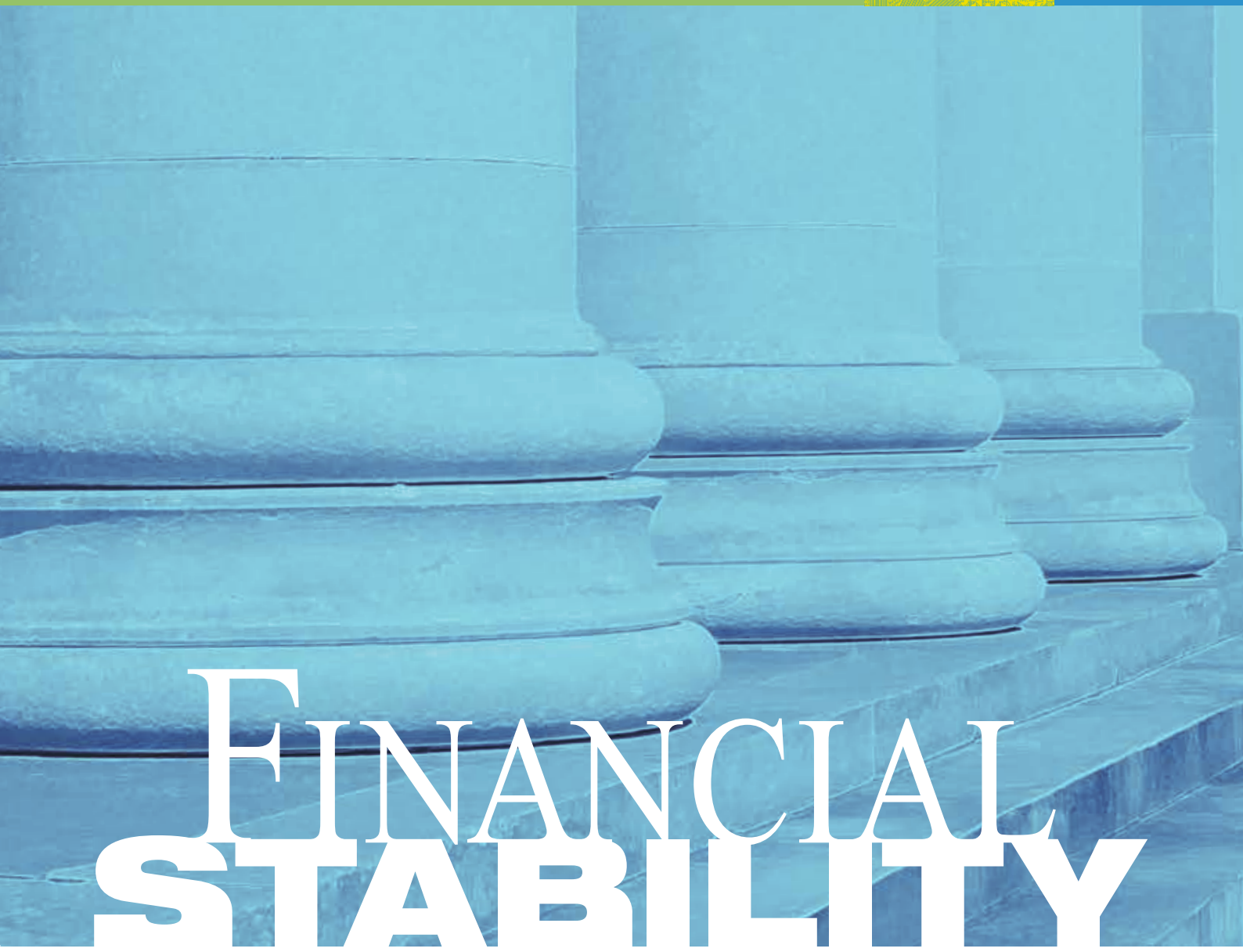
No.
9
Year 5
VII 2012



FINANCIAL STABILITY

CROATIAN NATIONAL BANK

CROATIAN NATIONAL BANK

Financial Stability

No. 9, Zagreb, July 2012

PUBLISHER
Croatian National Bank
Publishing Department
Trg hrvatskih velikana 3, 10002 Zagreb
Phone: +385 1 45 64 555
Contact phone: +385 1 45 65 006
Fax: +385 1 45 64 687

www.hnb.hr

Printed in 400 copies

ISSN 1846-9264 (print)
ISSN 1847-0017 (online)

Contents

Introductory remarks

Finance plays a key role in the allocation of resources, i.e. the process of transforming savings into investments, and therefore into 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 principal 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, for 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.

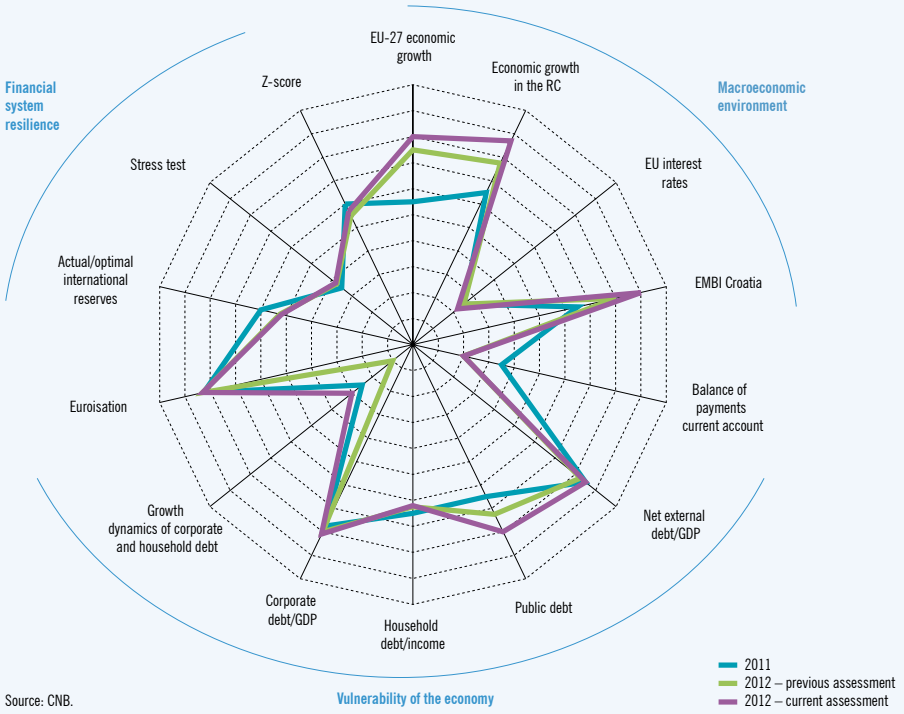
The CNB shares the responsibility for overall financial system stability with the Ministry of Finance and the Croatian Financial Services Supervisory Agency (HANFA), which are responsible for the regulation and supervision of non-banking financial institutions. Furthermore, owing to the high degree to which the banking system is internationalised, as 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 undertake activities providing appropriate protection from the consequences 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's 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 deepening of the eurozone debt crisis and the gloomier growth outlook for Croatia have increased the risks to financial stability in 2012. The banking sector is still resilient to the materialisation of highly unlikely adverse scenarios. In addition to the attainment of fiscal goals, the key for economic growth will be the banks' ability to shift their lending to the export sector.

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 indicators and their values in the reference periods, i.e. the beginning of the current year and the previous year. For each variable, an increase in the distance from the centre of the map indicates greater risks or system vulnerability and a diminution of its resilience, as well as a greater threat to stability. Hence, an increase in the area of the map suggests an increase in risks to financial stability, while a decrease in the area suggests their reduction.

The deepening of the eurozone debt crisis, which will push the eurozone to the brink of a recession in 2012, has continued to increase financial stability risks in Croatia. The growing divergence within the eurozone particularly worsened the prospects for growth and regaining fiscal sustainability in peripheral eurozone economies, some of which have strong trade and financial ties with Croatia. Like Croatia, these countries have relatively weak fundamentals, which may also spark indirect contagion in an environment of strong risk aversion. In addition to the bleaker growth outlook, specific risks to financial stability, which could further deepen the expected recession in the Croatian economy, are also growing stronger.

Against this background, economic forecasts for Croatia have been deteriorating steadily in response to the sharp economic downturn early in the year and the tightening of financial conditions for all economic sectors. Domestic lending to the private sector slackened considerably early in 2012 and, coupled with external deleveraging of the non-financial sector, nearly put an end to the year-on-year overall debt growth. The necessary fiscal adjustment, focused mostly on the revenue side, has also added to the economic contraction in the short run. Due to all of the above, economic activity is expected to drop by 1.6% in 2012.

The increase in external and domestic risks raises the probability that economic outcomes for Croatia will be worse than expected under the baseline scenario. The first group of risks is associated with putting the public finances of peripheral European countries on a sustainable path. Even if the measures adopted were strictly implemented, progress in improvements in competitiveness, which would rekindle growth, improve the fiscal outlook and reduce the dependency of peripheral European economies on foreign capital, is very uncertain in the adverse international environment. The risks associated with delays in budgetary cuts or reforms planned in European peripheral countries, the disclosure of new losses in European banks, which could spark a run by investors and depositors, or hesitance and reluctance to strengthen eurozone bailout mechanisms sufficiently to limit the spillover of shocks from the most vulnerable countries and banking sectors will continuously feed financial market volatility in the forthcoming period.

The second group of risks lurking in the international environment is associated with the acceleration of the deleveraging process in European banks. These banks steadily reduced their exposure to Central and Eastern Europe from the onset of the crisis. This became particularly evident in early 2012, when the European banking sector stepped up its balance sheet clean up and strove to raise its capital adequacy to attain regulatory targets. Parent bank deleveraging has so far had a relatively modest effect on Croatia thanks to the solid profitability of domestic banks and the strict macroprudential policy followed in the pre-crisis period, which created substantial foreign liquidity reserves in banks and reduced their dependence on foreign funds (see Box 1 Parent bank deleveraging and capital flows in Central and Eastern Europe). However, as foreign capital inflows are not very likely in the remaining part of 2012, domestic deposits will have to be the major source of funding for loans.

Finally, one should not lose sight of domestic risks, above all the danger that insufficient fiscal adjustment on the expenditure side might threaten the attainment of objectives set by the Fiscal Responsibility Act. Furthermore, the foreign liquidity risk of the banking sector has increased marginally, although it may be compensated by the steadily growing central bank reserves. The allocation of domestic loans will be a key factor in the longer run. After encouraging signals in 2011, new loans are again tending to go to less creditworthy debtors from the real estate sector.

A combination of elements from the given adverse scenarios, though some of them are highly unlikely, could additionally tighten financing conditions for all domestic sectors and significantly deepen the recession in the Croatian economy. Under that scenario, the banking sector would face a sharp increase in non-performing loans and incur losses. Given the strong capital adequacy of banks, system stability would be maintained even under this highly unlikely scenario, although some banks would have to increase their capital or merge with stronger credit institutions.

The room for autonomous economic policy actions in Croatia has been much reduced after almost four years of unfavourable economic trends. Under the harsh circumstances prevailing in 2012, key policy elements may be summed up as mutually complementary goals: preserve access to foreign capital, maintain exchange rate stability and create preconditions for growth the moment external conditions improve.

A combination of unfavourable factors that could aggravate the recession in Croatia emphasises the need to meet fiscal targets at least as defined under the Fiscal Responsibility Act. One of the triggers to the shock scenario could be the undermined confidence of market participants in the ability to achieve sustainable public finances. Also, fiscal adjustment should be based largely on the expenditure side, particularly on items where cuts have less negative effects on growth.

The central bank has made it easier for banks to use foreign liquidity in 2012. Room for such actions will be slightly narrowed in the future. However, the overall financial system still has sufficient reserves to avoid a strong credit crunch and maintain exchange rate stability even in the case of major disruptions in the environment.

Should the fiscal adjustment process develop as planned, structural reforms speed up and disruptions in the international environment be avoided, the key to growth will be the role of banks in loan allocation. With monetary policy support to lending, banks should turn more to the export sector, which has better growth prospects, particularly bearing in mind that the problems of many debtors, notably in the real estate sector, may be long-lasting.

Macroeconomic environment

The banking sector is at the core of the renewed escalation of the eurozone crisis. Due to reduced lending, capital inflows to non-eurozone countries are shrinking, while the deepening of recessionary tendencies in the eurozone diminishes demand for their exports. Against this background, the domestic economy is again sinking into recession, with limited possibilities for counter-cyclical fiscal and monetary policy actions. Therefore, economic policy should focus on structural reforms to raise the country's potential growth rate.

The eurozone crisis has entered a critical phase, which calls for solutions to ensure long-term financial stability. The exacerbation of the financial crisis was stopped in the second half of 2011 by strong ECB interventions in late 2011 and early 2012, the conclusion of the fiscal pact and successful restructuring of Greek debt to private creditors late in the first quarter of 2012. However, the crisis began to flare up again early in the second quarter (Figures 4, 5, 6, and 7).

ECB interventions and the conclusion of the fiscal pact eased the crisis only temporarily. By granting EUR 1000bn worth of three-year liquidity loans to the eurozone banking system, the ECB prevented the freezing of the market for financing the banks resulting from the undermined confidence in bank solvency from turning into a sharp drop in loans to the economy. Stabilisation of bank liquidity also helped to stabilise the sovereign debt market in peripheral eurozone countries for a short while as banks directed a portion of liquidity to their home country bonds.

This extended the period for Greek debt restructuring and conclusion of the fiscal pact aimed at securing the conditions for permanent financial stabilisation in the eurozone. The pact pro-

Table 1 Economic growth, exports and industrial production in selected developed and emerging market countries

	Annual GDP growth rate			Quarterly GDP growth rate, $\Delta Q_t/Q_{t-1}$		Annual rate of change in exports of goods		Annual rate of change in industrial production (seasonally adjusted)	
	2010	2011[a]	2012[b]	Q4/2011	Q1/2012	Q4/2011	Q1/2012	Q4/2011	Q1/2012
USA	3.0	1.7	2.0	0.7	0.5	11.0	9.2	4.1	4.4
EU	2.0	1.5	0.0	–0.3	0.0	6.2	5.5	0.1	–1.4
Germany	3.7	3.0	0.7	–0.2	0.5	8.0	8.3	2.8	1.2
Italy	1.8	0.4	–1.4	–0.7	–0.8	5.9	5.5	–3.1	–5.1
Slovenia	1.4	–0.2	–1.4	–0.6	0.2	7.3	2.7	–1.8	0.2
Slovak R.	4.2	3.3	1.8	0.8	0.7	10.1	6.3	3.8	7.4
Czech R.	2.7	1.7	0.0	–0.2	–0.8	7.4	7.9	3.7	1.0
Poland	3.9	4.3	2.7	1.0	0.8	7.2	5.7	8.7	6.1
Hungary	1.3	1.7	–0.3	0.0	–1.2	3.0	0.2	4.4	–1.5
Estonia	2.3	7.6	1.6	0.1	0.3	14.1	9.1	1.7	–1.8
Latvia	0.3	5.5	2.2	1.0	1.1	16.4	12.3	5.6	8.5
Lithuania	1.4	5.9	2.4	0.8	0.8	14.2	11.8	0.0	1.7
Bulgaria	0.4	1.7	0.5	0.1	0.0	19.7	–3.1	1.8	–3.1
Romania	–1.6	2.5	1.4	–0.2	–0.1	10.1	–0.8	3.5	0.5
Croatia	–1.2	0.0	–1.6	–1.1[c]	–1.9[c]	–2.0	–1.3	0.4	–6.0

[a] Estimate. [b] Forecast. [c] The seasonal adjustment methodology of Croatia's GDP has been presented in the manuscript titled Description of the X-12 seasonal adjustment methodology that is available at request.
Sources: Eurostat, CBS, Bloomberg, OECD and CNB (for Croatia).

vides for enhanced supervision of fiscal policies in the eurozone countries and strengthens the capacity of financial mechanisms (EFSF and ESM) for interventions aimed at preserving the solvency of countries and, indirectly, of their banking systems.

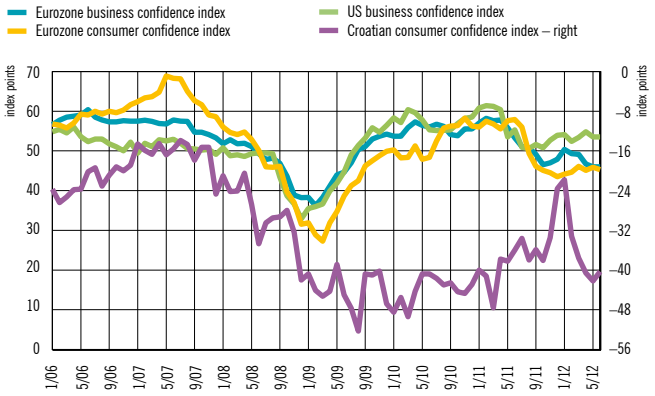
These actions helped ease some tensions in capital markets. With the gradual opening of markets for the financing of the banks, the risk premiums on sovereign debt of peripheral eurozone countries dipped in the first quarter of 2012, after hovering at critical levels in winter 2011. However, serious dissensions appeared in the approach to resolution of the crisis as early as April 2012, which again led to the spread of instability in financial markets (Figures 4, 5, 6 and 7).

The negative economic and political consequences of the austerity policy rekindled the crisis. Strong recessionary effects of austerity measures threatened the attainment of fiscal consolidation targets in Spain. With large uncovered debts in the banking sector, this raised doubts about the ability of the Spanish government to cover bank losses, so that the risk premium on Spanish sovereign debt again soared to unsustainable levels. Growing uncertainty spread to Italy; in view of the size of these two economies, this again called into question the adequacy of the eurozone bailout mechanisms. The decision to raise substantially IMF funds that would be available for financial market stabilisation failed to calm the situation.

An additional impetus that took the eurozone crisis to a critical level came after the Greek parliamentary elections. They showed that there was a strong opposition to the austerity policy and called into question the implementation of the agreed bailout programme for Greece. This gave a clear political dimension to the eurozone financial crisis.

Possible abandonment of the programme agreed with the EU has raised the possibility of a Greek exit from the eurozone and a stronger crisis in the larger peripheral eurozone countries. It

Figure 2 Business and consumer confidence indices



Sources: Bloomberg and CNB.

Table 2 Fiscal balance and current account balance in selected developed and emerging market countries

	Fiscal balance, as % of GDP (ESA 95)			Current account balance, as % of GDP		
	2010	2011[a]	2012[b]	2010	2011[a]	2012[b]
USA	–10.6	–9.6	–8.3	–3.3	–3.2	–3.1
EU	–6.5	–4.5	–3.6	–0.9	–0.7	–0.4
Germany	–4.3	–1.0	–0.9	5.8	5.3	4.7
Italy	–4.6	–3.9	–2.0	–3.5	–3.1	–2.2
Portugal	–9.8	–4.2	–4.7	–9.7	–6.5	–3.6
Ireland	–31.2	–13.1	–8.3	0.5	0.0	1.6
Greece	–10.3	–9.1	–7.3	–12.3	–11.3	–7.8
Spain	–9.3	–8.5	–6.4	–4.5	–3.9	–2.0
Slovenia	–6.0	–6.4	–4.3	–0.8	–1.1	–0.4
Slovak R.	–7.7	–4.8	–4.7	–3.6	0.1	0.2
Czech R.	–4.8	–3.1	–2.9	–4.4	–3.6	–3.2
Poland	–7.8	–5.1	–3.0	–3.7	–4.3	–3.9
Hungary	–4.2	4.3	–2.5	1.0	0.9	2.2
Estonia	0.2	1.0	–2.4	3.8	0.6	–0.3
Latvia	–8.2	–3.5	–2.1	3.0	–1.2	–1.8
Lithuania	–7.2	–5.5	–3.2	1.1	–1.6	–2.0
Bulgaria	–3.1	–2.1	–1.9	–0.4	0.8	0.6
Romania	–6.8	–5.2	–2.8	–3.9	–4.1	–5.0
Croatia	–4.9	–5.0	–4.2	–1.0	–1.0	–1.1

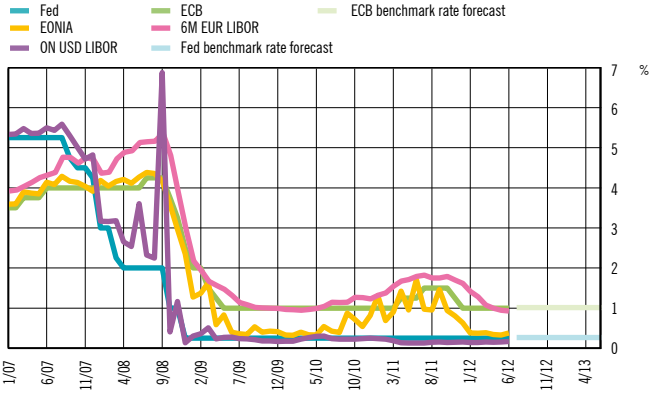
[a] Estimate. [b] Forecast.
Sources: European Commission, *European Economic Forecast*, spring 2012 and CNB (for Croatia).

seems that the crisis has reached a turning point: either a credible lasting solution is found or the eurozone will disintegrate with unforeseeable economic and political consequences.

A viable solution to the crisis implies a fiscal union and incentives to economic growth. In the context of a search for permanent solutions, political changes in France after the presidential election drew attention to economic growth as an indispensable component of a long-term solution. In addition to possible modifications to the necessary austerity programme in countries with large budget deficits, measures to boost growth in these countries will become the focus of the attention. The measures imply the reliance on joint EU funds and financial institutions, the necessary rebalancing in the eurozone by strengthening demand in core EU countries, and the possible relaxation of the ECB's monetary policy by interest rate cuts and the weakening of the euro (Tables 1 and 2 and Figure 3).

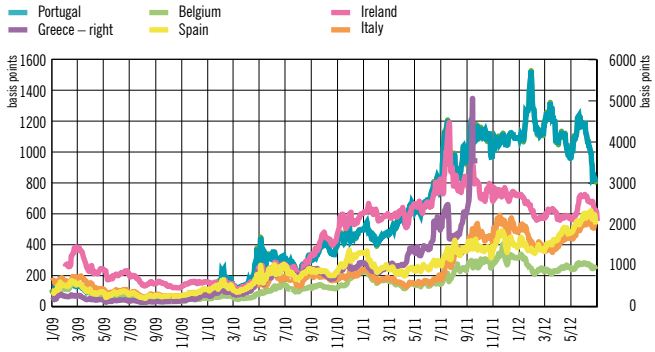
Still, the key component of a lasting solution should be a strong step towards a fiscal union, which also entails much stronger political integration. In addition to the political will, this would require much innovation and wisdom on the part of political elites so as to ensure the democratic legitimacy as well as stability of a new institutional arrangement.

Figure 3 Key interest rates of the main central banks and leading market interest rates



Sources: Fed, ECB and Bloomberg.

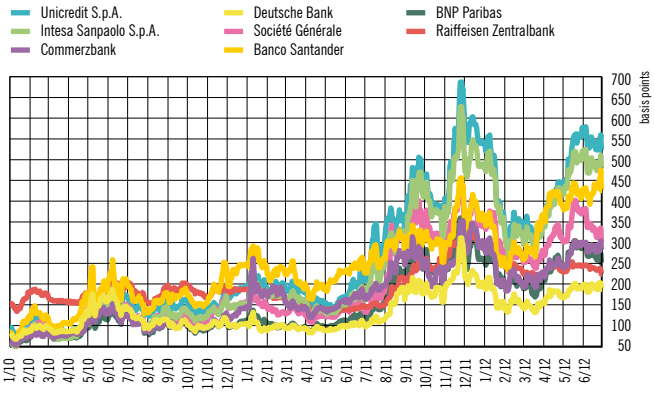
Figure 4 CDS[a] spreads for 5-year bonds of selected eurozone countries



[a] 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.

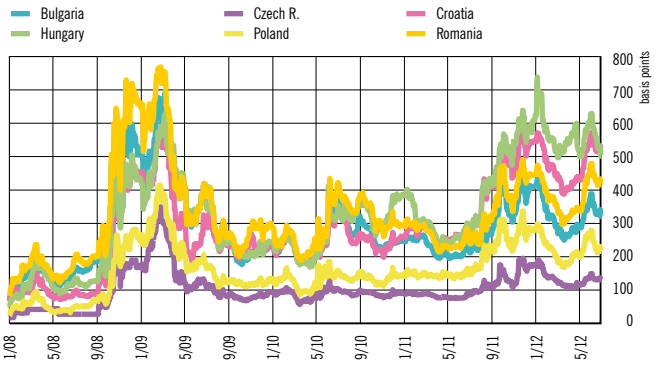
Source: Bloomberg.

Figure 5 CDS spreads for 5-year bonds of selected banks



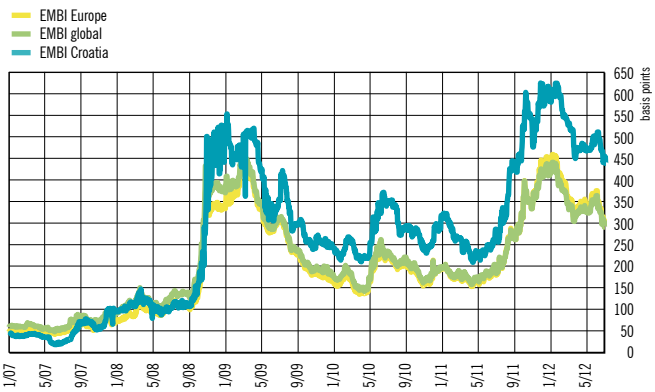
Source: Bloomberg.

