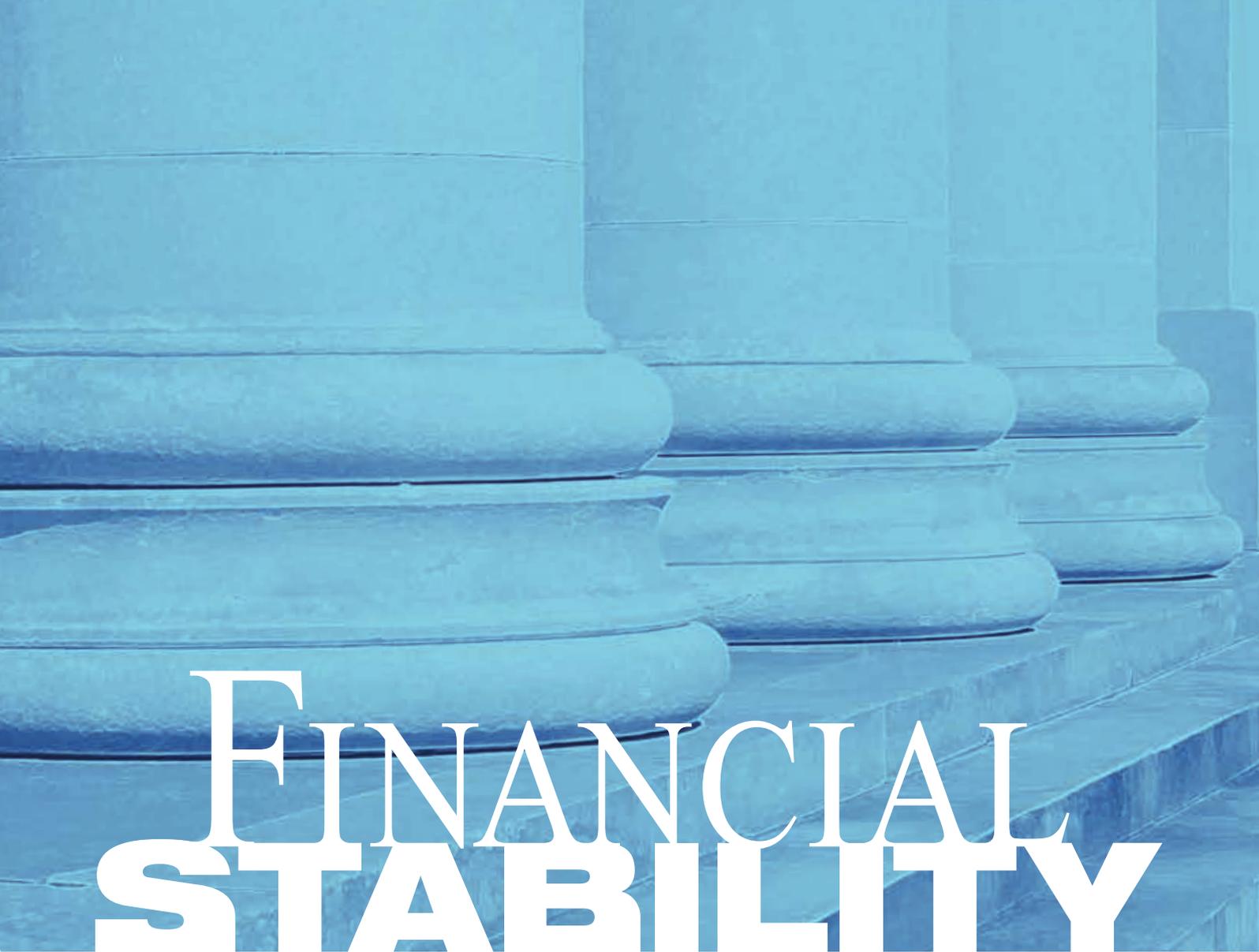


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Introductory remarks

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

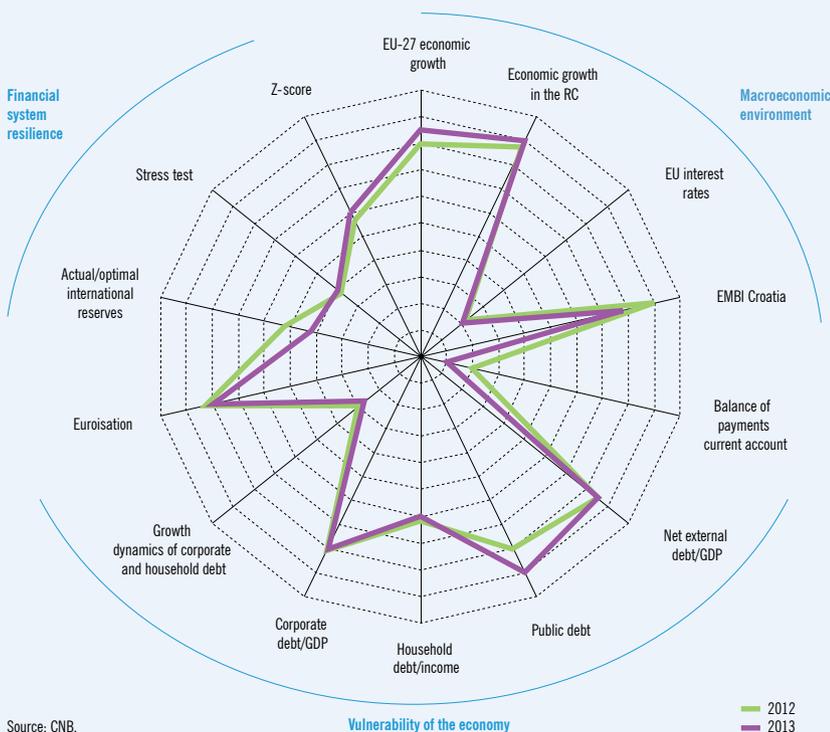
Services Supervisory Agency (HANFA), which are responsible for the regulation and supervision of non-banking financial institutions. Furthermore, owing to the high degree to which the banking system is internationalised, as reflected in the foreign ownership of the largest banks, the CNB also cooperates 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



The risks to financial stability deriving from the international financial system have reduced, while weaknesses in the real sector have tended to increase the risks. The banking system is highly capitalised and is capable of withstanding even strong, not very likely shocks, and the level of international reserves is sufficient to cushion any possible external shocks.

The main indicators of financial stability in Croatia are summarised in Figure 1. The financial stability map shows the changes in the main indicators of the likelihood of risks arising that relate to the domestic and the international macroeconomic environment and the vulnerability of the domestic economy, as well as indicators of the resilience of the financial system that could eliminate or reduce costs in the event of these risks materialising. The map shows the most recent developments or projec-

tions of selected indicators and their values in the reference periods. Increased distance from the centre of the map for each variable indicates a rise in risk or the vulnerability of the system, that is, of a diminution of its resilience, and accordingly a greater threat to stability. Any increase in the area of the map, then, indicates that the risks for the financial stability of the system are increasing, while a diminution of the area suggests they are slackening.

The resilience of the financial system has remained at a high level. Risks to financial stability from the international financial system have reduced, but the weaknesses in the real sector have acted in such a way as to increase the risks. The expected rates of growth in Croatia and in the main trading partner countries in 2013 have fallen, and a gradual recovery is expected only at the end of the year. On the other hand, the decline in risk premiums in the international financial markets and the very low reference interest rates enable the Republic of Croatia to borrow at relatively acceptable rates.

Nevertheless, it is important to point out that the position of Croatia relative to similar states has deteriorated, and a comparison of risk premiums shows that the markets perceive Croatia as being attended by more risks than most of the countries of Central and Eastern Europe. This is caused primarily by the relatively weaker performances of the economy in the past few years, which has frustrated the implementation of fiscal adjustment and led to a rise in the public debt. In the last few years, public debt has been rising with increasing speed and has approached the 60% of GDP level to which it is tied by the Budget act, and which is also one of the criteria for joining the eurozone. The challenge for economic policy makers is still the implementation of reforms enabling an increase in the rate of growth over the medium term, and thus keeping public debt at a sustainable level, while avoiding the negative short-term effects of fiscal adjustment. Such an economic policy will tend to bring down risk premiums, and the positive effects of such a reduction will be felt by all domestic sectors for the cost of borrowing will come down.

For sustainable greater rates of growth it is necessary to increase exports, for in conditions of relatively high external debt, it is not realistic to found economic growth on domestic consumption. The unsustainably high deficit in the current account of the balance of payments from the pre-crisis period was eliminated, as a result of the fall in imports because of reduced income and a rise in private sector savings. A rise in external debt was thus halted, and foreign risks were contained. The need to retain a deficit in the current account at a considerably lower level than those of the pre-crisis period thus implies that growth of exports has to be transformed into the principal generator of future economic growth.

Contraction of domestic demand, after a period of long-term unsustainable growth in foreign debt and credit in the period before the crisis, is reducing the demand for bank loans. In conditions of increased uncertainty on the labour market, the household sector deleverages. Although the reduction of consumer optimism has been diminished, deleveraging will probably continue until there are visible improvements on the labour market.

Private non-financial companies provide a slight basis for optimism, having registered a gradual increase in borrowing during

the year. For the moment this trend is to quite a large extent concentrated on firms that have foreign owners, which are the most desirable source of financing in a period of tightened credit standards and relatively high prices for credits from domestic banks. Nevertheless, it is important to point out that for any considerable rise in corporate optimism and the concomitant rise in demand for loans, which at the present time continues to be weak, there need to be clearer indications of a recovery of demand for their products and services on the domestic and foreign markets.

In the banking sector the process of gradual reduction of foreign liabilities in conditions of reduced demand, increased risks on the domestic market and high levels of liquidity has continued together with gradual introduction of the model of financing by domestic deposits in the subsidiaries of big European banks that operate in the Central and Eastern Europe. Still, the dynamics of this progress were considerably toned down in 2013. The process has also affected the reduction of the likelihood of renewing the financing of long-term insolvent debtors (whom only the persistent renewal of bank loans has saved from insolvency).

We have already warned of the negative consequences of this kind of financing in this publication (Box 4 Patterns of corporate loaning in crisis conditions, *Financial Stability*, No. 6, January 2011), and we are still monitoring changes in these relations (Box 2 Models of bank financing in the corporate sector). Still relatively long and expensive judicial proceedings have an adverse effect on the process of recognising and collecting on non-performing loans. On the other hand, the current processes of pre-bankruptcy arrangements and changes in the rules concerning the classification of placements, as well as the expected shortening of judicial procedures after entry into the EU, will in the coming period speed up the recognition and collection of non-performing loans. Stopping the practice of renewing the loans of bad debtors should result in the movement of capital to new and profitable projects, in the medium term mitigate the problem of non-performing loans and have a positive effect on the creation of added value in the economy. Although this process is painful for the banks in the short term, because of the reduction of current profitability, in the medium term it will give rise to a more stable and profitable banking system.

From the point of view of financial stability, it is important to point out that the profitability and capital adequacy of the banking system, which was accumulated in a timely manner before the crisis, are sufficient for the gradual implementation of the process described, and the conducted stress test has shown that the banking system is also capable of withstanding possible if not very probable large macroeconomic shocks.

Macroeconomic environment

Notwithstanding a certain improvement on the financial markets and in banking, the prolongation of the recession in the eurozone is the main source of risk for financial stability and is at the same time a constraint on the recovery of a domestic economy founded on exports.

The absence of any economic recovery in the eurozone is the main source of risks to financial stability. ECB activities aimed at stabilising the sovereign bond market and establishing a banking union calmed the financial markets (Figures 4, 5, 6 and 7); nevertheless, risks to financial stability in the eurozone are still great and on the whole derive from the prolongation of the recession which creates a risk of additional losses in bank balance sheets and hinders fiscal consolidation (Tables 1 and 2).

Additional uncertainty derives from the difficulties in formation a system for the handling of problematic banks and the problems of implementing reforming policies in the peripheral countries because of rising social and political tensions. Also present are the pro-cyclical effects of the introduction of Basel III and the anchoring of market players to the new standards, which encourage banks to increase capital adequacy in adverse market conditions. These events enhance the process of bank deleveraging, which has a negative effect on loans and economic recovery.

The recovery of the eurozone economy from what is called a balance sheet recession typical of a period after a financial crisis is extremely long and difficult. The process is exacerbated by the simultaneous deleveraging of the private sector and the necessity for fiscal consolidation in the peripheral countries, which because of the lack of fiscal space have to run a pro-cyclical fiscal policy, as well as the absence of a mechanism

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

	Annual GDP growth rate			Quarterly GDP growth rate, $\Delta Q/Q_{t-1}$		Annual rate of change in exports of goods		Annual rate of change in industrial production (seasonally adjusted)	
	2011	2012	2013 ^a	Q4/2012	Q1/2013	Q4/2012	Q1/2013	Q4/2012	Q1/2013
USA	1.8	2.2	1.9	0.1	0.6	2.0	0.9	1.9	1.7
EU	1.6	-0.3	-0.1	-0.6	-0.2	1.6	-0.8	-3.1	-1.9
Germany	3.0	0.7	0.4	-0.7	0.1	1.1	-1.7	-2.1	-2.0
Italy	0.4	-2.4	-1.3	-0.9	-0.6	2.6	-0.9	-7.0	-4.3
Slovenia	0.6	-2.3	-2.0	-1.0	-0.7	-0.6	1.1	-2.3	-0.8
Slovak R.	3.2	2.0	1.0	0.1	0.2	6.3	4.8	4.7	2.0
Czech R.	1.9	-1.3	-0.4	-0.3	-1.1	3.4	-4.1	-5.2	-2.7
Poland	4.5	1.9	1.1	0.0	0.1	4.1	2.4	-1.8	-0.9
Hungary	1.6	-1.7	0.2	-0.4	0.7	0.7	0.7	-4.8	-0.9
Estonia	8.3	3.2	3.0	0.6	-1.0	9.4	7.7	1.7	4.9
Latvia	5.5	5.6	3.8	1.4	1.4	13.5	3.6	5.7	-1.0
Lithuania	5.9	3.6	3.1	0.7	1.3	21.4	16.7	8.6	6.4
Bulgaria	1.8	0.8	0.9	0.1	0.1	-2.3	12.2	1.1	2.5
Romania	2.2	0.7	1.6	1.0	0.7	-5.7	4.8	3.3	6.0
Croatia ^b	0.0	-2.0	-1.0	-0.7	-0.5	7.4	-7.8	-5.2	1.3

^a Forecast. ^b The seasonal adjustment methodology of Croatia's GDP has been presented in the manuscript titled Description of the X-12 seasonal adjustment methodology that is available at request.

Sources: Eurostat, CBS, Bloomberg, OECD and CNB (for Croatia).

for coordinating economic policies capable of ensuring fiscal expansion in the countries of the eurozone that have the necessary fiscal space (Tables 1, 2 and 3).

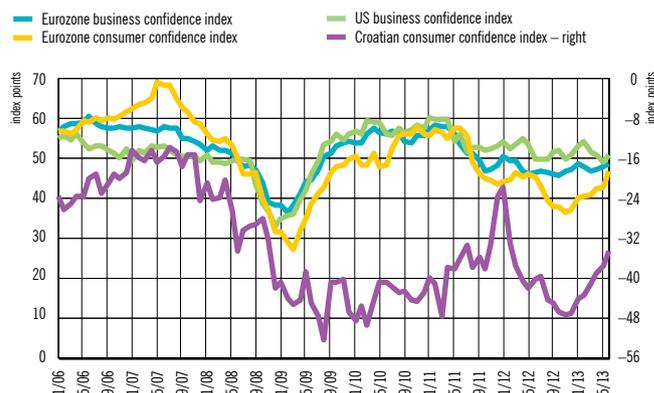
In such conditions the only impulse to eurozone recovery in the real sphere can come from the improvement of external balances, which is not enough for any very strong recovery, because of the considerable imbalances within the eurozone and the aggregate surplus in current account balances in the eurozone. In addition, this process has on the whole to date unfolded via contraction of the imports of the peripheral European countries, while potential growth can be strengthened only by an expansion of their exports (Table 2). Apart from the insufficient structural reforms capable of increasing competitiveness, particularly in the non-price segment, slow export growth is also affected by the weakening of economic growth in China, Russia and other large economies.

A long-term solution of the crisis requires a much higher level of economic and political integration. Mitigation of the austerity policy in the over-indebted countries, which has been partially implemented by extending the deadlines for fiscal consolidation, could possibly have short-term positive effects on demand and growth. But for a sustainable long-term growth, it will be necessary to place the debts of heavily indebted countries under supervision.

Expansion of the balance sheets of the main central banks helps recovery, but also increases the risk of future financial crisis. The aggressive easing of the policy carried out by the monetary

authorities in the USA and Japan is having a positive effect on real economic activity in these countries. But at the same time concern is growing that such a policy can result in overheating on the financial markets and bring about a gap between asset prices and economic fundamentals, which in consequence can increase the probability of the outbreak of a new financial crisis (Table 1, Figure 3).

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	2013 ^a	2011	2012	2013 ^a
USA	-10.1	-8.9	-6.9	-3.3	-3.0	-2.8
EU	-4.4	-4.0	-3.4	0.1	0.9	1.6
Germany	-0.8	0.2	-0.2	5.6	6.4	6.3
Italy	-3.8	-3.0	-2.9	-3.1	-0.5	1.0
Portugal	-4.4	-6.4	-5.5	-7.2	-1.9	0.1
Ireland	-13.4	-7.6	-7.5	1.1	5.0	3.1
Greece	-9.5	-10.0	-3.8	-11.7	-5.3	-2.8
Spain	-9.4	-10.6	-6.5	-3.7	-0.9	1.6
Slovenia	-6.4	-4.0	-5.3	0.1	2.7	4.8
Slovak R.	-5.1	-4.3	-3.0	-2.5	2.0	2.5
Czech R.	-3.3	-4.4	-2.9	-3.9	-2.6	-2.4
Poland	-5.0	-3.9	-3.9	-4.5	-3.3	-2.5
Hungary	4.3	-1.9	-3.0	1.0	1.9	2.5
Estonia	1.2	-0.3	-0.3	0.6	-3.1	-2.2
Latvia	-3.6	-1.2	-1.2	-2.4	-1.7	-2.1
Lithuania	-5.5	-3.2	-2.9	-3.7	-0.5	-1.0
Bulgaria	-2.0	-0.8	-1.3	0.1	-1.1	-2.6
Romania	-5.6	-2.9	-2.6	-4.5	-4.0	-3.9
Croatia	-5.2	-3.8	-4.8	-0.9	0.0	1.3

^a Forecast.

Sources: European Commission, *European Economic Forecast*, spring 2013 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	2013 ^a	2010	2011	2012
Italy	120.8	127.0	131.4	118.3	115.0	122.9
Portugal	108.3	123.6	123.0	230.6	217.9	237.3
Ireland	106.4	117.6	123.3	1110.9	1062.2	1021.0
Greece	170.3	156.9	175.2	184.5	177.4	229.8
Spain	69.3	84.2	91.3	164.8	164.9	170.0
Slovenia	46.9	54.0	59.0	115.2	111.3	117.3
Slovak R.	43.3	51.7	54.3	76.0	76.7	73.9
Czech R.	40.8	45.1	46.9	48.0	46.8	51.6
Poland	56.4	55.5	55.8	67.4	67.0	73.8
Hungary	81.4	78.4	77.1	161.5	161.6	159.6
Estonia	6.1	10.1	11.1	115.9	97.2	99.8
Latvia	42.2	41.9	44.3	164.6	145.5	138.1
Lithuania	38.5	41.6	40.8	83.0	77.8	77.1
Bulgaria	16.3	19.5	18.1	105.5	95.0	98.4
Romania	33.4	34.6	34.8	75.8	76.1	77.4
Croatia	47.2	53.7	58.9	103.6	101.8	102.7

^a 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

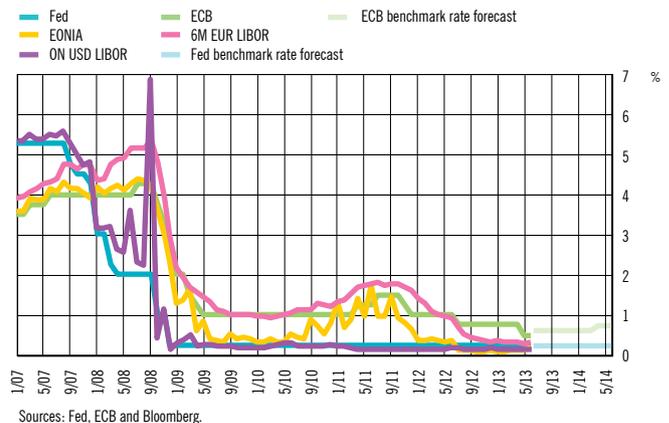


Figure 4 CDS^a spreads for 5-year bonds of selected eurozone countries

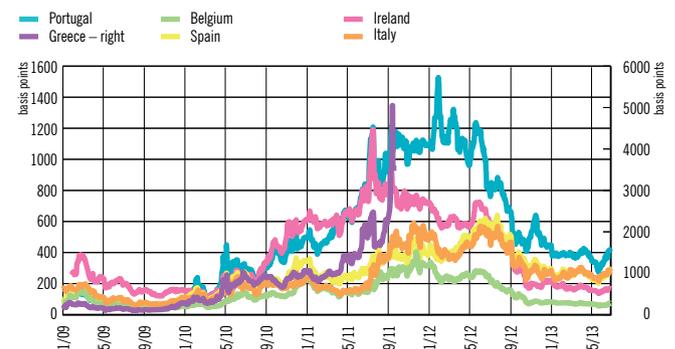


Figure 5 CDS spreads for 5-year bonds of selected banks

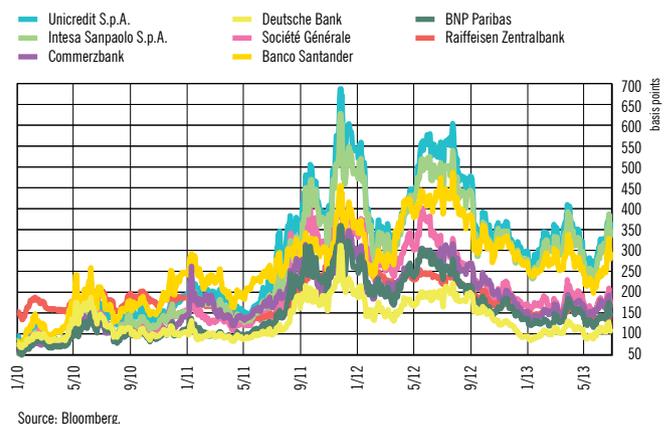


Figure 6 CDS spreads for 5-year bonds of selected emerging market countries

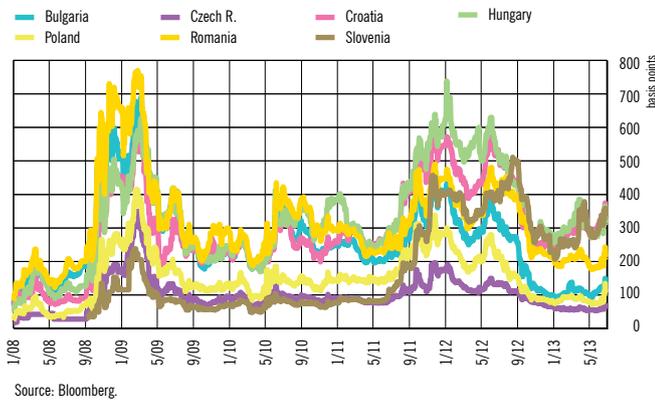


Figure 7 EMBI spreads

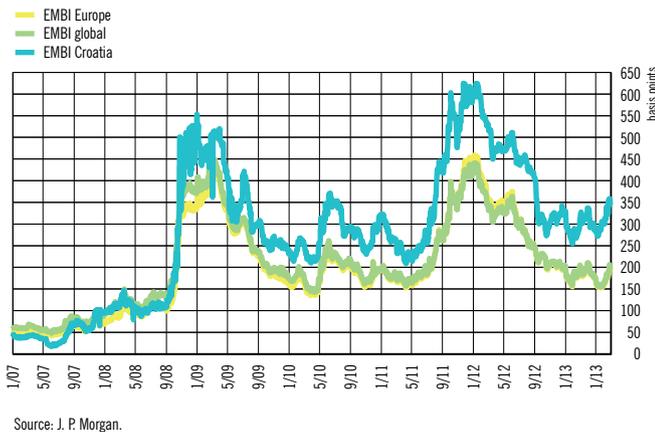
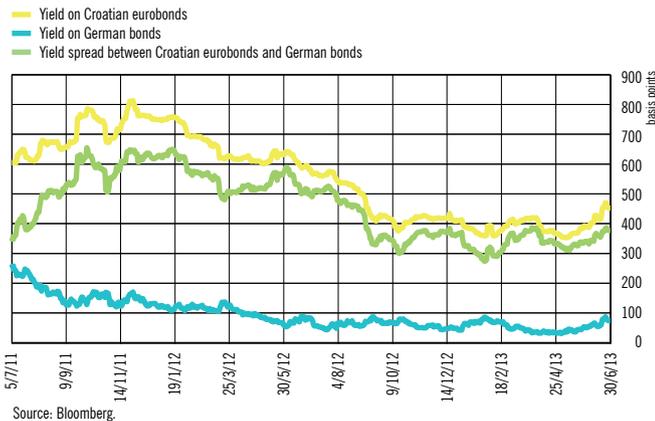


Figure 8 Yields on Croatian and benchmark German bonds maturing in 2018 and their spread



In its endeavours to help in the way out from the recession the ECB, as well as offering programmes for expanding balance sheets, has reduced its key rate of interest, but has not managed to re-establish the functioning of a transmission mechanism, and financial markets in the eurozone have remained fragmented, which holds up recovery (Figure 3). The announcement of the possibility of the introduction of outright monetary transactions (OMT), although they have not really been implemented, aided by the decision to establish banking union, managed to convince the markets that investment in the bonds of peripheral countries was less risk-laden. This resulted in a fall of the risk premium and yields on sovereign bonds and a smaller short-term oscillation connected with the crisis of the Cypriot banking sector (Figures 4 and 5). This has been aided by a balancing of external balances of the peripheral countries, which shows that budget deficits, as long as there is no capital outflow, could be financed at the expense of domestic sector surpluses without resorting to any considerable net financing from abroad (Table 2).

