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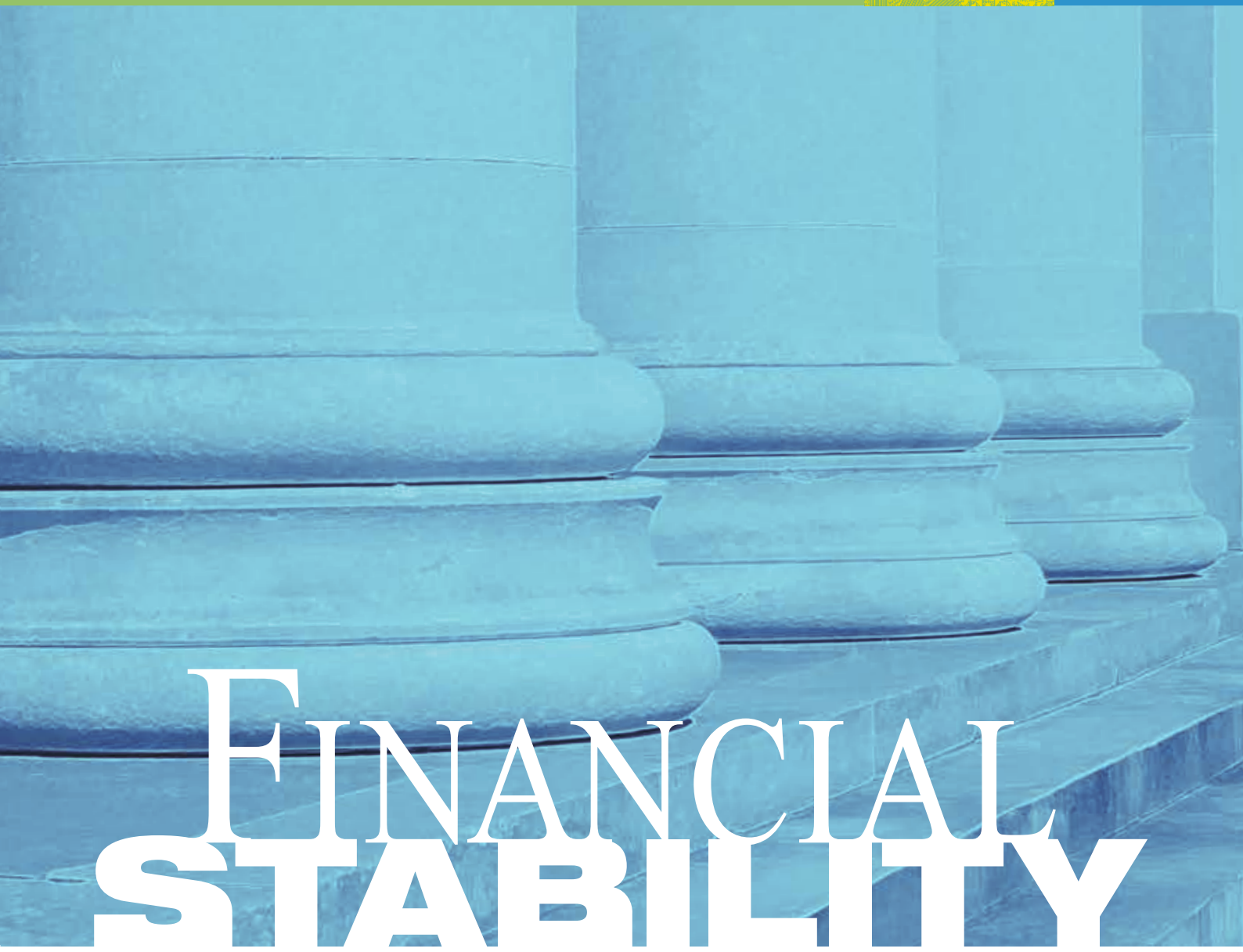

FINANCIAL STABILITY

CROATIAN NATIONAL BANK

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Financial Stability

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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.

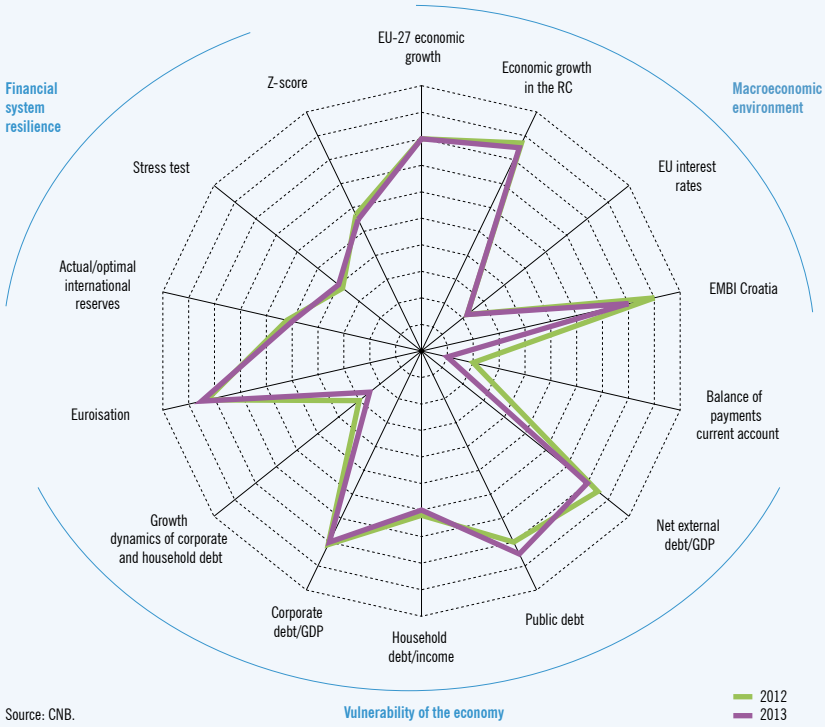
The CNB shares the responsibility for overall financial system stability with the Ministry of Finance and the Croatian Financial Services Supervisory Agency (HANFA), which are responsible for the regulation and supervision of non-banking financial institutions. Furthermore, owing to the high degree to 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 the 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.

As a result of the decline in the global risk premium and a slightly improved environment in the financial markets, the focus of the risk shifted to the slowdown in Croatia's economy and the economies of its trading partners. Thanks to its relatively high capitalisation, the banking system is capable of withstanding even strong, although unlikely, shocks. The deleveraging of Croatian banks has been relatively moderate and amid decreased demand for loans had no significant impact on financial stability. However, the potential risk remains.

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 improvement in the financing conditions in international financial markets in the second half of 2012 mitigated the risks to Croatia's financial stability to an extent. However, the euro area financial market remains strongly segmented and the short-term economic outlook relatively poor. The decrease in the insecurity in financial markets was prompted predominantly by the ECB president's announcement that the ECB will do whatever it takes to preserve the euro area, by the ECB introducing the secondary market purchase programme of euro area member states' sovereign debt, subject to strict conditions, by the progress in the upgrading of the EU institutional framework and the implementation of structural reforms and fiscal adjustment in peripheral eurozone countries. However, there are still considerable differences in the risk premia of individual member states. Countries with weaker fundamentals borrow at much more unfavourable conditions than the eurozone's core countries. In addition, after the fall in the GDP of EU member states in 2012, in 2013 we may expect only gradual economic recovery. Due to all of the above, the risks of adverse macroeconomic scenarios still dominate but at much reduced likelihood of tail events.

Croatia's public debt to GDP ratio has continued its strong growth, although still remaining at a moderate level, not showing any signs of stabilising for the time being. The downgrade in Croatia's credit rating by Standard & Poor's and Moody's caused by the aforementioned weaknesses and the years-long period of recession at this point only slightly increased Croatia's risk premium. The anticipation of the rating downgrade combined with low global risk premia, high liquidity and easily obtainable capital in international financial markets continue to enable the Republic of Croatia to borrow abroad at much lower expected interest rates than at the time of the last eurobond issue (for more details see Box 2: Assessment of the impact of RC credit rating downgrade on borrowing costs and access to foreign capital markets). Nevertheless, the possible tightening of financial conditions in the international markets paired with the shift in the perception of the country's solvency would make access to foreign funding much more difficult; combined with the deleveraging of other sectors, this could lead to capital outflow and economic contraction.

Weak performance of the Croatian economy is the second most significant source of risks to financial stability in 2013. Lower costs of funding in the international market and the expected recovery of at least some of Croatia's most important trading partners and consequently of export demand will not create the preconditions necessary for Croatia's economic recovery before the second half of 2013. Non-performing loans will thus continue rising under the influence of weak corporate results, dwindling income of households and ageing bank portfolio.

In 2012, at last, the process of domestic bank deleveraging against their foreign parent undertakings was started, that is, parent banks began reducing their overall exposure to Croatia. This is the continuation of a process that has for a long period of time marked the capital flows of numerous countries of Central and South Eastern Europe. Thus far, the process of deleveraging proceeded at a moderate pace amid an ample supply of capital on international markets, which were partly substituted for the funds of parent banks, and weak demand for loans. Bank deleveraging neither limited credit growth nor affected financial stability. However, the deleveraging process may limit the positive reaction of the domestic financing conditions to better availability of external liquidity, while a more significant acceleration in the process or its continuation in the case of tighter financing conditions might be a financial stability risk.

In 2013, the domestic financial system will remain highly resilient to the materialisation of some of these risks. Thanks to its relatively high capitalisation, the banking system is capable of withstanding even unlikely shocks. Thus, in a simulated adverse scenario, even faced with a sizeable fall in GDP and depreciation of the kuna against the euro and the Swiss franc, the banking system would remain stable in 2013. The country's external liquidity slightly improved, which, against the backdrop of stable external debt, supports exchange rate stability. Non-financial sector companies compensated for the relatively poor chances of their sales growing and being maintained in 2011 and 2012 by increasing their net exports, which helped their profitability grow and reduced their currency exposure. All this has mitigated the unfavourable effects of potential shocks on financial stability.

Exchange rate stability amid favourable developments in the balance of payments has enabled the high CNB kuna liquidity policy to be used to support CBRD programmes aimed at financing predominantly export-oriented companies at relatively favourable conditions. However, the still prominent risks to financial stability urge for a swift turn in other policies, so it is urgent to make budget cuts and step up the pace of structural reforms. This would improve the risk perception and maintain access to foreign sources of funding even in the case of unfavourable developments in international financial markets. At the same time, attaining these goals would boost confidence as regards future growth and mitigate risks associated with the delevaraging of domestic banks. This also goes for the timely recognition of potential loan losses, which enables banks to assess risk accurately and direct their lending towards companies with the greatest growth potential. Last but not least, economic reform and provisioning in a timely manner against bad loans should facilitate the process of economic restructuring in the direction of strengthening the export sector, the only one with significant growth potential in the medium term.

Macroeconomic environment

The reduction of risks in external financial markets improved financing conditions. However, the eurozone recession limited exports as the main generator of sustainable growth of domestic economy. The continuation of structural reforms and fiscal consolidation is the main precondition for boosting growth in the medium term.

The external macroeconomic and financial environment is still uncertain, although there are signs of improvement. Although the risks associated with the crisis in the market for the sovereign debt of peripheral eurozone countries and in the banking systems of these countries significantly decreased relative to the first half of the year, after the ECB's decisive measures and an agreement on a banking union, a certain degree of insecurity is still present. This has contributed to weak lending, which together with low consumer and business confidence has prolonged recessionary trends in the peripheral countries and the eurozone as a whole (Tables 1, 2 and 3).

The eurozone disintegration risk that increased significantly in mid-2012 resulted in the substantial fragmentation of financial markets and heterogeneity in the financial conditions in the eurozone. This risk was substantially mitigated by the announcement of the ECB president, Mario Draghi, that the ECB would do whatever it takes to preserve the eurozone. The announced outright monetary transactions, i.e. the so-called OMT programme, include sterilised intervention in the market of shorter maturity sovereign debt, aimed at more efficient common monetary policy and a reduction in the financing costs of eurozone countries to levels reflecting macroeconomic fundamentals. The programme, which incorporates strict conditions agreed upon within the framework of the arrangement concluded with the so-called Troika institutions (the IMF, the

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)	
	2011	2012[a]	2013[b]	Q2/2012	Q3/2012	Q2/2012	Q3/2012	Q2/2012	Q3/2012
USA	1.8	2.1	2.3	0.3	0.7	5.9	2.9	4.7	3.4
EU	1.5	–0.3	0.4	–0.2	0.1	3.9	4.8	–1.9	–2.0
Germany	3	0.8	0.8	0.3	0.2	5.4	5.6	–0.4	–1.4
Italy	0.4	–2.3	–0.5	–0.7	–0.2	2.8	2.2	–7.5	–6.1
Slovenia	0.6	–2.3	–1.6	–1.1	–0.6	0.3	–0.1	1.0	2.0
Slovak R.	3.2	2.2	2.0	0.6	0.6	10.8	11.5	12.4	16.6
Czech R.	1.9	–1.3	0.8	–0.4	–0.3	3.8	4.5	–0.2	–1.1
Poland	4.3	2.4	1.8	0.2	0.4	0.4	3.9	3.3	1.6
Hungary	1.6	–1.2	0.3	–0.4	–0.2	3.5	2.4	0.0	0.1
Estonia	8.3	2.5	3.1	0.9	1.6	4.2	5.7	–2.5	–1.0
Latvia	5.5	4.3	3.6	1.3	1.7	8.6	17.7	5.1	5.7
Lithuania	5.9	2.9	3.1	0.6	1.3	3.8	16.3	–2.8	7.4
Bulgaria	1.7	0.8	1.4	0.3	0.1	8.2	2.5	0.2	0.0
Romania	2.5	0.8	2.2	0.1	–0.5	2.4	–2.5	1.3	0.2
Croatia	0.0	–1.8	0.3	–0.1	0.1	–7.6	–0.5	–6.2	–4.3

[a] Estimate. [b] Forecast.
Sources: Eurostat, CBS, Bloomberg, OECD and CNB (for Croatia).

ECB and the EC), aims at eliminating the eurozone disintegration risk (Figures 4, 5 and 6).

Even without effective implementation, the introduction of the programme had an exceptionally favourable impact on risk premia of peripheral eurozone countries which went down significantly relative to the summer months. An additional contribution came from the agreement on the introduction of the banking union, which should, when fully implemented, ensure the separation of risks relating to the banking sector from the sovereign risk of an individual country.

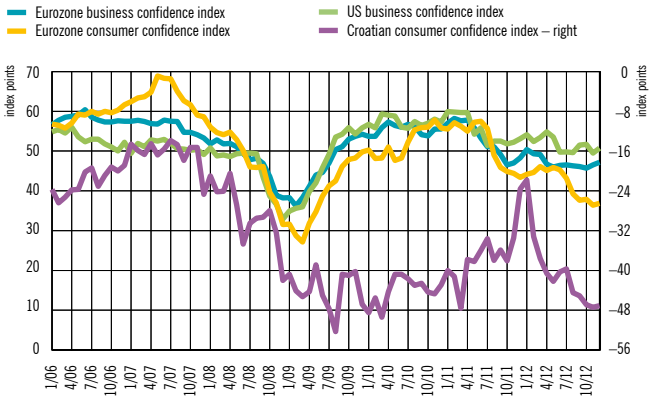
European leaders agreed on a unified system of bank supervision at their meeting in December 2012. The banks in the banking union will come under the supervision of the European Central Bank from 2014, with the stress at first being laid on large banks. The implementation of unified supervision opens up the possibility of utilising ESM funding for the immediate recovery of threatened banks, thus severing the link between banks and states and permanently reducing the risk for investors in sovereign bonds.

Due to its fiscal implications an agreement on a common mechanism for dealing with troubled banks and a deposit guarantee scheme, the two other components of the banking union, has been postponed until mid-2013, when agreement on further steps in the fiscal and economic integration of the eurozone is planned.

Therefore, it will be necessary to review the impacts of introducing the banking union in the eurozone on Member States outside the eurozone opting to join the banking union, as well as on the non-EU countries, that are financially integrated in the eurozone through parent banks of their domestic banks subject to ECB supervision, especially in view of the restrictions in the participation in the two additional components of the banking union.

The speech given by the ECB president and the agreement on the implementation of the banking union should facilitate bank financing in the capital market by reducing risks as well as contribute to renewed strengthening of interbank and cross-border lending. This will also have a favourable effect on the slowdown in the process of the eurozone banks reducing their exposures to European emerging markets, which has negatively affected risk, i.e. the financing costs of these countries. The process intensified in the second and third quarter of 2012 under the pressure by local regulators in home countries of parent banks, aiming to facilitate recapitalisation of parent banks in compliance with new Basel requirements. This capital withdrawal has occurred in a situation in which markets are sensitive to risks linked to large

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		
	2011	2012[a]	2013[b]	2011	2012[a]	2013[b]
USA	–10.1	–8.5	–7.3	–3.3	–3.1	–2.9
EU	–4.4	–3.6	–3.2	–0.5	–0.2	0.4
Germany	–0.8	–0.2	–0.2	5.6	5.7	5.0
Italy	–3.9	–2.9	–2.1	–3.3	–1.2	–0.4
Portugal	–4.4	–5.0	–4.5	–6.6	–3.0	–1.8
Ireland	–13.4	–8.4	–7.5	1.1	2.3	3.4
Greece	–9.4	–6.8	–5.5	–11.7	–8.3	–6.3
Spain	–9.4	–8.0	–6.0	–3.7	–2.4	–0.5
Slovenia	–6.4	–4.4	–3.9	0.1	2.0	2.7
Slovak R.	–4.9	–4.9	–3.2	–2.5	1.4	1.4
Czech R.	–3.3	–3.5	–3.4	–3.9	–2.9	–2.1
Poland	–5.0	–3.4	–3.1	–4.5	–3.9	–3.3
Hungary	4.3	–2.5	–2.9	1.0	1.6	2.6
Estonia	1.1	–1.1	–0.5	0.3	–0.9	0.1
Latvia	–3.4	–1.7	–1.5	–2.4	–2.9	–3.1
Lithuania	–5.5	–3.2	–2.8	–3.7	–2.9	–3.0
Bulgaria	–2.0	–1.5	–1.5	1.7	–1.6	–2.1
Romania	–5.5	–2.8	–2.4	–4.1	–4.1	–4.2
Croatia	–5.1	–4.3	–4.8	–0.9	–0.4	0.1

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

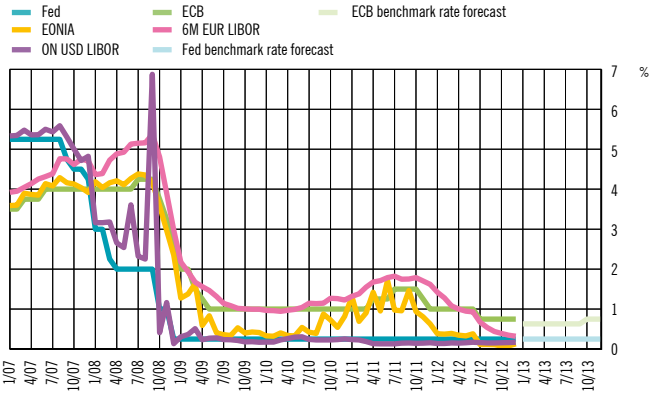
Table 3 Public and external debt in selected European emerging market countries

as % of GDP

	Public debt			External debt		
	2011	2012[a]	2013[b]	2010	2011	Q2/2012
Italy	120.7	126.5	127.6	118.2	115.0	118.5
Portugal	108.1	119.1	123.5	230.8	218.1	227.9
Ireland	106.4	117.6	122.5	1110.9	1075.8	1041.4
Greece	170.6	176.7	188.4	184.5	177.4	206.3
Spain	69.3	86.1	92.7	165.1	165.5	169.2
Slovenia	46.9	54.0	59.0	115.2	111.3	115.2
Slovak R.	43.3	51.7	54.3	76.0	76.7	73.6
Czech R.	40.8	45.1	46.9	47.8	46.5	47.7
Poland	56.4	55.5	55.8	67.4	67.1	71.6
Hungary	81.4	78.4	77.1	161.5	161.2	167.0
Estonia	6.1	10.1	11.1	115.9	97.2	97.1
Latvia	42.2	41.9	44.3	164.6	145.5	142.3
Lithuania	38.5	41.6	40.8	83.0	77.8	76.9
Bulgaria	16.3	19.5	18.1	105.5	95.0	95.3
Romania	33.4	34.6	34.8	76.2	73.3	73.8
Croatia	46.7	53.3	57.5	103.6	101.8	104.9

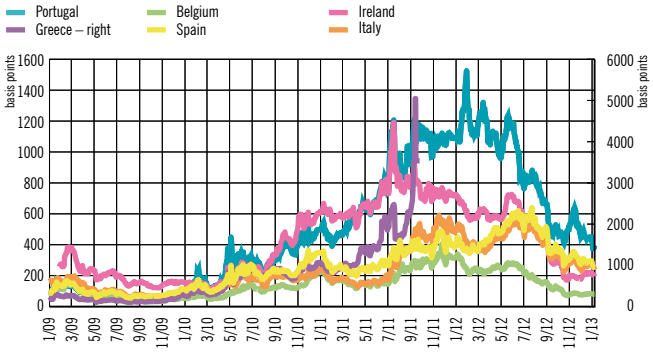
[a] Estimate. [b] Forecast.
Sources: Eurostat, World Bank, *Quarterly External Debt Statistics* and CNB (for Croatia).

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



Sources: Fed, ECB and Bloomberg.

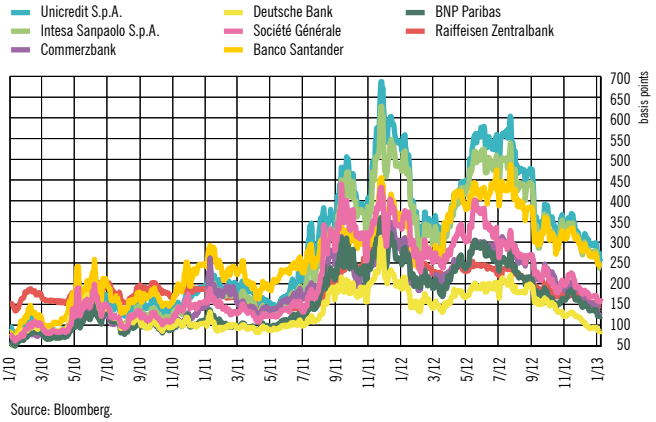
Figure 4 CDS[a] spreads for 5-year bonds of selected eurozone countries



[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.

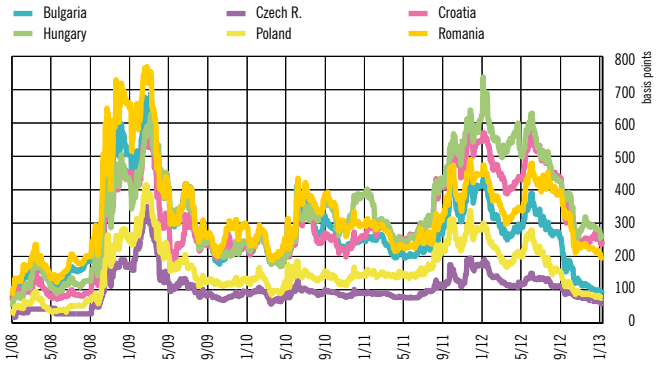
Source: Bloomberg.

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



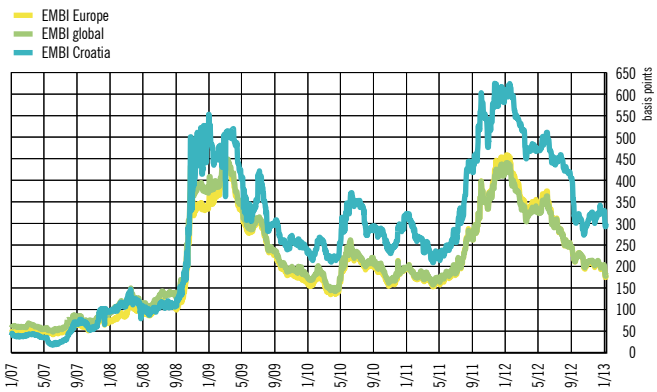
Source: Bloomberg.