Figure 6 CDS spreads for 5-year bonds of selected emerging market countries



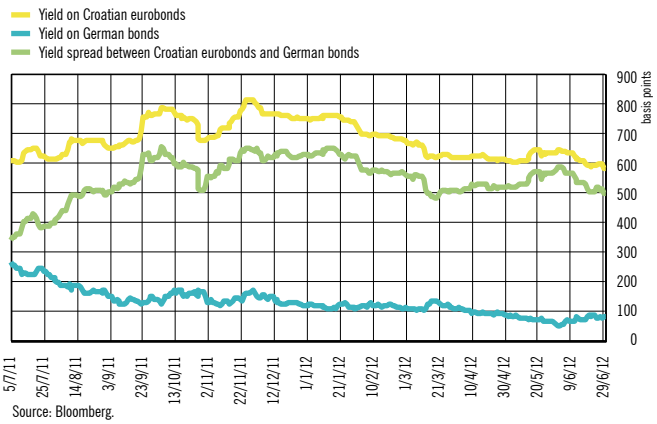
Source: Bloomberg.

Figure 7 EMBI spreads



Source: J. P. Morgan.

Figure 8 Yields on Croatian and benchmark German bonds maturing in 2018 and their spread



Source: Bloomberg.

Table 3 Public and external debt in selected European emerging market countries

as % of GDP

	Public debt		External debt	
	2011[a]	2012[b]	2010	2011
Slovenia	47.6	54.7	115.8	119.0
Slovak R.	43.3	49.7	76.0	78.2
Portugal	107.8	113.9	230.6	220.7
Italy	120.1	123.5	118.5	119.2
Ireland	108.2	116.1	1.113.3	1.055.1
Greece	165.3	160.6	181.3	184.0
Spain	68.5	80.9	166.1	167.9
Czech R.	41.2	43.9	49.6	48.9
Poland	56.3	55.0	56.3	68.8
Hungary	80.6	78.5	160.1	159.8
Estonia	6.0	10.4	116.1	110.7
Latvia	42.6	43.5	165.2	155.8
Lithuania	38.5	40.4	87.2	86.0
Bulgaria	16.3	17.6	105.5	98.3
Romania	33.3	34.6	77.5	79.2
Croatia	45.7	51.7	101.2	99.6

[a] Estimate. [b] Forecast.
Sources: Eurostat, World Bank, *Quarterly External Debt Statistics* and CNB (for Croatia).

In the meantime, financial market attention has turned to the banking sector as the main focus of the crisis. The crisis could escalate further because of increased risks in the banking sector, particularly in Spain due to large losses, as well as the risks associated with a possible Greek exit from the eurozone, which could again spark a banking panic and its spread to other countries. This has fuelled a rise in demands for a banking union that would unify supervision, deposit insurance and bank rehabilitation at the eurozone level. As this also implies elements of a fiscal union, which has not yet been agreed, such proposals have so far lacked support from the main creditor countries.

Regulatory demands for capital increases in the midst of the market funding crisis have led to bank deleveraging. Investor flight from the sovereign debt market of peripheral eurozone countries increases their dependency on funding from domestic investors and banks. Burdened by losses and regulatory demands to raise capital, banks are being forced to deleverage and are increasingly less able to finance the government and the economy (Figure 9).

There are also tendencies to close financial flows within country borders, with a negative effect on capital inflows to emerging markets in Europe and other world regions. The revival of the Vienna initiative in early 2012 was aimed at keeping outflows of assets of eurozone banks from Central and Eastern European countries within moderate limits.

Reduced capital inflows and the drop in export demand, which has been spreading slowly from peripheral to core eurozone countries because of recession, create an extremely unfavourable external environment for non-eurozone countries that have strong trade and financial ties with the eurozone. This is particularly true for countries like Croatia that because of high external debt cannot generate economic growth by encouraging domestic demand (Figures 10, 11 and 14).

The Croatian economy is again sinking into recession. Following the slight recovery backed by export growth in mid-2011, the Croatian economy again sank into recession in the last quarter of 2011 and the first quarter of 2012 due to harsher funding terms in foreign and domestic markets and the drop in export demand. Notwithstanding the assumed slight recovery in the second half of the year, GDP is expected to drop by 1.6% in 2012 and be accompanied by a continued fall in employment and real drop in household disposable income (Figure 11).

Room for counter-cyclical fiscal and monetary policies has been limited. It is hard to avoid recessionary trends in the short run when, in the context of increased risk aversion in response to the financial crisis in the eurozone, fiscal policy must stick to budget consolidation to keep public debt at sustainable levels and ensure access to foreign financial markets.

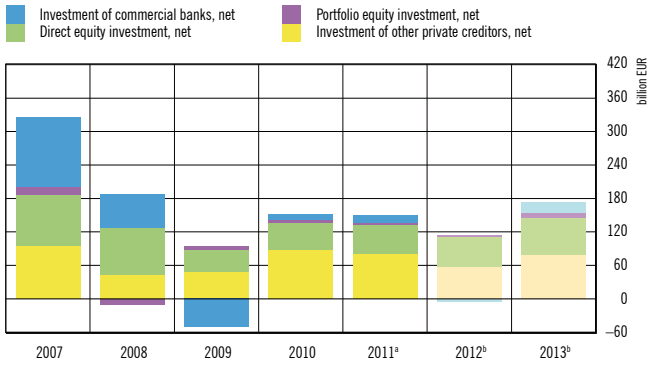
At the same time, the impact of monetary policy is also limited by the need to maintain exchange rate stability in conditions of large foreign currency debt and mounting depreciation pressures stemming from reduced foreign capital inflows (Figure 26). Further, the attempts to encourage bank lending by releasing liquidity through reserve requirement cuts have failed to produce credit growth because of low demand by export-oriented enterprises and the increased risk associated with loans to domestic-oriented enterprises (Figure 10).

The budget adopted for 2012 assumes a moderate cut in public expenditures and a rise in revenues, while the general government deficit should be reduced from 5.0% of GDP in 2011 to 4.2%. With the continued consolidation in the next few years, public debt should stabilise at below 60% of GDP (Tables 2 and 3).

The current account deficit has been reduced to a sustainable level, but external vulnerabilities have remained high because of substantial external debt. The expected reduction in negative net savings of the public sector, which should be accompanied by a somewhat smaller decrease in net savings of the private sector, will keep the current account deficit at around 1% of GDP. With the expected foreign direct inflows of around 1.5% of GDP, this would put an end to external debt growth (Figures 10 to 15). Together with international reserves, which are fluctuating around the optimal level, this would ensure the country's foreign currency liquidity in 2012, despite the fact that short-term debt is around one third of GDP (Figures 15 and 18).

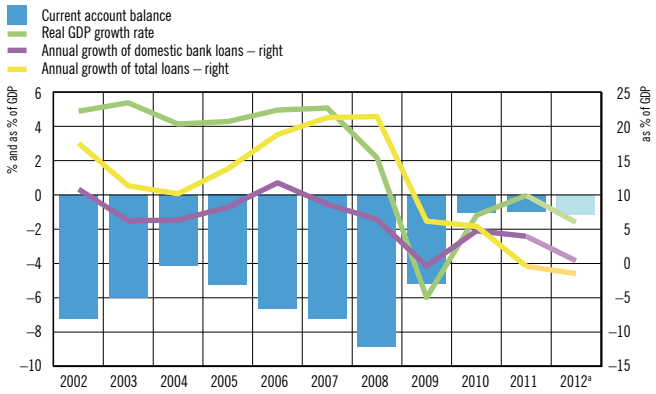
Such developments in fiscal and external imbalances were sufficient to preserve the country's credit rating at an investment grade. The government was thus able to raise the planned

Figure 9 Capital inflows to European emerging market countries



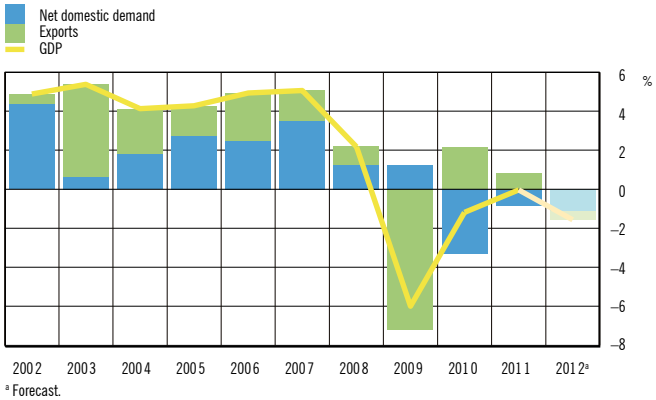
a Estimate. b Forecast.
Source: International Institute of Finance, *Capital Flows to Emerging Market Economies*, January 2012.

Figure 10 Foreign capital inflows and GDP growth in Croatia



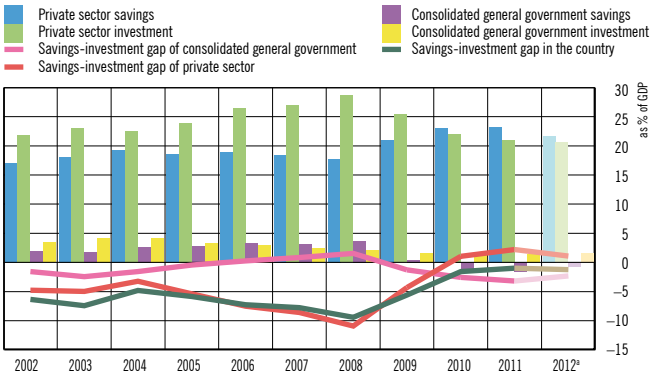
a Forecast.
Sources: CNB and CBS.

Figure 11 GDP growth pattern (contribution to growth)



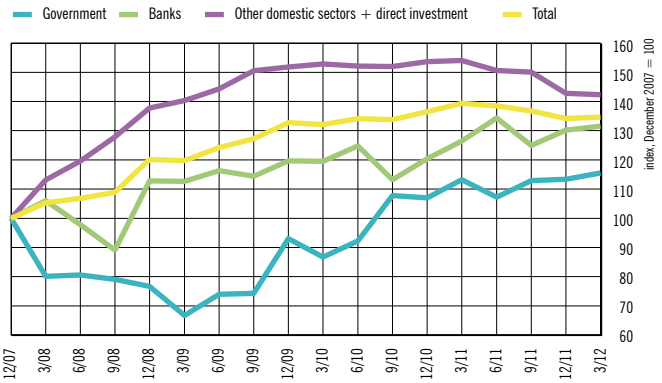
a Forecast.
Source: CBS.

Figure 12 Savings and investment – total and by sector



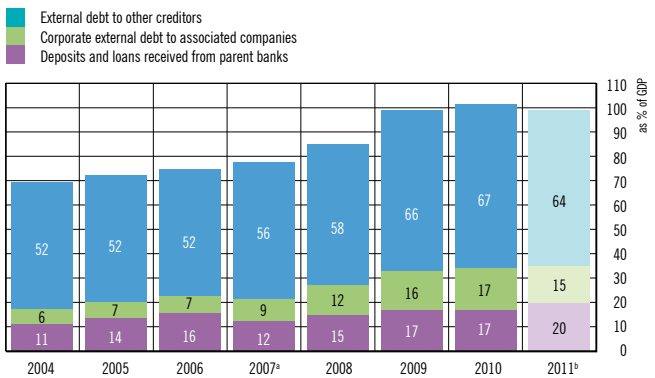
[a] Forecast.
Sources: MoF and CNB (estimate).

Figure 13 External debt by domestic institutional sector



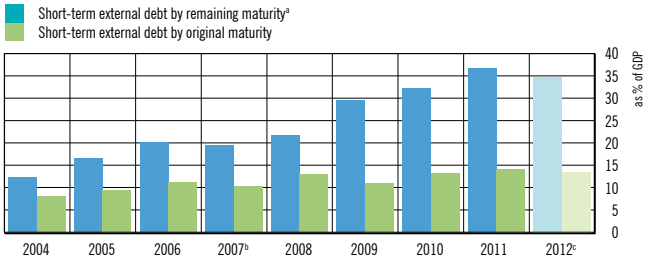
Source: CNB.

Figure 14 Total external debt by creditor



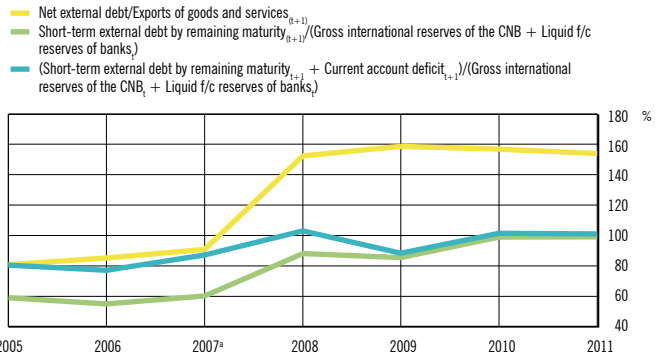
[a] Since end-2007, external debt has been calculated according to the new methodology. [b] Forecast.
Source: CNB.

Figure 15 Short-term external debt



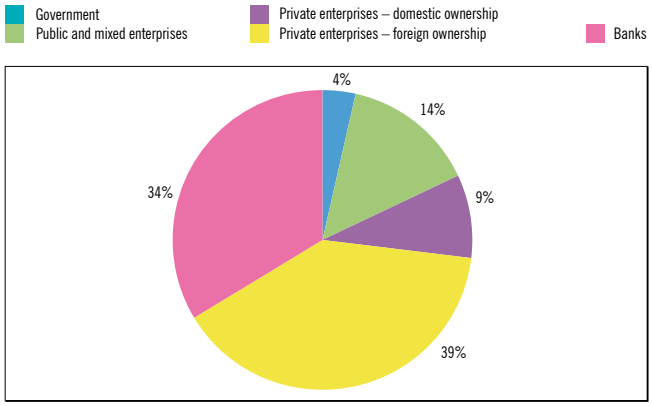
[a] Short-term external debt by remaining maturity is the amount of debt maturing in the reference year, representing the sum of the balance of short-term debt at the end of the previous year and long-term debt maturing in the reference year
[b] Since end-2007, external debt has been calculated according to the new methodology.
[c] Forecast.
Note: From 2008 on, short-term debt by remaining maturity includes round-tripping transactions, which represent an accounting item that has a neutral effect. For more details on round tripping, see *CNB Bulletin*, No. 154, Box 4 Round tripping and its impact on Croatian statistical data.
Source: CNB.

Figure 16 Selected indicators of external vulnerability



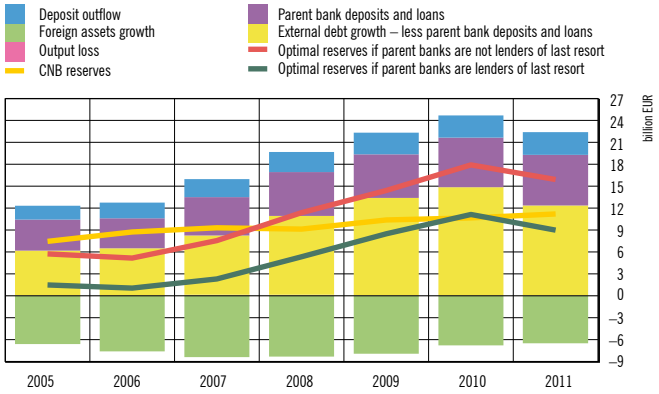
Note: Net external debt is calculated as a difference between gross external debt and gross international reserves and bank foreign assets.
[a] Since end-2007, external debt has been calculated according to the new methodology.
Source: CNB.

Figure 17 Projection of external debt principal payments in 2012 by sectors



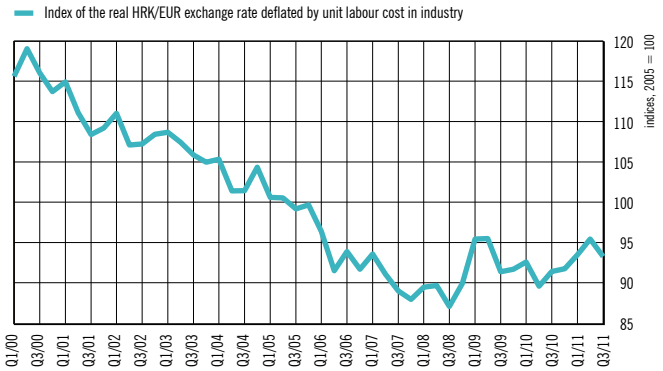
Source: CNB.

Figure 18 Optimal international reserves – contribution of individual components



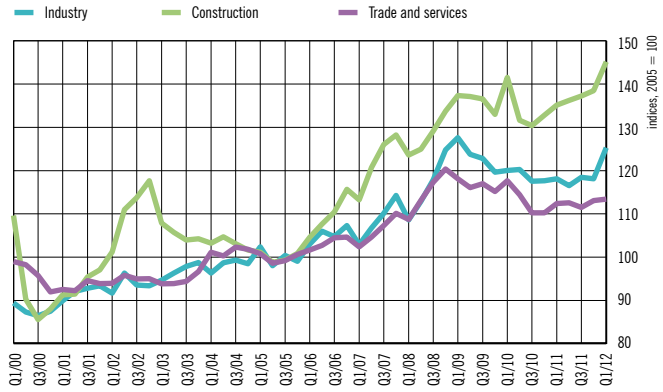
Source: CNB.

Figure 19 Real kuna/euro exchange rate



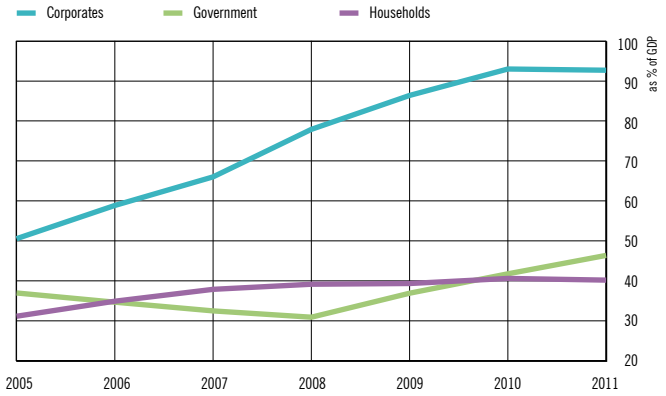
Note: A fall in the index indicates a real appreciation of the kuna against the euro.
Sources: CBS, CNB and CNB calculations.

Figure 20 Unit labour cost



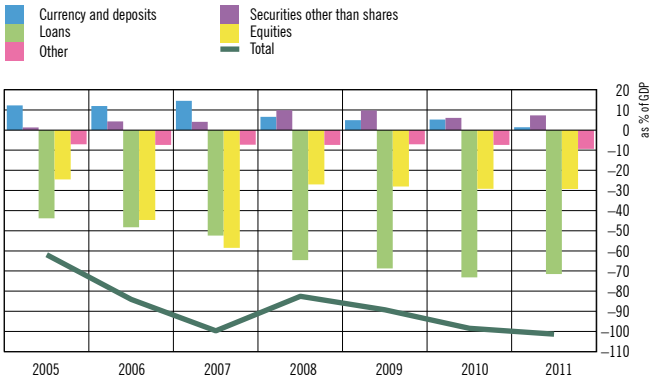
Sources: CBS, CNB and CNB calculations.

Figure 21 Total debt by sector



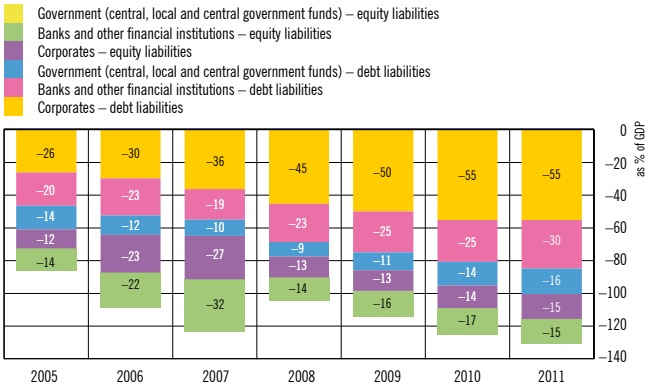
Source: CNB – financial accounts.

Figure 22 Net position of domestic sectors with respect to the rest of the world by instrument



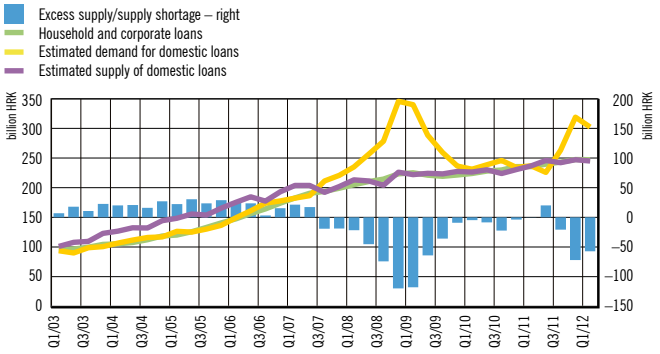
Source: CNB – financial accounts.

Figure 23 Net financial position of selected domestic sectors with respect to the rest of the world by equity and debt instrument



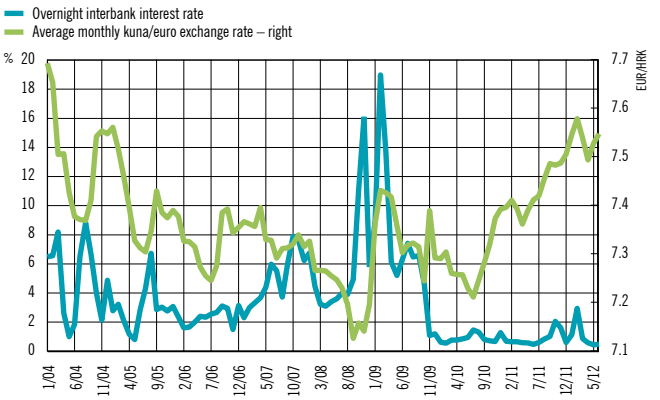
Source: CNB – financial accounts.

Figure 24 Estimated credit demand and supply in the domestic market[a]



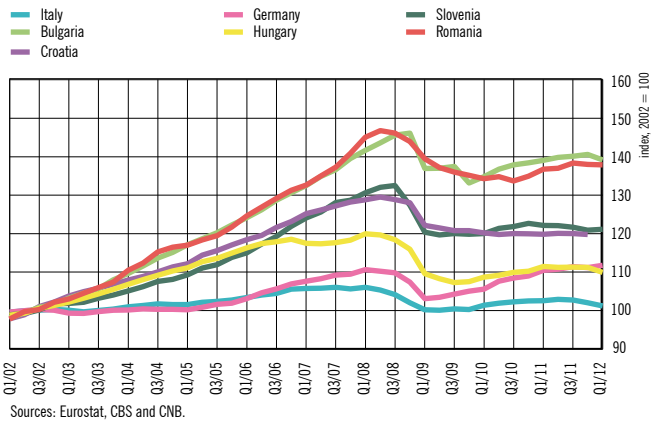
[a] Based on the results of the model used to estimate the impact of demand and supply on the Croatian credit market from Box 2 Credit market disequilibrium, *Financial Stability*, No. 5, July 2010.
Source: CNB calculations.

Figure 25 Kuna/euro exchange rate and overnight interest rates



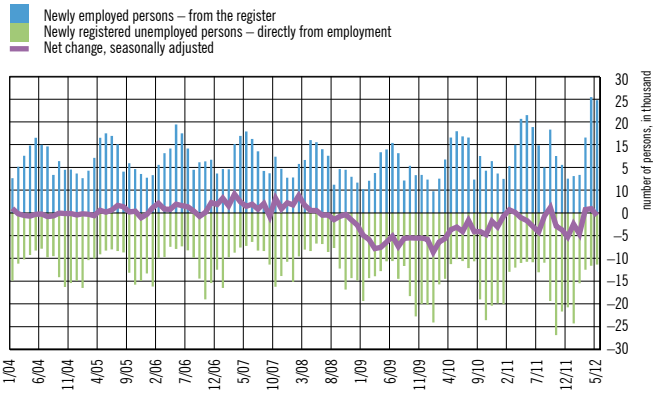
Source: CNB.

Figure 26 Gross domestic product, seasonally adjusted data in constant prices



Sources: Eurostat, CBS and CNB.

Figure 27 Changes in employment registered with the Croatian Employment Service (CES)



Sources: CES and CNB calculations.

amount in foreign markets in April 2012. However, the interest rate was higher as the risk premium increased in the midst of the eurozone crisis (Figures 7, 8 and 29). This also created room for gradual deleveraging in the corporate sector, while bank debt remained nearly constant, without exerting too much pressure on the kuna exchange rate (Figures 13 and 26).

Large foreign currency reserves of the monetary system and the strong capitalisation of banks guarantee short-term stability. However, should the eurozone crisis escalate further, corporate debt refinancing may become a problem and foreign banks may withdraw their assets. This would require appropriate use of the foreign currency reserves of the monetary system to maintain financial and monetary stability. At the same time, the likely deepening of the recession under that scenario would call for additional fiscal policy adjustments to maintain fiscal imbalances within limits acceptable to financial markets. As bank losses would increase substantially in such conditions, it is extremely important to maintain the existing high capitalisation of the banking sector.