The trends described also resulted in a fall in the costs of financing for major corporates, but interest rates on loans to small and medium-sized firms in the peripheral countries are still high. The ECB accordingly is endeavouring to find new models with which to incentivise the flow of loans to that sector and thus set off the recovery of activities and employment. Recent initiatives for channelling considerable resources in the form of favourable EIB loans to small firms and youth employment are aimed in the same direction.

Weak loan activities are also affected by the fact that a good deal of the banking sector in the eurozone is still burdened with non-performing loans that continue to grow because of the recession, which discourages banks from relaxing loan conditions. This is exacerbated by the demands of regulators for an increase in bank capitalisation, concomitant with a simultaneous meagre supply of long-term capital, which encourages bank deleveraging. The poor supply of long-term financing to banks is partially affected by the model for solving the Cyprus banking crisis, which, so as to maintain the long-term sustainability of the public debt, involved not only shareholders and bond holders in covering the losses, but also unsecured deposits. This manner of resolving the banking crisis was interpreted by markets as a probable sign of the forms of future mechanisms for resolving a banking crisis at EU level.

For this reason for further calming of the financial and economic crisis in the eurozone the solution that by the middle of 2013 will supplement the proposal for a single resolution mechanism for banks in difficulties will be of great importance. It should provide a clear image as to who will bear the burden of resolving bank insolvency, and also determine the connection between the bank system and public finances in individual countries. Compromise proposals aim at a strong reliance on the involvement of shareholders and creditors (a bail-in, as it is called), with protection of deposits, and, if necessary, financing from a common fund. It seems that, in addition to the legal problems, the greatest obstacles for finding a solution are of a political character, which reflect in addition to day to day political factors the still

unresolved problems of a long-term vision for the eurozone and the EU and disagreements about the level of fiscal and political integration up to which member states are ready to transfer their national sovereignty to the common European institutions.

In such conditions, banks from the eurozone continue to be restrained in the financing of the needs of European countries from the emerging markets. Hence mainly to be credited with a slight rise in the flow of capital is an increased inflow of portfolio investment of global investors in search of higher yields in conditions of a wash of liquidity on the main world markets (Figure 9).

At the same time banks are changing their operating models in the region of SE Europe, making subsidiary banks more reliant on domestic financing. This results in a gradual reduction of the exposure of parent banks from the eurozone to their subsidiaries, on the whole by the reduction of loans and deposits, but only in rare cases by capital withdrawal. In conditions of reduced demand for loans, this does not have at the present time any very considerable negative effects on the supply.

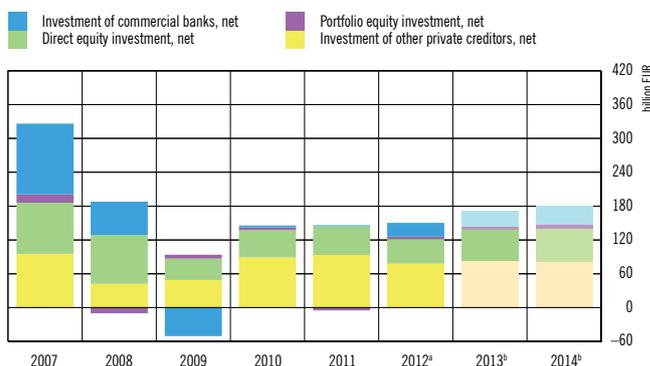
This progress is coordinated within the framework of the Vienna 2 initiative, and with the establishment of unified control by the ECB, of a single resolution mechanism and a deposit insurance system as the main pillars of a banking union, which members of the EU outside the eurozone can also join; this will create a still stronger framework, reducing the possibility of creating excessive vulnerabilities, and at the same time of unexpected disturbances in cross-border interbank capital flows.

Processes characteristic of peripheral eurozone countries are present in Croatia as well. Because of the great financial integration via parent banks and real connections via the business cycle, because the main export markets are eurozone countries, Croatia in practical terms has to share the problems and fates of eurozone member countries and has no very great manoeuvring space for an autonomous macroeconomic policy.

Thus the negative growth of the Croatian economy in the last quarter of last and the first quarter of this year is correlated with adverse trends in the eurozone (Table 1, Figure 10). Poor foreign demand is an additional obstacle to demand in conditions in which domestic demand, because of the relatively high debt levels of all domestic sectors and of vigorous imports, in other words of restricted possibilities for an increase of foreign and domestic debt, cannot provide an impulse to sustainable growth (Figures 11, 13 and 21).

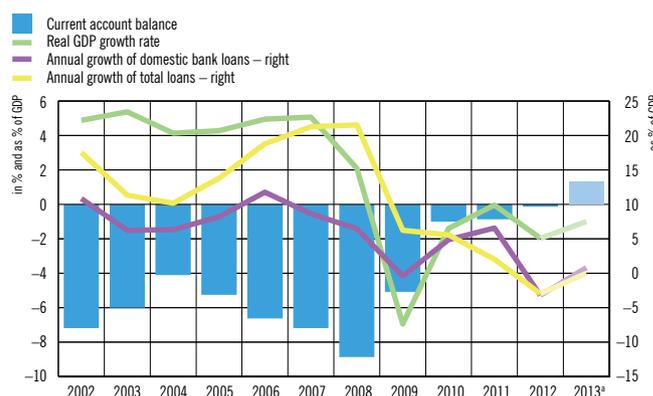
Such trends resulted in an overall 2% fall of GDP in 2010, and the transferred low level from the end of the year, in spite of the slower decline in the first quarter and the expected gradual recovery in the second half of the year, will also tend to bring about an annual fall of GDP in 2013 as well, estimated to come to about 1.0% (Figures 10 and 11). In such conditions the fall in employment and the rise in unemployment as well as of the total inactive population will continue (Figure 25).

Figure 9 Capital inflows to European emerging market countries



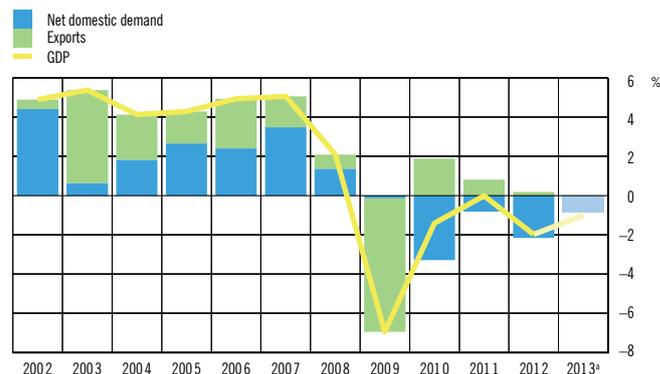
^a Estimate. ^b Forecast.
Source: International Institute of Finance, *Capital Flows to Emerging Market Economies*, January 2013.

Figure 10 Foreign capital inflows and GDP growth in Croatia



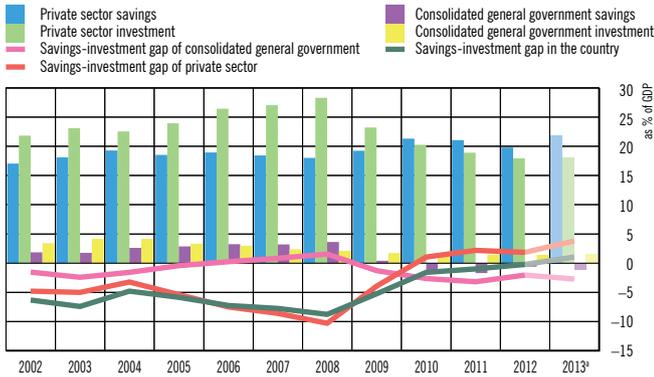
^a Forecast.
Sources: CBS and CNB.

Figure 11 GDP growth pattern (contribution to growth)



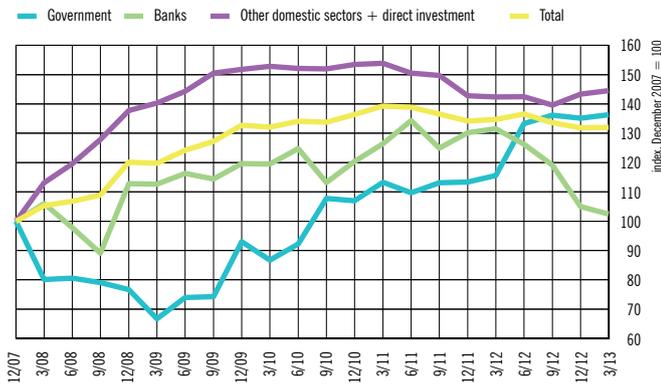
^a Forecast.
Source: CBS.

Figure 12 Savings and investment – total and by sector



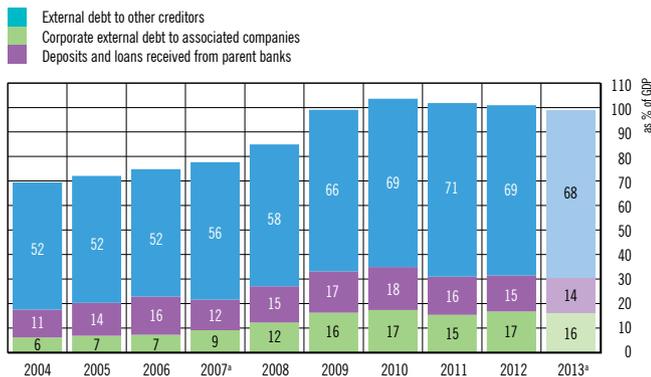
^a Forecast.
Sources: MoF and CNB (estimate).

Figure 13 External debt by domestic institutional sector



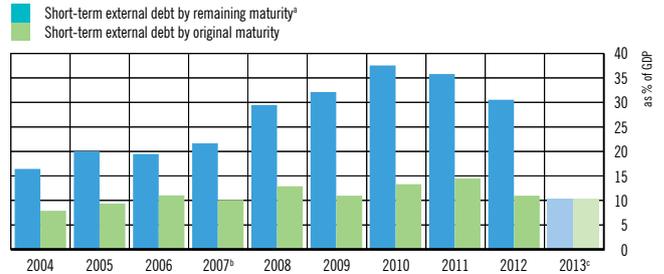
Source: CNB.

Figure 14 Total external debt by creditor



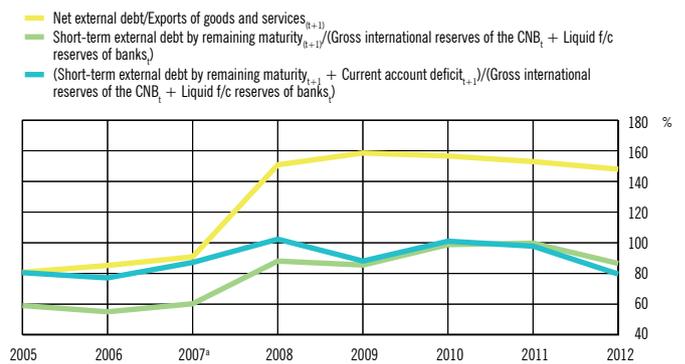
^a Since end-2007, external debt has been calculated according to the new methodology. ^b Forecast.
Source: CNB.

Figure 15 Short-term external debt



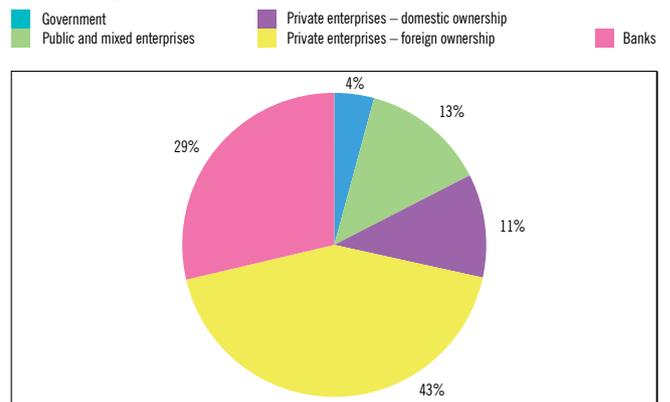
^a Short-term external debt by remaining maturity is the amount of debt maturing in the reference year, representing the sum of the balance of short-term debt at the end of the previous year and long-term debt maturing in the reference year.
^b Since end-2007, external debt has been calculated according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

Figure 16 Selected indicators of external vulnerability



^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

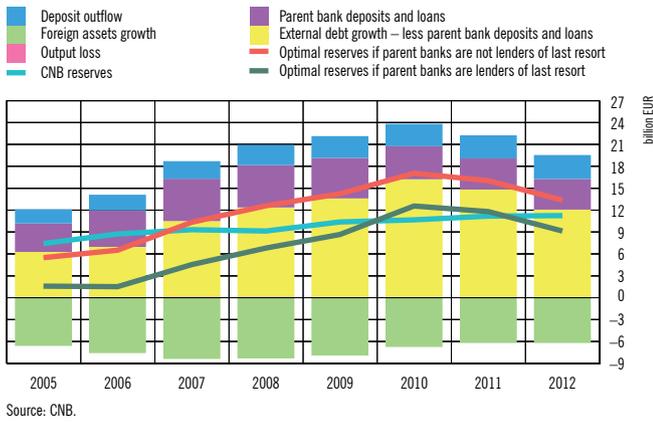


Figure 21 Total debt by sector

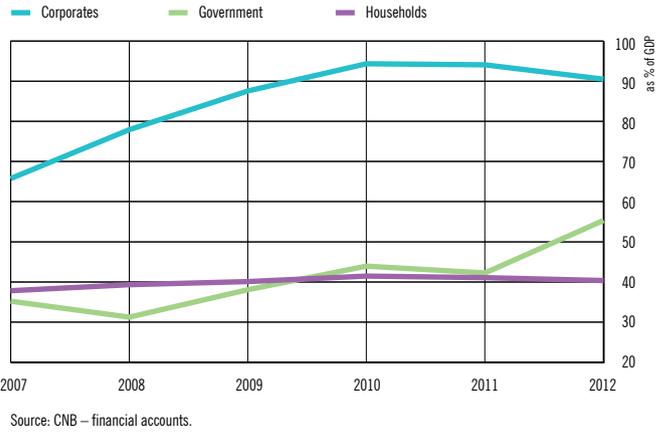


Figure 19 Real kuna/euro exchange rate

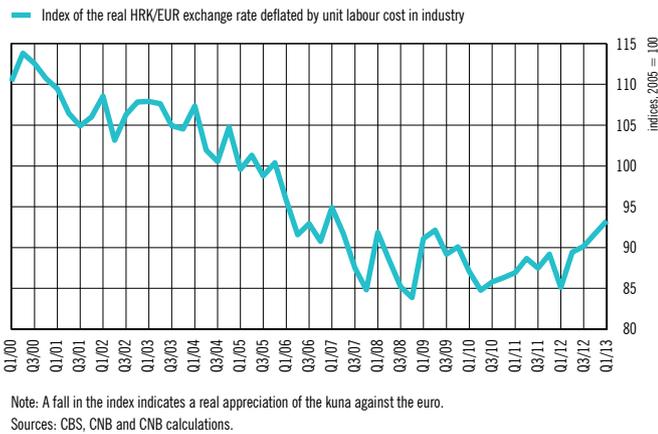


Figure 22 Net position of domestic sectors with respect to the rest of the world by instrument

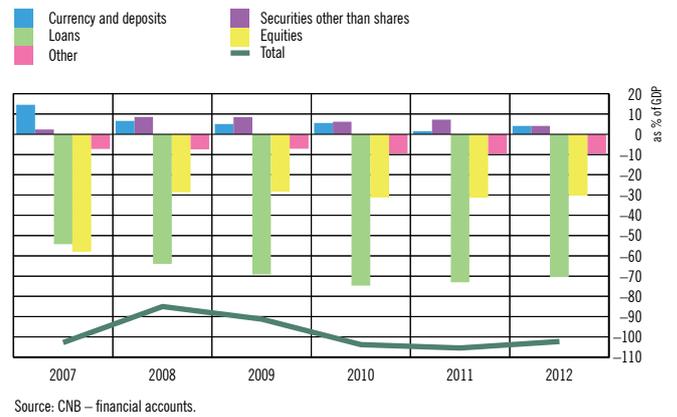


Figure 20 Unit labour cost

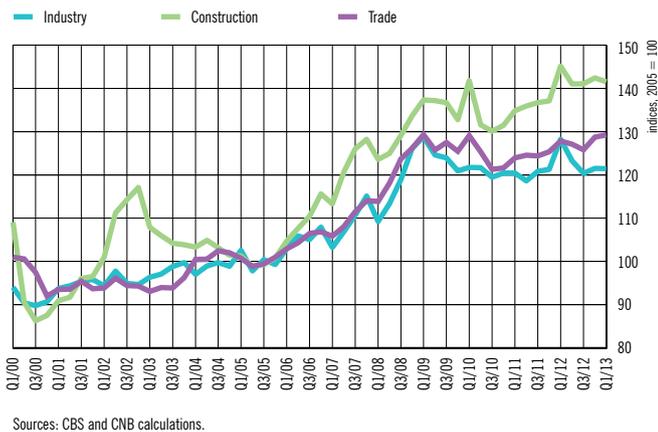


Figure 23 Net financial position of selected domestic sectors with respect to the rest of the world by equity and debt instrument

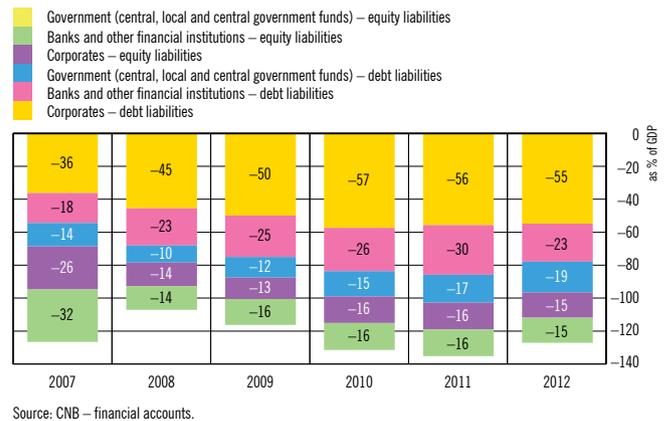
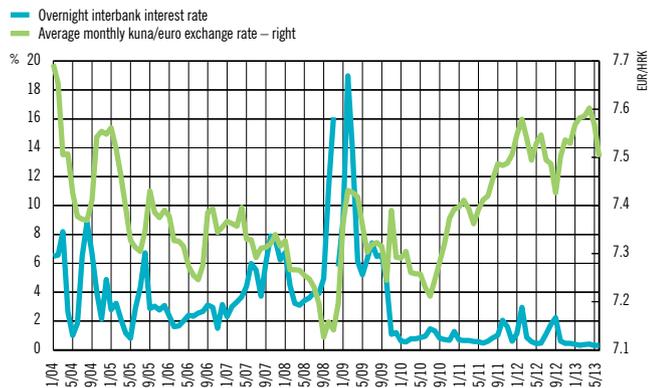
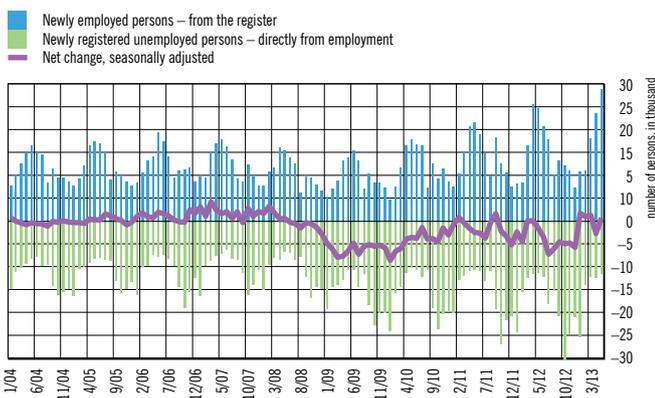


Figure 24 Kuna/euro exchange rate and overnight interest rates



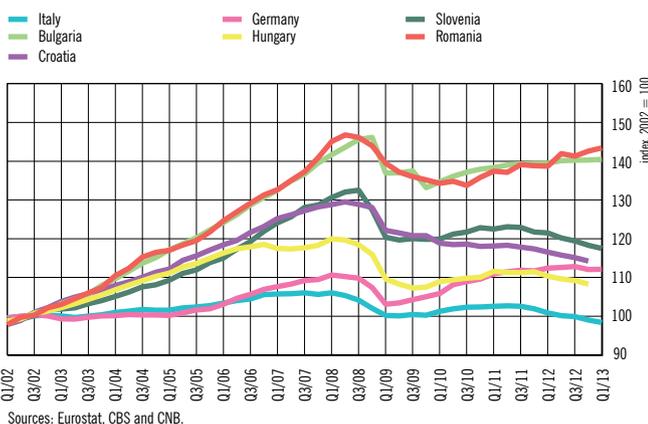
Source: CNB.

Figure 25 Changes in employment registered with the Croatian Employment Service (CES)



Sources: CES and CNB calculations.

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



Sources: Eurostat, CBS and CNB.

Space for fiscal stimulus to recovery is restricted because of the relatively high risk to the sustainability of the public debt (Table 3). In conditions of general improvement of the conditions on the financial markets, or the fall of global risk aversion linked with the mentioned undertakings of the chief central banks and the calming of the debt crisis in the eurozone after the move of the ECB, the government has managed to obtain a considerable part of this year's needs for borrowing by issuing bonds on the American market.

This was also assisted by a budget revision, according to which the planned deficit of general government, which originally came to HRK 13.8bn, was reduced to HRK 12.1bn, because of which the need for borrowing was reduced. But the 5.625% yield asked on the bond at issue, although much more favourable than that produced in the previous borrowing in 2012, still indicates the relatively high risk premium that the markets require (Figure 6).

This is above all a reflection of the concern about the sustainability of the debt in view of the negative rates of economic growth; in the shortage of fiscal space, getting growth moving by increasing competitiveness and improving the investment climate will remain the main orientation of economic policy.

Favourable trends in the balance of payments facilitate the implementation of the monetary strategy of a stable exchange rate aimed at the preservation of low inflation and financial stability. The closing of the deficit in the current account balance in 2012 and 2013, which is on the whole of a cyclical nature, and somewhat fewer financial obligations due, reduced the need for foreign financing and created a space for the slight reduction of the foreign debt (Figures 10, 13, 14 and 15).

Such trends in the balance of payments and in foreign liabilities improved foreign liquidity indicators and kept international reserves at a level capable of mitigating any potential shocks to the foreign currency liquidity of the country (Figures 16 and 18).

This also ensured the successful implementation of the monetary strategy for preserving the exchange rate of the kuna against the euro, which is aimed at sustaining a relatively low rate of inflation (about 3% in 2012 and, according to expectations, 2.4% in 2013) as well as the stability of the financial system, which, on account of the high degree euroisation, is vulnerable to any major change in the exchange rate (Figure 23).

Although they are well capitalised, because of the long-lasting recession the banks are burdened with a high and rising level of non-performing loans, and show great risk aversion and are restrained in making loans, particularly to small firms. Accordingly, the makers of economic policy are still faced with the important challenge of finding effective models, following up those in existence that go via the CBRD, for the government to share risks with banks and thus stimulate a growth in loans to those companies whose activities can have positive effects on the balance of payments.