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



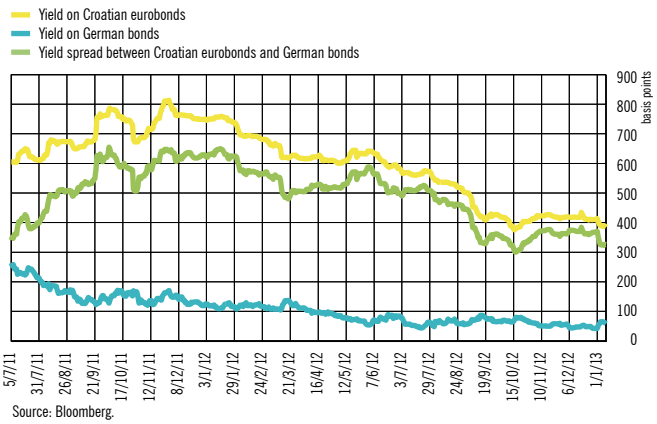
Source: Bloomberg.

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.

exposures to emerging markets and after the favourable effects of the ECB's LTRO programme of ensuring long term liquidity to banks have worn off.

The already realised and the possible further reduction of financial risks paired with the consequential decline in financing costs and the thus spurred strengthening of lending activity and capital flows in the eurozone will increase chances of its economy recovering from recession in the second half of 2013 (Table 1). Those peripheral countries that are more successful at implementing credible fiscal consolidation programmes and strengthening international competitiveness thanks to structural reforms, improving their credibility and ensuring lower financing costs, are also expected to make a contribution. The same goes for countries surrounding the eurozone and the EU that are economically and financially highly connected with the eurozone economy, including Croatia.

Although tensions in the eurozone have subsided, risks remain high, so 2013 will be a year in which economic actors and economic policy makers in all eurozone countries and countries that gravitate toward it will face substantial challenges. The risks of failure in the implementation of reforms arise from negative social and political repercussions of fiscal restrictions introduced by countries on the periphery of the eurozone. In addition, upcoming elections in some of the major eurozone countries open up the possibility of delays in the implementation of reforms. They may even hamper attainment of the compromise necessary for being able to find acceptable solutions for the problem of further development in the institutional infrastructure in the banking, fiscal, economic and political spheres, which are necessary for the efficient functioning of a supranational monetary union.

Croatia reduced its macroeconomic imbalance in 2012. However, it failed to use structural reforms to create the foundations for more dynamic growth. The budget deficit decreased in 2012; however, paired with the increase in net aggregate savings and private sector deleveraging, along with low export demand caused by the recession in the eurozone and weak competitiveness, economic activity weakened, pushing the GDP down by some 1.8% (Table 2, Figures 10, 11 and 12).

A further reduction in the balance of payments current account deficit to 0.4% of GDP increased Croatia's total external debt by only a little, while the refinancing of the maturing external debt was conducted without difficulties (Figures 10, 13, 14 and 15). The government increased its external debt, while banks and non-financial enterprises have reduced theirs due to slackening demand and limited loan availability amid recessionary conditions.

These relatively favourable developments in the balance of payments have provided for good foreign currency liquidity and a lack of exchange rate pressures so exchange rate stability was maintained without substantial interventions by the central bank. Also, the stability of the system dominated by foreign currency liabilities was ensured in this way (Figure 25).

Although the growth of banks' non-performing loans continued amid the recessionary conditions, strong capitalisation and the still satisfactory profitability of most banks ensured banking system stability and a steady loan supply. However, weak demand continued to weigh down loan growth (Figure 10).

At the same time, the stable exchange rate also contributed to the preservation of price stability. The main upward pressure on inflation, which increased to 3.5%, a rate above that in the eurozone, was caused by external shocks arising from an increase in the prices of food and oil, the rise in the VAT rate and an increase in regulated domestic prices, predominantly of energy products, in the process of removing the disparity with the costs realised over the previous years.

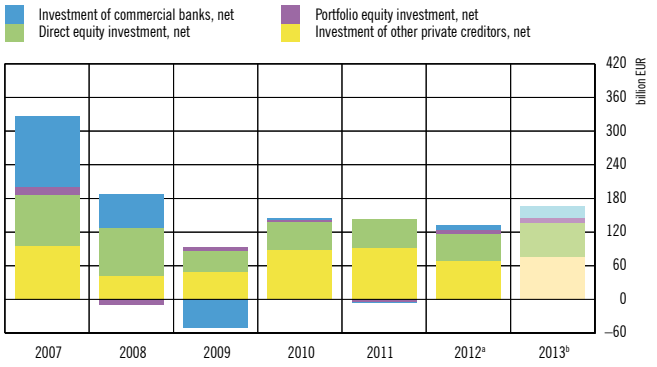
The general improvement in financing conditions in the external market was favourably reflected in Croatia's risk premium. Thus, in 2012 yield spreads in government bonds and CDS went down by some 250 to 300 basis points, which also contributed to the preservation of financial stability (Figures 7 and 8).

The lacklustre implementation of structural reforms and the unexpected turn in the fiscal consolidation policy caused a downgrade in Croatia's credit rating at the end of the year. However, this had no very great effect on the price of borrowing since the markets already incorporated a weaker rating into the price based on the country's fundamentals. In an effort to provide impetus to domestic investment demand amid the weak domestic private sector demand and poor chances of growth in foreign demand due to recession in the main export markets, in its 2013 budget the government envisaged a sizeable increase in government investments, while continuing to reduce current non-interest expenses (when EU expenses are excluded). This, together with the planned only moderate revenue growth due to weak economic growth, resulted in the rise of the expected budget deficit relative to 2012 and further growth in the public debt (Tables 2 and 3).

Although, given the four years of recession, the government's intentions are partly understandable, they received no praise. Finally, two out of the three leading credit rating agencies have downgraded Croatia's credit rating from investment to speculative grade with stable outlook.

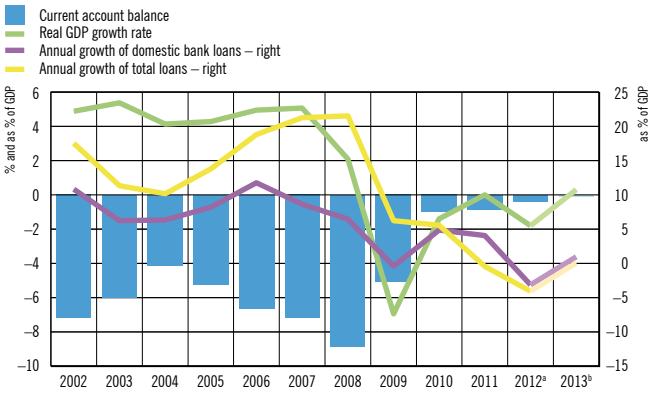
Against this backdrop, recessionary trends are expected to continue in the first six months of 2013 and gradual economic recovery may not be expected until the second half of the year. Consequently, growth in 2013 will be weak (some 0.3%), depending heavily on the recovery in export demand and the eurozone coming out of the recession, as well as on the reviving of investment demand that has been limited by the relatively high indebtedness of domestic sectors and still high costs of capital relative to the pre-crisis period resulting from higher risks (Table 1, Figure 10). Investments have also been unfavourably influenced by lower investor expectations amid recessionary conditions and numerous administrative hurdles, especially at the local government level.

Figure 9 Capital inflows to European emerging market countries



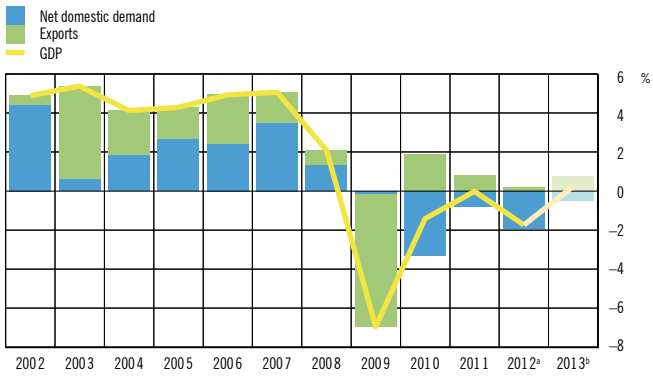
a Estimate. b Forecast.
Source: International Institute of Finance, *Capital Flows to Emerging Market Economies*, October 2012.

Figure 10 Foreign capital inflows and GDP growth in Croatia



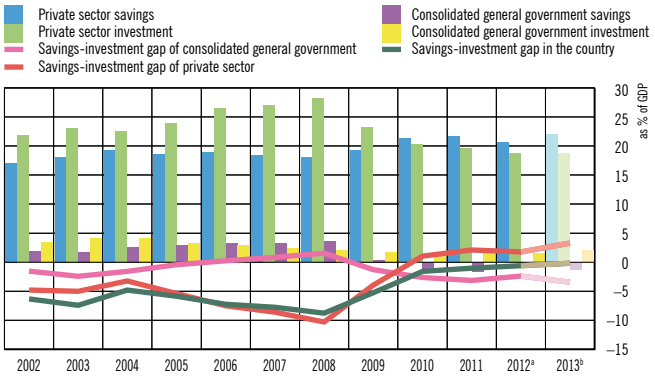
a Estimate. b Forecast.
Sources: CBS and CNB.

Figure 11 GDP growth pattern (contribution to growth)



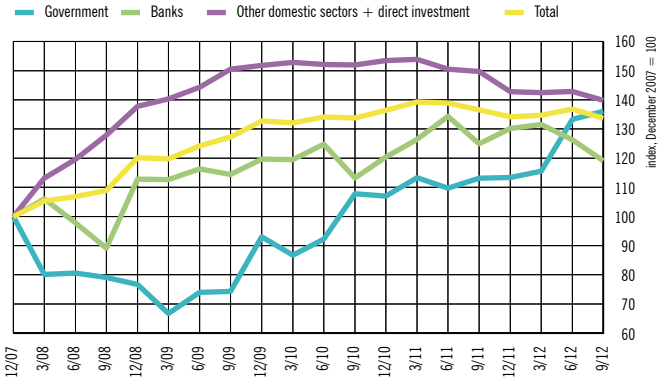
a Estimate. b Forecast.
Source: CBS.

Figure 12 Savings and investment – total and by sector



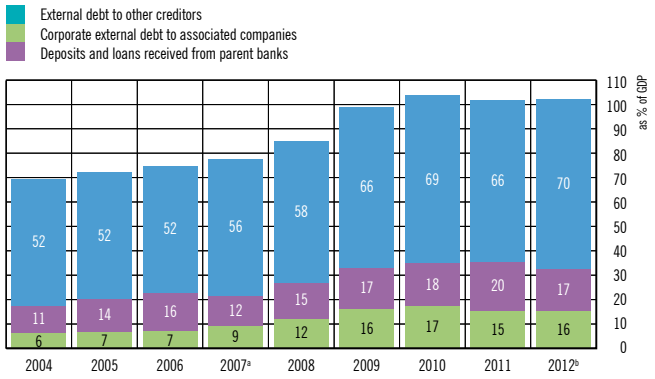
[a] Estimate. [b] Forecast.
Sources: MoF and CNB (estimate).

Figure 13 External debt by domestic institutional sector



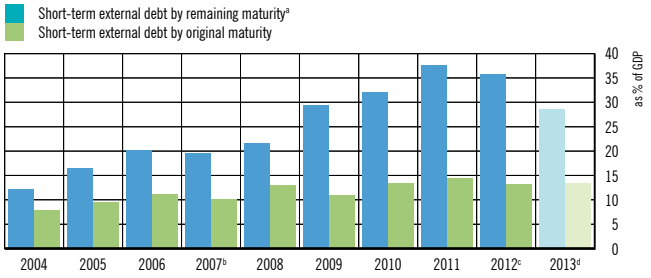
Source: CNB.

Figure 14 Total external debt by creditor



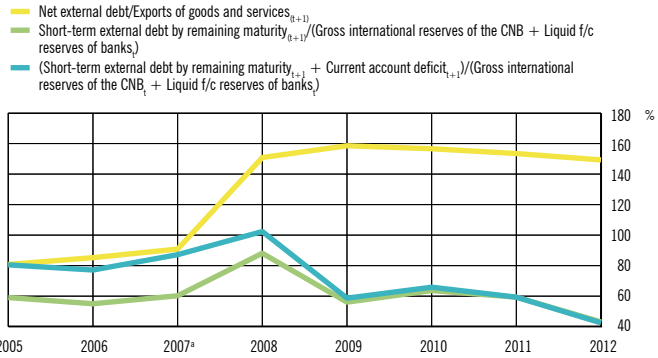
[a] Since end-2007, external debt has been calculated according to the new methodology. [b] Estimate.
Source: CNB.

Figure 15 Short-term external debt



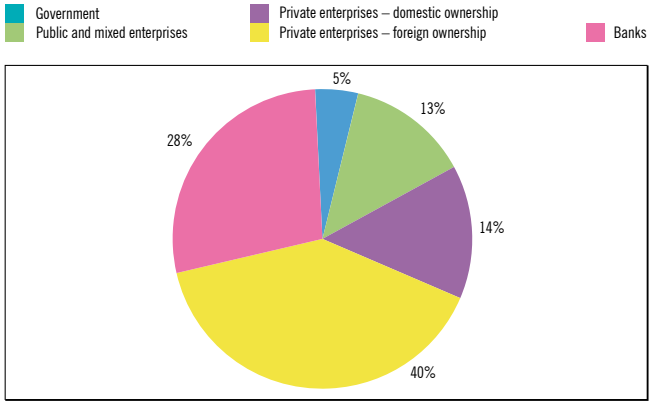
[a] Short-term external debt by remaining maturity is the amount of debt maturing in the reference year, representing the sum of the balance of short-term debt at the end of the previous year and long-term debt maturing in the reference year.
[b] Since end-2007, external debt has been calculated according to the new methodology.
[c] Estimate. [d] 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



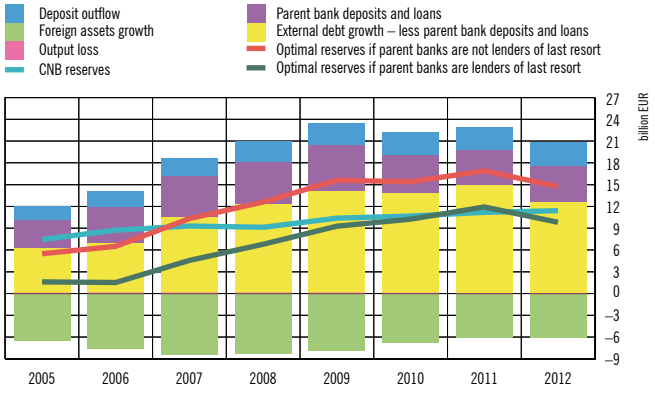
[a] Since end-2007, external debt has been calculated according to the new methodology.
Note: Net external debt is calculated as a difference between gross external debt and gross international reserves and bank foreign assets.
Source: CNB.

Figure 17 Projection of external debt principal payments in 2013 by sectors



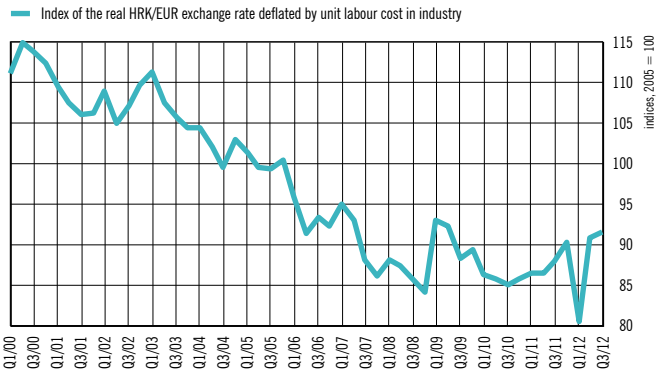
Source: CNB.

Figure 18 Optimal international reserves – contribution of individual components



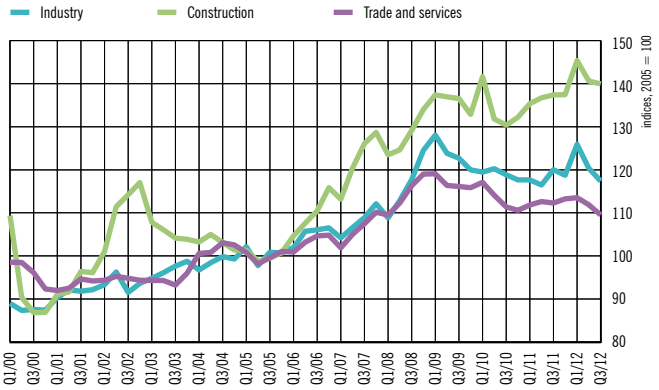
Source: CNB.

Figure 19 Real kuna/euro exchange rate



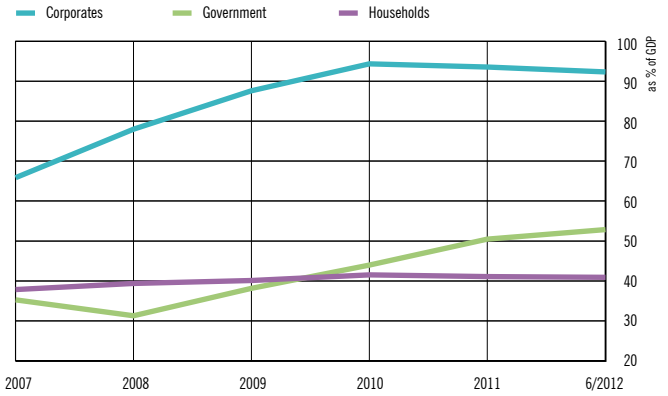
Note: A fall in the index indicates a real appreciation of the kuna against the euro.
Sources: CBS, CNB and CNB calculations.

Figure 20 Unit labour cost



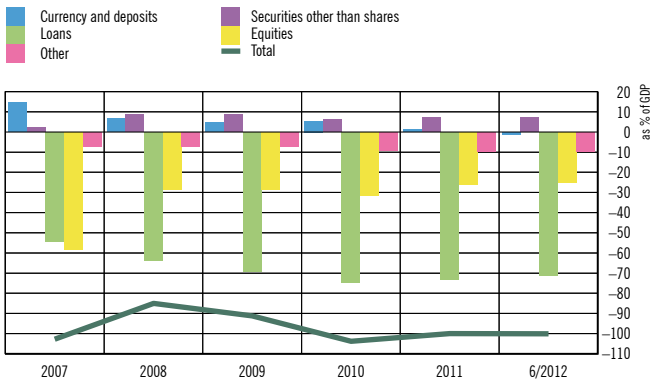
Sources: CBS and CNB calculations.

Figure 21 Total debt by sector



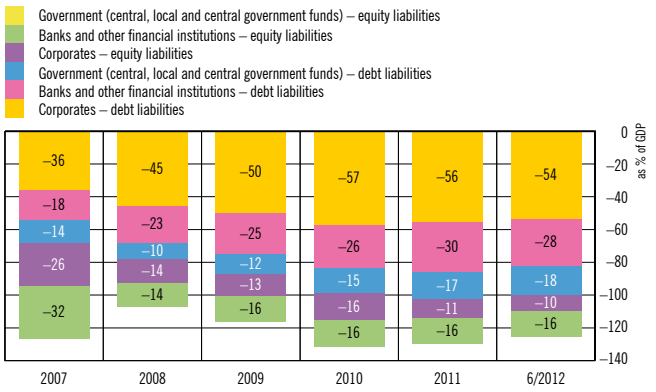
Source: CNB – financial accounts.

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



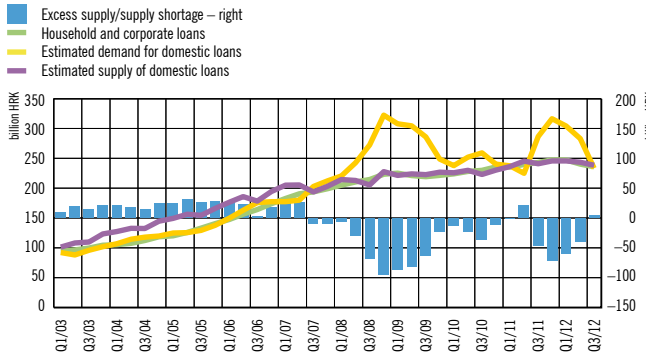
Source: CNB – financial accounts.

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



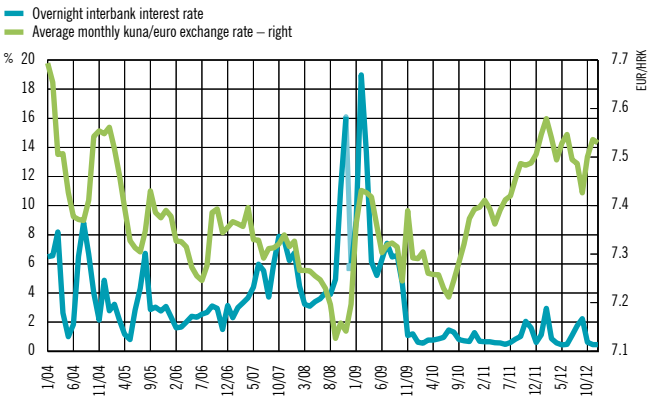
Source: CNB – financial accounts.

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



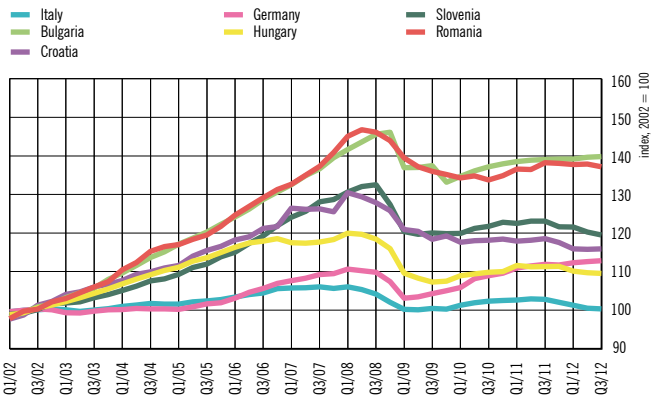
[a] Based on the results of the model used to estimate the impact of demand and supply on the Croatian credit market from Box 2 Credit market disequilibrium, *Financial Stability*, No. 5, July 2010.
Source: CNB calculations.

Figure 25 Kuna/euro exchange rate and overnight interest rates



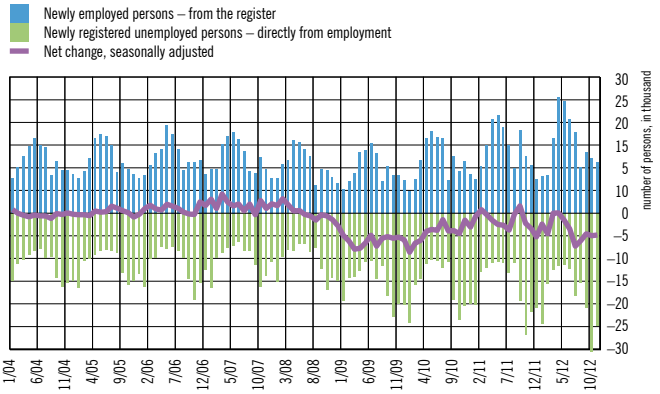
Source: CNB.

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.

Since due to weak domestic demand expected growth will primarily rely on exports, the current account balance will additionally improve (to 0.1% of GDP). Assuming the further gradual stabilisation of the eurozone's financial markets, this should provide for undisturbed external refinancing of the relatively less sizeable matured debt at a price that is, despite the rating downgrade, lower than in 2012 (Figures 7, 15 and 17).

External liquidity will slightly improve and external debt will stabilise, which will ensure the stability of the foreign exchange rate. The government is expected to satisfy some of its financing needs in the foreign market and domestic banks are expected to slow down the repayment of their foreign liabilities to their parent banks amid more favourable conditions created by the measures at EU level mentioned earlier (Figure 13).

This will provide for the kuna exchange rate stability and thus ensure price and banking system stability.