The country's credit rating may also be threatened by a sharp economic downturn. It may result from stronger economic restructuring at the time when exports cannot provide sufficient impetus to growth in the prevailing recessionary environment (Figure 29). Incentives to short-term growth coming from heavy public sector investment would not be desirable in such circumstances as they would adversely affect growth in domestic demand and imports. In the context of limited export growth, this would exacerbate external imbalances and worsen the perception of financial markets and credit rating agencies, threatening the long-term growth potential.

Deep structural reforms are needed for long lasting stability. In this context, economic policy should focus on creating preconditions for dynamic growth in the medium and long run by stepping up reforms to enhance the investment climate and bring about a profound economic transformation by strengthening intellectual capital as the main factor of competitiveness and sustainable growth.

Table 4 Financial accounts for Croatia

as % of GDP

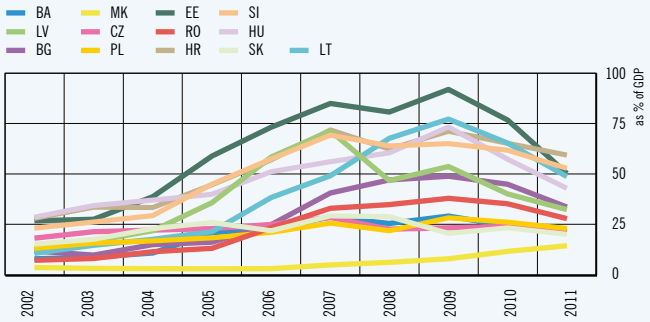
Liabilities		Claims												Total liabilities	
		Domestic sectors										Rest of the world			
		Corporates		Financial sector		General government		Households		Total					
		2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Corporates	Monetary gold and SDRs	0	0	0	0	0	0	0	0	0	0	0	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	2	3	3
	Loans	0	0	43	45	0	0	0	0	43	45	47	44	90	89
	Shares and equity	39	39	4	3	28	28	22	22	94	91	27	26	111	118
	Insurance technical provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other claims and liabilities	32	32	1	1	6	6	2	2	42	41	12	12	48	53
	Total	68	70	49	52	32	33	20	24	169	180	83	83	252	263
Financial sector	Monetary gold and SDRs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Currency and deposits	15	14	19	19	3	2	53	55	89	90	14	16	104	107
	Securities other than shares	0	0	0	0	0	0	0	0	0	0	3	2	3	2
	Loans	0	0	7	6	0	0	0	0	7	7	23	22	30	29
	Shares and equity	1	1	2	2	9	10	4	3	17	17	17	17	36	34
	Insurance technical provisions	1	1	1	1	0	0	16	18	18	20	0	0	18	20
	Other claims and liabilities	1	1	0	0	0	1	1	2	3	4	1	1	4	4
	Total	18	17	29	29	13	13	75	78	135	137	59	59	194	196
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	20	22	0	0	0	0	20	22	11	11	30	33
	Loans	0	0	8	9	0	0	0	0	8	9	4	4	11	13
	Shares and equity	0	0	0	0	26	26	0	0	26	26	0	0	30	26
	Insurance technical provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other claims and liabilities	3	3	0	0	0	0	0	0	3	3	0	0	4	3
	Total	4	3	27	31	30	26	0	0	61	60	14	15	75	76
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	40	40	0	0	0	0	40	40	0	0	41	40
	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
	Total	0	0	41	41	0	0	0	0	41	41	0	0	42	41
Rest of the world	Monetary gold and SDRs	0	0	1	1	0	0	0	0	1	1	0	0	1	1
	Currency and deposits	0	0	16	14	0	0	3	3	19	17	0	0	19	17
	Securities other than shares	0	0	20	22	0	0	0	0	20	22	0	0	20	22
	Loans	0	0	1	1	0	0	0	0	1	1	0	0	1	1
	Shares and equity	11	11	3	3	0	0	0	0	15	15	0	0	14	15
	Insurance technical provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other claims and liabilities	3	3	0	0	0	0	0	0	3	3	0	0	4	3
	Total	14	14	42	42	0	0	3	3	59	59	0	0	59	59
Total	Monetary gold and SDRs	0	0	1	1	0	0	0	0	1	1	0	0	1	1
	Currency and deposits	15	14	35	33	3	2	56	58	108	107	14	16	123	124
	Securities other than shares	0	0	42	46	0	0	0	0	42	47	14	15	57	61
	Loans	0	0	98	101	0	0	0	0	98	101	74	71	172	172
	Shares and equity	51	51	9	9	65	64	21	25	147	149	43	44	190	193
	Insurance technical provisions	1	1	1	1	0	0	16	18	18	20	0	0	18	20
	Other claims and liabilities	37	39	3	3	6	6	4	4	49	52	11	12	60	64
	Total	104	105	188	195	74	72	98	105	464	477	157	158	622	635

Source: CNB.

Box 1 Parent bank deleveraging and capital flows in Central and Eastern Europe

Strong capital inflows into the countries of Central and Eastern Europe in the pre-crisis period were associated with structural features that characterised their economy (in most cases these were small and open economies that had only recently completed the process of transition), fast integration into the European Union as well as dominant large European banks' ownership of these countries' banking systems. The importance of parent banks for capital inflows can be seen in lending intensity, particularly if we look at loans to own subsidiaries and loans granted to the non-financial sector in Central and Eastern Europe. The annual inflows of loans from parent banks between 2002 and 2007 in the thirteen observed countries thus stood on average at 9% of their GDP, growing cumulatively to 38% of GDP towards the end of 2007, although these amounts different greatly from country to country (Figure 1).

Figure 1 Claims of BIS reporting banks on all sectors of CEE region countries, as % of GDP



Note: Data are based on the locational banking statistics which show the aggregate claims of BIS reporting banks on a non-consolidated basis, i.e. claims within a bank group are not net out.
Sources: BIS and CNB calculations.

The outbreak of the financial crisis brought difficulties for some parent banks on their domestic markets, which, combined with deteriorating economic outlooks in the region also led to a temporary halt in capital inflows. A new swing of the crisis towards the end of 2011, the need to clean up balance sheets that had not been cleaned sufficiently during the crisis period, the need for strengthening capitalisation in compliance with the requirements set out in the framework of stress testing by the European Banking Authority, and preparations for observing Basel III standards under which the banks have to rely less on short-term financing sources[1] have provoked discussion on the strengthening of the process of deleveraging of West-European banks and the ensuing worsening of the economic developments in Europe. This process could hit, in particular, the countries of Central and Eastern Europe due to their dependence on parent bank financing.

To examine the possible effects of the expected process of parent bank deleveraging on Central and Eastern Europe, an econometric analysis of the determinants of inflows of loans from parent banks to the countries of Central and Eastern Europe was performed. The main determinants of the inflow of loans from parent banks included in the analysis were: growth perspective measured by differences in growth rates between the countries of Central and Eastern Europe and Western Europe, investor risk aversion on the global financial markets, measured by the VIX index, financial soundness indicator measured by relative profitability of subsidiary banks in relation to parent banks and, finally, parent bank leverage measured by total assets to total capital ratio[2]. The source of data on loan inflows are locational banking statistics of the Bank for International Settlements (hereinafter: BIS), which presents unconsolidated claims of reporting banks by banking, non-banking and all sectors of a country separately.

The baseline model has been estimated based on annual data for the 2002-2010 period for 13 countries of the region using the fixed effect estimator. The results of the baseline model show that a relatively faster economic growth in the region of Central and Eastern Europe compared to the EU-15 group of countries is associated with a bigger inflow of loans into the region, while increased risk aversion on the global financial markets leads to smaller loan inflows. Moreover, higher profitability of subsidiary than in parent banks attracts cross-border loans to the region. Yet the most interesting result here is the quantification of the relationship between parent bank deleveraging and the inflow of loans to the region. Such a unit reduction in parent bank leverage leads to a fall in the inflow of loans to the banking sector of a country in the region of approximately 0.5% of GDP and to a fall in the inflow of loans to all the sectors of 0.6% of GDP (Table 1).

The measure of the parent bank leverage used, i.e. the total assets to capital ratio, in general did not change much before the crisis, but has been decreasing rapidly since the beginning of the crisis (Table 2). The analysis made shows that this process has contributed significantly to the slowdown in the inflow of loans into the region of Central and Eastern Europe during the crisis.

To evaluate the impact of macroprudential policy pursued in the period before the crisis, the *subsidiary banks' total loans to deposits ratio* was used in the baseline model as a measure of its strictness. In the model, this ratio was also placed into an interaction with dummy variables that represent the crisis period and a reduction in a parent bank's leverage so as to isolate the effect of leveraging during crisis on capital flows. The results of such an extended model show that the more relaxed macroprudential policy of central banks in the pre-crisis period, which may be associated with a higher loans to deposits ratio of domestic banks, led to stronger capital inflows before the crisis and stronger outflows after the outbreak of the crisis. The countries in the region that pursued a stricter macroprudential policy before the crisis[3] thus succeeded in mitigating the intensity of cross-border capital inflows before the crisis as well as the effect of deleveraging of parent banks during the crisis (Table 3).

1 See IMF, *Global Financial Stability Report* (April 2012).

2 Leverage was calculated by asset size weighting of the individual indicators of total assets to total capital ratios for the three largest banks. Additional specifications with an indicator for the two largest and for the largest subsidiary bank were also estimated for the purpose of comparison of the robustness of the parameter estimate. Parent banks come from Austria, Belgium, France, Greece, Italy, the Netherlands, Germany, Norway and Sweden.

3 The countries with a below average pre-crisis total loans to deposits ratio, i.e. a stricter macroprudential policy include Bulgaria, the Czech Republic, Croatia, Macedonia, Poland and Slovakia.

Table 1 Baseline model, determinants of BIS reporting bank loan inflows to the banking sector and all sectors

as % of GDP

	Banking sector	All sectors
Difference in GDP growth rates between a country in the region and EU-15	0.533***	0.621**
	(0.12)	(0.23)
VIX	–0.213***	–0.285***
	(0.05)	(0.06)
Difference in ROAE between subsidiary banks and parent banks	0.118**	0.188**
	(0.05)	(0.07)
Indebtedness position of parent banks	0.458**	0.626**
	(0.16)	(0.21)
Constant	–3.532	–4.338
	(2.87)	(3.10)
Determination coefficient	0.507	0.534
Number of observations	117	117

Note: Asterisks denote the significance levels: * p<0.10, ** p<0.05 and *** p<0.01, with standard errors reported in brackets.
Source: CNB calculations.

Table 2 Indebtedness position of parent banks at year-end

Parent bank	2002	2007	2010
Erste Group Bank AG	26	18	12
Hypo Alpe-Adria-Bank International AG	25	23	27
Österreichische Volksbanken AG	16	27	23
Raiffeisen International Bank AG	20	16	12
KBC Groep SA	21	19	17
Société Générale	27	34	22
National Bank of Greece	22	11	11
Intesa Sanpaolo	20	11	12
Unicredit SPA	16	16	14
ING Groep NV	30	21	15
Bayerische Landesbank	42	32	23
Commerzbank AG	42	38	26
DNB Nor ASA	16	19	17
SEB	28	31	22
Swedbank AD	23	24	18

Sources: Bankscope and CNB calculations.

The effect of the process of parent bank deleveraging on the countries of Central and Eastern Europe might depend not only on the efficacy of their economic policies but also on the ability of subsidiary banks to ease the effects of the fall in capital inflows on domestic loan supply by substituting foreign by domestic sources of financing. For this purpose, the previous two model specifications were estimated, using as a dependent variable the change in the consolidated BIS reporting banks claims, that include domestic and foreign loans to the non-financial sector, in relation to GDP. The results of the new model are rather similar to the baseline model so that the unit reduction in parent bank leverage is associated with a fall in the supply of loans in a country of the region of 0.6% of GDP. Also, as in the case of cross-border loan inflows, the effect of parent bank deleveraging on the domestic loan supply was smaller in those countries that pursued a more conservative macroprudential policy before the crisis.

The analysis made indicates that more intensive process of deleveraging of West- European parent banks could trigger capital outflows from Central and Eastern Europe. However, the least hit by this process so far have been the countries in the region that pursued a strict macroprudential policy before the crisis. Therefore, it can be assumed that the negative effect of parent bank deleveraging on cross-border inflows and loan supply in the forthcoming period will continue to be smaller in those countries whose central banks had forced the banks to operate in a more conservative manner and which now have more manoeuvring room to mitigate external shocks. In the case of Croatia, the easing of the intensity of changes in capital inflows might come from the still solid profitability of domestic banks as well as the relatively low indebtedness of their parent banks.

Table 3 Alternative model, determinants of BIS reporting bank loan inflows to the banking sector and all sectors

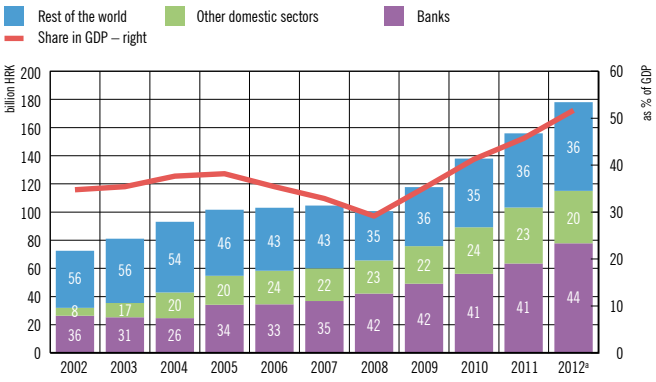
as % of GDP

	Banking sector	All sectors
Difference in GDP growth rates between a country in the region and EU-15	0.712***	0.907***
	(0.10)	(0.20)
VIX	–0.150***	–0.212***
	(0.03)	(0.04)
Difference in ROAE between subsidiary banks and parent banks	0.040	0.078
	(0.04)	(0.07)
Indebtedness position of parent banks	0.477**	0.678***
	(0.18)	(0.16)
Interaction variable	–6.369***	–7.933***
	(1.89)	(2.24)
Loan to deposit ratio of parent bank clients	7.315***	10.255***
	(1.94)	(2.67)
Constant	–13.173**	–18.315***
	(5.50)	(5.86)
Determination coefficient	0.649	0.696
Number of observations	117	117

Note: Asterisks denote the significance levels: * p<0.10, ** p<0.05 and *** p<0.01, with standard errors reported in brackets.
Source: CNB calculations.

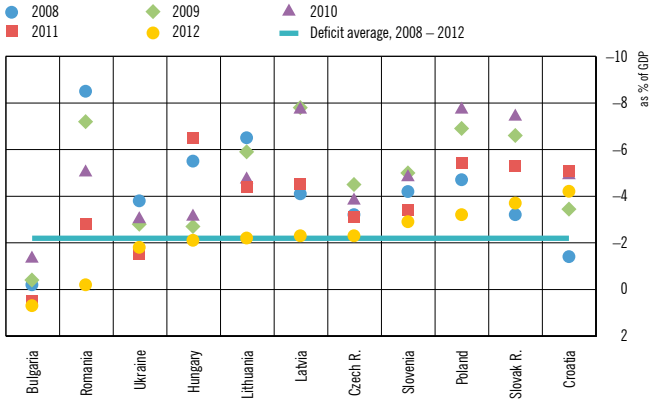
Government sector

Figure 28 General government debt



[a] CNB projections.
Sources: MoF and CNB.

Figure 29 General government deficit

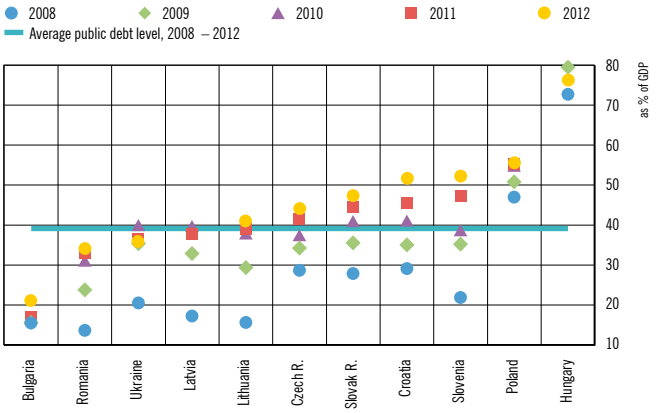


Source: IMF, *Regional Economic Outlook 2011*.

The beginning of the fiscal adjustment process in the context of the first year of implementation of the Fiscal Responsibility Act has characterised public finance in 2012. Under the Act, the ratio of general government expenditures to GDP must be cut by one percentage point a year until a primary budget surplus is achieved. Delays in the implementation of necessary reforms and the expected low growth in nominal GDP will further expand the size of fiscal adjustments needed to meet the regulatory criteria in 2012, posing a major challenge to public finances. Persevering implementation of the Fiscal Responsibility Act in a setting of adverse economic conditions is particularly important as sustainable public finances are necessary to preserve financial market confidence and a favourable credit rating, as well as to establish the credibility of the overall government economic policy.

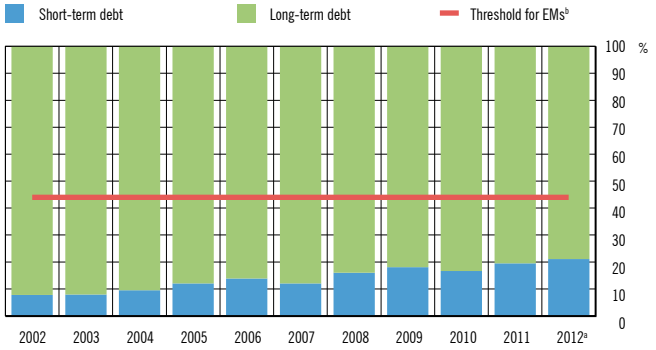
The general government budget for 2012 projects that general government expenditures will be cut by 1% of GDP, which is in line with the Fiscal Responsibility Act. However, there are considerable risks to meeting this fiscal objective. The main risks arise from the sharp economic slowdown and delays in the implementation of structural reforms necessary to reduce budget expenditures. In addition, the government took over guarantees to shipyards and included them in public debt, which automatically increased interest expenses. The slump in economic activity and postponement of reforms thus require a swift reduction

Figure 30 Public debt



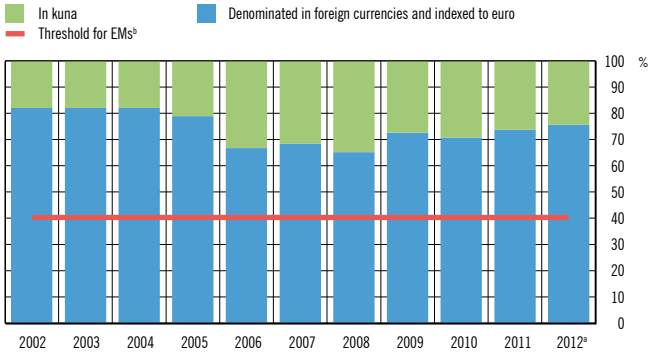
Source: IMF, *Regional Economic Outlook 2011*.

Figure 31 Breakdown of public debt by remaining maturity



[a] CNB projections.
[b] One of the indicators used for estimating the fiscal sustainability risk in emerging market countries (EMs).
Sources: MoF and CNB.

Figure 32 Currency breakdown of public debt



[a] CNB projections.
[b] One of the indicators used for estimating the fiscal sustainability risk in emerging market countries (EMs).
Sources: MoF and CNB.

Table 5 Thresholds of the fiscal sustainability risk indicator in 2012[a]

Indicator	Direction to be safe	Threshold	Observation for Croatia
r – g[b]	<	1.1%	3.3%
General government public debt (as % of GDP)	<	42.8%	51.7%
Cyclically adjusted primary balance (as % of potential GDP)	>	–0.5%	–1.5%
Gross financing needs (as % of GDP)	<	20.6%	6.9%
Share of short-term debt as a ratio of total debt	<	44.0%	21.1%
Debt denominated in foreign currencies	<	40.3%	75.7%
Weighted average maturity of public debt (years)	>	2.3	4.6
Short-term external public debt (as % of international reserves)	<	61.8%	3.9%

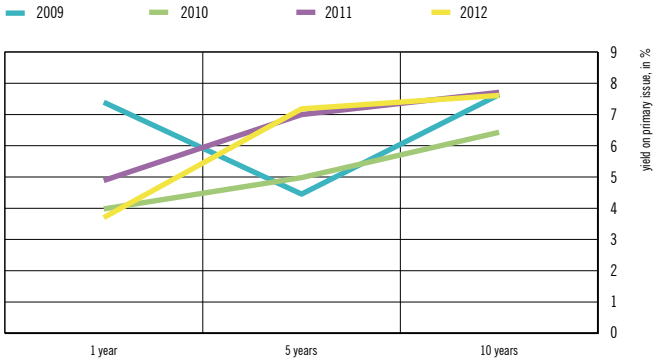
[a] Baldacci, E., I. Petrova, N. Belhocine, G. Dobrescu, and S. Mazraani: *Assessing Fiscal Stress*, IMF Working Paper, WP/11/100.
[b] Imputed interest rate on general government debt, deflated by the GDP deflator (5-year average), minus real GDP growth rate (5-year average).
Sources: IMF WP/11/100 and CNB.

in fiscal expenditures to keep government expenditures in 2012 in line with the fiscal rule. An analysis of the scenario where further adjustments are postponed and public finances steadily depart from the fiscal rule indicates the risk of continued strong growth in public debt and its stabilisation at a relatively high level.

Judging by their dynamics in the first several months of 2012, government budget revenues could be in line with the plan. The increase in indirect taxes and the reduction in health care contributions on wages coupled with vigorous efforts to collect tax revenues have had a favourable impact on the revenue side, i.e. the side on which fiscal adjustments focused in the first half of the year.

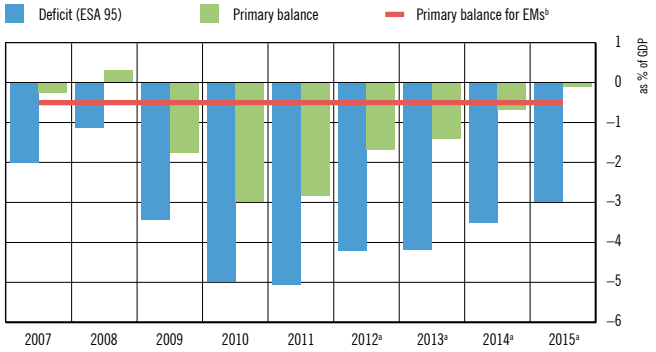
Most fiscal sustainability indicators have continued to deteriorate in 2012. Should the budget deficit (according to ESA 95 methodology) be some 4.2% of GDP, which is insufficient to meet the fiscal criteria, the general government debt-to-GDP ratio would grow by around 6 percentage points in 2012, to 51.7% of projected GDP. This is above 42.8%, i.e. the threshold indicating increased risk for emerging market countries (Table 5). Also, both public debt and the share of foreign currency denominated debt have increased, while the difference between the real implicit interest rate and real GDP growth doubled from 1.6% to 3.3%. The cyclically adjusted primary deficit as a share of GDP would remain around 1 percentage point above the safe level. However, in view of higher interest expenses and the fiscal adjustment planned for 2012, this would still mean progress since the end of 2011. Most of the observed early warning signals for fiscal sustainability indicate higher risk of fiscal stress.

Figure 33 Yield on primary issue of euro securities



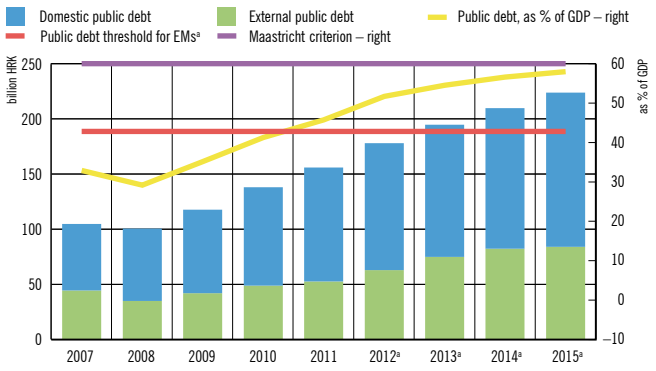
Source: MoF.

Figure 34 Projection of general government deficit



[a] CNB projections.
[b] One of the indicators used for estimating the fiscal sustainability risk in emerging market countries (EMs).
Sources: MoF and CNB.

Figure 35 Projection of general government debt



[a] CNB projections.
[b] One of the indicators used for estimating the fiscal sustainability risk in emerging market countries (EMs).
Sources: MoF and CNB.

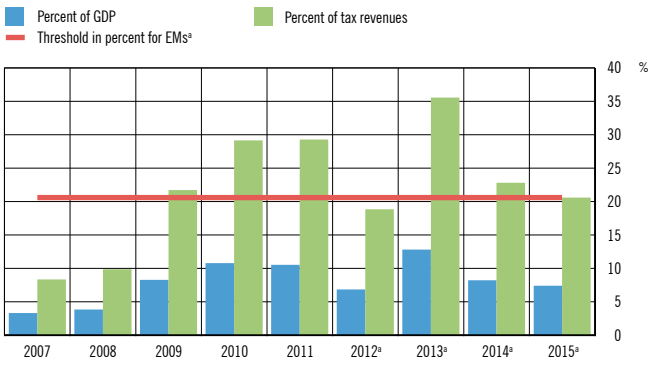
Though shorter, the average remaining maturity of public debt is still favourable, somewhat reducing risks to fiscal sustainability. The weighted average maturity of total public debt decreased to 4.6 years, while the average maturity of external public debt was reduced from 8.1 years in March 2011 to 7.7 years in March 2012. This is the outcome of substantial short-term borrowing in the domestic market and the shortened maturity of the most recent foreign borrowing, from 10 to 5 years. The risks associated with the refinancing of maturing debt are larger in emerging market economies than in developed economies. This is due to lower credibility, which is in turn attributable to weaker institutions, and is particularly noticeable in crisis situations. Therefore, the deepening of the eurozone debt crisis stresses the importance of relatively favourable shares of short-term external public debt and overall short-term debt in public debt and of the relatively long average maturity of public debt.