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	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	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	4	3	6
	Loans	0	0	44	41	0	0	0	0	44	41	45	43	91	84
	Shares and equity	25	28	3	3	31	30	17	16	76	78	23	22	112	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	0	0	2	2	36	37	12	12	49	49
	Total	69	61	50	48	32	30	20	19	171	158	84	82	255	239
Financial sector	Monetary gold and SDRs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Currency and deposits	13	12	20	21	3	2	57	58	93	94	17	12	105	107
	Securities other than shares	0	0	0	0	0	0	0	0	0	1	2	1	3	2
	Loans	0	0	7	8	0	0	0	0	7	8	23	22	30	30
	Shares and equity	1	1	3	3	10	10	3	3	17	17	18	18	36	35
	Insurance technical provisions	1	1	1	1	0	0	18	22	20	23	0	0	18	23
	Other claims and liabilities	1	1	0	0	1	1	2	1	4	3	1	1	4	4
	Total	18	16	29	33	13	13	76	85	137	147	60	54	197	201
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	23	25	0	0	0	0	23	25	12	14	31	39
	Loans	0	0	12	12	0	0	0	0	12	12	5	5	12	17
	Shares and equity	2	2	0	0	27	26	0	0	29	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	7	0	0	0	0	0	0	6	7	0	0	4	7
	Total	4	9	28	36	30	26	0	0	62	72	15	19	76	91
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	41	40	0	0	0	0	41	40	0	0	41	40
	Shares and equity	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Insurance technical provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other claims and liabilities	0	0	1	1	0	0	0	0	1	1	0	0	1	1
	Total	0	0	42	41	0	0	0	0	42	41	0	0	42	41
Rest of the world	Monetary gold and SDRs	0	0	1	1	0	0	0	0	1	1	0	0	1	1
	Currency and deposits	0	0	14	12	0	0	3	3	18	15	0	0	19	15
	Securities other than shares	0	0	22	24	0	0	0	0	22	24	0	0	21	24
	Loans	0	0	1	1	0	0	0	0	1	1	0	0	1	1
	Shares and equity	7	7	3	3	0	0	0	0	10	10	0	0	14	10
	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	10	42	41	0	0	3	3	59	54	0	0	59	54
Total	Monetary gold and SDRs	0	0	1	1	0	0	0	0	1	1	0	0	1	1
	Currency and deposits	15	12	35	34	3	2	57	62	110	110	15	12	124	122
	Securities other than shares	0	0	43	51	0	0	0	0	43	51	15	20	57	71
	Loans	0	0	99	101	0	0	0	0	100	102	75	70	175	172
	Shares and equity	52	38	9	9	66	67	22	19	149	133	44	40	193	173
	Insurance technical provisions	1	1	1	1	0	0	17	22	19	24	0	0	19	24
	Other claims and liabilities	37	44	3	3	6	1	4	4	50	52	11	13	61	64
	Total	105	96	191	199	75	70	99	107	470	472	159	155	630	627

Source: CNB.

Box 1 Systemic risk indicators

There is a great likelihood that over the course of time a financial system will accumulate a certain risk level that might threaten it and compromise its stability as well as making the unhindered process of financial intermediation impossible. If such a risk is materialised, it is referred to as a systemic event¹, which is defined as an acute episode of financial instability, while a systemic risk is the risk of a systemic event actually occurring. Although systemic events occur relatively rarely, their consequences are usually manifested in extremely high costs shared by the whole of the society. Hence understanding systemic risk has a key place in considerations of financial stability, i.e. in decision making about measures and instruments for it to be preserved and strengthened.

One of the basic objectives of analysing and monitoring systemic risk is to provide a timely recognition of the appearance of financial vulnerabilities connected with a given kind of instrument, financial markets and financial institutions² and an evaluation of the likelihood of the occurrence of a systemic event and its consequences to the financial and real sector. From the perspective of macroprudential policy makers it is important to point out that early observation of an accumulation of systemic risk can be crucial for the prevention of a future crisis episode, for it provides the regulators and the financial sector time enough to act preventively with adequate measures and instruments on the accumulation of risks and to increase the resilience of the system and provide adequate capital and liquidity buffers capable of being implemented if the shocks should occur.³

The selection of proper indicators capable of giving timely warning of the appearance or accumulation of systemic risks in a system is thus one of the biggest challenges of macroprudential policy. The problem in the process of analysing financial stability, that is, of potential sources of systemic risk and resilience of the financial system to possible crisis episodes is the existence of a large number of variables that might perhaps be important for the financial stability and trends in the real sector. For this reason in the literature, composite indices are often used, summing up much information obtained on the basis of individual macroeconomic financial and other indicators. Such indicators reflect the state of financial stability or systemic risk and can make it easier for economic policy maker and market participants as well to monitor and understand the degree of financial stability in the system and enable them to predict possible sources and triggers of financial stress and crisis episodes.⁴ Such indicators can also be a useful tool in the communications of economic policy makers and the public, in explaining the decisions about the use of measures aimed at strengthening and preserving the risk-resilience of the financial system.

1 *Models and tools for macroprudential analysis*, Working Paper No. 21, May BIS.

2 Schou-Zibell, L., J. R. Albert and L. L. Song (2012): *A Macroprudential Framework for Monitoring and Examining Financial Soundness*, Discussion paper series No. 2012-22, 2012, Philippine Institute for Development Studies.

3 *Global Financial Stability Report: Grappling With Crisis Legacy*, Chapter 3 Toward Operationalizing Macroprudential Policies: when to act, World Economic and Financial Surveys, IMF, September, 2011.

4 Gadanez, B., and K. Jayaram (2009): *Measures of financial stability – a review*, BIS, Proceedings of the IFC Conference on “Measuring financial innovation and its impact”, Basel, August 26-27 2008, Vol. 31, pp. 365-380.

The variables to be used in a calculation of a composite index have to reflect the structure of the financial system and the macroeconomic specificities of a given country. In order to avoid the use of arbitrary methods for determining the variables to be included in the systemic risk analysis and to be able to obtain a single indicator out of a large number of variables, or a composite index or factor, in the literature the principal component analysis method is often used. In this method the data are transformed in such a way that in a small number of constructed series as much information as possible is retained from the initial set of variables. In this manner it is also possible to determine the relative importance of individual variables that affect financial stability and the trending of the main factors obtained with this method.

In order to obtain information about financial stability in Croatia, risk indicators are divided into indicators that contain information about the process of the accumulation of systemic risk in the system and indicators that indicate the materialisation of previously accumulated risks. The counter-cyclical action of macroprudential policy would imply that the process of the accumulation of risk should be prevented and slowed down and that in periods when the risks have built up, before they actually materialise, a policy directed at the strengthening of system resilience to possible shocks should be conducted, to be used for the stabilisation of the system if and when the risks materialise.

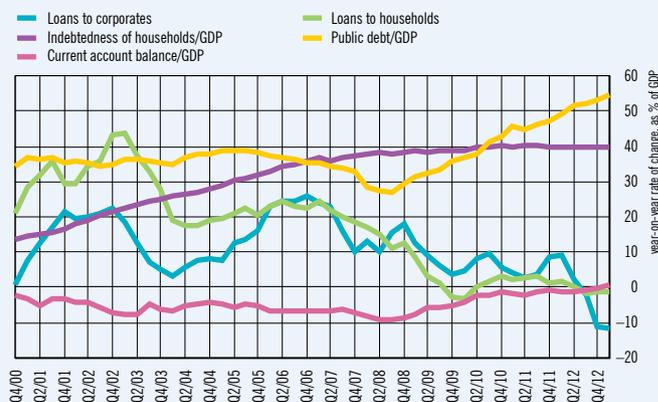
The risk accumulation index (IAR) is composed of 14 variables (Table 1), and the risk materialisation index (IMR) consists of seven variables (Table 2). Quarterly data for the period from the first quarter of 2002 to the first quarter of 2013 are taken for the computation. Both indexes are defined as the first principal component obtained by the principal components method analysis:

$$IAR_t = \mathbf{x}_t \alpha$$

$$IMR_t = \mathbf{y}_t \alpha,$$

where α is a weight vector having dimension 14 x 1 (or 7 x 1) and \mathbf{x}_t (or \mathbf{y}_t) is 1 x 14 (or 1 x 7) vector of the value of the indicator on the basis of which the indices are evaluated (Tables 1 and 2). The weights reflect the contribution of a given indicator in the explanation of the common

Figure 1 Components of indicators of risk accumulation



Sources: CNB, HANFA, MoF and CBS.

Figure 2 Indicator of risk accumulation



Source: Author's calculation.

Table 1 Indicators suggesting accumulation or decrease of the systemic risk in the system

Sources of accumulation of systemic risk	Indicators
Structure of assets with respect to interest rate variability	Loans by interest rate variable within 1 year/ total loans
Currency structure of assets and liabilities	Loans indexed to foreign currency/total loans
	Foreign currency deposits/total deposits
Corporates	Indebtedness of corporates/GDP
	Rate of change in corporate loans
Households	Indebtedness of households/GDP
	Households debt/disposable income
	Rate of change in household loans
Real estate	Hedonic real estate price index
Macroeconomic trends	External debt/GDP
	Public debt/GDP
	Current account balance/GDP
Financial markets	Prices of shares

Source: CNB.

trend of all the indicators included into the calculation of the individual index constructed on the basis of the first principal component.

The indicator of the process of accumulation of risk in the system suggests that the most risks were accumulated in the system in the period before the recent financial crisis (Figure 2). On the basis of the loading parameters it can be concluded that the most influence was exerted on the process of risk accumulation in the system by the rates of changes of loans to the private sector, the total indebtedness of the household sector, the degree of euroisation and the trend in the public debt.

Risk accumulation in the system started as early as 2002; deceleration of the process in 2003 was primarily related to the then rule of the CNB directed at the cooling of the credit expansion and foreign borrowings of banks. For at the beginning of 2003, the CNB tightened measures of monetary policy and introduced sanctions against the rise of domestic

loans made by commercial banks of more than 16% a year, or 4% a quarter, which resulted in a considerable deceleration of the speed of credit activity compared to the previous period.

In the period from mid-2004 to mid-2007, the main generators of the risk accumulation process in the system were the high rates of growth of loans to the corporate and private sectors and a strong increase of their total indebtedness as measured in terms of GDP. A high deficit in current account balances also contributed to the accumulation of risks in the period observed. Reduction of the degree of euroisation measured by the proportion of foreign currency deposits in total deposits and the ratio of foreign currency loans to total loans that marked a larger part of the pre-crisis period worked in the opposite direction.

The process of risk accumulation started to slow down in the first signs of the world financial crisis, appearing in mid-2007, and in the period after the escalation of the crisis in the last quarter of 2008 in essence held steady. In an interpretation of Figure 2, it is important to realise that the low level of risk accumulation does not necessarily have to mean a reduction of overall level of risk, which becomes clearer when the individual components of the index are considered, on the basis of which it might be possible to conclude that the total achieved level of most of them (public debt, total indebtedness of firms and retail sector, foreign debt) indicated an increased risk, which was reduced slightly only in some segments, while the degree of euroisation actually increased.

It has to be pointed out that during the whole of the period the CNB employed various monetary and macroprudential measures and instruments with which, on the one hand, the resilience of the system to shocks was increased and on the other the process of risk accumulation, which would have been still more pronounced without them, was mitigated. As well as the loan growth restriction in 2003, worth mentioning among the most important measures and instruments in this context are the high level of general reserve requirements, the decision on the obligation to maintain minimal foreign currency claims, the decision on the obligation to set aside marginal reserve requirements against increases in the foreign liabilities of banks, the introduction of a special reserve requirement, introduction and increase of capital requirements for currency induced credit risk, increase in the capital adequacy requirement, foreign currency interventions on the whole aimed at alleviating pres-

Table 2 Indicators suggesting materialisation of previously accumulated risks

Sources of materialisation of systemic risk	Indicators
Corporates	NPL to total loans ratio – corporates
Households	NPL to total loans ratio – households
	Household interest/income
Macroeconomic trends	Survey unemployment rate
	Inflation
	Weighted exchange rate according to the structure of the assets of commercial banks
Financial markets	Risk premium for Croatia – EMBI yield spreads

Source: CNB.

tures on the appreciation of the domestic currency that resulted in an increase in international reserves and the introduction of the highest permissible non-penalised rate of credit growth of 12%.⁵

Apart from the process of risk accumulation, for the creation of a fuller image of financial stability it is necessary to observe indicators of risk materialisation. Index of risk materialisation covers indicators of the quality of the assets of commercial banks, macroeconomic trends and trends on the financial markets.

In the period up to the escalation of the financial crisis most of the indicators observed had improved considerably. The ratio of non-performing to total loans had reduced for both the corporate and the household sector, the survey unemployment rate was also continually falling, inflation was low, the exchange rate weighted according to the structure of the assets of commercial banks (loans in kuna, euros and francs are included) had on the whole slightly appreciated, and the risk premium for the country, on which the cost of foreign borrowing depended, had the lowest recorded level. Although this was an apparently stable period marked by positive trends and a relatively powerful economic growth, Figure 5 shows that it was then that most of the imbalance and systemic risk was accumulated, risk that would begin to be materialised in mid-2007 and with the strengthening of the world financial crisis.

Results of the analysis indicate that the major part of the materialised risk related to risks in bank balance sheets that were manifested in a surge in non-performing in total loans to companies and on a slightly smaller scale to the retail sector, along with the trends in the exchange rate weighted by the structure of commercial bank assets and with a powerful increase in the risk premium of the country, which resulted in a considerable rise in the costs of borrowing at home and abroad.

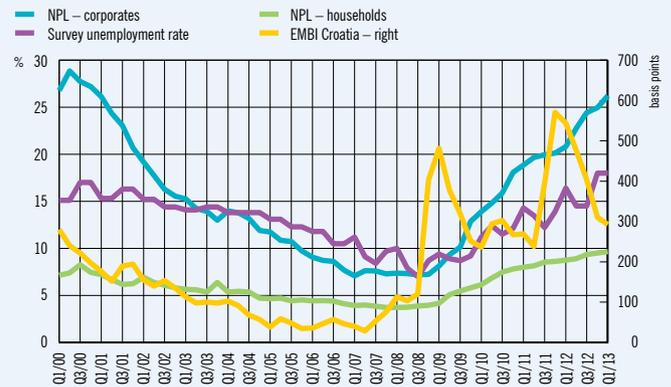
From all this it can be concluded that the process of risk accumulation in Croatia was to the greatest extent linked with strong borrowing from the private sector and government units, which is in line with the findings of most of the authors who deal with the crisis episodes. In numerous research papers, it is seen to be precisely the excessive rise in loans and exaggerated optimism in loan activities that have been identified as the key characteristics of the financial and banking crises.⁶ A strong loan activity in the pre-crisis period might have considerably exacerbated the effect of the transmission of the crisis from financial mediators to the real sector and vice-versa⁷, while the typical pattern of risk accumulation on this basis implies that a strong growth of loans to the private sector stimulates a relatively even stronger rise in aggregate demand as against potential growth, which leads to the economy overheating and the growth of macroeconomic imbalances, for bank loans often result in a growth in spending and imports, in other words an

5 For more about the measures and instruments of the monetary policy and the macroprudential policy, see Annual Reports of the CNB.

6 *The role of macroprudential policy*, Bank of England Discussion Paper, November 2009, Bank of England; Kaminsky, G., and C. M. Reinhart (1999): *The Twin Crises: The Causes of Banking and Balance-of-Payments*, American Economic Review.

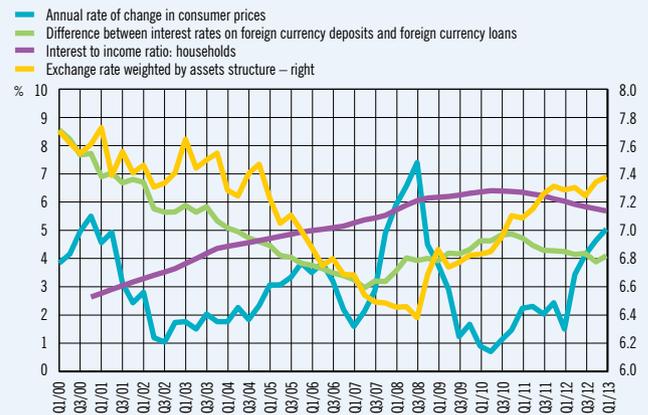
7 *Global Financial Stability Report: Grappling With Crisis Legacy*, Chapter 3 Toward Operationalizing Macroprudential Policies: when to act, World Economic and Financial Surveys, September 2011, IMF.

Figure 3 Components of indicators of risk materialisation



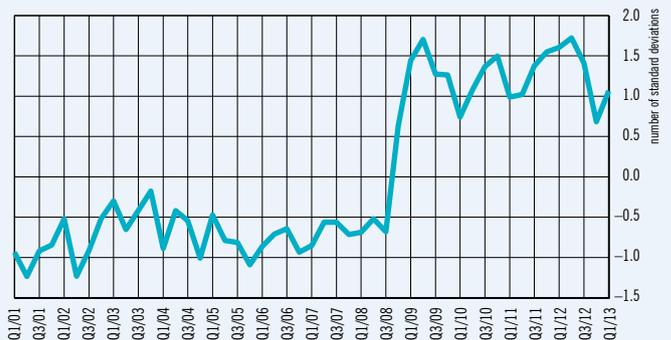
Sources: CNB and CBS.

Figure 4 Components of indicators of risk materialisation



Sources: CNB, CBS and Bloomberg.

Figure 5 Indicators of risk materialisation



Source: CNB.

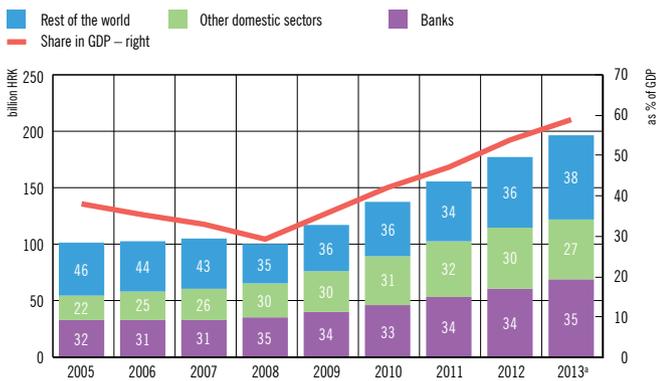
enlargement of the deficit (or diminution of the surplus) on the current account balance, inflationary pressures and pressures on the stability of the domestic currency⁸. In cases of countries with emerging markets, this most often involves financing from abroad and an increase in foreign indebtedness. Also it has to be pointed out that a surge in credit activity is on the whole linked with a growth in the financial vulnerability of the system for it implies a rather poor quality of loans made and an increased acceptance of risk. These risks on the whole materialise only

later, and most often after the occurrence of some kind of shock, when as a result it is too late to undertake measures and introduce instruments capable of strengthening the resilience of the system. All together this additionally emphasises the importance of the timely application of macroprudential measures and instruments aimed at preventing and slowing down the process of accumulating risks and strengthening the resilience of the financial system.

⁸ Hilbers, P., I. Otter-Robe, C. Pazarbasioglu and G. Johnsen (2005): *Assessing and managing rapid credit growth and the role of supervisory and prudential policies*, IMF Working Papers, No. 5/151, July 2005.

Government sector

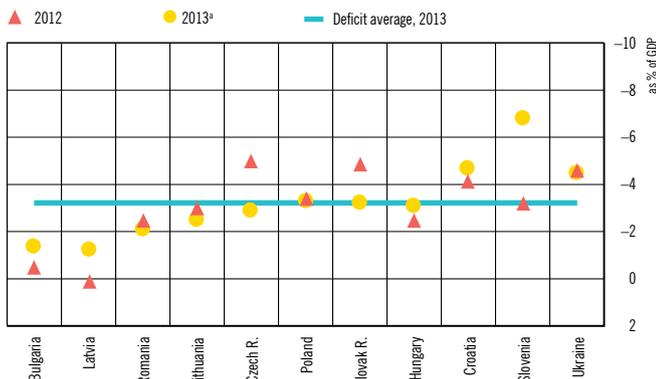
Figure 27 General government debt



* CNB projections.
Sources: MoF and CNB.

Public finances are greatly burdened by the recession, now in its fifth year, which hinders fiscal consolidation. In 2012 the fiscal rule was technically observed, by expenditures being reduced by 2.1% of GDP, after having been increased in 2011 according to ESA 95 by the activation of the shipbuilding guarantee. The budget for 2013 was altered at the very beginning of the year because of the reduction of the projected rate of economic growth. During the first half of the year most of the planned financing was already obtained, and in the last quarter the still uncertain revenues from privatisation are expected.

Figure 28 General government deficit

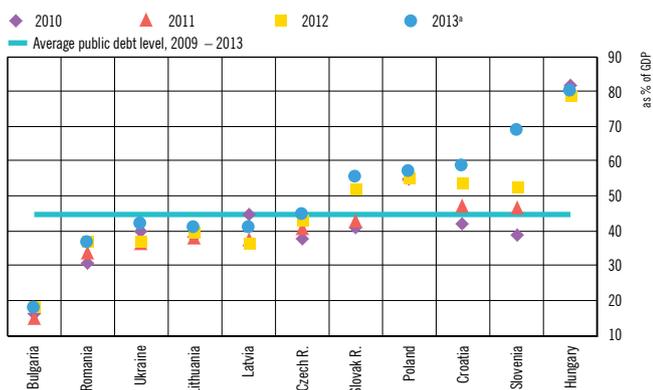


* CNB and IMF projections.
Source: IMF, World Economic Outlook 2013.

The fiscal rule that was implemented for the first time in the history of Croatian public finances was technically fulfilled in 2012. The implementation is founded in the Fiscal Responsibility Act that calls for a reduction of expenses by one percentage point of GDP. Since this fiscal rule is procyclical, conformity is very hard in years in which economic activity falls, as it did in 2012, in which nominal GDP is almost unchanged from 2011. Fulfilment of the fiscal rule, monitored according to ESA 95, was facilitated in 2012 by the fact that in 2011 the government assumed the remains of the guaranteed debt pursuant to a renewed activation of the guarantee for three years in the amount of HRK 6.6bn. Expenditures in 2012 were reduced from these inflated expenditures in 2011 by 2.1% of GDP, while the fiscal rule entailed a reduction of 1% of GDP.

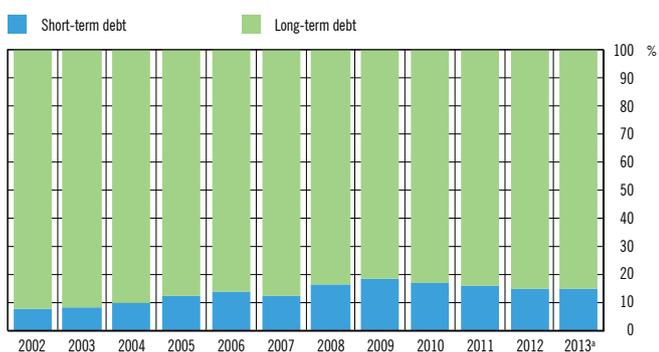
The budget is faced with a great challenge in meeting the fiscal rule for 2013. According to current projections, there is little chance that the fiscal rule for 2013 will be fulfilled, in view of the expected fall in GDP and the lack of structural reforms

Figure 29 Public debt



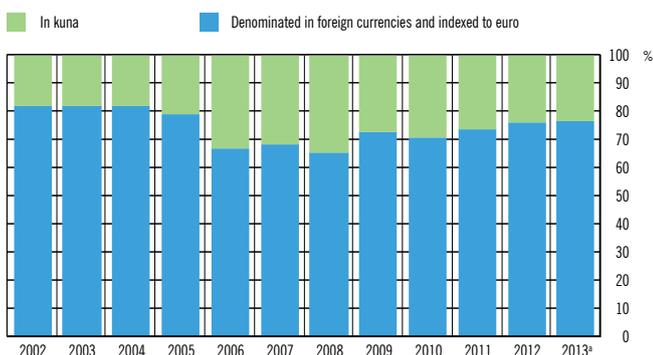
* CNB and IMF projections.
Source: IMF, *World Economic Outlook 2013*.

Figure 30 Breakdown of public debt by remaining maturity



* CNB projections.
Sources: MoF and CNB.

Figure 31 Currency breakdown of public debt



* 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%	58.8%
Cyclically adjusted primary balance (as % of potential GDP)	>	-0.5%	-1.9%
Gross financing needs (as % of GDP)	<	20.6%	10.6%
Share of short-term debt as a ratio of total debt	<	44.0%	14.7%
Debt denominated in foreign currencies	<	40.3%	76.7%
Weighted average maturity of public debt (years) ^c	>	2.3	5.7
Short-term external public debt (as % of international reserves) ^c	<	61.8%	4.6%

^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.

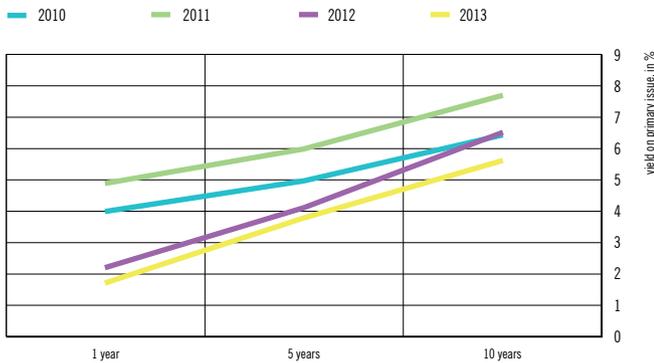
in the public sector which would have enabled a reduction of standing expenditures.

The budget for 2013 even at the very beginning of the year underwent a revision because of an adjustment of the growth of GDP from 1.8% to 0.7%. Because of the lower revenues arising from the slower growth, expenditures were reduced by HRK 874m. But there are still certain risks attached to some of the expenditure items, such as expenditures for staff, where a reduction of HRK 1.685bn was planned.

The 2013 deficit according to ESA 95 might trend around 4.8% of GDP, which is above the level reached in 2012. The continuation of the fall in GDP, which restricts the space for increase of revenue, while the permanent costs (salaries, pensions, health care) drop very slowly or even rise autonomously (like pensions for instance) has an adverse effect on the budgetary deficit. The deficit is much above the level of long-term fiscal sustainability (Figure 33, Table 5) and above the 3% level set by Maastricht. In recession conditions, then, the deficit requires reducing through structural reforms in the public sector.