The strongest pressure on banking system stability will therefore be generated by continued growth of non-performing loans under the influence of lacklustre economic recovery and mounting unemployment and thus related weaker bank profitability. However, the high capital adequacy of most banks ensures their resilience to increased risks and thus the stability of the banking system.

Structural reforms are key to growth acceleration in the medium term. The credit rating downgrade has given economic policy-makers a strong impetus to return to the policy of budget consolidation and press ahead with structural reforms. This would spur the inflow of direct investments, which is especially important for export-oriented sectors, and create the preconditions for Croatia's accession to the EU in the middle of 2013 to impart the strongest possible momentum to economic growth in the medium term.

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					
		2011	6/2012	2011	6/2012	2011	6/2012	2011	6/2012	2011	6/2012	2011	6/2012	2011	6/2012
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	2	2	3	4
	Loans	0	0	46	44	0	0	0	0	46	44	44	44	89	88
	Shares and equity	25	28	3	3	30	30	17	16	75	77	23	22	110	100
	Insurance technical provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other claims and liabilities	32	33	1	1	6	6	2	2	42	43	12	12	48	55
	Total	68	61	49	51	32	36	19	18	168	167	83	80	251	247
Financial sector	Monetary gold and SDRs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Currency and deposits	14	12	20	21	2	2	56	57	92	93	17	17	103	109
	Securities other than shares	0	0	0	0	0	0	0	0	0	1	2	2	3	2
	Loans	0	0	6	7	0	0	0	0	7	8	23	22	30	30
	Shares and equity	1	1	2	3	10	10	3	3	17	18	18	18	35	36
	Insurance technical provisions	1	1	1	1	0	0	18	20	20	21	0	0	18	22
	Other claims and liabilities	1	1	0	0	1	1	2	1	4	3	1	1	4	4
	Total	18	16	29	32	13	13	75	82	134	144	59	59	193	203
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	22	24	0	0	0	0	22	24	11	14	30	37
	Loans	0	0	11	10	0	0	0	0	11	10	5	5	11	15
	Shares and equity	2	2	0	0	26	26	0	0	28	28	0	0	30	28
	Insurance technical provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other claims and liabilities	6	5	0	0	0	0	0	0	6	5	0	0	4	6
	Total	4	7	27	34	30	26	0	0	61	68	14	19	75	87
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	40	41
	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	41	42
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	14	11	0	0	3	3	17	14	0	0	19	14
	Securities other than shares	0	0	22	25	0	0	0	0	22	25	0	0	20	25
	Loans	0	0	1	1	0	0	0	0	1	1	0	0	1	1
	Shares and equity	11	12	4	4	0	0	0	0	15	16	0	0	14	16
	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	15	42	42	0	0	3	3	58	60	0	0	58	60
Total	Monetary gold and SDRs	0	0	1	1	0	0	0	0	1	1	0	0	1	1
	Currency and deposits	14	12	35	32	3	2	56	61	108	107	14	17	122	124
	Securities other than shares	0	0	42	51	0	0	0	0	42	51	14	18	56	69
	Loans	0	0	98	103	0	0	0	0	98	104	74	71	172	175
	Shares and equity	51	43	9	10	65	67	21	20	146	139	43	41	189	180
	Insurance technical provisions	1	1	1	1	0	0	16	20	18	22	0	0	18	22
	Other claims and liabilities	37	42	3	3	6	7	4	4	49	56	11	13	60	69
	Total	103	99	188	201	74	76	97	104	462	480	157	159	619	639

Source: CNB.

Box 1 Determinants of net interest margins in Central and Eastern Europe[1]

The cost of financial intermediation is an important determinant of total financing costs of the private sector. Researches show a strong relationship between the costs of financial intermediation and economic growth, indicating that the cost of financing has a significant impact on investments and capital allocation and thus on growth potential and the pattern of economic activity.[2] In addition, the cost of financial intermediation affects banking sector profitability and indirectly its stability and the ability to support the economy. In bank-centric systems dominant in the European emerging markets, where bank loans are the main source of financing for the private sector, the factors that affect loan availability also influence the stability of the whole banking sector.

In the period after the onset of the financial crisis there has been much discussion of the possibilities and the role of banks in spurring the recovery of fallen economies, especially in countries where lending has long been stagnant or very weak. In view of this, stress has been placed on the possibility of spurring loan demand by reducing bank lending rates.

Despite the importance of borrowing conditions for economic recovery and for financial stability, this area has not been researched extensively for the CEE countries, especially not in connection with the period after the onset of the global financial crisis. Therefore, the main goal of this research is to review the main determinants of the costs of financial intermediation in these countries, for they determine the total cost of financing for the private sector, and based on this establish the possibility of influencing interest rates.

The net interest margin of banks is one of the most widely used indicators of the cost and efficiency of financial intermediation in reference literature.

Net interest margin = (interest earned – interest paid) / bank's earning assets.

From banks' perspective, net interest margin is one of the most significant determinants of their profitability, determined by variables that can be influenced by a bank's management board as well as by variables outside its control spectrum. At the same time, together with macroeconomic indicators, client risk, market competition and the degree of general risk aversion, it is an important determinant of the overall level of financing costs for the private sector, thus directly affecting loan availability.

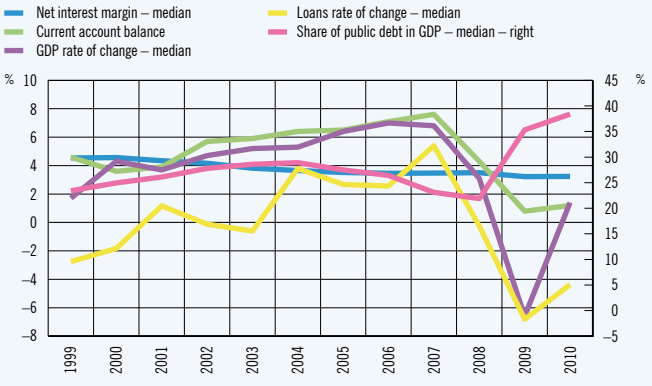
As a rule, a high net interest margin indicates less developed financial markets and lower banking sector efficiency, which has an unfavourable effect on investments and slows the economy down. In contrast, lower interest margins are usually characteristic for deeper and more developed financial markets that encourage investment activities and support economic growth. In this connection it should be emphasised that the benefits of lower costs of financial intermediation can be effectuated only if banks manage risks responsibly, i.e. if lower margins are not a consequence of inadequate risk assessment.[3]

The empirical part of the research has been carried out on a sample covering 152 banks from eleven CEE countries (Bulgaria, the Czech Republic, Estonia, Croatia, Latvia, Lithuania, Hungary, Poland, Romania, Slovakia and Slovenia) in the period between 1999 and 2010. The dependent variable in the model is net interest margin, while explanatory variables are divided into three groups:

- macroeconomic indicators: the real rate of change in GDP, inflation, share of current account deficit in GDP, public debt to GDP ratio and regulatory costs measured as the ratio of bank reserves to the monetary aggregate M3,
- bank specific indicators: cost to income ratio, capital adequacy ratio, ratio of granted loans to customer deposits, the share of non-interest income in total income and costs of reserves for impaired loans, and
- banking market-specific indicators: concentration measured as the share of the three largest banks in total banking sector assets.

The analysis of the indicators for the median bank shows that net interest margin went down during the entire period under review, thus lowering the costs of financial intermediation, this decline slowing down after the onset of the crisis (Figure 1). Before 2008, the countries from the sample (measured by the median) boasted relatively high growth rates,

Figure 1 Net interest margin and macroeconomic indicators



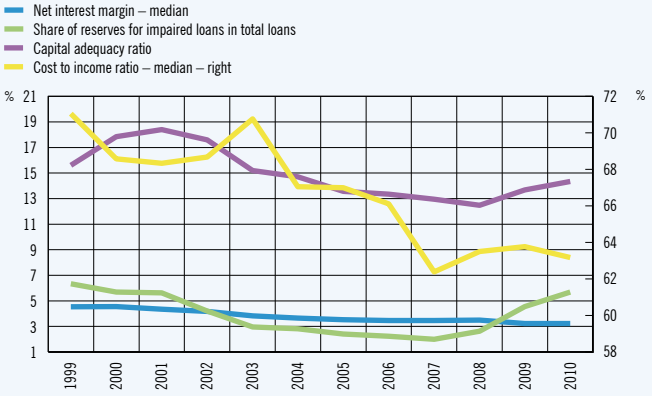
Sources: Bankscope and Eurostat.

1 The Box gives a concise overview of the main findings of Mirna Dumičić and Tomislav Ridzak's research paper, *Determinants of Banks' Net Interest Margins in the CEE*, Financial Theory and Practice, Vol. 37, No. 1, 2013.

2 Claeys, S., and R. Vander Vennet: *Determinants of Bank Interest Margins in Central and Eastern Europe: A Comparison with the West, Economic Systems*, 32(2), 197 – 216, 2008; Kasman, A., G. Tunc, G. Vardar, and B. Okan: *Consolidation and commercial bank net interest margins: Evidence from the old European Union members and candidate countries*, Economic Modelling 27, 648 – 655, 2010; Maudos, J., and J. F. de Guevara: *Factors Explaining the Interest Margin in the Banking Sectors of the European Union*, Journal of Banking and Finance, 28, 2259 – 2281, 2004.

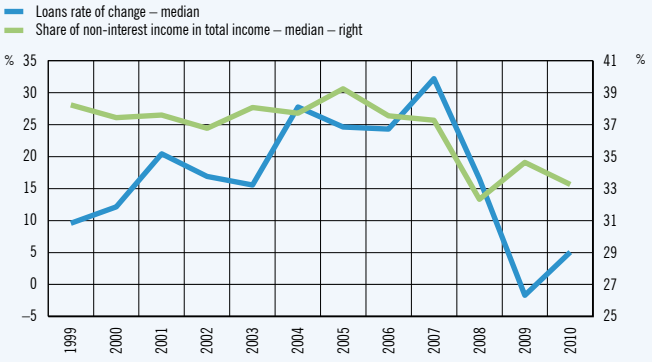
3 Schwaiger, M. S., and D. Liebig: *Determinants of the Interest Rate Margins in Central and Eastern Europe*, Oesterreichische Nationalbank, Financial Stability Report, No. 14, 2009.

Figure 2 Net interest margin and selected bank indicators



Source: Bankscope.

Figure 3 Lending and non-interest income



Source: Bankscope.

strong capital inflows and high rates of credit growth. After 2008 and the exacerbation of the global financial crisis, economic activity slowed down significantly as did capital inflows and lending. Period public debt grew during the entire period, its growth picking up speed after the onset of the crisis (Figure 1).

As regards bank-specific variables, up to the onset of the crisis, one may see a sizeable fall in the cost to income ratio, which is connected with the increase in bank operating efficiency but also to the strong growth of income against the backdrop of strong lending. This was aided by the consolidation process in the banking sectors of the countries under review, taking place predominantly in the first half of the mentioned period, as well as increased competition and the struggle for market shares that were quite intensive prior to the crisis.[4] When the crisis broke out this trend reversed. The share of reserves for impaired loans was mostly on the decline until the onset of the crisis and so was the capital adequacy ratio. When the crisis started the reserves for impaired loans went up significantly due to the marked decline in the quality of bank placements, while the capital adequacy ratio increased as a result of efforts invested by regulators to increase the resilience of the system (Figures 2 and 3). The share of non-interest income to total income shrank after 2008, as a result also of lending activity, which attracts numerous charges, having declined.

The model was assessed by using the Arellano and Bover systemic generalised method of moments (GMM) estimator, which uses historical values of the dependent variable and orthogonal deviations of other endogenous variables, while the equation is as follows:

$$y_{i,t} = \alpha y_{i,t-1} + \boldsymbol{x}'_{i,t} \cdot \beta_{BS} + \boldsymbol{w}'_{i,t} \cdot \beta_{BM} + \boldsymbol{z}'_{i,t} \cdot \beta_{M} + \varepsilon_{i,t}$$

$$\varepsilon_{i,t} = \mu_i + t_t + \nu_{i,t}$$

The three variable vectors are bank-specific ($\boldsymbol{x}_{i,t}$), banking market-specific ($\boldsymbol{w}_{i,t}$) and macroeconomic indicators ($\boldsymbol{z}_{i,t}$), while $y_{i,t}$ represents net interest margin. Subscripts i and t are for i-th bank and t-th time period. The error term contains the bank-specific (μ_i) and the time-specific component (t_t).

The majority of macroeconomic indicators included in the model proved to be statistically significant, meaning that the environment in which a bank operates affects net interest margin. The link between the rate of change in GDP and net interest margin is positive, implying that during the period of intensive credit growth banks were able to charge higher margins due to increased loan demand[5]. However, it is noteworthy that this is not a statistically significant indicator in all specifications. Strong capital inflows measured by the current account balance are linked to the decline in net interest margin. In contrast, public debt and net interest margin are positively correlated, probably as a consequence of increased macroeconomic risks and public debt sustainability issues. Inflation is positively correlated with net interest margin, while the link between net interest margin and short-term money market interest rates is negative. By replacing the macroeconomic indicators with the yield spread on government bonds acting as a synthetic macroeconomic indicator it has been confirmed that the increased risk of a country is linked to higher net interest margin.

Among the bank specific indicators most of the coefficients had the expected signs. The analysis of cost to income ratio confirmed the results obtained by most research that better bank efficiency results in lower margins. Reserves for impaired losses are negatively linked to net interest margin, most probably because banks are not allowed to accrue interest on non-performing loans. This also indicates that strong competition eliminates the possibility of making up for these losses commercially. The results show a structural change in the relationship between capitalisation and interest margin, which is negative and much higher in the crisis period. The coefficient relating to the share of non-interest income in total income is negative, indicating that banks that have larger shares of non-interest income in total gross income charge lower margins on loans.

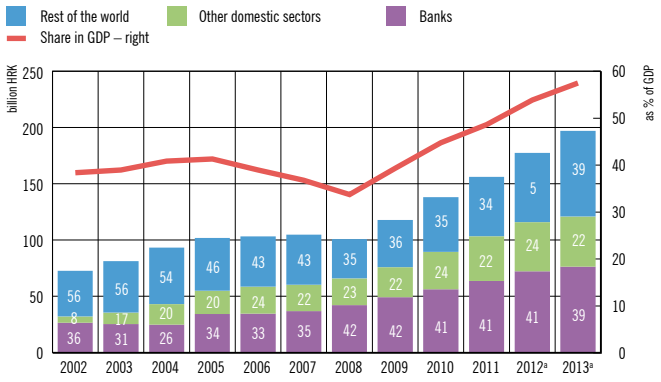
4 Aydin, B.: Banking *Structure and Credit Growth in Central and Eastern European Countries*, IMF Working Paper WP/08/215, September 2008.

5 S. Claeys and R. Vander Vennet came to a similar conclusion in "Determinants of Bank Interest Margins in Central and Eastern Europe: A Comparison with the West", *Economic Systems*, 32(2), 197 – 216, 2008.

Based on these results, it may be concluded that up until the crisis, net interest margins declined primarily under the influence of strong capital inflow, stable macroeconomic environment and increasing cost efficiency in the banks, as well as the improving quality of their placements. In the same period, strong loan demand and public debt growth had the opposite effects. During the crisis period, strong public debt growth, increasing macroeconomic risks and sizeable decline in capital inflow pushed the net interest margin up. However, such factors as weak loan demand, increased capital adequacy ratio and growing bad loans, which resulted in a lower net interest margin, increasingly prevailed. In conclusion, research results indicate that, in addition to banks, the costs of financial intermediation and thus the spurring of economic activity are under a significant influence of economic policy makers who pursue a macroeconomic policy directed at preventing and mitigating risks and preserving a stable macroeconomic environment.

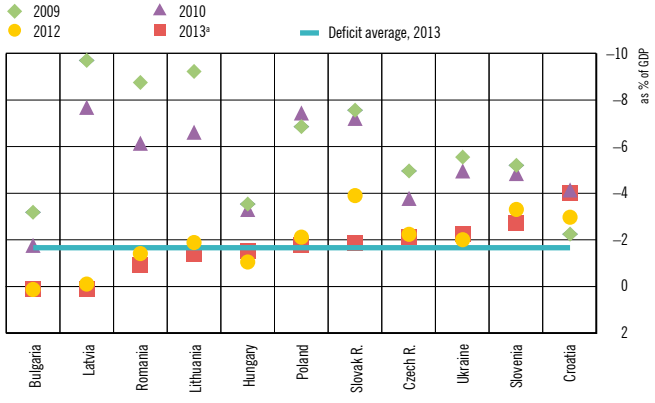
Government sector

Figure 28 General government debt



a CNB projections.
Sources: MoF and CNB.

Figure 29 General government deficit



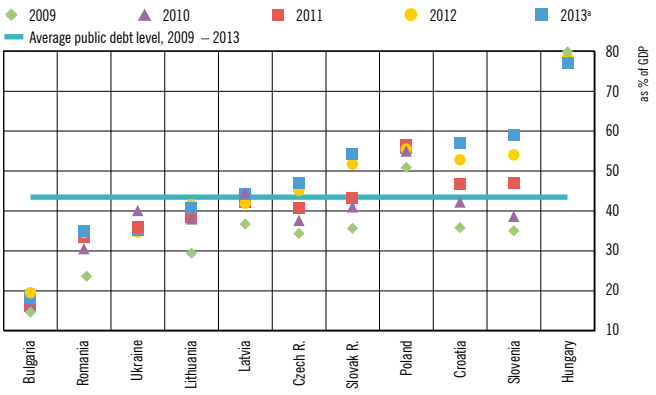
a EC and CNB projections.
Source: IMF, *Regional Economic Outlook 2011*.

After structural and fiscal reforms in the government sector in 2012 had proved insufficient for the achievement of e long-term sustainability in public finances, the rating agency Standard & Poor's reduced Croatia's credit rating from BBB- to BB+ with a stable outlook. In early February, the rating agency Moody's also downgraded Croatia's credit rating from Baa3 to Ba1, also with a stable outlook. To enhance financial stability it is therefore vital to propose a prompt budget revision in early 2013 that will incorporate a package of structural reforms to lend credibility to its implementation.

Fiscal consolidation in 2012 was based on an increase in tax revenues, which, after the 2012 budget revision and the 2013 budget plan, was rated negatively by the rating agency Standard & Poor's, and resulted in a reduction of this agency's credit rating for Croatia from BBB- to BB+. In early February, the rating agency Moody's also reduced Croatia's credit rating from Baa3 to Ba1. As the 2012 budget revision revealed the absence of any necessary structural reforms, the original expenditure plans for 2012 were increased for higher salaries, subsidies and social benefits. Under the mid-term fiscal framework, the preferred approach to budget consolidation lies in increasing revenues instead of reducing current expenditures, which bespeaks a lack of ambitious fiscal objectives and shows that a budget review in early 2013 would be desirable if credibility were to be reinstated.

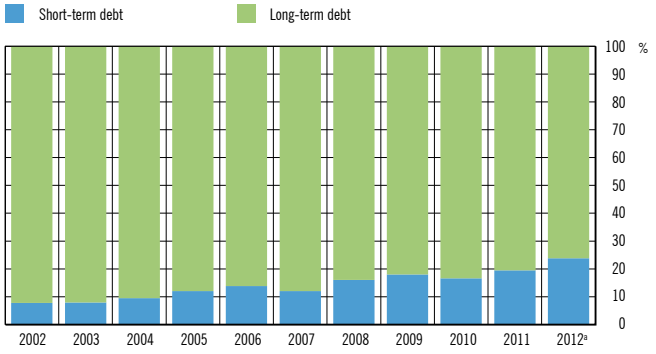
The presented 2013 budget puts an end to fiscal consolidation, with a view to boosting investments so that government expenditures can help revive the economy in 2013. General

Figure 30 Public debt



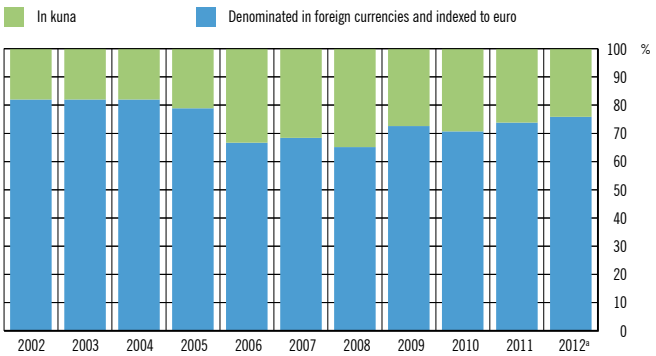
[a] EC and CNB projections.
Source: IMF, *Regional Economic Outlook 2011*.

Figure 31 Breakdown of public debt by remaining maturity



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

Figure 32 Currency breakdown of public debt



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

Table 5 Thresholds of the fiscal sustainability risk indicator in 2013[a]

Indicator	Direction to be safe	Threshold	Observation for Croatia
r – g[b]	<	1.1%	4.7%
General government public debt (as % of GDP)	<	42.8%	57.1%
Cyclically adjusted primary balance (as % of potential GDP)	>	–0.5%	–2.2%
Gross financing needs (as % of GDP)	<	20.6%	10.3%
Share of short-term debt as a ratio of total debt	<	44.0%	21.0%
Debt denominated in foreign currencies	<	40.3%	76.4%
Weighted average maturity of public debt (years)[c]	>	2.3	5.3
Short-term external public debt (as % of international reserves)[c]	<	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).
[c] 2012
Sources: IMF WP/11/100 and CNB.

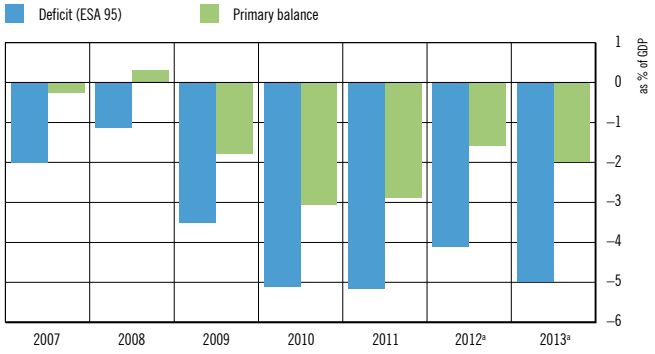
government budget deficit for 2013 is approximately 1% of GDP wider than that under the 2012 budget, as a result of increased interest expenses and investment expenditure. The increase in interest expenses of 0.5% of GDP was expected given an increase in public debt and the assumption of the shipyards' loans. The other category of expenditures visibly growing in 2013 is that of investments whose growth is planned at the level of approximately 0.6% of GDP. Other expenditure increase is due to the process of accession to the EU and the expected additional expenditure of approximately 1% of GDP annually, or 0.5% in 2013, since Croatia's accession is planned for the second half of the year.

The Fiscal Responsibility Act was for the first time applied to budget execution in 2012, and the success of its implementation depends on the implementation of the budget accounting standard under ESA 95. As stated in the previous issue of Financial Stability, the main risks to the implementation of the Fiscal Responsibility Act arise from a sharp slowdown in economic growth and a slow implementation of structural changes necessary for the reduction in budget expenditures. In addition to risks which materialised, the government took over guarantees to shipyards and included them in public debt, thus automatically increasing interest expenses. The assumption of the shipyards' debt and its inclusion in public debt in the previous years (from 2009 to 2011) is bound to be reflected in increased expenditures as well as deficit-widening. It is estimated that the effect of the assumption of the shipyards' debt and its inclusion in the public debt will increase expenditure in 2011 by some six billion kuna. Given the 2011 increase in expenditure, which is in line with the international budget accounting standard ESA 95, the fiscal rule in 2012 is expected to be met.