The continuous observance of the fiscal rule would enable the attainment of a primary surplus in 2015. Notwithstanding the fiscal adjustment planned, Croatia will record the highest budget deficit in its peer group of countries in 2012 (Figure 29). This would not change even if there were stronger fiscal adjustment efforts that cut the deficit to 3.8% of GDP to meet the requirements of the Fiscal Responsibility Act. The medium-term deficit projections (Figure 34) show that the primary budget surplus cannot be attained by 2015 without sticking to the fiscal rule.

Gross government financing needs are higher in 2013 because of substantial short-term borrowings in 2012. In February 2012 the government raised a short-term bank loan of EUR 940m and took over short-term loans to shipyards. This considerably increased gross financing needs in 2013, from 7.2% of GDP estimated in the previous edition of Financial Stability to 12.2% of GDP (Figure 36). The government has already borrowed most of the funds needed, in part also through the issue of USD 1.5bn worth of long-term international bonds in April 2012. The yield at issue was 6.375% thanks to the brief easing in international financial markets in April and announcements of fiscal reforms. However, difficulties in complying with the fiscal rule and any tightening in the international environment could hamper the meeting of government financing needs in the future.

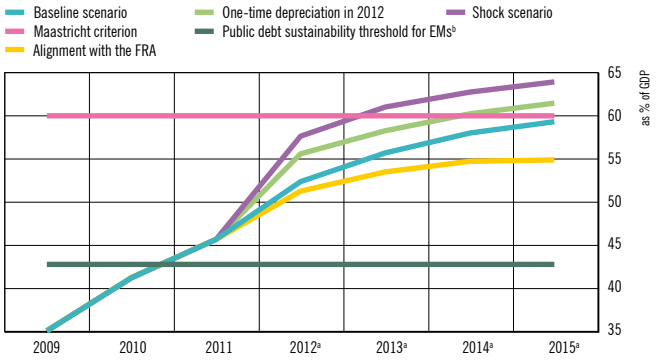
The scenarios analysed show that public debt could soon come close to 60% of GDP or, under the highly unlikely adverse scenario, even exceed that level. Under the scenario without additional fiscal measures to reduce the budget expenditure-to-GDP ratio by at least 1 percentage point a year, public debt continues to grow fast through to the end of 2015. Additional fiscal measures are needed to observe the fiscal rule and put a sooner end to public debt growth. With a gradual economic recovery in 2013 and 2014, this would enable faster stabilisation of public debt, though it would stay above the fiscal sustainability threshold for emerging markets. Under the scenario of a highly unlikely but plausible strong shock associated with the exacerbation of the eurozone crisis, which entails a sharp economic downturn in Croatia and a 10% depreciation of the

Figure 36 Gross financing needs



[a] CNB projections.
[b] One of the indicators used for estimating the fiscal sustainability risk in emerging market countries (EMs).
Sources: MoF and CNB.

Figure 37 Projection of public debt under various scenarios

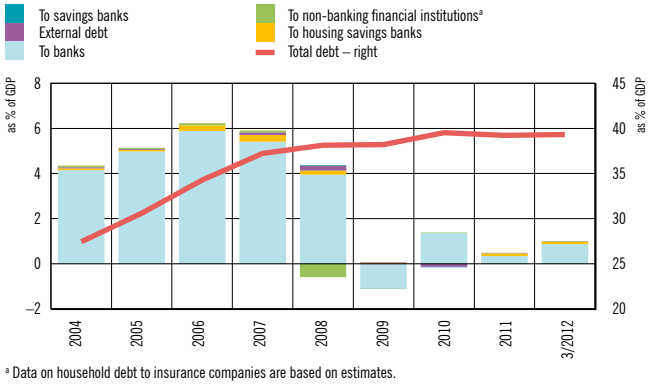


[a] CNB projections.
[b] One of the indicators used for estimating the fiscal sustainability risk in emerging market countries (EMs).
Source: CNB.

kuna vs the euro, public debt would reach the 60% limit as soon as 2013, even with additional fiscal measures (Figure 37). This is also the ceiling under the Budget Act. Should government debt (public debt excluding debt of local government units) reach that ceiling, the government would, in accordance with the Budget Act, be obliged to propose a budget with a surplus, which implies a strong adjustment in the short-term. Given the sensitivity of fiscal figures to macroeconomic shocks, in addition to stronger structural reforms that would ensure fiscal adjustment in the forthcoming years, the process of fiscal policy formulation should secure adequate reserves in case adverse circumstances arise.

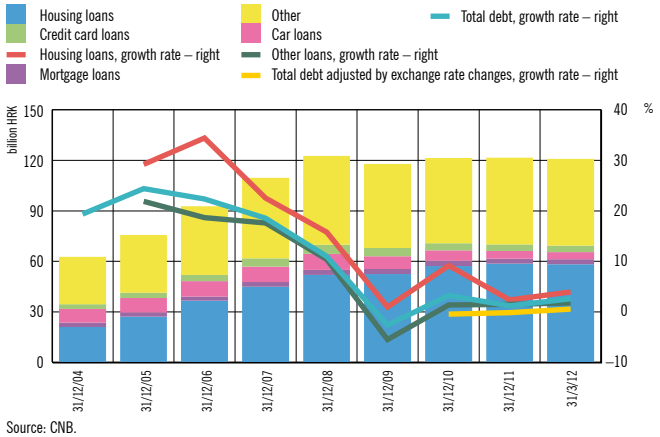
Household sector

Figure 38 Change in and stock of household debt



[a] Data on household debt to insurance companies are based on estimates.
Note: Data on total household debt exclude debt to leasing companies in order to avoid a break in the data series caused by the change in the methodology for reporting the value of leasing contracts from 1 January 2011 onwards.
Sources: HANFA and CNB.

Figure 39 Household loans by purpose



Source: CNB.

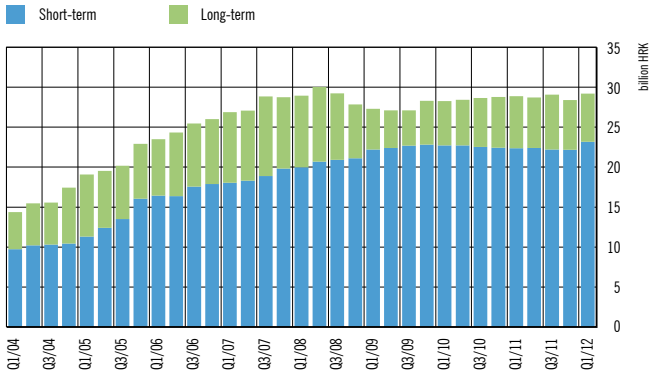
Household debt continued to stagnate in early 2012. The deterioration in the macroeconomic environment could increase the number of households facing difficulties in the repayment of liabilities.

In late 2011 and early 2012, household debt continued to stagnate in the context of the further deepening of recessionary tendencies in the economy. At the end of the first quarter of 2012, the year-on-year growth in total household debt was 2.6%, or 0.6% adjusted for exchange rate changes (Figure 39), while total debt has been hovering around 40% of GDP for almost two years. The rise in total household debt remained extremely low (1% of GDP in the first quarter of 2012) and mostly related to debt to banks (Figure 38).

The amounts of newly-granted household loans suggest an ongoing stagnation in household borrowing. Having grown steadily from the end of 2009, the share of long-term loans in total newly-granted household loans started to fall again in late 2011 and early 2012. A noticeable slowdown in long-term loans (Figures 40 and 41) was the outcome of renewed gradual growth in interest rates on long-term loans (Figure 49) and subdued demand in conditions of heightened uncertainties in the labour market (Figure 42). In the period under review, households relied less on all forms of long-term borrowing (Figure 40), with new housing loans falling the most in relative terms. The total amount of housing loans, adjusted for exchange rate changes, continued to hold steady in late 2011 and early 2012, notwithstanding the uninterrupted nominal annual growth of 3.2% on average (Figure 39).

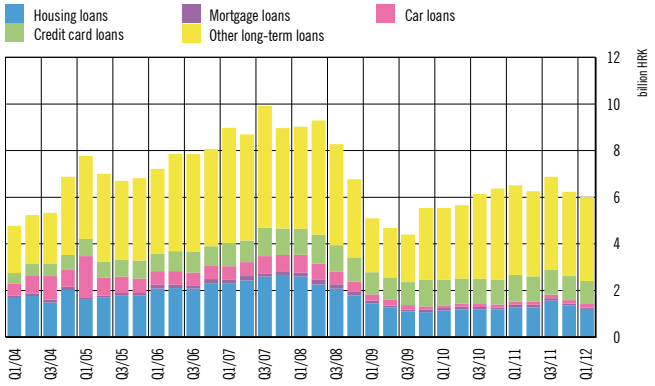
Weak household demand for loans largely reflects adverse trends in the labour market, as evident from the intensified decline in employment and the decrease in real wages (Figure 42). After holding steady for two years, the real wage bill started to fall again. This will likely continue in the remaining part of the

Figure 40 Maturity breakdown of newly-granted household loans, adjusted by seasonal fluctuations



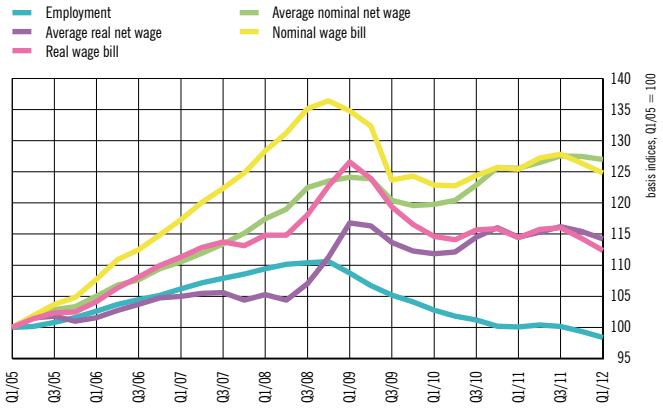
Source: CNB.

Figure 41 Newly-granted long-term household loans by purpose, adjusted by seasonal fluctuations



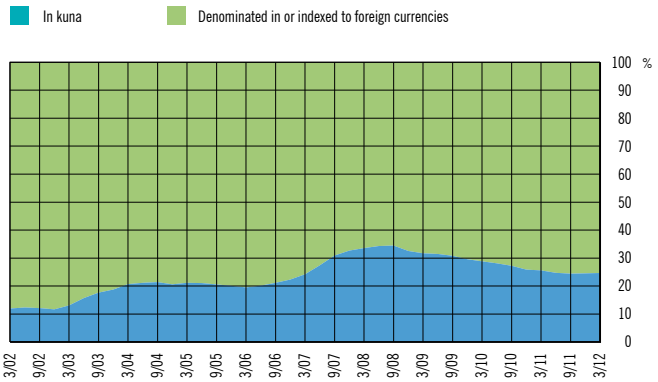
Source: CNB.

Figure 42 Employment and wages (seasonally adjusted)



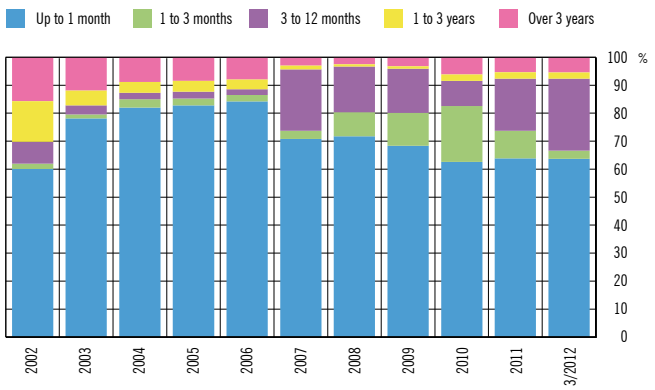
Source: CBS.

Figure 43 Currency breakdown of household loans



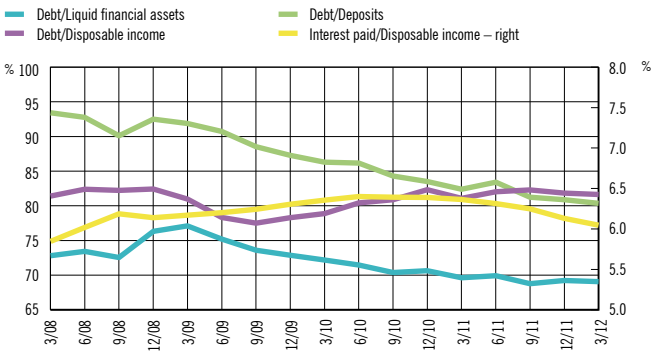
Source: CNB.

Figure 44 Household loans by interest rate variability



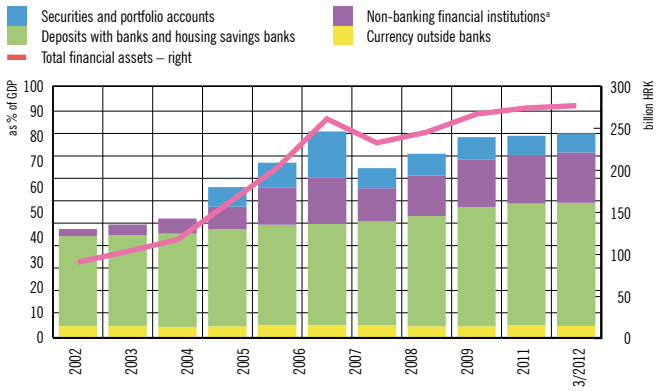
Source: CNB.

Figure 45 Household debt and debt burden



Note: Data on total household debt exclude debt to leasing companies in order to avoid a break in the data series caused by the change in the methodology for reporting the value of leasing contracts from 1 January 2011 onwards.
Sources: HANFA, CDCC and CNB.

Figure 46 Household financial assets



[a] Data on household claims against open-end and closed-end investment funds and data on claims against insurance companies are based on estimates.
Sources: HANFA, CDCC and CNB.

year in view of the expected continued slide in employment, slow growth in nominal wages and slightly higher inflation.

In addition to unfavourable trends in the real economy, household exposure to macroeconomic and financial shocks has remained high because of the breakdown of household debt by currency and interest rate variability. The currency breakdown of household loans points to a slight increase in the share of foreign currency-indexed loans, to 75.3% in late March 2012 (Figure 43). At the same time, the share of loans with interest rates variable within a year remained extremely high (over 92%), although the last quarter of 2011 and the first quarter of 2012 saw a slight increase in the share of loans whose interest rates can change in the period from 3 to 12 months to the detriment of loans with interest rates variable within 3 months (Figure 44).

The deterioration in the economic situation impeded the household deleveraging process (Figure 45). The trend towards improvement in the ratio of household debt to total liquid financial assets came to a halt in late 2011, while the ratio of household debt to disposable income[1] continued to fluctuate around the same level. As the moderate nominal increase in household debt, which was due to the weakening of the kuna against the euro and the Swiss franc, exceeded the rise in household disposable income and liquid financial assets[2] in late 2011 and early 2012 (Figure 46), their ratios at end-March 2012 were the same as in mid-2011. Only the household-debt-to-savings ratio continued to improve in that period on the back of slightly slower yet solid growth in household deposits (of around 5%). At the same time, real stagnation in household borrowing and the rise in nominal income contributed to the decline in the ratio of interest payments to household disposable income, despite the renewed marginal growth in interest rates.

Household debt is expected to hold steady in the remaining part of 2012 due to the sharp fall in employment and real income and the maintenance of interest rates at an elevated level. In the light of worsened macroeconomic conditions, the number of households facing difficulties in loan repayment could continue to grow. Vulnerability could grow even more if, in addition to labour market risks, households were faced with a sharp increase in bank lending rates and/or the weakening of the exchange rate for the kuna (see Box 2 Improvement of the methodology of household stress testing in relation to macroeconomic and financial shocks).

1 Estimated disposable income of households does not include some forms of income generated in the official economy (e.g. royalties, temporary service contracts and income from capital) or income from the unofficial economy (grey economy).

2 Household financial assets exclude foreign cash and deposits with foreign banks since their level cannot be precisely estimated.

Box 2 Improvement of the methodology of household stress testing in relation to macroeconomic and financial shocks

Bank loans to households have so far in the course of the crisis shown to be relatively safe compared to corporate loans, so their quality worsening did not have a significant impact on the business results of banks. Nevertheless, strong appreciation of the exchange rate of the Swiss franc, combined with interest rates increase in mid-2011, pointed to a high degree of sensitivity of the financial situation of individual household segments to different macroeconomic disturbances. Last year thus saw a sharp increase in the share of bad loans in total loans indexed to the Swiss franc. A high degree of Croatian household exposure to exchange rate and interest rate risks, which are indirectly manifested in the form of bank credit risk, calls for a detailed analysis of household credit risk.

The dominant approach to household financial shock stress testing is based on selected vulnerability indicator modelling and a simulation of the effects of different shocks on this indicator. However, before the analysis, one has to decide between different objective, subjective and administrative indicators of vulnerability[1], for which there are no objectively and precisely determined thresholds capable of distinguishing overly indebted and potentially vulnerable households from those that are not vulnerable. In view of the very poor mutual correlation between these indicators, the selection of a vulnerability indicator for stress testing has a decisive influence on the results and conclusions of an analysis. In this box, we present the results of a new approach to household stress testing analysis which compensates to a degree for the shortcomings of the dominant method associated with arbitrary selection of the indicators of vulnerability and vulnerability thresholds[2].

The new methodology of household stress testing is based on three interconnected phases. In the first phase of the analysis, two objective (debt burden repayment and debt burden repayment corrected for minimum living costs[3]) and one subjective indicator of vulnerability (subjective perception of the financial situation) were used to determine, by means of a latent class cluster analysis, for each household, the probability of belonging to the group of vulnerable households. After dividing households into two groups based on the degree of their vulnerability, in the second phase of the analysis, the impact of different socio-economic and demographic characteristics on the probability of belonging to a certain group was determined. And, finally, the estimated logistic regression model was used in the third phase of the analysis to simulate the effect of different macroeconomic and financial shocks on financial vulnerability of households over a short and a medium term. The described household stress testing analysis was conducted on the basis of micro data available from the Household Budget Survey (HBS) for 2008, 2009 and 2010.

A combination of different indicators of vulnerability was used to ensure a wider range of available information on the financial position of households. Based on the obtained indicators, the latent class cluster analysis was used to estimate the probability of each indebted household being vulnerable. For that purpose, households were classified into groups exposed to a low or a high risk of vulnerability, depending on a higher degree of probability of belonging to either of the groups. All the three vulnerability indicators proved to be statistically significant in household grouping, and their impact was in line with that expected (Table 1).

Over the observed three-year period, 8.8% of indebted households were classified as vulnerable on average. The estimated latent class cluster model showed that household vulnerability rose sharply in 2009 and that its growth in 2010 was somewhat slower. The debt repayment burden was on average much bigger for vulnerable households than for households that had not been identified as vulnerable. The differences in the financial burden between these two groups of indebted households are even bigger if minimum living costs are added to the amount of loan repayment. The probability of perceiving the financial situation as very difficult or difficult during the observed period was also much higher in the group of vulnerable households (Figure 1).

The impact of the different socio-economic and demographic characteristics of households on the probability of their being vulnerable has been estimated by logistic regression with a dependent binary variable

Table 1 Cluster model

Vulnerability indicator	Coefficient	p-value	R-square
Loan repayment burden	0.141	0.000	0.166
Adjusted loan repayment burden	0.635	0.000	0.282
Subjective financial situation		0.000	0.021
Very difficult	1.612		
Difficult	0.921		
With minor difficulties	0.452		
Mainly good	–0.249		
Good	–0.239		
Very good	–2.498		

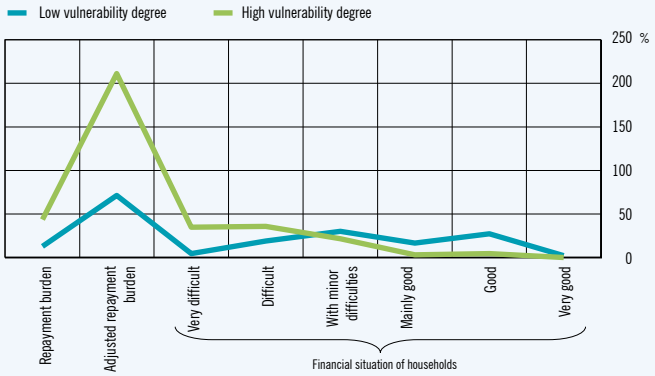
Note: Model is estimated on a pooled sample of indebted households from 2008, 2009 and 2010.
Sources: EIZG and CNB.

1 Objective indicators identify households as vulnerable when their indebtedness or their debt repayment burden exceeds a certain threshold. Subjective indicators of vulnerability are based on a subjective evaluation of the financial situation by the household, while the administrative approach is generally based on actual data on debt arrears. A more detailed account of the analyses of household vulnerability in Croatia made so far, based on the concept of financial margin, a kind of derivative of the objective approach that represents the income reserve available to the household after settling loan repayments and minimum living costs, can be found in Box 4 Household resilience to financial and macroeconomic shocks, Financial Stability, No. 4, February 2010 and Financial Stability, No. 6, January 2011. Household stress testing in Croatia by using the financial margin has also been described in a paper by Sugawara, N., and J. Zalduendo (2011): *Stress-Testing Croatian Households with Debt-Implications for Financial Stability*, SB Policy Research Working Paper 5906.

2 The analysis was made within the project Household Credit Risk in Croatia: An Analysis Based on the Household Budget Survey (2011), prepared by the Institute of Economics, Zagreb, and the Croatian National Bank.

3 The debt repayment burden represents the ratio of the monthly amount of bank loan repayments and household disposable income. When minimum living costs, expressed as a threshold of the risk of poverty, calculated for each household by the CBS, taking into account household composition, are added to the amount of loan repayments, the corrected burden of debt repayments is obtained. The subjective indicator of vulnerability is a subjective perception of the current financial situation of the household, and can range from very difficult to very good.

Figure 1 Comparison of indicators by vulnerability groups



Sources: EIZG and CNB.

equal to 1 if in the first phase of the analysis the household has been estimated as vulnerable or 0 if it has not been estimated as vulnerable. In line with the expectations, the growth in disposable income reduces the probability of a household's financial vulnerability, in contrast with higher amounts of loan repayments, which have an opposite effect. The age[4] of the household head, the number of children and the amount of minimum living costs whose increase reduces households' ability to make loan repayments on time, also had a statistically significant impact on the probability of the household's being vulnerable during the observed period (Table 2).

Finally, using the estimated logistic regression, the effect of different macroeconomic and financial shocks on household financial vulnerability was simulated. Simulations of unemployment, interest and exchange rate shocks and their combinations were made on the 2010 sample of indebted households. As in the previous household financial stress testing, the relative importance and the effect of simulated shocks were approximated by a change in the number of vulnerable households[5] and the share of their debt in the total debt of all the indebted households (EAD, exposure-at-default).

In simulations, the shocks are transmitted to the estimated probability that a household is vulnerable by means of the values of independent variables of the logistic model, notably the amount of disposable income and the amount of loan repayments. The fall in employment thus reduces the amount of income available for loan repayments and for meeting the minimum living needs, while interest rate increase and

Table 2 Estimated coefficients of logistic regression

Variable	Coefficient	Marginal effect
Disposable income	–5.83210***	–0.04999
Loan repayment amount	1.86578***	0.01599
Housing loan	0.25175**	0.00233
Age	0.14468	0.00124
Age^2	–0.00149***	–0.00001
Education_low	0.28621	0.00266
Education_high	0.51764	0.00530
Public enterprise	–0.18055	–0.00148
Entrepreneur	0.95081*	0.01294
Employment_other	0.66283*	0.00760
Unemployment	0.44803	0.00409
Rural environment	0.24507	0.00214
Women	–0.21382	–0.00175
Number of children	0.59934***	0.00514
Minimum cost of living	0.00040***	0.00000
Constant	30.41784***	
Number of observations = 1	2699	
Number of observations = 0	259	
Total number of observations	2958	
McFadden R-square	0.533	

Note: (*), (**) and (***) denote significance levels of 90%, 95% and 99%, respectively.
Sources: EIZG and CNB.

weakening of the exchange rate are conducive to household vulnerability through higher monthly loan repayments. The effect of simulated shocks has been randomly distributed across households, with the average effect of shocks being determined on the basis of a large number of simulations[6]. In addition to simulated shocks, the probability of a household being vulnerable is also associated with price changes that are approximated by higher minimum living costs. The simulations, in addition to usual model[7] presumptions, also rested on the assumption that the total amount of loans granted to households did not change in 2011 and 2012, i.e. that all due loans were successfully refinanced under prevailing market conditions.

Changes in the share of vulnerable households and bank exposure to potential losses based on their lending followed rather closely the developments in bad household loans over the observed three-year period. The simulation conducted for 2011, that combines all the three shocks calibrated in accordance with the actual macroeconomic and financial developments, was also in line with the bad loan dynamics.

