisaged, the pressures leading to increases in loan payments should abate. At the same time, since the main risk to household credit-worthiness stems from a potential drop in household disposable income due to a decline in employment and real wages, which should be lower than in 2009, the rise in the debt share held by vulnerable households should slow down. Although the upward trend in the already large interest rate and currency exposure of the household sector combined with adverse developments in household disposable income could reduce the quality of banks' credit portfolios in this business segment, this analysis suggests that this deterioration would seriously affect the financial position of banks only in case of extreme shocks.

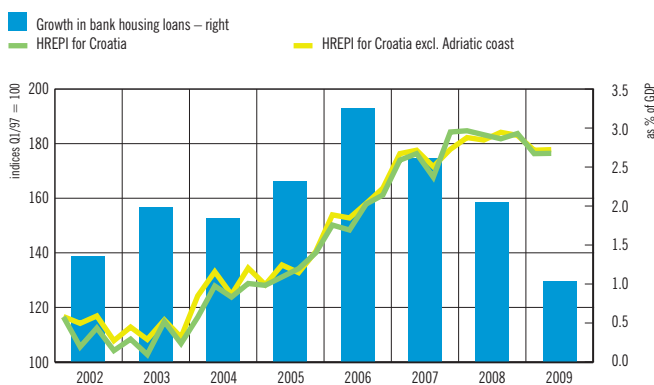
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7 The relative impact of an individual shock on the number of vulnerable households and the share of their debt in total sector debt depends, in addition to the assumed size of the simulated shock, on the initial exposure of households to each risk (in the simulations conducted, some 74% of households were exposed to currency risk, while all indebted households were exposed to interest rate risk).

8 A 5% decline in employment paired with a 20% increase in the amount of annual loan payments due to exchange rate depreciation or a 5 percentage point increase in interest rates.

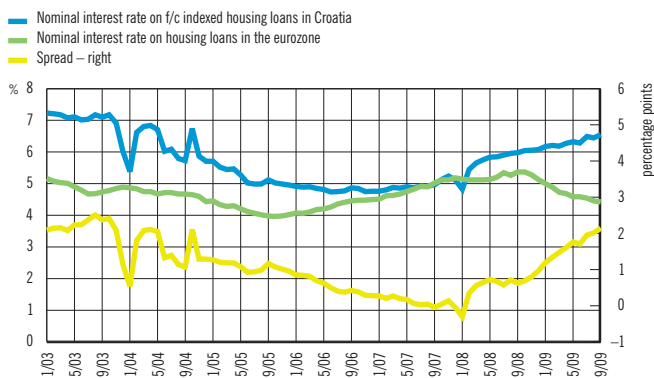
# Real Estate Sector

Figure 36 Housing Loans and HREPI<sup>a</sup> on a quarterly basis



<sup>a</sup> The hedonic real estate price index takes into account qualitative characteristics of the real estate.  
Source: CNB calculations.

Figure 37 Comparison of Interest Rates on Housing Loans in Croatia and the Eurozone



Sources: CNB and ECB.

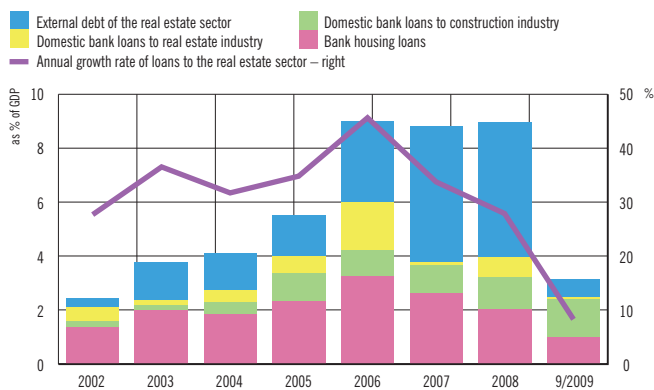
Rising unemployment risks and falling income paired with a higher level of real interest rates led to a decline in household demand for residential property, which contributed to a fall in housing prices. The downward trend in residential property prices could continue in 2010 in view of the problems in the real estate business.

The downward trend in turnover and prices in the residential real estate market began in late 2008 and gained momentum early in 2009. A particularly sharp drop in residential property prices (-4.6%) was seen in the first quarter of 2009 (Figure 36) when prices fell to the level at which they stayed for the following three months. Real estate prices on the Adriatic coast, which were more stable in 2008, decreased more than prices in the rest of Croatia in the first half of 2009. Hence, excluding the real property prices on the Adriatic coast, the year-on-year decline in real estate prices was somewhat smaller (-2.0%) in the second quarter.

The fall in residential property prices in the first half of 2009 can be accounted for by developments in fundamental factors. Deteriorating labour market conditions in 2009 reduced household disposable income by mid-year, while interest rates on home loans grew markedly in real terms, which significantly subdued home loan growth (Figures 36 and 37). The expected continuation of adverse labour market trends in 2010 and the stagnation of nominal interest rates at a relatively high level, coupled with the expected relatively low inflation will exert downward pressures on market prices of residential property towards their equilibrium level.

The option to refinance and roll over existing loan arrangements, which domestic banks offered their clients dealing in construction particularly in the first quarter of 2009, postponed a major fall in market prices of residential real estate despite

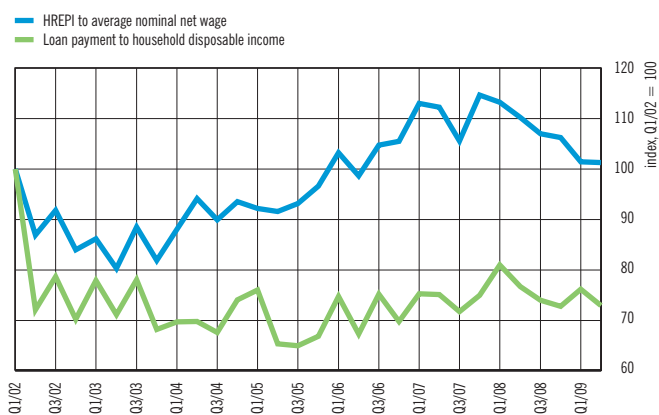
**Figure 38 Growth in Domestic and Foreign Loans to the Real Estate Sector**



Source: CNB calculations.

a sharp drop in demand. However, domestic bank lending to corporates dealing in construction slackened considerably by the end of September 2009. At the same time, the growth in the external debt of the real estate sector also lost much of its momentum, while there was a more moderate slowdown in the funding provided by domestic sources to corporates dealing in real estate activities and home loans. By the end of the third quarter of 2009, the growth in total loans to the real estate sector decelerated markedly relative to the end of 2008. The annual growth rate of these loans was 8.3% at end-September 2009 (Figure 38). This segment of the non-financial corporate sector has already faced hindered access to funding from both domestic and foreign sources. With a fall in its operating income and large unsold housing inventories, its capacity to meet financial obligations will be reduced. This will spur further growth in the sector's bad loans, which grew by almost 45% in the first nine months of 2009. In an environment of subdued demand, this could also reinforce downward pressures on house prices.

**Figure 39 Financial Availability of Housing Loans**

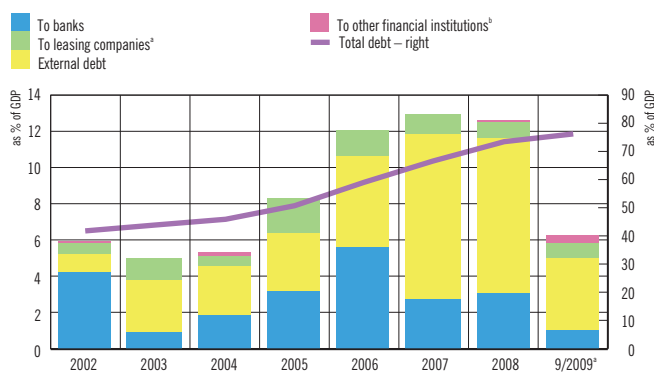


Sources: CBS and CNB calculations.

The financial availability of residential real estate improved from the end of 2008 to the end of the first half of 2009 (Figure 39). This was due to the drop in residential property prices and a relatively slow adjustment of the labour market. Still, adverse labour market trends in the second half of 2009 and their expected continuation in the first half of 2010 (though at a slower pace) will not improve the financial availability of real estate property and will limit the potential boost to demand from the lower prices expected. The fall in operating income of corporates dealing in construction and real estate activities due to stronger downward pressures on market prices of residential property, paired with increasingly scarce and relatively expensive funding sources and growing illiquidity will postpone new investment activity of this sector and increase its refinancing and default risks.

# Non-Financial Corporate Sector

Figure 40 Change and Non-Financial Corporate Debt Stock

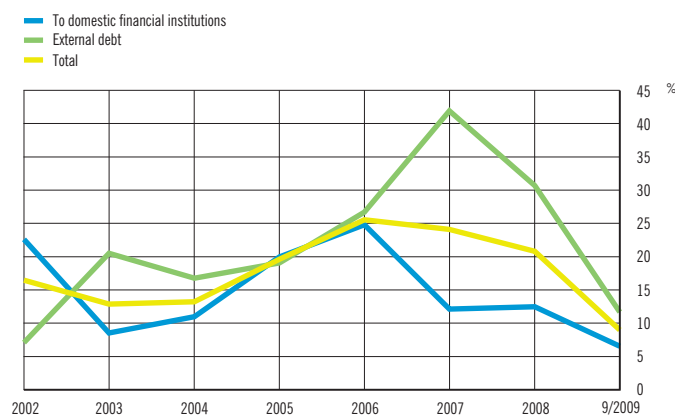


<sup>a</sup> Estimate. <sup>b</sup> Debt to insurance companies in September 2009 was approximated by loans (including interest).

<sup>c</sup> Year-on-year increase in debt as at end-September 2009.

Sources: CNB and HANFA.

Figure 41 Annual Growth Rate of Non-Financial Corporate Debt



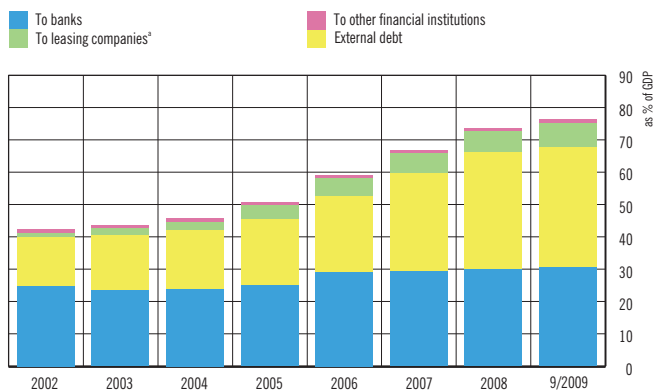
Sources: CNB and HANFA.

Much slower domestic and foreign borrowing by non-financial corporations in the first nine months of 2009 ran parallel to the sectoral reallocation of resources and changes in lending policies that, together with corporate sector restructuring, helped bring about an economic recovery in general. Corporate exposure to currency and credit risk continued to increase, particularly in the non-tradable sector. Growing illiquidity and subdued market expectations coupled with increased corporate debt burden are holding back economic recovery.