Figure 33 Yield on primary issue of euro securities

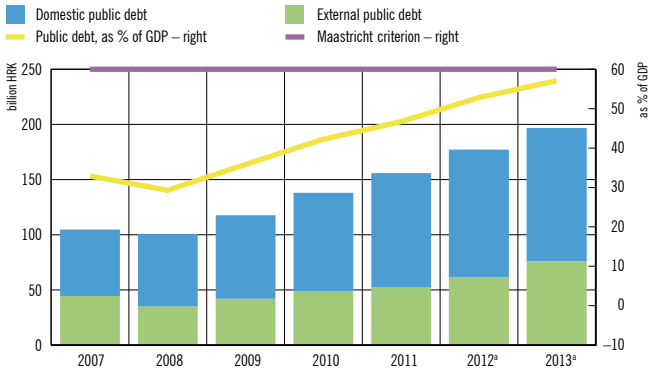
Source: MoF.

Figure 34 Projection of general government deficit



a CNB projections.
Sources: MoF and CNB.

Figure 35 Projection of general government debt



a CNB projections.
Sources: MoF and CNB.

Using independent macroeconomic forecasts, the fiscal committee may increase the certainty of fiscal consolidation implementation. The task of the fiscal committee is to monitor and ensure proper application of fiscal rules. Fiscal rules may enhance the credibility of budget consolidation plans and foster fiscal discipline. As shown by empirical studies for EU Member States, national fiscal rules strengthen the implementation of fiscal policy. The establishment of non-political fiscal committees responsible for drafting macroeconomic projections for budget preparation may ensure that budget plans and projections are not based on overly optimistic macroeconomic projections that make real implementation of fiscal consolidation impossible.1 Fiscal rules may be linked to different fiscal indicators, the most effective of which are linked to the share of expenditure in GDP.

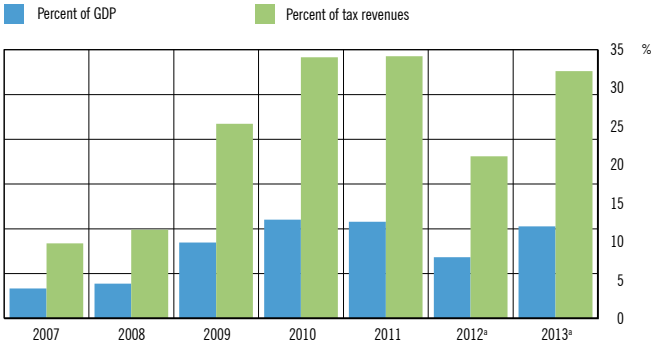
If this indicator is set correctly, the share of expenditure in GDP should fall faster during the good times, grow during the bad times, and hold steady throughout the cycle. The currently pro-cyclical fiscal rule in Croatia should be replaced by a counter-cyclical rule; at the same time, fiscal consolidation should be continued until a balanced budget can be achieved.

Deterioration in fiscal sustainability indicators calls for prompt structural changes to reverse the trend. Most of the indicators of fiscal sustainability (Table 5) continue to deteriorate. Public debt growth, the share of debt expressed in foreign currency, the share of short-term debt in public debt and the difference between real implicit interest rate and the real GDP growth (r - g) further warn of the need for concrete and fast structural changes. A larger than expected fall in economic activities in 2012 worsened the situation in most indicators, proving that structural reforms are not necessary only to generate savings on the budget side but also to boost economic growth. Fiscal liquidity indicators warn of a growing risk of fiscal stress unless fast structural reforms are made. The share of short-term debt in total public debt, though still below the threshold, has been growing steadily, increasing from 17.8% of the total public debt at the end of 2011 to 23.85% at the end of 2012.

The fall in yields on Croatian bonds in 2012 was the result of a fall in risk perception driven by positive changes in the eurozone. In September there was a significant fall in yields on Croatian bonds and T-bills of all maturities. Such favourable developments were mainly due to the decision on the introduction of the ECB's outright monetary transactions. Therefore, to maintain such a favourable yield in 2013, budget execution in 2013 and compliance with the fiscal rule will be of key importance, assuming no major financial turmoil will take place on the global level that might globally increase risk perception and reduce the price. The reduction in Croatia's credit rating by the agency Standard & Poor's led to a small fall in bond prices;

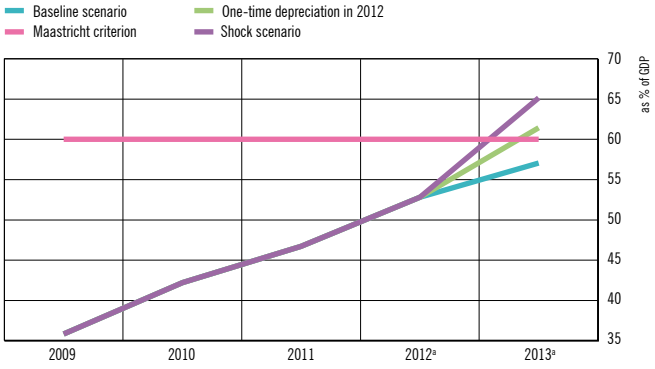
1 Debrun, X., and M. S. Kumar: *The Discipline-Enhancing Role of Fiscal Institutions: Theory and Empirical Evidence*, IMF Working Paper No. 07/171 (Washington: International Monetary Fund).

Figure 36 Gross financing needs



a CNB projections.
Sources: MoF and CNB.

Figure 37 Projection of public debt under various scenarios



a CNB projections.
Source: CNB.

however, it is possible that the implementation of structural reforms aimed at boosting economic growth will also propel their recovery.

The average remaining maturity of the public debt keeps getting shorter, as the government tends to borrow on a shorter-term basis. The weighted average remaining maturity of the entire public debt fell to 5.31 years, half a year less than at the end of 2011. The maturity of the remaining foreign public debt fell to 6.71 years and that of the remaining domestic public debt to 4.56 years.

The biggest challenge for the authorities responsible for fiscal policy in 2013 will be the general government deficit and due financial liabilities financing. The borrowing needs in 2013 will stand at about 10.3% of GDP, a significant increase over the 6.8% of GDP needed in 2012. As shown in Figure 9, this is still much below the threshold value of one of the indicators for fiscal sustainability assessment which stands at 20.6% of GDP. The easing of the financial crisis in the European Union certainly creates room for successful financing, although due to Croatia's credit rating downgrade, additional efforts will be needed to strengthen government sector solvency.

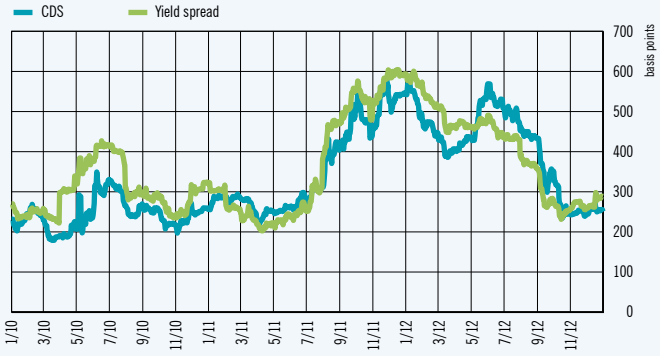
The scenarios used in stress testing raise the public debt above the legally prescribed limit of 60% of GDP in 2013. The rate of public debt growth in the past four years has brought public debt under the baseline scenario close to 60% of GDP. Under various different scenarios, the public debt reaches over 60% of GDP. Under the first stress scenario, a depreciation of the exchange rate of the kuna of 10% against all currencies would raise public debt above the level of 60%, i.e. to 61.4% of GDP. The other, combined stress scenario also includes a fall in GDP of -3.6%, which additionally increases public debt to 65.2% of GDP. Such developments are particularly important if we take into account the fact that Article 74 of the Budget Act clearly limits government debt at 60% of GDP.

Box 2 Assessment of the impacts of the RC credit rating downgrade on borrowing costs and access to foreign capital markets

In mid-December 2012, the credit rating agency Standard & Poor's cut Croatia's credit rating for long-term and short-term borrowing from investment grade (BBB-/A-3) to speculative BB+/B.[1] The agency stated as the main reasons for such a downgrade the structural and fiscal reforms of the Government in 2012, claiming that they were not sufficient to boost economic growth and ensure the sustainability of public finances over a long term. Generally speaking, a country 's credit risk assessment or credit rating is an assessment of the ability and readiness of a country as an issuer of debt security fully to meet its financial obligations when due. As changes in a country's credit rating may affect the cost of borrowing, concerns were raised that Croatia would have to deal with an increase in interest rates and that the planned bond issues abroad in 2013 would be difficult to achieve[2]; this would have negative implications for domestic macroeconomic developments. If the Government were to turn increasingly to the domestic financial market, it would squeeze the private sector out from the loan market, which in turn would make recovery of the domestic economy more difficult. The purpose of this analysis is therefore to assess the impacts of Croatia's credit rating downgrade over the short term.

Analyses previously presented in CNB publications show the cost of borrowing in the Republic of Croatia as a combination of the impact of macroeconomic fundamentals and developments in global risk aversion (see *Financial Stability*, No. 3, Box 1, *CNB Bulletin* No. 171, Box 5).[3] The weakening of macroeconomic fundamentals (public debt growth, budget deficit and absence of economic growth) has in the past several years affected the growth in the risk premium. However, external developments are also included in the price of borrowing, paritcularly in the short run.

Figure 1 Yield spreads of RC government bonds over benchmark German bonds and CDS spreads for the RC, 2010 – 2013



Source: Bloomberg.

As regards the cost of borrowing on the international financial markets, the developments in yield spreads of Croatian sovereign bonds over the benchmark German sovereign bond and credit default swaps for Croatia from November 2010 to mid-January 2013 shown in Figure 1 do not point to any worsening in the financing conditions in the international market following the country's credit rating downgrade.

To assess more precisely the effect of the credit rating downgrade from investment to speculative grade on the cost of borrowing, an econometric analysis was made. For this purpose, a simple event study based on daily data was used, where, on a panel of fourteen European countries[4] all changes from investment grade to speculative level in the 2007 to 2012 period were identified. After that, using a linear model, the effect of a rating downgrade on yield spreads of government bonds was estimated. The model takes account of the possible anticipation period and the time needed to absorb the announcement of a credit rating downgrade[5] by identifying the response of yield spreads not only on the day of the credit rating downgrade but also one day before and one day after the announcement. The model also addresses the potential procyclicality in agency announcements, so that the specification also includes an indicator of real activity for individual countries. As the model is estimated on a daily basis, the only data available for that purpose are those in the stock exchange indices of individual countries.[6] The model also included the the VIX index (Chicago Board Options Exchange Market Volatility Index) as an indicator of global risk aversion.

The model used was estimated using a linear panel-regression with the dependent variable being the yield spread of government bonds of fourteen European countries over German government bonds. Yield spreads are explained by changes in global risk aversion and national stock markets while model variables also include event indicators of credit rating downgrade to speculative level for each of the three agencies. The coefficient associated with these event indicators for each agency can be interpreted as a direct impact of a credit rating downgrade to a speculative category on the price of borrowing of each individual country.

The results of the model used are shown in Table 1 and indicate that debt degradation to a speculative category during the observed period

1 The other two major credit rating agencies, Moody's and Fitch have so far kept their lowest investment grades for Croatia.

2 HRK 14.2bn in foreign bond issues were planned under the state budget for 2013.

3 Dumičić, M., and T. Ridzak (2011): *Determinants of sovereign risk premia for European emerging markets*, Financial Theory and Practice, 35 (3) and Kunovac, D. (2013): *Cost of Borrowing in the EU and in Croatia, the effect of spillover of external shocks*, currently being prepared.

4 The following countries were included in the analysis: Croatia, Bulgaria, Romania, Hungary, Austria, Belgium, the Czech Republic, Spain, France, Ireland, Italy, Lithuania, Poland and Portugal.

5 If information sets used by the agencies as a basis for credit ratings were equal to those used by market participants, rating announcements would have no impact on developments in government bond yields. In other words, efficient markets would have already absorbed this information and a rating change would not bring anything new to the market. However, it has been shown in practice that markets often perceive agencies' announcements as surprises and, accordingly, respond to the news only after the announcement.

6 Assuming that the price of a share reflects the present value of expected payments of all future cash flows relating to the share (i.e. dividends), markets react to changes in the real business cycle.

Table 1 Results of econometric model estimate with panel data

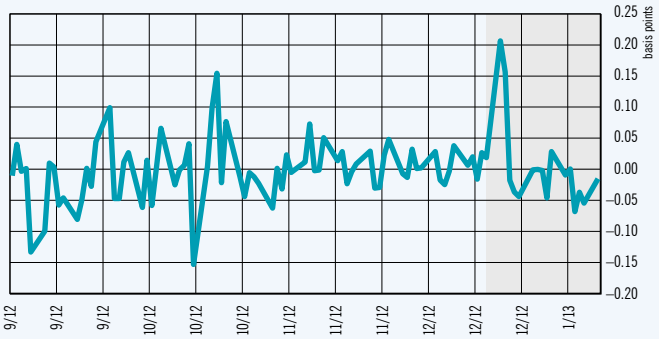
	Moody's	S & P	Fitch	VIX	Stock market	Constant
Level model	51 (***)	30 (***)	63 (***)	12.8 (***)	–121 (***)	0.1 (*)
Percentage change model	4.2 (*)	3.8 (**)	5.2 (**)	7.5 (***)	–66.7 (***)	0.1 (***)

Note: Symbols (***), (**) and (*) represent statistical significance on the level of 99%, 95% and 90%.
Sources: Bloomberg and CNB calculations.

had a significant statistical and economic impact on yield spreads. Thus Moody's announcement of downgrade to non-investment status resulted in a widening of yield spread of 51 basis points within one day, and market response to the announcements by Standard & Poor's and Fitch resulted in similar widenings, of 30 and 63 basis points, respectively[7]. In the interpretation of the obtained results, account should be taken of a currently much lower level of global risk aversion compared to the period when the countries from our panel, with the exception of recent degradation of Croatia, were degraded to a speculative category[8]. Therefore, the present levels of yield spreads of bonds are also much lower, so that the expected response to credit rating downgrade under the present conditions is less intensive than in the case of previous similar downgrades. This is why, in addition to the model estimated in terms of the levels, a model was also estimated in terms of changes in yield spreads. In this way, account was taken of the possible dependence of the intensity of response to debt degradation to speculative category and current level of yield spreads. In this case the results indicate that credit rating downgrade to speculative level increases the level of yield spread by 4.2% in the case of Moody's, 3.8% in the case of Standard & Poor's and 5.2% in the case of Fitch.

The described response to credit rating downgrade may also include the effects of other factors (such as for instance a daily change in the global risk premium, spillover effects and financial contagion). Therefore, for a more precise assessment, one has to examine the direct consequences of a downgrade in the Croatian debt credit rating by Standard & Poor's on the development in yield spreads. To give a more precise answer to this question, the yield spreads of domestic bonds have to be cleared of the strong influence of external financial developments, thus isolating that part of the dynamics in these spreads that can be attributed solely to domestic, idiosyncratic economic developments. Such an approach aims to avoid bias in the assessment of the effect of change in the rating on yield spread that may occur if, along with changes in the rating, yield spreads are also influenced by forces other than those

Figure 2 Daily change of the "domestic" component of yield spread of RC government bonds



Note: The shaded area represents the period after credit rating downgrade.
Sources: Bloomberg and CNB calculations.

directly associated with a change in the rating that are characteristic for developments in yield spreads globally. For this purpose, using a principal component analysis, three common factors were constructed in the group of yield spreads, i.e. variables which by definition summarise the information (variability) of the analysed group of yield spreads. After that, a simple linear model was assessed under which yield spreads of Croatian bonds are explained exclusively by the constructed common factors. Crucial for this analysis is the residual of the interpreted model, i.e. that part of the dynamics in yield spread not influenced by common external developments.

The analysis made indicates that domestic yield spreads in the past several years were influenced by a deterioration in domestic fundamentals, as well as by external developments. To identify the direct impact of the change in rating on yield spread, Figure 2 shows a daily change in these residuals in the past several months. Daily changes in the "domestic component" of yield spreads indicate that the change in rating to a certain extent came as a surprise to the markets which then responded to the degradation. However, the response was not strong and amounted to 21 basis points on the day following the rating downgrade and additional 15 basis points on the following day.

However, it should be noted that it would be wrong to conclude on the basis of this analysis that the impact of macroeconomic and fiscal fundamentals on the price of borrowing was negligible. Although fiscal and other fundamentals do not have a crucial impact on the dynamics of yield spread over a short-term, they certainly influence the price of borrowing over a longer-term, as shown by many papers[9]. Therefore fiscal consolidation implementation and a reform that will lead to improvement in business conditions and enable faster growth are necessary for a reduction in the cost of financing for all domestic sectors.

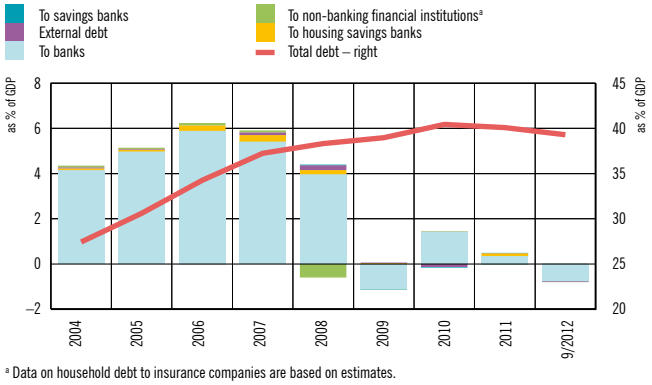
7 Owing to a small number (7) of events analysed, the models used in the past for each agency identify only the events of a fall in credit rating to a speculative level, irrespective of current ratings of the remaining two agencies. It was observed that the strongest response was that to the announcement of the agency that reacted the first, and that all further announcements by other agencies were no longer a big surprise for markets and elicited milder responses. This calls for a cautious approach in the accumulation of the results given in Table 3 by different agencies.

8 For instance, Hungary towards the end of 2011 and in early 2012 and Ireland and Portugal in 2011.

9 See, for instance Poghosyan, T. (2012), Baldacci, E., and M. S. Kumar (2010) and Barobosa, L., and S. Costa (2010).

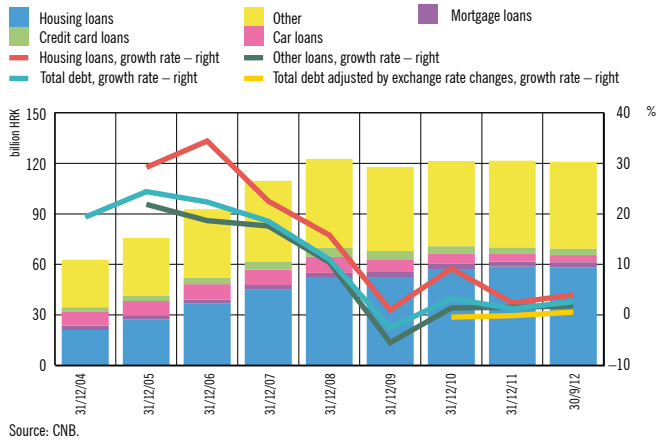
Household sector

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.

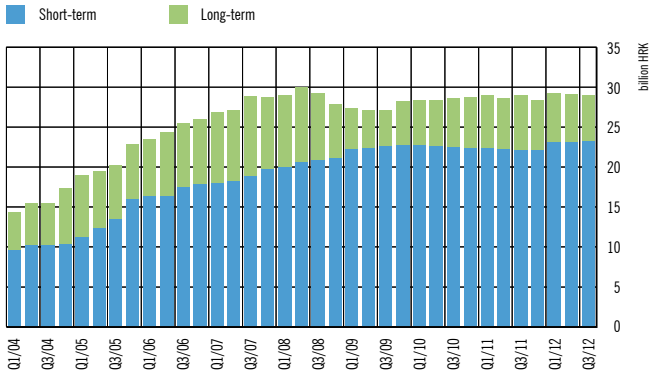
The process of household deleveraging in 2012 was largely due to heightened risks related to labour market developments. The expected further decline in employment and real income, along with the traditionally high degree of exposure to exchange and interest rate risks, will increase household default risk on loans in 2013.

As the household deleveraging process gained momentum in 2012, household debt dipped to below 40% of GDP (Figure 38) at end-September. The debt reduction was primarily evident in the fall in exposure to banks (–0.8% of GDP), while debt to other financial intermediaries, accounting for 4% of total debt, was relatively stable. The year-on-year rate of growth in total household debt was –2.0% at end-September 2012, or –1.5% excluding the effect of changes in the exchange rate of the kuna, which slightly appreciated in the third quarter (Figure 39).

The absence of strong new lending activity (Figure 40) contributed to the trend of household deleveraging in 2012. The total amount of newly-granted loans has all but stagnated for two years, with minor seasonal fluctuations, while the burden of servicing existing loans has been relatively stable. As a result, total household debt has decreased in effective terms since mid-2009, at the average annual rate of –0.84% (Figure 39).

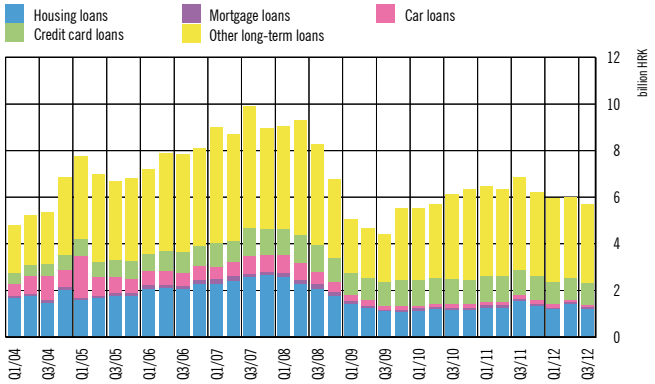
The maturity breakdown of new household loans indicates a decline in long-term loans and stronger reliance of households on short-term credit lines. Such trends can be largely attributed to a slump in consumption, in particular of durables. They were also due to stronger growth in interest rates on longer-term loans than on loans maturing in up to a year and easier access to short-term loans, in particular current account overdrafts. The fall in new long-term loans began in late 2011 and was

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



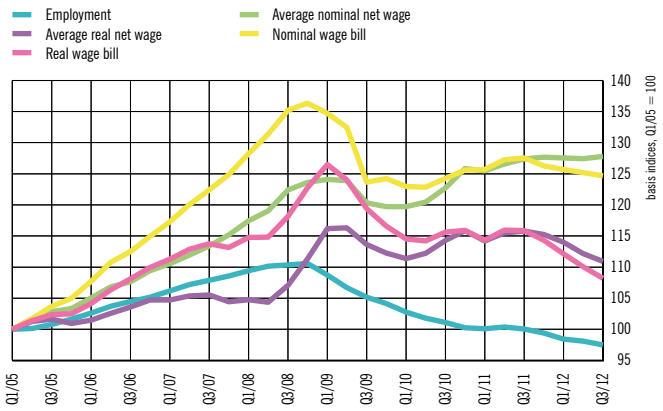
Source: CNB.

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



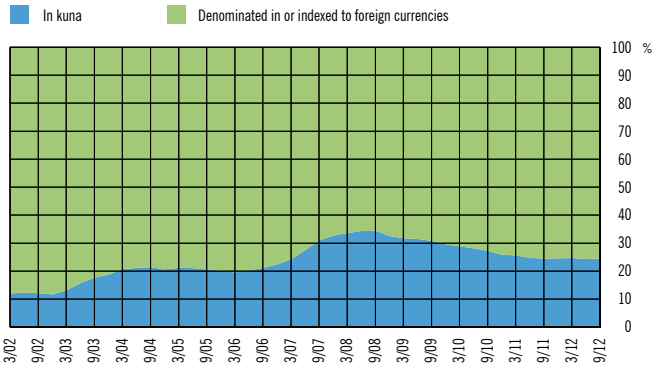
Source: CNB.

Figure 42 Employment and wages (seasonally adjusted)



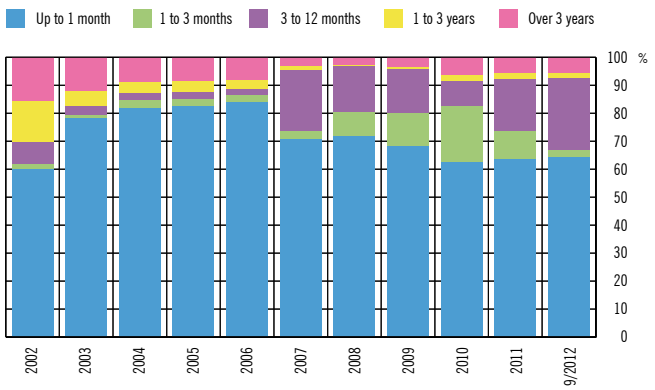
Source: CBS.