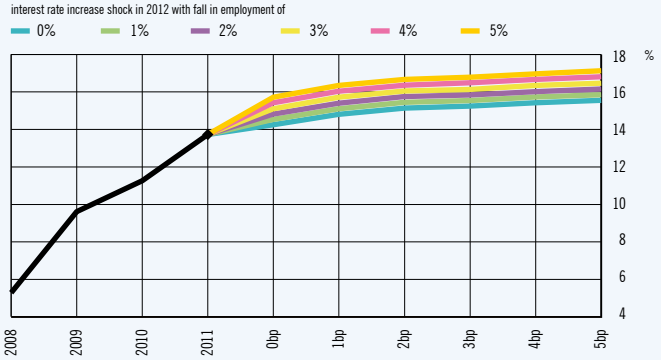
4 The effect of the age of the household head on household financial vulnerability is in line with the life cycle-permanent income hypothesis where household consumption and borrowing take the form of an inverted U-curve. This implies that indebtedness of an individual or a household increases up to a certain age when this individual's income reaches its maximum, after which the borrowing needs subside gradually.

5 The probability that separates vulnerable households was calibrated in accordance with the estimated latent class cluster model and stands at 0.32.

6 On average 1000 simulations per shock.

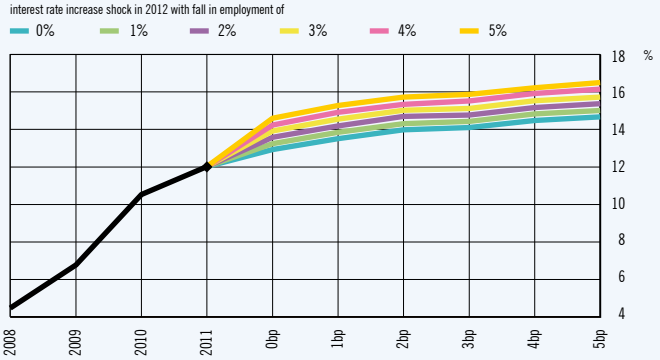
7 Box 4 Household resilience to financial and macroeconomic shocks, Financial Stability, No. 4, February 2010 and Financial Stability No. 6, January 2011.

Figure 2 The share of vulnerable households in the total number of indebted households after the combined impact of employment and interest rate shocks



Sources: EIZG and CNB.

Figure 3 The share of vulnerable households' debt in the total sector debt after the combined impact of employment and interest rate shocks

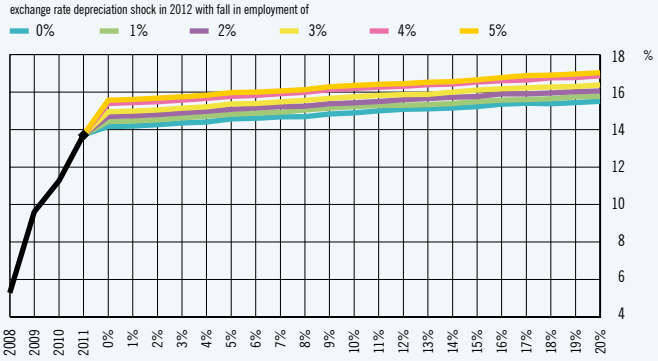


Sources: EIZG and CNB.

The number of potentially vulnerable households and their share of debt thus continued to grow in 2011, though at a slightly slower rate than in the previous year, with almost 14% of all the indebted households being vulnerable and with their debt accounting for 12% of the total household debt. The biggest contribution to this growth in household vulnerability and consequently bank exposure to credit risk in 2011 came from the weakening of the exchange rate of the kuna against the Swiss franc[8] (approximately 0.5 percentage points), while the effect of labour market conditions worsening[9] was somewhat smaller (0.4 percentage points). Given a small fall in interest rates on household loans in 2011, the remaining increase in household vulnerability (1.6 percentage points) and credit exposure of banks (0.6 percentage points) was due to the combined effect of the unemployment and exchange rate shocks on household financial resilience.

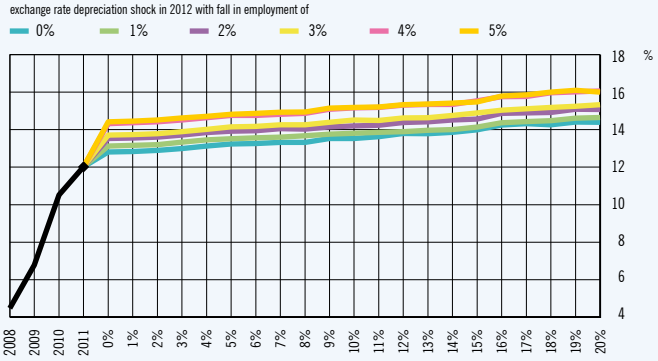
The simulated scenario for 2011 was then supplemented by a range of potential shocks of various intensities for 2012, some of which are possible but only slightly probable[10]. The effect of each shock was first estimated separately and then their combined effects were calculated[11]. The simulations of individual shocks indicate a change in the relative effect of the observed shocks compared to the previous household stress testing analyses. Thus, the effect of a fall in employment on household vulnerability was equal to the effect of the increase in interest rates, so that a fall in employment of 3.0% or an increase in interest rates

Figure 4 The share of vulnerable households in the total number of indebted households after the combined impact of employment and exchange rate shocks



Sources: EIZG and CNB.

Figure 5 The share of vulnerable households' debt in the total sector debt after the combined impact of employment and exchange rate shocks



Sources: EIZG and CNB.

8 By 14.2%, with a simultaneous depreciation of the exchange rate of the kuna against the euro of 2.0%.

9 Employment fall of 1.15% and nominal wage growth of 4.3%.

10 Employment fall of between 1% and 5%, interest rate growth of between 1 percentage point and 5 percentage points and depreciation of the exchange rate of the kuna against the euro and the Swiss franc of between 1% and 20% were simulated.

11 Although in reality all the three shocks appear together, to ensure a clearer outline of monetary policy options, combinations of two shocks were simulated: employment and interest rate shocks and employment and exchange rate shocks.

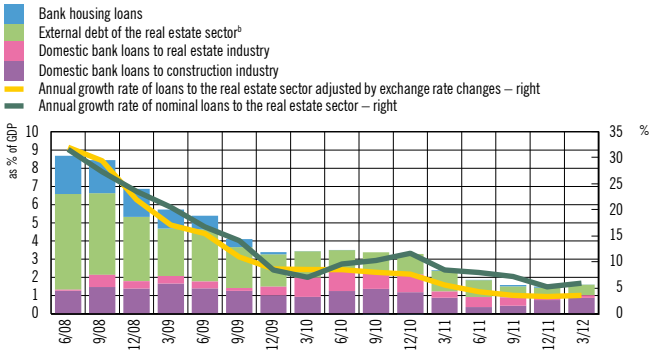
of 3 percentage points would increase the share of debt of vulnerable households by 1 percentage point. The exchange rate changes again had the smallest impact on household financial resilience, so that an equal increase in bank exposure to risky households might be caused by weakening of the exchange rate of the kuna of approximately 13%.

The simulated combinations of shocks show a similar relative intensity of the observed shocks' effects on household vulnerability, although it is not linear and depends on the specific combination of shocks. The effect of a fall in employment thus proved to be much bigger than in previous stress tests, while the effect of bank interest rate growth, which had been by far the biggest in previous analyses, almost halved. Despite a somewhat bigger contribution of exchange rate changes to household sector vulnerability than under the previous methodology, it was still the smallest for the range of simulated shocks. Thus, for the given level of employment, the effect of bank interest rate growth of one percentage point equals the effect of kuna exchange rate weakening of approximately 5%. The most strictly simulated combinations of shocks show a very similar effect on household vulnerability so that a fall in employment of 5%, coupled with a simultaneous increase in the amount of loan repayments due to interest rate growth of 5 percentage points or a 20% weakening of the kuna exchange rate would make approximately 17% of all the indebted households vulnerable, their debt accounting for 16% of the total household sector debt, an increase of one third over 2011.

The analysis made suggests that household vulnerability has been growing steadily since the financial crisis broke out, although the trend of this growth has been slowing down, which is in line with the dynamics of bad household loans. As shown by the presented methodological framework of this box, unemployment shock has the strongest effect on household financial vulnerability, while the effect of interest rate growth is slightly smaller and the potential effect of exchange rate change was the smallest for the simulated range of shocks. The simulations show that in 2011, the increase in bank exposure to credit risk in the household lending sector was primarily due to the combined effect of exchange rate weakening of the kuna against the Swiss franc and a fall in employment. In view of the expected further falls in employment and real income, with interest rates remaining elevated, in 2012, the negative trends on the labour market will continue to have a dominant effect on the dynamics of household vulnerability and bank exposure to potential losses, which might grow in the same way as last year.

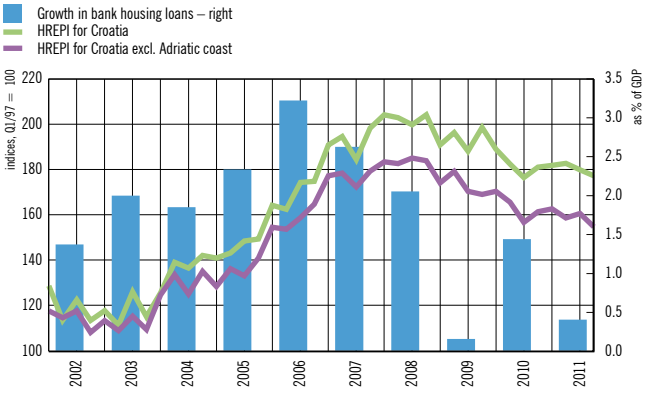
Real estate sector

Figure 47 Annual change[a] of the real estate sector debt



[a] Changes in debt adjusted by exchange rate changes.
[b] External debt includes the debt of real estate and construction industries.
Note: The figures relating to domestic loans granted to the real estate sector before 2010 were slightly modified due to the new classification of activities.
Source: CNB calculations.

Figure 48 Housing loans and HREPI[a] on a quarterly basis



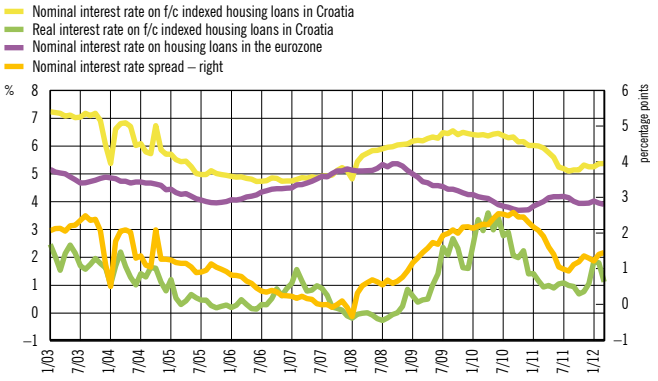
[a] The hedonic real estate price index takes into account qualitative characteristics of the real estate.
Source: CNB calculations.

The rise in real estate sector debt slowed down substantially, while the absence of intensive deleveraging points to continued support by the financial sector on the back of expectations of future recovery.

The several-year slowdown in the rise of real estate sector debt came to a halt in late 2011 and the debt continued to increase at a low rate. The year-on-year increase in loans to the real estate sector, adjusted by exchange rate changes, stood at 3.5% at end-March 2012 (Figure 47). Notwithstanding renewed recessionary pressures in late 2011 and stagnation of investment by all institutional sectors at a low level, debt of the real estate sector continued to edge up, departing from the general trend in non-financial sector debt. A slight recovery in domestic lending to corporates dealing in construction ran parallel to a slowdown in lending to corporates dealing in real estate management, while external debt growth held steady at a relatively slow pace. The domestic financial sector thus continued to support the real estate sector on the back of expectations of future recovery, and support by foreign creditors, who have not yet begun to withdraw, is evident as well. The absence of deleveraging in the real estate sector against the backdrop of the prolonged downturn in construction activity indicates that the sector's vulnerability is still substantial.

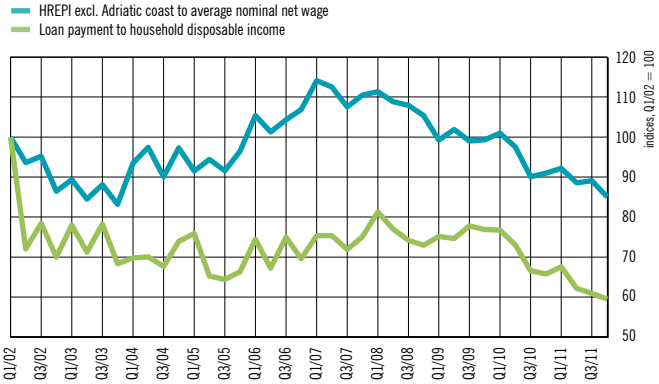
Within the real estate sector, borrowing in residential construction was stagnant. This was due to the very low demand that was the outcome of lower real income and high uncertainties in the labour market, despite the improved availability of residential real estate (Figure 50). Housing loans have not grown in real terms for more than two years (Figure 47), also due to the resurgence in interest rates (Figure 49) and the relatively slow decline in residential real estate prices. In the last quarter of 2011, residential property prices dropped by 2.1% year-on-year, decreasing cumulatively from the pre-crisis record high by 13.2%. Excluding the real property prices on the Adriatic coast,

Figure 49 Comparison of interest rates on newly-granted housing loans in Croatia and the eurozone



Sources: ECB and CNB.

Figure 50 Financial availability of residential property



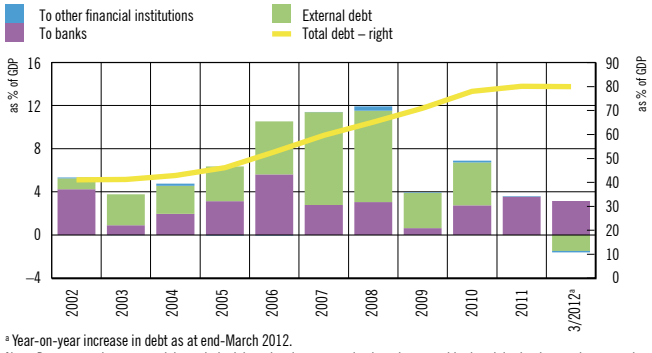
Sources: CBS and CNB calculations.

which are usually more resilient to price corrections, the decline in residential prices was even sharper: 4.2% on an annual basis and 15.7% in cumulative terms (Figure 48).

As no major improvements in investment demand are expected through to the end of 2012, the debt of the real estate sector will hold steady. Adding to this will be interest rates being maintained at high levels. A possible increase in supply in the residential property sector in response to the announced introduction of a property tax could add momentum to the downward trend in residential property prices. However, even the decline in prices is unlikely to diminish the large stock of unsold new flats as demand would shift from newly-finished to older residential units.

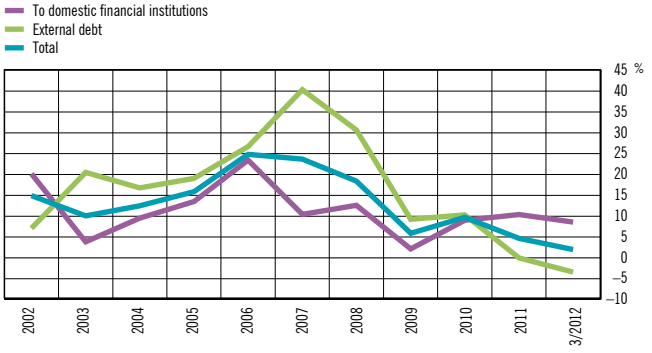
Non-financial corporate sector

Figure 51 Change in and stock of non-financial corporate debt



[a] Year-on-year increase in debt as at end-March 2012.
Note: Data on total corporate debt exclude debt to leasing companies in order to avoid a break in the data series caused by the change in the methodology for reporting the value of leasing contracts from 1 January 2011 onwards.
Data on external debt exclude round-tripping transaction.
Sources: HANFA and CNB.

Figure 52 Annual growth rate of non-financial corporate debt



Note: Data on total corporate debt exclude debt to leasing companies in order to avoid a break in the data series caused by the change in the methodology for reporting the value of leasing contracts from 1 January 2011 onwards.
Data on external debt exclude round-tripping transaction.
Sources: HANFA and CNB.

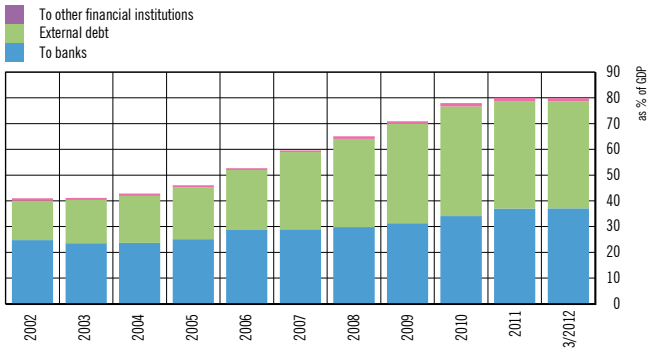
The rise in non-financial corporate debt almost came to a halt in late 2011 and early 2012. This was mostly due to the fall in foreign borrowing, while borrowing from domestic banks continued at a steady pace. Notwithstanding a slight decrease, exposure of non-financial corporations to currency and interest rate risks remained relatively high.

On the back of recessionary trends, the growth in debt of the non-financial corporate sector almost came to a standstill in late 2011 and early 2012. This was the result of the drop in the external debt of non-financial corporations. Their domestic debt steadily grew at a solid pace but their total debt did not increase much because of foreign capital outflows. The total year-on-year increase in debt slowed down to 2% of GDP at the end of the first quarter of 2012, while it was 4% and around 7% of GDP in 2011 and 2010 respectively. As in the previous years, the annual inflow of domestic bank loans was around 3% of GDP, while the annual increase in external debt came to an end in 2011 and became negative late in the first quarter of 2012 (Figure 51). The year-on-year growth rate of debt to domestic financial institutions was 9% at the end of the first quarter of 2012. With the fall in external debt, the growth rate of total non-financial corporate debt was only 2% (Figure 52). As a result, the debt levelled off at 80% of GDP (Figure 53).

The steady pace of bank loans to non-financial corporations is also evident from the data on newly-granted loans, with a noticeably faster growth in short-term loans in the preceding six months (Figure 54).

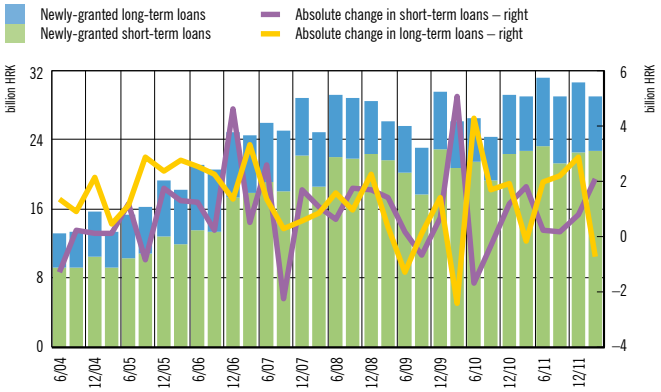
The stagnation of non-financial corporate debt was due to deteriorating domestic economic prospects and the impeded access to foreign capital. Slower foreign borrowing by the non-financial corporate sector was due to low investment demand for

Figure 53 Non-financial corporate debt



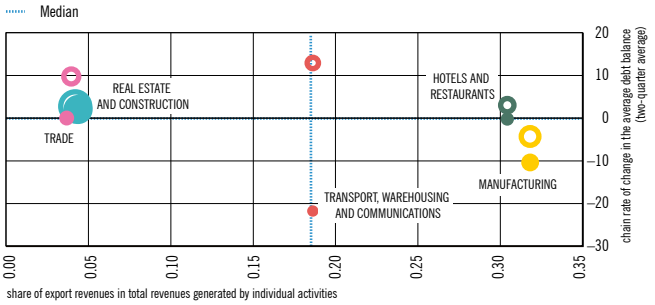
Note: Data on total corporate debt exclude debt to leasing companies in order to avoid a break in the data series caused by the change in the methodology for reporting the value of leasing contracts from 1 January 2011 onwards.
Data on external debt exclude round-tripping transaction.
Sources: HANFA and CNB.

Figure 54 Newly-granted bank loans and absolute change in the stock of gross loans



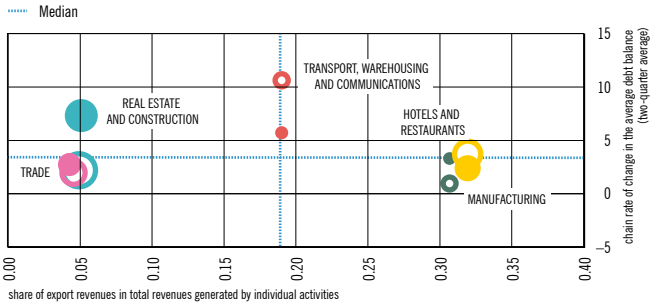
Source: CNB.

Figure 55 External debt allocation by sectors from September 2011 to March 2012



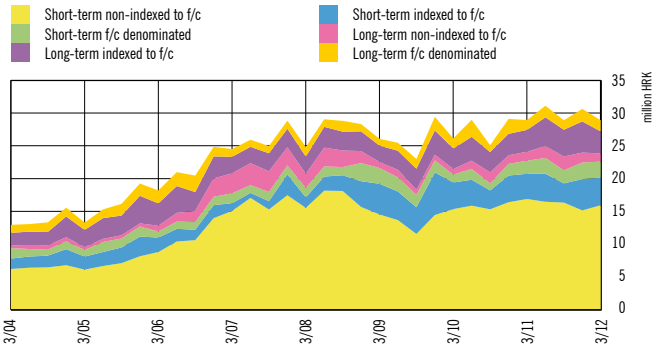
Note: A full circle denotes the debt dynamics in the last two quarters observed (the average debt balance at end-March 2012 and end-December 2011 relative to the average debt balance at end-September and end-June 2011). An empty circle denotes the same change in the debt balance in the previous period (the average debt balance at end-September and end-June 2011 relative to the average debt balance at end-March 2011 and end-December 2010). The size of the circle denotes the significance of a particular activity's share in total external debt of non-financial corporations. Activities accounting for a relatively minor share in total debt are not presented.
Sources: FINA (export and total revenues) and CNB (external debt).

Figure 56 Allocation of domestic bank loans by sectors from September 2011 to March 2012



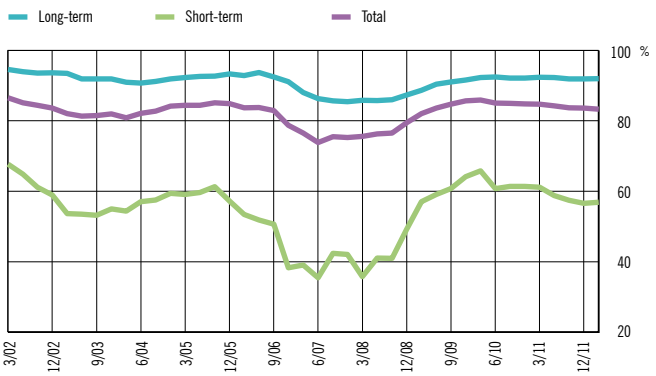
Note: A full circle denotes the debt dynamics in the last two quarters observed (the average debt balance at end-March 2012 and end-December 2011 relative to the average debt balance at end-September and end-June 2011). An empty circle denotes the same change in the debt balance in the previous period (the average debt balance at end-September and end-June 2011 relative to the average debt balance at end-March 2011 and end-December 2010). 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: FINA (export and total revenues) and CNB (loans by activity).

Figure 57 Breakdown of newly-granted loans to non-financial corporations by maturity and currency



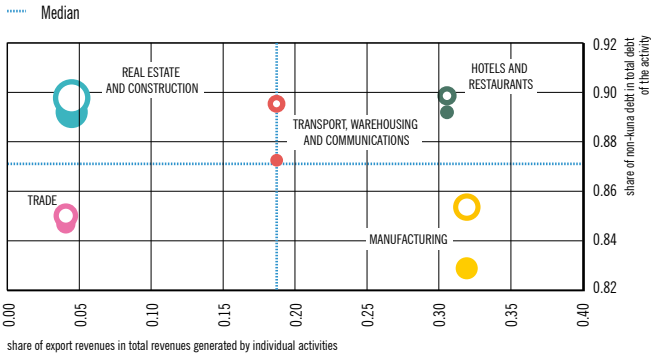
Note: Short-term loans comprise personal overdrafts, which are statistically recorded as newly-granted loans in each month.
Source: CNB.

Figure 58 Share of corporate non-kuna debt[a] in total loans



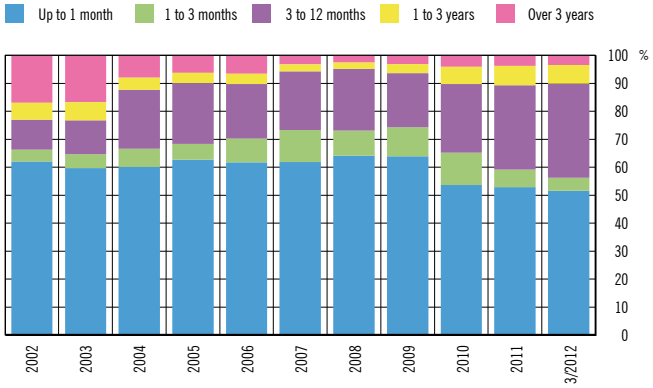
[a] It is assumed that total external debt is denominated in foreign currencies.
Source: CNB.

