# FINANCIAL STABILITY

CROATIAN NATIONAL BANK

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# Financial
# Stability

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# Contents

# Introductory remarks

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

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

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

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

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

# Overall assessment of the main risks and challenges to financial stability policy

## Figure 1 Financial stability map



Source: CNB.

Legend: 2013, 2014
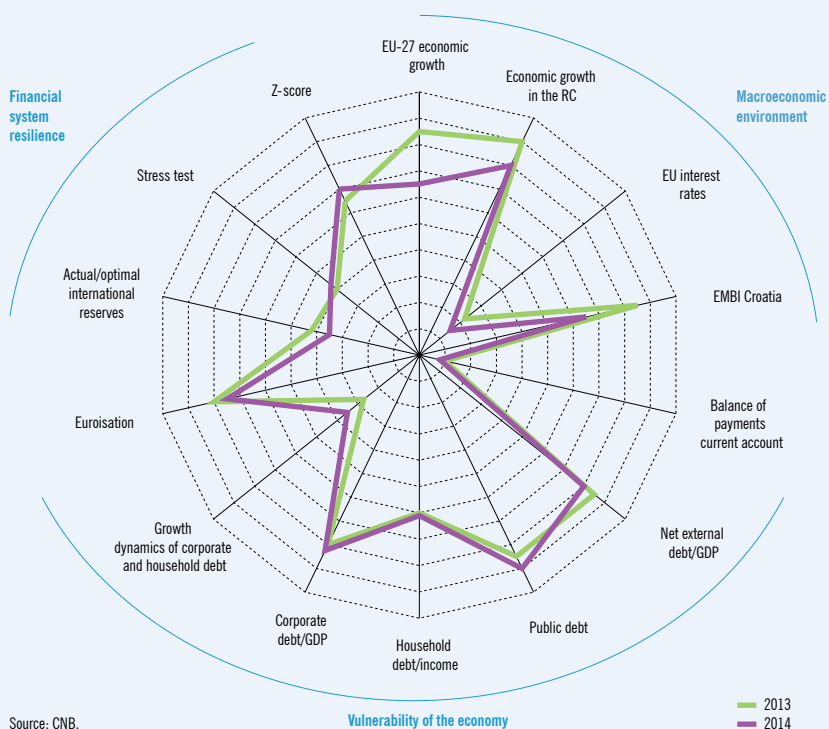
Risks to financial stability decreased due to a further reduction in the risk premium in global financial markets and a slightly improved macroeconomic outlook for the Croatian economy, in particular the expected positive balance in the current account which facilitates the maintenance of a stable exchange rate for the kuna. The fall in the profit of banks in 2013 reflects the increase in value adjustments, which in turn increased banking system resilience. The conducted stress testing exercise shows that the banking sector is still capable of withstanding relatively large and highly unlikely but plausible shocks.

The main financial stability indicators for Croatia are summarised in Figure 1. The financial stability map shows changes in key indicators of the possibility of the occurrence of risks related to the domestic and international macroeconomic environment and the vulnerability of the domestic economy, as well as changes in indicators of financial system resilience that can eliminate or reduce costs should such risks materialise. The map shows the most recent market developments or forecasts of selected indicators and their values in the reference period, i.e. the previous year. 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 decreasing.

The continued expansionary monetary policy of leading central banks brought a further reduction in the risk premium in global financial markets. The most recent steps of the ECB – a cut in the benchmark interest rate, introduction of a negative interest rate on deposits which banks hold with the central bank and measures aimed at strengthening the credit channel of the monetary transmission mechanism – triggered a further reduction in eurozone interest rates and the risk premium in financial markets. The issue of the sustainability of the debt of peripheral eurozone members is currently outside the focus of financial markets thanks to the expansive monetary policies, positive economic growth rates and fiscal consolidation measures implemented in the most vulnerable eurozone members. The favourable environment in financial markets also affected the risk premium for the Republic of Croatia, so that its most recent bonds in international markets[1] were issued at an extremely low yield of only 4.01%. Against this background, the refinancing risk of the relatively large external debt maturing in 2014 has been reduced.

Risks to financial stability also decreased owing to the slightly less unfavourable macroeconomic outlook for the Croatian economy. The partial recovery of foreign demand provided a boost to export growth in the first quarter of 2014. With the still subdued domestic demand, the current account surplus is expected to reach 1.9% of GDP on an annual basis, mitigating risks to stability of the exchange rate of the kuna, which is important for the financial stability of the highly euroised economy.

However, despite these improvements, risks to financial stability stemming from the domestic economy are still considerable and are related to the ongoing absence of economic growth and the continued strong increase in public debt. Although the excessive deficit procedure should provide a fiscal policy framework that would ensure public debt sustainability in the forthcoming period, the strong increase in government debt in recent years and the prolonged recession suggest a relatively worse risk perception of Croatia in international financial markets. This is reflected in a risk premium higher than in comparable countries, which makes funding costs for the economy highly sensitive to changes in risk appetite in the global financial markets.

Although short-term interest rates for the corporate sector have been falling to 10-year lows, while long-term rates are already close to those levels, the growth rate of corporate debt is relatively low due to weak demand for products of this sector and its relatively large aggregate debt. Nevertheless, slightly lower interest rates facilitate corporate sector deleveraging, thanks to lower interest expenses, and reduce risks to financial stability. As financing costs for the corporate sector are correlated with

the country's risk premium, the progress in lowering the risk perception for Croatia should also have a positive effect on this sector.

Adverse trends in disposable income and the labour market continue to be conducive to household deleveraging towards a level justified by economic fundamentals, thereby reducing risks to financial stability stemming from this sector. The research presented in Box 2 shows that there is still a need for further aggregate deleveraging of the household sector, even if it is relatively small. It primarily depends on developments in macroeconomic fundamentals, such as interest rates, (un)employment and wages. With lower interest rates, which could result from a further decline in the risk premium and higher employment, i.e. the halting of negative trends in the labour market, the aggregate need for further deleveraging of the household sector could be reduced or disappear, which could provide a boost to household sector demand, subdued for several years now, without increasing risks to financial stability.

The trends observed in the household, corporate and government sectors are also reflected in the banking sector due to its dominant role in financing the Croatian economy. This above all relates to stagnant exposure to the private sector, whose demand remains limited in the prolonged recession, with growing exposure to the government sector which has substantial financing needs due to budget deficits. It should be noted that this increased concentration toward government makes banks more vulnerable to risks arising from this sector. Furthermore, the fall in interest rates on government debt in the international financial market and the likely limited demand for financing due to fiscal consolidation will reduce bank profitability in the forthcoming years.

However, although profitability of the banking sector dropped sharply in 2013 due to the costs of value adjustments on non-performing loans, net income before value adjustments remained attractive on a European scale, i.e. much higher than in the eurozone, and at the level of Central and Eastern European EU member states (see the Banking sector section, Figure 90). However, the strategy of preserving operating profitability by increasing exposure to the government sector will become less successful in a period of a steady decline in interest rates.

The gradual growth in value adjustments for non-performing loans has strengthened the resilience of the banking sector, in spite of adversely affecting profitability. Although profits, which serve as the first buffer to shocks, recorded a sharp downturn in 2013, the stress tests conducted indicate that the banking sector is still capable of withstanding relatively large, highly unlikely but still plausible shocks.

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1 Issued was EUR 1.25bn worth of 8-year bonds denominated in euro, with a coupon rate of 3.875%.

# Macroeconomic environment

The stabilisation on the public debt market in the eurozone, the gradual economic recovery in the EU countries, the continued relaxation of the ECB's monetary policy aimed at encouraging bank lending and the easing of uncertainty surrounding the Fed's monetary policy contributed to a relatively favourable macroeconomic and financial environment and a reduction in the global risk premium. However, the lack of structural reforms to improve the investment climate and enhance competitiveness raises the probability of a continued poor economic activity in the country and thereby its vulnerability to potential financial shocks.

The second half of 2013 and 2014 to date were characterised by the continued stabilisation of conditions in the financial markets and the gradual recovery of the eurozone (Table 1). The fiscal adjustment policy in peripheral countries has continued into 2014 (Table 2). Combined with the ECB's activities to support a high level of banking system liquidity and its program of potential repurchase of government bonds (OMT), this had a positive impact on the government debt market. In search of higher yields, global investors were prompted by ECB actions to resort to investments in peripheral countries (Figures 4, 5, 6 and 7). In the first six months of 2014, Ireland and Portugal exited the bailout program and, like Greece, successfully issued bonds in the international market.

Favourable trends in financial markets were also spurred by the implementation of the rehabilitation mechanism at EU level as an element within the process of forming a banking union, which will reduce risk for public finance of individual countries.

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

| | Annual GDP growth rate | | | Quarterly GDP growth rate, $\Delta Q_t/Q_{t-1}$ | | Annual rate of change in exports | | Annual rate of change in industrial production (seasonally adjusted) | |
|---|---|---|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014[a] | Q4/2013 | Q1/2014 | Q4/2013 | Q1/2014 | Q4/2013 | Q1/2014 |
| USA | 2.8 | 1.9 | 2.8 | 0.7 | 0.0 | 4.3 | 1.8 | 3.3 | 3.4 |
| EU | −0.4 | 0.1 | 1.6 | 0.4 | 0.3 | 1.0 | 2.0 | 1.8 | 1.7 |
| Germany | 0.7 | 0.4 | 1.8 | 0.4 | 0.8 | 2.4 | 3.8 | 3.0 | 3.3 |
| Italy | −2.4 | −1.9 | 0.6 | 0.1 | −0.1 | 0.6 | 1.5 | −0.4 | 0.0 |
| Slovenia | −2.5 | −1.1 | 0.8 | 1.2 | −0.3 | 3.3 | 5.8 | 1.1 | 1.7 |
| Slovak R. | 1.8 | 0.9 | 2.2 | 0.5 | 0.6 | 4.3 | 3.9 | 8.5 | 7.2 |
| Czech R. | −1.0 | −0.9 | 2.0 | 1.5 | 0.4 | 1.2 | 7.4 | 7.1 | 6.5 |
| Poland | 2.0 | 1.6 | 3.2 | 0.7 | 1.1 | 5.0 | 9.1 | 5.4 | 5.9 |
| Hungary | −1.7 | 1.1 | 2.3 | 0.7 | 1.1 | 5.0 | 4.8 | 5.7 | 7.5 |
| Estonia | 3.9 | 0.8 | 1.9 | −0.1 | −0.7 | −1.5 | −1.9 | 1.2 | −1.4 |
| Latvia | 5.2 | 4.1 | 3.8 | 0.7 | 0.6 | −3.9 | 0.0 | −1.0 | −2.4 |
| Lithuania | 3.7 | 3.3 | 3.3 | 1.2 | 0.6 | −2.8 | −11.1 | −1.9 | −6.5 |
| Bulgaria | 0.6 | 0.9 | 1.7 | 0.3 | 0.3 | 5.1 | .... | 2.5 | 3.8 |
| Romania | 0.6 | 3.5 | 2.5 | 1.4 | 0.2 | 13.2 | 10.0 | 10.5 | 10.7 |
| Croatia[b] | −2.2 | −0.9 | −0.2 | −0.4 | 0.4 | 1.8 | 14.5 | −2.3 | 0.7 |

[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).