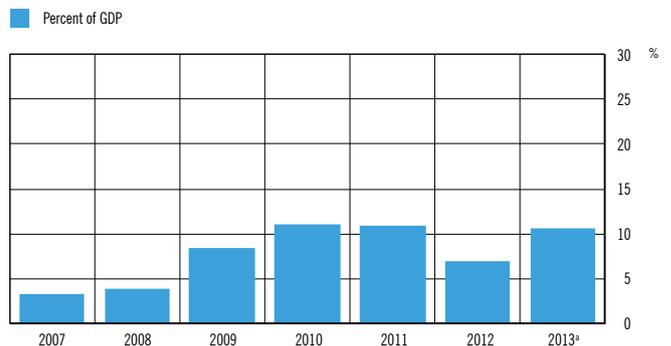
It is important for financial stability that financing planned by the budget is achieved; in 2013 this comes to about 10.6% of GDP. In 2013 the needs for financing are much greater than they were in 2012, when they came to 6.9% of GDP. At the beginning of the year, the Finance Ministry successfully conducted a primary bond issue on the American market and thus covered almost 50% of the needs for financing in this year. Apart from that, in mid-July 2013, two government bonds were issued on the domestic market, on the basis of which a total of almost

Figure 32 Yield on primary issue of euro securities



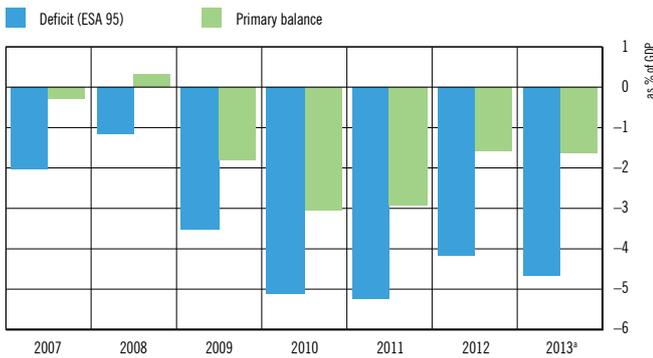
Source: MoF.

Figure 35 Gross financing needs



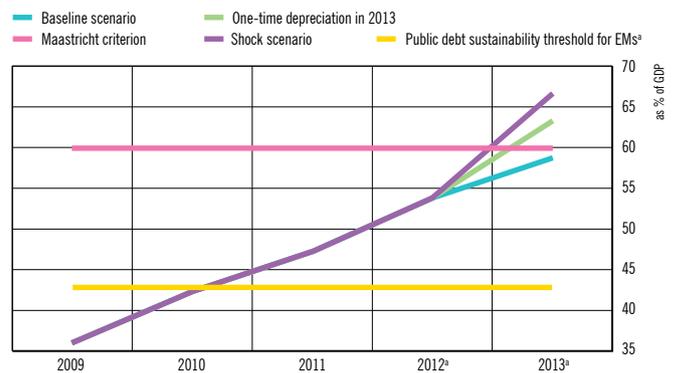
* CNB projections.
Sources: MoF and CNB.

Figure 33 Projection of general government deficit



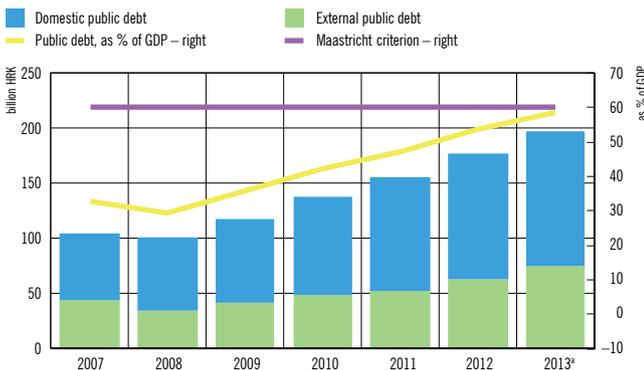
* CNB projections.
Sources: MoF and CNB.

Figure 36 Projection of public debt under various scenarios



* CNB projections.
Source: CNB.

Figure 34 Projection of general government debt



* CNB projections.
Sources: MoF and CNB.

HRK 8.4bn was realised. Apart from foreign currency-indexed bonds of a face value of EUR 750m, a kuna bond worth a total of 2.75bn was also issued, which is important for the sake of development of the market for debt in the domestic currency, particularly since in recent years the share of public debt in the domestic currency has been perceptibly reduced (Figure 31). Finally it is important to point out that the needs for financing are planned to be met in part by revenues from privatisation.

By the end of 2013 public debt is expected to remain below the 60% of GDP limit that is set by Maastricht (Figure 34). The Croatian public debt is very high in terms of all the indicators, but the maturity of the debt is well distributed over the years, so that the gross needs for financing (Figure 35) are below the critical levels. After a considerable amount was included in the public debt in 2011 because of the restructuring of the ship-building industry, the trending of the public debt in the years to come will to the greatest extent depend on the manner of

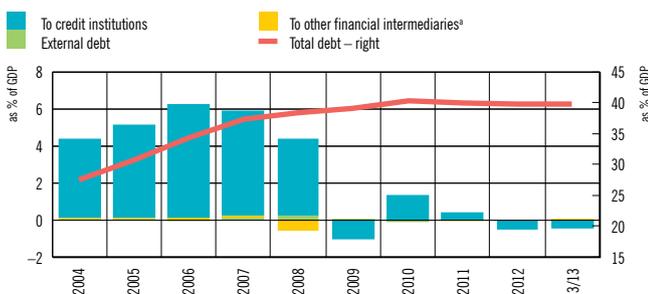
carrying out fiscal policy and structural reforms the objective of which is the reduction of expenditures.

Stress scenarios raise the public debt above the 60% of GDP level. Consideration of differing scenarios for the projection of the public debt in 2013 raises the public debt above 60% of GDP. According to the stress scenario of a depreciation of the exchange rate for the kuna of 10% against all currencies, the

public debt will climb above the 60% level, in fact to 63.6% of GDP. The second, combined, stress scenario involves a fall of GDP by 3.1% with a depreciation of 10%, which will produced an additional rise in public debt, to 66.6% of GDP. This turn of events would require an additional adjustment because Article 74 of the Budget Act clearly restricts public debt to the 60% of GDP level.

Household sector

Figure 37 Change in and stock of household debt



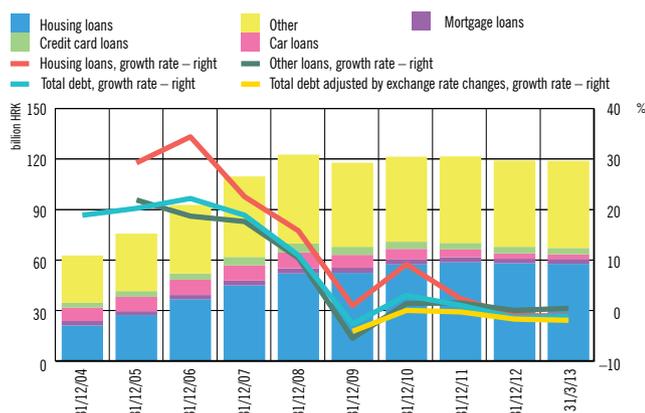
* Data on household debt to insurance companies are based on estimates.
 Note: Data on total household debt exclude debt to leasing companies in order to avoid a break in the data series caused by the change in the methodology for reporting the value of leasing contracts from 1 January 2011 onwards. Due to the harmonisation of the sector classification with the European System of National Accounts (ESA 95), household debt to banks, savings banks and housing savings banks is reported as debt to credit institutions.
 Sources: HANFA and CNB.

In the household sector, deleveraging was continued at the end of 2012 and in the beginning of 2013. Because of the expected absence of any economic recovery this year, the tendency for households to reduce their indebtedness will continue to be featured. In spite of that, the high exposure to risk of adverse trends on the labour market might make debt servicing difficult for some households.

Although weakened, the long-term process of deleveraging in households continued at the end of 2012 and at the beginning of 2013, and the total debt of the population stagnated at a level just a little lower than 40% of GDP (Figure 37). In this period households slightly reduced their exposure to credit institutions¹ (by 0.5% of GDP), which accounts for almost 99% of total household debt, while the debt of households abroad and to other financial intermediaries remained almost unchanged. At the annual level the total debt of households had been reduced by the end of March 2013 by almost 1.2%, or by 1.9% if the effect of the weakening of the exchange rate is excluded (Figure 38), the major part of this fall being generated during the third quarter of 2012.

Household sector deleveraging went on at a slightly lower pace towards the end of 2012 and in early 2013, which was caused by a slight growth in new, particularly long-term, borrowing (Figure 40). In the structure of newly made long-term loans, only the amounts of new other long-term loans rose (cash any-purpose loans, consumer loans and so on), partially brought about by a slightly more marked reduction of interest rates at the very beginning of the year and the relaxation of lending standards for these loans during the whole of the period under observation

Figure 38 Household loans by purpose



Source: CNB.

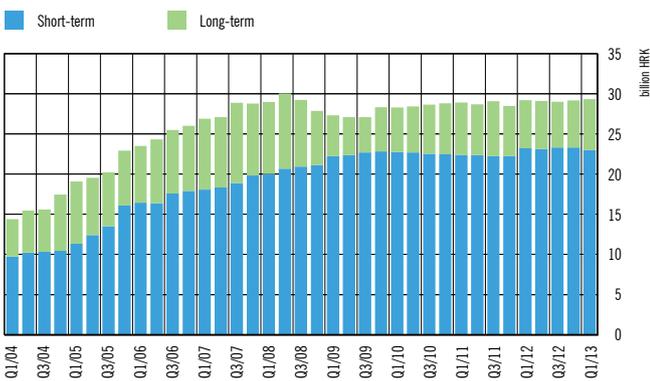
¹ Credit institutions according to the sectorisation rules of the European System of National Accounts or ESA 95 comprise banks, savings banks and housing savings banks.

Figure 39 Change in household lending criteria in the last three months



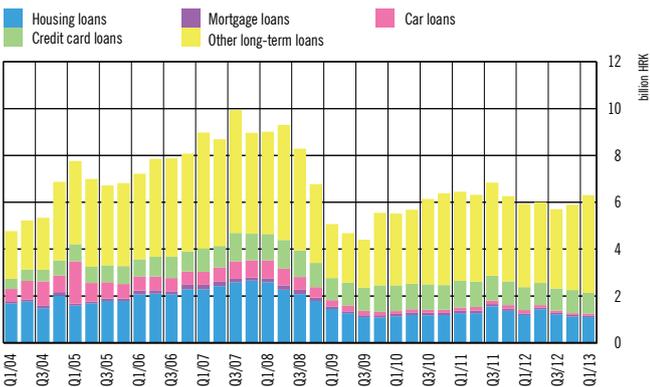
Note: Positive and negative values denote the strengthening and weakening of credit standards, respectively. Source: CNB.

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 39). At the same time the demand of households for other forms of long-term loans, particularly for car purchase, continued to drop (Figure 41), reflecting the trends in vehicle sales (an annual fall of practically 44%). The dynamics of newly made loans necessarily had a reflection on the total amount of loans made, and so by the end of March 2013, the amount of loans for car purchase had fallen the most (at an annual level by 31.4%). Housing loans also continued to drop slightly, at a rate of about 1% a year (in nominal and in effective terms), influenced by factors on the loan supply side (stiffened conditions from the point of view of the value of collateral and its proportion to the amount of the loan), as well as on the demand side (uncertainty concerning the recovery of the housing real estate market and the relatively low level of consumer confidence). There was a slight rise only in other long-term loans (0.4%).

The fall of economic activity resulted in the maintenance of negative trends on the labour market at the end of 2012 and in early 2013, which were still the main factors constraining any stronger dynamising of household loans (Figure 42). The cumulative fall in employment of almost 13% and or real wages by about 5% during the last four (crisis) years, together with a further rise of uncertainty on the labour market, will continue to deter most households from new, vigorous borrowing and the financing of investment and purchase of consumer durables (Figure 48).

Not only were they more exposed to the risk of losing jobs, but households at the end of 2012 and in early 2013 were commonly highly exposed to financial risks of exchange rate and interest rate changes (Figures 43 and 44). Although the household exposure to exchange rate risk was almost unchanged in the past two years (the proportion of foreign currency indexed loans in the structure of total loans came at the end of March 2013 to 75%), the degree of exposure to interest rate risk at the beginning of 2013 rose significantly, partially as a result of the structure of loans newly made. Thus almost 97% of all loans at the end of March 2013 were made with the chance that the interest rates might change within a year, although at the same time there was a slight improvement of the structure of loans within that category (a rise in the proportion of loans in which the interest rate could not be changed in a period of less than three months).

Indicators of indebtedness and the burden of debt servicing in households went on by and large improving at the end of 2012 and the beginning of 2013 (Figure 45). Along with the continuation of deleveraging, during the period observed, households saved much more vigorously, and by the end of March 2013 the debt to deposit ratio had fallen to the lowest level on record. Since deposits, which rose in the period at an annual rate of 5%, are also an important segment of overall liquid financial assets of households² (Figure 46), in this way the ratio of debt to this form of asset improved. Concurrently the slightly more vigorous reduction of the interest payments stimulated an improvement of debt servicing burden of households in spite of the deceleration in the growth of the available nominal income

² Financial assets of households do not include cash foreign currency or deposits in foreign banks because the amount cannot be precisely estimated.

Figure 42 Employment and wages (seasonally adjusted)

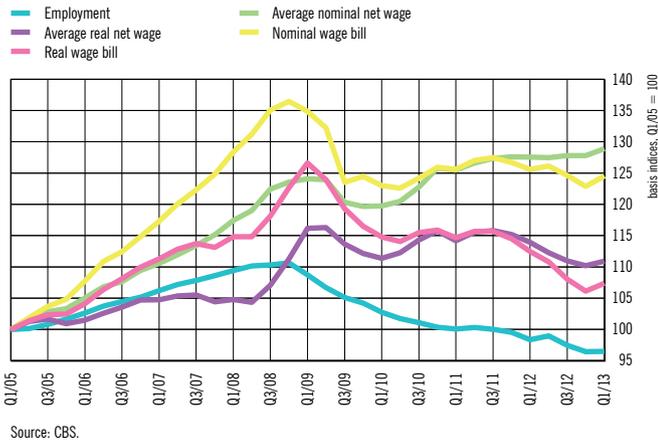


Figure 43 Currency breakdown of household loans

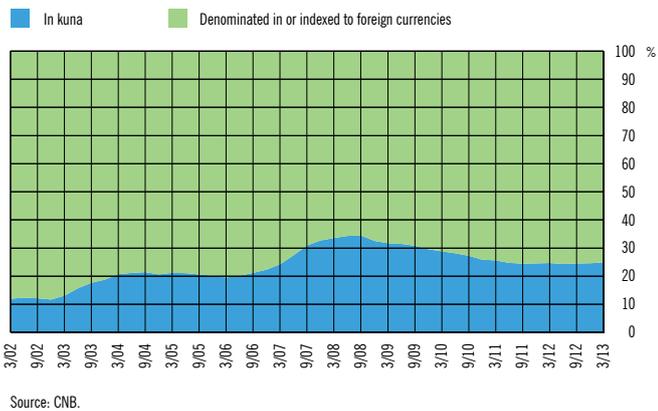


Figure 44 Household loans by interest rate variability

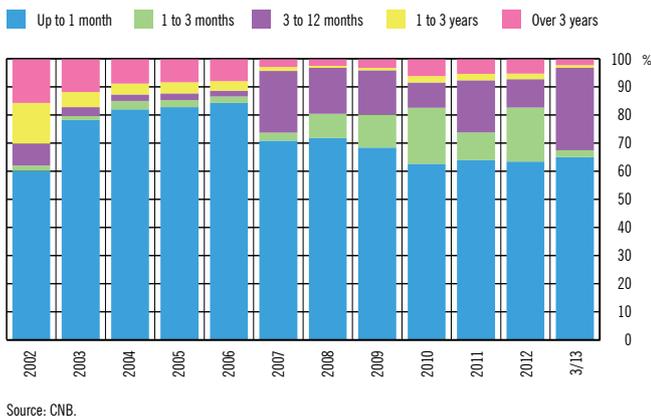


Figure 45 Household debt and debt burden

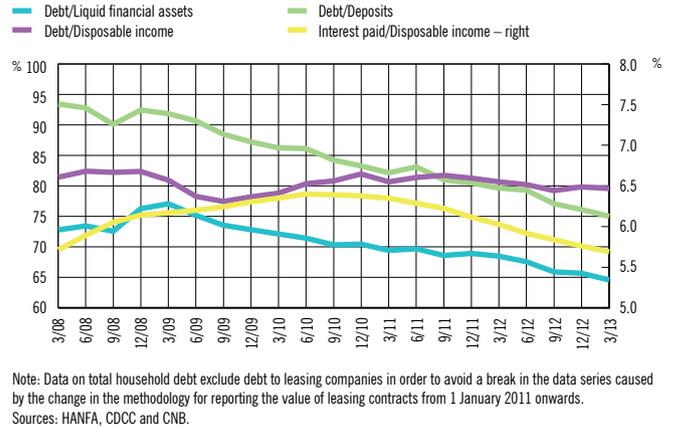
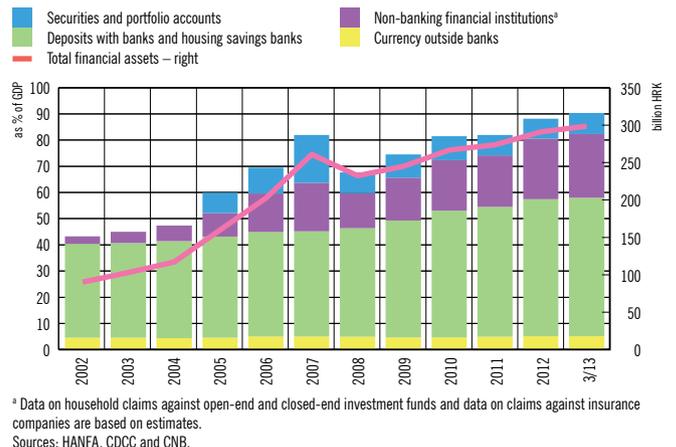


Figure 46 Household financial assets



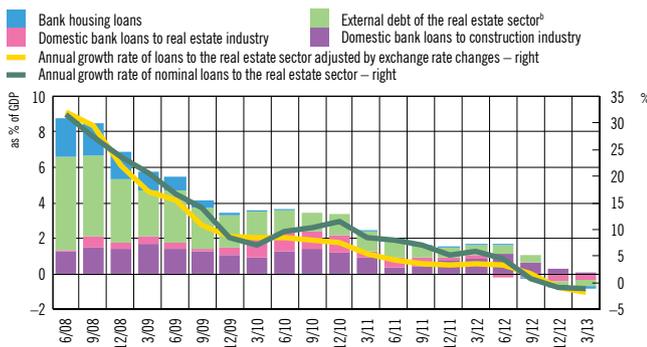
at the end of the past and the beginning of this year. Thus in the observed period only the ratio of debt and available household income³ stayed at the mid-2012 level.

Households will go on deleveraging in the second half of 2013, mainly in response to the expected further drop in employment and real incomes. Adverse macroeconomic conditions and the uncertainty related with any future recovery, which are reflected in the still relatively poor consumer optimism in households, although in the past few months a slight improvement has been observed, will keep their personal spending at a relatively low level and dampen demand for new loans. Because of the high exposure to risks that derive from the labour market, timely debt repayments might become difficult for some households, even if loan conditions are relaxed under the influence of regulatory changes.

3 The estimated disposable incomes of households do not include some forms of income generated in the official economy (for example, royalties, temporary service contracts and income from capital), or income from the unofficial or grey economy.

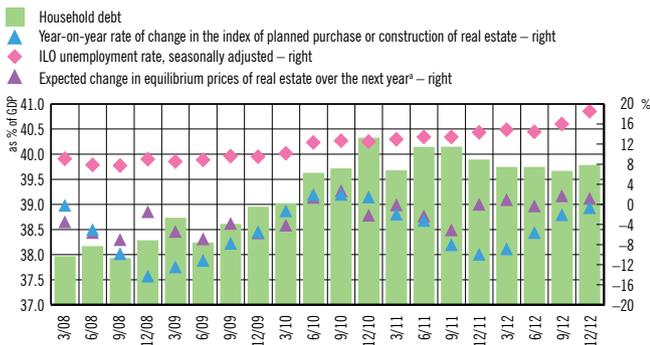
Real estate sector

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



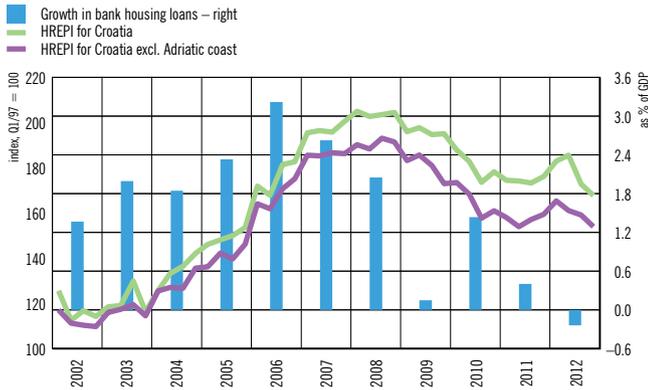
^a Refers to the expected annual change in the same period of the next year (+12 months) and is estimated based on the equilibrium price model, taking into account CNB projections for the main determinants of demand for residential real estate (real interest rates and household disposable income).
 Source: CNB.

At the end of 2012, the process of deleveraging began in the real estate sector. No quickening of the residential market is expected in 2013, because of the expected failure of the economy to recover and the continuation of adverse trend in the labour market, and the deleveraging trend would well continue.

After several years of gradual deceleration of borrowing, the total debt of the real estate sector at the end of 2012 and the beginning of 2013 fell for the first since the outbreak of the financial crisis (Figure 47). In the period observed, in relative terms the domestic loans made to corporates dealing with real estate fell the most (by an annual average of 0.4% of GDP). Although there was a simultaneous considerable reduction in the financial support of domestic banks to firms from the construction industry, they went on obtaining positive increments of domestic loans (by an annual average of 0.2% of GDP). At the same time, the real estate started deleveraging with respect to foreign sources in an average annual amount of 0.3% of GDP, while the housing loans of domestic banks were reduced by an average 0.1% of GDP. Thus at the end of March 2013 the nominal debt of this sector was reduced by 1.1% at an annual level, or by 1.7% if the effect of exchange rate changes is excluded.

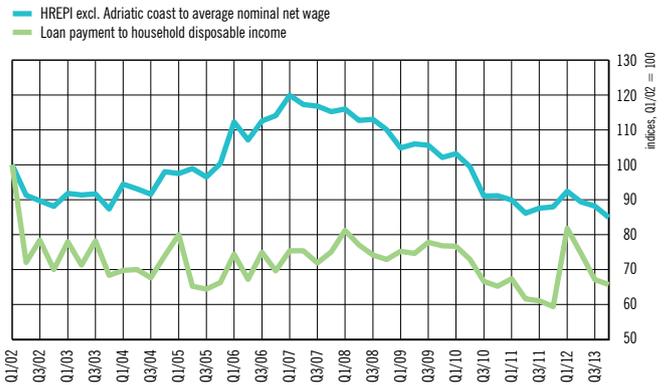
The absence of positive signals from the labour market (Figure 42) and the continuation of the tendency for a slight rise in real interest rates on housing loans (Figure 51) and the tightening of other loan conditions (Figure 39) kept back demand of households for housing real estate, and accordingly for loans, at an exceptionally low level, and thus continued creating pressure on a further fall of prices for housing space (Figure 49). Households adjusted their expectations of the future dynamics of real estate prices to macroeconomic conditions and deferred possible investments in housing units. This kind of expectation of a further fall, although to an extent slowed down (Figure 48), in

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. Source: CNB calculations.

Figure 52 Financial availability of residential property



Sources: CBS and CNB calculations.

Figure 50 Distribution of average residential property prices in 2011 and 2012

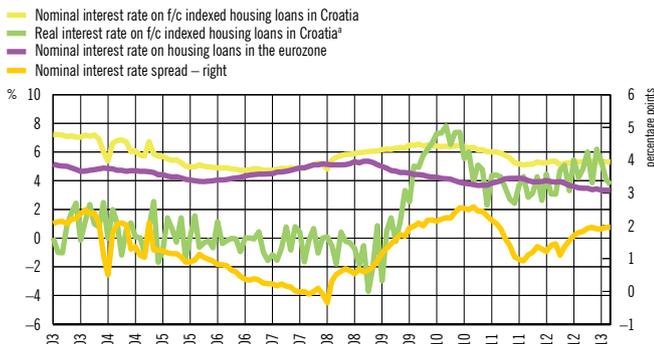


Source: CNB calculations.

concert with a still low level of consumer optimism, additionally stepped up pressure for a price correction. Although the average prices of residential real estate, influenced by a quite marked segmentation of the market (Figure 50), rose briefly in the first half of 2012⁴ (Figure 49), by the end of the year this rise had been neutralised, and at the end of 2012 the prices of residential real properties in Croatia at an annual level had been reduced by almost 5%. The price reduction was a little more marked in the coastal area than in the inland regions of Croatia (Figure 49).