Figure 59 Currency exposure in March 2012



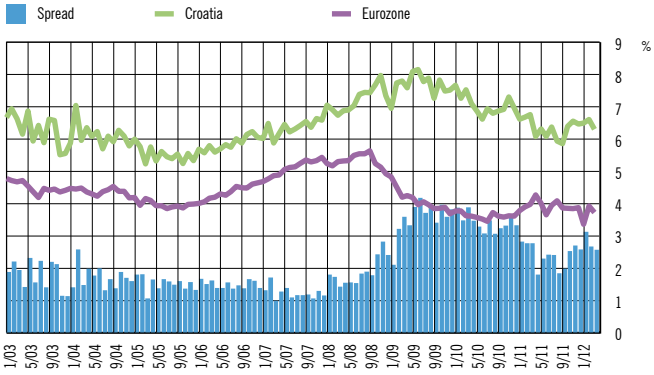
Note: A full (empty) circle denotes the share of non-kuna debt in March 2012 (September 2011). The size of the circle denotes a particular activity's share in total debt of non-financial corporations. Activities accounting for a relatively minor share in total debt are not presented.
Sources: FINA (export and total revenues) and CNB (loans by activity).

Figure 60 Breakdown of bank loans to non-financial corporations by interest rate variability



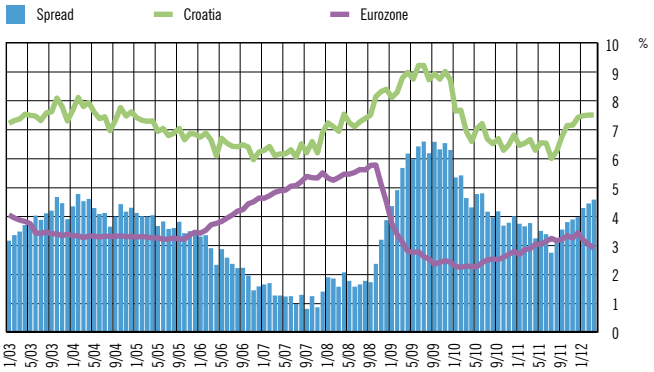
Source: CNB.

Figure 61 Interest rates on long-term loans to non-financial corporations in Croatia and the eurozone



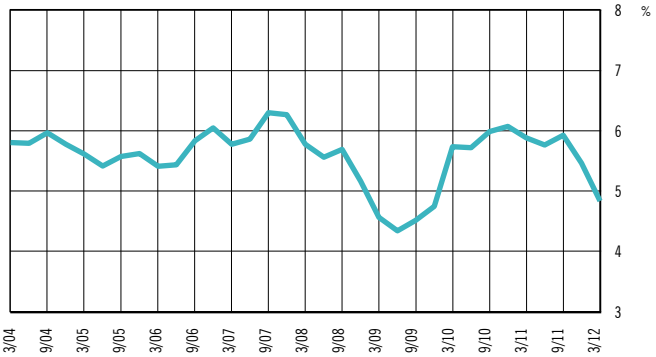
Sources: ECB and CNB.

Figure 62 Interest rates on short-term loans to non-financial corporations in Croatia and the eurozone



Sources: ECB and CNB.

Figure 63 Ratio of transaction account deposits of non-financial corporations to gross value added



Source: CNB.

loans, which resulted from recessionary tendencies in domestic and foreign markets, the deleveraging process in foreign banks and the fact that foreign creditors are holding back on lending under the impact of uncertainty in global financial markets.

The sectoral allocation of loans deteriorated slightly to the detriment of the tradable sector. Though with divergent dynamics, both domestic and foreign components contributed to the deterioration in loan allocation. A noticeable decrease in external debt was recorded by enterprises from the manufacturing industry and transport, storage and communications, while external debt of other activities held steady in the preceding six months (Figure 55). At the same time, the rise in domestic bank loans gained momentum in real estate and construction activities, while most other activities recorded slower loan growth (Figure 56).

A moderate recovery in corporate kuna financing began in 2010 and continued into late 2011 and the first quarter of 2012. A

change in the currency structure of newly-granted loans was noticeable in short-term corporate loans (Figure 57). However, this had only a marginal impact on the currency structure of total loans to the non-financial corporate sector, around 83% of which are denominated in foreign currencies (Figure 58).

Exposure of non-financial corporations to currency risk remained high though it edged down late in the first quarter of 2012. Its reduction from September 2011 was the outcome of the slightly reduced external corporate debt and more vigorous short-term borrowing in kuna. This trend was evident in all activities (Figure 59).

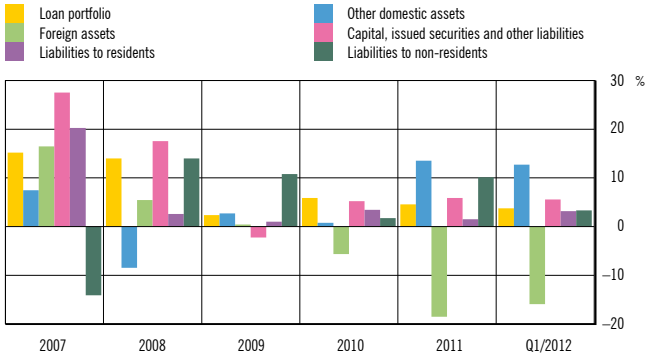
Exposure of non-financial corporations to interest rate risk also remained substantial at the end of the first quarter of 2012. Loans with interest rate variable within a year continued to account for around 90% of domestic loans (Figure 60). Adding to this risk was the upward trend in bank interest rates; beginning in late 2011, a three-year period of decline in interest rates ended. The increase was particularly noticeable in interest rates on short-term corporate loans. In the same period, interest rates in the eurozone edged down, widening the spread between interest rates on corporate loans in Croatia and the eurozone (Figures 61 and 62).

Liquidity of non-financial corporations, measured as the ratio of their transaction account deposits to gross value added, worsened on the back of the economic slowdown and more costly funding and was approximately the same in late March 2012 as in the recessionary year of 2009 (Figure 63).

In the conditions of slower economic activity and heightened interest rates, the stagnation in non-financial corporate debt is expected to continue in the remaining part of 2012. Enterprises will continue to rely on domestic bank loans, while the downward trend in external borrowing could intensify should the eurozone crisis deepen and should the deleveraging process in European banks gain momentum. In view of such macroeconomic developments and the considerable uncertainty in financial markets, the debt-related vulnerability of enterprises will remain high.

Banking sector

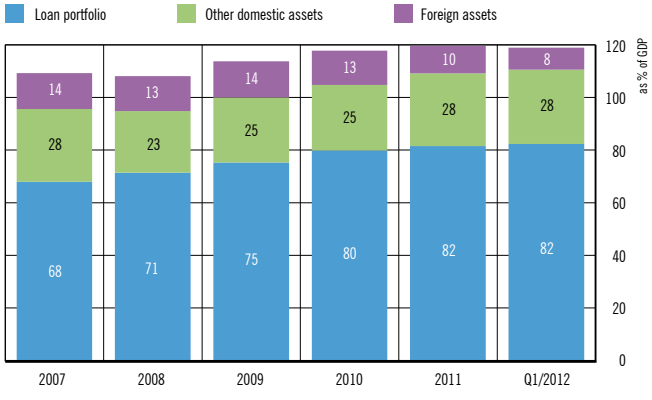
Figure 64 Major banking sector balance sheet items,[a] year-on-year rates of change



[a] An increase in balance-sheet items at end-March 2012 was calculated relative to March 2011.

Source: CNB.

Figure 65 Banking sector assets



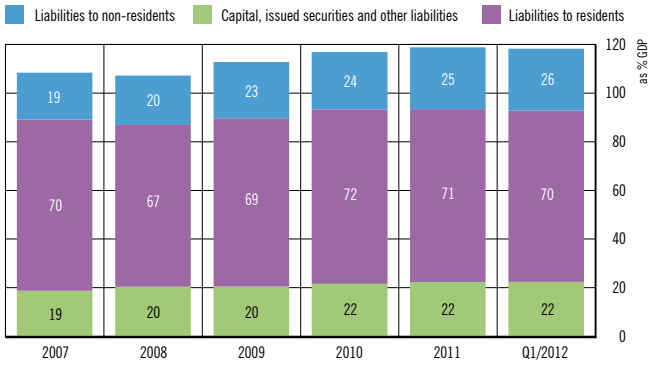
Source: CNB.

Lending to the private sector was subdued in a period of renewed recession. Bank operations were largely determined by the recent regulatory changes, which mostly support financing of the government and public enterprises. A more conservative approach to intermediation mitigated the risk of the aggregate credit portfolio, so that non-performing loans continued to increase at a slower pace at the turn of the year. By contrast, asset restructuring exposed banks to higher external liquidity risks. Still, the satisfactory capital adequacy of the banking sector as a whole sufficiently ensures its resilience to potential shocks.

Balance-sheet vulnerabilities

The recent changes in the structure of bank liabilities and assets were largely induced by regulatory changes. In the context of the prolonged recession, the balance sheet volume of banks remained unchanged in effective terms early in 2012, while its nominal decrease may be attributed exclusively to exchange rate changes in the observed period. The drop in private sector demand for loans, which reflects the economic downturn, and the tightening of financial conditions for all sectors put an end to the rise in bank assets. The moderate annual increase in banking sector assets slowed in late March to 4.2% in nominal terms and to 2.4%, excluding the exchange rate effects. The slower increase in bank assets and the parallel slight growth in nominal GDP reduced marginally the ratio of bank assets to GDP, to 119% at end-March 2012 (Figure 65).

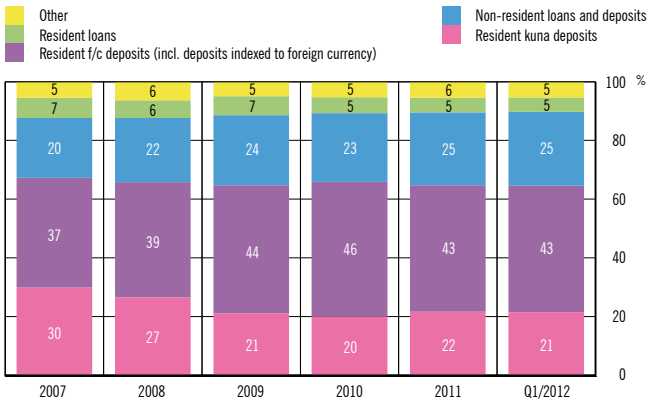
Figure 66 Banking sector liabilities[a]



[a] Collectively assessed impairment provisions represent the difference between banking sector assets and banking sector liabilities and capital.

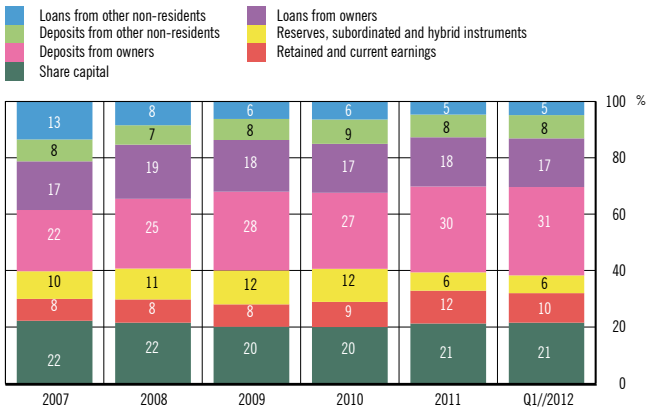
Source: CNB.

Figure 67 Structure of liabilities



Source: CNB.

Figure 68 Structure of foreign-source funds



Source: CNB.

Substantial deposit withdrawals from foreign banks early in the year enabled continued domestic lending and eased current budget financing. However, this further increased foreign currency liquidity risk for banks. The annual growth rate in bank loans was 4.7% in nominal terms (3.4% in effective terms) in the first quarter of 2012. Banks focused more on government financing and lending to public enterprises. By contrast, lending to the private sector weakened as this sector relied more on loan refinancing and rescheduling in the preceding half year. The relaxation of central bank measures enabled banks to withdraw a portion of the deposits from foreign banks early in the year and to use them to refinance government debt in the domestic market (amounting to over HRK 5bn).[3] Intensive borrowing by the government and public enterprises reduced bank exposure to the credit risk of the private sector but strengthened the link between banking sector risk and government risks. The replacement of deposits with foreign banks by government treasury bills also raised bank earnings. However, indicators of bank liquidity dipped to a three-year low (Figures 64, 65, 66 and 70).

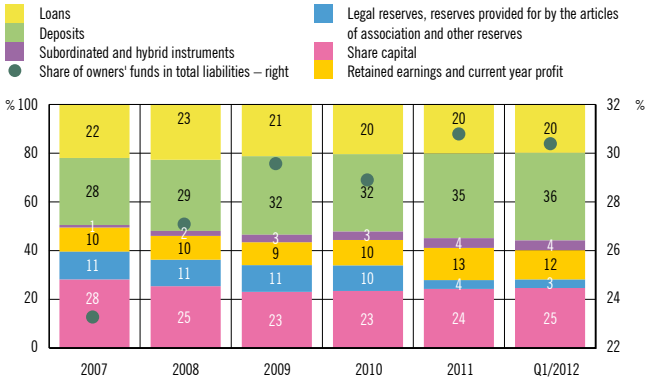
On the liability side, banks continued to rely on foreign financing in spite of adverse conditions in international financial markets as domestic inflows were slow. Bank liabilities to non-residents edged up steadily and foreign financing remained a stable funding source for banks even in conditions of strong volatility in the international capital market. The share of foreign owners in total bank funding, including capital, remained relatively stable at slightly over 30%, while their share in total foreign funding grew marginally: to 87% (Figures 67, 68 and 69).

On the side of domestic funding sources, the decrease in corporate deposits was mostly offset by deposits of households and domestic financial institutions. In addition to seasonal factors, the 12% drop in corporate deposits in the first quarter was due to the announced changes in the tax treatment of dividends and greater difficulties of the economy to maintain sufficient current liquidity. Household deposits, the main and most stable source of bank funding, steadily increased in the preceding six months, albeit at a slower pace.

These developments changed the structure of bank assets and liabilities. The balance sheet volume remained unchanged in effective terms, while most of its nominal decrease may be attributed to exchange rate fluctuations in the period under review. The structure of banks' balance sheets reveals the persistently high exposure to currency-induced credit risk (CICR) and an increase in liquidity risk. Bank exposure to direct currency risk was low as usual due to the currency-indexation of loans; the net open foreign exchange position was below 2% of own funds at end-March 2012. By contrast, bank exposure to CICR remained high on account of the rise in foreign currency loans to the government and public enterprises, which are mostly unhedged against currency risk (Figures 75 and 76). Exposure to CICR was affect-

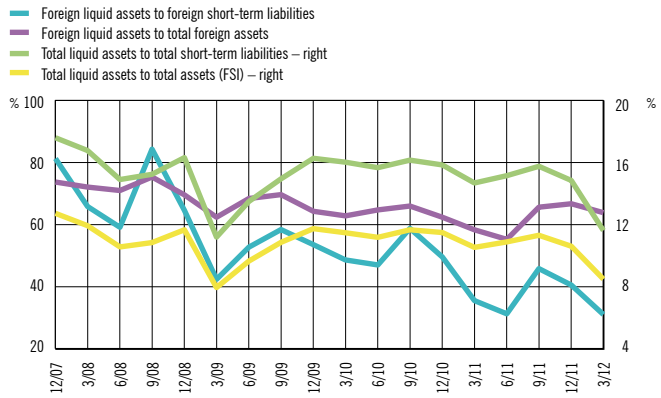
3 From February 2012 on, the central bank recognises euro T-bills for the purpose of the minimum required amount of foreign currency claims.

Figure 69 Breakdown of bank owners' funds by instrument



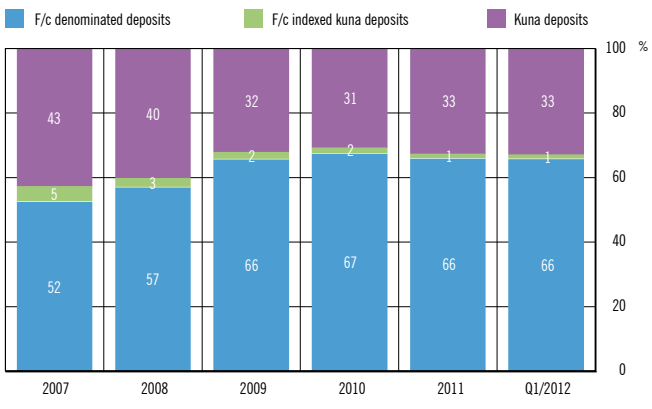
Source: CNB.

Figure 70 Liquidity indicators



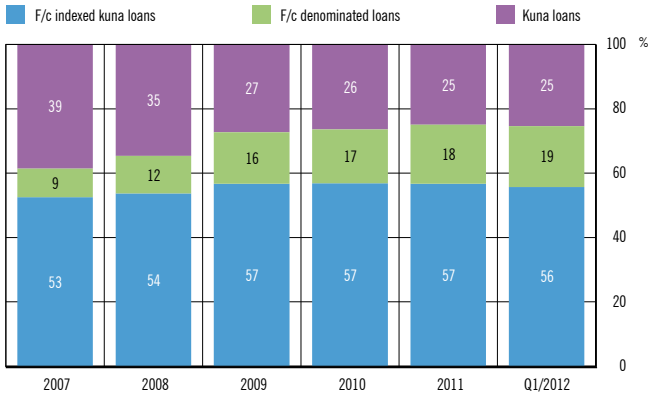
Source: CNB.

Figure 71 Currency breakdown of deposits



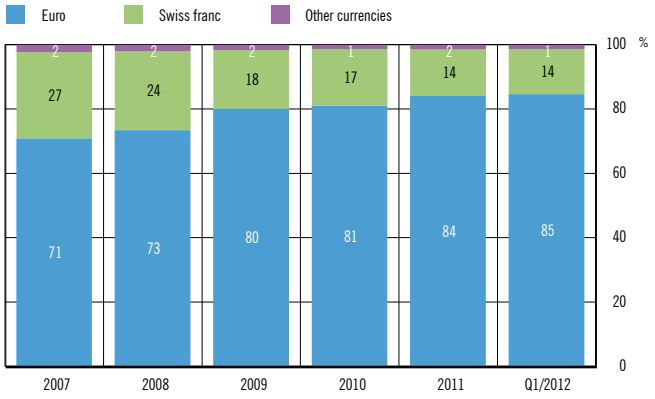
Source: CNB.

Figure 72 Currency breakdown of loans



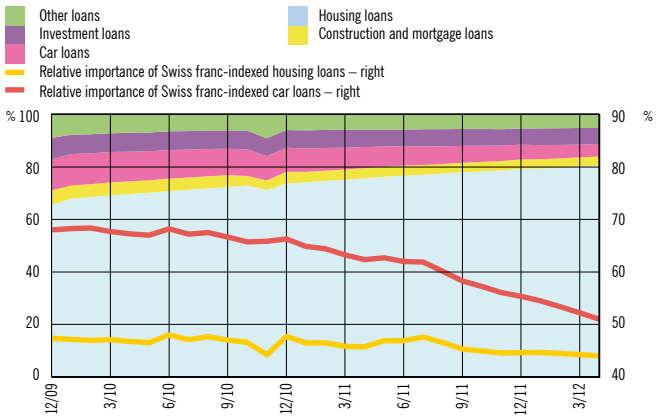
Source: CNB.

Figure 73 Currency breakdown of non-kuna loans



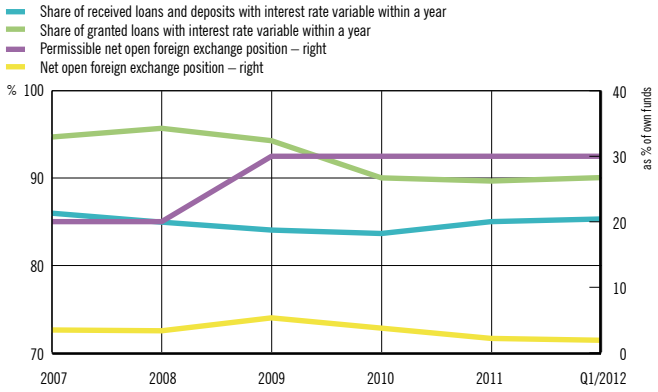
Source: CNB.

Figure 74 Breakdown of Swiss franc-indexed loans



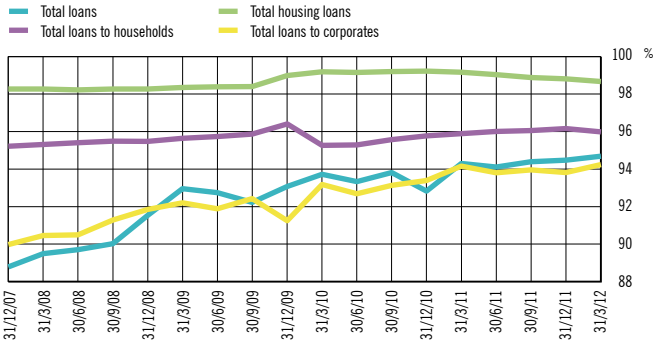
Source: CNB.

Figure 75 Bank exposure to direct currency and interest rate risks



Source: CNB.

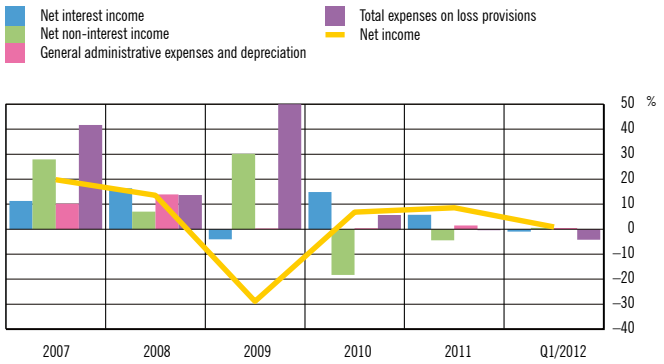
Figure 76 Share of unhedged loans in total loans exposed to CICR[a]



[a] Under new rules, CICR and several other risks have been transferred to the second pillar of the new framework of capital calculation, i.e. regulations on internal capital of credit institutions.

Source: CNB.

Figure 77 Change in selected business performance indicators[a], year-on-year rates of change



[a] Total expenses on loss provisions increased by around 220% in 2009.

Source: CNB.

ed positively by the gradual decline in the share of loans indexed to the Swiss franc (Figures 71, 72, 73 and 74). Bank exposure to direct interest rate risk is very low due to the widespread use of variable interest rates, although this risk is also manifested in the form of indirect credit risk. The low level of direct interest rate risk is also illustrated by the difference between bank assets and liabilities with interest rates variable within a year (Figure 75). As new placements were financed in part by the withdrawals of foreign liquidity, the loan-to-deposit ratio gradually increased. However, this ratio stayed relatively low when compared with Central and Eastern European countries.

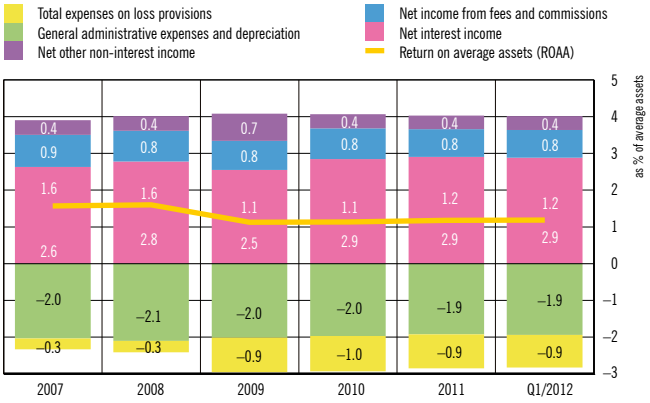
Unfavourable macroeconomic developments in the rest of the year will limit the rise in assets, while the structure of banks' balance sheets will be relatively stable. Possible changes could come from further regulatory amendments (such as the change in the reserve requirement rate in April) to spur domestic economic activity and facilitate public debt refinancing. The room for such actions has been much curtailed due to the sensitive liquidity position and resilience of banks in the context of heightened financial uncertainty. An exacerbation of the eurozone crisis could result in regulatory changes, and ensuing changes in the balance sheet, in the opposite direction. Once the effect of one-off factors wears off, domestic deposits should continue to grow at a stable pace, while the still pronounced volatility in international financial markets will adversely affect the availability of foreign funding. Should the eurozone crisis deteriorate or the deleveraging process in parent banks escalate, the central bank could continue to gradually release foreign assets of banks to ease the negative impact of foreign shocks on funding costs and availability. However, there is increasingly less room for such interventions in view of the sensitive liquidity position and resilience of banks in a time of heightened financial uncertainty.

Strategic risks[4]

Bank earnings and profitability indicators continued to grow moderately in late 2011 and early 2012, but the latter stayed lower than in the period preceding the crisis. The easing of recessionary pressures and more frequent use of loan refinancing and renewal in the preceding year put an end to the upward trend in costs for value adjustments and finally reduced them for the first time since the onset of the crisis. The reduction in charges for value adjustments, the main determinant of banks' business results ever since the beginning of the crisis, had a favourable impact on bank performance. As a result, banks' net income edged up (0.9%) despite a slight drop in net interest income (1.0%), while ROAA and ROAE held steady at 1.2% and 6.9% respectively (Figures 77, 78 and 79).