All this reduced risk premia to nearly pre-crisis levels (Figure 7), which indicates that risks may be underestimated amid the currently ample liquidity in financial markets, encouraging the formation or growth of price bubbles in some markets. Deflation of price bubbles brought about by an external shock, such as materialisation of geopolitical risks associated with devel-opments in Ukraine or macroeconomic and financial turmoil, could result in a renewed escalation of the crisis and adversely affect countries with substantial external imbalances. The most recent ECB measures motivated by the risk of falling into a deflationary spiral might also head in this direction.

Figure 2 Economic sentiment and business confidence indicies
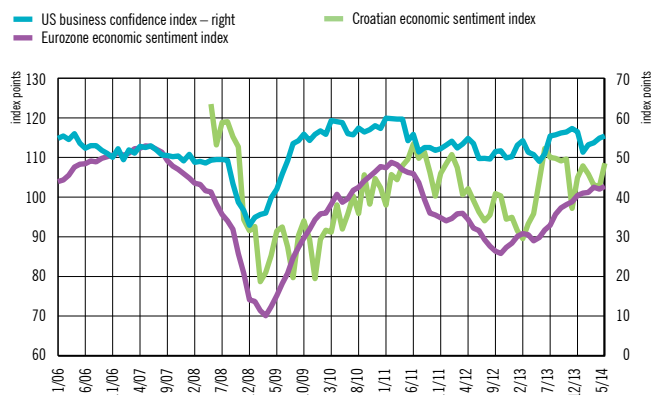


Sources: Bloomberg and CNB.

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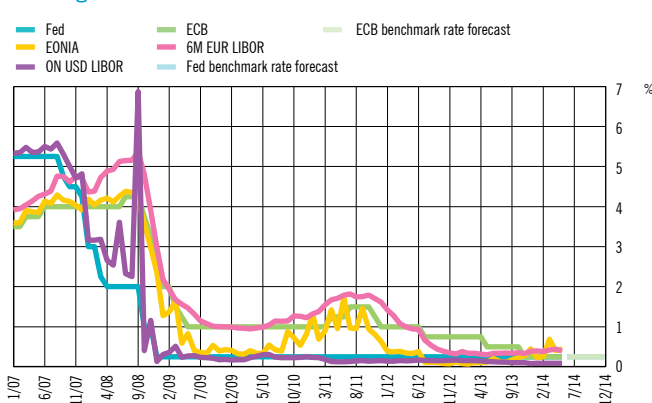


Sources: Fed, ECB and Bloomberg.

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

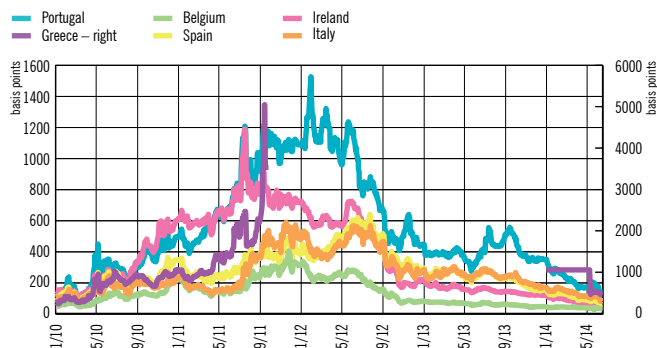| | Fiscal balance, as % of GDP (ESA 95) | | | Current account balance, as % of GDP | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014[a] | 2012 | 2013 | 2014[a] |
| USA | –9.2 | –6.2 | –5.4 | –2.7 | –2.3 | –2.2 |
| EU | –3.9 | –3.3 | –2.6 | 0.9 | 1.6 | 1.8 |
| Germany | 0.1 | 0.0 | 0.0 | 7.0 | 7.4 | 7.3 |
| Italy | –3.0 | –3.0 | –2.6 | –0.4 | 0.9 | 1.5 |
| Portugal | –6.4 | –4.9 | –4.0 | –2.2 | 0.4 | 1.0 |
| Ireland | –8.2 | –7.2 | –4.8 | 4.4 | 6.6 | 7.4 |
| Greece | –8.9 | –12.7 | –1.6 | –4.6 | –2.4 | –2.3 |
| Spain | –10.6 | –7.1 | –5.6 | –1.2 | 0.8 | 1.4 |
| Slovenia | –4.0 | –14.7 | –4.3 | 3.1 | 5.3 | 6.0 |
| Slovak R. | –4.5 | –2.8 | –2.9 | 1.6 | 2.5 | 2.4 |
| Czech R. | –4.2 | –1.5 | –1.9 | –2.6 | –1.2 | –0.4 |
| Poland | –3.9 | –4.3 | 5.7 | –3.4 | –1.6 | –1.7 |
| Hungary | –2.1 | –2.2 | –2.9 | 1.1 | 3.1 | 3.0 |
| Estonia | –0.2 | –0.2 | –0.5 | –2.8 | –1.8 | –2.7 |
| Latvia | –1.3 | –1.0 | –1.0 | –2.5 | –0.8 | –1.3 |
| Lithuania | –3.2 | –2.2 | –2.1 | –1.1 | 1.3 | –0.8 |
| Bulgaria | –0.8 | –1.5 | –1.9 | –0.8 | 1.9 | 1.0 |
| Romania | –3.0 | –2.3 | –2.2 | –4.4 | –1.1 | –1.2 |
| Croatia | –5.0 | –4.9 | –3.8 | –0.1 | 0.9 | 1.9 |

[a] Forecast.
Sources: European Commission, *European Economic Forecast*, spring 2014 and CNB (for Croatia's current account balance).

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



Legend: Portugal, Greece – right, Belgium, Spain, Ireland, Italy

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

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



Legend: Unicredit S.p.A., Intesa Sanpaolo S.p.A., Commerzbank, Deutsche Bank, Société Générale, Banco Santander, BNP Paribas, Raiffeisen Zentralbank

Source: Bloomberg.

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



Legend: Bulgaria, Poland, Czech R., Romania, Croatia, Slovenia, Hungary

Source: Bloomberg.

In particular, although economic recovery in the eurozone is expected to continue to gain traction in 2014, it is still relatively weak and uneven. Combined with an inflation rate far below the 2% target, this induced the ECB further to relax its monetary policy.
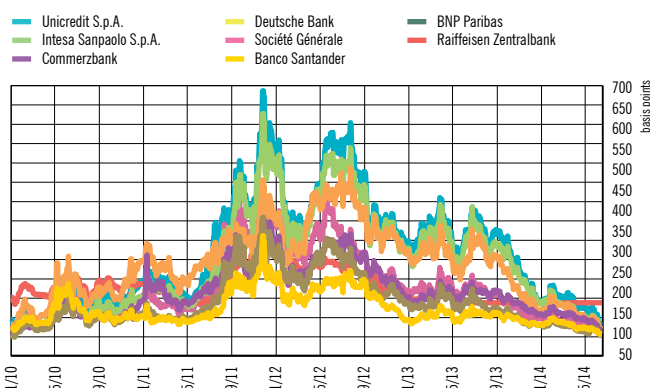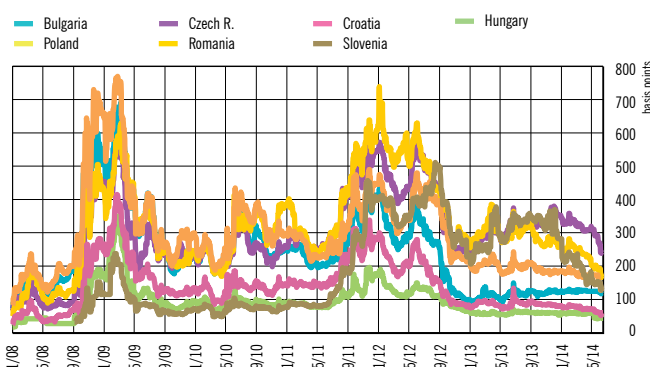
In early June 2014, the ECB cut its benchmark rate from 0.25% to 0.15% and introduced a negative interest rate of 0.10% on bank deposits with the ECB. Also disclosed were the modalities of the targeted longer-term refinancing operations maturing in 2018; their initial amounts will depend on the outstanding amounts of loans to the euro-area non-financial private sector (excluding loans to households for house purchase), while the amounts to be granted in 2015 and 2016 will depend on newly-granted loans to the non-financial private sector. This is to activate the credit channel, which remains insufficiently effective as loans continue to shrink. This is particularly affecting small and medium-sized enterprises as larger companies and banks have easier access to the bond market. Also, the ECB announced that it would intensify preparatory work related to outright purchases of asset-backed securities. This form of quantitative relaxation is an effort to further enhance the functioning of the monetary policy transmission mechanism in averting deflationary risks and supporting economic growth.