The accelerated decline in the prices of residential real properties in the second half of 2012 did slightly improve their financial accessibility in spite of somewhat higher real interest rates on housing loans and reduced real incomes of households (Figure 52). Since at the same time the other loan conditions (Figure 39) were slightly tightened up, and a similar tendency is expected in 2013, as is the continuation of adverse trends on the labour market, the financial accessibility of residential space will probably not perceptibly change, although prices might go on falling.

Figure 51 Comparison of interest rates on newly-granted housing loans in Croatia and the eurozone



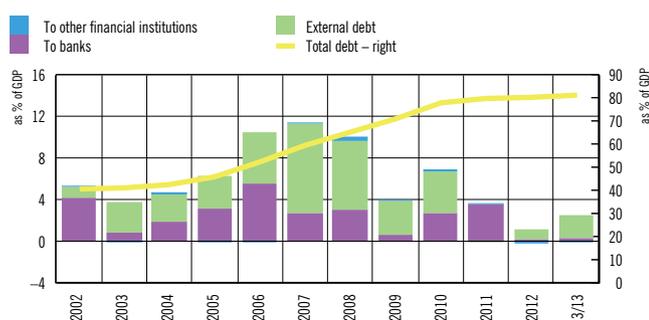
^a The real interest rate on f/c indexed housing loans was deflated by the change in the average nominal net wage, excluding the effect of the crisis tax. Sources: ECB and CNB.

A continuation of the described trends on the market for residential real estate is likely in 2013 as well, above all as a result of the further fall in the number of employed and a reduction in the disposable income of households. Although the government incentive programmes implemented during last year did have certain positive effects on the residential real estate market, and it can be expected that a new model of subsidised housing construction will have similar effects, the uncertainty and insecurity on the labour market will still deter most households from investment in residential real estate and create pressure for a further correction of prices. Hence there is also no expectation of any intensification of housing loans being made, and the trend for the deleveraging of the real estate sector could well continue.

⁴ The average price of residential real estate traded in the first half of 2012 is within the upper part of the price distribution of residential real properties of 2011 (at the level of the 85th percentile). Since as early as the second half of 2012 prices had returned close to the median, this suggests that in the first part of 2012 there had been a temporary significant distortion in the representativeness of the real properties traded, which could not be corrected by the hedonistic method.

Non-financial corporate sector

Figure 53 Change in and stock of non-financial corporate debt



Note: The change in the debt stock of non-financial institutions excludes one-off effects of the sale of a portion of claims of a major bank to a company in the direct state ownership in December 2012 and the assumption of a portion of shipyard debt by the government in June 2012. Data on total corporate debt exclude debt to leasing companies in order to avoid a break in the data series caused by the change in the methodology for reporting the value of leasing contracts from 1 January 2011 onwards. Data on external debt exclude round-tripping transaction. Sources: HANFA and CNB.

Figure 54 Annual growth rate of non-financial corporate debt

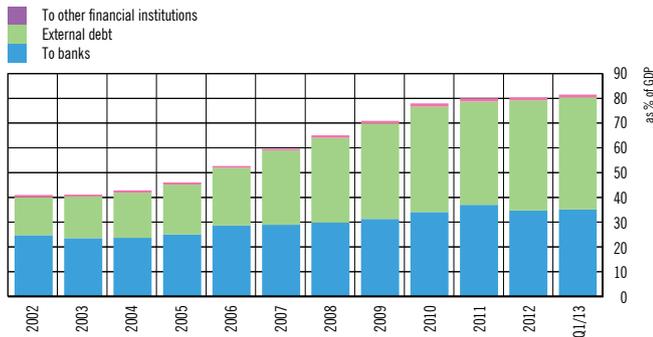


Note: The year-on-year rates of growth of the debt of non-financial institutions exclude one-off effects of the sale of a portion of claims of a major bank to a company in the direct ownership of the parent in December 2012 and the assumption of a portion of shipyard debt by the government in June 2012. Data on total corporate debt exclude debt to leasing companies in order to avoid a break in the data series caused by the change in the methodology for reporting the value of leasing contracts from 1 January 2011 onwards. Data on external debt exclude round-tripping transaction. Sources: HANFA and CNB.

The overall debt level of non-financial corporations is rising slightly as a consequence of a rise in foreign debt, while domestic debt is stagnating. The reallocation of borrowing towards foreign sources is a consequence of the enhanced perception of risk and the more stringent conditions for borrowing on the domestic market, which has resulted in rising borrowing on the foreign market, above all from parent companies. The foreign currency risk of the corporate sector, although on the decline, is still very high because of the large share of the debt in a foreign currency as compared to the debt in kuna. The interest risk of corporations is slightly on the rise because of the growth of interest rates on short-term loans and the shortening of the periods within which changes in interest rates might be applied.

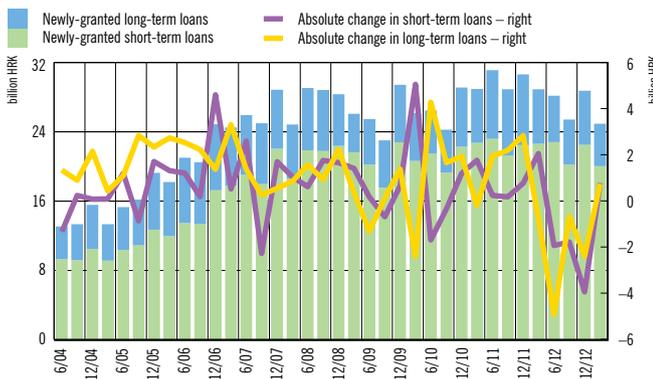
The total indebtedness of non-financial corporations rose slightly in the period under observation, from September 2012 to March 2013, and reached about the 81.5% of GDP. Most of the growth of total indebtedness of non-financial corporations was caused by a rise in foreign debt, while domestic debt stagnated in the period (Figure 53). The credit growth of non-residents to connected persons (2.3 percentage points in the first quarter of 2013) is the main cause of the rise of foreign debt, and the slight hike in the exchange rate of the kuna against the

Figure 55 Non-financial corporate debt



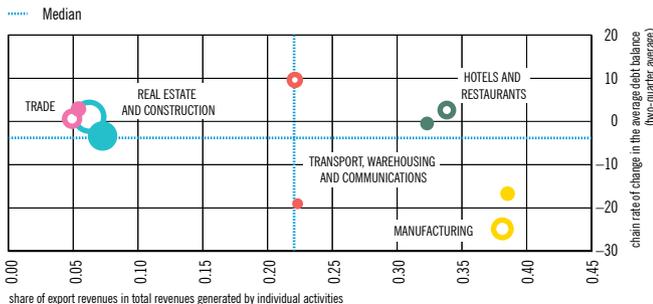
* Data for 2011 exclude shipyard debt that was assumed by the government in the first half of 2012.
 Note: Data on total corporate debt exclude debt to leasing companies in order to avoid a break in the data series caused by the change in the methodology for reporting the value of leasing contracts from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

Figure 56 Newly-granted bank loans and absolute change in the stock of gross loans



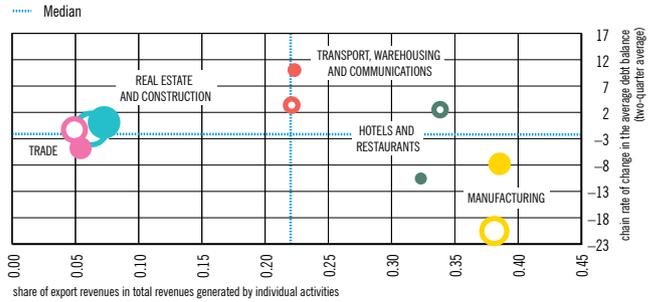
Source: CNB.

Figure 57 External debt allocation by sectors from September 2012 to March 2013



Note: A full circle denotes the debt dynamics in the last two quarters observed (the average debt balance at end-March 2013 and end-December 2012 relative to the average debt balance at end-September and end-June 2012). An empty circle denotes the same change in the debt balance in the previous period (the average debt balance at end-September and end-June 2012 relative to the average debt balance at end-March 2012 and end-December 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.
 Sources: FINA (export and total revenues) and CNB (external debt).

Figure 58 Allocation of domestic bank loans by sectors from September 2012 to March 2013



Note: A full circle denotes the debt dynamics in the last two quarters observed (the average debt balance at end-March 2013 and end-December 2012 relative to the average debt balance at end-September and end-June 2012). An empty circle denotes the same change in the debt balance in the previous period (the average debt balance at end-September and end-June 2012 relative to the average debt balance at end-March 2012 and end-December 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.
 Sources: FINA (export and total revenues) and CNB (loans by activity).

euro (about 0.5 percentage points in the first quarter of 2013) also contributed.⁵

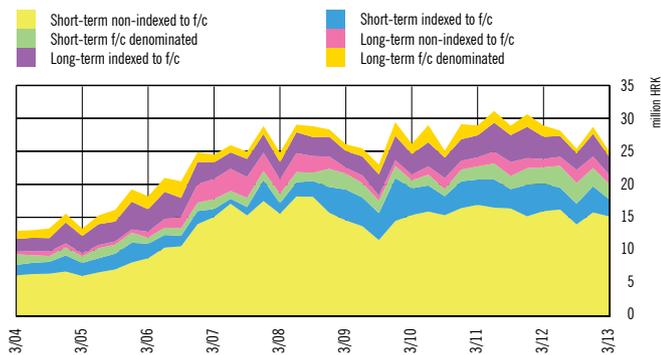
Pessimistic expectations about economic trends, enhanced risk perception of individual firms and growing risk of the marketability of collateral will lead to a moderate tightening of the conditions of issuing loans on the domestic market, judging from a bank lending survey carried out by the CNB. In such conditions the rise in the credit demand for the financing of working capital and growing need for debt restructuring have spurred the non-financial companies that are able to do so to take on more debt abroad, on the whole from their parent firms.

The trend towards a reduction in newly made loans that marked 2012 was continued at the beginning of 2013, although there were signs that it was being halted. The total amount of long-term and short-term loans outstanding rose in the first quarter of 2013, after a continued reduction in the last three quarters, which recorded the assumption of the debt of the shipyards in June and the mentioned sale of part of a bad portfolio by a quite large bank to its parent bank in December 2012 (Figure 56).

In the construction sector, foreign borrowing dropped slightly in the observed six-month period, up to March 2013; a slight rise in financing from domestic banks was also achieved. The same tendencies, although more pronounced, were recorded in the activities of transportation and communications, where state transport companies are in the lead. On the other hand, firms in trade and tourism rely less strongly on domestic sources of financing, and borrowing abroad is stagnating. The manufacturing industry still stands out for its relatively high levels of deleveraging. Projects of renewable sources of energy, the

⁵ Also contributing to the growth of the foreign debt accompanied by a reduction of domestic debt was the recent assumption of some of the bad portfolio of a major bank by the foreign parent bank via the intermediation of a domestic non-financial company. In the non-financial corporations' debt structure, this slightly enlarges the proportion of foreign debt, and reduces the proportion of the debt to domestic banks (Figure 55).

Figure 59 Breakdown of newly-granted loans to non-financial corporations by maturity and currency



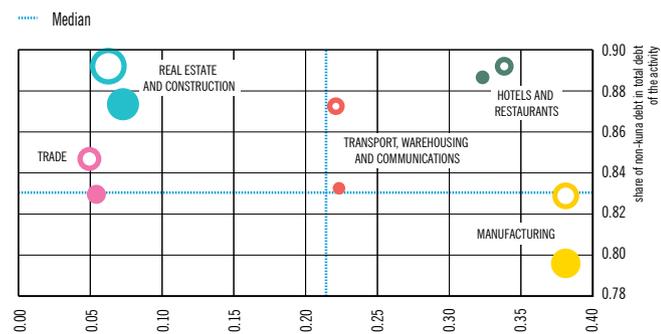
Note: Short-term loans comprise personal overdrafts, which are statistically recorded as newly-granted loans in each month.
Source: CNB.

Figure 60 Share of corporate non-kuna debt^a in total loans



^a It is assumed that total external debt is denominated in foreign currencies. Debt indexed to foreign currencies (a foreign currency clause) is also included.
Source: CNB.

Figure 61 Currency exposure in March 2013



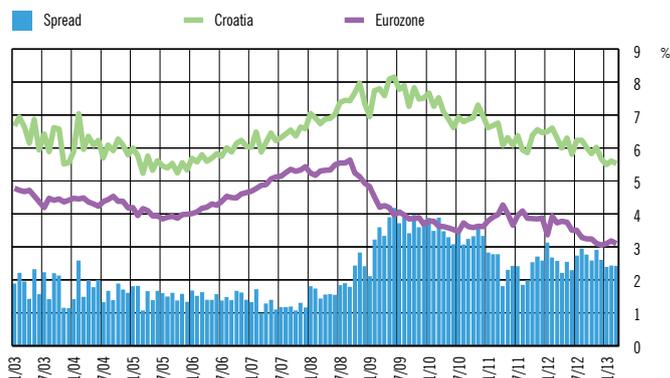
share of export revenues in total revenues generated by individual activities
Note: A full (empty) circle denotes the share of non-kuna debt in March 2013 (September 2012). The size of the circle denotes a particular activity's share in total debt of non-financial corporations. Activities accounting for a relatively minor share in total debt are not presented.
Sources: FINA (export and total revenues) and CNB (loans by activity).

Figure 62 Breakdown of bank loans to non-financial corporations by interest rate variability



Source: CNB.

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

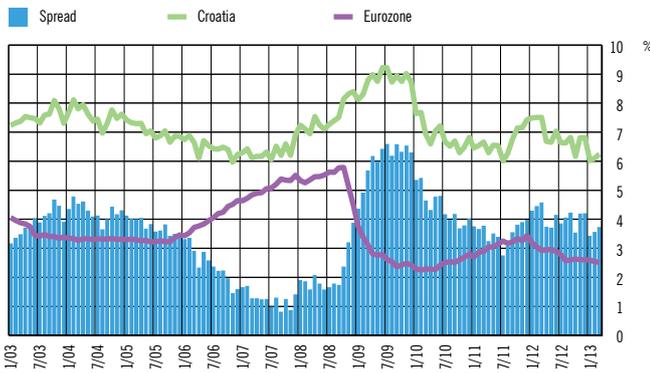


Sources: ECB and CNB.

companies of which after obtaining a license and go on-stream change their sector (move from the manufacturing industry to the electricity supply sector), have a not negligible effect (about 2.5 percentage points) on the deleveraging of the manufacturing sector (Figures 57 and 58).

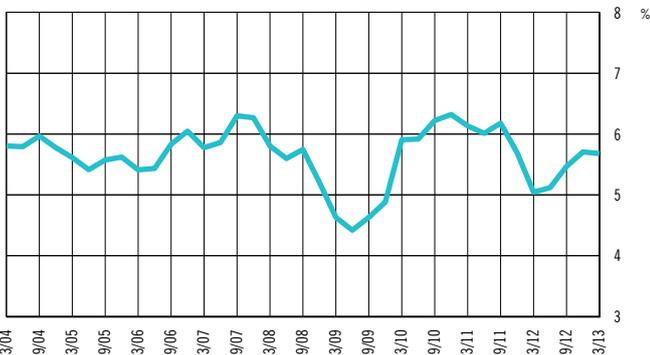
The growth of loans newly made to non-financial corporations is most expressed in the case of short-term kuna loans, while short-term loans in a foreign currency have reduced. As against this, newly made long-term kuna loans are on the decline, and long-term loans in a foreign currency are increasing (Figure 59). In spite of such trends, the proportion of long-term loans in a foreign currency in overall loans is reducing, and that of short-term loans is increasing. The total foreign currency risk is reduced because the proportion of total debt in a foreign currency has been reduced (Figure 60). The exposure to currency risk of all sectors is on the decline, with transport and communications in the lead, as well as the manufacturing industry sector (Figure 61).

Figure 64 Interest rates on short-term loans to non-financial corporations in Croatia and the eurozone



Sources: ECB and CNB.

Figure 65 Ratio of transaction account deposits of non-financial corporations to gross value added



Source: CNB.

Exposure to interest rate risk has increased because of the growth in the proportion of loans that can have their interest rates changed in a period of up to a year in total loans. In the last two quarters this share has exceeded 90% (Figure 62).

The trends in interest rates in Croatia mirror the trends in the eurozone with some slight deviations concerning short-term loans the price of which in the last half-year rose slightly (Figures 63 and 64). The growth of interest rates for short-term loans and the simultaneous fall of rates on long-term loans are the consequence of increased demand for short-term loans for financing working capital and the greater reluctance of banks to the credit risk involved in investment in working capital.

In consequence of the rise in newly made short-term loans, the liquidity risk measured by the ratio of deposits in the transaction accounts of non-financial corporate and gross added value is reducing and coming close to the values of the pre-recession period (Figure 65).

The slight rise in indebtedness in the corporate sector, primarily in the segment of financing short-term working capital, and the lack of investment suggests that business optimism is still at a low level. If the fall of interest rates for long-term loans continues, the likelihood of economic recovery will increase.

Box 2 Models of bank financing in the corporate sector

The world financial crisis had a considerable effect on the loan market, reducing the inclination of financial mediators to take on risks. In conditions of a contraction of real economic activity and increased uncertainty, this led to a reduction in the volume of transactions, accompanied by a rise in the costs of financing and a tightening of general lending conditions. However, the pace of these processes was unequally distributed among credit institutions, which can be explained, inter alia, by different models of bank financing. This is a set of the most important features of the relations that have been established over the course of time between creditors and debtors, that is to say, banks and firms. Accordingly, as a result, it tends to shape the character of both demand and supply, which makes it an extremely interesting analytical instrument. The objective of this research is to find what models of bank lending have been formed on the domestic market (for corporate debt) and what kind of influence they have on financial stability, particularly in the crisis period, which has entered its fifth year.

Contemporary theory on financial intermediation distinguishes two models of bank financing. The first is traditional financing, transaction-oriented lending, which is based on standardised banking products that are offered to one or more clients according to conditions defined in advance, on the whole motivated by cost rationing. The second is what is called relationship lending, which involves an implicit contract arrangement based on gathering privileged information in a long-term and complex relationship¹ with the debtor, in which the creditor in effect is turning its financial resources into equity in the company. In principle, this form is a reflection of the adjustment (of both supply and demand) to business environment in conditions of imperfect and asymmetrical information.

The definition of relationship lending produces the measures most often used in the literature for the three dimensions of the relationship: the number of relationships with banks (R), the intensity of the lending by individual creditors (I) and finally the actual duration of the credit relationship (D). An individual observation of these dimensions can facilitate an insight into the structure of the ties that are established in the relationship between bank and corporation, but it is insufficient from the aspect of identification of the phenomenon of relationship financing. Because in practice firms on the whole use several sources of external financing, particularly large companies, it is too restrictive to rely only on the definition of one or the dominant creditor.² On the other hand,

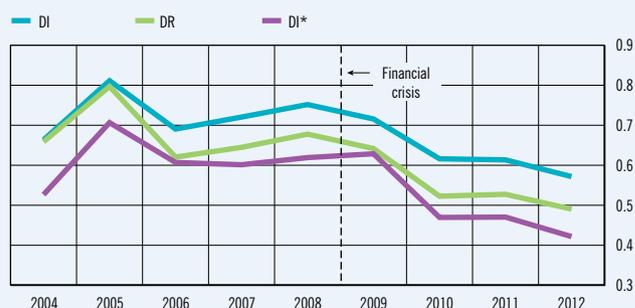
1 Relationship lending does not exhaust itself in credit arrangements, but includes numerous other financial services, such as banker's guarantees, letters of credit, cash management, deposit and discount operations, buying up claims and other matters. However, it is difficult to track with statistical consistency the development of overall relations at a micro-level, and in the literature the most often used information concerns credit transactions, which is followed in this research as well.

2 Memmel, C., C. Schmieder and I. Stein (2008): *Relationship Lending-Empirical Evidence for Germany*, Economic and Financial Report 2008/01, European Investment Bank.

partial use of just the duration of the credit relationship can lead to erroneous conclusions about the ties between creditor and debtor³.

It is then more reliable to use a combination of these measures in order to distinguish a long-term relation with a single bank (DR) or with a dominant bank (DI). Apart from this, the measure of a very long lending relationship with a dominant bank (DI*) can be used, defined as a duration longer than the average duration of a lending relationship in the activity in which the company under observation is operating⁴. In this

Figure 1 Share of companies identified according to one of the criteria for relationship lending



Note: In the calculation of composite measures of relationship lending, R assumes the average financing of a firm in a 100% amount by one bank; I assumes an average financing of a company in at least a 75% amount by one bank; D assumes a long-term lending relationship (longer than two years) with a single bank. Sources: FINA and CNB.

Figure 2 Share of banks in which relationship lending is the dominant lending strategy



Note: Relationship lending is identified as the dominant business strategy in banks in which more than 60% of the corporate portfolio consists of firms with which they apply this model of lending (because of the great sensitivity of the share with indicator DI* at a relatively high marginal value, in this case a marginal value of 50% is used). Sources: FINA and CNB.

3 Elsas, R., and J. P. Krahnert (1998): *Is Relationship Lending Special? Evidence from credit- file data in Germany*, Journal of Banking and Finance, 22.

4 The average duration of a lending relationship, according to the supervisory reports of the CNB on a nine-year sample for the total corporate portfolio, comes to 3.25 years, the relations in trade and services being longer (3.59 and 3.18 years), while in the construction sector they are 3.05, and in industry (including farming) they are the shortest, amount to 2.98 years.

analysis the preferred measures of relationship financing are DI and DI*. According to these indicators, most firms on the domestic market make use of relationship financing; during the crisis, however, its presence has been clearly reduced (Figure 1)⁵.

Seen from the point of view of the creditor, most banks used relationship lending in a considerable extent with firms in the period of economic growth. However, in the crisis this model of lending became much less widespread. Nevertheless, this adjustment was not instantaneous, it did not set in suddenly with the first wave of the crisis, but gradually, as crisis was prolonged (Figure 2). This is partially linked with the deferral of expectations of an economic recovery. However, to a given extent, it also reflects changes in bank operations, above all a greater risk aversion and unwillingness to have long-term exposures in conditions of heightened insecurity and cost pressures because of the poor collection of claims and the constant rise in non-performing loans. A certain number of recent mergers and acquisitions in the bank sector could also have contributed to the practice of relationship lending being scaled-down as a result of portfolio consolidation⁶.

It is interesting to look at some characteristics of firms and banks that embark on relationship lending. Corporations that relatively often make use of the model of relationship lending are as a rule less risky⁷ or relatively smaller⁸ and more profitable business units. For this reason it is easier for them to borrow, and this is indicated by a slightly larger financial leverage, with relatively lower amounts of collateral and somewhat lower lending costs. On the other hand, the practice of relationship lending is more applied by banks that have displayed greater efficiency and profitability, independently of their size or capitalisation. Unlike these, banks that have lower returns on assets and equity are probably more motivated to apply cost-oriented business strategies, i.e. are less inclined to relationship lending, as the theory of financial intermediation actually predicts (Figures 3 and 4).

Although the average riskiness of the corporate portfolio of banks that dominantly employ the practice of relationship lending was in the period under observation lower than in transaction-oriented banks (Figure 4), the correlation between relationship lending and credit risk is an intricate problem, and empirical and theoretical research have tended to give two kinds of answers. When a long-term and intensive tie is created between bank and client, information exchange can be improved. This, on the one hand, gives clients a stable source for the financing of projects that can turn a profit only over the long term, even in the case that certain shocks arise. On the other hand, the bank is able to have a

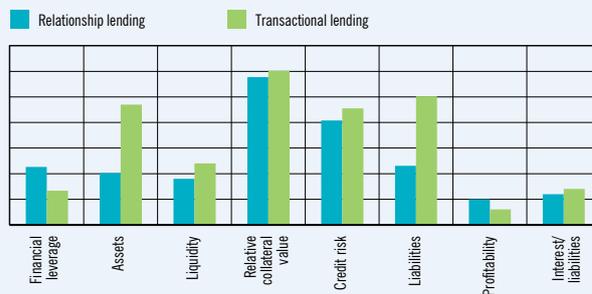
5 The most marked reduction of concentration in relationship lending was recorded in the industrial sector.

6 This is particularly obvious in lending to small and medium-sized firms, see for example Montoriol-Garigga, J. (2008): *Bank Mergers and Banking Relationships*, ECB WP 934.

7 Information about the risks of business entities is based on internal evaluations of credit risk of non-financial corporates developed in the Financial Stability Department of the CNB.

8 It is to be expected that the problem of imperfect and asymmetrical information will be the greatest in the segment of small firms, which would also explain a somewhat more widespread practice of relationship lending in such debtors considering that it is helpful in just such a business environment.

Figure 3 Financial indicators of firms with respect to the model of bank lending (in the period from 2007 to 2011)



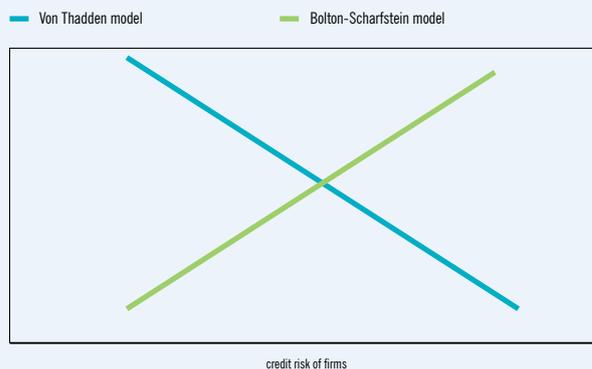
Notes: 1. Differences of the medians (average for company risk factor) are statistically significant at the 1% level. 2. Units of measurement are standardised, that is, adjusted so that the magnitudes should be visible, and the differences comparable (and so they are not shown). Sources: FINA and CNB.