The culmination of the financial crisis in early 2009 had a dampening impact on the borrowing of non-financial corporations. The pace of their borrowing steadily slowed down in the rest of the year in continuation of the previous year's trends. This reduced the annual growth rate of non-financial corporate debt to below 10% in September 2009. Slower debt growth was also the result of weaker corporate demand for loans, which was due to a decline in overall economic activity, as well as to less available and more expensive domestic and foreign funding sources.

Changes in the funding structure of non-financial corporations also continued; a marked slowdown in their domestic market borrowing in the first nine months of 2009 was coupled with significantly slower growth in foreign borrowing. Among domestic sources, bank lending decelerated the most, reflecting also the fact that banks tightened their lending policies in response to increased credit risk. With the exception of investment funds, whose exposure to the corporate sector declined for three consecutive years, corporate debt to leasing companies and other financial institutions continued to grow at a

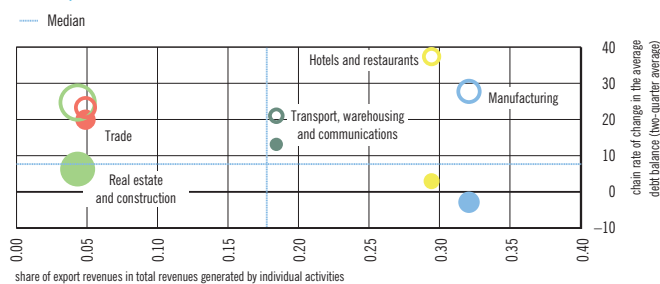
Figure 42 Non-Financial Corporate Debt



\*Data on debt to leasing companies are based on estimates.

Sources: CNB and HANFA.

Figure 43 External Debt Allocation by Sectors from March to September 2009

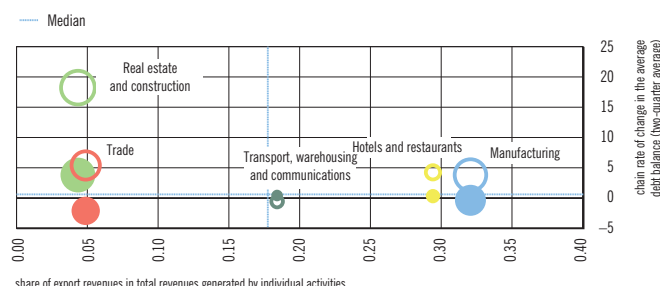


share of export revenues in total revenues generated by individual activities

Note: A full circle denotes the debt dynamics in the last two quarters observed (average debt balance at end-June and end-September 2009 relative to the average debt balance at end-December 2008 and end-March 2009). An empty circle denotes the same change in the debt balance in the previous period (average debt balance at end-December 2008 and end-March 2009 relative to the average debt balance at end-June and end-September 2008). The size of the circle denotes the significance of a particular activity's share in total external debt of non-financial corporations, with the debt balance at end-September 2009 used as the debt indicator. Activities accounting for a relatively minor share in total debt are not presented.

Sources: CNB (external debt) and FINA (export and total revenues).

Figure 44 Allocation of Domestic Bank Loans by Sectors from March to September 2009



share of export revenues in total revenues generated by individual activities

Note: A full circle denotes the debt dynamics in the last two quarters observed (average debt balance at end-June and end-September 2009 relative to the average debt balance at end-December 2008 and end-March 2009). An empty circle denotes the same change in the debt balance in the previous period (average debt balance at end-December 2008 and end-March 2009 relative to the average debt balance at end-June and end-September 2008). The size of the circle denotes the significance of a particular activity's share in total debt of non-financial corporations to domestic banks. Activities accounting for a relatively minor share in total debt are not presented.

Sources: CNB (loans by activity) and FINA (export and total revenues).

relatively steady pace in this period (Figure 40). Similar trends in the domestic market are expected to continue through 2010, while corporate external debt should grow somewhat more than in 2009.

The beginning of recovery in foreign markets and a reduction in the country risk premium in the first half of 2009 facilitated access to foreign sources. However, this did not affect the dynamics of foreign borrowing by the non-financial sector, which slowed down considerably in 2009. Coupled with a fall in the annual growth rate of external debt to slightly above 10%, this ended the years-long dominance of this source of corporate funding (Figure 41). In terms of the debt-to-GDP ratio, corporate debt burden has been steadily growing, in part due also to the GDP fall (Figure 42).

Domestic bank loans held steady in the second and third quarters, with the exception of loans to corporates in the construction sector. They continued borrowing, but the pace of their loan growth slowed down the most. Similar trends were visible in foreign borrowing by activity though corporates from the non-tradable sector continued to predominate (Figures 43 and 44). This is partly due to the fact that these corporates are in majority foreign ownership, particularly those in the trading sector. The reduction in inventories, which began in manufacturing in the observed period, may also have led to the relative decrease in demand for loans.

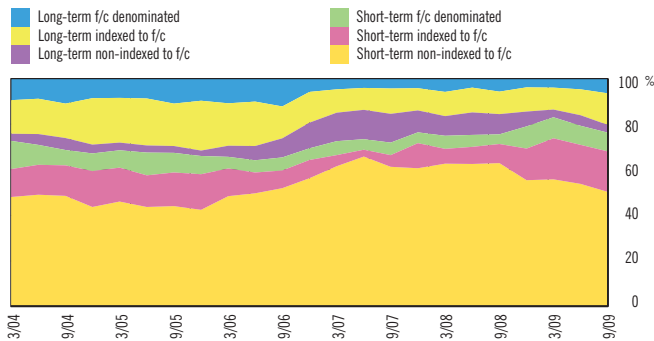
In a situation of heightened uncertainty in which the quality of the corporate loan portfolio was increasingly likely to deteriorate, banks protected themselves against credit and currency risks by granting more loans with short-term maturities and a currency clause, as well as by the stated sectoral reallocation of credit potential (Figure 45). The changes in the currency structure reflect banks' attempts to balance their currency position at the time when the share of foreign currency funding was increasing. As a result, the share of the non-financial corporate sector debt denominated in foreign currency rose to 85% at end-September 2009, additionally increasing the sector's currency risk relative to the beginning of the year (Figure 46).

An increase in currency risk was also recorded by corporates in the non-tradable sector. Although their external borrowing in the last six months continued at a slower pace than before, it still outpaced external borrowing by other sectors.

As the non-tradable sector increasingly borrows in foreign currency and mostly does not generate foreign currency income, any exchange rate depreciation is likely to hit this sector even harder than in early 2009 (Figure 47). Although the currency risk exposure of corporates in the tradable sector also increased, these corporates still managed to keep it at a lower level as they generated substantial foreign currency income, which is a natural protection against currency risk.

Notwithstanding a slight increase in the share of loans with interest rates fixed for up to a year, the sensitivity of non-financial corporations to interest rate risk remained high. Some 70% of domestic bank loans were made with interest rates variable

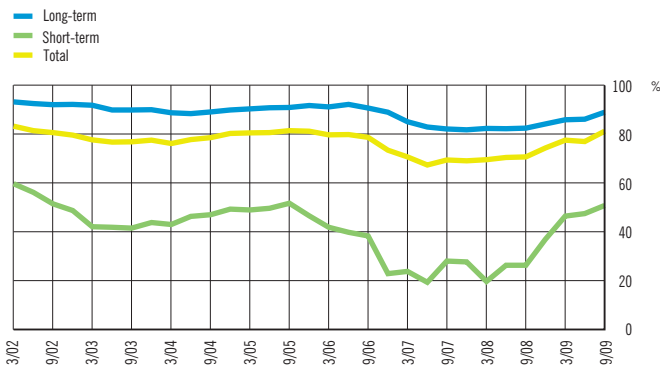
Figure 45 Breakdown of Newly-Granted Loans to Non-Financial Corporations by Maturity and Currency



Note: Short-term loans comprise personal overdrafts, which are statistically recorded as newly-granted loans in each month.

Source: CNB.

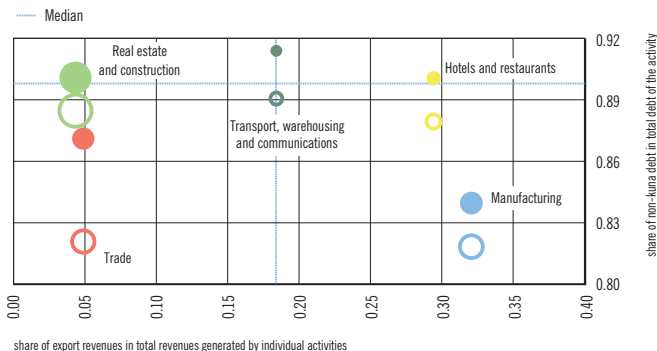
Figure 46 Share of Corporate Non-Kuna Debt<sup>a</sup> in Total Loans



<sup>a</sup>It is assumed that total external debt is denominated in foreign currencies.

Source: CNB.

Figure 47 Currency Exposure

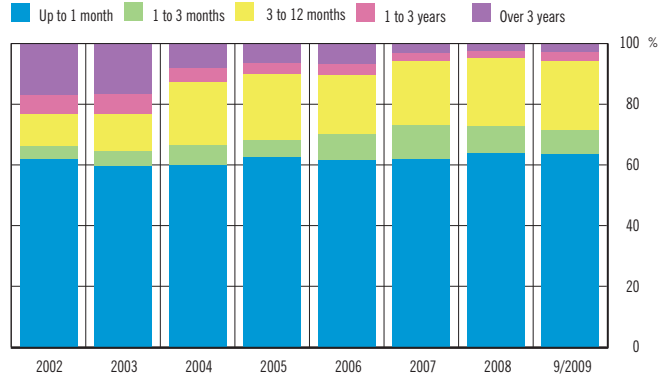


share of export revenues in total revenues generated by individual activities

Note: A full (empty) circle denotes the share of non-kuna debt in September (March) 2009. The size of the circle denotes a particular activity's share in total debt of non-financial corporations. Activities accounting for a relatively minor share in total debt are not presented.

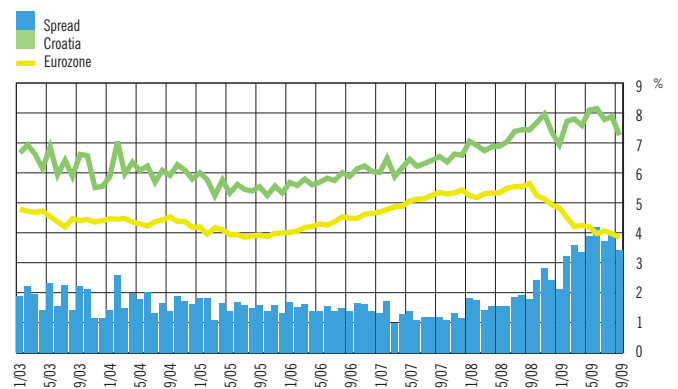
Sources: CNB (loans by activity) and FINA (export and total revenues).

Figure 48 Breakdown of Bank Loans to Non-Financial Corporations by Interest Rate Variability



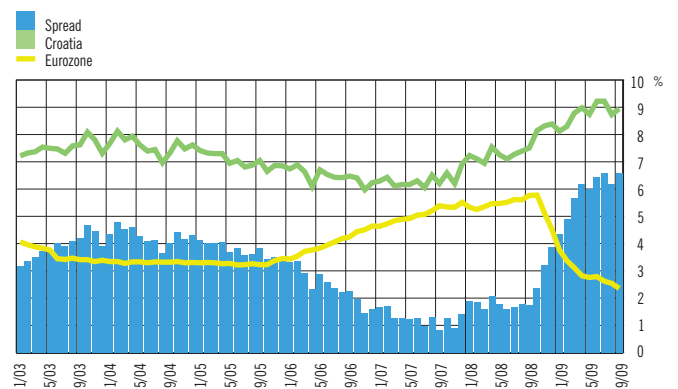
Source: CNB.