## Figure 7 EMBI spreads

- EMBI Europe
- EMBI Croatia



Source: J. P. Morgan.
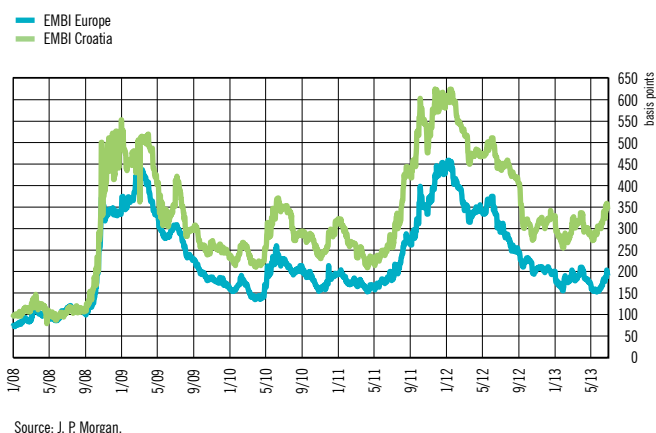
## Figure 8 Yields on Croatian and benchmark German bonds maturing in 2018 and their spread

- Yield on Croatian eurobonds
- Yield on German bonds
- Yield spread between Croatian eurobonds and German bonds



Source: Bloomberg.
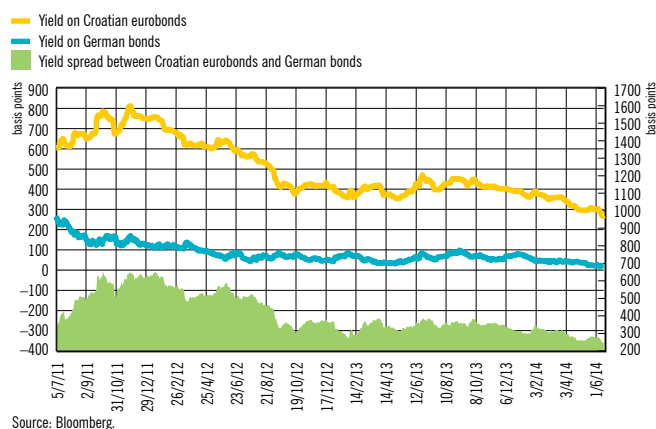
## Figure 9 Capital inflows to European emerging market countries

- Investment of commercial banks, net
- Direct equity investment, net
- Portfolio equity investment, net
- Investment of other private creditors, net



ᵃ Estimate. ᵇ Forecast.
Source: International Institute of Finance, *Capital Flows to Emerging Market Economies*, January 2014.
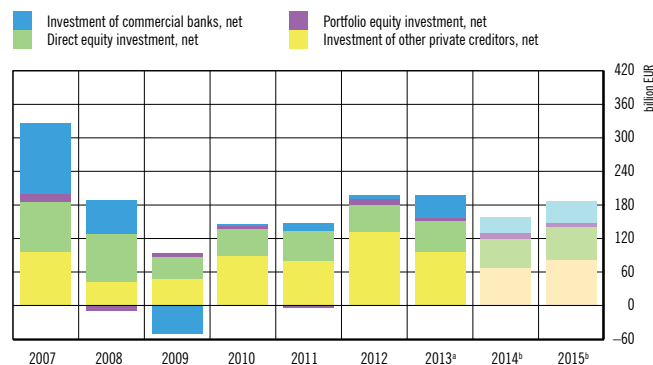
## Table 3 Public and external debt in selected European emerging market countries
as % of GDP

|  | Public debt | | | External debt | | |
|---|---|---|---|---|---|---|
|  | 2012 | 2013 | 2014ᵃ | 2011 | 2012 | 2013 |
| Italy | 127.0 | 132.6 | 135.2 | 114.9 | 121.9 | 122.0 |
| Portugal | 124.1 | 129.0 | 126.7 | 217.8 | 232.3 | 223.0 |
| Ireland | 117.4 | 123.7 | 121.0 | 1063.5 | 1004.9 | 977.4 |
| Greece | 157.2 | 175.1 | 177.2 | 177.4 | 226.6 | 228.9 |
| Spain | 86.0 | 93.9 | 100.2 | 166.7 | 168.2 | 159.6 |
| Slovenia | 54.4 | 71.7 | 80.4 | 146.7 | 147.1 | 169.2 |
| Slovak R. | 52.7 | 55.4 | 56.3 | 58.3 | 57.5 | 54.8 |
| Czech R. | 46.2 | 46.0 | 44.4 | 46.8 | 50.9 | 54.0 |
| Poland | 55.6 | 57.0 | 49.2 | 67.4 | 72.8 | 70.5 |
| Hungary | 79.8 | 79.2 | 80.3 | 163.9 | 159.3 | 144.6 |
| Estonia | 9.8 | 10.0 | 9.8 | 95.6 | 95.6 | 87.4 |
| Latvia | 40.8 | 38.1 | 39.5 | 145.5 | 135.9 | 128.8 |
| Lithuania | 40.5 | 39.4 | 41.8 | 77.4 | 75.8 | 66.9 |
| Bulgaria | 18.4 | 18.9 | 23.1 | 95.0 | 96.2 | 95.1 |
| Romania | 38.0 | 38.4 | 39.9 | 76.0 | 76.7 | 68.3 |
| Croatia | 56.0 | 67.4 | 70.7 | 101.8 | 103.1 | 105.7 |

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

The banks took advantage of favourable conditions in financial markets to issue bonds and raise additional capital in order to boost liquidity and, in particular, capital adequacy within preparations for the asset quality review and stress testing, the results of which are expected in late 2014. The asset quality review process influences the lending policy of banks as it reduces their risk appetite. This particularly affects more risky segments of banks' portfolios, such as loans to small and medium-sized enterprises and cross-border placements. Also, the banks have intensified efforts to clean their balance sheets of non-performing loans, thereby reducing the possibility of negative surprises regarding their asset quality. While this year's stress testing of European banks in coordination with the EBA is not expected to intensify fluctuations in financial markets stemming from the uncertainty regarding potential results, there is still a risk of negative surprises in that segment as well.

The reluctance of banks to extend loans caused by the balance sheet clean-up and stabilisation of operations could have a slowing effect on capital inflows to European emerging market countries, while new ECB operations may have the opposite effect (Figure 9).

In the first half of 2014, the Fed's downsizing of the securities purchase programme was motivated by the normalisation of real and financial developments in the US (Figure 3). The initial announcement of a possible termination or tapering of the quantitative easing programme hit emerging markets the most;

the intensity of capital outflows from these countries was not so much influenced by their macroeconomic fundamentals as it was by the size and liquidity of their financial markets. Nevertheless, an increase in interest rates in the US over the medium run could increase financing costs for emerging market countries and reduce their growth rates, in particular for those which are, due to substantial internal and external imbalances, seen as more risky, which includes Croatia. Still, the current relaxation of the ECB's monetary policy will facilitate borrowing in the European market and thereby reduce risk associated with the Fed's policy.

Notwithstanding the fall in global risk aversion and the downward trend in the risk premium for most countries, Croatia continues to compare poorly with its Central European peers with regard to its level (Figure 6). The most important reasons for the negative perception of Croatia in this context are the high level of external debt and the lack of economic recovery (Figures 10, 13, 14, 15).

Although the external debt level has stabilised thanks to the closure of the current account deficit, with the sizeable accumulated debt and the need to refinance maturing debt Croatia remains exposed to greater risks of sudden changes in capital flows and higher borrowing costs (Tables 2 and 3, Figures 10, 13 and 14). However, it should be noted that for the banking and non-financial corporate sectors these risks have been mitigated by the fact that a substantial portion of their external debt is accounted for by the banks' debt to parent banks and by corporate debt to foreign affiliated enterprises (Figure 17).

Against a background of high liquidity in financial markets, one should expect neither difficulties in refinancing maturing external debt nor significant downward pressures on the kuna so that, supported by ample foreign exchange reserves of the monetary system, the exchange rate will remain relatively stable (Figures 18 and 25). This is particularly important in view of the high level of euroisation that characterises the Croatian financial system, i.e. the high level of liabilities denominated in or indexed to foreign currency, as exchange rate destabilisation would have serious negative consequences for financial stability. In this regard, the household sector is particularly vulnerable, for it is least protected from currency risk.

In conditions of low inflation and a stable exchange rate, the central bank will continue to maintain high liquidity in the banking system. Nevertheless, given the still weak economic outlook, corporate debt stagnation and household deleveraging are expected to continue, while government debt to domestic banks is expected to grow.

Such developments will support a further increase in net aggregated savings of the private sector and a parallel slight decrease in negative net savings of the government sector, so that savings are expected to exceed investment in 2014 by around 1.5% of GDP (Figure 12). Accordingly, Croatia is expected to record a current account surplus of around 1.9% of GDP and to reduce its total foreign debt to around 105.0% of GDP in 2014.

No significant economic recovery is expected in Croatia in 2014, which raises the risk of external and domestic debt sustainability. The fiscal adjustment required under the excessive deficit procedure leaves limited room for fiscal stimulus to demand, the absence of structural reforms and the unfavourable investment climate stifle investment, while personal consumption growth is hampered by persistent negative trends in the labour market, household sector deleveraging and the consequent low level of consumer optimism. A positive contribution to growth is expected only from export growth driven by larger foreign demand, which is in turn spurred by the recovery of Croatia's main foreign trade partners. However, any further and significant increase in the economy's export potential requires the implementation of structural reforms to encourage technological progress, enhance the investment climate and facilitate business activity.

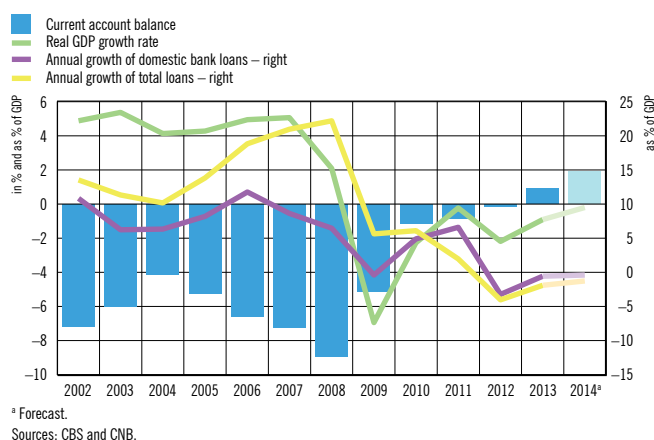Figure 10 Foreign capital inflows and GDP growth in Croatia



- Current account balance
- Real GDP growth rate
- Annual growth of domestic bank loans – right
- Annual growth of total loans – right

a Forecast.
Sources: CBS and CNB.