Figure 43 Currency breakdown of household loans



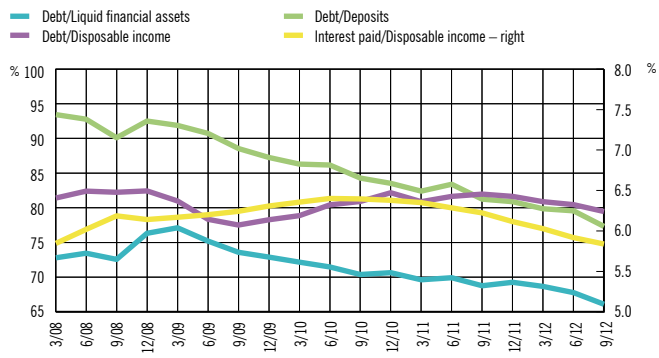
Source: CNB.

Figure 44 Household loans by interest rate variability



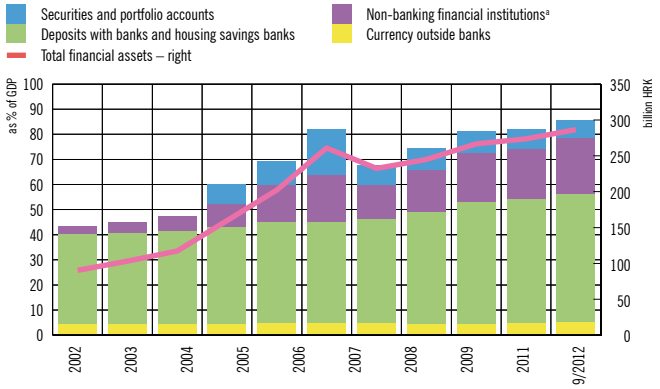
Source: CNB.

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.

evident in all loan types (Figure 41). At end-September 2012, the total amount of housing loans was, for the first time since the outbreak of the crisis, lower in both nominal and effective terms (by 1.4% and 0.5%, respectively on an annual level, Figure 39). The amount of other long-term loans also declined, though at a slightly lower annual rate (0.8%).

The slack demand for new loans indicates the continuous absence of long-term household investment as well as reduced consumption, in particular of durable goods, in the midst of growing risks in the labour market and uncertainties in the real estate market (Figure 48). Prolonged recessionary trends in 2012 were also reflected in increasingly adverse trends in the labour market, primarily a substantial drop in employment and real wages in a setting of higher inflation (Figure 42). Similar tendencies are expected to continue through most of 2013, with sluggish personal consumption keeping demand for loans at a low level. The expected drop in prices and uncertainties regarding the tax burden on residential property also curb demand for loans, in particular for long-term loans (Figure 48).

Apart from the increased exposure to macroeconomic risks, households are still highly exposed to exchange and interest rate risks. Exposure to these financial risks remained the same as in late 2011; at end-September 2012, 75.5% of all loans were indexed to foreign currencies (Figure 43), and as much as 92.4% of loans were those with interest rates variable within a year (Figure 44).

As a result of the more intensive process of deleveraging, all household debt and debt burden indicators improved in the first three quarters of 2012 (Figure 45). Despite the unfavourable macroeconomic environment, household savings continued to increase steadily in 2012, although at a slower pace than in the previous years. The period up to September 2012 saw an increase in household deposits with banks (of around 3% a year, or somewhat below the average interest rate on household time deposits), which account for the lion's share of total liquid financial assets of households[2] (Figure 46), so the ratio of debt to these financial asset categories improved considerably. The parallel slight upturn in nominal income and the decline in debt added to the improvement in the ratio of household debt to disposable income[3] and contributed to the decline in the ratio of interest payments to household disposable income despite the fact that interest rates remained elevated.

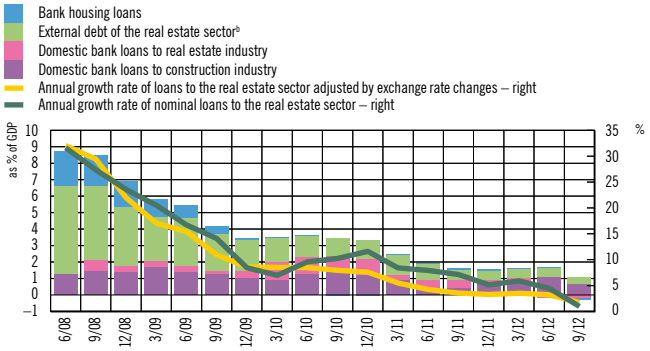
Against the backdrop of the expected further decline in employment and real wages, the household deleveraging process will continue into 2013. The rise in risks associated with sluggish economic activity, above all the risk of unemployment and wage reduction, will continue to exert pressure on households' ability to repay their debts on time. Coupled with persistently high interest rates of banks and the traditionally high exposure to exchange rate risk, this could further increase credit risk of banks associated with household loans.

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

3 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).

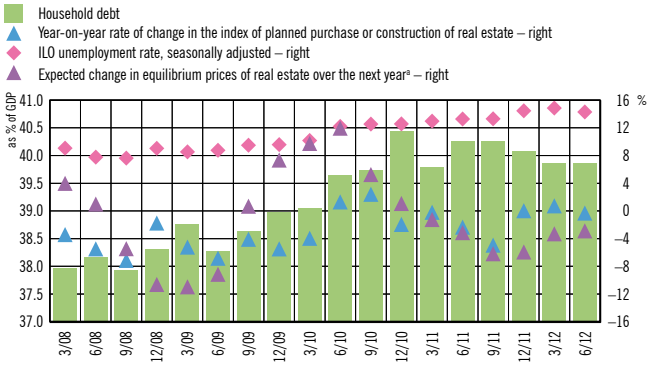
Real estate sector

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 Household debt, unemployment rate, consumer optimism and real estate market expectations



[a] Estimated based on the equilibrium price model and taking into account CNB projections for the main determinants of demand for residential real estate (real interest rates and household disposable income).
Source: CNB.

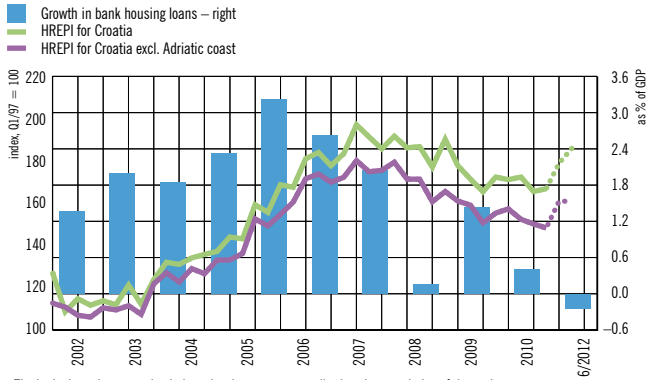
The deepening of the recession in the real estate sector has increased credit risk and led to a further slowdown in borrowing by this sector. The continuation of adverse labour market trends in 2013 will be the main limiting factor to the recovery in the residential property market.

The slowdown in borrowing by the real estate sector became more pronounced in the first half of 2012, so that growth in the sector's debt was at a historical low in late September (Figure 47). The rise in debt was only 1% in nominal terms at the end of the third quarter of 2012, or 1.7% excluding the effect of exchange rate changes. In 2012, financial support of domestic banks to corporates dealing in construction stayed almost the same as in late 2011 (average annual growth in debt was 0.9% of GDP in the first three quarters of 2012). In the same period, domestic lending to corporates dealing in real estate management came to a halt. As a result, deleveraging was recorded in an activity associated with developments in the real estate market for the first time since the onset of the financial crisis. Foreign financing to this sector continued to decelerate slightly in 2012 and its contribution to the rise in total sector debt was nearly twice as low as that of domestic banks in late September 2012.

The several-year effective deleveraging of households in a context of heightened uncertainties in the labour market and low consumer optimism has dampened demand for residential property and put a stop to housing loans (Figures 48 and 49). The expected unfavourable developments in the main factors of demand[4] for residential real estate will reinforce downward

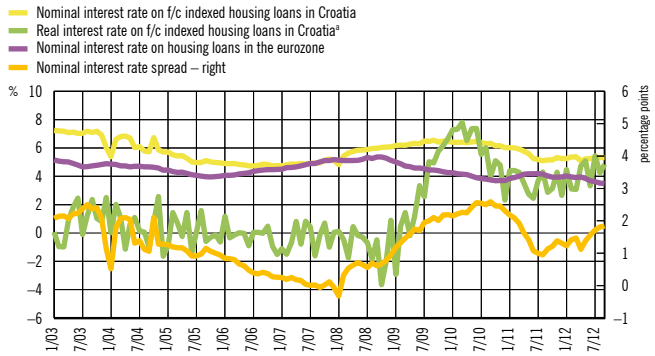
4 A drop in household disposable income and the maintenance of real interest rates of banks at an elevated level.

Figure 49 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.
Note: The period of stronger segmentation in the residential real estate market is presented by dashed lines.
Source: CNB calculations.

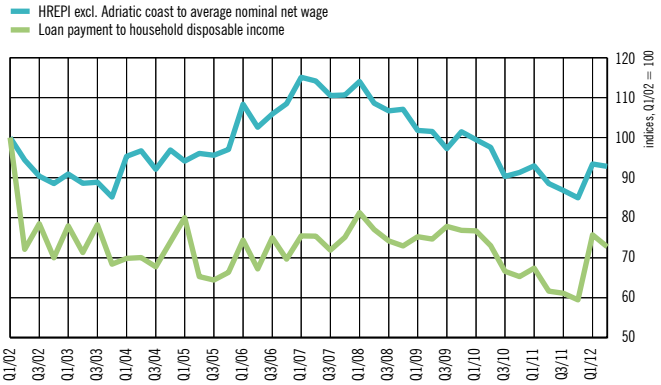
Figure 50 Comparison of interest rates on newly-granted housing loans in Croatia and the eurozone



[a] The real interest rate on f/c indexed housing loans was deflated by the change in the average nominal net wage, excluding the effect of the crisis tax.
Sources: ECB and CNB.

pressures on equilibrium prices in 2013. Though much weaker, existing household demand has turned mostly towards higher quality real estate in the past two years, which stimulated segmentation of the real estate market. Actual sales were thus

Figure 51 Financial availability of residential property



Sources: CBS and CNB calculations.

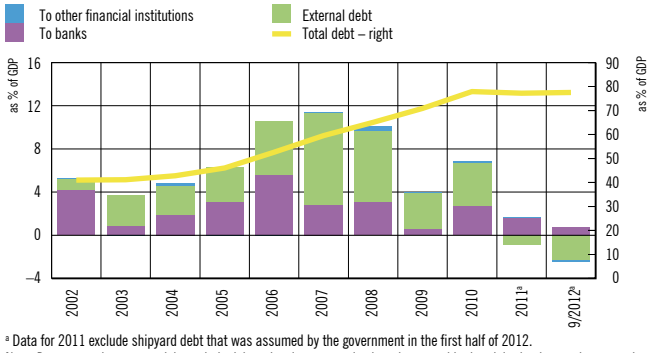
largely connected with higher quality real estate in attractive locations. Therefore, despite a drop in total turnover in the real estate market, average sale prices of residential property grew by 6.2% year-on-year in the first half of 2012, or 4.0% excluding prices of real property on the Adriatic coast (Figure 49). As this accounts for only a minor and relatively liquid share of the market, trends in the overall real estate market in 2012 were slightly negative or stagnant, as measured in terms of the real estate asking price index[5].

The decline in real income and the maintenance of lending rates at a relatively high level (Figure 50) slightly reduced the financial availability of residential property in the first half of 2012. The parallel increase in achieved prices of residential real estate reinforced this effect, although it was overestimated due to the stated segmentation of the market (Figure 51). Given the expected further decline in real disposable income of households and the ongoing drop in employment, adverse developments in the real estate market are likely to continue into 2013. In such conditions, the residential property market could become more segmented, while the introduction of the real estate tax could reinforce downward pressures on prices, in particular of lower quality and older property.

5 Real estate asking price index, CentarNekretnina.

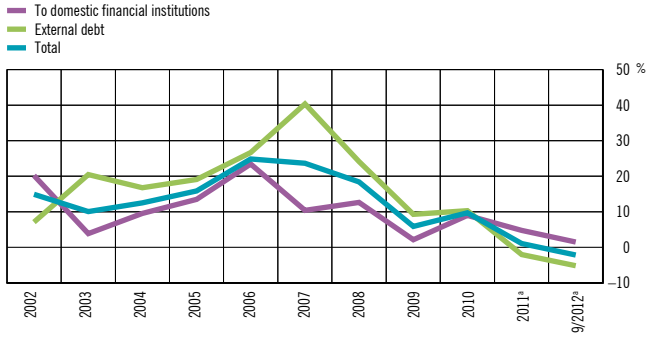
Non-financial corporate sector

Figure 52 Change in and stock of non-financial corporate debt



a Data for 2011 exclude shipyard debt that was assumed by the government in the first half of 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 53 Annual growth rate of non-financial corporate debt



a Data for 2011 exclude shipyard debt that was assumed by the government in the first half of 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.

In 2012, for the first time ever, the debt of the non-financial corporate sector dropped. This was largely due to foreign borrowing, while debt to domestic banks steadily grew at a slow pace on an annual basis. Interest rate and currency risks of the sector remained very high, with the currency risk continuing on a slight downward path.

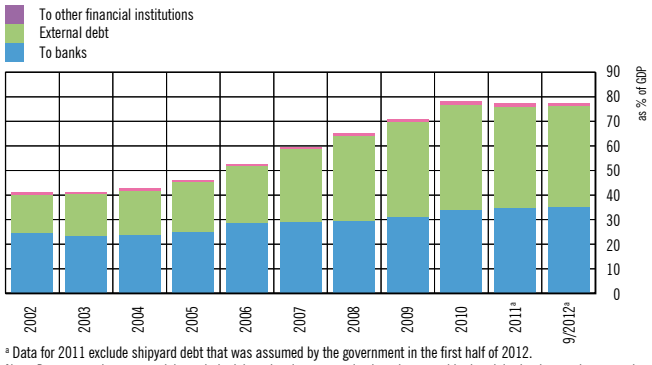
As the downsizing of non-financial corporate sector debt in 2012 ran parallel to a reduction in GDP, the debt-to-GDP ratio of the sector remained the same as in the year before, at around 78%. As a result of the reduction of non-financial corporate debt, which started in the segment of foreign financing, total sector debt declined notwithstanding domestic debt growth. Total debt went down around 2% as a result of a cut in external debt of around 5% and a 1.5% increase in debt to banks (Figures 52, 53 and 54).

The ongoing recession in the domestic market and the economic slowdown in major trading partners (see the Macroeconomic environment section) continue to affect adversely the activity of this sector, which reduces loan demand. At the same time, more stringent lending criteria of banks have a limiting impact on loan supply.

Notwithstanding the year-on-year growth in debt to domestic banks, the current dynamics suggests that non-financial corporate debt to banks has decreased in recent quarters due to a fall in new loans, in particular long-term loans (Figure 55).

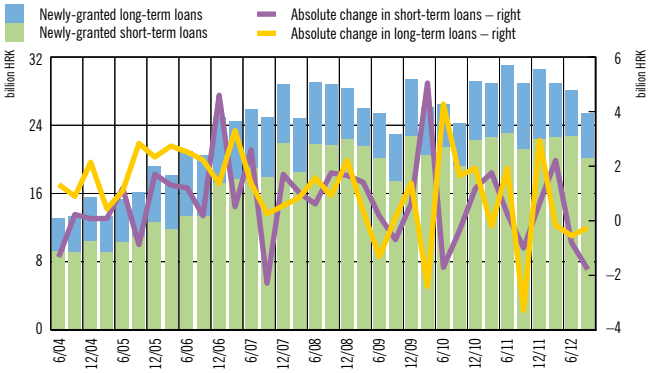
Newly-granted short-term loans recorded a downturn in the third quarter, while long-term loans have been on a downward slope since the first quarter of 2012.

Figure 54 Non-financial corporate debt



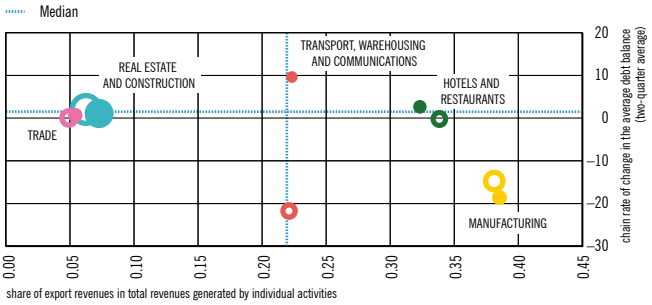
a Data for 2011 exclude shipyard debt that was assumed by the government in the first half of 2012.
Note: Data on total corporate debt exclude debt to leasing companies in order to avoid a break in the data series caused by the change in the methodology for reporting the value of leasing contracts from 1 January 2011 onwards.
Data on external debt exclude round-tripping transaction.
Sources: HANFA and CNB.

Figure 55 Newly-granted bank loans and absolute change in the stock of gross loans



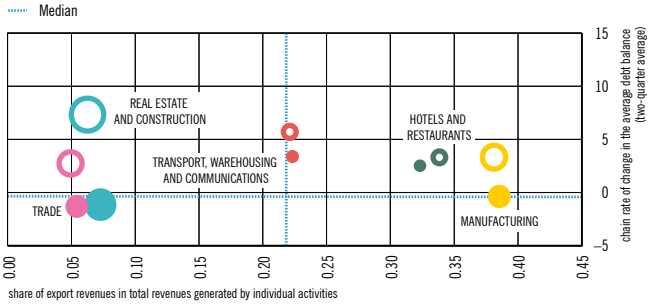
Note: Data on loans to shipyards are excluded as of 30 September 2011.
Source: CNB.

Figure 56 External debt allocation by sectors from March to September 2012



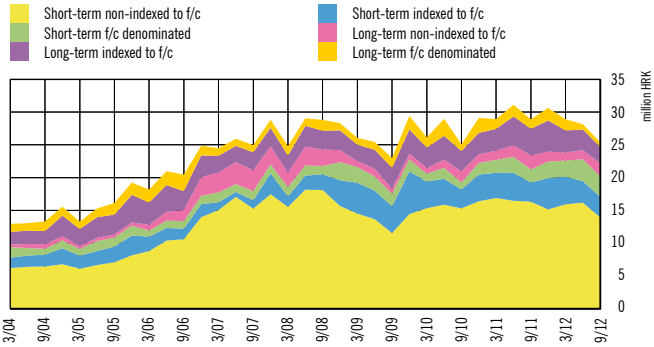
Note: A full circle denotes the debt dynamics in the last two quarters observed (the average debt balance at end-September 2012 and end-June 2012 relative to the average debt balance at end-March 2012 and end-December 2011). An empty circle denotes the same change in the debt balance in the previous period (the average debt balance at end-March 2012 and end-December 2011 relative to the average debt balance at end-June and end-March 2011). 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. Excluded are data on shipyard debt that was assumed by the government.
Sources: FINA (export and total revenues) and CNB (external debt).

Figure 57 Allocation of domestic bank loans by sectors from March to September 2012



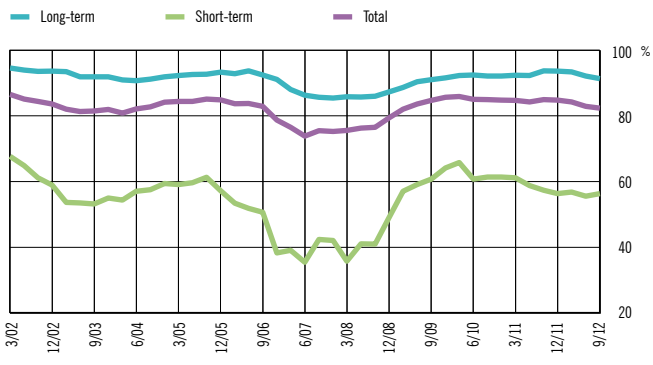
Note: A full circle denotes the debt dynamics in the last two quarters observed (the average debt balance at end-September and end-June 2012 relative to the average debt balance at end-March 2012 and end-December 2011). An empty circle denotes the same change in the debt balance in the previous period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

Figure 58 Breakdown of newly-granted loans to non-financial corporations by maturity and currency



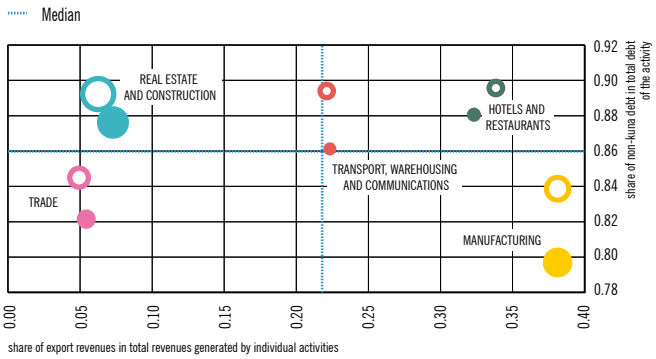
Note: Short-term loans comprise personal overdrafts, which are statistically recorded as newly-granted loans in each month.
Source: CNB.

Figure 59 Share of corporate non-kuna debt[a] in total loans



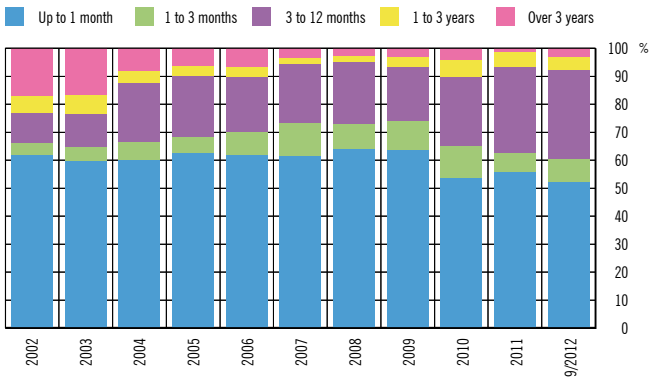
a It is assumed that total external debt is denominated in foreign currencies.
Note: Data on loans to shipyards are excluded as of 30 September 2012.
Source: CNB.

Figure 60 Currency exposure in September 2012



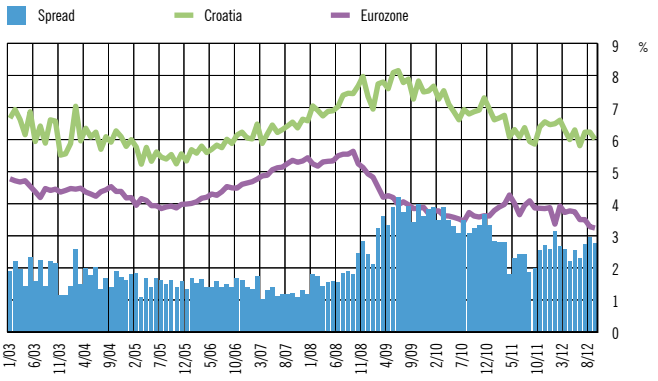
Note: A full (empty) circle denotes the share of non-kuna debt in September 2012 (March 2012). The size of the circle denotes a particular activity's share in total debt of non-financial corporations. Activities accounting for a relatively minor share in total debt are not presented.
Sources: FINA (export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

Figure 61 Breakdown of bank loans to non-financial corporations by interest rate variability



Source: CNB.

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



Sources: ECB and CNB.

External debt of the manufacturing industry contracted (Figure 56). A downturn in debt to domestic banks was recorded in the trade, real estate and construction sectors, as well as in the manufacturing industry (Figure 57).

External debt of the transport, storage and communications sector went up by around 10%, largely on account of higher investment in new telecommunication technologies. This was in contrast with the last quarter of 2011, when it decreased due to a debt-to-equity swap. External debt developments in other sectors were similar to those in the previous periods: debt of the manufacturing industry decreased, while that of other sectors continued to edge up (Figure 56).