Figure 49 Interest Rates on Long-Term Loans to Non-Financial Corporations in Croatia and the Eurozone



Sources: CNB and ECB.

Figure 50 Interest Rates on Short-Term Loans to Non-Financial Corporations in Croatia and the Eurozone



Sources: CNB and ECB.

Figure 51 Ratio of Transaction Account Deposits of Non-Financial Corporations to Gross Value Added

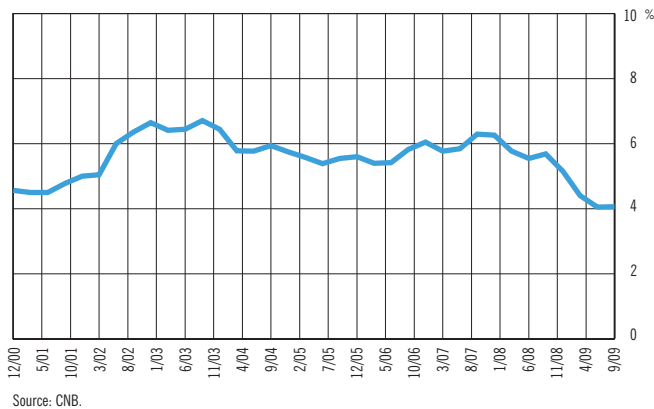
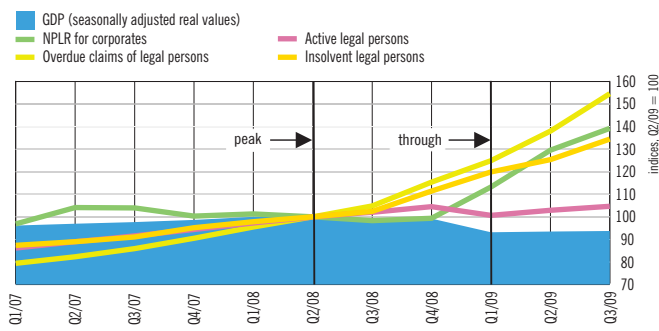


Figure 52 Features of Financial Crisis Development (shock transmission to the quality of corporate loans)



Note: There was a break in the time series for overdue claims and insolvent legal persons in the second quarter of 2008 due to the closure of a certain number of blocked accounts in one commercial bank. This effect was corrected (by linear extrapolation) to present more accurately the dynamics of these variables.

Sources: CBS, CNB and CCE.

within three months and close to 95% of loans were made with interest rates variable within a year (Figure 48). Interest rate risk was also increased by the fact that most foreign loans were issued at variable interest rates.

The upward trend of interest rates on corporate loans in Croatia came to a halt in mid-2009 in response to a reduction in the country risk premium, improved availability of funding sources and banks' efforts not to impair the payment capacity of non-financial corporates by adding to their interest burden, particularly in recessionary times. Short-term loans, particularly newly-granted kuna loans, were attended by interest rates that grew more strongly as banks' kuna sources were relatively scarce and as such loans were the only option available to riskier corporations; however, these rates had also stabilised by mid-2009. The downward trend in interest rates on long-term corporate loans gained momentum, in part probably due to the better credit standing of corporations that could obtain long-term loans at the time. In direct response to cuts in reference rates of the European Central Bank, interest rates on corporate loans in the eurozone remained extremely low. After interest rates on corporate loans in Croatia and the eurozone moved in divergent directions for a year, the spread between these rates became stable, though still wide, in mid-2009 (Figures 49 and 50). In view of the signs of a further decrease in interest rates on domestic loans in early 2010 and of the fact that the eurozone interest rates were stable or slightly higher in that period, the said interest rate differential should soon become narrower.

Corporate liquid assets remained at a low level as funding sources were more expensive and corporate operating incomes lower, while growing illiquidity slowed down both the process of resource allocation to more profitable activities and the pace of economic recovery (Figure 51). Pressures on corporate liquidity will probably not be eased immediately after the economic recovery begins, which means that default risk could continue to rise for a while. The impact of macroeconomic shocks on the economy's structure is felt with a lag. Together with the still heavy corporate debt burden, this stimulates the rise in the number of frozen accounts, i.e. of illiquid economic entities, slows down the opening of new businesses and deteriorates the quality of banks' credit portfolios (Figure 52). The ratio of non-performing loans to total corporate loans granted by domestic banks began to grow a full year after the beginning of the real economic downturn. This ratio is expected to continue growing in the early stage of economic recovery, with a reversal to the trend not likely to occur in the first part of 2010.



# Banking Sector

Figure 53 Annual Growth Rate of Major Banking Sector Balance Sheet Items<sup>a</sup>



<sup>a</sup> An increase in balance-sheet items at end-2009 was calculated relative to end-2008.

Source: CNB.

The macroeconomic shock spurred a sharp increase in charges for value adjustments, which in turn led to a significant fall in bank earnings. Banks responded by embedding expected losses on their credit portfolios into the interest rate spread, and implementing a stricter cost control and more cautious lending policies. Simulations of banks' resilience to external shocks suggest that the banking sector should remain stable in the following period. However, as regulatory reserves and bank earnings have been substantially reduced, some banks may need capital injections.

Figure 54 Banking Sector Liabilities<sup>a</sup>



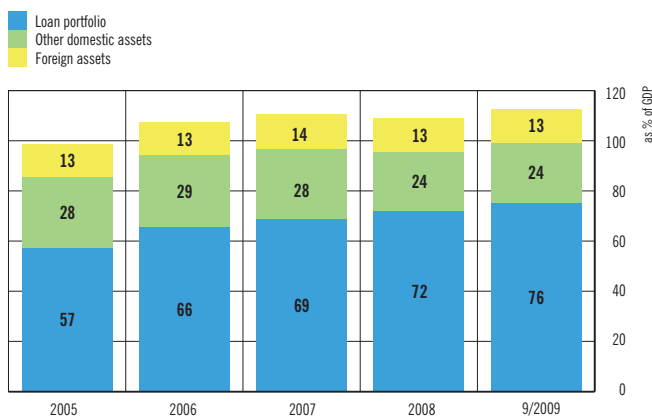
<sup>a</sup> Collectively assessed impairment provisions represent the difference between banking sector assets and banking sector liabilities and capital.

Source: CNB.

## Balance-Sheet Vulnerabilities

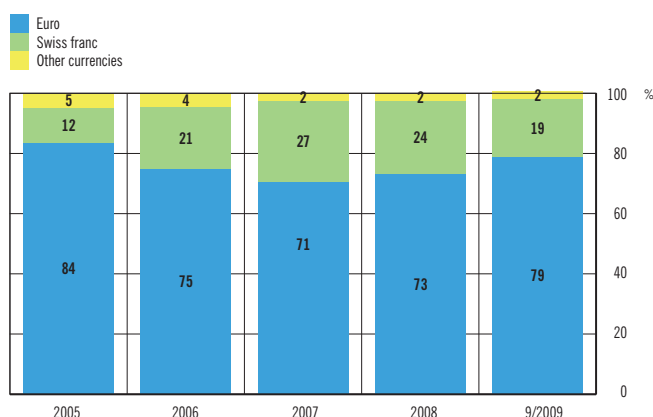
In the first nine months of 2009, banks continued to rely on foreign sources, above all deposits of their foreign owners, to compensate for the sluggish collection of resident deposits, the growth of which slowed down after the confidence crisis and the brief outflow in early October 2008. Stronger owners' support in the form of deposits paired with a slight increase in resident deposits and reliance on previously accumulated liquidity reserves enabled banks to continue their lending activities in 2009. As their total assets grew by only 1% in the first nine months of 2009, the room for a 2% credit growth was created by a 3% decrease in bank foreign assets and a marginal decrease in other forms of domestic assets. However, banks continued to maintain foreign liquidity reserves at a level much higher than the new, lower regulatory minimum, which suggests greater caution in granting loans (Figure 53).

Figure 55 Banking Sector Assets



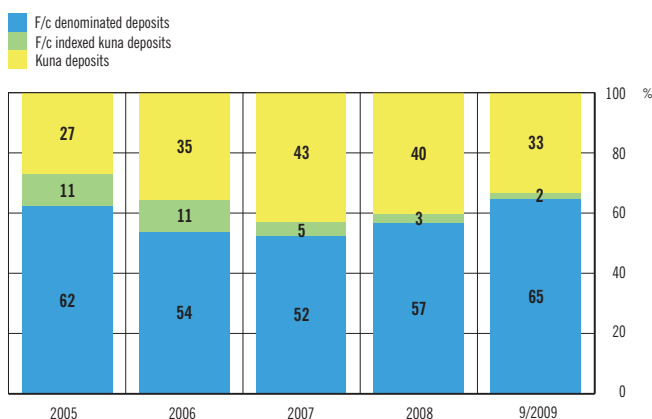
Source: CNB.

Figure 58 Currency Breakdown of Non-Kuna Loans



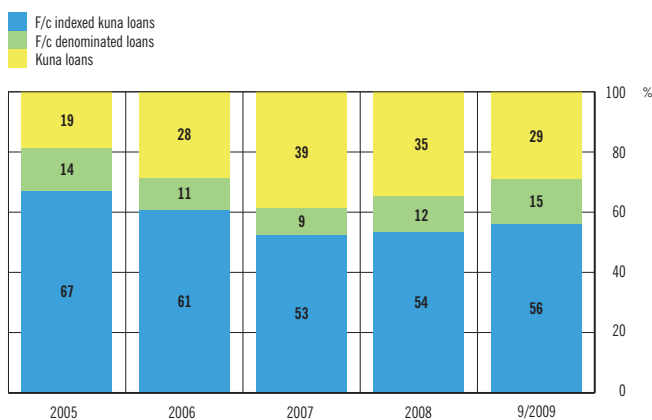
Source: CNB.

Figure 56 Currency Breakdown of Deposits



Source: CNB.

Figure 57 Currency Breakdown of Loans



Source: CNB.

These changes further increased the dominance of loan portfolios in bank assets.<sup>2</sup> The slight growth in total bank assets and the parallel sharp drop in GDP increased the ratio of banking sector assets to GDP by four percentage points, to 113% at end-September (Figures 53, 54 and 55).

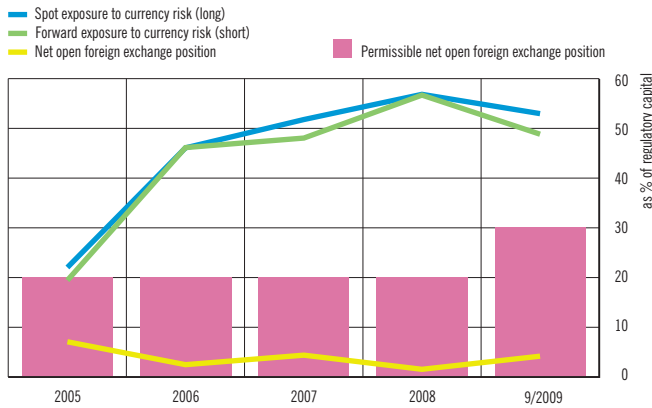
Overall credit growth was attributable to heavy lending to the government, particularly in early 2009, while household and corporate loans decreased by 2% in the first nine months of 2009. In such a period of economic downturn, this decrease can be explained by both the supply- and demand-side factors. Weaker household and corporate demand for loans was accompanied by difficulties in finding creditworthy clients.