Figure 4 Financial indicators of banks with respect to the model of bank lending (in the period from 2007 to 2011)



Notes: 1. Differences of the medians are statistically significant at the 1% (***), 5% (**) and 10% (*) level. Columns not coloured in show indicators for which no statistically significant difference has been established. 2. Units of measurement are adjusted so that the magnitudes shown should be visible, that is the differences comparable (and so they are not shown). Sources: FINA and CNB.

Figure 5 Relationship lending and credit risk



Source: CNB.

Table 1 Determinants of relationship lending (indicator: DI)

Dependent variable: Probability of application of relationship lending to firm				
Independent variables	Total (1)	Construction	Other	Total (2)
Risk factor in firm	-0.1259***	0.3169***	-0.2759***	-0.1010***
Big firms	-1.2128***	-1.3026***	-1.1972***	-1.1792***
Concentration on the banking market ^a	-392.3515***	-1.5211	-500.5592***	-389.4249***
Economic growth	0.0151***	0.0090	0.0184***	0.0149***
Large bank	-0.1885***	-0.1763***	-0.2021***	-0.5206***
ROA	0.1537***	0.1271***	0.1666***	0.1665***
Relative value of collateral	0.0000	0.0047*	0.0000	0.0000
C	2.1680***	1.2873***	2.4090***	2.0869***
Austrian banks				0.4386***
Italian banks				0.1325**
McFadden R ²	0.0337	0.0363	0.0361	0.0364
Number of observations=0	7734	1748	5986	7734
Number of observations=1	22213	6010	16203	22213

^a Concentration on the banking market is approximated by the Herfindahl-Hirschman index of concentrations for loans, standardised by the number of branches. Note: The symbols (***), (**), (*) indicate statistical significance at the 99%, 95% and 90% levels. Source: CNB.

Table 2 Impact of selection of bank lending model on risk profile of bank loan portfolios (panel regression with fixed effects)

Corporate portfolios of banks				
Variables	Share of bad debtors		Share of bad loans	
	Model 1	Model 2	Model 3	Model 4
Share of debtors employing relationship lending (DI)	-0.6114***		-0.2911***	
Share of debtors employing relationship lending (DI*)		-0.5874***		-0.3227***
Economic growth	-0.0037	-0.0059*	-0.0040**	-0.0052***
C	0.7736***	0.6832***	0.3974***	0.3786***
Adjusted R ²	0.4515	0.4647	0.5004	0.5274
Number of observations	161			
Number of banks	33			

Note: The symbols (***), (**), (*) indicate statistical significance at the 99%, 95% and 90% levels. Sources: FINA and CNB.

more adequate evaluation of the risks inherent in the client and a better evaluation of the collateral. This ultimately can reduce credit risk in bank balance sheets (the Von Thadden model⁹), and reduce the sensitivity of the banking system to monetary shocks¹⁰. However, as well as these advantages that reduce the degree of risk to the financial system, relationship lending can also work in the direction of increasing credit risks (the Bolton-Scharfstein model¹¹). Accumulation of risk will occur if the banks reduce their stringency in the process of collecting claims, including incentives to activate collateral (soft budget constraints), or if the banks acquire an information monopoly over the client and use it through hold-up costs.

9 Thadden, E. L. von (2004): *Asymmetric information, bank lending and implicit contracts: The winner's curse*, Finance Research Letters 1, 11-23.

10 Hackem, K. (2011): *Relationship Lending and the Transmission of Monetary Policy*, Journal of Monetary Economics, 58.

11 Bolton, P., and D. Scharfstein (1996): *Optimal debt structure and the number of creditors*, Journal of Political Economy, 104, 1–25.

Model estimations of the probability of applying relationship lending and credit risk help to distinguish these factors and to explain the impact of relationship lending on the stability of the domestic banking sector. The results of the models tested (Tables 1 and 2) show that the prevailing model for relationship financing during the period under observation was the Von Thadden model. Apart from there being a negative correlation between relationship financing and credit risk, also established was the already underscored negative correlation of this model of lending with the size of the business entity, as well as with the degree of concentration on the banking market. This result suggests the possibility that strengthening competition encourages banks to build unique and long-term ties with clients, that is, to employ a more flexible and individualised approach to lending to them¹².

12 Boot, A. W. A. (2000): *Relationship Banking: What Do We Know?*, Journal of Financial Intermediation, 9; Boot, A. W. A., and A. W. Thakor (2000): *Can Relationship Banking Survive Competition?*, Journal of Finance, 55.

The analysis conducted also provides a possible answer to the issue of whether foreign-owned banks adopt in their operations the business strategies of parent banks, that is, the models of financing that are dominantly applied by their owners in their home countries. Croatian banks that are majority Austrian-owned to a great extent apply the model of relationship lending on the Croatian market, confirming their closeness to the strategy of German banks, in which this type of bank financing is the most frequent. At the same time, in the case of Italian-owned banks, that are generally transaction-oriented in their home market, it is not possible to establish any imitation of the business strategies of their parent banks¹³.

Because of the considerable concentration of debtors from the construction industry and the exposure to them in the portfolios of banks that use relationship lending, this has been separately modelled. The results show that in this activity the model of relationship financing that increases credit risk (the Bolton-Scharfstein model) is used, which means that banks employ soft budget constraints with respect to construction firms. This positive correlation between relationship lending and credit risk, which can be separately observed in the segment of relatively short lending relationships¹⁴, may partially be the result of firms founded for specialised lending that mainly enjoy relationship lending. Because of their particular features, these firms are regularly considered to represent elevated credit risks. On the other hand, this finding can really indicate a widespread practice of providing financial support in this type of relationship lending in spite of higher risks (Table 3)¹⁵. In addition, the somewhat greater frequency of this phenomenon is indicative, for as a rule in these firms it is common to meet great individual exposures and valuable real estate collateral¹⁶. Still, this cannot be a long-term strategy of a bank, particularly in conditions of prolonged recession and a plunging real estate market¹⁷.

13 Although in most banking sectors both models of bank lending appear concurrently, empirical research has shown that some systems are dominantly either transactional (for example the Italian, Detragiache et al., *Multiple Versus Single Banking Relationships*, <http://www.feem.it/userfiles/attach/Publication/NDL1997/NDL1997-064.pdf>) or relationship oriented (for example the German, Memmel et al., *Relationship Lending-Empirical Evidence for Germany*, Economic and Financial Report, 2008/01).

14 The probability of exceptionally short-term relationship lending is modelled, confirming the presence of the Bolton-Scharfstein lending regime in this segment of the corporate portfolios of banks.

15 The characteristics of the used data sources suggest caution in the interpretation of these findings since total gross loans are monitored at the level of the debtor in the supervisory reports. Therefore, it is not possible to estimate the effects of short-term financing which would more precisely differentiate these characteristics. In addition, data on credit risk may to some extent be underestimated due to the debt restructuring and prolongation practice which is not recorded in the aforementioned sources.

16 It is in construction that this variable (value-to-loan) proved to be positive and statistically significant in the model, and empirical research has shown that in the case of any more important role of real estate collateral it can be expected that they are directly proportional to the risk of the company (Jimenez, G. and J. Saurina (2004): *Collateral, Type of Lender and Relationship Banking as Determinants of Credit Risk*, WP 0414, Banco de Espana).

17 Fukuda, S., and J. Nakamura (2010): *Why Did "Zombie" Firms Recover in Japan?*, CIRJE Discussion Papers/CIRJE-F-751.

Table 3 Rates of growth in loans and credit risk correlated with bank lending models

Period	Debtors with exceptionally long relationship lending	Debtors with shorter relationship lending	Debtors not employing relationship lending
Total corporate sector			
2007 – 2011	8.1 (19.3)	10.1 (29.7)	3.1 (22.8)
Before crisis period (before 2009)	11.9 (12.5)	19.0 (14.2)	5.9 (10.4)
Crisis period (after 2009)	6.7 (24.7)	7.6 (41.0)	2.2 (29.7)
Construction activity			
2007 – 2011	8.2 (22.3)	6.4 (28.9)	1.5 (19.5)
Before crisis period (before 2009)	15.0 (12.3)	13.8 (14.9)	7.5 (9.8)
Crisis period (after 2009)	5.7 (30.3)	4.1 (40.5)	-0.7 (27.2)
Other activities			
2007 – 2011	8.1 (18.3)	13.2 (30.3)	3.5 (23.7)
Before crisis period (before 2009)	11.0 (12.6)	24.4 (13.5)	5.4 (10.6)
Crisis period (after 2009)	7.0 (22.9)	10.4 (41.4)	3.0 (30.3)

Note: In brackets is the average degree of risk of a portfolio (share of debtors that do not properly service their debts expressed in percentages).

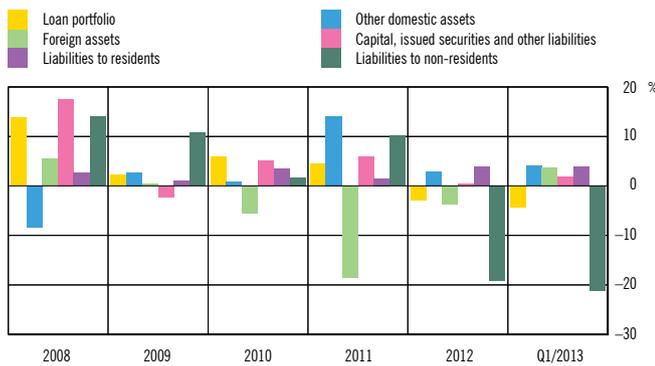
Sources: FINA and CNB.

Finally, it can be concluded that banks and clients in Croatia make extensive use of the model of relationship financing, which is in line with the business strategies of banks in Central Europe. Such a practice can in some situations produce certain advantages from the point of view of mitigating risks in the system. But in the conditions of a long-term crisis, relationship financing can have an adverse effect on the loan portfolios of the banks. Accordingly the fall in the incidence of relationship lending should not surprise, which helps in the channelling of lending to new projects.

With accession to the EU and the opening (integration) of the market, it can be expected that there will be a deepening of the financial market (not the banking market alone), ownership restructuring (merging and sales of credit institutes) as well as the opening of the market to new competitors, which can have a crucial effect on models of business financing and risk management. It can be assumed that relationship financing will gain in importance in the future with smaller banks too, on the whole present a longer time on the domestic market. On the other hand, the development of statistical and information databanks in the finance industry (credit registers and the like) can reduce the degree of asymmetric information and lead towards a more vigorous use of transaction-oriented financial intermediation.

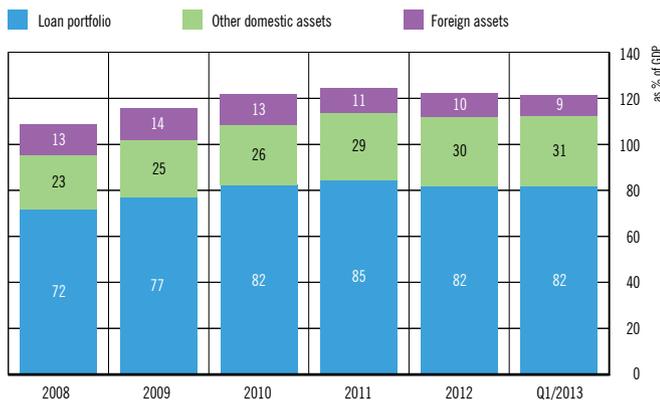
Banking sector

Figure 66 Major banking sector balance sheet items,^a year-on-year rates of change



^a An increase in balance-sheet items at end-March 2013 was calculated relative to March 2012.
Source: CNB.

Figure 67 Banking sector assets



Source: CNB.

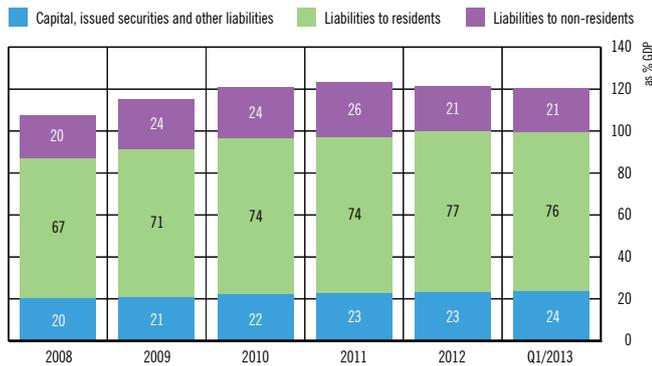
In the environment characterised by weakened demand and increased uncertainty, a slight contraction of loans has continued, alongside the noticeable affinity of banks to invest in low-risk assets on the domestic market and to reduce their foreign liabilities. As a result, dependence on foreign sources of financing was reduced, and at the same time the foreign liquidity of banks and the perspectives for dynamising revenues were weakened. Indicators of bank profitability are at the lowest level since the last banking crisis, a crucial influence here being exerted by the continued growth in non-performing loans. Nevertheless, the sector as a whole is still well capitalised and is capable of withstanding considerable shocks; however, the differences in the stabilities of individual banks continue to increase.

Balance sheet vulnerabilities

At the end of 2012 and at the beginning of 2013, loans made by banks were effectively slightly reduced, which is the continuation of the trend started in the middle of 2012⁶. In the same period, the foreign liabilities of banks fell, and the growth in the portfolio of domestic securities to an extent softened the asset

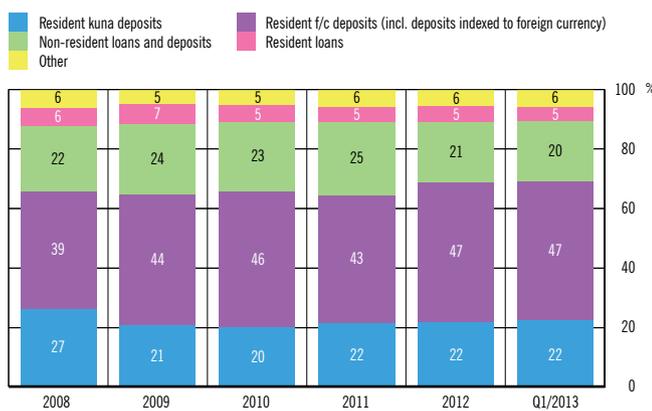
⁶ Aggregate balance sheet statistics were considerably affected by a large bank that at the end of 2012, in order to reduce the ratio of NPL, sold about HRK 5.6bn worth of claims (net value of HRK 3.7bn) to a company owned by its parent.

Figure 68 Banking sector liabilities^a



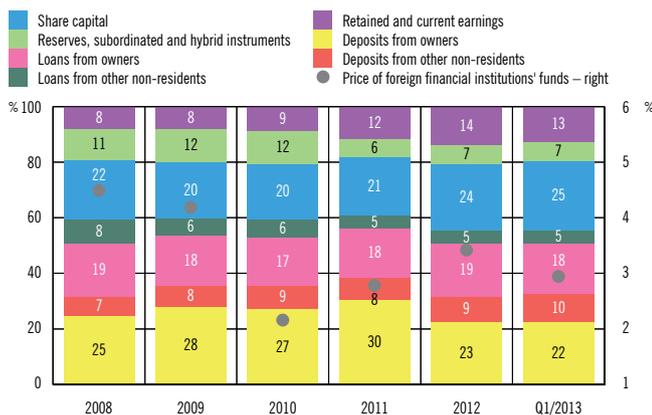
^a Collectively assessed impairment provisions represent the difference between banking sector assets and banking sector liabilities and capital.
Source: CNB.

Figure 69 Structure of liabilities



Source: CNB.

Figure 70 Structure of foreign-source funds



Source: CNB.

contraction. Accordingly, assets of banks in the last year have fallen by 1.8%, or by 2.5% if the effect of exchange rate changes is excluded (in 2012 this reduction came to 1.7% and 1.9%, respectively) (Figures 67 and 68).

At the end of March 2013 securities accounted for the highest proportion in bank assets in the last six years (10.3%), investments in Croatian government bonds having risen at the same time by about 8% (Figure 66).

Suppressed demand from the retail section, as well as more stringent credit conditions for the corporate sector still act as constraints on a rise in credit.⁷ As a result, loans made by the banks during the last year were reduced by 3.7%, or 4.4% if exchange rate changes are excluded⁸.

In conditions of low demand for credit, the banks used the recent growth of the domestic deposit funds and part of the existing foreign assets for further reduction of foreign liabilities. In the period from September 2012 to March 2013, liabilities to foreign owners were reduced by a total of about 19%, or by about 27% in the twelve-month period up to March 2013. In spite of this, because of retained profit from the previous period, the proportion of foreign owners in the liabilities of the banks is still relatively high (26% at the end of March 2013); their share in total foreign sources of finance rose slightly (to 85%) (Figures 69, 70 and 71).

Mild increase in resident deposits in the reference period was mainly the result of the growth in household deposits, while deposits of other domestic sectors decreased (Figures 68 and 69).

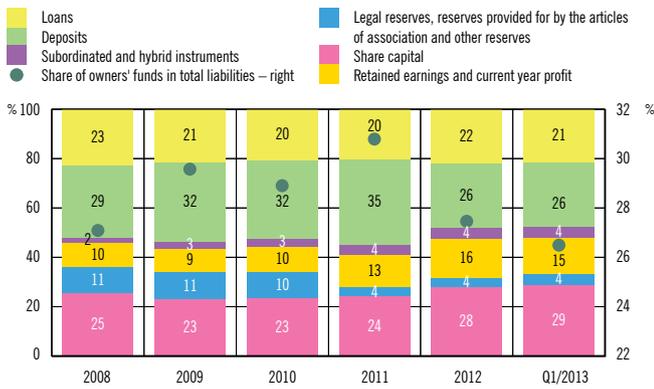
The fall in the foreign liabilities of banks, abetted by the influence of the process in which foreign owners were deleveraging and the weak loan activity on the domestic market, reflects the efforts of banks to reduce the costs and risk of external financing given the increase in the level and the volatility of the price of capital on the international markets after the beginning of the crisis. These changes, together with the mentioned changes in the structure of assets, reduced the liquidity position of banks, as indicated by a slight fall in bank liquidity indicators in the period under observation (Figures 66, 69, 70, 71 and 72).

The structure of loans and deposits is relatively stable and still reflects the low exposure to direct currency and interest rate risk (Figures 73, 74, 75 and 78). But exposure to currency induced credit risk is standardly high, although the portion of unhedged corporate sector debt has fallen slightly, which is a continuation of a trend of 2012 (Figure 78). The household sector continued to be largely unprotected against CICR.

⁷ Box 3 The results of the bank lending survey, *Bulletin of the CNB*, No. 194, Information on economic trends and forecasts, July 2013.

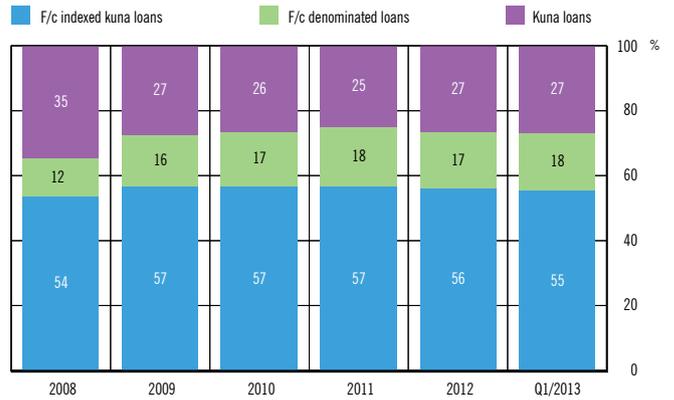
⁸ If the sale of part of the portfolio of a bank to a firm owned by the foreign owner is excluded, the nominal fall of loans comes to about 2.5%.

Figure 71 Breakdown of bank owners' funds by instrument



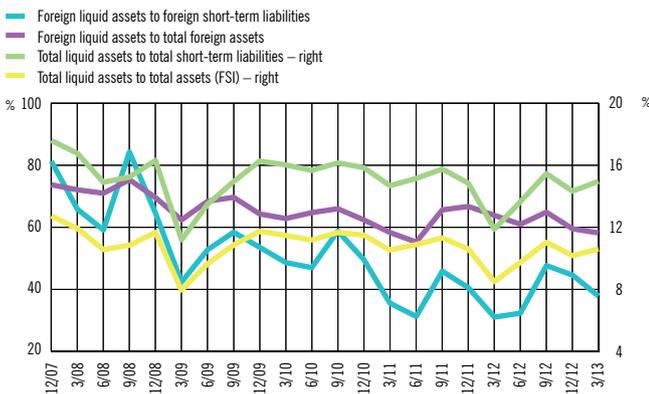
Source: CNB.

Figure 74 Currency breakdown of loans



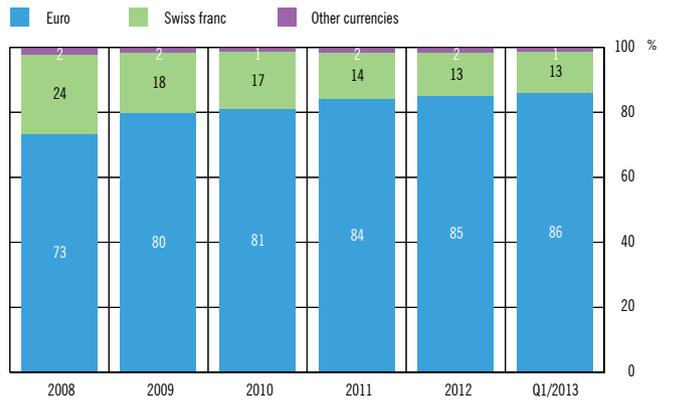
Source: CNB.

Figure 72 Liquidity indicators



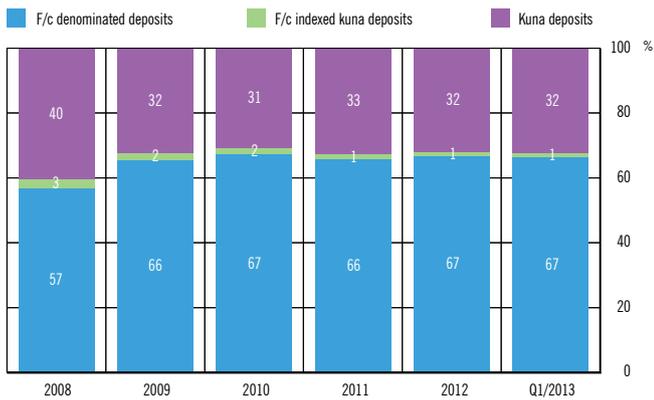
Source: CNB.

Figure 75 Currency breakdown of non-kuna loans



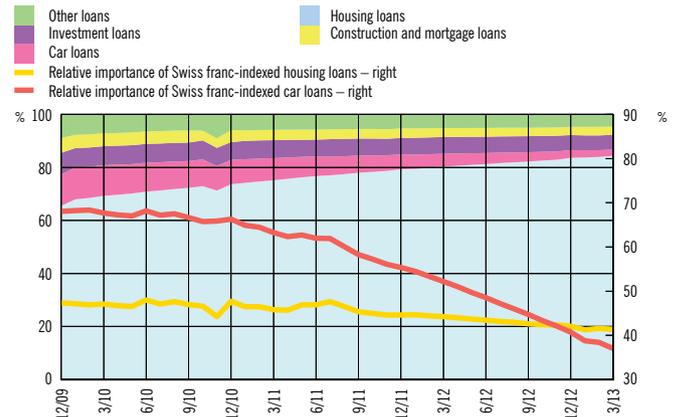
Source: CNB.

Figure 73 Currency breakdown of deposits



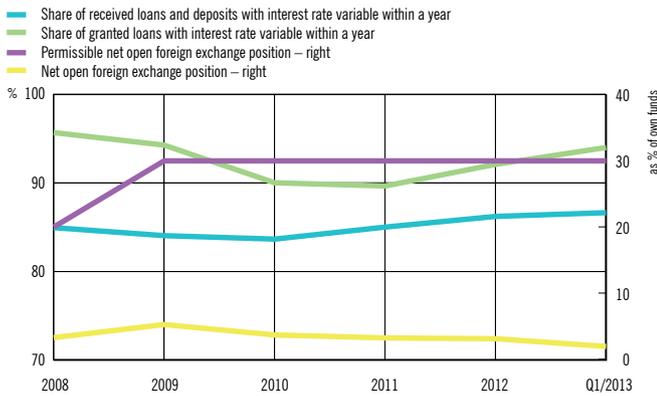
Source: CNB.

Figure 76 Breakdown of Swiss franc-indexed loans



Source: CNB.

Figure 77 Bank exposure to direct currency and interest rate risks



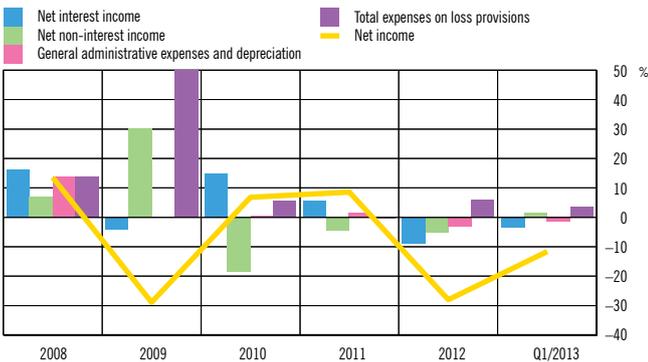
Source: CNB.