Trade, real estate and construction activities, as well as manufacturing marginally reduced their debt to domestic banks. The domestic debt of the manufacturing industry decreased much less than its external debt (Figure 57).

The fall in new loans to non-financial corporations was most evident in short-term kuna loans. By contrast, long-term kuna loans, accounting for a small share in total loans, grew sharply. The amount of newly-granted foreign currency-indexed loans of all maturities decreased further, which slightly reduced overall exposure to currency risk.

As a result of growth in new long-term loans in kuna (Figure 58), the share of foreign-currency indexed loans fell marginally (by around 0.5 percentage points) but was still a high 82% (Figure 59).

The share of currency exposure has been on a downward path in all sectors (Figure 60), which brought a welcome decrease in currency-induced credit risk for non-export sectors, such as construction and trade.

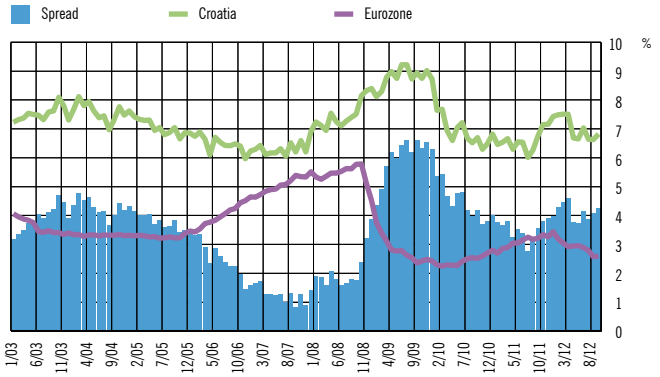
Exposure of non-financial corporations to interest rate risk remained high. The spread between interest rates in Croatia and the eurozone narrowed marginally from the beginning of 2012.

The period in which interest rates are variable shortened slightly, primarily from 1-3 months to up to 1 month; loans with interest rates variable within a month account for around 55% of all domestic loans to non-financial corporations (Figure 61).

The reduction in the risk premium for Croatia from the beginning of 2012 led to a marginal fall in average rates on long- and short-term loans. As a result, the spread between interest rates in Croatia and the eurozone narrowed, though it remained relatively wide (Figures 62 and 63).

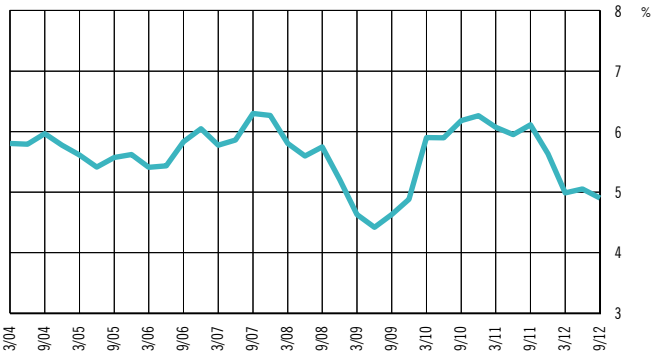
Liquidity of non-financial corporations, measured as the ratio of their transaction account deposits to gross value added, held steady at relatively low levels, similar to those in the recessionary year of 2009 (Figure 64). The poor liquidity was the outcome of the prolonged economic slowdown.

Figure 63 Interest rates on short-term loans to non-financial corporations in Croatia and the eurozone



Sources: ECB and CNB.

Figure 64 Ratio of transaction account deposits of non-financial corporations to gross value added

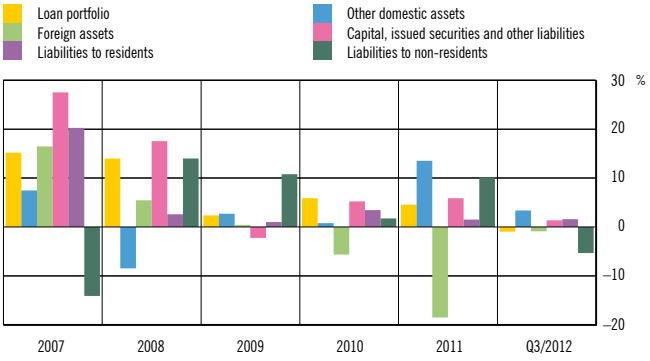


Source: CNB.

In view of weak GDP growth projected for 2013 and the steady slide in interest rates, primarily on the back of the fall in the global risk premium, the downward trend in non-financial corporate debt could come to a stop. Structural reforms to improve the business environment could contribute to a rise in loan demand due to larger investments by the non-financial corporate sector.

Banking sector

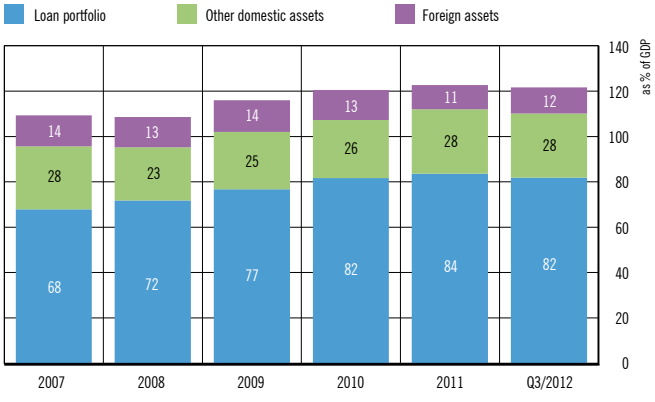
Figure 65 Major banking sector balance sheet items,[a] year-on-year rates of change



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

Source: CNB.

Figure 66 Banking sector assets



Source: CNB.

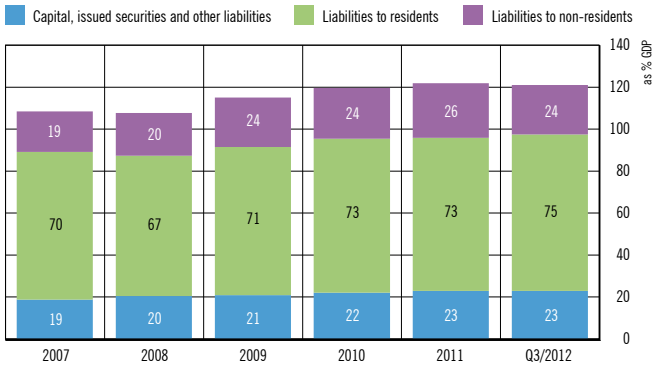
Due to a slight increase in country and foreign owner risk premiums in 2011 and in the first half of 2012, bank interest expenses grew in 2012. As a result of this growth, a drop in placements and continued deterioration in loan quality, bank profitability indicators hit record lows after the last banking crisis. Banks responded to the challenge by continuing to optimise their balance sheet structures, reducing external liquidity risk and exposure to domestic clients. However, while the banking sector as a whole remained well capitalised and capable of withstanding strong shocks, differences among banks were still considerable. The prolonged recession made it impossible to delay the recognition of risks and potential losses and dilute them by new credit growth in better times to come.

Balance-sheet vulnerabilities

The several-year trend of financial deepening came to a halt in 2012 as a result of credit contraction in real terms and a dip in total assets (Figures 66 and 67). Bank assets increased in nominal terms at an annual rate of 0.5% (0.4% in real terms) at end-September 2012, having dropped by 0.4% (stagnation in real terms) in the first nine months.

Despite having sufficient credit potential, generated by regulation changes that provided for the release of significant amounts of bank assets and by a seasonal increase in domestic deposits in the third quarter, banks mostly used the funds available to

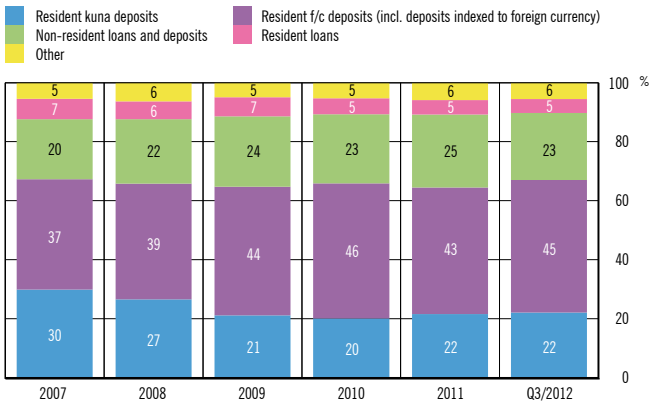
Figure 67 Banking sector liabilities[a]



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

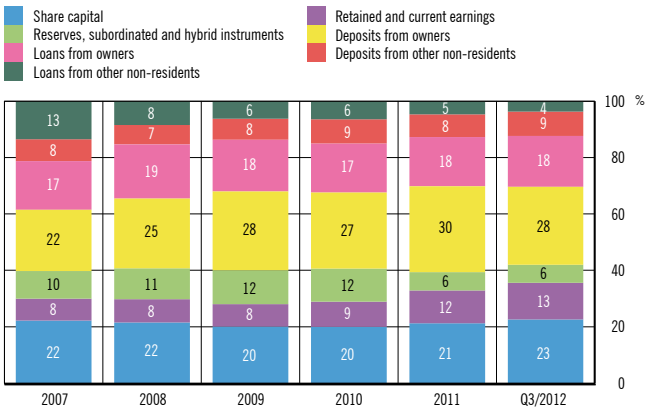
Source: CNB.

Figure 68 Structure of liabilities



Source: CNB.

Figure 69 Structure of foreign-source funds



Source: CNB.

boost foreign assets or reduce more expensive foreign liabilities. This, to some extent, caused a drop in lending, while mitigating the sector's external liquidity risk, as also suggested by liquidity indicators (Figures 65 and 71)[6].

The prolonged recession brought about a decrease in lending to all sectors in the period under review.[7] Household deleveraging intensified, while corporate deleveraging only started this year (for more details see the chapters *Household sector* and *Non-financial corporate sector*). In addition, the growth of lending to the government sector, the major user of bank loans in the crisis period, declined in 2012.[8] Total loans dropped annually by 0.6% in nominal terms in September (an increase of 0.6% in real terms), having decreased nominally by 1.5% in the first nine months of 2012 (down by 0.8% in real terms) (Figures 65 and 66).

As regards domestic financing sources, apart from corporate sector deposits, deposits of all other sectors increased in the first nine months of 2012. The decrease in corporate deposits in the first quarter attributable to amendments to profit tax regulations that came into effect in early March 2012 decelerated slightly by the end of September. Household deposits, as a rule the most stable source within the deposit base, increased seasonally in the third quarter and are set to increase further at decelerated rates on the back of a marked downturn in employment and real wages. On the other hand, financial institutions' deposits increased as a result of the growth of money market funds' investments in bank deposits (due to low T-bill yields) (Figures 67 and 68).

The increase in the cost of funding in international markets in the first half of 2012 and a small uptick in domestic private sector deposits, coupled with the absence of liquidity pressures amid slackening demand, prompted a decrease in foreign liabilities of banks. This was a logical consequence of the optimisation of their balance sheets, but also of the balance sheets of their owners, which were also undergoing deleveraging.[9] The bulk of the decrease in foreign liabilities thus came from owners' deposits. Nevertheless, as almost half of the earnings from 2011 were retained, the share of foreign owners in bank liabilities dropped only slightly below 30% of total liabilities, while their share in total foreign sources of finance went up a little to 88% (Figures 68, 69 and 70).

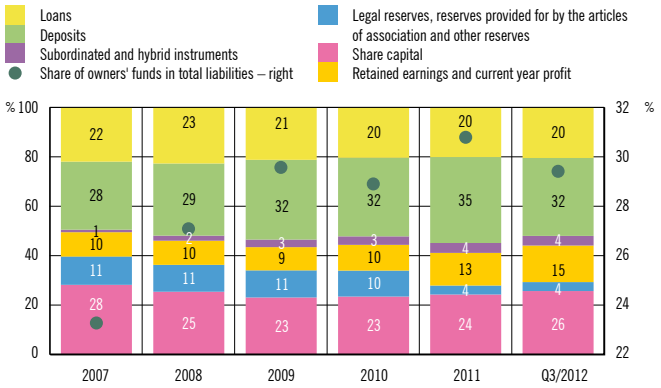
6 This also means a decrease in potential liquidity and capitalisation risks that might arise in the event of the introduction of new internal bank rules providing for a more stable funding of lending (this is in somewhat premature anticipation of new international regulations to be implemented under Basel III).

7 The increase in loans to domestic financial institutions was accounted for by loans granted to the CBRD. This is because the funds allocated to the credit-support scheme channelled through the CBRD have so far been transferred to enterprises at a very slow rate.

8 The calculations include an approximate amount of HRK 6bn reclassified from the corporate sector (shipyards) to the government sector.

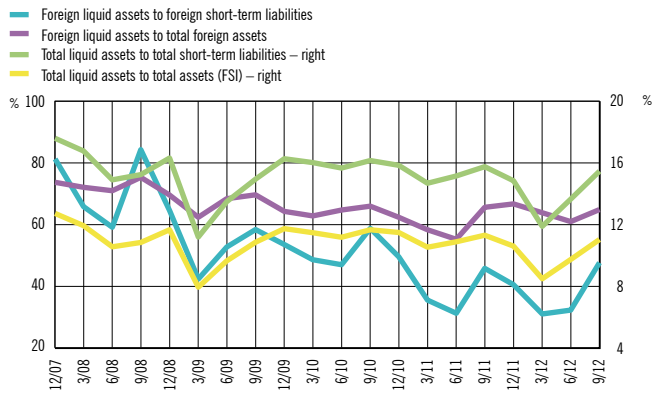
9 *European bank funding and deleveraging*, BIS Quarterly Review, March 2012, http://www.bis.org/publ/qtrpdf/r_qt1203a.pdf.

Figure 70 Breakdown of bank owners' funds by instrument



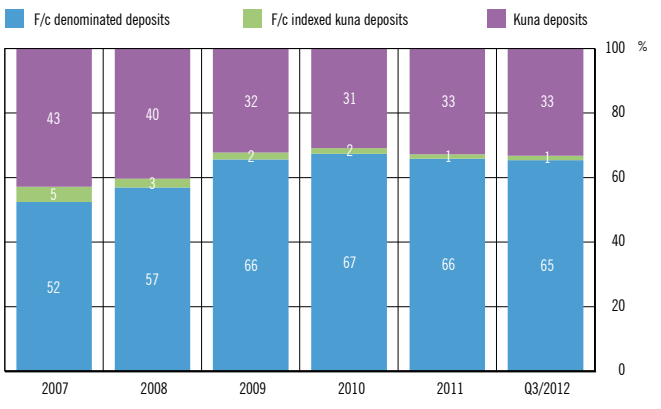
Source: CNB.

Figure 71 Liquidity indicators



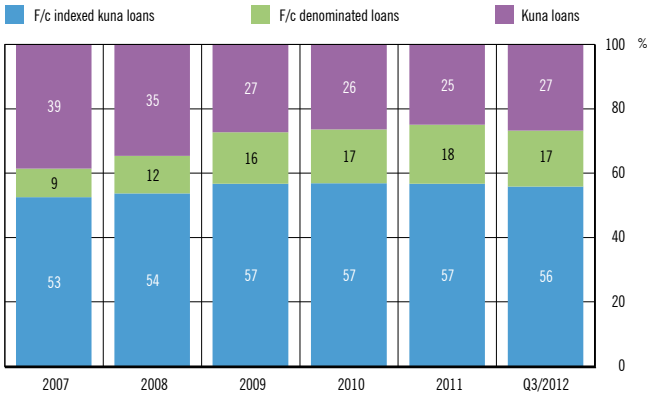
Source: CNB.

Figure 72 Currency breakdown of deposits



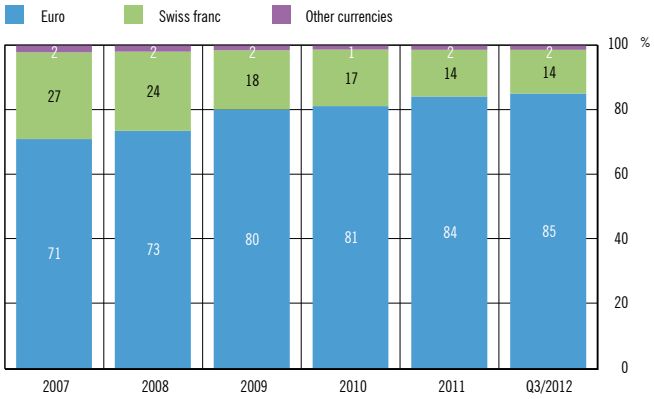
Source: CNB.

Figure 73 Currency breakdown of loans



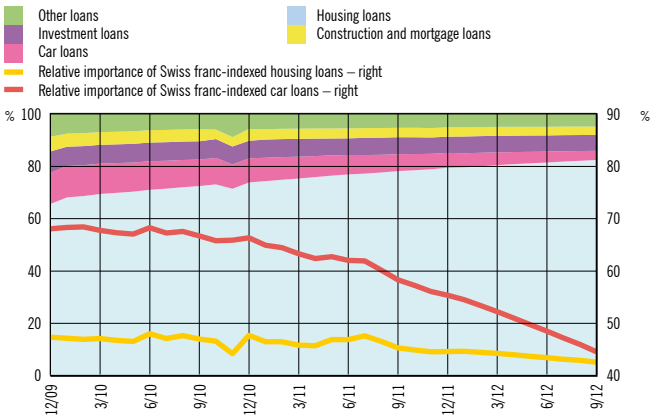
Source: CNB.

Figure 74 Currency breakdown of non-kuna loans



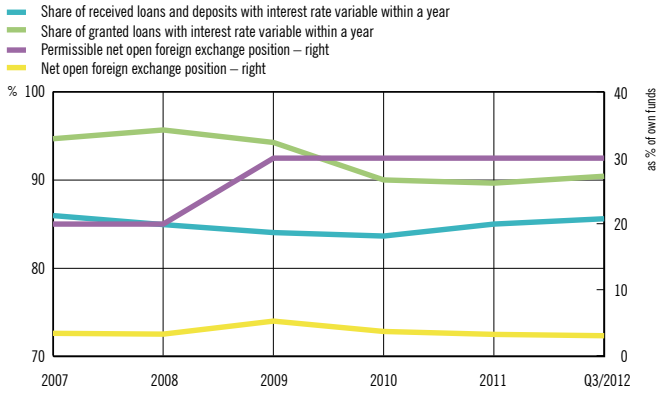
Source: CNB.

Figure 75 Breakdown of Swiss franc-indexed loans



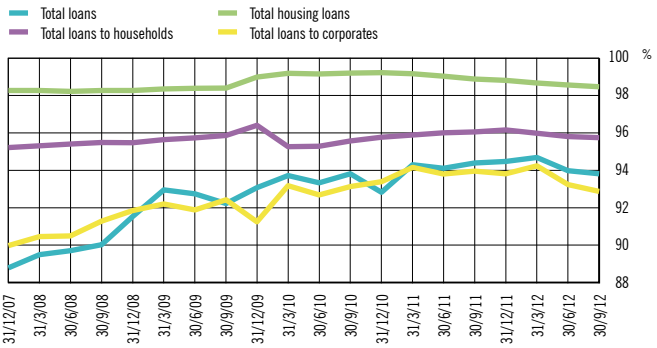
Source: CNB.

Figure 76 Bank exposure to direct currency and interest rate risks



Source: CNB.

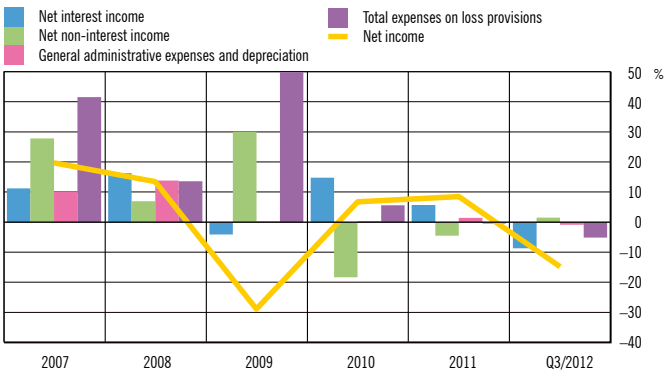
Figure 77 Share of unhedged loans in total loans exposed to CICR[a]



[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 78 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.

In contrast, the currency breakdown of loans and deposits remained stable, continuing to reflect a high currency risk exposure in the system. However, while currency risk exposure remained on the same level, this risk was slightly mitigated by the gradual disappearance of loans indexed to the Swiss franc which, seen in retrospect, exhibited much higher volatility than euro-indexed loans. Still, given the slow credit growth and depreciation of the kuna versus the Swiss franc in the last few years, the share of home loans indexed to the Swiss franc in total foreign currency indexed home loans remained above 40% (Figures 72, 73, 74 and 75).

While banks' direct market risk exposure was low as usual due to the widespread use of variable interest rates and currency clauses, indirect risk exposure remained high. The low level of direct interest rate risk is indicated by a positive and relatively stable difference between bank assets and liabilities with interest rates variable within a year. The net open foreign exchange position of banks, however, stood slightly below 2% of banks' own funds, which is considerably below the permitted value. However, banks' exposure to currency-induced credit risk remained high, primarily due to the traditionally significant currency mismatch between income, the bulk of which is in domestic currency, and loan liabilities of clients (primarily households) that are mostly indexed to foreign currencies (primarily the euro and Swiss franc). In contrast, a drop in loans to public enterprises and the government, as a rule unprotected from currency risk, by the end of the observed period, was insufficient to offset these risks, although it slightly reduced total exposure to CICR (Figures 76 and 77).

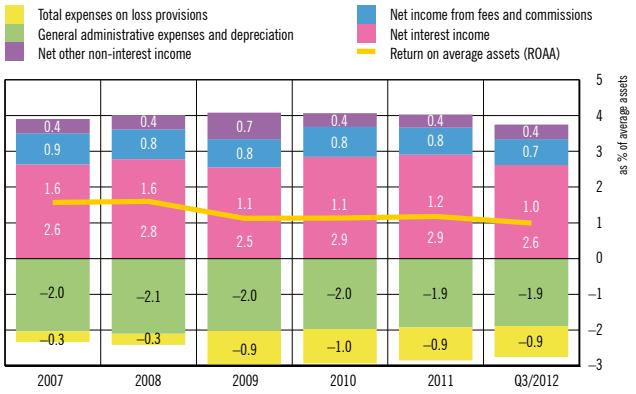
With adverse macroeconomic trends likely to continue until the year-end, one should expect no growth in banks' balance sheets. As the sufficient credit potential has not led to credit growth, and due to currently very low yields in international financial markets, banks could decide to continue with balance sheet reductions. Bank placement growth could until the year-end be driven by new government borrowing, while a growth in placements to the private sector could be expected no sooner than in the second half of 2013 with the onset of economic recovery.

Strategic risks[10]

Net interest income of banks went down by about 9% due to an increase in interest expenses on foreign liabilities. Consequently, banks' earnings fell significantly and profitability indicators hit ten-year record lows. As well as by an increase in the cost of external financing, banks' profitability was also adversely affected by the continued growth in the share of irrecoverable loans, low interest rates in the foreign and domestic interbank

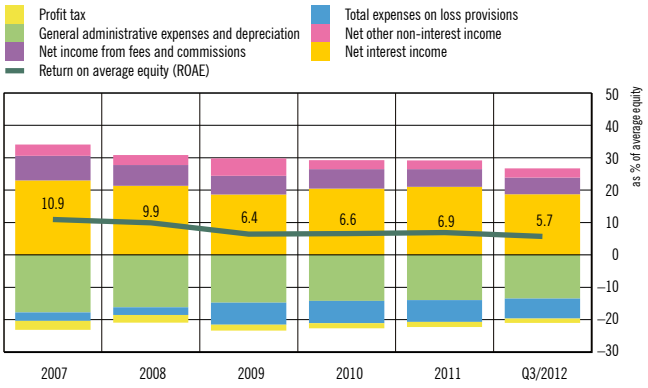
10 Income statement items for September 2012 were annualised to be comparable with those for the preceding whole year periods. This was made by summing up banks' business results in the last quarter of 2011 and the first three quarters of 2012.