The banks used some of the liquidity released in early 2009 by the central bank to stabilise their operations and facilitate the refinancing of government external debt. In the remainder of the year, by implementing prudent lending criteria, banks largely restored their liquid foreign assets and continued to maintain them above the prescribed minimum, mostly in the form of deposits with foreign banks. As foreign assets grew in the second and third quarters of 2009, their fall was only marginal relative to the end of 2008 (Figures 53 and 55).

Bank capital increased slightly in the first nine months of 2009 due to earnings, while there were no major capital injections in the period of the global financial turmoil. Basel II implementation will have no major impact on the capital needs of banks

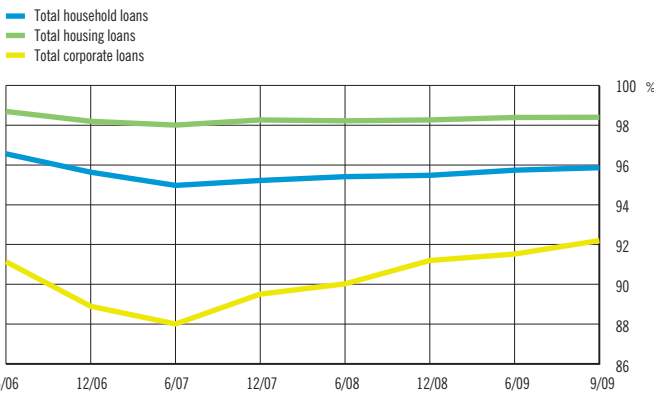
<sup>2</sup> In bank reports, the value of loans is presented on the net principle, i.e. the value of granted loans is reduced by the amount of value adjustments on these loans. Thus, although corporate and household loans decreased by 1.7% in the first nine months of 2009, their net value dropped by 2.5%. Also, the value of loans and deposits is expressed in kuna, which means that exchange rate changes may decrease or increase non-kuna items. The kuna held almost steady against the euro (appreciating by some 0.5%) and appreciated against the Swiss franc by some 1.8% between end-2008 and end-September 2009. This means that exchange rate trends did not much affect nominal loan growth in the period under review. Aggregate banking sector indicators were influenced by one large bank that settled issued bonds upon maturity, thereby halving the amount of total securities issued (Figures 1 and 2).

Figure 59 Bank Exposure to Currency Risk



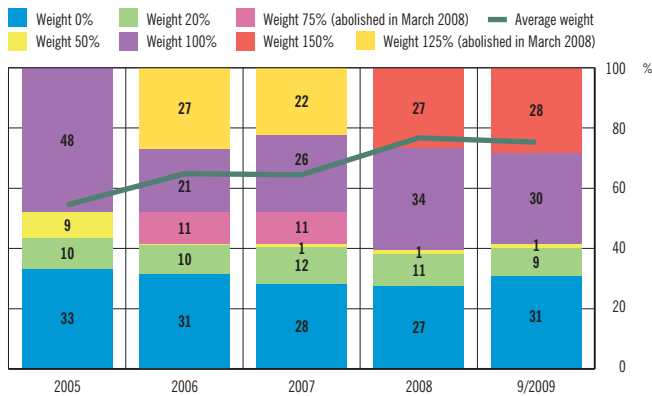
Source: CNB.

Figure 60 Share of Unhedged Loans in Total Loans Exposed to CICR



Source: CNB.

Figure 61 Distribution of Bank Assets by Assigned Weight and the Average Weight



Source: CNB.

as the higher minimum required capital adequacy ratio of 12% (the current ratio is 10%) will be offset by more lenient rules for the calculation of risk exposure. Still, some banks could need additional capital due to losses arising from higher charges for value adjustments. These charges, whose growth usually lags behind the slowdown in economic activity, will put pressure on bank earnings. Hence, the least-capitalised banks will have to raise additional capital or reduce their risk exposure.

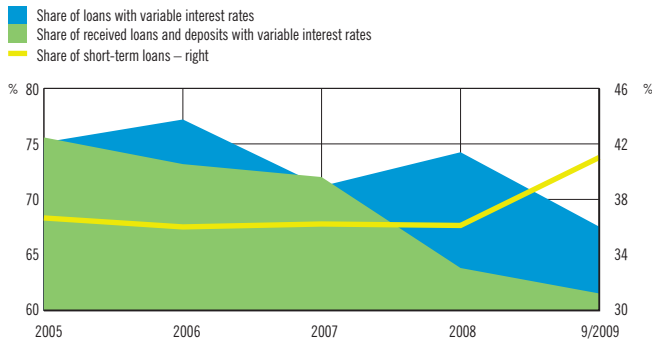
The delayed impact of unfavourable macroeconomic developments in 2009 on the increase in charges for value adjustments and the continued sluggish growth in resident deposits will sap the banks' ability to support economic recovery in 2010 by increased lending. However, their relatively solid liquid position combined with renewed foreign capital inflows should trigger the gradual normalisation of credit flows in 2010.

In this period of recessionary pressures and heightened uncertainty, bank liabilities underwent a sectoral and currency restructuring that increased the share of their foreign currency component. Banks compensated for the substantial drop in corporate kuna deposits, a consequence of hampered business, by foreign currency deposits of foreign financial institutions, of banks' owners in particular. Parallel to the fall in the absolute amount of resident deposits relative to the pre-crisis period (September 2008), households continued increasingly to substitute foreign currency deposits for kuna deposits in the first nine months of 2009 (Figure 56).

The higher uncertainty that spurred the rise in the foreign currency component of bank liabilities induced banks also to increase the foreign currency component of their assets. The escalation of the crisis in late 2008 reversed the several-year upward trend in the share of kuna loans; by the end of September 2009, this share had decreased to 29% (Figure 57). The rise in the share of foreign currency-denominated or -indexed loans in total loans ran parallel to the fall in the share of loans indexed to the Swiss franc, which fell to below 20% in September 2009 and returned to its pre-2006 level. The share of euro-indexed loans continued to grow, amounting to nearly 80% (Figure 58). The weakening of the demand for loans indexed to the Swiss franc was attributable to the recent increase in the repayment burden due to the appreciation of that currency. It could also be ascribed to the relatively simple currency conversion of existing loans indexed to the Swiss franc. Lacking sources of Swiss francs, banks enabled this conversion as these loans hinder the management of their foreign currency position.

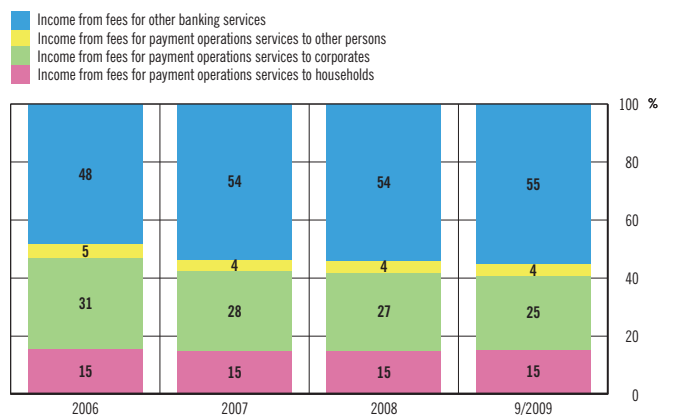
The increasing dominance of foreign currency loans and loans with a currency clause, as well as the restoration of foreign assets after their early 2009 decline, increased the net open foreign exchange position to some 5% of regulatory capital in September 2009, i.e. well below the 30% limit (Figure 59). Banks' exposure to currency-induced credit risk (CICR) also grew despite their efforts to increase lending to the export sectors, which raised most loans abroad in the past. The decrease in export revenues and the increase in corporate borrowing denominated in or indexed to foreign currencies thus had a predominant impact on CICR growth (Figure 60).

**Figure 62 Share of (Gross) Loans and Liabilities of Banks with Interest Rate Variable within Three Months and the Share of Loans with Remaining Maturity of up to One Year in Total Gross Loans and Liabilities of Banks**



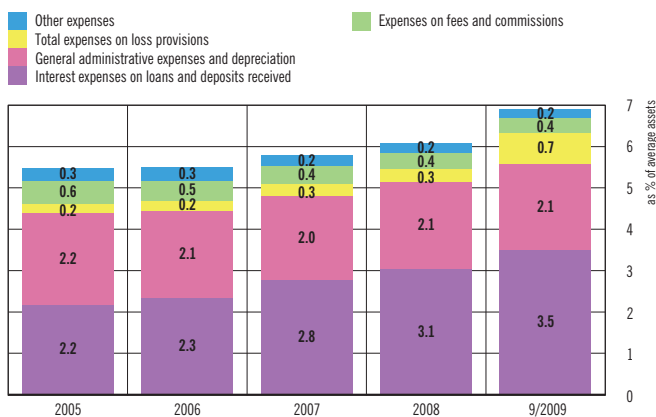
Source: CNB.

**Figure 65 Structure of Income from Fees and Commissions**



Source: CNB.

**Figure 63 Structure of Total Expenses**

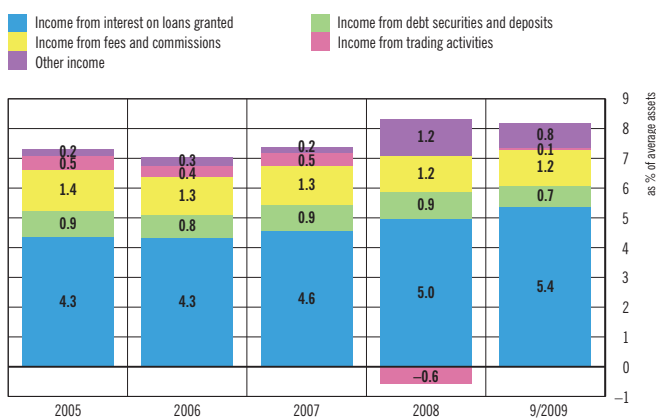


Source: CNB.

The early 2009 strong growth in government loans, which are risk-weighted at 0%, and a parallel stagnation in home loans, to which the highest risk weight is applied (150%) due to households' exposure to currency risk, slightly lowered the average risk weight applied to bank assets in the first nine months of 2009, providing a boost to the capital adequacy ratio (Figure 61).

The unfavourable macroeconomic climate and financial market turbulence in late 2008 induced banks increasingly to transfer interest rate risk (in addition to currency risk) to their clients by issuing more loans at variable interest rates. Throughout 2009, banks also strove to keep liquidity risk under control by increasing the share of short-term loans and thereby transferring some of the refinancing risk to their clients. Thus, the share of gross loans with a remaining maturity of up to one year rose from 36% to 41% between end-2008 and September 2009 (Figure 62).