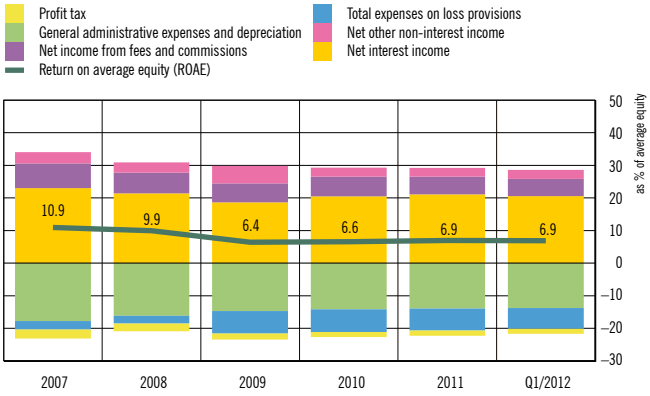
4 Income statement items for March 2012 were annualised to be comparable with those for preceding whole year periods. This was made by summing up banks' business results in the last three quarters of 2011 and the first quarter of 2012.

Figure 78 Contribution of ROAA categories



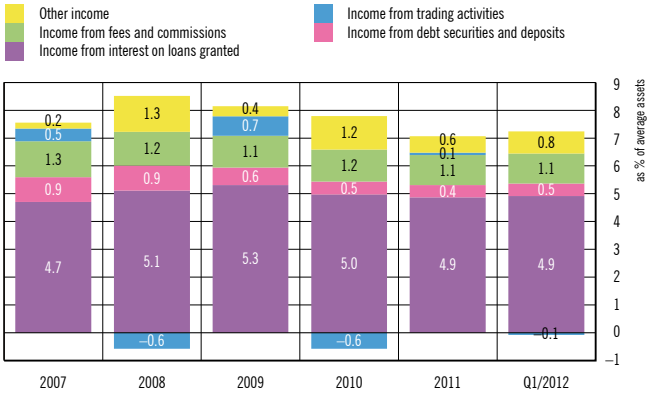
Source: CNB.

Figure 79 Contribution of ROAE categories



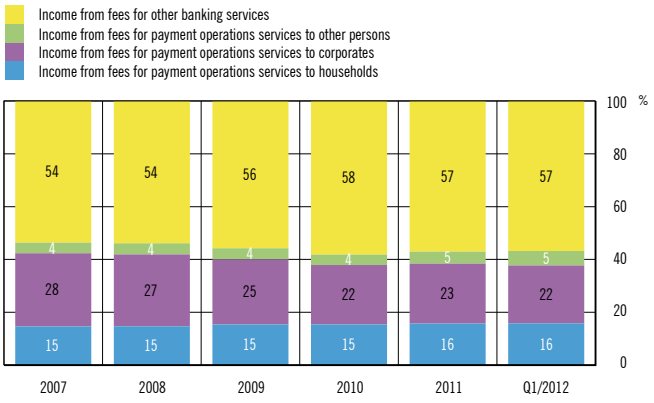
Source: CNB.

Figure 80 Structure of total income



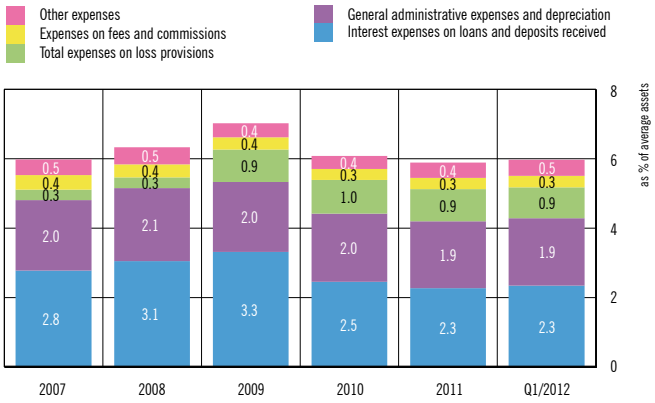
Source: CNB.

Figure 81 Structure of income from fees and commissions



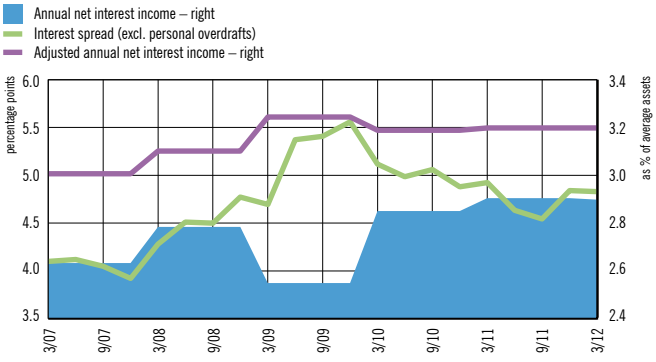
Source: CNB.

Figure 82 Structure of total expenses



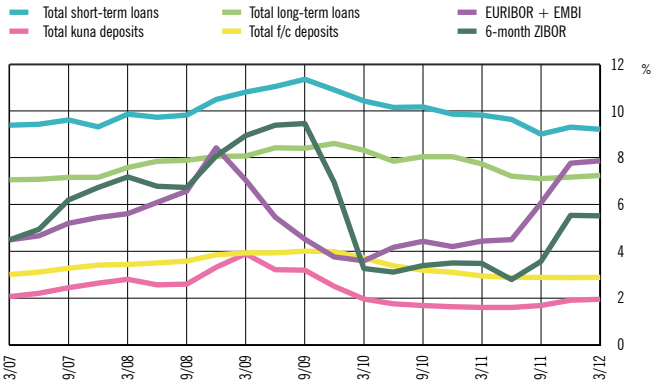
Source: CNB.

Figure 83 Interest spread (quarterly average of monthly interest rates on newly-granted loans) and annual net interest income



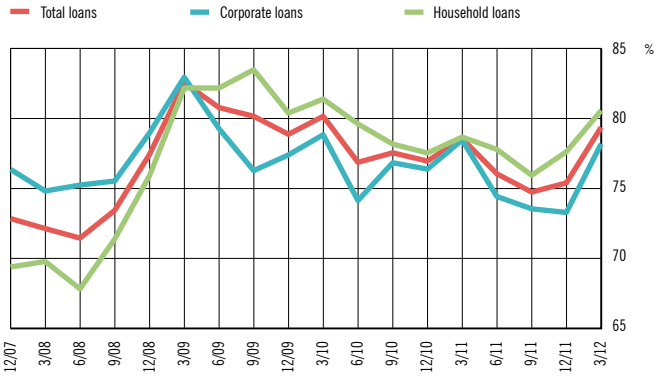
Note: Net interest income of banks has been adjusted by income from trading activities and exchange rate differences.
Source: CNB.

Figure 84 Selected interest rates (quarterly average of monthly interest rates)



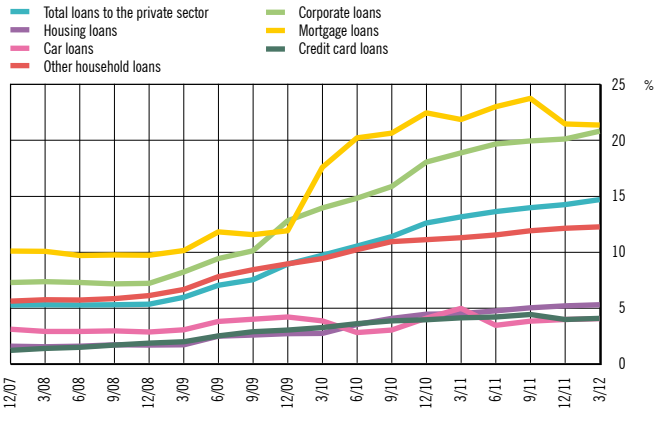
Source: CNB.

Figure 85 Share of short-term loans in total newly-granted loans (quarterly average)



Source: CNB.

Figure 86 Ratio of non-performing loans to total loans



Source: CNB.

The importance of net interest income for bank profitability stems from the dominance of credit portfolios in bank assets. In conditions of weak credit growth, it depends on changes in the interest margin. The weak loan growth is the limiting factor for income from fees and commissions, which largely depends on credit growth (for more details on determinants of interest and non-interest income see Box 3 Bank earnings modelling in Croatia), so that banks strive to increase earnings by controlling administrative expenses (Figures 80, 81 and 82).

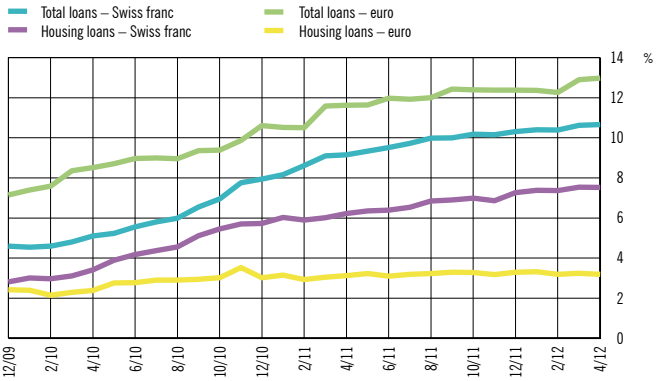
Bank earnings were bolstered by the slight growth in lending rates and the rise in the share of more expensive short-term loans. Heightened uncertainty in international financial markets in the second half of 2011, coupled with the pronounced volatility of benchmark interest rates, created cost pressures on the liability side of banks' balance sheets (although domestic deposit rates stayed stable). Banks responded to increased uncertainty by stopping and reversing the several-year decrease in lending rates. The interest spread, which takes into account only newly-granted loans, began trending up in late 2011, after having been on a downward slope since the escalation of the crisis in 2009. Still, the overall interest margin, which refers to the overall interest-bearing portfolio of bank assets, remained stable. This may be linked to the steady increase in the ratio of non-performing loans to total loans (NPLR) (Figures 83, 84 and 85).

The faster increase in non-performing loans and the subdued demand for loans will be the main limiting factors for bank earnings in 2012. A potential substantial increase in lending rates or further growth in the share of short-term financing would temporarily improve bank earnings. However, these could unfavourably affect bank earnings in the long run as credit risk may materialise due to bank clients getting into difficult financial positions. Banks have to strike a careful balance between assumption of direct risks (long-term loans with more favourable financing terms) and their transfer to clients (short-term financing, protection clauses, variable interest rates, etc.). Assuming no further deepening of the recession, bank earnings and profitability should hold steady through to the end of 2012. However, the spillover of instability from international financial markets could spur cost pressures that banks would not be able to transfer to their clients in conditions of slow loan growth.

Credit risk and bank capital adequacy

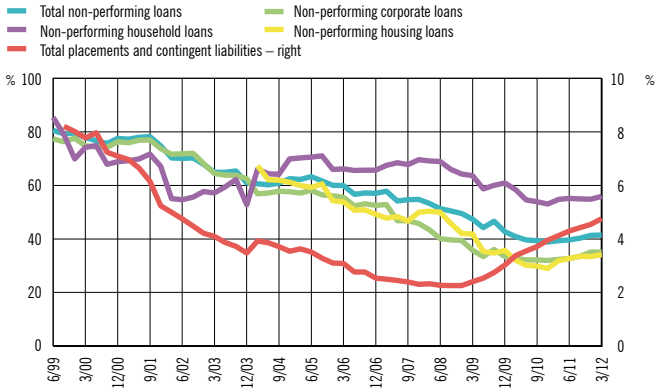
The rise in non-performing loans gradually lost steam in late 2011 and early 2012 due to the slight economic recovery in mid-2011, the banks' stronger orientation toward lending to the government and public enterprises, intensified restructuring and refinancing of corporate loans, and the weaker effect of exchange rate changes on the quality of household loans. NPLR for the private sector reached nearly 15% at end-March 2012; it rose to 8.7% for household loans and 20.8% for corporate loans (Figures 86 and 87). Due to the stable exchange rate of the Swiss franc, the sharpest deceleration in NPLR growth was

Figure 87 Ratio of non-performing loans to total loans by loan categories and the currency of indexation



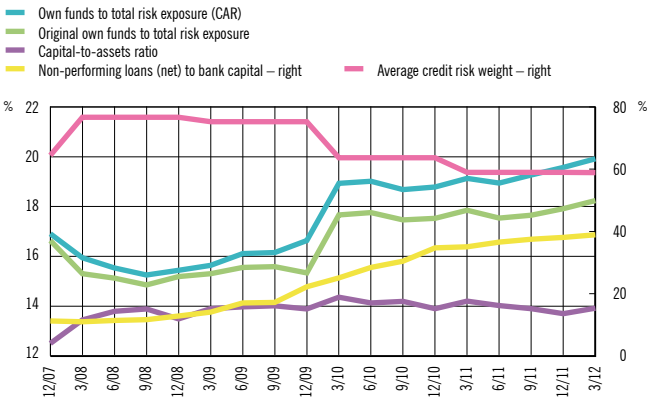
Source: CNB.

Figure 88 Coverage of total placements and contingent liabilities by value adjustments



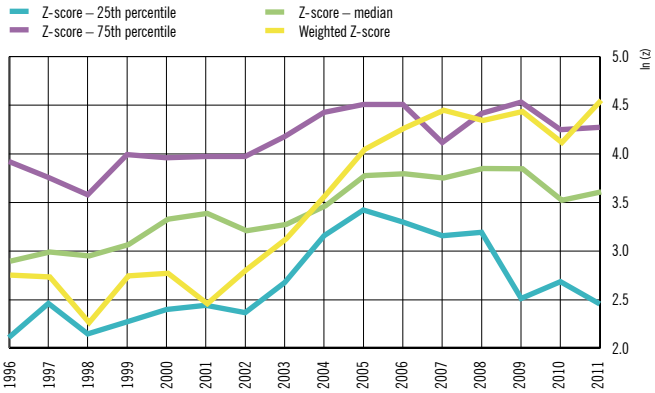
Source: CNB.

Figure 89 Capital adequacy ratios



Source: CNB.

Figure 90 Distribution of insolvency risk



Source: CNB.

evident in household loans, which account for the bulk of Swiss franc-indexed loans.[5]

The slower increase in non-performing loans and the solid dynamics of operating income improved the coverage of non-performing loans by value adjustments. However, the burden on bank capital exerted by the uncovered portion of non-performing loans steadily trended up, effectively reducing the shock absorption power. The capital adequacy ratio (CAR) of banks grew primarily on account of larger investment in less risky assets and corrections in the calculation of risk-weighted assets in line with Basel II rules. There have been no capital injections, and none are expected in the remainder of the year (Figures 88 and 89).

Capital adequacy indicators, i.e. indicators of banking sector risks show that banking sector resilience would remain satisfactory under adverse macroeconomic scenarios. However, as the segmentation of solvency indicators for individual banks continued, a small group of risky banks came into view. The distribution of insolvency risk in terms of Z-score clearly shows divergent movements within the sector, i.e. the separating out of the group of banks with growing insolvency risk (Figure 90).

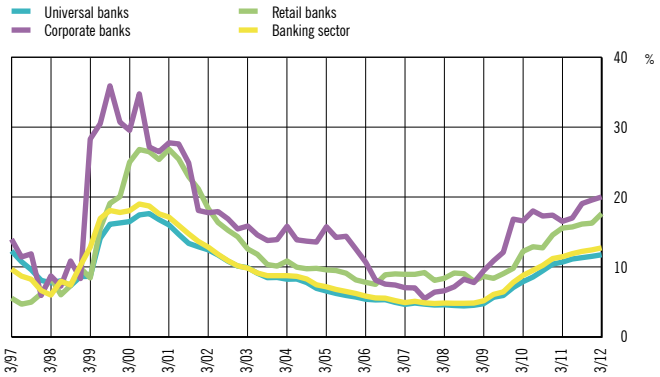
Banking sector resilience

The growth in overall NPLR slowed down in late 2011 and early 2012, with a heavier reliance on refinancing and rescheduling of loans. At the same time, the differentiation among strategic bank groups[6] continued with regard to the intensity of the

5 Though the kuna weakened against the Swiss franc by around 9.5% in the year up to March 2012, most of the depreciation occurred over the summer months of 2011 (in the first quarter of 2012, the depreciation was only 0.6%). In the same period, the kuna weakened against the euro by 1.7% (it appreciated by 0.3% in the first quarter of 2012).

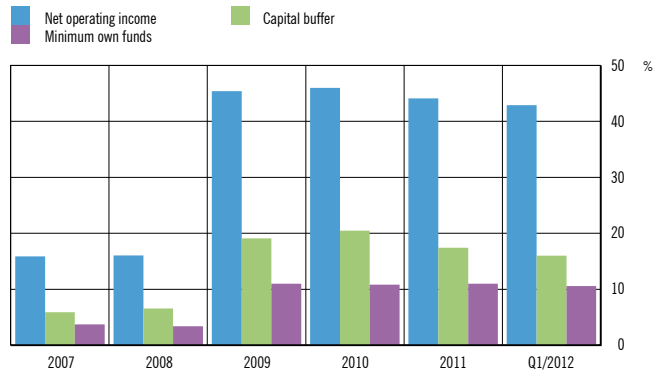
6 Strategic bank groups are described in more detail in Box 6 Revision of the stress-testing methodology, Financial Stability, No. 3, August 2009.

Figure 91 Dynamics of NPLR by bank groups



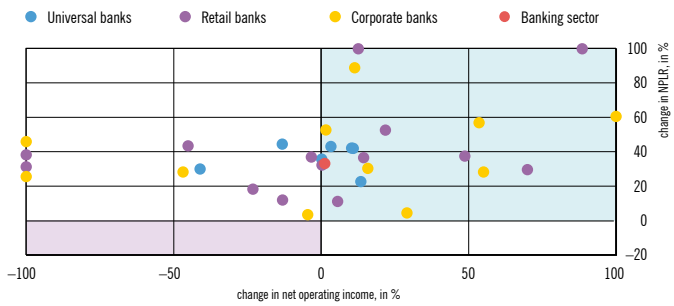
Source: CNB.

Figure 92 Relative importance of charges for value adjustments



Source: CNB.

Figure 93 Change in bank earnings and NPLR in the first quarter of 2012 relative to the previous three years' average[a]



[a] The light blue 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 purple 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.

deterioration in the credit portfolio quality. The slower increase in non-performing loans was predominantly due to universal banks, while non-performing loans continued to grow sharply in retail and corporate banks. The NPLR for the group of universal banks went up 0.4% from September 2011 to end-March 2012, to 11.7%. The NPLR for retail banks grew much faster and reached 17.6% in March. As a rule, corporate banks are most exposed to credit risk. Their non-performing loans have been growing strongly since mid-2011 and their NPLR stood at 20.0% in late March 2012 (Figure 91).

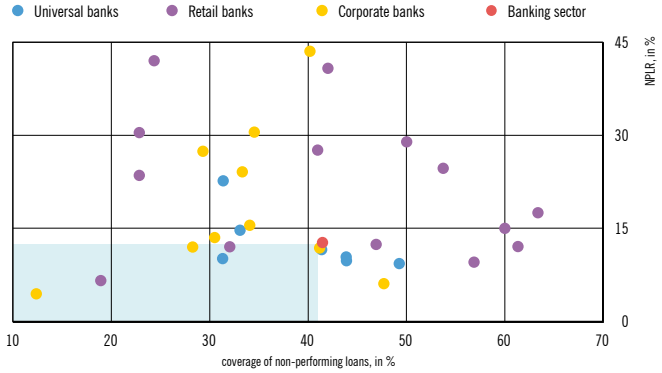
The slower increase in NPLR eased the pressure on buffers to shocks in late 2011. The costs of value adjustments remained elevated, slightly less than half of banks' net operating income, which improved the coverage of non-performing loans by value adjustments. All banks recorded a deterioration in the quality of loan portfolios from 2011. This reduced former doubts about the correctness of loan quality assessments on the part of several retail banks that recorded decreases in net income (Figures 92 and 93).

The rise in the coverage of non-performing loans by value adjustments that began in 2011 had a positive impact on financial stability. The higher coverage reduced the potential shock that would arise from the correction in the coverage of non-performing loans to the average level from 2003 to 2012 (Figures 94 and 95), to some 1.3 percentage points of the capital adequacy. Only a few (mostly) retail and corporate banks continued to report relatively low ratios of non-performing loans and of their coverage. In conditions of the steadily deteriorating macroeconomic environment, this makes them more vulnerable to a potential double shock – the continued inflow of new non-performing loans and the rise in charges for value adjustments on previously extended non-performing loans. Therefore, caution is warranted in interpreting the stress test results (given below), which may somewhat underestimate the potential fall in the CAR under the shock scenario. Also, a combination of above-average deposit rates and losses incurred by several retail and corporate banks calls into question the sustainability of their business models (Figure 96).

Stress test results for 2012 show that existing buffers at the sector level are adequate even under extreme but plausible adverse macroeconomic shocks.[7] In addition, compared with earlier stress tests, the differentiation in test results continued between more resilient universal banks on the one hand and less resilient personal and corporate banks on the other hand (Figure 90).

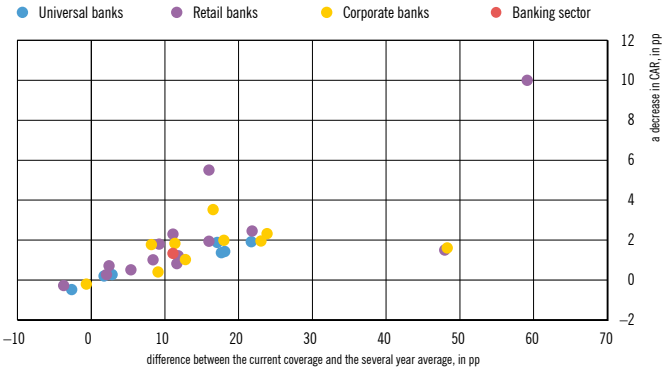
7 The stress tests conducted rely on sectoral models of credit risk presented in Financial Stability No. 7 and on the modelling of net interest and non-interest margins given in Box 3 of this edition of Financial Stability. Credit risk models enable a simulation of the impact of macroeconomic shocks on changes in the riskiness of individual loan groups. Thereby, the impact of the macroeconomic scenario on each bank is manifested depending on the structure, i.e. the risk profile of its credit portfolio (corporate, housing and consumer loans and other loans). In addition, the modelling of bank earnings for different segments of operating income is integrated with this approach and yields more realistic results than formerly used expert judgements in the context of stress testing.

Figure 94 Coverage of non-performing loans by value adjustments and NPLR by bank groups, as at 31/3/2012



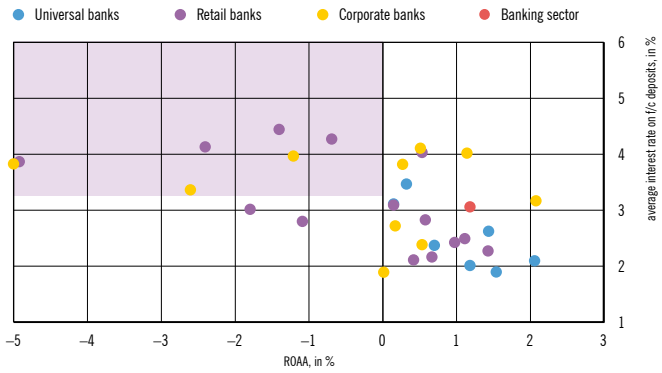
Source: CNB.

Figure 95 Adjustment of the CAR as at 31/3/2012 by the fall in the coverage of non-performing loans relative to the average (2003 – 2012)



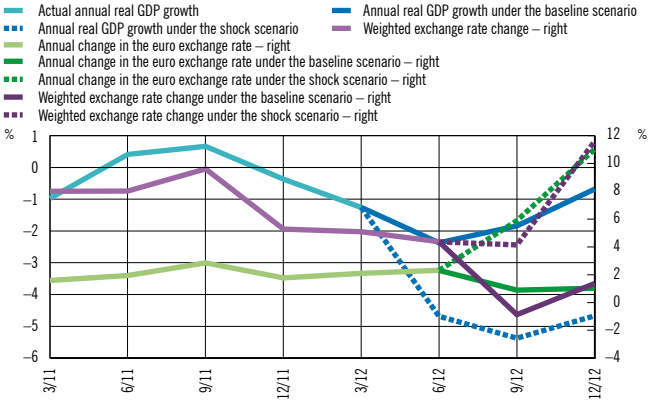
Source: CNB.

Figure 96 Annual ROAA and average annual interest rate on f/c deposits at end-March 2012



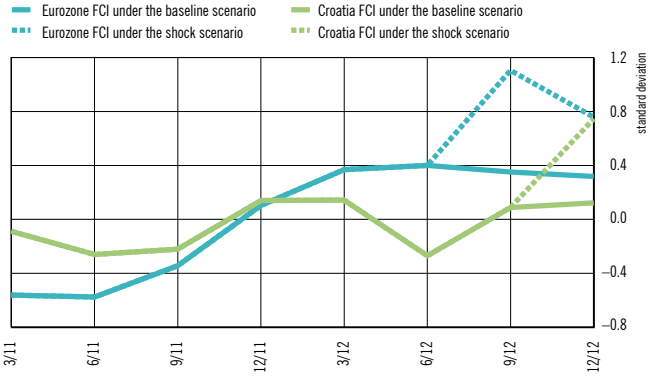
Source: CNB.