Figure 11 GDP growth pattern (contribution to growth)



- Net domestic demand
- Net exports
- GDP

a Forecast.
Source: CBS.
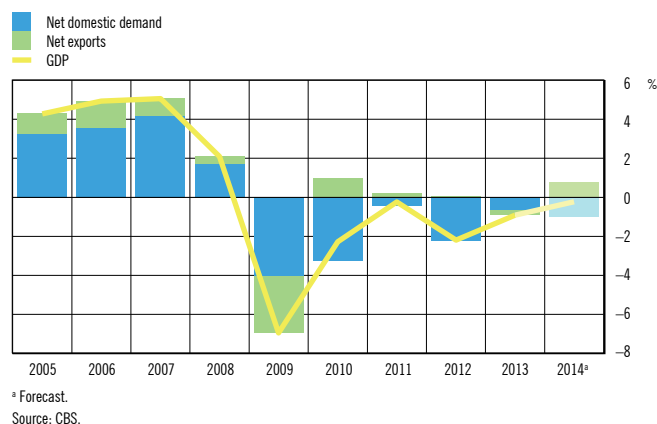
## Figure 12 Savings and investment – total and by sector

Legend:
- Private sector savings
- Private sector investment
- Savings-investment gap of consolidated general government
- Savings-investment gap of private sector
- Consolidated general government savings
- Consolidated general government investment
- Savings-investment gap in the country



as % of GDP

2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014[a]

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

## Figure 13 External debt by domestic institutional sector

Legend: Government — Banks — Other domestic sectors + direct investment — Total



index, December 2007 = 100

12/07 12/07 5/08 10/08 3/09 8/09 1/10 6/10 11/10 4/11 9/11 2/12 7/12 12/12 5/13 10/13 3/14
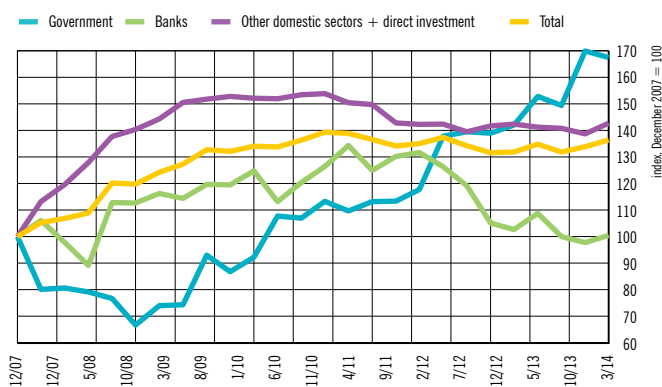
Source: CNB.

## Figure 14 Total external debt by creditor

Legend:
- External debt to other creditors
- Corporate external debt to associated companies
- Deposits and loans received from parent banks



as % of GDP

| | 2004 | 2005 | 2006 | 2007[a] | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014[b] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Top | 52 | 52 | 52 | 56 | 58 | 66 | 69 | 67 | 70 | 73 | 71 |
| Middle | 11 | 14 | 16 | 12 | 15 | 17 | 18 | 21 | 16 | 15 | 15 |
| Bottom | 6 | 7 | 7 | 9 | 12 | 16 | 17 | 16 | 17 | 18 | 18 |

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

## Figure 15 Short-term external debt

Legend:
- Short-term external debt by remaining maturity[a]
- Short-term external debt by original maturity



as % of GDP

2004 2005 2006 2007[b] 2008 2009 2010 2011 2012 2013 2014[c]
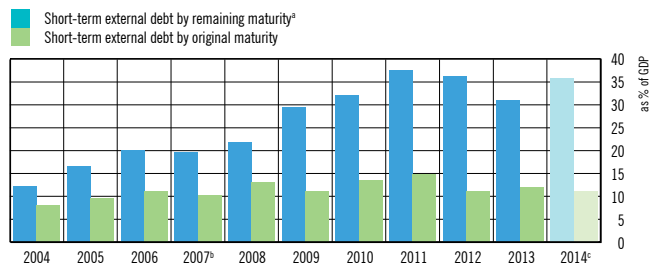
[a] Short-term external debt by remaining maturity is the amount of debt maturing in the reference year, representing the sum of the balance of short-term debt at the end of the previous year and long-term debt maturing in the reference year.
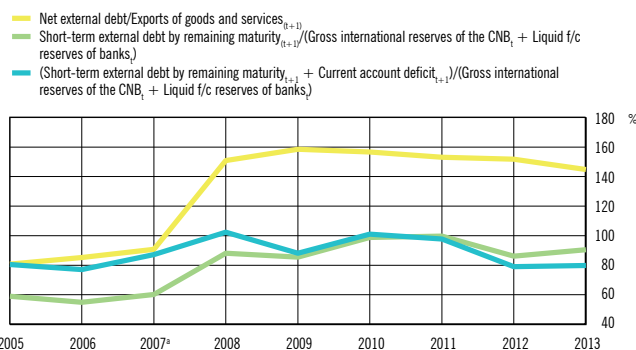[b] Since end-2007, external debt has been calculated according to the new methodology.
[c] Forecast.
Note: From 2008 on, short-term debt by remaining maturity includes round-tripping transactions which represent an accounting item that has a neutral effect. This item excluded, debt maturing in 2011 decreases by about 2 percentage points of GDP. 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

Legend:
- Net external debt/Exports of goods and services$_{(t+1)}$
- Short-term external debt by remaining maturity$_{(t+1)}$/(Gross international reserves of the CNB$_t$ + Liquid f/c reserves of banks$_t$)
- (Short-term external debt by remaining maturity$_{(t+1)}$ + Current account deficit$_{(t+1)}$)/(Gross international reserves of the CNB$_t$ + Liquid f/c reserves of banks$_t$)



%

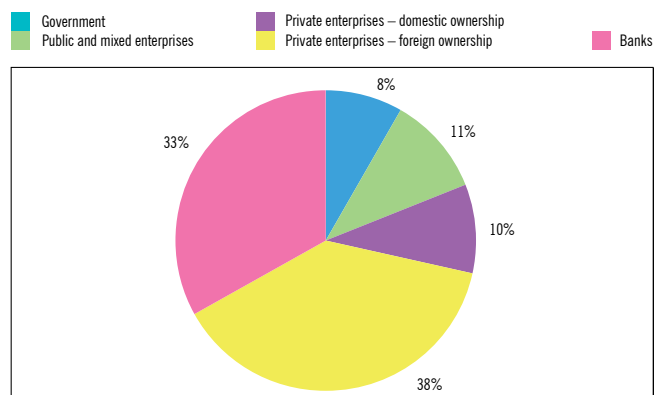2005 2006 2007[a] 2008 2009 2010 2011 2012 2013

[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 2014 by sectors

Legend:
- Government
- Public and mixed enterprises
- Private enterprises – domestic ownership
- Private enterprises – foreign ownership
- Banks



8%
11%
10%
38%
33%

Source: CNB.

## Figure 18 Optimal international reserves – contribution of individual components



Legend:
- Deposit outflow
- Foreign assets growth
- Output loss
- CNB reserves
- Parent bank deposits and loans
- External debt growth – less parent bank deposits and loans
- Optimal reserves if parent banks are not lenders of last resort
- Optimal reserves if parent banks are lenders of last resort

billion EUR

Source: CNB.
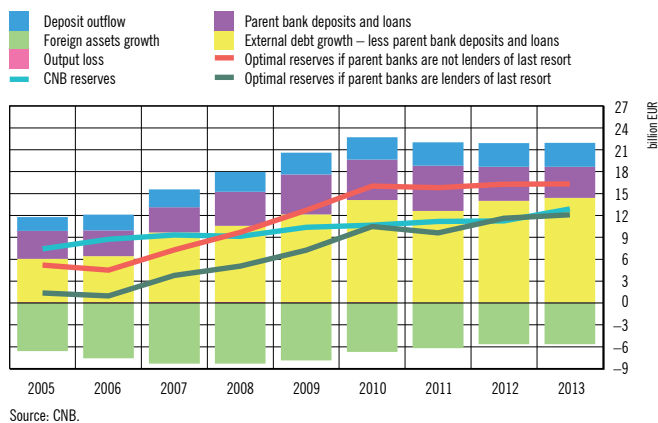
## Figure 19 Real kuna/euro exchange rate



- Index of the real HRK/EUR exchange rate deflated by unit labour cost in industry

index 2005 = 100

Note: A fall in the index indicates a real appreciation of the kuna against the euro.
Sources: CBS, CNB and CNB calculations.
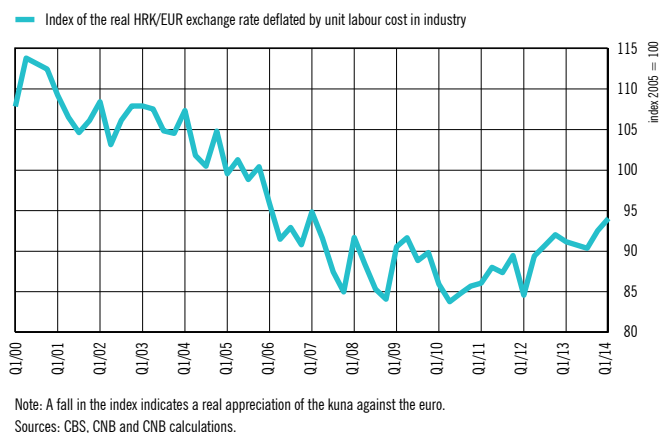
## Figure 20 Decomposition of real kuna/euro exchange rate – quarterly change



- Unit labour costs
- Nominal exchange rate

%

Sources: CBS, CNB and CNB calculations.
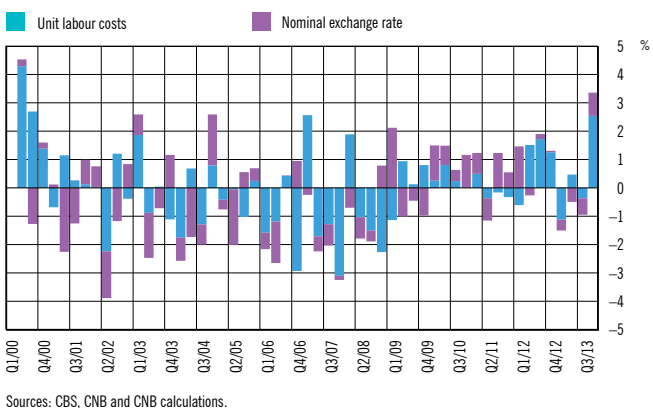
## Figure 21 Unit labour cost



- Industry
- Construction
- Trade

indices, 2005 = 100

Sources: CBS and CNB calculations.
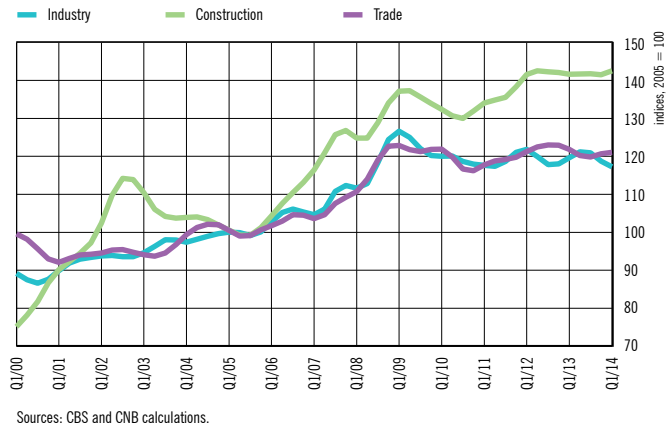
## Figure 22 Total debt by sector