Figure 78 Share of unhedged loans in total loans exposed to CICR^a



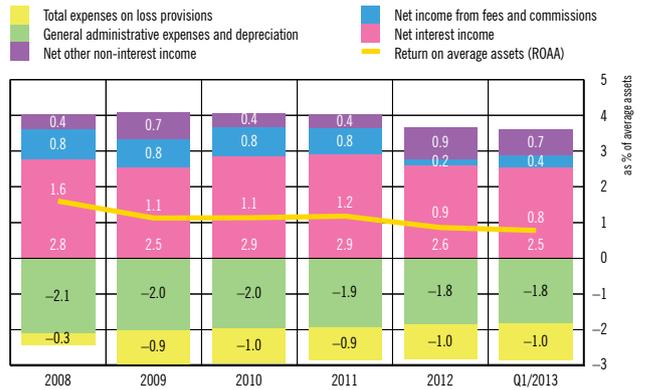
^a Under new rules, CICR and several other risks have been transferred to the second pillar of the new framework of capital calculation, i.e. regulations on internal capital of credit institutions.
Source: CNB.

Figure 79 Change in selected business performance indicators^a, year-on-year rates of change



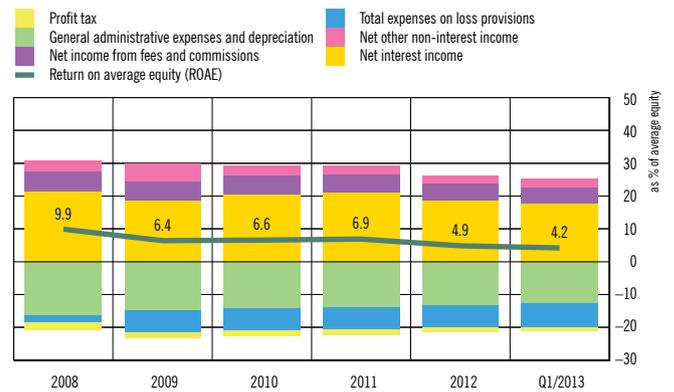
^a Total expenses on loss provisions increased by around 220% in 2009.
Source: CNB.

Figure 80 Contribution of ROAA categories



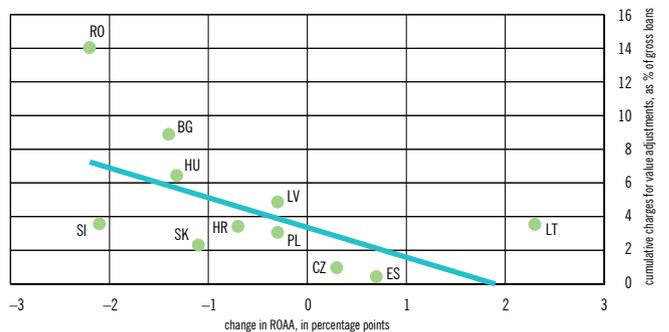
Source: CNB.

Figure 81 Contribution of ROAE categories



Source: CNB.

Figure 82 Charges for value adjustments and bank profitability, 2008 – 2012



Source: IMF, Financial Soundness Indicators, April 2013.

Except for housing loans, all loans indexed to the Swiss franc have been gradually vanishing from the balance sheets of banks since banks have not been approving them for some time now. As against this, the depreciation of the kuna against the Swiss franc in the last few years and the slow rise in housing loans in general support the relative importance of housing loans tied to the franc. Changes in the structure of loans are to a large extent the result of a change in their net value because of deterioration in their quality (Figure 76).

Expected macroeconomic trends of a slight growth in the rest of the year indicate that no very strong growth in the balance sheets of banks or changes in their structures should be expected⁹. After an intense process of balance-sheet restructuring since the beginning of 2012, during which the banks considerably reduced their foreign assets and liabilities, the manoeuvring space of the banks for further changes is extremely narrow.

Strategic risks¹⁰

The weaker interest earnings because of investments in more secure assets on the domestic market and the greater average interest expenses on liabilities to domestic and foreign financial institutions led to a strong fall in net interest income. This was accompanied by a rise in the costs of value adjustments because of the decreased quality of loans, and the profits of banks were much reduced, with profitability indicators dropping to a ten-year low.

Net interest income of banks was reduced by 8.8% in 2012, and by another 3.5% in the first quarter of 2013. Affected by the deterioration in loan quality, particularly in the corporate portfolio, interest income has been falling since 2010. The rise in investment in government bonds with slightly more favourable yields has to a slight extent kept up interest income, but in safer positions the earnings are relatively small. On the other hand, interest expenses are very slowly decreasing, after having risen in 2012. As a result, in concert with a rise in the costs for value adjustments, the net profit of banks fell by 28.0% in 2012 and by another 11.6% in the first quarter of 2013. Accordingly annual ROAA dropped to 0.8% at the end of 2012 and in March 2013, and in the same year the annual ROAE fell to 4.8% and 4.2% respectively (Figures 79, 80 and 81). The negative correlation between value adjustment costs and the profitability of banks is empirically clearly established in international comparisons as well, which do not differentiate Croatia from the countries of Central and Eastern Europe (Figure 82).

⁹ For more about the macroeconomic outlook in the rest of the year, see the chapter *Macroeconomic environment*.

¹⁰ Items from the profit and loss statement up to March 2013 are brought down to an annual level so as to be comparable with the previous whole-year periods. This was done by summing the operating results of banks in the last three quarters of 2012 and the first quarter of 2013.

Figure 83 Structure of total income

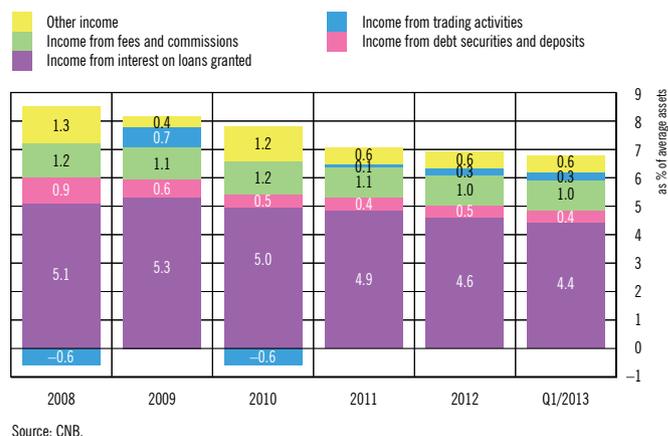


Figure 84 Structure of income from fees and commissions

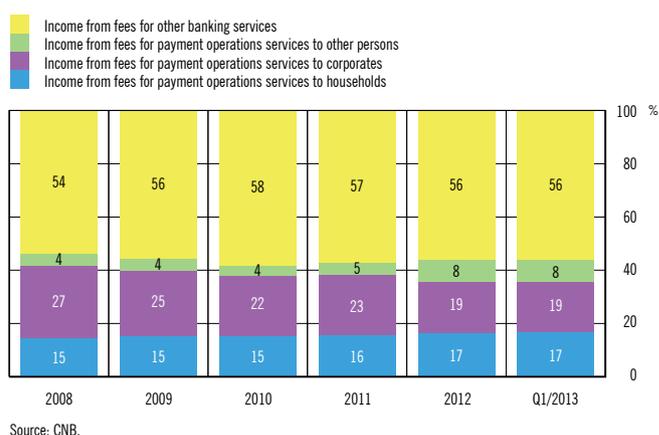


Figure 85 Structure of total expenses

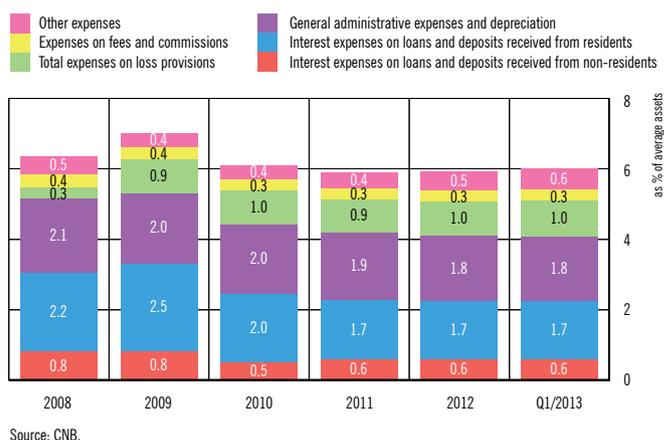
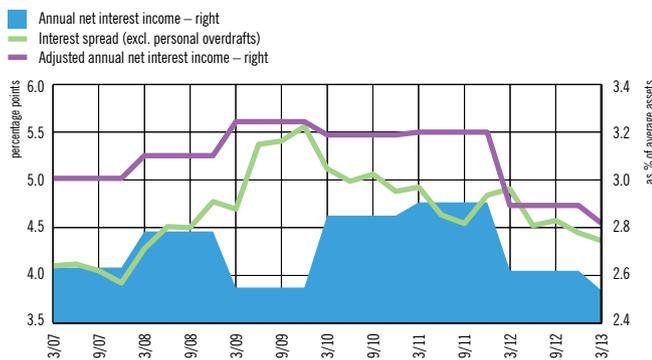
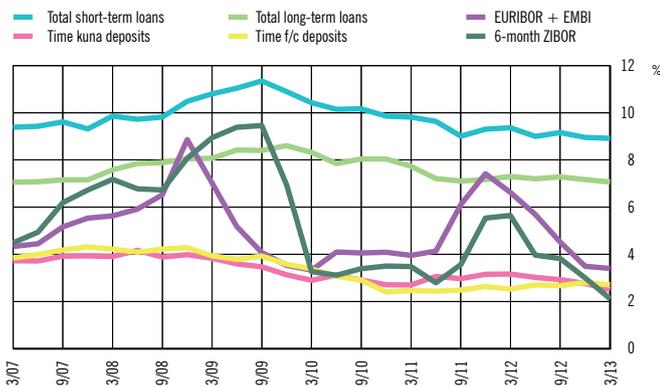


Figure 86 Interest spread (quarterly average of monthly interest rates on newly-granted loans) and annual net interest income



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

Figure 87 Selected interest rates (quarterly average of monthly interest rates)



Source: CNB.

Figure 88 Share of short-term loans in total newly-granted loans (quarterly average)



Source: CNB.

With the onset of the crisis, the banks adjusted their business strategy in the segments of credit section, portfolio optimisation and cost management so as to fully support their earnings, but the short-term outlook for dynamising earnings continues to be unfavourable. The rise in the share of institutional clients (government and financial corporations) in the credit portfolios of the banks after the beginning of the crisis restrict the opportunities for cross-selling and growth in non-interest income (Figures 83 and 84). At the same time, the inflow of new NPL at the beginning of the year indicates a further pressure on interest income. The space for any significant savings on operating costs is fairly narrow because they underpin the necessary infrastructure and the distribution network (Figure 85).

The response of the banks to the crisis was to lend to less risky clients (which is visible from the fall in average weighted risk in Figure 92), yet clients with lower weighting also produce lower yields, which in return has a negative effect on profit over the short term. Since there is also a concurrent real fall in lending, the interest bearing assets has increasingly smaller potential to compensate for value adjustment costs (Figure 83).¹¹

The adjusted interest margin continued to fall after 2011. The decline in interest income resulting from the fall in the quality of loans and the simultaneously higher average interest expense with higher reference interest rates brought the interest margin down to its lowest level since 2008. From the beginning of 2012, the ratio of loans (more productive forms of assets) to assets fell, and safer but less productive items rose. In such circumstances the passive rates of banks remained relatively low, and there is no reason for them to be raised, for the banks have nowhere to place the funds (Figures 86 and 87).

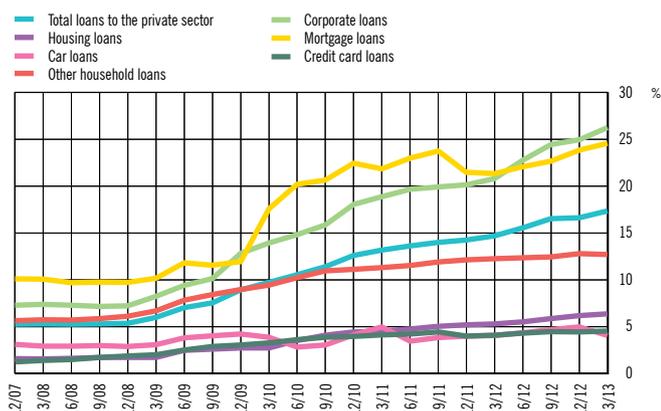
In spite of the gradual reduction of interest expenses, pressures on income from interest are too high for net interest income to recover without some new credit growth. If the current strategies continue to be held, the choice of relatively poor yields in safe investments, the banks will increase the risks of a future adequate coverage of value adjustment costs.

The proportion of short-term loans in total loans granted during 2012 reached the level of about 80% which is close to the highest level recorded to date. But because of the fall in the quality of loans, this type of more expensive lending has not generated a rise in interest income (Figure 88).

In the continuation of the year, as well as a gradual recovery of the economy, a slight rise in lending can be expected, which will help to bring about a gradual improvement in bank performance.

¹¹ According to the last survey about credit activities, the banks tightened the terms on which they made loans, particularly with respect to the corporate sector. For more on this, see Box 3 The results of the bank lending survey, *Bulletin of the CNB*, No. 194, Information on economic trends and forecasts, July 2013.

Figure 89 Ratio of non-performing loans to total loans



Source: CNB.

Credit risk and bank capitalisation

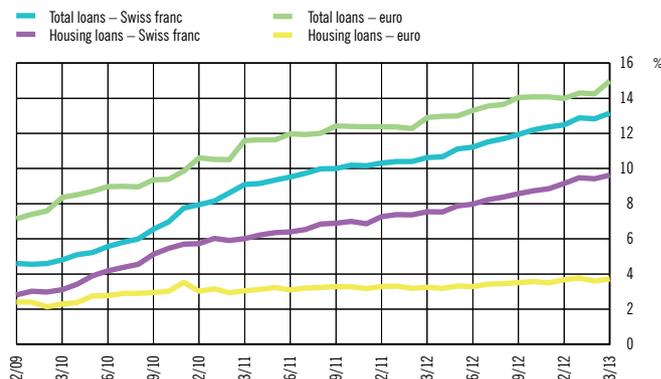
The absence of credit growth puts increasingly greater emphasis on the quality of the existing loan portfolio, which as it ages, in conditions of an adverse macroeconomic environment, is deteriorating. In addition, reduced credit activity in the crisis is going on in parallel with a reduction of the practice of fairly tight business cooperation between creditors and debtors, which to an extent can additionally speed up the recognition of loan losses (see Box 2 Models of bank financing in the corporate sector). The share of NPL in the private sector at the end of the first quarter of this year reached 17.4%¹² or 14.6% of the entire portfolio (Figure 89).

In the case of loans to the corporate sector, the main determinant of quality trends in overall loans, the percentage of NPL at the end of March 2013 exceeded 26%, the construction and commerce sectors contributing very highly. At the same time, the quality of loans made to the retail sector continued to deteriorate as well. Although the kuna exchange rate in the period under observation¹³ was relatively stable, unfavourable trends in the labour market (see the chapter *Household Sector*) led to a rise in the share of bad loans to this sector to 9.7%. A considerable contribution to the rise of bad loans to the retail sector in the current period was made by the rise of this share in housing loans to 6.4%, there being a perceptible rising difference in the quality with respect to value indexing. At the end of March 2013, thus, the proportion of non-performing housing loans indexed to the Swiss franc was about two and a half times greater than of those that were euro-indexed (Figures 89 and 90).

12 Because of the sale of part of the loan portfolio of one large bank at the end of 2012 there was a temporary statistical rise in the quality of assets, but the growth of the ratio of NPL to the private sector was rapidly continued.

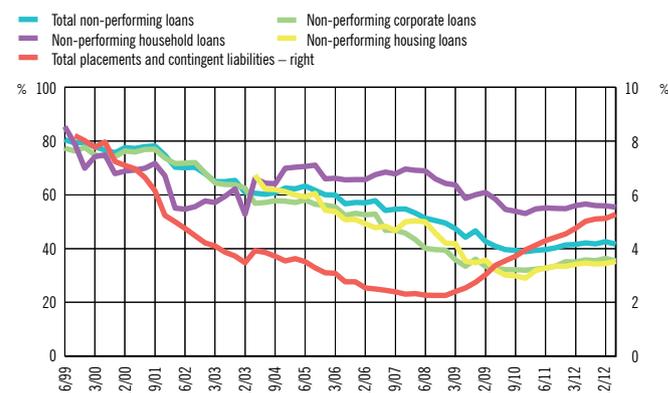
13 In 2012, the kuna depreciated in terms of the Swiss franc by about 0.8%, and by about 0.2% against the euro. In the first quarter of 2013, the kuna appreciated against the Swiss franc by 0.2% and depreciated 0.5% against the euro.

Figure 90 Ratio of non-performing loans to total loans by loan categories and the currency of indexing



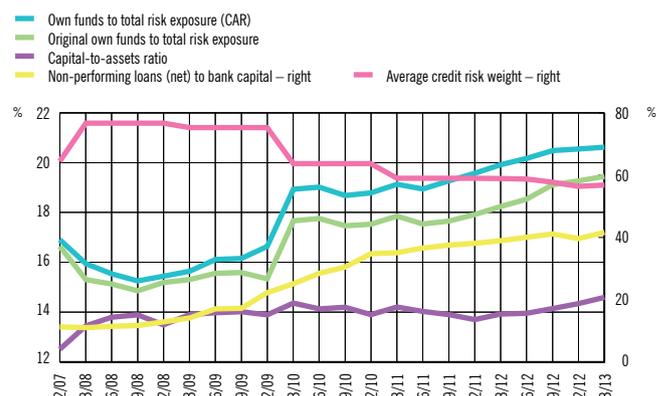
Source: CNB.

Figure 91 Coverage of total placements and contingent liabilities by value adjustments



Source: CNB.

Figure 92 Capital adequacy ratios



Source: CNB.

Box 3 Market power and stability of banks in the countries of Central and Eastern Europe

In spite of a strong growth in research concerning the relation of the market power of banks and their stability after the onset of the financial crisis, there are still no clear conclusions about this link. On the one hand the prevailing conviction, according to which an increase in competition increases vulnerability, points out that banks with a greater market power are more stable because of their more cautious risk management, by which they are protecting their franchise value.¹ As against this, the belief according to which greater competition increases stability starts off from the paradigm of risk shifting from the balance sheet of the client to the balance sheet of the bank because of the higher prices that are to be found in the less competitive sectors. The objective of this box is to investigate the influence of market power of banks on their stability, using banks from Central and Eastern Europe as an example, and to provide an answer to the question as to which channel this relation is realised.

The standard measure of the market power of banks, the Lerner index², shows a relative difference between price and marginal cost. As the methodology of calculation this index ascribes the whole of the difference to market strength, it leaves no possibility that the banks might

use market power outside their pricing strategy³. For this reason, in the literature in recent times, additional indicators of bank market power have been introduced. In this paper, the concept of the competition efficiency frontier, or CEF⁴, is used as indicator of the market power of an individual bank. Accordingly lower competition efficiency in the limitation of the revenues of an individual bank is in effect a reflection of the great market power of that bank. The advantage of this indicator, as against the Lerner index, is that fact that it is a relative indicator of market power and is not directly linked with prices.

The empirical part of the research was carried out on a sample of 415 banks from Central and Eastern Europe⁵ (Albania, Bosnia and Herzegovina, Bulgaria, Czech R, Estonia, Croatia, Latvia, Lithuania, Hungary, Macedonia, Poland, Romania, Slovakia, Slovenia and Serbia) in the period from 1997 to 2012, using the database Bankscope⁶. Since the measurement of stability and market power of banks is a sensitive question, special attention was given to the choice and calculation of the variables. Thus we measure the stability of banks with the Z-score, the ratio of NPL, costs for value adjustment, and burdening of equity with uncovered NPLs. Also, we use a number of control variables: efficiency, liquidity, credit growth, ratio of loans and deposits, size of bank, ratio of loans and assets, ratio of equity and assets, proportion of non-interest earnings, proportion of NPL, the interbank position, the regulatory burden and the output gap.

1 Franchise value is the ratio between market and book value of a bank. The book value of a bank is the balance sheet amount of capital, and the market value of the bank is approximated by discounting the net operating earnings of the bank by its average cost on capital. Accordingly franchise value is a kind of intangible asset, something like goodwill, of which decision makers in the bank are aware.

2 The Lerner index is the relative margin as compared to the marginal cost and is calculated according to the following formula:

$$L = \frac{P - MC}{P},$$

where L is the Lerner index, MC is the marginal cost, and P is the implicit active interest rate. The marginal cost is obtained by a derivation of the function of total cost to the assets of the bank.

3 On the problems associated with the Lerner index as instrument for testing the correlation between market power and stability, see more in Beck, T. H. L., O. G. De Jonghe and G. Schepens (2011): *Bank competition and stability: cross-country heterogeneity*, Universiteit Gent, D/2011/7012/37.

4 The competition efficiency frontier, CEF, is an indicator of market power derived from the concept of efficiency, and is obtained from the following function:

$$\ln(Y_i) = \Theta_0 + \sum_{j=1}^5 \Theta_j \ln X_j + 1/2 \sum_{j=1}^5 \sum_{l=1}^5 \Theta_{jl} \ln X_j \ln X_l + \sum_{k=1}^2 \sum_{l=1}^2 \lambda_{kl} \ln X_k \ln P_l + \sum_{k=1}^2 \pi_k P_k + 1/2 \sum_{k=1}^2 \sum_{m=1}^2 \lambda_{km} \ln P_k \ln P_m$$

where the following obtain:

Y_i is the dependent variable (earnings from operations related to the interest range divided by the operating costs),

P_k is a productivity indicator (ratio of work and deposits and physical capital and deposits),

X_i is the input price (price of work and price of physical capital),

X_i is unit costs (of processing and physical capital) and the GDP gap.

We start off from the assumption that the unexplained part of the equation can be divided into two parts: the random part and the part conditioned by competition, and the previous equation can be rewritten in the following form:

$$\ln(\text{rev}/oc) = R(\ln X_i, \ln X_j, \ln P_k) + \ln e + \ln u$$

Making use of a distribution free approach (DFA) we start off from the assumption that the residual consists of a random component and a component that is the result of competition. In a long enough period the average of the random component tends to zero, and the residual tends to the effect of competition. Finally, the competition efficiency frontier is calculated in the following way:

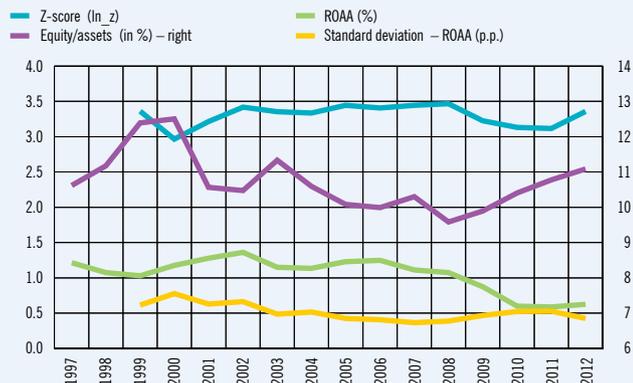
$$CE_i = \exp(\ln \bar{u}_i - \ln \bar{u}_{\min}) - 1 = (\bar{u}_i / \bar{u}_{\min}) - 1$$

where CE is the competition efficiency frontier, the averaged residual during time for bank i, the minimum in the series. Kraft, E., and I. Huljak (2011): *A Frontier Approach for Measuring Bank Competition Efficiency in Croatia*, the 9th International Conference "Challenges of Europe", Economic Faculty, Split 2011, used these indicators taking banks in Croatia as a model and showed that in different segments of the same market the level of competition can be diverse.

5 Honohan, P., and D. Klingebiel (2000): *Controlling Fiscal Costs of Banking Crises*, World Bank, mention that about half of the countries mentioned had a banking crisis during the nineties, the social costs of which ranged between 3% and 30% of GDP.

6 After 2005, the coverage by data for the banking sector of almost all the countries ranges at a relatively high level of over 80%. But in general in our sample these countries were not equally represented.

Figure 1 Selected indicators for the median country of Central and Eastern Europe



Source: Author's calculation according to figures from the Bankscope database.

Pursuant to an analysis of indicators for the median bank we conclude that the stability of banks in CEE rose between 2001 and 2008. Considered by components of the Z-score⁷, the highest recorded level in this period is the result of high and stable profitability, while during the whole of the period the equity-to-assets ratio was reduced. This fall was the result of the high initial level of capitalisation because of the reclassification of loans during and after the banking crises of the end of the last century that affected most of the countries observed (Figure 1). One of several reasons for the fall in the net interest margin recorded in this period mentioned in the literature is rise in competition.

The spillover of the effects of the financial crisis to the stability of the banks of CEE started in 2008, when costs for value adjustment rose considerably with a simultaneous fall in lending, which altogether brought about instability of earnings and depressed their level, thus causing a fall in the Z-score to a ten-year low. In this period the fall of the net interest margin was halted (Figure 2).