Figure 97 Projections of macroeconomic variables under various scenarios



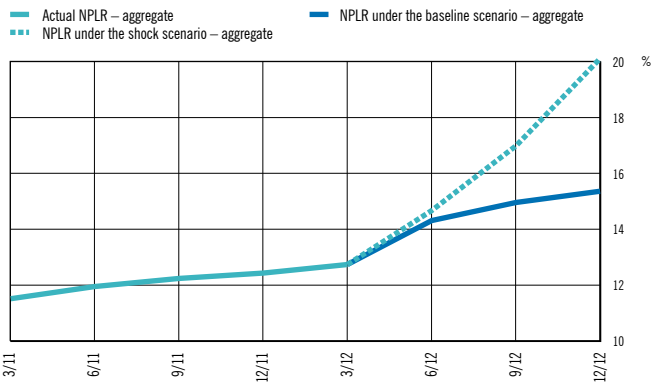
Source: CNB.

Figure 98 Financial conditions indices under various scenarios



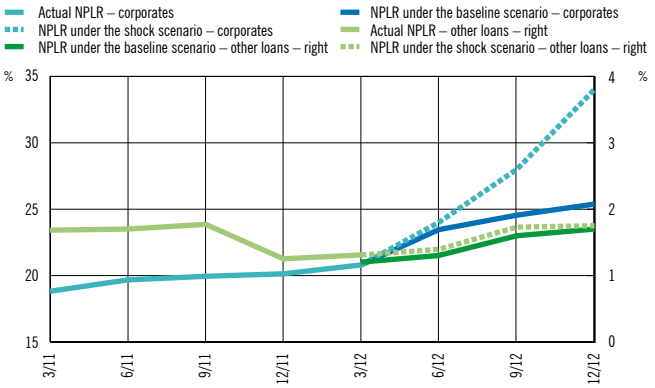
Note: Positive (negative) values denote a deterioration (an improvement) of financial conditions.
Source: CNB.

Figure 99 Projections of NPLR under various scenarios



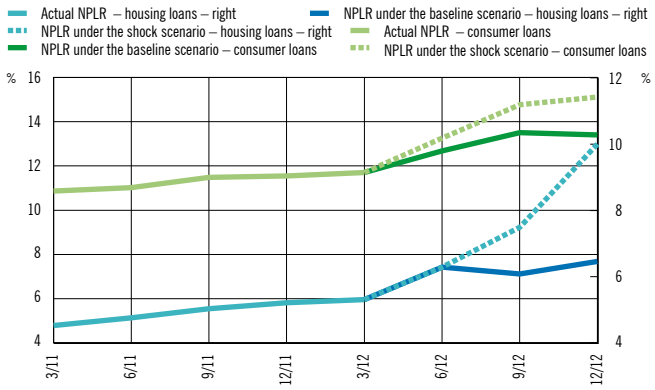
Source: CNB.

Figure 100 Projections of non-performing loans to corporates and other loans under various scenarios



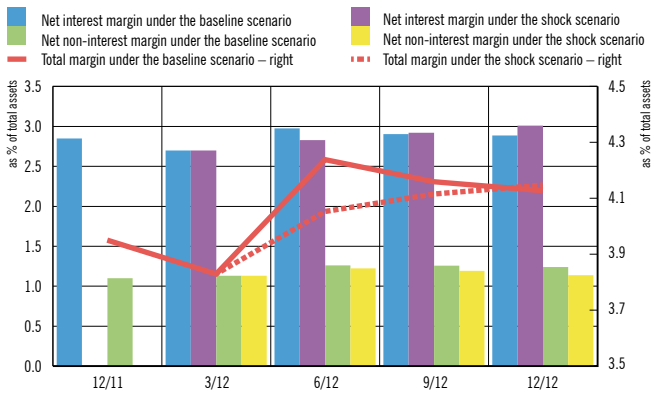
Source: CNB.

Figure 101 Projections of non-performing housing and consumer loans under various scenarios



Source: CNB.

Figure 102 Projections of bank margins under various scenarios



Source: CNB.

Against the setting of the unfavourable international environment and negative trends in almost all aggregate demand components of domestic GDP, the baseline scenario, in other words the most likely outcome, assumes a 1.6% fall in real GDP and the maintenance of a relatively stable exchange rate of the kuna against the euro[8] in 2012. The shock scenario, which represents stress testing for a highly unlikely but plausible combination of shocks, assumes a 4.0% decline in real GDP.[9] It includes adverse shocks that would worsen financing conditions in the eurozone and Croatia. In view of expectations that foreign funding would be less available and more expensive, the scenario also includes the cumulative 10% depreciation of the exchange rate of the kuna against the euro, assuming that the euro/Swiss franc exchange rate remains stable (Figures 97 and 98).

Under the baseline scenario, NPLR could reach around 15.5% by the end of 2012. The shock scenario assumes a sharper increase in NPLR, to around 20% by the end of the projection horizon (Figure 99). As a rule, the corporate loan portfolio makes the largest contribution to the dynamics of non-performing loans. Under the baseline and shock scenarios, the share of non-performing corporate loans stands at 25.5% and 34%, respectively, at end-2012. A somewhat smaller increase in the risk is associated with consumer loans, where the share of non-performing loans under the baseline and shock scenarios reaches 13.5% and 15%, respectively. The share of non-performing housing loans would grow mildly under the baseline scenario, to 6.5%, and to 10% under the shock scenario (Figures 100 and 101).

Under the baseline scenario, the projected slight increase in net income of banks[10] should continue to be more than sufficient to absorb overall expenses on value adjustments, so that, assuming that earnings are reinvested, the CAR of the banking sector would grow by slightly more than two percentage points relative to March 2012. This mostly refers to large universal banks as the CAR of retail and corporate banks should hold steady under the baseline scenario (Figure 102 and Table 6).

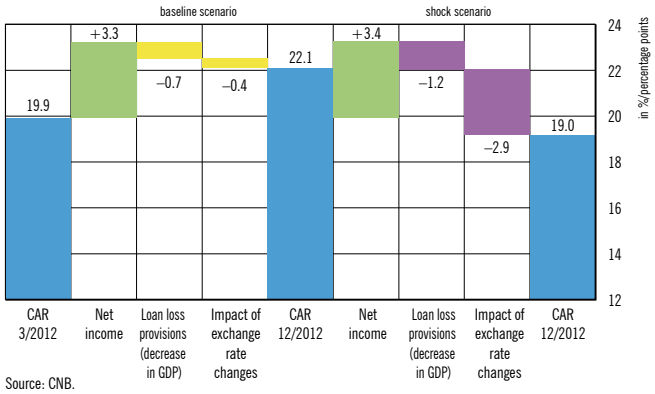
Value adjustments on loans would be even higher under the shock scenario, while net income would remain nearly unchanged. In addition to the impact of a major downturn in GDP,

8 Projections for the kuna/euro exchange rate and for the euro/Swiss franc exchange rate were taken from *Consensus Forecast*, May 2012.

9 Projected GDP values under the shock scenario were obtained based on quantile vector autoregressions to which financial condition indices and GDP growth rates for Croatia and the EU were introduced. The shock scenario was constructed as the outcome that covers 5% of the worst outcomes for the given baseline scenario. For more details see Box 1 Financial conditions and real economic activity, Financial Stability, No. 8, January 2012.

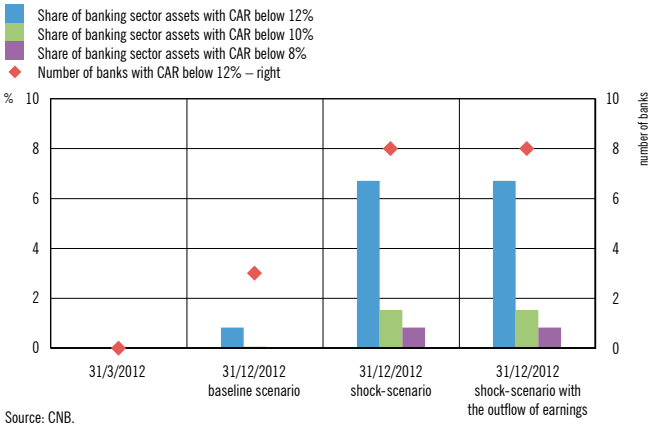
10 Net interest and net non-interest margins were projected based on the earnings modelling given in Box 3 Bank earnings modelling in Croatia. Net operating income is the result of projections for net margins and total bank assets, as well as corrections for general administrative expenses and depreciation by the same amount in both scenarios.

Figure 103 Contribution of individual components to the change in CAR under various scenarios



Source: CNB.

Figure 104 Breakdown of banks and their assets by CAR under various scenarios



Source: CNB.

Table 6 Dynamics of NPLR and CAR under various scenarios by bank groups

		31/12/2012					
	31/3/2012	Baseline scenario		Shock scenario		Shock scenario with the outflow of earnings	
	CAR (%)	CAR (%)	CAR relative to 31/3/2012	CAR (%)	CAR relative to 31/3/2012	CAR (%)	CAR relative to 31/3/2012
Banking sector	19.9	22.1	2.2	19.0	–0.9	18.1	–1.8
Retail banks	18.7	19.0	0.3	15.8	–2.9	15.8	–2.9
Corporate banks	14.8	15.1	0.3	12.6	–2.2	12.4	–2.4
Universal banks	20.4	22.9	2.4	19.7	–0.7	18.7	–1.7

Source: CNB.

this is due to exchange rate changes that activate currency-induced credit risk. Furthermore, any kuna weakening would automatically bring about a decrease in the capital adequacy ratio as banks' capital is expressed in kuna, while their assets are predominately denominated in euro (Figure 103). Under the shock scenario, the capital adequacy ratio of the banking sector would drop by almost 1 percentage point and be about 3 percentage points less than under the baseline scenario. The smallest decrease would be recorded in universal banks (0.7 percentage points), while it would be 2.2 percentage points and 2.9 percentage points, respectively, in corporate and retail banks (Table 6). Assuming no additional measures are taken to increase capital, the shock scenario projects that, by end-2012, the CAR would fall below 12% for eight banks holding around 7.0% of banking sector assets and below 8% for three banks holding 0.8% of bank assets (Figure 104).[11]

Stress test results become much worse under the shock scenario that assumes profit withdrawals. Bearing in mind the high capital adequacy of domestic banks and pressures faced by foreign owners at a time of crisis in the eurozone, stress tests included the possible outflow of profits.[12] If profitable banks were to pay total 2012 profits to owners, the aggregate CAR would fall by around 1.8 percentage points by the end of 2012. This decrease would be somewhat smaller in universal banks (1.7 percentage points) and greater in corporate and retail banks, 2.4 percentage points and 2.9 percentage points, respectively (Figure 104 and Table 6).

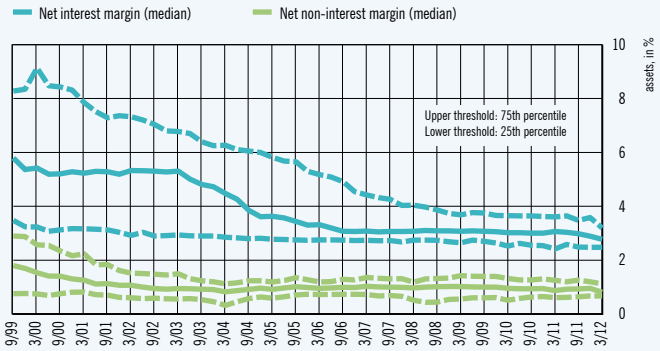
11 All these projections are based on the assumption that banks neither increase nor reduce capital in the period under review.

12 The test includes the restriction under which a bank may not reduce its capital adequacy ratio to below 12% as a result of the payment of earnings.

Box 3 Bank earnings modelling in Croatia

The level and developments in bank earnings have a crucial impact on the availability of capital in the economy, the efficiency of the process of financial intermediation and banking sector stability and the related economic growth dynamics. High bank margins can thus discourage savings and investments and encourage the process of disintermediation. However, too-low margins can have a negative effect on bank capitalisation and weaken their resilience to shocks[1]. As operating income of banks is the first buffer in the conditions of a fast growth in bad loans, a better understanding of income determinants also plays a key role in the analysis of banking sector resilience and estimate of the risk profile of individual banks. This research thus explores models that may be used for formalising and improving the expert estimates of the operating income of Croatian banks hitherto used in the context of stress testing.

Figure 1 Bank net margins[a]



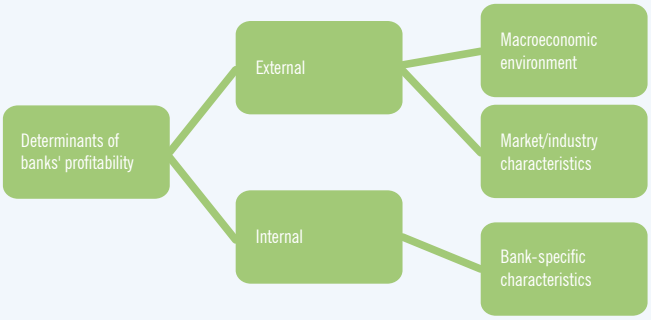
[a] Net margin is the difference between revenues and expenditures (interest or non-interest) relative to total bank assets.
Source: CNB.

In accordance with the trends in the countries of Central and Eastern Europe, bank margins in Croatia had also been trending downwards steadily from the end of the 1990s until the breakout of the financial crisis, influenced by gradual economic integration into the EU and the ever increasing availability of foreign capital[2]. However, over the past year they have been stabilising (Figure 1). This fall was particularly evident in net interest income, the dominant component of total bank earnings, whose average level almost halved from the beginning of the observed period and fell to approximately 3.0% before the crisis. The fall in non-interest margins was slightly smaller. Also, margins of banks converged visibly, with the banks that had initially recorded higher margin levels recording a sharper decrease.

In explaining bank earnings, the literature usually distinguishes external factors, such as economic growth, inflation, market structure, financing costs, etc. and internal or bank-specific factors, such as the size of a bank, its capitalisation, cost effectiveness, market power and credit risks (Figure 2). Such an approach to bank earnings modelling, in accordance with the Ho-Saunders trade model[3], distinguishes the margin component that is insensitive to risk (which reflects market structure) and the risk adjustment component (credit and interest rate risk). The interest margin that can be explained by market structure and aggregate level of risk is known in literature as pure or model-based interest margin[4]. Departures from this margin can be attributed to macroeconomic effects, market imperfections and idiosyncratic factors.

In the approach to Croatian banks' income modelling, net interest and net non-interest income were observed separately. Relevant literature lists many potential determinants of net interest income so the most often used variables and those of particular relevance for Croatia were

Figure 2 Determinants of banks' profitability[a]



[a] Ramlall, I. (2009): *Bank-Specific, Industry-Specific and Macroeconomic Determinants of Profitability in Taiwanese Banking System: Under Panel Data Estimation*, International Research Journal of Finance and Economics, Issue 34, EuroJournals Publishing, Inc.
Source: CNB.

selected. They include the size of a bank measured by gross loans, interest rate risk measured by means of different interest rate volatility, credit risk measured by the share of bad loans or by loan loss provisions and loan growth (Table 1). Different banking sector market structure measures were abandoned after they had produced contradictory results in the preliminary analysis. However, the model includes the quantitative financial integration of Croatia into international capital flows, measured by the average share of foreign financing (banks and enterprises), which is, in the case of a small open economy, a much better determinant of interest income than the pure structure of the domestic market (the share of foreign ownership or the measure of concentration)[5]. In order

1 Doliente, J. S. (2003): *Determinants of Bank Net Interest Margin of Southeast Asia* and Sanders, A., and L. Schumacher (1997): *The Determinants of Bank Interest Rate Margins: An International Study*, NYU STERN, Working paper series 1998.

2 Schweiger, M. S., and D. Liebeg (2006): *Determinants of Bank Interest Margins in Central and Eastern Europe*, Financial Stability Report 12, OeNB.

3 Ho, T., and A. Saunders (1981): *The Determinants of Bank Interest Margins: Theory and Empirical Evidence*, Journal of Finance and Quantitative Analysis.

4 Schweiger, M. S., and D. Liebeg (2006): *Determinants of Bank Interest Margins in Central and Eastern Europe*, Financial Stability Report 12, OeNB.

5 The presence of foreign banks is usually used as an indicator of international integration of the banking sector, but this indicator has shown very little variation in Croatia in the past ten years. For more information on the effect of foreign bank presence, see for instance Martinez, P. M., and A. Mody (2004): *How foreign participation and market concentration impact bank spreads: evidence from Latin America*, Journal of Money Credit and Banking, 36 (3) and Poghosyan, T. (2010): *Re-examining the impact of foreign bank participation on interest margins in emerging markets*, Emerging Markets Review, Vol. 11, Issue 4.

Table 1 Results of the panel regression with fixed effects for net interest margin (balanced sample: 31 December 2001 – 31 March 2012)

Independent variable	Coefficient		
	Model A	Model B	Model C
Constant	0.0376	0.0412	0.1850
Volatility of money market interest rate (variance, 12-month EURIBOR)	–0.0017	–0.0021	
Volatility of money market interest rate (variance, 3-month ZIBOR)	–0.0005	–0.0004	
NPLR		–0.0003	–0.0005
Bank size			–0.0103
Indicator variable for outlier in the margin value of a bank, as at 31/3/2002	0.2521	0.2504	0.2394
Adjusted R2	0.6443	0.6578	0.7259
	Model D	Model E	Model F
Constant	0.1811	0.1757	0.0658
Loan loss provisions		–0.0314	
Share of foreign financing (banks and enterprises)			–0.0007
Loan growth	–0.0056		
NPLR	–0.0005		–0.0003
Bank size	–0.0100	–0.0099	
Interaction variable of the Swiss franc exchange rate and the indicator variable for bank size			0.0089
Indicator variable for outlier in the margin value of a bank, as at 31/3/2002	0.2389	0.2394	0.2403
Adjusted R2	0.7204	0.6735	0.7404

Note: All variables are significant.
Source: CNB.

to estimate their effect on net interest margin, these variables were included in a panel specification with fixed effects for individual banks based on quarterly data for the period from the end of 2001 to the first quarter of 2012. The net non-interest margin can usually be well explained by variation in the net interest margin, so that no additional variables were used in its modelling.

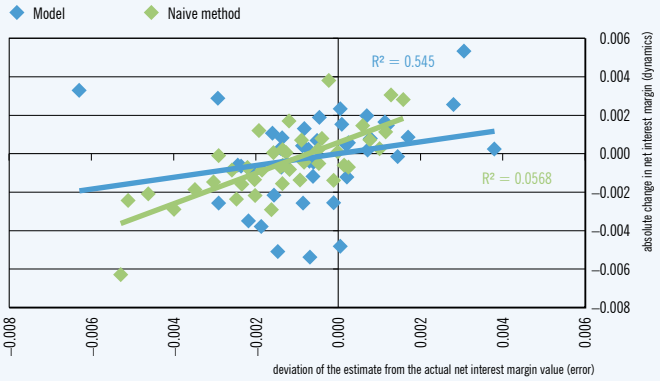
The results of the estimated model show the negative effect of bank size (measured by gross loans) on net interest margin, which is in line with the expectation that small banks use higher net interest margin to compensate for higher fixed costs per loan unit, higher credit risk on balance sheets as well as the absence of potential support by the foreign owner. In addition, interest rate risk in the form of higher volatility of domestic and foreign benchmark interest rates also reduces net interest margin. It should be borne in mind that banks may use different instruments to hedge against risks to lessen the effect of volatility of funding sources, which is reflected over a short-term in non-interest income from trading activities but over a long-term should not have an impact on bank margins. Credit risk (NPLR) also has a negative effect on net interest margin because bad loan growth reduces the interest income of banks while with its inclusion in the model it assumes a part of the explanatory power of interest rate risk and greatly enhances the total predictive power of the model. This finding also indicates that interest rate and credit risk often come hand in hand, which is associated with the fact that the transfer of interest rate risk on bank clients is reflected in the form of increased credit risk materialisation. Finally, the share of foreign financing of banks and enterprises shows a clear negative relationship with interest margin, which indicates that growing financial integration in the conditions of abundant cheap foreign capital abroad was one of the main factors of the falling net interest margin. The possibility of access to foreign capital for banks and enterprises proved to be much more important for net interest margin of domestic banks than the structure of the domestic banking market. To reduce estimate bias due to the positive effect of the exchange rate of the Swiss franc on the portfolio of larger banks and on the aggregate assessment of interest income, we have isolated this effect by interaction between the bank size and exchange rate of the Swiss franc.

We were able to account for the greatest number of variations in interest margin by model F (which includes under independent variables the share of bad loans of an individual bank, the level of total foreign financing of banks and enterprises and a control variable for the effect of the exchange rate of the Swiss franc on large banks[6]). However, to test the added value of the use of the presented models, the values of net interest margin estimated "within the sample" by means of different models were compared to the results of the so called "naive method" based on net interest margin averaging in the past four quarters, which approximates the existing approach to bank earnings projection based on expert estimates. Under the criteria of the average absolute deviation, the models estimated by means of interest rate risk (A and B) proved to be worse alternatives than the naive approach, while models C, D and E produce an almost identical error, while it is the F model that significantly reduces the error estimate compared to the naive method (by approximately 9%). In addition, in the naive approach, estimate deviations from the actual values of the net interest margin have been correlated with its change, so that this approach is the most erroneous in the case of sharp falls in net interest margins. By contrast, in the case of the best estimated model, these deviations were very poorly correlated with the intensity of changes in net interest margin (Figure 3). In conclusion, the naive approach is the most erroneous exactly under stress scenarios, when the significance of a good buffer estimate provided by earnings is at its highest.

The developments in net non-interest margin can, in accordance with the expectations, be well accounted for by variations in net interest margin (Table 2). Although banks can use non-interest income to compensate over a short-term for a poorer interest income, which can explain occasional visible divergence in their developments (particularly immediately after the financial crisis broke out), these two segments of earn-

6 The effect of independent variables on the developments in dependent variables, in the models presented with variables in different units of measurement, can be seen in standardised coefficients which indicate a change in the standard deviation of the dependent variable induced by a unit change in the standard deviation of specific independent variable (which are then mutually comparable), i.e. for original (standardised) parameters in the F model, as follows: –0.0007 (–0.3242); –0.0003 (–0.1565); 0.0089 (1.0557).

Figure 3 Relationship between the change in net interest margin and the error estimate of model F



Source: CNB.

ings were mostly positively correlated due to the limited ability of banks to raise commissions and fees for existing clients, so that credit activity is also required if higher non-interest income is to be generated. Also, unlike interest income, non-interest income was not influenced to such a degree by the nominal exchange rate. However, due to income growth driven by these changes, non-interest margin declined. This completes the approach to total interest margin modelling and provides a qualitative expansion to the used standard system of bank stress testing (see Box 5 Credit risk models for specific bank portfolios, Financial Stability, No. 7, June 2011).

In conclusion, the best determinants of the net interest margin of banks have shown to be the share of bad loans of an individual bank in total loans and the total share of foreign financing of banks and enterprises, corrected for the effect of the exchange rate of the Swiss franc on large banks' portfolios. The model that includes these variables accounts for the halt in the downward trend in bank income since the breakout of the crisis by a much more difficult access to foreign financial markets. The increase in the share of bad loans had the opposite effect, but has so far not succeeded in substantially undermining bank earnings. To an extent this could be attributed to the increase in the exchange rate of the Swiss franc, which boosted interest-bearing assets during the observed period. The estimated model has shown on average somewhat better results than the naive approach to forecasting, although its major advantage in bank stress testing lies in the more reliable projections of a fall in the earnings of individual banks should the unfavourable scenario materialise. The model is also well connected to the credit risk model which combines macroeconomic shocks with bad loan developments. Therefore, the use of this model in bank stress testing should provide more realistic estimates of the effects of simulated shocks on individual banks and the banking sector as a whole.

Table 2 Results of the panel regression with fixed effects for net interest margin (30 September 1999 – 31 March 2012)

Net interest margin models	
Constant	0.0070
Net interest margin	0.2297
Interaction variable of the weighted Swiss franc and euro exchange rates and the indicator variable for bank size	–0.0022
Adjusted R2	0.9712

Note: All variables are significant.
Source: CNB.

List of figures and tables

Abbreviations and symbols

Abbreviations

bn	– billion
CAR	– capital adequacy ratio
CBS	– Central Bureau of Statistics
CDCC	– Central Depository & Clearing Company
CDS	– credit default swap
CEE	– Central and Eastern European
CES	– Croatian Employment Service
CICR	– currency-induced credit risk
CM	– Croatian Motorways
CNB	– Croatian National Bank
EAD	– exposure at default
EBA	– European Banking Authority
ECB	– European Central Bank
EFSF	– European Financial Stability Facility
EIZG	– Institute of Economics, Zagreb
EMBI	– Emerging Market Bond Index
EMU	– Economic and Monetary Union
EONIA	– Euro Overnight Index Average
ERM	– Exchange Rate Mechanism
ESM	– European Stability 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
FRA	– Fiscal Responsibility Act
FSI	– financial soundness indicators
GDP	– gross domestic product
GFS	– Government Finance Statistics
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

Two-letter country codes

BA	– Bosnia and Herzegovina
BG	– Bulgaria
CZ	– Czech Republic
EE	– Estonia
HR	– Croatia
HU	– Hungary
LT	– Lithuania
LV	– Latvia
MK	– The former Yugoslav Republic of Macedonia
PL	– Poland
RO	– Romania
SI	– Slovenia
SK	– Slovak Republic

Symbols

–	– no entry
....	– data not available
0	– 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

ISSN 1846-9264 (print) • ISSN 1847-0017 (online)