- Corporates
- Government
- Households

as % of GDP

Source: CNB – financial accounts.
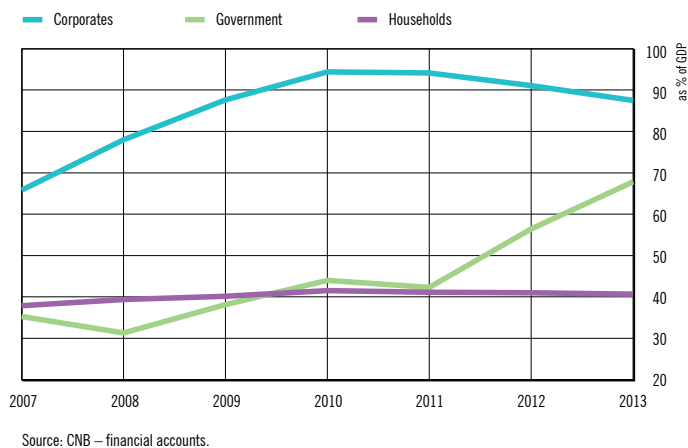
## Figure 23 Net position of domestic sectors with respect to the rest of the world by instrument



- Currency and deposits
- Loans
- Other
- Securities other than shares
- Equities
- Total

as % of GDP

Source: CNB – financial accounts.

Figure 24 Net financial position of selected domestic sectors with respect to the rest of the world by equity and debt instrument

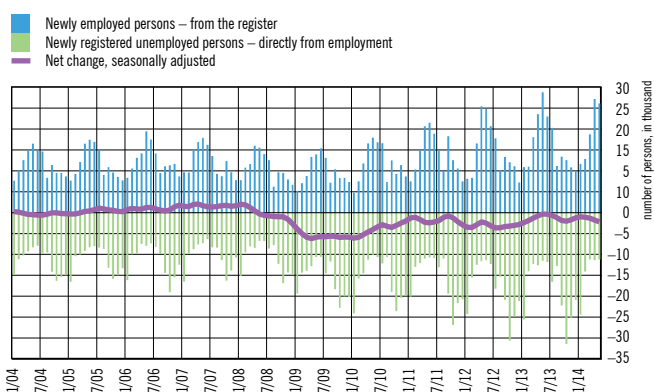- Government (central, local and central government funds) – equity liabilities
- Banks and other financial institutions – equity liabilities
- Corporates – equity liabilities
- Government (central, local and central government funds) – debt liabilities
- Banks and other financial institutions – debt liabilities
- Corporates – debt liabilities
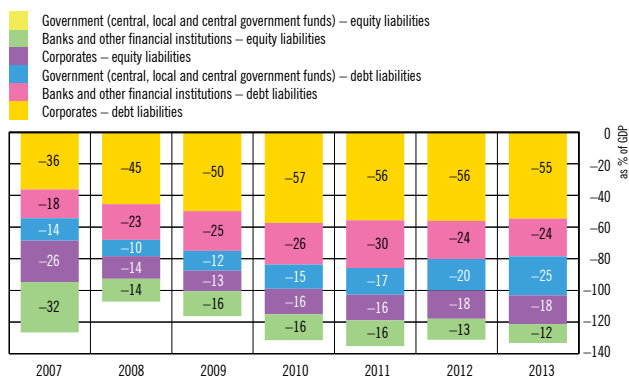


Source: CNB – financial accounts.

Figure 25 Kuna/euro exchange rate and overnight interest rates

- Overnight interbank interest rate
- Average monthly kuna/euro exchange rate – right
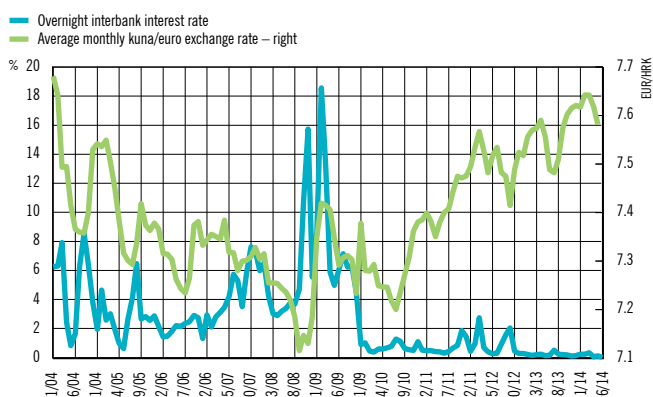


Source: CNB.

Figure 26 Changes in employment registered with the Croatian Employment Service (CES)

- Newly employed persons – from the register
- Newly registered unemployed persons – directly from employment
- Net change, seasonally adjusted



Sources: CES and CNB calculations.

Figure 27 Gross domestic product, seasonally adjusted data in constant prices

- Italy
- Bulgaria
- Croatia
- Germany
- Hungary
- Slovenia
- Romania
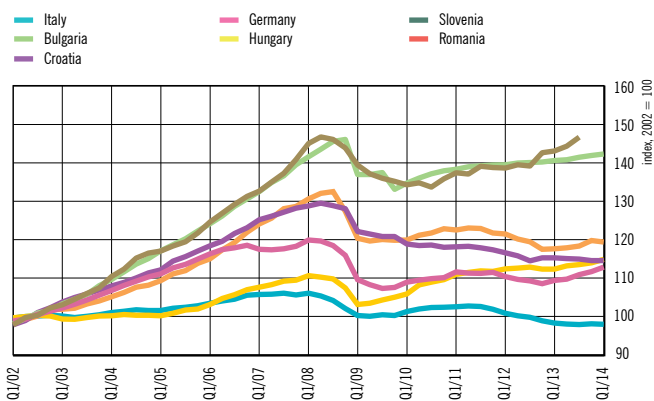


Sources: Eurostat, CBS and CNB.

## 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 | | | | | |
| | | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
| 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 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 5 | 4 | 7 | 6 |
| | Loans | 0 | 0 | 42 | 40 | 0 | 0 | 0 | 0 | 42 | 40 | 43 | 41 | 85 | 82 |
| | Shares and equity | 24 | 24 | 3 | 3 | 29 | 30 | 16 | 16 | 73 | 73 | 24 | 25 | 97 | 97 |
| | Insurance technical provisions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Other claims and liabilities | 31 | 31 | 1 | 2 | 6 | 6 | 2 | 2 | 40 | 42 | 12 | 12 | 52 | 53 |
| | Total | 55 | 55 | 49 | 47 | 35 | 36 | 18 | 18 | 158 | 156 | 84 | 82 | 241 | 238 |
| Financial sector | Monetary gold and SDRs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Currency and deposits | 12 | 14 | 22 | 26 | 3 | 6 | 59 | 61 | 96 | 107 | 13 | 22 | 109 | 129 |
| | Securities other than shares | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 |
| | Loans | 0 | 0 | 8 | 3 | 0 | 0 | 0 | 0 | 8 | 3 | 22 | 12 | 30 | 15 |
| | Shares and equity | 1 | 1 | 3 | 3 | 11 | 11 | 3 | 3 | 18 | 18 | 16 | 14 | 33 | 32 |
| | Insurance technical provisions | 1 | 1 | 1 | 0 | 0 | 0 | 22 | 24 | 24 | 26 | 0 | 0 | 24 | 26 |
| | Other claims and liabilities | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 3 | 2 | 1 | 0 | 4 | 3 |
| | Total | 16 | 17 | 34 | 33 | 14 | 18 | 86 | 89 | 150 | 157 | 52 | 50 | 202 | 207 |
| 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 | 25 | 29 | 0 | 0 | 0 | 0 | 25 | 29 | 15 | 19 | 40 | 48 |
| | Loans | 0 | 0 | 12 | 14 | 0 | 0 | 0 | 0 | 12 | 14 | 5 | 6 | 17 | 20 |
| | Shares and equity | 0 | 0 | 0 | 0 | 26 | 28 | 0 | 0 | 26 | 28 | 0 | 0 | 26 | 28 |
| | Insurance technical provisions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Other claims and liabilities | 8 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 7 | 0 | 0 | 8 | 7 |
| | Total | 8 | 7 | 37 | 43 | 26 | 28 | 0 | 0 | 70 | 78 | 20 | 25 | 90 | 102 |
| 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 | 41 |
| | Shares and equity | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Insurance technical provisions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Other claims and liabilities | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| | 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 | 12 | 9 | 0 | 0 | 3 | 3 | 16 | 12 | 0 | 0 | 16 | 12 |
| | Securities other than shares | 0 | 0 | 24 | 25 | 0 | 0 | 0 | 0 | 24 | 25 | 0 | 0 | 24 | 25 |
| | Loans | 0 | 0 | 1 | 7 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 | 1 | 7 |
| | Shares and equity | 7 | 6 | 6 | 7 | 0 | 0 | 0 | 0 | 13 | 13 | 0 | 0 | 13 | 13 |
| | 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 | 3 | 3 |
| | Total | 10 | 9 | 45 | 49 | 0 | 0 | 3 | 3 | 58 | 61 | 0 | 0 | 58 | 61 |
| Total | Monetary gold and SDRs | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| | Currency and deposits | 12 | 14 | 34 | 35 | 3 | 6 | 63 | 64 | 112 | 120 | 13 | 22 | 125 | 141 |
| | Securities other than shares | 0 | 0 | 52 | 56 | 0 | 0 | 0 | 0 | 52 | 56 | 20 | 25 | 72 | 80 |
| | Loans | 0 | 0 | 103 | 104 | 0 | 0 | 0 | 0 | 104 | 104 | 71 | 60 | 175 | 165 |
| | Shares and equity | 32 | 31 | 13 | 13 | 66 | 69 | 19 | 19 | 129 | 131 | 40 | 39 | 169 | 170 |
| | Insurance technical provisions | 1 | 1 | 1 | 1 | 0 | 0 | 22 | 24 | 24 | 26 | 0 | 0 | 24 | 27 |
| | Other claims and liabilities | 43 | 42 | 3 | 3 | 6 | 6 | 4 | 3 | 56 | 54 | 12 | 12 | 68 | 66 |
| | Total | 89 | 89 | 206 | 213 | 74 | 81 | 108 | 110 | 478 | 493 | 156 | 158 | 634 | 650 |

Source: CNB.