Figure 79 Contribution of ROAA categories



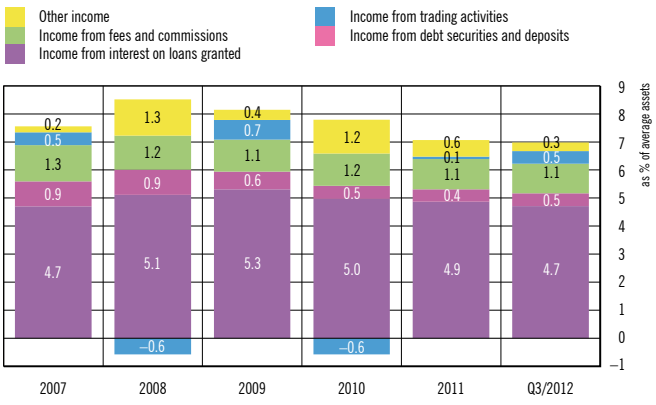
Source: CNB.

Figure 80 Contribution of ROAE categories



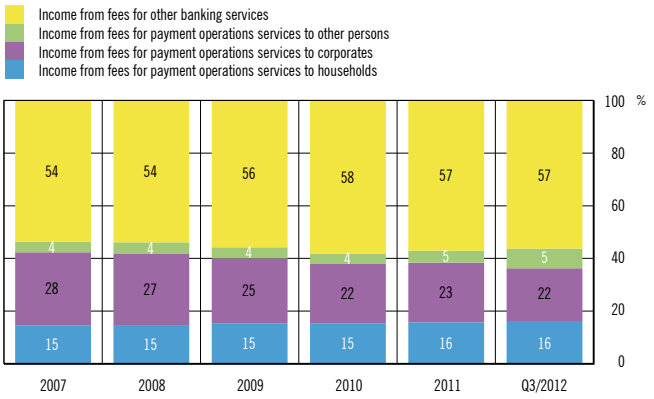
Source: CNB.

Figure 81 Structure of total income



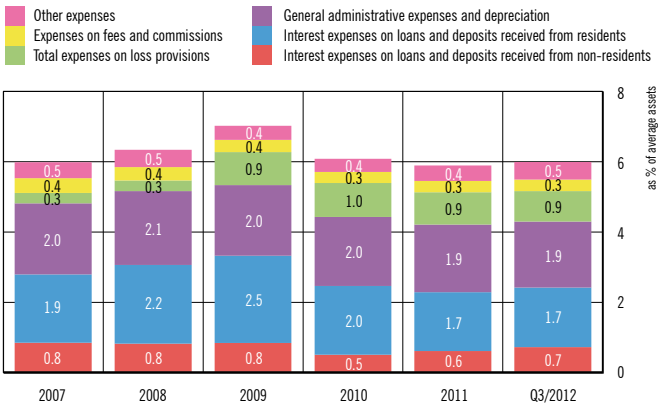
Source: CNB.

Figure 82 Structure of income from fees and commissions



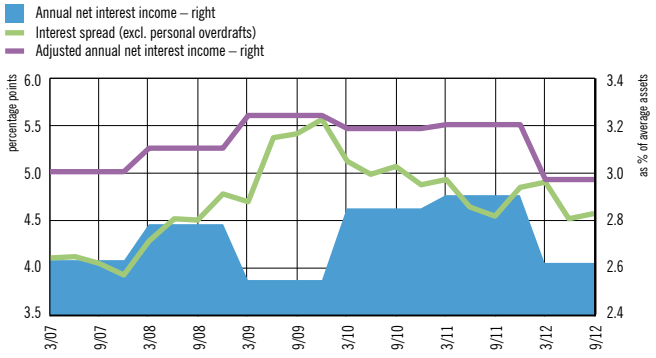
Source: CNB.

Figure 83 Structure of total expenses



Source: CNB.

Figure 84 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.

markets and an increase in the share of safer assets with lower returns. The only type of interest income that increased was that on debt securities of the Republic of Croatia. As a result, banks' net income was down by 14.8% and returns on average assets and average equity decreased to 1.0% and 5.7% respectively (Figures 78, 79 and 80).

Since the onset of the crisis, banks have adjusted their operating models so as to give the maximum support to their earnings. However, the opportunities for cross-selling and non-interest income growth have been limited due to a growing share of institutional clients (the government and financial corporations) in banks' credit portfolios (Figures 81 and 82). Banks have also reduced their operating expenses, but they provide little room for any significant savings (Figure 83).

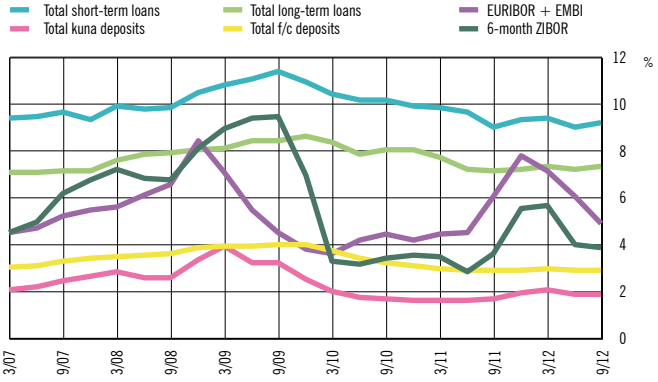
In addition to the pressure put on their earnings by the prolonged recession, it appears that banks' selectivity in granting new loans could become one more restrictive factor for their long-term operations. The crisis has prompted banks to tighten their lending policies and proportionately increase lending to less risky clients (as illustrated by a drop in the average risk weight, Figure 90), which has begun to have a negative effect on their earnings. In addition, loans decreased by the end of the observed period in both absolute and relative terms (as a share in assets) (Figure 81).

The increase in the cost of external financing has added to banks' motivation to restructure their balance sheets despite the fact that foreign borrowing has remained a relatively favourable form of funding. As a result, the corrected interest margin has narrowed to the lowest level since end-2008. The rise in interest expenses has primarily resulted from an increase in the risk premium in international capital markets that was transferred to domestic banks through their owners. The drop in these expenses in the second half of 2012 will be transferred, with a time lag, to domestic banks' financing costs. Given weak loan demand and comfortable liquidity, there is currently no reason for banks to respond to this by increasing domestic deposit rates (Figures 84 and 85).

After increasing in 2011 and in the first half of 2012, country and foreign owner risk premiums narrowed after September 2012. However, having lagged behind nominal rates, interest expenses will not immediately return to the pre-2012 level. On the other hand, if pressures on banks continue, foreign liabilities are likely to decrease further.

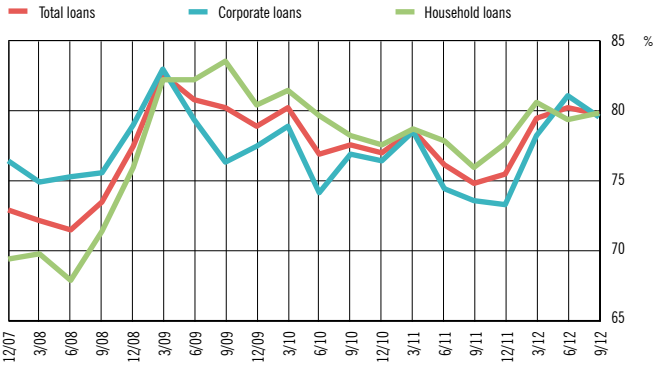
Banks have supported earnings by slightly raising interest rates on newly-granted loans and by increasing the share of short-term – more expensive – loans. This, however, has failed to increase the net interest income significantly, as this can only be achieved by enhancing the amount of new loans. The share of short-term lending approached the historical high achieved at end-2008. As regards the corporate sector, this can be attributed to a decline in investments and to financing current liquidity by unfavourable short-term loans in the period under review. As concerns households, this phenomenon resulted from a drop in home loans and other long-term loans in the period under review, coupled with an intensified use of short-term loans (predominantly current account overdrafts) due to worsened financial conditions (Figure 86).

Figure 85 Selected interest rates (quarterly average of monthly interest rates)



Source: CNB.

Figure 86 Share of short-term loans in total newly-granted loans (quarterly average)



Source: CNB.

Banks' performances are unlikely to change significantly in the absence of growth in credit to the private sector. Since the onset of the crisis, banks have had to strike a careful balance between the 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.). However, any excessive transfer of risk to clients eventually returns to banks' balance sheets as credit risk materialisation.

Credit risk and bank capital adequacy

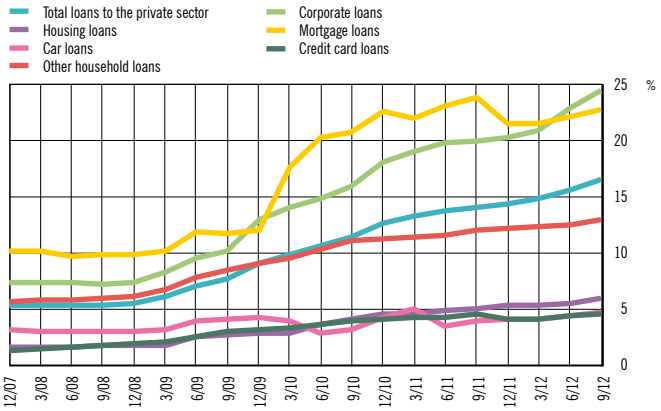
As a result of a more conservative credit policy, risks that materialised after the onset of the crisis and a drop in the loan to assets ratio, banks' credit risk exposure declined, while the risk profile was increasingly related to the ageing of the existing portfolio as a result of the slow credit growth.[11] The growth in the ratio of non-performing loans accelerated on the back of continued adverse macroeconomic developments and a drop in lending, with the result that the private sector's ratio for such loans reached 16.5% at end-September 2012 (14.5% for the total loan portfolio). Although the kuna exchange rate was stable in the observed period[12], household loan quality deteriorated still further as a result of the exacerbated financial situation (see Household sector), so that the ratio of non-performing loans granted to the household sector increased to 9.4%. The increase in non-performing household loans in the current period was to a large extent due to the ratio of non-performing home loans rising to 5.9%, with a growing difference in quality relative to the currency of indexation (Figures 87 and 88).

The ratio of non-performing corporate loans, the key determinant of trends in total loan quality, reached 24.4% at end-September 2012. Large contributions to this increase, by the end of the period, came from manufacturing and, as usual, from construction. The growth in the ratio of non-performing corporate loans was also spurred by the reclassification of loans to shipyards (high-quality government backed loans) from the enterprise to the government sector, which reduced the corporate loan quality by slightly less than one percentage point (Figure 87).

The growth in non-performing loans was not accompanied by an increase in value adjustments, with the result that the coverage of non-performing loans by value adjustments declined in the third quarter of 2012, increasing the burden on capital created by potential further corrections in bank asset quality. This coverage usually declines temporarily when the non-performing loan ratio increases and recovers as new non-performing loans age. In such a context, charges for value adjustments usually grow in two phases. The observed period saw an inflow of new non-performing home and corporate loans, which was to some extent due to on-site examinations of banks (Figure 89).

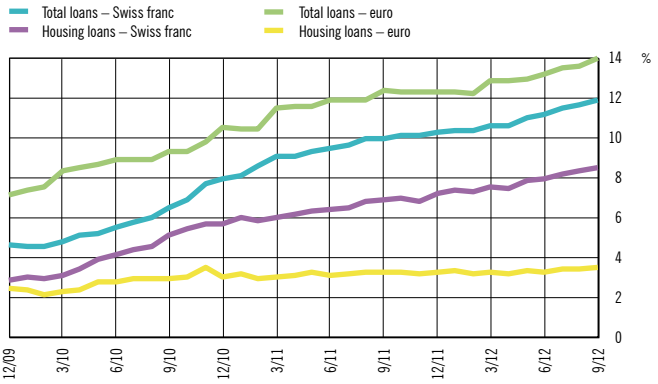
There have been no large capital injections since the beginning of the crisis, and none are to be expected until the end of 2013. Banks' resilience to potential shocks has therefore mostly

Figure 87 Ratio of non-performing loans to total loans



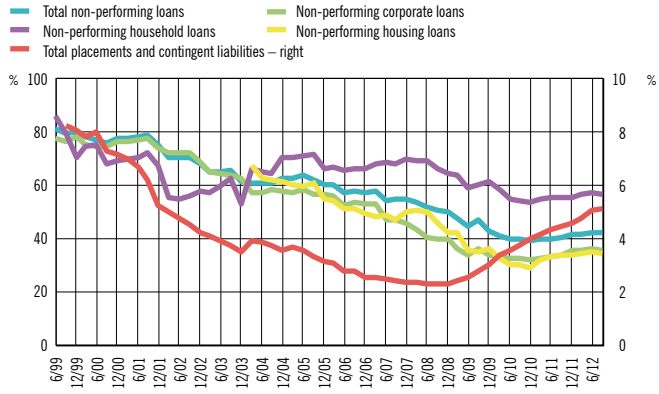
Source: CNB.

Figure 88 Ratio of non-performing loans to total loans by loan categories and the currency of indexation



Source: CNB.

Figure 89 Coverage of total placements and contingent liabilities by value adjustments

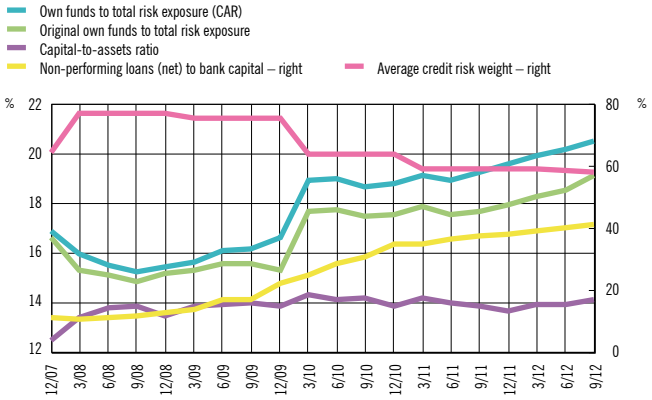


Source: CNB.

11 Specifically, at end-September 2012, the share of non-performing home loans indexed to the Swiss franc was almost three times greater than the share of such loans indexed to the euro.

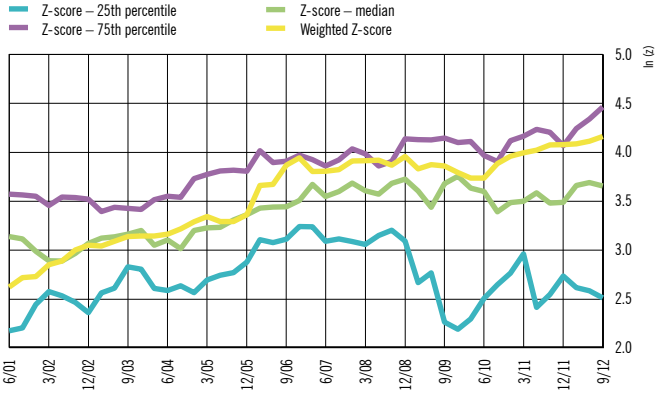
12 The kuna depreciated versus the Swiss franc by approximately 0.3% year-on-year in September 2012 (appreciating by 0.6% in the first three quarters of 2012). In the same period, the kuna appreciated by 0.6% against the euro (1.1% in the first three quarters of 2012).

Figure 90 Capital adequacy ratios



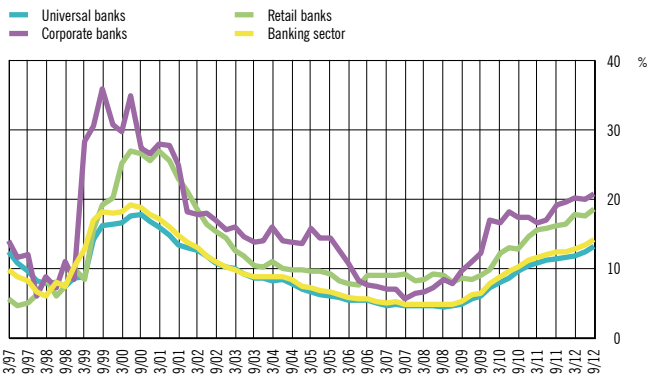
Source: CNB.

Figure 91 Distribution of insolvency risk



Source: CNB.

Figure 92 Dynamics of NPLR by bank groups



Source: CNB.

stemmed from the capital accumulated in the pre-crisis period. The capital adequacy ratio increased in the period under review primarily due to investors growing more cautious and investing into less risky assets, and to the retained earnings from the previous periods (Figure 90).

Differences in stability among banks increased further in 2012. The distribution of insolvency risk in terms of the Z-score shows that the largest current differences among banks are at the level of the differences within the sector recorded in late 2009, before decreasing temporarily until the end of 2010. However, these differences started to increase again in 2011 and 2012, suggesting greater differences in insolvency risk (see Figure 91).

The prolonged recession made it impossible to delay the recognition of risks and potential losses and their dilution by new credit growth.

Banking sector resilience

The increase in the non-performing loan ratio accelerated in mid-2012, primarily due to an accelerated decrease in the portfolio quality of universal banks, although placement quality of smaller banks, both corporate and retail, also deteriorated.[13] The non-performing loan ratio for universal banks, which, as a rule, have the largest impact on the banking sector, reached 13.1% at end-September 2012 due to a fall in the quality of home loans. The non-performing loan ratios for retail and corporate banks went up to 18.5% and 20.5% respectively, with the quality of the retail banks' credit portfolio deteriorating much more considerably in the first nine months of 2012 (Figure 92).

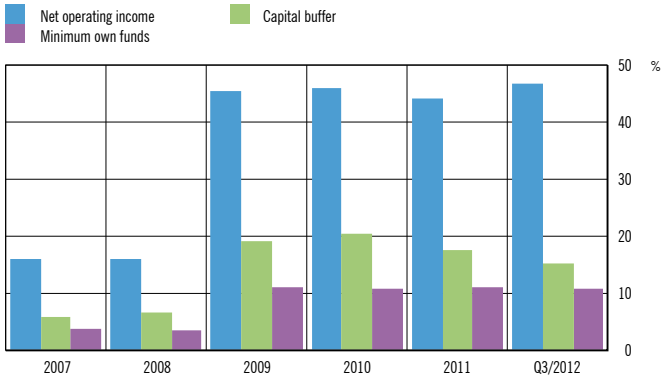
Despite slightly lower charges for value adjustments, a decrease in banks' net income in the first nine months of 2012 increased the burden on the buffer by credit risk materialisation. In contrast, slightly lower charges for value adjustments and small capital growth led to an increase in the relative importance of capital buffers. Charges for value adjustments thus stood only slightly below half the amount of net operating income; however, all banks whose net income dropped also recorded a deterioration in credit portfolio quality in the first nine months of 2012.[14] This reduced the risk of excessively favourable portfolio risk assessment in conditions of weak bank performance. In the previous stress tests this criterion was applied to single out a group of small (mainly retail) banks, which were in this way exposed to the risk of adding to the balance sheet burden in the subsequent periods (Figures 93 and 94).

Although the decline in the coverage of non-performing loans by value adjustments recorded in mid-2012 has had an adverse

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

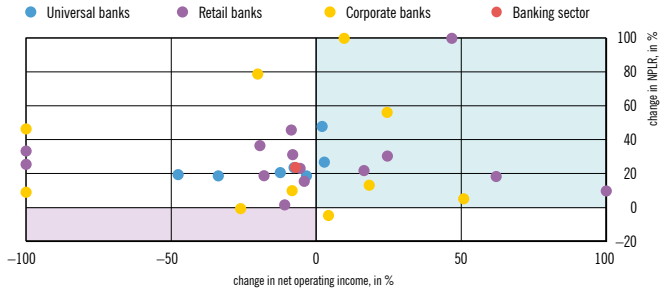
14 This can to some extent be related to on-site examinations of banks.

Figure 93 Relative importance of charges for value adjustments



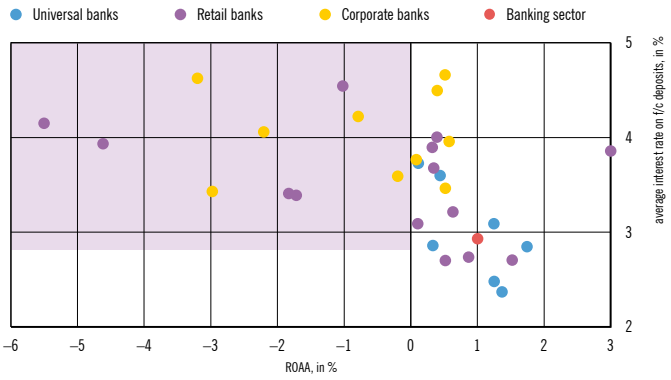
Source: CNB.

Figure 94 Change in bank earnings and NPLR in the first three quarters 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.

Figure 95 Annual ROAA and average annual interest rate on f/c deposits at end-September 2012

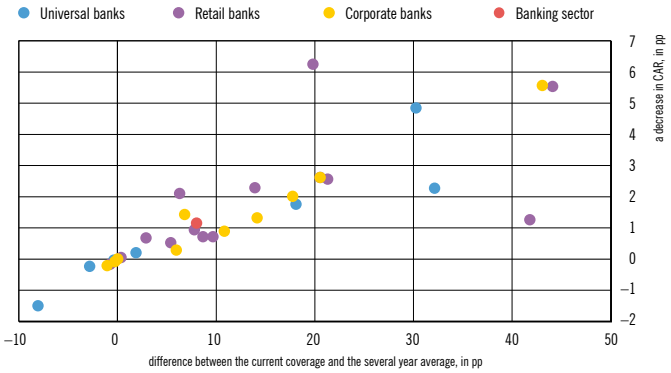


Source: CNB.

Figure 96 Coverage of non-performing loans by value adjustments and NPLR by bank groups, as at 30/9/2012

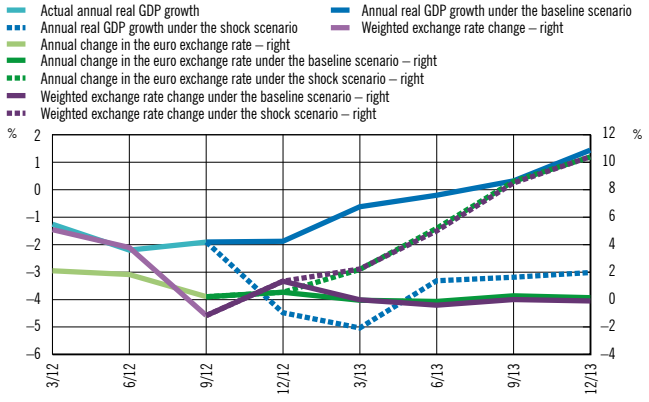
Source: CNB.

Figure 97 Adjustment of the CAR as at 30/9/2012 by the fall in the coverage of non-performing loans relative to the average (2004 – 2012)



Source: CNB.

Figure 98 Projections of macroeconomic variables under various scenarios



Source: CNB.

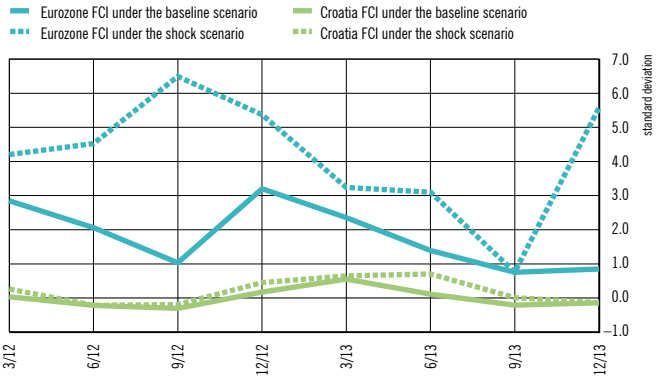
effect on financial stability, it has to a large degree also been caused by the gradual reclassification of non-performing loans into higher coverage groups. With more value adjustments gradually allocated to these new non-performing loans, the coverage will increase but the potential risks will diminish. This would also reduce a potential shock arising from the increase in the required coverage of non-performing loans, which would at present lead to a drop of about 1.3% in the capital adequacy ratio should the coverage of non-performing loans be raised to the average level from the 2004 to 2012 period (Figures 96 and 97).