**Figure 64 Structure of Total Income**



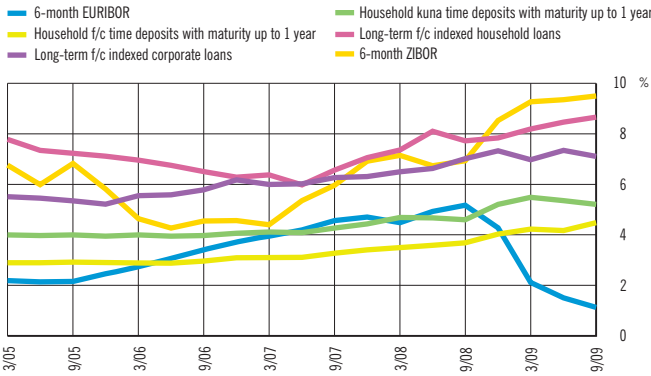
Source: CNB.

### Strategic Risks<sup>3</sup>

In the first nine months of 2009, banks recorded a sharp increase in value adjustments due to the adverse macroeconomic developments that began in mid-2008. At the same time, since the risk premium for Croatia remained relatively high, interest expenses increased. This substantially raised banks' foreign funding costs despite the drop in benchmark eurozone interest rates and reduced regulatory burden (Figure 63). As a result, domestic and benchmark foreign interest rates continued to move in divergent directions (Figure 66). As banks made additional efforts to raise resident deposits in the domestic market, interest expenses on domestic sources increased.

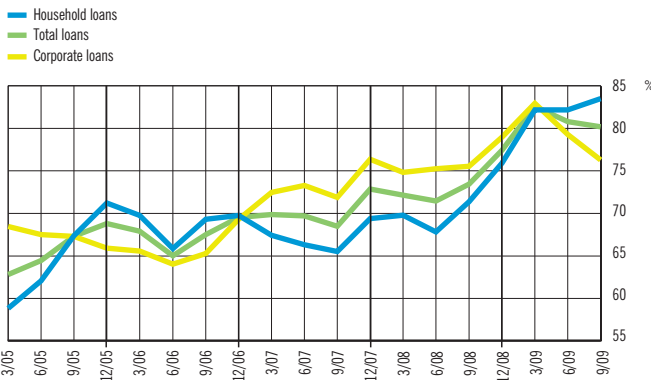
<sup>3</sup> Income statement items for the third quarter of 2009 were annualised to be comparable with those for preceding whole year periods. This was made by summing up banks' business results in the last quarter of 2008 and the first three quarters of 2009.

Figure 66 Selected Interest Rates (quarterly average of monthly interest rates)



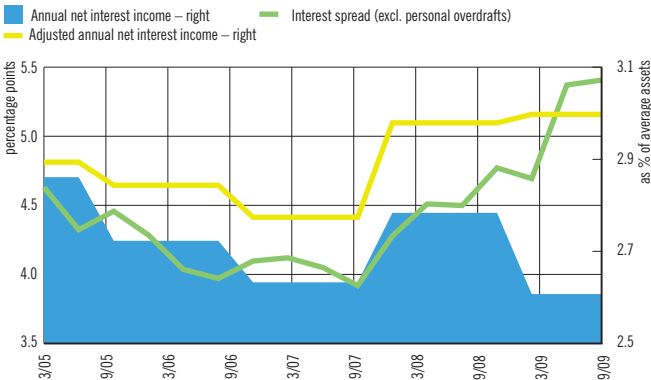
Source: CNB.

Figure 67 Share of Short-Term Loans in Total Newly-Granted Loans (quarterly average of monthly loans)



Source: CNB.

Figure 68 Interest Spread (quarterly average of monthly interest rates) and Annual Net Interest Income



Source: CNB.

To alleviate the impact of higher value adjustments and interest expenses on their net income banks resorted to increasing their lending rates and adjusting their operations by cuts in general administrative expenses and depreciation (Figures 63 and 66). The rise in lending rates coupled with the rise in the ratio of loans to total assets increased the relative importance of banks' interest income (Figure 64).

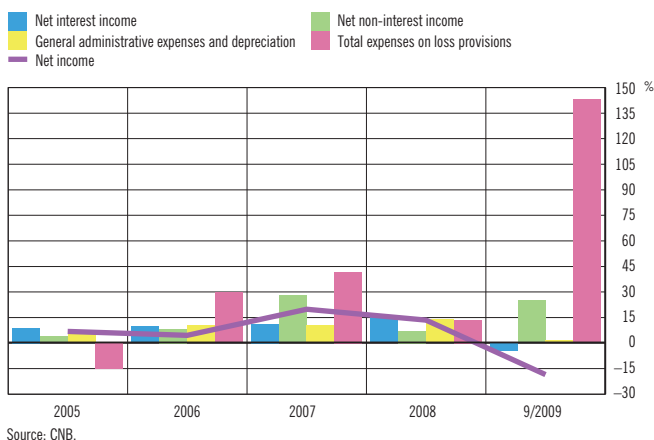
Bank income from trading activities was negligible on a whole year basis. However, it was significant in some quarters, particularly income from derivatives trading. This was due to short-term fluctuations in foreign exchange and interest rates as banks used derivatives to reduce their direct exposure to currency and interest rate risk (Figures 59 and 64). Notwithstanding a substantial increase in the level of fees and commissions, the relative significance of this income source did not grow, due to the reduced volume of services for which they are charged, in particular income from fees for payment operations services to corporates (Figures 64 and 65).

The rise in lending rates particularly affected the household sector as interest rates on all types of loans grew, while the upward trend in interest rates on corporate loans came to a halt in mid-2009 (Figure 66). The corporate sector was already heavily burdened by high financing costs, while recessionary pressures strongly reinforced the increase in its bad loans. Any further increases in the interest burden would further reduce its debt service capacity. The stabilisation of interest rates on corporate loans can also be associated with stricter non-interest credit terms introduced in efforts to attract higher-quality clients. In addition, although the share of more expensive, short-term loans was slightly reduced in the second and third quarters of 2009, it was still much higher than in previous years (Figure 67).

These interest rate trends reflect banks' expectations regarding future economic developments. Due to pessimistic expectations regarding banks' exposure to direct and indirect credit risk in 2010 and more prudent liquidity management, the rise in lending rates outpaced the rise in deposit rates and shortened the maturity of banks' credit portfolios. Banks thus tried to embed some potential losses on their credit portfolios in the interest rate spread,<sup>4</sup> which grew sharply in 2009 (Figure 68). Trends in the interest margin, measured as the ratio of annual net interest income to average assets, diverged from trends in the spread in the first nine months of 2009: the spread increased by a whole percentage point, while the interest margin narrowed relative to the end of 2008. In addition to the fact that the interest spread calculation does not take account of the loan amount granted, this unusual phenomenon can be attributed to a sharp increase in interest expenses on foreign liabilities of several large banks (primarily the cost of kuna sources linked to the ZIBOR) in

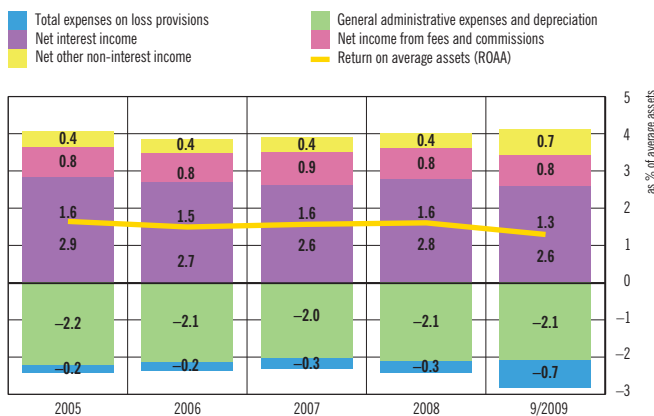
4 The interest spread is calculated as the difference between the interest rate on total loans and the interest rate on total deposits, with personal overdrafts being excluded from loans. In the interest rate statistics, they are recorded as newly-granted loans in each month, which overestimates their share in total loans. Together with high nominal interest rates, this artificially increases the interest spread by some 2 percentage points.

Figure 69 Change in Selected Business Performance Indicators



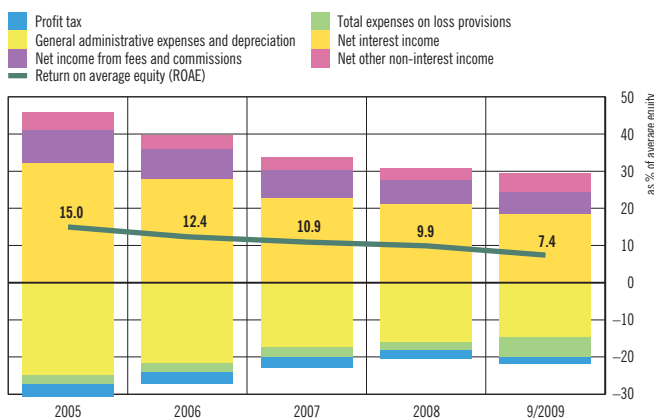
Source: CNB.

Figure 70 Contribution of ROAA Categories



Source: CNB.

Figure 71 Contribution of ROAE Categories



Source: CNB.

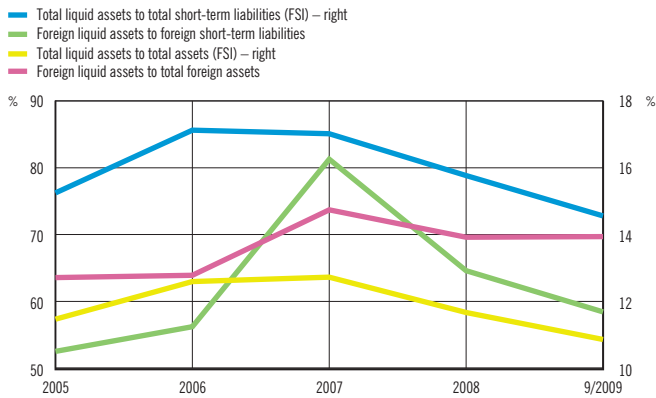
the first nine months of 2009. These costs decreased the net interest income of banks but were not entered in the calculation of the interest spread as it includes only contracted lending and deposit operations with residents (Figures 66 and 68). As banks used instruments to hedge against the interest rate risk arising from non-resident deposits, this additional cost was not reflected in their total profit but it distorted the interest margin.

This distorted indicator seemingly decreased net interest income. This income should be adjusted for income from derivatives trading that banks used to compensate for the increase in interest expenses arising from owners' deposits and foreign exchange differences (Figure 68). As much as possible in the short run, banks restrained the growth in general administrative expenses and depreciation so that they recorded an increase in their net income before value adjustments. Nevertheless, the astounding 143% increase in charges for value adjustments reduced banks' net income by some 19% (Figure 69).

Poorer business results and a marginal increase in capital and assets notably decreased both return on average assets (from 1.6% to 1.3%) and return on average equity (from 9.9% to 7.4%) at end-September 2009 (Figures 70 and 71).