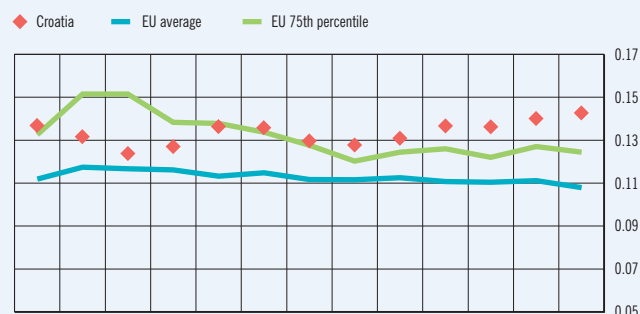# Box 1 Introducing a structural systemic risk buffer

Taking account of the level and development of structural systemic risks that may threaten the stability of the domestic financial system and assessing the need to strengthen the capital capacity of credit institutions, the CNB imposed a structural systemic risk buffer [SSRB] in late May 2014, which is applicable to all credit institutions and all exposures[1]. The SSRB is set at 1.5% for all credit institutions, while an additional 1.5% (totalling 3%) must be maintained by institutions with a relatively larger scale and complexity of activities. Therefore, the structural systemic risk buffer is added to the existing Total capital ratio of 8% and the capital conservation buffer of 2.5%, i.e. the overall adequacy is set at 10.5%, which effectively raises the own funds capital adequacy ratio to 12% for small credit institutions and to 13.5% for other credit institutions, amounting to around 13.2% weighted at the system level.

In view of the relatively high historical capitalisation of the banking system, partially determined by the CNB's prudential policy in earlier periods, and the fact that, with prevailing long-term risks, the capital adequacy ratio was set at 12% for several years, the activation of this instrument does not pose an additional regulatory burden and limitation to balance sheet expansion of credit institutions.

The motive for the introduction of the SSRB and the calibration of its size were determined by the identification of the following risks:

(i) substantial macroeconomic imbalances[2] (the highly negative value of the net international investment position, weak export potential, large private and public sector debt, high unemployment and long-term contraction in real economic activity, etc), Figure 1;

(ii) concentration of assets in the domestic banking sector has grown over the last few years, due in part to recent bankruptcy proceedings

## Figure 1 Elevated structural macroeconomic imbalances increase the probability of shocks to the financial system
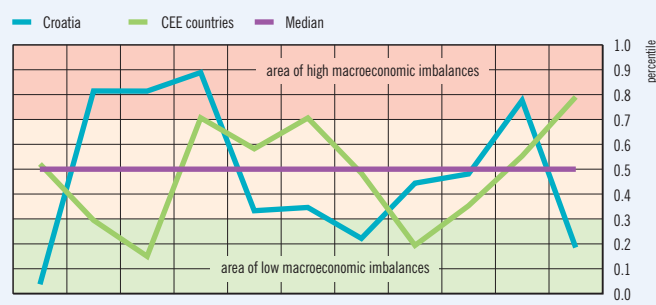


Note: The relative position in the distribution of individual indicators implies the degree of imbalance. MIP indicators (from 1 to 11, in this order): current account balance, net international investment position, real effective exchange rate, change of export market shares, unit labour costs, house prices, private sector credit flow, debt burden of the private sector, debt burden of the public sector, unemployment rate and the growth in financial institutions' liabilities.
Source: CNB calculations according to the Macroeconomic Imbalance Procedure (MIP) Scoreboard, European Commission 2012.

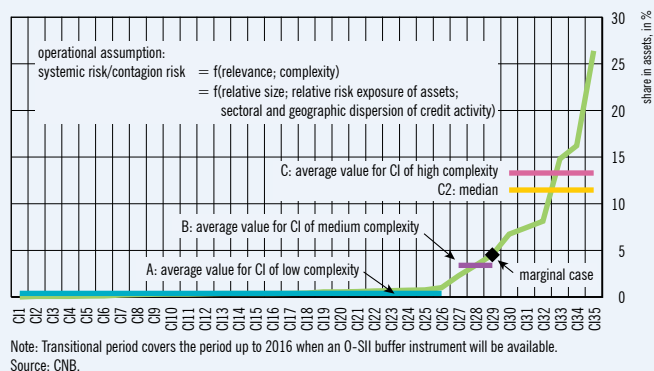## Figure 3 Trends in the real estate market
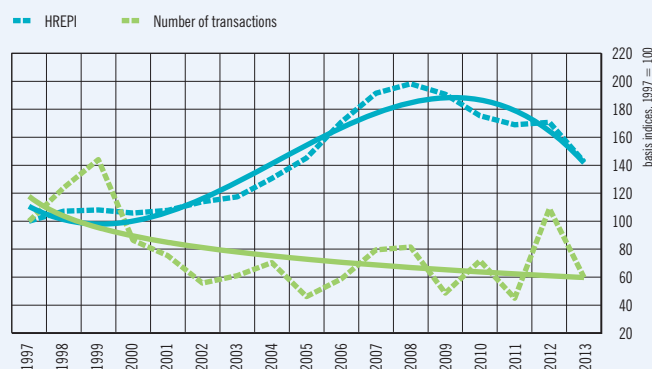


Source: CNB.

against individual institutions and to merger procedures, and is among the highest on a European level, which may reduce system resilience in stressful conditions (Figure 2);

(iii) non-cyclical risks associated with the real estate market necessitate a capital buffer against potential risks stemming from nominal rigidities of that market (which are not entirely and clearly evident in official price statistics based on a relatively limited sample of transactions), which may contribute to permanent illiquidity and specific risks of collateral (Figure 3);

## Figure 2 Degree of concentration of assets (Hirschman-Herfindahl) in the domestic banking system is relatively high



Note: The limit shows the value of HHI above which above-average fiscal costs and the loss of aggregate product in the crisis have been recorded.
Source: CNB.

1 See the Decision on the application of the structural systemic risk buffer (Official Gazette 61/2014), which is in force as of 19 May 2014.

2 This has been extensively covered in CNB publications (Brkić, M., and A. Šabić: *Okvir za praćenje makroekonomskih neravnoteža u Europskoj uniji – značenje za Hrvatsku*, Pregledi P-25, CNB, May 2014), while a detailed overview of structural imbalances is also provided in: EC: *Results of in-depth reviews under Regulation (EU) No 1176/2011 on the prevention and correction of macroeconomic imbalances*; *Macroeconomic Imbalances Croatia 2014*, Occasional Papers 179, March 2014.

Figure 4 Calibration of the SSRB level that covers risks
associated with systemically important institutions in
transitional period



Note: Transitional period covers the period up to 2016 when an O-SII buffer instrument will be available.
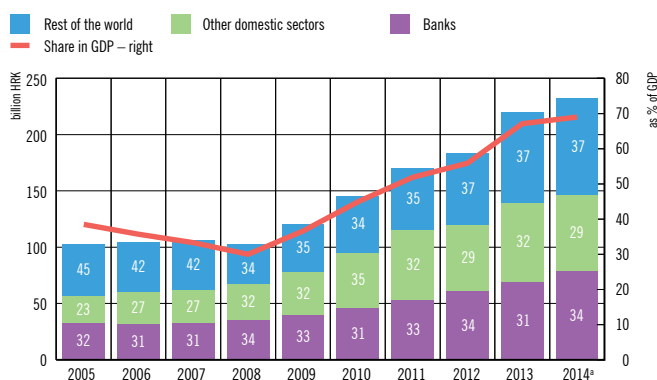Source: CNB.

(iv) potential negative consequences in case of materialisation of the stated risks could be aggravated if they spread to business processes of major financial intermediaries, which is why an additional buffer for systemically important institutions has been provided. However, as this macroprudential instrument may be implemented only as of 2016, following ESRB guidance[3], the CNB has substituted this requirement by an additional requirement through a SSRB for a group of systemically important institutions to buffer against stated shocks (Figure 4). This segment of capital buffers has been calibrated by applying a multiplicative factor of 2, which corresponds to the ratio between the size (measured in terms of a share in assets) of a median institution in group C (a share above 5%) and the size of the border-case (largest) institution in group B (accounting for a share of 1-5%)[4].

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3 ESRB: *The ESRB Handbook on Operationalizing Macro-Prudential Policy in the Banking Sector*, 2014.

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4 This approach excludes the impact of extremely high and low values, i.e. differences among institutions that are created by normal competitive processes in the financial market.

# Government sector

## Figure 28 General government debt



Legend: Rest of the world · Other domestic sectors · Banks · Share in GDP – right

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

## Figure 29 General government deficit



Legend: 2012 · 2013 · 2014[a] · Deficit average, 2013

Categories: Latvia, Bulgaria, Romania, Hungary, Lithuania, Czech R., Slovak R., Slovenia, Poland, Croatia
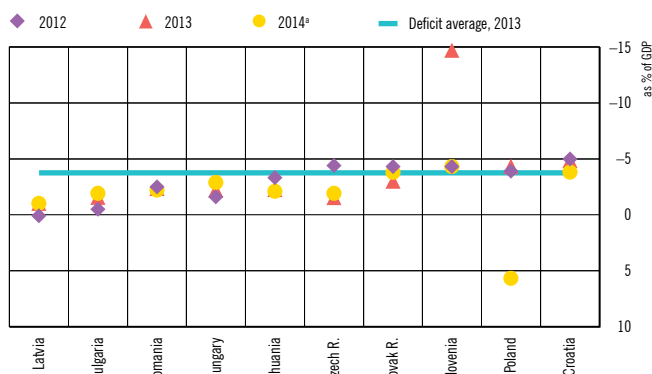
[a] EC projections.
Sources: Eurostat and EC.

Under the convergence programme, the public debt-to-GDP ratio should peak in 2014, come to a halt in 2015 and decrease mildly afterwards. However, this ratio is projected to grow slightly under the baseline scenario. The decrease in the public debt-to-GDP ratio will above all depend on the economy's exit from recession and implementation of structural reforms to lower the share of general government expenditure in GDP. A favourable environment in financial markets has led to the lowest-ever yield on Croatian bonds, attained in the European market.