Therefore, the standard stress test results may to some extent underestimate the potential fall in the capital adequacy ratio under the shock scenario. The resilience of banks was for that reason tested under a shock scenario with somewhat stricter rules on the classification of placements providing for an increase in value adjustments. On the other hand, however, due to an increase in the non-performing loan ratio for retail and corporate banks, a large number of these banks moved away from the area of low coverage and a high estimated loan quality, reducing the risk of a double shock in conditions of the steadily deteriorating macroeconomic environment (Figure 96).

The burden on the net income of several banks in the forthcoming period could be created by a combination of above-average deposit rates and losses incurred. This has been the case in a growing number of retail and corporate banks (Figure 95).

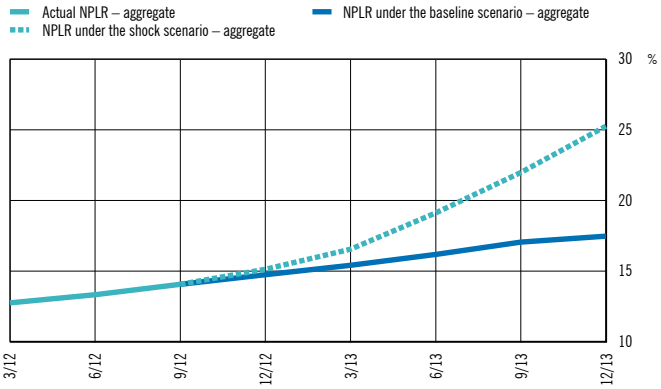
Stress test results for 2013 have shown that existing buffers at the sector level are adequate even under extreme but plausible adverse macroeconomic shocks.[15] However, despite sound results at the aggregate level, mainly influenced by the simulation of changes in universal banks' balance sheets, the differentiation of results within the sector has continued, particularly regarding less resilient retail and corporate banks (Figure 91 and Table 6). The baseline scenario, considered to be the most likely outcome, assumes a stagnation in real GDP in 2013 (a 0.3% increase) and the maintenance of a relatively stable kuna/euro exchange rate.[16] The shock scenario, which represents stress testing for a highly unlikely but plausible combination

Figure 99 Financial conditions indices under various scenarios



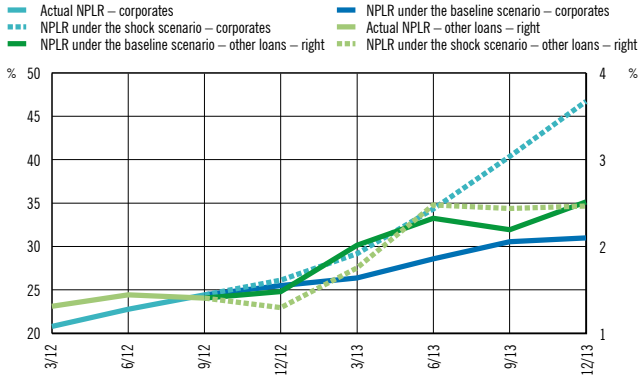
Note: Positive (negative) values denote a deterioration (an improvement) of financial conditions.
Source: CNB.

Figure 100 Projections of NPLR under various scenarios



Source: CNB.

Figure 101 Projections of non-performing loans to corporates and other loans under various scenarios



Source: CNB.

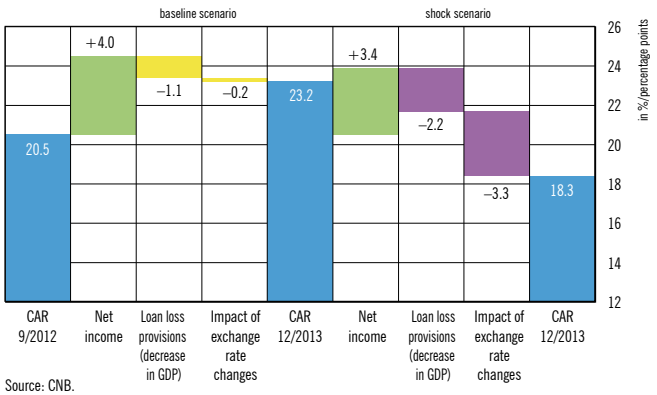
15 The stress tests conducted rely on the sectoral models of credit risk presented in *Financial Stability* No. 7, June 2011, and on the modelling of net interest and non-interest margins given in Box 3 Bank earnings modelling in Croatia, *Financial Stability*, No. 9, July 2012. Credit risk models enable 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 assessments in the context of stress testing.

16 The projection for the kuna/euro exchange rate and for the euro/Swiss franc exchange rate is taken from *Consensus Forecast*, February 2012.

Figure 102 Projections of non-performing housing and consumer loans under various scenarios

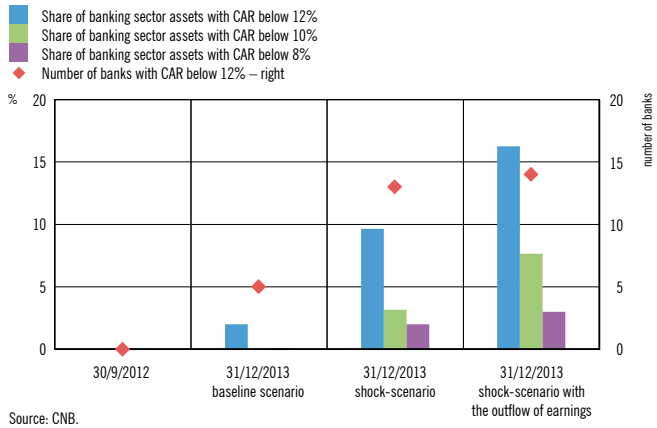
Source: CNB.

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 CAR under various scenarios by bank groups

	30/9/2012	Baseline scenario	Shock scenario	Shock scenario – with a coverage increase
Banking sector	20.5	2.7	–2.2	–2.9
Retail banks	18.1	–0.5	–5.3	–5.8
Corporate banks	15.5	0.1	–4.2	–6.2
Universal banks	21.0	3.1	–1.9	–2.5

Source: CNB.

of shocks, assumes an average decline of 3.6% in real GDP[17]. This scenario includes the worsening of the eurozone recession and deterioration of financing conditions for banks, as well as a cumulative 10% depreciation of the kuna/euro exchange rate relative to the baseline scenario, assuming that the euro/Swiss franc exchange rate remains like that in the base scenario (Figures 98 and 99).

Under the baseline scenario, the non-performing loan ratio could reach around 17.5% at end-2013. Under the shock scenario, this ratio would rise to 25.2% (Figure 100). As a rule, the corporate loan portfolio makes the largest contribution to the dynamics of non-performing loans, as illustrated by trends in the ratio of non-performing loans for corporate banks. Under the baseline and shock scenarios, the ratio of non-performing corporate loans at end-2013 stands at 31% and 47% respectively. In the household lending sector, consumer loans would reach 14% and 17% respectively under the baseline and shock scenarios at the end of the projection horizon, while the ratio of non-performing home loans, so far relatively low, would grow moderately, to 7.1% and 11.5% respectively (Figures 101 and 102).

The projected net income of banks[18] increased in 2013 from 2012 under the baseline scenario and should continue to be more than sufficient to absorb total charges for value adjustments. Therefore, assuming that all profit is retained, the capital adequacy ratio of the banking sector would increase by 2.7 percentage points at the end of 2013 from September 2012. This exclusively refers to large universal banks as the capital adequacy ratio of retail and corporate banks holds steady or decreases slightly under the baseline scenario (Table 6).

17 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.

18 Net interest and net non-interest margins are projected based on the earnings modelling given in Box 3 Bank earnings modelling in Croatia, *Financial Stability*, No. 9, July 2012. Net operating income is the result of the projections of net margins and total bank assets, as well as a correction for general administrative expenses and depreciation.

Under the shock scenario, the projected net income would be lower than under the baseline scenario (around 15%), while charges for value adjustments on loans would increase further as a result of a sharper downturn in GDP and exchange rate changes activating 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 euros. Under this scenario, the capital adequacy ratio of the banking sector would drop by about 2 percentage points, standing below the baseline scenario ratio by approximately 5 percentage points, with the potential depreciation of the kuna being the main cause for a decrease in the capital adequacy ratio, as in the previous stress tests (Figure 103). The smallest decrease would be recorded in universal banks (1.9 percentage points), while it would be 4.2 percentage points and 5.3 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-2013 the capital adequacy ratio would fall below 12% for thirteen banks holding around 9.5% of banking sector assets. Five banks holding about 2% of banking sector assets would have a capital adequacy ratio lower than 8% (Figure 104).[19]

Trends in the coverage of non-performing loans by value adjustments (Figure 89) in the previous periods show that it remained relatively low since the outbreak of the crisis. Therefore, this stress-testing exercise included a simulation of the impact on the capital adequacy ratio of a faster increase in the coverage. With the simulated change, the non-performing loan coverage goes up to around 50%, approximately its eight-year average. If total value adjustments are gradually increased over the observed horizon, this automatically leads to a decrease of 0.7 percentage points in the capital adequacy ratio by generating additional charges for value adjustments by end-2013. Under the shock scenario, these effects included, the banking sector's capital adequacy ratio would decrease by 2.9 percentage points from end-September 2012 to end-2013. The corporate loan portfolio, being the least covered by value adjustments, would undergo the greatest changes (Figure 91). The overall decrease in the capital adequacy ratio would be the smallest in universal banks (2.5 percentage points) and much greater in corporate and retail banks, 6.2 percentage points and 5.8 percentage points, respectively (Figure 104 and Table 6).

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

Box 3 Improvement of the early warning system for signalling banks in difficulties

Timely identification of disturbances in the business of credit institutions is essential for the efficient supervision of these institutions and prevention of damage associated with the materialisation of specific and systemic risks. Supervisory functions thus help preserve financial system stability and efficacy and reduce the risks of direct and indirect costs of crisis, which are often economically significant. For instance, banking crises in Croatia in the '90s generated fiscal costs of rehabilitation in an amount exceeding 4% of GDP (on an annual level)[1].

And while crisis episodes (bank failures) are relatively rare, business difficulties such as bank instabilities that have the ability to threaten the functioning of financial intermediation of an individual bank and trigger spillover effects and ensuing systemic difficulties, are much more common. This makes them ideal for modelling with a view to a timely detection of potentially dangerous processes in banks[2]. A group of early warning models was thus developed in the Croatian National Bank to signal difficulties in bank operations and identify specific processes of accumulation and materialisation of risks in banks[3] which can be used to effectively complement data collected in the course of on-site supervision. However, the testing of the success of individual models on data from previous periods has revealed that there is room for improvement as regards the precision of this system, encouraging the development of an alternative approach, which is outlined in this framework.

The new signalling system consists of three stages of determination of the degree of risk in any bank (the bank's rating) (Figure 1). During stage one, based on specified stability measures, the banks in the area of instability are identified (depending on their individual position in the distribution of the value of indicators by banks at a certain point in time). This represents an individual signal (IS) of disturbance in business operations (block a in Figure 1). The composite or the reference signal (S) appears if at least two individual signals are present in T0. Based on the number and rhythm of reference signal occurrence for each bank, it is possible to evaluate qualitatively the signal in five categories (block b in Figure 1). These risk categories are finally assigned quantitative grades (R) on the scale of 1 to 5, according to the degree of risk (block c in Figure 1). The sensitivity of discrimination of such a system is evident in a case in which a signal in T0 may appear for two banks, and depending on risk evolution in three successive periods, the rating may vary within a range from 2 (low risk) to 5 (the highest risk). Formally, $R = f(S_{T-1}, S_{T0}, S_{T+1})$.

Therefore, for the described system to become operative, two elements have to be determined: stability measures and their threshold values. The absence of a universal measure of bank stability is a practical problem also widely discussed in literature[4]. Here three main channels of shocks to the business (capital) of banks are analysed by means of a solvency indicator which points to the general operating risk, liquidity risk and credit risk, which are not necessarily inter-connected or synchronised in time.

(1) $Z = (k + \mu)/\sigma$; $IS = Zscore < g.v.$

where: Z is Z-index (solvency indicator), k the relationship between capital and assets, μ the average value of ROA, σ standard deviation of ROA, *g.v.* threshold value (20th percentile) while other symbols have been defined before.

(2) $LR = (G + D + T)/A < g.v.$

where: *LR* is the liquidity coefficient, *G* cash, *D* deposits, *T* T-bills, *A* total assets, *g.v.* threshold value (20th percentile).

(3) $RE = TIV/A > g.v.$

where: *RE* are provisions for losses, *TIV* expenses on loss provisions, *g.v.* threshold value (80th percentile) while other symbols have been defined before.

By classifying the degree of risk for a total of 48 banks operating in Croatia in the previous ten years, a map of banks' ratings is obtained (Figure 2), which, based on the sample of previous periods identifies all problem banks, i.e. key moments of the occurrence of disturbance. In this way this system improves on the approaches commonly used in the CNB, which makes it a good-quality complement to supervisory tools. The absence of sound banks from the map, or the market, was mainly the result of their acquisitions by larger banks, while riskier banks as a rule were either wound-up or merged with other banks.[5] The banking market consolidation was at its peak during the banking crisis from the end of the '90s until the end of 2004, which was followed by market stabilisation and a simultaneous credit cycle recovery. Market consolidation came to a halt during the period of a fast growth in placements between 2005 and 2007, which was accompanied by growing risks (most notably the credit risk). The accumulated risks caused disturbances in the business operations during the crisis that started in 2008, when this process reached its peak, even before their substantial materialisation.

1 Jankov, Lj.: *Banking Sector Problems: Causes, Solutions and Consequences*, S-1, March 2000; Ahec-Šonje, A.: "Sensitivity Analysis of the Banking System - the Application of "Signal" Method", *Economic Review*, 53 (9-10), 2002.

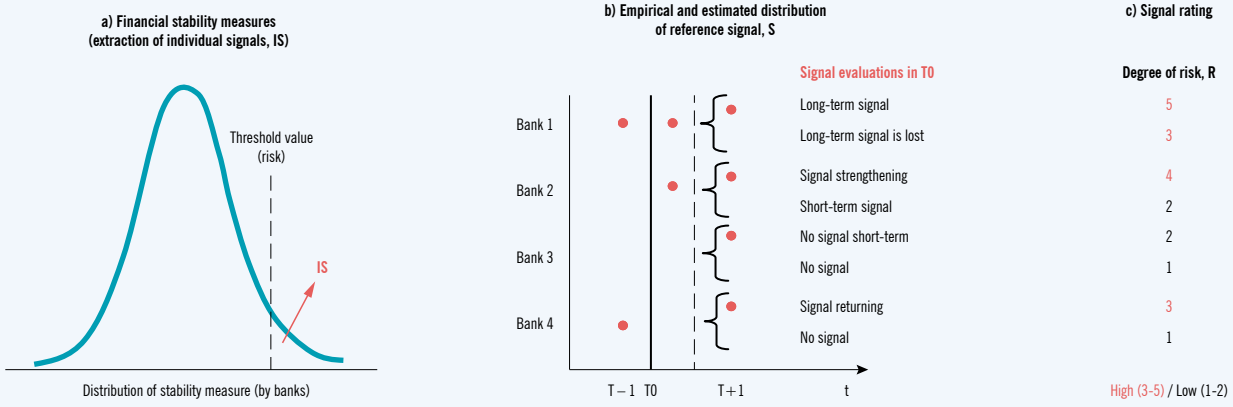
2 Empirical literature attaches greater importance to factors specific for an individual economy, i.e. to the domestic market in case of disturbances in bank operations, than to external imbalances, restrictions and shocks associated with standard banking crises (Hardy, C. D., and C. Pazarbasioglu: *Determinants and Leading Indicators of Banking Crises*, IMF Staff Papers, Vol. 46, No. 3, 1999).

3 These approaches include: *CAMELS risk validation system* (parameter approach: the functions of profitability, assets risk, liquidity and lending interest rates of banks), *the model of internal risk perception of banks* (non-parametric approach: it follows the relationship between liquidity and the price of borrowing on the money market for an individual bank), *the standard early warning system that signals difficulties in bank operations* (non-parametric approach: signals the probability of disturbances depending on the combination of measures of risk behaviour based on interest rate values, credit growth and bank liquidity).

4 Carapeto, M., S. Moeller, A. Faelten, V. Vitkova, and L. Bortolotto: *Distress classification measures in the banking sector*, Cass Business School, City University of London, 2010; Jahn, N., and T. Kick: *Early warning indicators for the German banking system: a macroprudential analysis*, Discussion Paper, Deutche Bundesbank, No. 27, 2012.

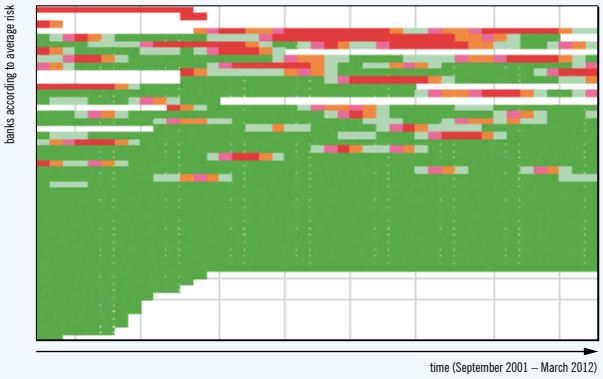
5 The last such case was the case of Credo banka d.d. towards the end of 2011, which had its authorisation withdrawn by the CNB, the measure followed by a winding-up procedure.

Figure 1 New signalling system



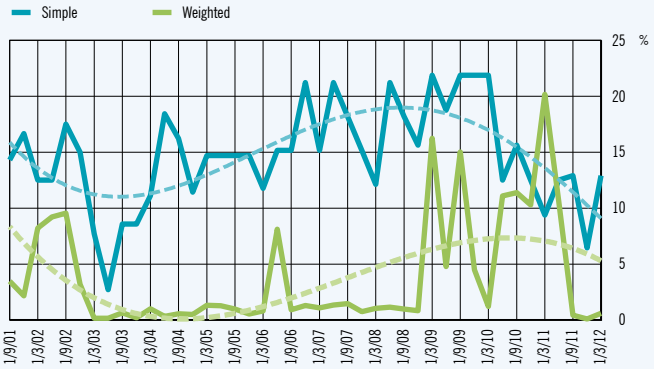
Source: CNB.

Figure 2 Risk map by banks



Note: High risk is shown in shades of red and low risk in shades of green.
Source: CNB.

Figure 3 Banking system rate of risk

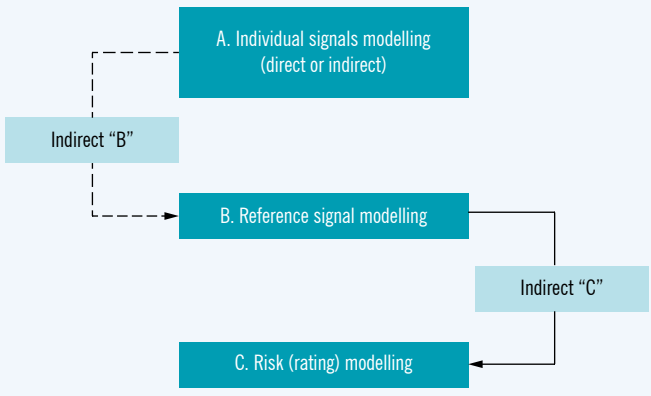


Source: CNB.

By aggregating banks with a high level of risk (3-5), an insight is obtained into the changes in the risk rates of the sector as a whole, and by weighting this indicator (by shares in assets), in a certain way, a new synthetic measure of banking sector stability is obtained (Figure 3). These indicators make it easier to identify such developments in the previous periods, making clearly evident a trend of growth in the risk rate in the pre-crisis period which peaked in early 2010, by which time the bulk of the risks had already materialised, and was followed by a period of relative decline in the vulnerability of these banks. By contrast, the weighted rate of risk indicates that the probability of systemic disturbances during this period was relatively low, although in the mature phase of the crisis, certain disturbances were periodically reported even in banks holding around 15% of the sector's assets.

Given that a bank's rating in the current period is the signal function over three consecutive periods, to classify the risk of a bank in the last completed quarter based on which individual signals are determined, one has to estimate the realisation of signals in the following quarter. For this purpose, a risk model has to be developed, which can basically

Figure 4 Alternative approaches to risk



Source: CNB.

Table 1 Results of signal and risk model (logistic regression)

Dependent variable	Risk signal		High risk	
Sample	Q2/2001 – Q2/2012		Q3/2001 – Q1/2012	
Independent	Coefficient	Partial contribution to outcome probability	Coefficient	Partial contribution to outcome probability
Constant member	–2.540598		–2.5439890	
Lending interest rate index	0,425126*	0.53	0,421708*	0.52
Deposit interest rate index	1,253628**	2.50	1,262870**	2.54
External loan financing index	0,329367*	0.39	0,3598000*	0.43
Risk concentration index	0,753853**	1.13	0,752566**	1.12
Number of observations "dependent variable=0"	1335		1264	
Number of observations "dependent variable=1"	242		216	
Observation ratio 1/0	0.181		0.171	
McFadden R2	0.084		0.085	
Precision coefficient	65.8%		66.0%	
Percentage of exactly anticipated signals	68.1%		68.1%	
AUROC	82.7%		82.8%	

Notes:
1. Independent variables with a one-year time shift.
2. Indices of independent variables (binary values with signal functions) are determined on the basis of threshold values: above the 80th percentile for risk concentration in assets and deposit interest rates, above the 90th percentile or below the 10th percentile for lending interest rates, above 119% (116%) for external loan financing, measured by the ratio of total loans to deposits, in the model of high (low) risk. Threshold values for distributions are arbitrary, and the threshold of the ratio has been determined by maximising McFadden R2 which includes the said indicator.
3. There is no sign of multicollinearity, quasi separation or full separation.
4. Significance: (**) on the level of 1%, (*) on the level of 5%.
Source: CNB.

have three variants (Figure 4). One can model the components of individual signals (time series of solvency, liquidity and provisions), and based on threshold values identify their individual signals, or directly model these individual signals (which requires three probability models for each relevant binary dependent variable). The other approach lies in the modelling of the probability of the occurrence of the reference signal, after which a qualitative and a quantitative estimate would be made or a bank's rating over a current period determined. The third possibility implies direct rating modelling. As shown by experience, time series and individual signals are extremely hard to model (within acceptable limits of reliability), however, the modelling of reference signals (and indirectly, the degree of risk), or the degree of risk itself did not pose such difficulties[6]. Therefore, the latter two options were used in this research.

The modelling of the probability of the occurrence of the reference risk signal S, or a high degree of risk, $R_{3,4,5}$, is based on logistic functions whose arguments are entirely based on Boole (individual variables carry the value of 0 or 1, depending on the criteria and as such are included in the group of independent variables). The optimum specification (according to statistical criteria listed below) was found in the model that comprises information on price and structural characteristics of assets in credit and deposit activities of an individual bank. The models unambiguously show that the probability of the occurrence of risk signal, or the classification of a bank as a highly risky bank, is associated with extreme values of individual interest rates on deposits (either too high or too low compared to other banks) or high prices of loans, but also with a high concentration of risk in the assets and greater use of secondary sources of credit activities financing (Table 1). Both models offer a satisfactory degree of prognostic precision, predicting exact outcomes in 68% of cases and classifying exact risk signals in over 65% of cases.

In addition to enabling risk measuring in the current period, the presented statistical models can also be used for short-term projections, whose horizons do not exceed three quarters. However, it should be borne in mind that the assigned ratings of banks are already leading indicators of disturbances in their business operations. Therefore, the actual values of ratings are recommended for use in monitoring individual banks exactly in terms of signalling instability of an individual credit institution, while model projections in the next several quarters should be considered more as an indication of the evolution of long-term risks in the system.

6 The preliminary research conducted by the CNB comprised all the listed approaches (modelling of differently specified dependent variables) based on different statistical models.

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
EC	– European Commission
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

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