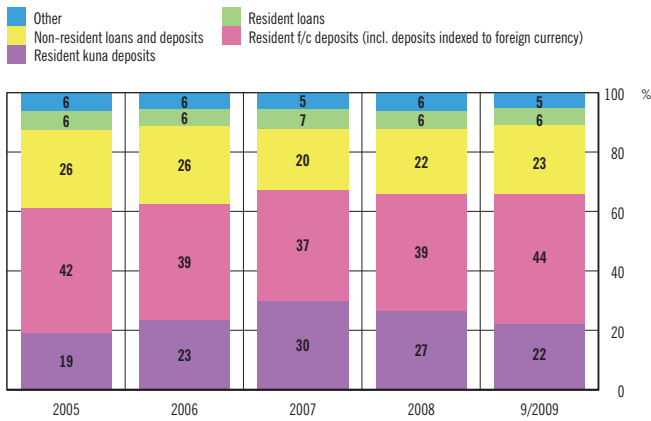
Notwithstanding a marked fall in bank earnings in 2009, they played well their role of the first buffer to shocks, which was particularly important in the period that saw no noticeable capital injections. As the response of value adjustments to macroeconomic disturbances occurs with a time lag, both the pressure of macroeconomic trends and value adjustment costs will remain at elevated levels in 2010. Therefore, one can hardly expect a major cut in interest rates, despite the probable decrease in bank financing costs. Internal model-based estimates of the banking sector earnings in 2009 suggest that earnings were much lower (nearly 20%) than in 2008, but still sufficient to protect the capital of most banks. Lending to the corporate and household sectors will probably pick up in 2010. Still, as the materialisation of credit risk will hamper the operations of banks for some time, a strong recovery of their earnings is not likely to occur before 2011.

Figure 72 Liquidity Indicators



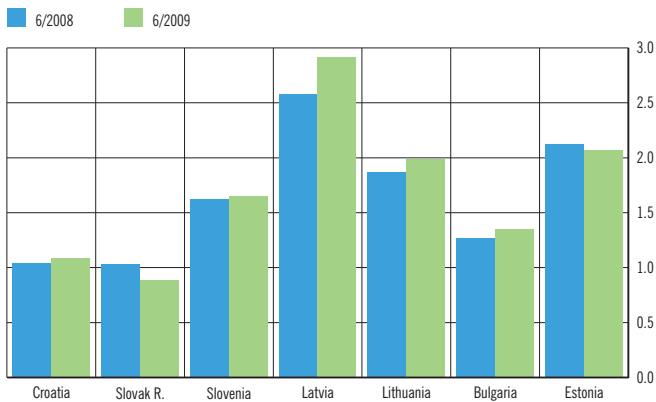
Source: CNB.

Figure 73 Structure of Liabilities



Source: CNB.

Figure 74 Loan-to-Deposit Ratio for the Private Sector in Selected Countries



Source: IMF, International Financial Statistics, November 2009.

## Liquidity Risk

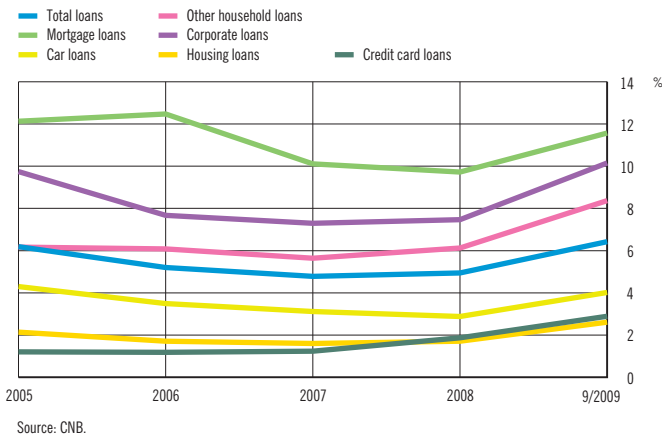
The use of a portion of the released liquid foreign assets of banks and domestic reserves, as well as the banks' growing reliance on foreign sources to finance loans, which substituted for reduced domestic deposits in late 2008, meant that most indicators of bank liquidity deteriorated in the first nine months of 2009 (Figures 72 and 73).

Although banks largely restored the level of their total liquid assets in the second and third quarters of 2009, these assets were still lower than at end-2008 so that indicators of overall bank liquidity deteriorated. As a result, the ratio of liquid to total assets dropped compared to the end of 2008. The ratio of total liquid assets to short-term liabilities also decreased as total liquid assets were somewhat lower and short-term liabilities steadily grew.

Compared with 2008, external liquidity indicators deteriorated much less or held steady thanks to the partial restoration of foreign liquid assets in the second and third quarters of 2009. The ratio of foreign liquid assets to foreign liquid liabilities continued to trend down, though at a slower pace than in 2008. This was mostly due to the sharp growth in non-resident deposits that are reported within short-term liabilities (regardless of whether their maturity is fixed or not). The ratio of foreign liquid assets to total foreign assets levelled off as they decreased by almost the same rate.

The rise in the share of short-term liabilities to non-residents (deposits) resulted in deteriorated external liquidity indicators. Still, as foreign owners proved to be a stable financing source during the financial turmoil, one may conclude that the liquidity position of banks in the Republic of Croatia remained relatively sound. This position was given a strong boost by the high coverage of loans by deposits, which made the banking sector less dependent on foreign funding and less exposed to refinancing risk. Compared with the banking sectors of other selected Central and Eastern European countries, the loan-to-deposit ratio stayed relatively low in Croatia and held almost steady in the observed period (June 2008-June 2009). This ratio was much higher in most other countries and grew even more in the reference year due to the parallel decline in deposits and loan stagnation (Figure 74).

Figure 75 Ratio of Non-Performing Loans to Total Loans



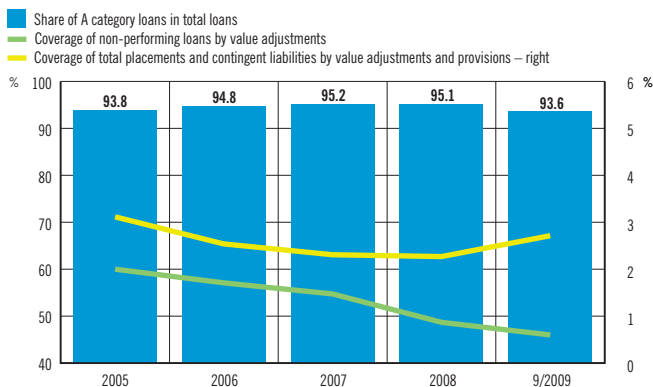
Source: CNB.

Figure 76 Growth in Loans, Non-Performing Loans and Value Adjustments



Source: CNB.

Figure 77 Loan Quality and the Coverage of Loans and Placements by Value Adjustments



Source: CNB.

## Credit Risk and Bank Capitalisation

Following their slight growth in 2008, bad loans increased much more strongly in the first three quarters of 2009 as the impact of adverse macroeconomic developments spread from operations of bank clients to banks' balance sheets. At end-September 2009, the ratio of non-performing loans to total loans (NPLR) stood at 6.4% and was some 30% higher than at the end of 2008 (Figure 75). Although all sectors recorded an increase in NPLR, it was particularly pronounced in the segment of corporate loans. The quality of all household loan categories deteriorated, with the strongest relative deterioration being recorded by the formerly least risky home loans and credit card loans.

In addition to macroeconomic developments that affected the creditworthiness of bank clients, the NPLR dynamics was affected by changes in the loan portfolio structure. As loan growth was interrupted and the amount of newly-granted loans decreased, the average age of the loan portfolio continued to rise, spurring also the increase of NPLR. The fall in the quality of banks' loan portfolios was somewhat cushioned by strong lending to the government in late 2008 and early 2009, while lending to the private sector steadily declined.

Value adjustments on loans also grew noticeably but much more slowly than bad loans. Hence, the several-year downward trend in the coverage of bad loans by value adjustments continued (Figures 76 and 77) and this indicator fell much below its ten-year average (46% vs. 62%). Hence, it is possible that additional value adjustments on bad loans will put further pressure on bank earnings and capital in 2010. Such dynamics of the bad loan coverage ratio is due to the fact that some placements have only recently been reclassified as bad loans. In the final run, these loans could create a loss larger than the loss covered by current value adjustments. In contrast, the coverage of total placements and contingent liabilities by value adjustments and provisions increased. This was due to a marginal increase in value adjustments on loans and a decline in total placements (Figure 77).

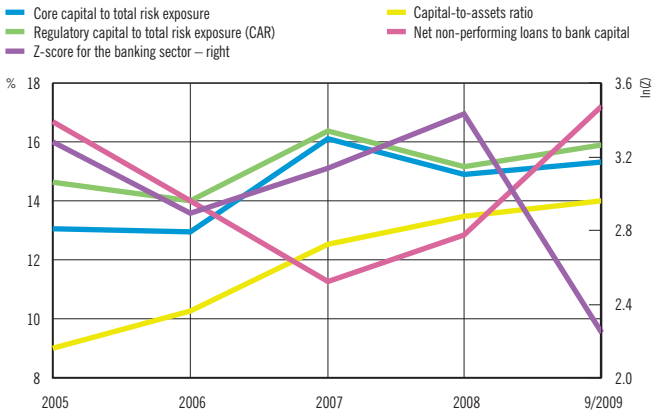
The profit made in the first nine months of 2009 provided a slight boost to bank capital, which positively affected capitalisation indicators. The same effect was produced by a decrease in risk exposure due to the fall in placements and changes in their structure based on the rise in the share of placements to the government sector. Still, the growth in the ratio of bad loans after value adjustments to bank capital, which started after 2007, picked up pace, with the Z-score of the banking sector<sup>5</sup> also confirming these negative trends. More specifically, Z-score decreased as capitalisation growth was insufficient to compensate for the fall in bank earnings, which became more volatile, pointing to the rise in insolvency risks in the banking sector.

To assess the extent to which the current level of value adjustments covers potential losses on these loans and the capi-

<sup>5</sup> For a more detailed description of Z-score see Box 5 Assessing Banking Sector Stability in Terms of Z-Score, *Financial Stability*, No. 1, June 2008.



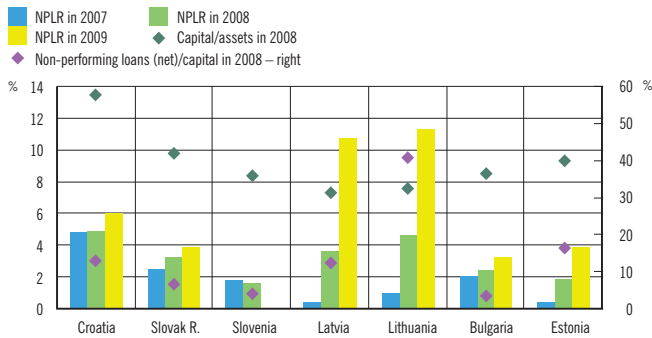
Figure 78 Capital Adequacy Ratios



Source: CNB.

talisation level of the Croatian banking sector, it is useful to observe country data on the dynamics of bad loans and value adjustments. Data for Croatia and Central and Eastern European countries show that the increase of NPLR was somewhat slower in Croatia than in other countries under review. This could mean that Croatian banks tried to postpone the reporting of their clients' loan repayment difficulties by lengthening repayment terms and rescheduling loan repayments. In addition, although data on the bad loan coverage ratio are not available for most of the countries surveyed, the ratio of net bad loans to bank capital shows that this coverage is somewhat lower in Croatia, which suggests optimism among banks about the recoverability of bad loans. Value adjustments on bank placements are thus expected to continue growing in 2010, meaning that the relatively high level of bank capitalisation in Croatia should be taken with a grain of salt (Figure 79).

Figure 79 NPLR and the Coverage of Non-Performing Loans by Value Adjustments<sup>a</sup> by Country



<sup>a</sup> Data for 2009 refer to the most recent available data, which means that they do not necessarily refer to the same month for all countries.