General government deficit (ESA 95) was marginally reduced, from 5.0% in 2012 to 4.9% of GDP in 2013. This decrease was due to higher growth in revenues than in expenditures. The budget for 2013 was not implemented in line with the fiscal rule which requires a one percentage point cut in the share of general government expenditure in GDP. Budget expenditures (ESA 95) stood at HRK 150.6bn in 2013 and accounted for 45.9% of GDP. This represents an increase of 0.2 percentage points from 2012.

The long-lasting recession is expected to continue into 2014 due to the slow implementation of major structural reforms. The budget for 2014 and its rapidly ensuing first revision aimed at bringing the deficit in line with the requirements of the excessive deficit procedure, with the major part of the adjustment being planned on the revenue side. Health care contributions and fees for telecommunication operators were raised, taxes on games of chance were amended, while payments for privileged pension benefits were redirected from the second to the first pension pillar. The additional tax burden on labour and the increase in excise duties on fuel weaken competitiveness and raise

## Figure 30 Public debt



◆ 2011    ▲ 2012    ■ 2013    ▇ 2014[a]
— Average level, 2011 – 2014    — Average level, 2008 – 2010

as % of GDP
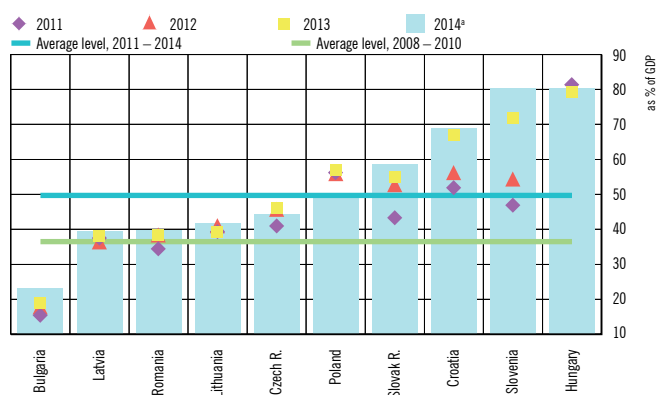
[a] EC projections.
Sources: Eurostat and EC.

## Figure 31 Breakdown of public debt by remaining maturity



■ Short-term debt    ■ Long-term debt
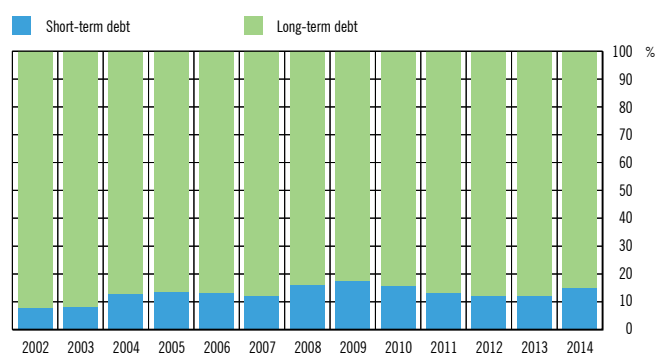
Sources: MoF and CNB.

## Figure 32 Currency breakdown of public debt



■ In kuna    ■ Denominated in foreign currencies and indexed to euro
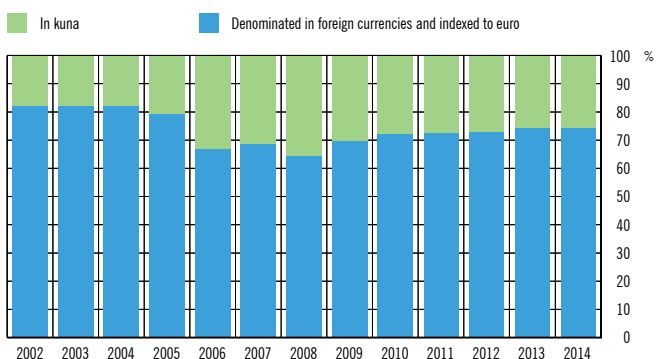
Sources: MoF and CNB.

## Table 5 Thresholds of the fiscal sustainability risk indicator in 2014[a]

| INDICATOR | Direction to be safe | Threshold | Observation for Croatia | Change |
|---|---|---|---|---|
| r – g[b] | < | 1.1% | 5.2% | ↑ |
| General government public debt (as % of GDP) | < | 42.8% | 69.0% | ↑ |
| Cyclically adjusted primary balance (as % of potential GDP) | > | –0.5% | 0.5% | ↓ |
| Gross financing needs (as % of GDP) | < | 20.6% | 10.1% | ↓ |
| Share of short-term debt as a ratio of total debt | < | 44.0% | 12.0% | ↑ |
| Debt denominated in foreign currencies | < | 40.3% | 74.5% | ↓ |
| Weighted average maturity of public debt (years) | > | 2.3 | 4.5 | ↑ |
| Short-term external public debt (as % of international reserves) | < | 61.8% | 9.2% | ↑ |

[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 a verage).
Sources: IMF WP/11/100 and CNB.

the likelihood of continued recession. On the expenditure side, subsidies to agriculture and transportation were cut the most, while investment growth slowed down.

Should these measures be implemented in full, the deficit (ESA 95) should be reduced to 3.8% of GDP in 2014 and to 3.1% in 2015 under European Commission projections. Accordingly, the reduction of the deficit to below 3.0% of GDP is not expected before 2016, with additional measures implied. In line with the proposed measures, the structural deficit should be reduced by 0.4 percentage points in 2014 and by 0.8 percentage points in 2015.

The rapidly growing public debt (Figure 38) exerts a strong pressure on financial stability. Public debt (ESA95) will come very close to 70% of GDP. The rate of growth of public debt in Croatia is among the fastest in comparable countries. This is largely due to the assumption of the debts of shipyards and other public enterprises and the payment of arrears of health institutions in 2012 and 2013. The average annual growth in public debt, of 12%, triggered an increase in interest expenses, which will exceed HRK 10bn in 2014. The growing interest expenses and unfavourable fiscal effects of the EU entry hamper fiscal adjustment. On the other hand, beneficial to Croatia is the current favourable situation in the European capital market, which has pushed yields to record low levels (Figure 33). One should bear in mind that the implicit real interest rate on public debt decreased by the growth rate of GDP (r – g) is far from the empirically "safe area" (Table 5), due above all to the lack of economic growth. Although public debt growth at such a high

## Figure 33 Yield on primary issue of euro securities

— 2010    — 2011    — 2012    — 2013    — 2014

yield on primary issue, in %

Source: MoF.

## Figure 34 Projection of general government debt

▮ Domestic public debt    ▮ External public debt
— Public debt, as % of GDP – right    — Maastricht criterion – right

billion HRK

as % of GDP

ᵃ EC projections.
Sources: MoF, EC and CNB.

## Figure 35 Gross financing needs

▮ Percent of GDP

%
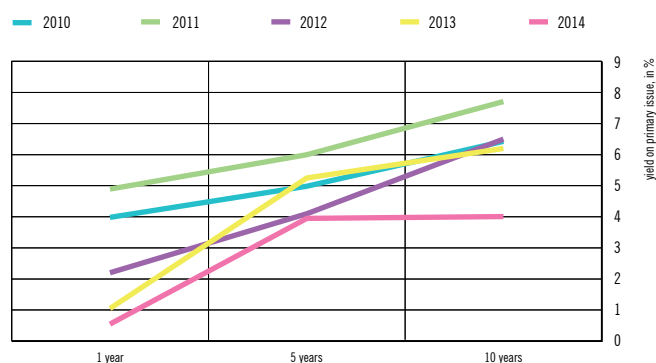
Sources: MoF and CNB.

## Figure 36 Projection of public debt under various scenarios

— Baseline scenario    — One-time depreciation in 2013
— Maastricht criterion    — Shock scenario

as % of GDP
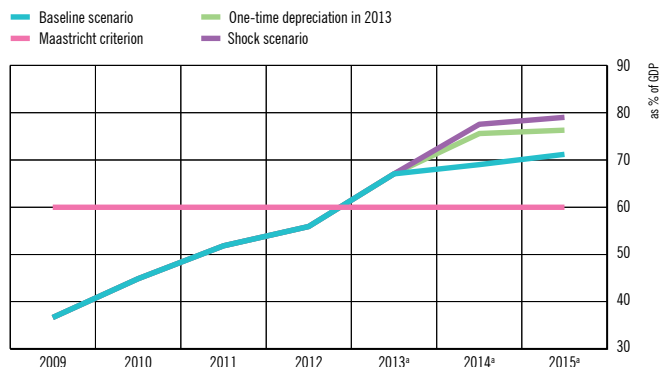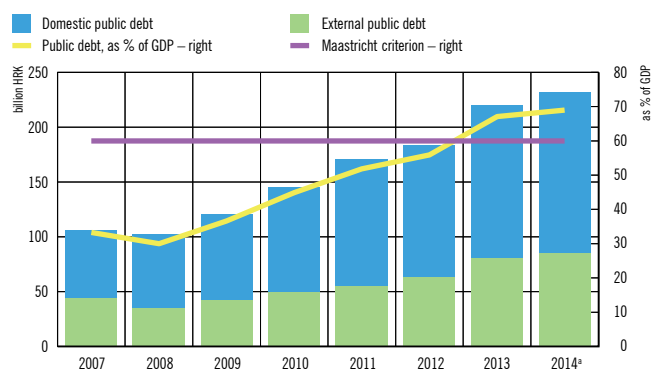
ᵃ CNB projections.
Source: CNB.

## Figure 37 Public debt growth rate (2009 – 2014)

public debt growth rate, 2009 – 2014

Latvia, Poland, Hungary, Czech R., Lithuania, Bulgaria, Slovak R., Romania, Croatia, Slovenia
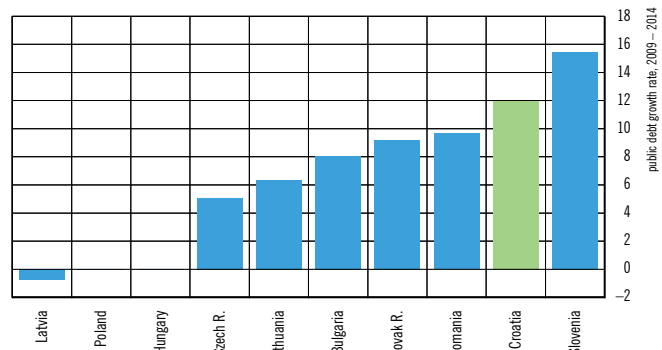
Sources: Eurostat and CNB.