In parallel with the fall in net interest margin, competition among banks, measured by CEF, was reduced in the last ten years, except for a few years around the outbreak of the crisis. At the same time, the franchise value of banks (according to the hypothesis that competition leads to vulnerability of the basic disciplinary mechanisms within a bank) at the beginning of the crisis started to fall, which can be explained by the lower revenues of banks in the period of the rise in their average cost of capital.⁸

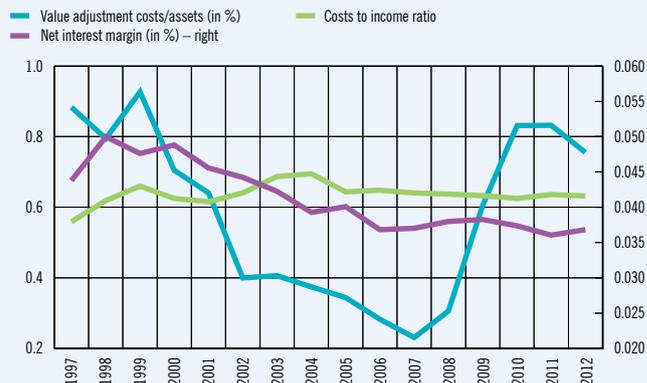
7 The Z-score is a widely accepted indicator of the individual stability of banks and is calculated as:

$$Z = \frac{k + \mu}{\delta}$$

in which k is the equity and assets ratio, μ is the average indicator of ROA (in the last three years) and δ is the volatility of earnings (standard deviation of profitability of assets for the last three years).

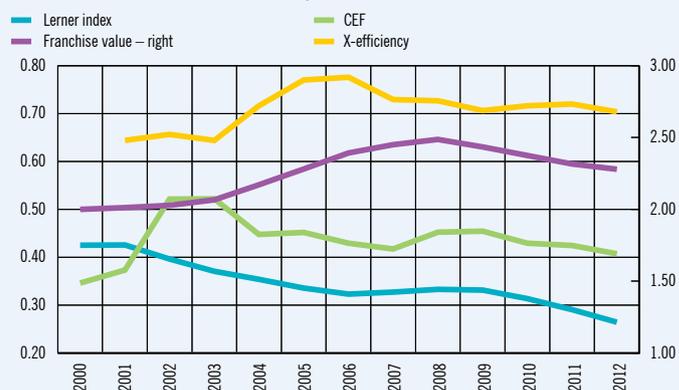
8 Franchise value is calculated as the ratio of market and book value of a bank. Since the banks in CEE on the whole are not actively traded on the stock market the market value is imputed in the calculation of the current value of money flows that the bank records. The perpetuity model is employed, in which money flows are approximated by operating profits, and costs of capital by the implicit rate of the bank on liabilities.

Figure 2 Selected indicators for the median bank of Central and Eastern Europe



Source: Author's calculation according to figures from the Bankscope database.

Figure 3 Indicators of bank market power, efficiency and franchise value (five year averages) for the median bank of Central and Eastern Europe



Source: Author's calculation according to figures from the Bankscope database.

The first step in the empirical research is to test the contribution of market power to the franchise value of a bank. The results show that market power, shown as CEF, affects the franchise value of a bank positively. At the same time, bank size means considerable savings because of the effects of economy of scale, and has a positive effect on franchise value, while the regulatory cost as expected reduces this value (Table 1).

In the next step the connection between bank stability and market power is tested. The model is evaluated for the period before and after the crisis on a panel of banks from the countries of CEE with and without fixed effects for the country⁹. So as to be able the better to explain the

9 Making use of the Chow test the justification of dividing the sample into before and during the crisis is confirmed. The justification of using fixed effects is tested by the use of the Hausman test (Greene, 2008). Including the assumption of the endogeneity of market power, a two-degree ordinary least squares method is used by the instrumentalisation of market power with its past value, which does not change the main findings of the research.

Table 1 A simple model of bank franchise value

	Ordinary least squares	Fixed effects for countries
Dependent: Franchise value		
Market power	0.740***	0.853***
Market share	1.725***	1.526***
Interbank position	-0.002	0.030*
Regulatory burden	-1.579***	-1.792**
_cons	1.985***	1.862***
N	316	316
R-square	0.25	0.39

Note: The symbols (***) and (*) indicate statistical significances at the 1%, 5% and the 10% levels.

Source: Author's calculation according to figures from the Bankscope database.

relationship between market power and stability, we have used decomposition of the Z-score on the stability of the portfolio and stability of capital¹⁰. Other control variables are: efficiency of the bank measured by X-efficiency, liquidity measured by ratio of liquid to total assets, rise in lending, ratio of loans to deposits, market share and economic growth that alongside the fixed effects introduced describes the macroeconomic situation in each individual country¹¹.

By decomposition of the Z-score on the stability of the portfolio and stability of capital it turns out that banks with greater relative market power have statistically and economically much greater portfolio stability in the period of the crisis (Table 2). The robustness of this finding is tested by modelling other indicators of portfolio stability. The results show that banks with greater market power in the crisis period also have a lower proportion of NPL, lower value adjustment costs to assets and a lower ratio of uncovered non-performing loans to capital.

In order to obtain final conclusions it is necessary still to verify the prices that the banks with greater market power set so as to be able to exclude the possibility that bank portfolio stability is the result of price management and not quality management. By modelling the net interest margin, the implicit active and passive rates we do not find a clear correlation between net interest margin and CEF, but we do obtain a clear negative correlation between CEF and active and passive rates.

In combination with the previous results about the better quality of the loan portfolio, we can conclude that market power of banks measured by CEF increases the stability of the banks' portfolios, which is the result

10 Kohler, M. (2012): *Which banks are more risky? The impact of loan growth and business model on bank risk-taking*, suggests the decomposition of the Z-score to obtain valuable additional information:

$$Z = \frac{k + \mu}{\delta} = \frac{k}{\delta} + \frac{\mu}{\delta} = P + L$$

where P is portfolio stability and L capital stability

11 The model is adjusted according to: Beck, T. H. L., O. G. De Jonghe and G. Schepens (2011): *Bank competition and stability: cross-country heterogeneity*, Universiteit Gent, D/2011/7012/37.

Table 2 Results of the basic model

	Before the crisis		During the crisis	
	Ordinary least squares	Fixed effects for countries	Ordinary least squares	Fixed effects for countries
Dependent: Portfolio stability				
Market power	1.091*	0.576	0.879**	0.633**
X-efficiency	1.452*	2.872***	-1.238**	-0.457
Liquidity	-0.749	-0.599	0.093	0.419**
Credit growth	0.121	-0.007	1.302***	1.339
Loans to deposits ratio	0.256	0.264	-0.043	-0.008***
Market share	2.463***	4.186***	3.390***	4.690***
Economic growth	-0.022	-0.193	-0.007	0.006
_cons	-0.077	-2.899**	1.357***	0.778
N	133	133	333	333
R-square	0.22	0.33	0.14	0.26

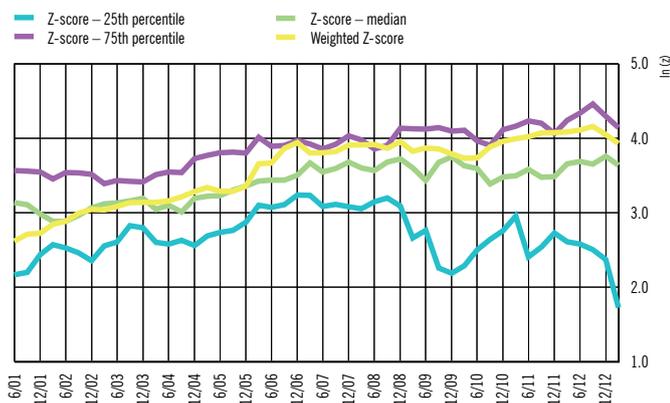
Note: The symbols (***) and (*) indicate statistical significances at the 1%, 5% and the 10% levels.

Source: Author's calculation according to figures from the Bankscope database.

of a better management of credit risk and not of charging higher costs to clients since we do not find any evidence of higher interest rates deriving from greater market power. What is more, the active and passive interest rates of banks with a greater CEF are lower, which means that lower costs of bank capital enables entry into safer loan forms that take for granted lower yields as well as lower risks. These results are in line with the franchise value hypothesis, which argues that a bank with greater market power will take steps to protect franchise value, not necessarily to maximise earnings in the short term. From this point of view, banks with more market power can choose informational instead of economic profits, and the consumption of information rent unfolds in the development of quality relationships with clients, which enables the protection of franchise value over the long run.

Finally, the growing differences in bank stabilities in CEE are a reflection of differences in the qualities of the loan portfolio, that is, of the materialisation of the credit risk in a crisis period. Distinguishing market power as a factor that contributes to loan portfolio stability in crisis periods still does not imply that competition is an undesirable phenomenon. Indeed, the initial measurements show that competition has a positive effect on bank efficiency, which is a precondition for lower costs of borrowing. Still, the sensitivity of banks in CEE and their experience in the financial crisis make the issue of their stability particularly sensitive and ask for caution in the adoption of any measures capable of reducing bank franchise value in the future. From this point of view, the entry of banks from countries of CEE into a banking union could additionally reduce their franchise value, which could also then diminish their stability.

Figure 93 Distribution of insolvency risk



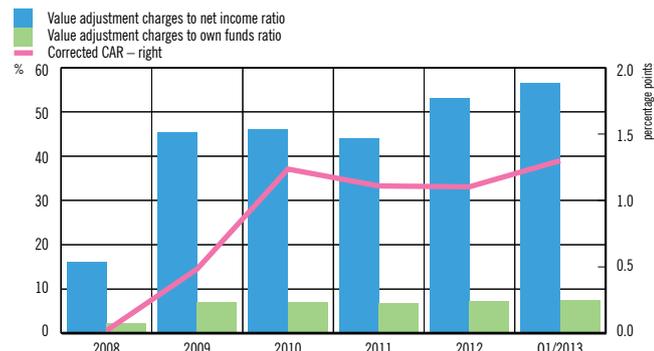
Source: CNB.

Figure 94 Distribution of NPLR



Source: CNB.

Figure 95 Balance sheet buffers to amortise shocks and the CAR corrected by the fall in the coverage of non-performing loans



Note: The correction of banks' CAR for the fall in the coverage is made in relation to the coverage level of 50%, which is an average for the 2004–2013 period.
Source: CNB.

At the beginning of 2013 the share of NPL rose noticeably, which led to an autonomous fall in the coverage of bad loans by value adjustments and a rise in value adjustment costs. Since new NPL at the beginning are as a rule classified into groups with lower coverage, in time the coverage rises, which leads to a rise in value adjustment costs. From this point of view, new non-performing loans will lead to a rise in the costs for value adjustments in two phases.

The fall in the coverage of non-performing loans (to 41.6%) led to a rise in the burden on capital by potential further corrections to bank asset quality. Thus the ratio of uncorrected value of non-performing loans and bank capital at the end of March 2013 exceeded 40% (Figures 91 and 92).

The resilience of banks to potential shocks is still to the greatest extent based on the high level of capital accumulated in the pre-crisis period. The growth of capital adequacy in the period was primarily resultant upon enhanced investor caution, manifested by investments being made into less risky assets, and the rise of capital from retained profit, while there was no major recapitalisation in the shape of inflows of new funds from the owners (Figure 92).

Differences in the stability of the different banks in a crisis period increase, and thus at the end of March reached their historical maximum measured by the difference of the 25th and 75th percentile Z-score (Figure 93). The fall in the stability of banks might be a result in part of the competition among banks. The influence of the sharpening of the market struggle of banks in the countries of Central and Eastern Europe, recorded in several years before the crisis, on the accumulation of risks that have materialised during the crisis is examined in Box 3 Market power and stability of banks in the countries of Central and Eastern Europe.

Resilience of the banking sector

The non-performing loans ratio in the banking system continues to rise, but the rise in the dispersion of this indicator among the banks has been halted. As compared to the last crisis moments in banking, at the moment it is possible to see the domination of the negative effects that systematically affect all the banks, while expressed to a lesser extent are specific risks indicating isolated problems in individual banks. This could mean that the differences in the recent individual stability indicators among the banks are on the whole the result of their management of a universally present credit risk, and not of idiosyncratic shocks (Figures 93 and 94),

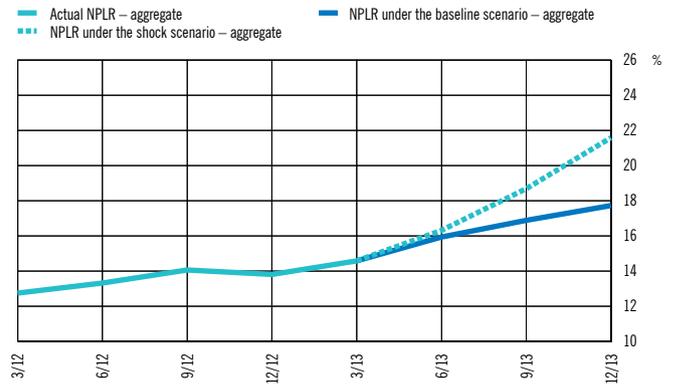
The weakening of bank net income and a simultaneous rise in value adjustment costs and capital stagnation have led to a rise in the burden on all buffers against shocks. Thus the annual value adjustment costs at the end of March came to about 55% of the net income of banks, while the ratio of these costs to own funds rose slightly to a little more than 7% (Figure 95).

Figure 96 The share of bank assets selected by potential risk indicators



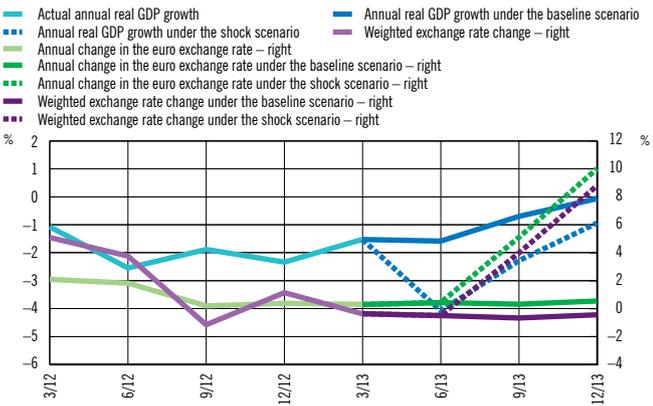
Source: CNB.

Figure 99 Projections of NPLR under various scenarios



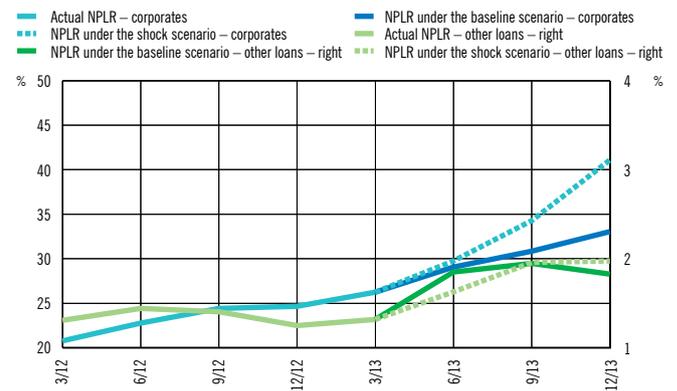
Source: CNB.

Figure 97 Projections of macroeconomic variables under various scenarios



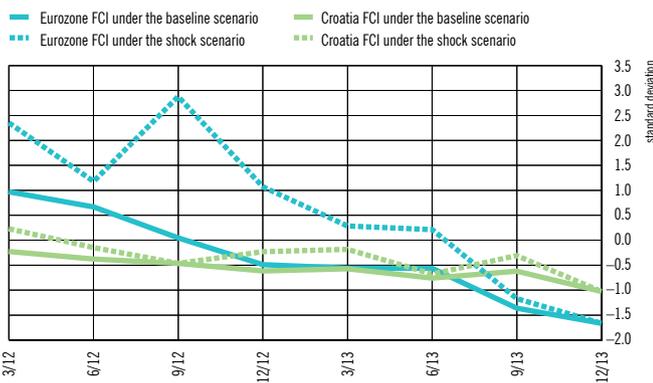
Source: CNB.

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



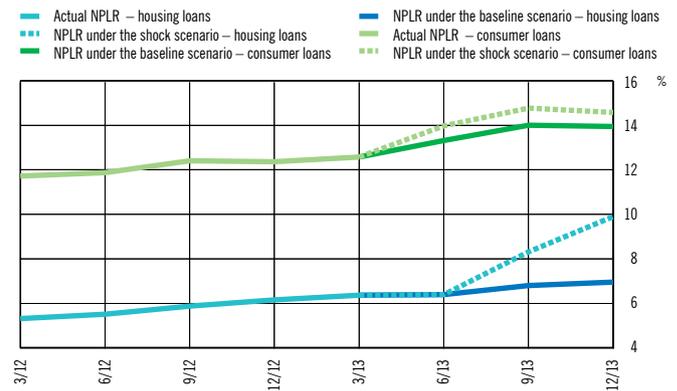
Source: CNB.

Figure 98 Financial conditions indices under various scenarios



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

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



Source: CNB.

The accelerated rise in non-performing loans at the beginning of 2013 led not only to a fall in profit but also to a slight fall in the coverage of non-performing loans and a greater burden on capital by the uncorrected part of the non-performing loans (Figure 91). But because of the practice of the gradual reclassification of loans into groups with high coverage, value adjustments for these loans will go on rising. A potential shock that might arise because of an increase in coverage of non-performing loans to the average level of the last nine years would reduce the rate of capital adequacy by about 1.3 percentage points, which underlines the importance of retaining the capital buffers in the period of a prolonged financial crisis (Figure 95).

Standard indicators of latent difficulties in managing the credit risk in bank portfolios suggest caution in the interpretation of results of resiliency testing. At the end of 2012, about 10% of the assets of the sector were concentrated in banks that in the period in which earnings weakened evaluated a rise in the quality of loans or that had relatively weak coverage with a simultaneous below-average level of non-performing loans (Figure 96).

The testing of banking sector resilience carried out for 2013 shows that the bank buffers created in the previous period are still adequate at the aggregate level even in the case of the appearance of not probable but still possible adverse macroeconomic shocks.¹⁴ But aggregate results conceal differences in bank resilience (Figures 102 and 103 and Table 6). Resilience testing was carried out in two scenarios. The most probable, fundamental scenario, assumes the continuation of negative trends in economic activity, in the context of which real GDP would fall in 2013 by another 1.0%, above all impacted by a further fall in personal and government spending, and the exchange rate of the kuna for the euro would still be relatively stable.¹⁵ A shock scenario used to test resilience to a not probable but still possible combination of shocks assumes an average fall of real GDP of 2.2%¹⁶. In such a scenario an exacerbation of recession in the eurozone and a deterioration in bank financing conditions can be expected, as well as a cumulative depreciation of the kuna by about 10% as compared to the fundamental sce-

nario, in which the relationship between euro and Swiss franc would be like that in the basic scenario (Figures 97 and 98).¹⁷

In the fundamental scenario, the proportion of non-performing loans in total loans might come to about 18% at the end of 2013. In the shock scenario there would be a much stronger rise in the proportion of non-performing loans, which would be about 22% (Figure 99). Standardly, the corporate portfolio makes the biggest contribution to the dynamics of non-performing loans. The proportion of non-performing corporate loans in the fundamental scenario at the end of 2013 comes to 33% and in the shock scenario about 41%. In the retail loan sector, consumer loans at the end of the projection horizon would climb to 14% or about 15% in the fundamental and the shock scenario, respectively. The proportion of non-performing housing loans, which has previously accounted for a relatively small proportion of non-performing loans, would rise moderately, to 7% and 10% (Figures 100 and 101).

The predicted effect of the change of the regulations in 2013 was relatively small, for it was concentrated in the last quarter, and assumes a reduction in the capital adequacy ratio of only 0.4 percentage points. Some of these measures are oriented to protecting bank capital by a more cautious classification of loans and allocations for value adjustments related to them, and this expense should in fact be considered provisionally since the banks would in fact invest it in their resilience (0.3 percentage points). On the other hand, in the case of changes related to consumer lending there will be no strengthening of bank capital, but a bank cost, which will in contrast create a burden on their capital of 0.1 percentage point, in conditions when the profitability of banks is already eroded by value adjustment costs.¹⁸

Assuming that all the profit made is retained, the capital adequacy ratio in the sector would in the fundamental scenario rise by 0.5% points by the end of 2013 from March in the same year (Figure 102 and Table 6).

14 Banking sector resilience testing is based on sector models of credit risk as shown in *Financial Stability*, No. 7, June 2011. Models of credit risk enable simulations of the influence of macroeconomic shocks to changes in the risk levels of individual groups of loans. Thus the effect of the macroeconomic scenario on each bank is manifested according to the structure or the risk profile of its loan portfolio (corporate loans, housing loans, consumer loans and other loans).

15 Projection of the exchange rate of the kuna for the euro and the Swiss franc and the rate of the euro and Swiss franc is taken from *Consensus Forecasts*, April 2013.

16 Projection values of GDP in a shock scenario are calculated on the basis of quantile vector autoregressions, in which indexes of financial conditions and rates of growth in GDP for Croatia and the EU are introduced. The shock scenario is constructed as the outcome that bounds the 5% worst outcomes, with the set fundamental scenario. For a more detailed description, see Box 1 Financial conditions and real economic activity, *Financial Stability*, No. 8, January 2012.

17 Banking operating results, as well as by value adjustment costs that derive from resilience testing, are projected in the following way. For net revenue in 2013 a result at the level of the annualised first quarter of 2013 is assumed. At the same time, for the shock scenario, a net revenue 10% lower than the basic scenario is assumed. Because of the changes in regulations announced related with the classification of placements, as well as with consumer lending, the effects of regulatory changes are included in all the scenarios.

18 Changes in the regulations for the classification of placements effectively defer the payment of earnings until the moment the NPLs are collected, which might create an additional projective layer of 0.3 percentage points of capital adequacy from current earnings in the last quarter of 2013. On the other hand, changes in the regulations for consumer lending that tend to favour debtors could reduce bank net earnings by about a tenth of the expected net earnings starting from the quarter in which they come into force. Since we assume the beginning of the application of the regulations in the last quarter of 2013, the expected effect in 2013 comes to about 2.5% of net earnings in the whole year, these changes in the regulations accordingly reducing bank resilience.

Figure 102 Contribution of individual components to the change in CAR under various scenarios

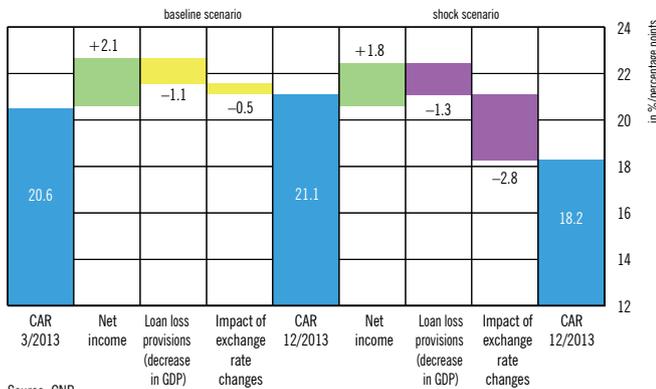


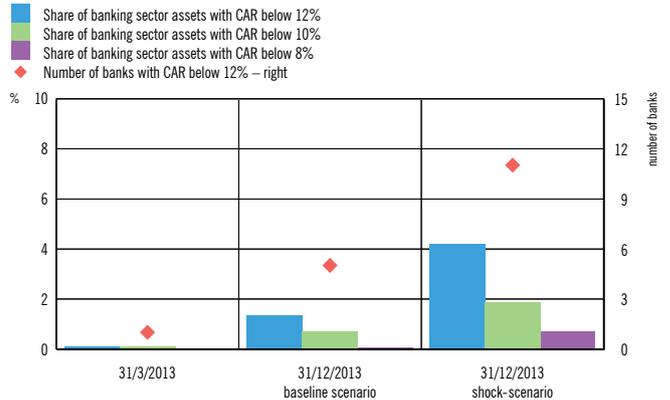
Table 6 Dynamics of CAR under various scenarios

	Balance 31/3/2013	31/12/2013 – baseline scenario	31/12/2013 – shock scenario
CAR	20.6	0.5	-2.4

Source: CNB.

As compared to the basic scenario, in the shock scenario, along with a lower net income, there will be additional growth in the charge for value adjustments of loans under the impact of a considerable decrease in GDP and a change in the exchange rate that activates CICR. Apart from that, depreciation of the

Figure 103 Breakdown of banks and their assets by CAR under various scenarios



kuna automatically weakens the capital adequacy since banks' capital is expressed in kuna, while their assets are mainly expressed in euros (Figure 102). The capital adequacy ratio of the banking sector would in such a scenario be reduced by 2.4 percentage points and would be about 2.9 percentage points lower than in the fundamental scenario, the potential depreciation of the kuna appearing as the most important factor in the fall of capital adequacy (Table 6). In this scenario, if additional measures for strengthening capitalisation are not taken, by the end of 2013, eleven banks that hold about 4.2% of the assets of the sector would have a capital adequacy ratio lower than 12%. Three banks, which hold a little less than 1% of the assets of the sector, would have a CAR lower than 8% (Figure 103).¹⁹

¹⁹ All these projects are made on the assumption that there will be no recapitalisation in the observed period, and no reduction in capital.

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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
∅	– average
a, b, c,...	– indicates a note beneath the table and figure
*	– corrected data
()	– incomplete or insufficiently verified data