Sources: IMF, *International Financial Statistics*, November 2009 and *Financial Soundness Indicators* (fsi.imf.org).

## Box 5 Improvements in Stress-Testing Techniques

Stress testing based on a macroeconomic credit risk model has been continuously improved. This particularly refers to supplementation of the initial static methodology by taking into account the dynamics of future current income of banks, which serve as the first buffer to shocks should adverse scenarios materialise, and to the grouping of banks based on their business models, which affect the way macroeconomic shocks are manifested.<sup>1</sup>

To adjust stress testing to CNB's macroeconomic forecasts as far as possible, stress testing exercises have started to capture projections of loan dynamics that, together with additional assumptions about developments in interest margins and non-interest income, enable the projection of banks' net earnings and other elements necessary to increase the stress-testing dynamics. Although the earlier inclusion of earnings added some dynamics to stress testing, it stayed largely static as the initial position was compared with the projected position after a shock, which was limited to a one-year horizon. A stronger reliance on quarterly projections enables more precise estimates of the intra-year dynamics of bad loans and capitalisation, potential trend reversals, as well as possible major shocks within the horizon observed relative to previously presented final positions.

Net operating income, which serves as the first buffer against an increase in value adjustments, was projected from individual forecasts of its components, and net interest and non-interest income of banks net of general administrative expenses and depreciation. Developments in net interest income were approximated by recent trends in implicit margins and expectations about their dynamics in the forthcoming period, as well as the expected future volume of loans and deposits. The expected maintenance of interest rates at relatively high levels will help to maintain the present level of net interest income, while poorer loan repayment performance will directly reduce interest income. Net non-interest income was projected on the basis of expected future dynamics of economic activity and credit growth. As general administrative expenses and depreciation can be influenced by banks, they were used to support earnings as early as 2009. Over the projection horizon, banks are expected to limit these expenses, with limits growing stronger as bank earnings decrease (Figures 2 and 3).

Formally written, the projected capital adequacy dynamics over the observed horizon is formed as follows:

The capital adequacy ratio at the beginning of the projection period is equal to:

$$CAR_t = \frac{RC_t}{ORE_t}$$

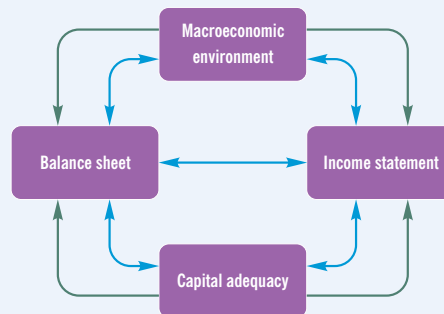
$CAR_t$  = capital adequacy ratio in the initial period,

$RC_t$  = regulatory capital in the initial period

$ORE_t$  = overall risk exposure in the initial period.

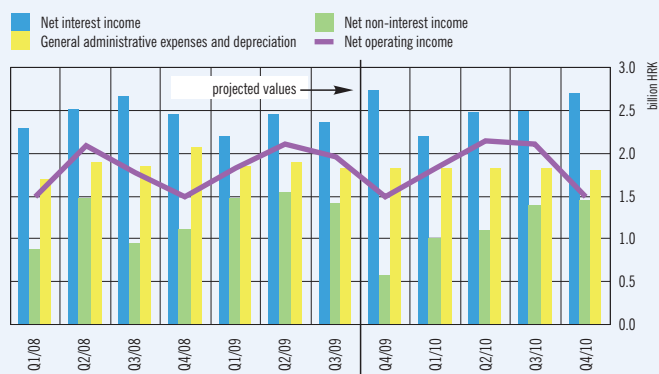
1 A macroeconomic credit risk model and its previous improvements are described in Box 4, *Financial Stability*, No. 1, June 2008, Box 4, *Financial Stability*, No. 2, February 2009 and Box 6, *Financial Stability*, No. 3, June 2009.

Figure 1 Simplified Presentation of the Stress-Testing Methodology<sup>a</sup>



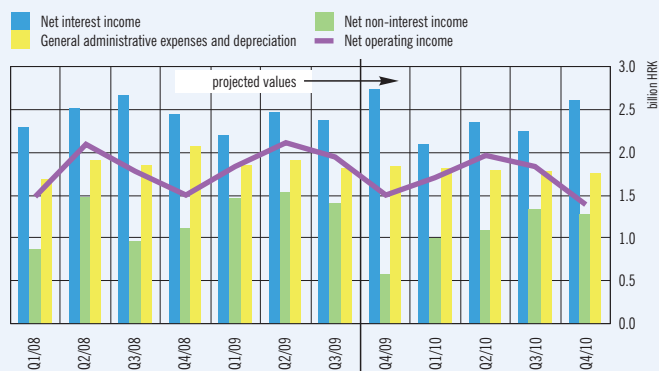
<sup>a</sup> Blue arrows denote economic interdependencies, while green arrows denote the intuition underlying the stress testing exercise.  
Source: CNB.

Figure 2 Projected Developments in Banks' Business Results (baseline scenario)



Source: CNB.

Figure 3 Projected Developments in Banks' Business Results (shock scenario)



Source: CNB.

The capital adequacy ratio at the end of a quarter for which the projection is made is equal to:

$$CAR_{T+1} = \frac{RC_T + \Delta RC_{T+1}}{ORE_T - I_{T+1} + F_{T+1}}$$

where:

$\Delta RC_T$  = change in the regulatory capital within a projection horizon, calculated as the loss realised (if value adjustments exceed net operating income) or as net earnings (if value adjustments are lower than net income reduced by taxes), with net earnings realised over the quarter being credited to capital, while losses realised are debited to capital.

$I_T$  = impact on regulatory capital and overall risk exposure calculated by multiplying the amount of current value adjustments by the change in the ratio of non-performing loans to total loans:

$$I_T = AP_{T0} * \Delta NPLR_T$$

where:

$NPLR$  = ratio of non-performing loans to total loans

$AP_{T0}$  = actual provisions (value adjustments arising from loan quality and overall risk exposure in the initial stress-testing period):

$$AP_{T0} = (TL_{B1} * \%PR_{B1} + TL_{B2} * \%PR_{B2} + TL_{B3} * \%PR_{B3} + TL_C * \%PR_C)_T$$

$TL_x$  = total loans in a certain quality group

$PR_x$  = ratio of value adjustments on loans in a certain quality group to total loans in that group

$F$  = exchange rate effect on the capital adequacy ratio calculated as:

$$F_T = D_T * W_T * ORE_T,$$

where:

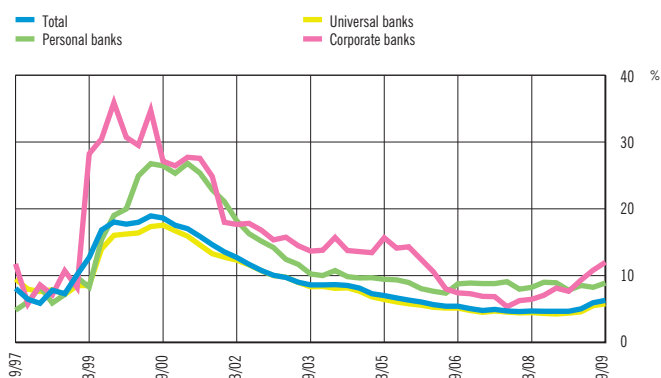
$D_T$  = rate of change in the exchange rate of the kuna

$W_T$  = share of ORE exposed to currency changes

This procedure is reiterated for each quarter until the end of the projection horizon.

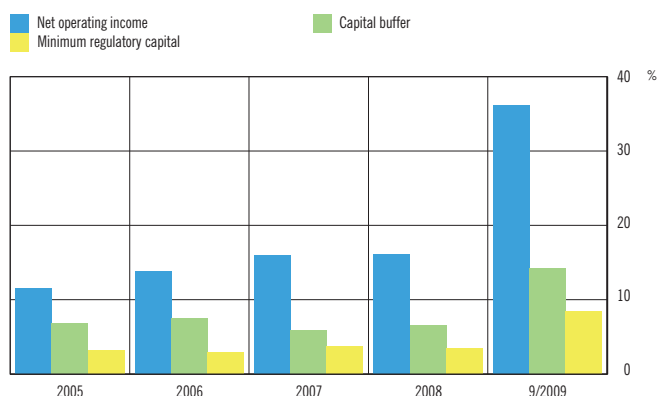
The stress-testing technique will continue to be improved, particularly the segments of modelling bank earnings and introducing feedbacks between the macroeconomic environment and bank performance. Parallel to this, additional stress testing-techniques for individual sectors have been developed in order to verify results of the macroeconomic model in view of its weaknesses arising from the reliance on historical data to estimate key elasticities. Finally, Basel II implementation will pose new challenges in the improvement of stress-testing methods, i.e. create additional incentives for the development of new methods.

Figure 80 Dynamics of NPLR by Bank Groups



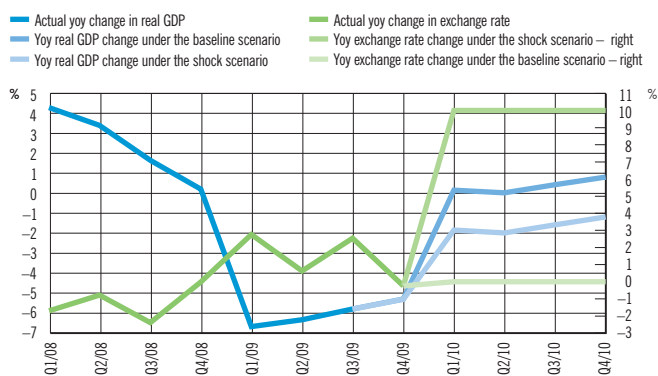
Source: CNB.

Figure 81 Relative Importance of Charges for Value Adjustments



Source: CNB.

Figure 82 Projections of Macroeconomic Variables under Various Scenarios



Source: CNB.

## Banking Sector Resilience

The Croatian banking sector has so far weathered well adverse macroeconomic developments that considerably vitiated the credit portfolio quality and increased value adjustments in 2009. This was largely due to still solid earnings, which slightly increased the level of total banking system capital even in the absence of noticeable capital injections. Strong growth of NPLR in 2009 was recorded by universal and corporate banks. In contrast, NPLR of personal banks has remained stable since 2006, at a level slightly lower than 10% (Figure 80). These developments are largely consistent with the results of previous stress testing exercises, justifying the continued use of the same basic technique.<sup>6</sup>

At the onset of the crisis, Croatian banks had sizeable regulatory capital surpluses that, together with net operating income, provided an additional buffer against unexpected value adjustments. This buffer absorbed the sharp growth in value adjustments in 2009. Charges for value adjustments in the first three quarters of 2009 were thus close to 36% of banks' net operating income for that period, i.e. 14% of capital buffer and 8% of the minimum regulatory capital<sup>7</sup> at end-September 2009 (Figure 81). Still, although the sector as a whole withstood the shock well, the number of banks that reported losses grew to eight in the first three quarters of 2009 (it was three in 2008).

The dynamics of non-performing loans over a projection horizon that encompasses the last quarter of 2009 and the entire 2010 was predicted based on a macroeconomic credit risk model and assumptions about developments in macroeconomic variables. The baseline scenario uses the CNB's projection for economic activity, which assumes a 6% GDP decline in 2009 and a slight 0.3% GDP growth in 2010, and the maintenance of the exchange rate at its end-2009 level. The shock scenario assumes less favourable developments in 2010; a 2% GDP decline and a 10% depreciation of the exchange rate of the kuna (Figure 82).

The projected dynamics of NPLR in the last quarter of 2009 shows that its growth picked up and that this ratio could be 7.7% at the end of 2009, 57% up over the end of 2008. Under the baseline scenario, the increase in NPLR could be much slower in 2010 than in 2009 as the decline in economic activity ended in the second quarter of 2009. As economic activity dynamics affects NPLR with a time lag, NPLR could grow by an additional 20% by the end of 2010, coming close to 9%. Under the shock scenario, NPLR could grow by some 130% in 2010, to somewhat less than 17%, which means that it would be 2.5 times higher than in the third quarter of 2009 (Figure 83).

6 The grouping of banks and expectations about future trends were explained in Box 6, *Financial Stability*, No. 3, June 2009.

7 Capital buffer is equal to regulatory capital minus the minimum regulatory capital. The minimum regulatory capital is the capital needed to achieve the minimum capital adequacy ratio of 10%.

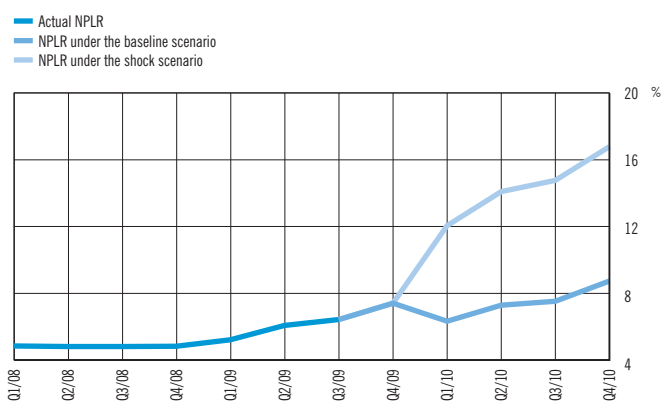
Table 4 Dynamics of NPLR and CAR after Shocks by Bank Groups under an Aggregate Credit Risk Model<sup>a</sup>

	2009		2010		
	CAR (%)	CAR (%)	Change in CAR relative to 2009 (pp)	CAR (%)	Change in CAR relative to 2009 (pp)
Banking sector	16.8	18.3	1.5	13.6	-3.2
Universal banks	17.2	18.9	1.6	14.4	-2.8
Personal banks	15.0	14.9	-0.1	7.1	-7.9
Corporate banks	11.9	11.7	-0.2	5.7	-6.2

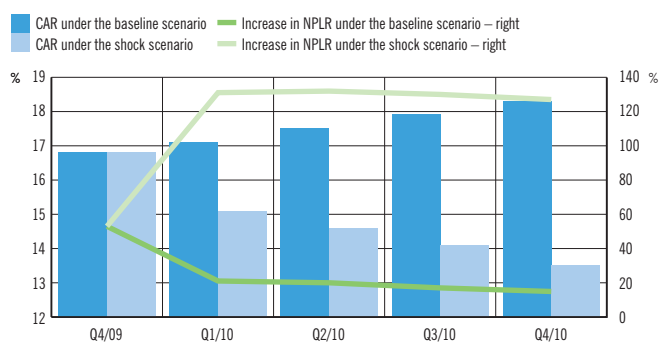
<sup>a</sup> Both scenarios include the effect of net operating income, while the shock scenario includes also the immediate exchange rate effect.

Source: CNB.

Figure 83 Projections of NPLR under Various Scenarios



Source: CNB.

Figure 84 Dynamics of NPLR and CAR of the Banking Sector under an Aggregate Credit Risk Model<sup>a</sup>

<sup>a</sup> Both scenarios include the effect of net operating income, while the shock scenario includes also the immediate exchange rate effect.

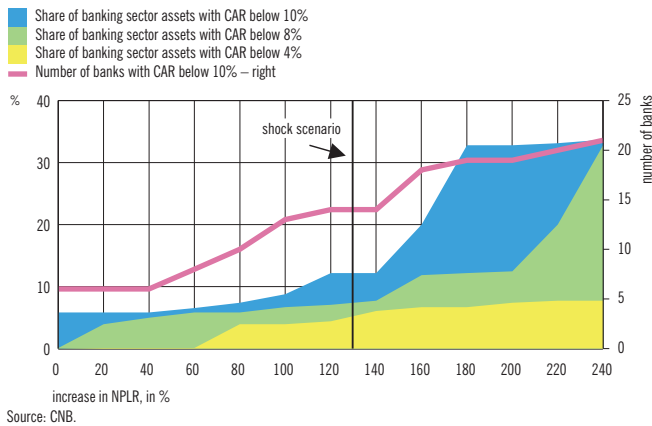
Source: CNB.

These elements enable a dynamic presentation of developments in the capital adequacy ratio. Under the baseline scenario, net income of banks is sufficient to absorb the entire shock, which assumes that the capital adequacy ratio would steadily grow at a pace similar to that in 2009. The rise in NPLR under the shock scenario coupled with a somewhat less favourable dynamics of bank earnings will decrease the capital adequacy ratio of the banking sector. The total decline in the capital adequacy ratio (CAR) under that scenario, including the direct impact of exchange rate changes that emerges at the moment of depreciation, would be 3.2 percentage points in 2010. However, even under that scenario, the sector as a whole would stay well capitalised and its CAR would stand at 13.6% at the end of 2010 (Figure 84).

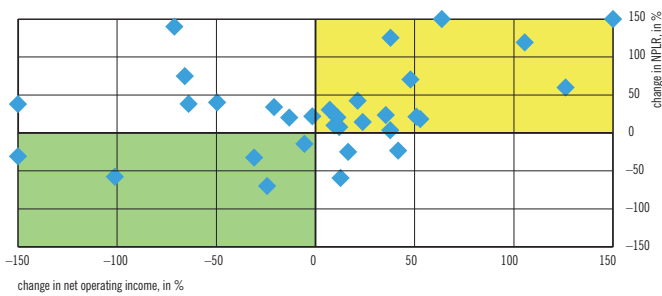
Viewed by groups of banks, net operating income of universal banks should be more than sufficient to absorb newly created expenses on value adjustments under the baseline scenario. Should banks decide to retain total net income realised, their capital adequacy ratio would be 1.6 percentage points higher at the end of 2010. The CAR of personal and corporate banks will slightly fall even under the baseline scenario. The shock scenario assumes a significant decline in the capital adequacy ratio in 2010, largely due to the direct and indirect influence of the kuna exchange rate depreciation. Thanks to their relatively solid business performance and stronger resilience to macroeconomic shocks, this decline would be much less in the group of universal banks than in other bank groups, standing at 2.8 percentage points. In contrast, the CAR of personal and corporate banks would drop by 7.9 percentage points and 6.2 percentage points respectively (Table 4).

The reasons for the high sensitivity of corporate banks under these simulations largely relate to their poor business results in 2008 and 2009. In contrast with universal banks, such results of corporate banks have already burdened their capital instead of boosting it. Earnings of corporate banks are not expected to rebound in the forthcoming period. Due to their orientation to the more risky segment of household loans, personal banks

**Figure 85 Assets and Number of Banks after a Shock under an Aggregate Credit Risk Model for 2010**



**Figure 86 Change in Bank Earnings and NPLR in the First Three Quarters of 2009 Relative to the Previous Three Years' Average<sup>a</sup>**



<sup>a</sup> The yellow shaded area shows banks with more solid business results and a more prudent risk assessment of the credit portfolio relative to the previous three years' average. The green shaded area encompasses banks in which earnings declined but which made more optimistic assessments of their credit portfolio quality despite a deterioration in macroeconomic conditions.

Source: CNB.

initially have the highest coverage of non-performing loans by value adjustments, which makes them highly sensitive to the percentage increase in value adjustments under the credit risk model used.

Notwithstanding the sharp decline in the capital adequacy ratio of some banks, the capitalisation level of the entire sector remains satisfactory even under the shock scenario. Nevertheless, by end-2010, the CAR could fall below 10% for 14 banks holding 12% of banking sector assets and below 4% for five banks holding 6% of bank assets (Figure 85). These estimates are based on the assumption that banks raise no additional capital. However, past experience suggests that capital strengthening and/or bank mergers would be likely should the shock scenario materialise.

In addition to the previously stated assumptions underlying stress test results, one should not forget that the initial level of non-performing loans and value adjustments reported by individual banks could deviate from the actual degree of risk in their credit portfolios. More specifically, lower earnings could prompt some banks to extend repayment terms and reschedule some loans in efforts to avoid the decrease in accounting earnings and the level of capitalisation. Observed in terms of individual banks, it is obvious that banks whose earnings growth was faster in the past few years also reported a higher increase in NPLR (Figure 86). It is also evident that some banks whose net operating income decreased during the crisis period assess that the quality of their credit portfolios has been constantly improving. Stress testing exercises will in the future employ various methods to assess also the actual portfolio risk of banks whose practices deviate the most from usual standards, which could somewhat erode the results obtained.

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## Abbreviations and Symbols

### Abbreviations

BIS	– Bank for International Settlements
bn	– billion
CAR	– capital adequacy ratio
CBS	– Central Bureau of Statistics
CCE	– Croatian Chamber of Economy
CDCC	– Central Depository & Clearing Company
CDS	– credit default swap
CEE	– Central and Eastern European
CICR	– currency-induced credit risk
CNB	– Croatian National Bank
CPI	– consumer price index
EAD	– exposure at default
ECB	– European Central Bank
EIZG	– Institute of Economics, Zagreb
EMBI	– Emerging Market Bond Index
EMU	– Economic and Monetary Union
EONIA	– Euro Overnight Index Average
ERM	– Exchange Rate Mechanism
EU	– European Union
EULIBOR	– Euro London Interbank Offered Rate
EUR	– euro
EURIBOR	– Euro Interbank Offered Rate
f/c	– foreign currency
FDI	– foreign direct investment
Fed	– Federal Reserve System
FINA	– Financial Agency
FSI	– financial soundness indicators
GFS	– Government Finance Statistics
GDP	– gross domestic product

HANFA	– Croatian Financial Services Supervisory Agency
HBS	– Household Budget Survey
HREPI	– hedonic real estate price index
HRK	– Croatian kuna
ILO	– International Labour Organization
IMF	– International Monetary Fund
m	– million
MoF	– Ministry of Finance
MRR	– marginal reserve requirements
NPLR	– ratio of non-performing loans to total loans
OECD	– Organisation for Economic Co-operation and Development
ON USLIBOR	– overnight US dollar London Interbank Offered Rate
pp	– percentage points
RC	– Republic of Croatia
ROAA	– return on average assets
ROAE	– return on average equity
RR	– reserve requirements
SDR	– special drawing rights
yoy	– year-on-year
ZIBOR	– Zagreb Interbank Offered Rate
ZSE	– Zagreb Stock Exchange

### Symbols

–	– no entry
....	– data not available
0 used	– value is less than 0.5 of the unit of measure being used
Ø	– average
a, b, c,...	– indicates a note beneath the table and figure
*	– corrected data
( )	– incomplete or insufficiently verified data