## Figure 38 Average remanining maturity of general government debt

▮ 2013    ▮ 2012    ▮ 2011    ▮ 2010    ▮ 2009    ▮ 2008

Remaining maturity of total public debt

Remaining maturity of domestic public debt

Remaining maturity of external public debt

years
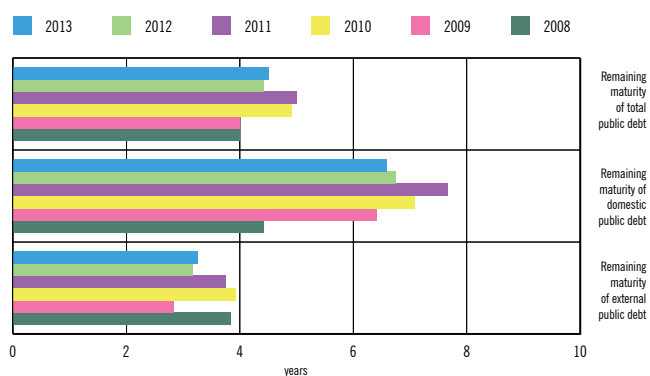
Source: CNB.

annual rate is not specific to Croatia, efforts should be taken to slow it down significantly, to a level that would enable a gradual reduction of the public debt-to-GDP ratio.

The structure of Croatian public debt by remaining maturity is very favourable (Figure 31). The ratio of short-term debt to total public debt stands at around 15%, which is much below the threshold for comparable markets, of 44%. Currency structure of Croatian public debt remains unfavourable, with the predominant share of the debt denominated in foreign currency (mostly euro) and kuna debt indexed to foreign currency. The average remaining maturity of total public debt of 4.5 years is a positive indicator, which has remained above the level of 4 years ever since 2008.

Notwithstanding the deficit reduction after the budget revision, financing needs have remained larger than in the previous year. They were 10.1% of GDP in 2013. Borrowing totalled 14.1% of GDP, but HRK 13.3bn was kept in deposit for financing needs in 2014, so that the need for financing in 2014 stands at 12.5% of GDP, which is an increase of 2.4 percentage points from 2013. The latest Croatian borrowing in the European financial market in May was a record both in terms of the amount and of the yield. More specifically, EUR 1.25bn was the largest is-

sue in euro, while the yield of 4.01% was the lowest ever yield on eurobonds. This is the result of the favourable environment in the European financial market, supported by the economic recovery and fiscal adjustments implemented in the most vulnerable member states as well as the continued implementation of expansive monetary policy. Public debt projections indicate a sharp slowdown in debt growth owing to the deficit cut under the excessive deficit procedure. Public debt is expected to grow in 2014 and 2015, albeit at much lower rates. In terms of its share in GDP, public debt could grow by 1.9 percentage points and by only 0.2 percentage points in 2014 and 2015 respectively. On the other hand, the debt level will have to be adjusted to the ESA 2010 statistical standard by the end of 2014, which could raise the level of explicit public debt due to the inclusion of the debt of public enterprises which are included in the government sector.

Under the shock scenario, public debt would reach 77.4% of GDP in 2015. The shock scenario estimates the debt level in the event of a 10% kuna depreciation and a 2.5% GDP decline in 2014. Due to the large share of euro and other currencies in public debt and due to the fall in GDP, in the case of the combined shock scenario, the public debt-to-GDP ratio would grow by 7 percentage points.
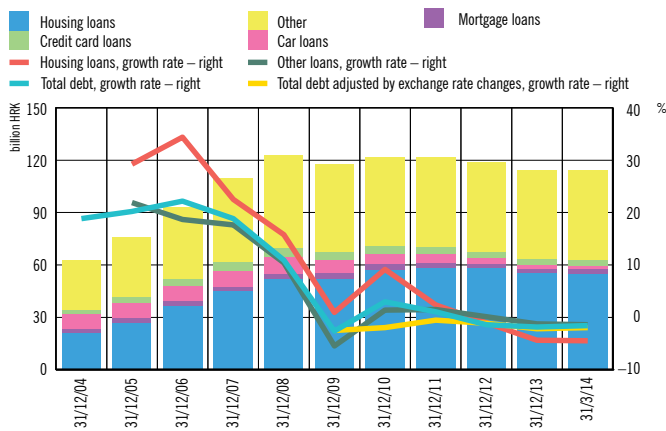
# Household sector

## Figure 39 Change in and stock of household debt
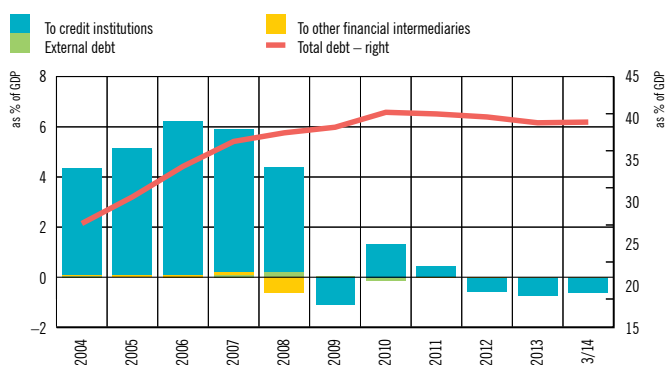


Legend:
- To credit institutions
- External debt
- To other financial intermediaries
- Total debt – right

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

## Figure 40 Household loans by purpose



Legend:
- Housing loans
- Credit card loans
- Housing loans, growth rate – right
- Total debt, growth rate – right
- Other
- Car loans
- Other loans, growth rate – right
- Total debt adjusted by exchange rate changes, growth rate – right
- Mortgage loans

Source: CNB.

Household deleveraging continued in late 2013 and early 2014, due above all to ongoing negative conditions in the labour market. As a major recovery in that market is not expected in the forthcoming period, this trend is expected to continue in the remaining part of 2014.

At the end of the last and the beginning of this year, the household sector continued to adjust its liabilities to falling income against the background of the years-long recession (Figure 39). In the first quarter of 2014, total household debt decreased by another –1.6%, or –2.0% excluding the exchange rate effect (Figure 40), remaining below the level of 40% of GDP (Figure 39). This was largely due to the decrease in household exposure to credit institutions (by –0.6% of GDP), while foreign liabilities and liabilities to other financial intermediaries remained almost unchanged.

The continued deleveraging trend of households was also evident in the dynamics of the amount of newly-granted loans. In particular, notwithstanding the slight increase in the amount of new loans in late 2013, which was also due to a marginal reduction in bank interest rates, all types of newly-granted loans, regardless of maturity, recorded a decrease at the annual level (by the end of March 2014, by a total of –3.3%, Figure 41). The slight increase in newly-granted long-term loans in late 2013 was due largely to the increase in the amount of other long-term loans[2], whose share in the total amount of new loans has been steadily growing since late 2008. For this reason, these loans became the dominant type of new long-term loans to households towards the end of 2013 and at the beginning of 2014, accounting for almost 70% (Figure 42). Nevertheless,

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2 This mostly relates to general-purpose cash loans.

## Figure 41 Maturity breakdown of newly-granted household loans, adjusted by seasonal fluctuations

Legend: Short-term, Long-term



Source: CNB.
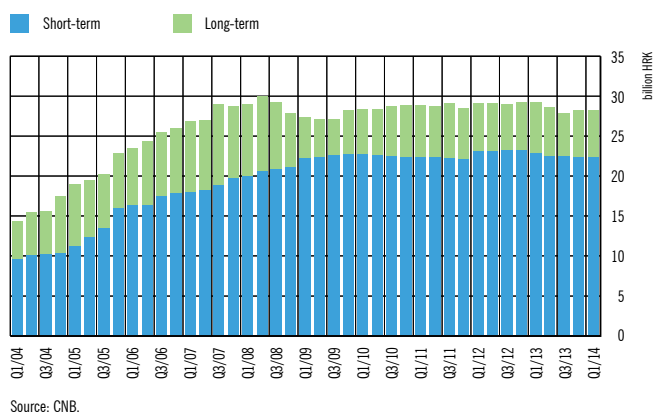
## Figure 42 Newly-granted long-term household loans by purpose, adjusted by seasonal fluctuations

Legend: Housing loans, Mortgage loans, Car loans, Credit card loans, Other long-term loans



Source: CNB.
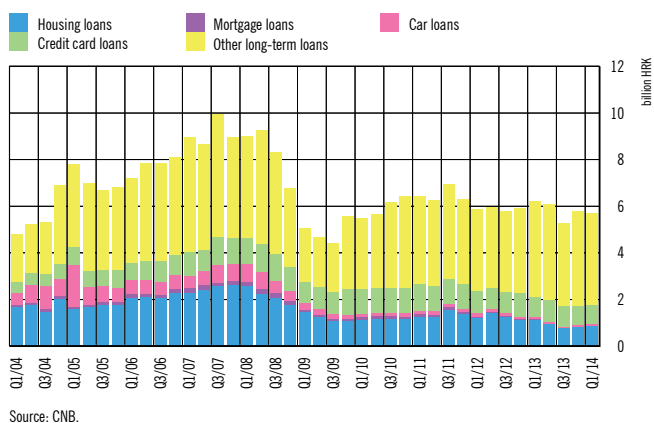
## Figure 43 Change in household lending criteria in the last three months

Legend: Total household loans, Consumer and other loans, Housing loans



Note: Positive and negative values denote the strengthening and weakening of credit standards, respectively.
Source: CNB.
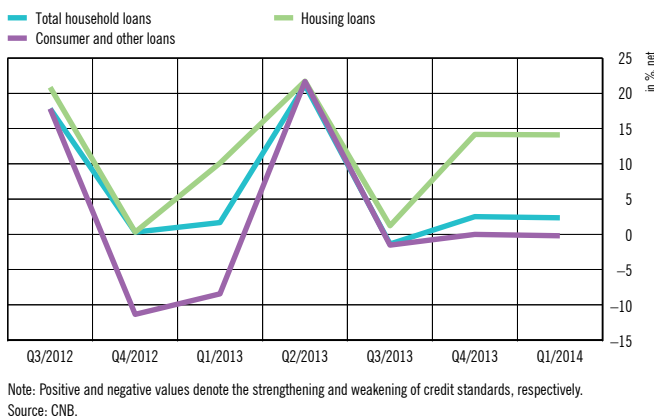
## Figure 44 Employment and wages (seasonally adjusted)

Legend: Employment, Average real net wage, Real wage bill, Average nominal net wage, Nominal wage bill



Source: CBS.
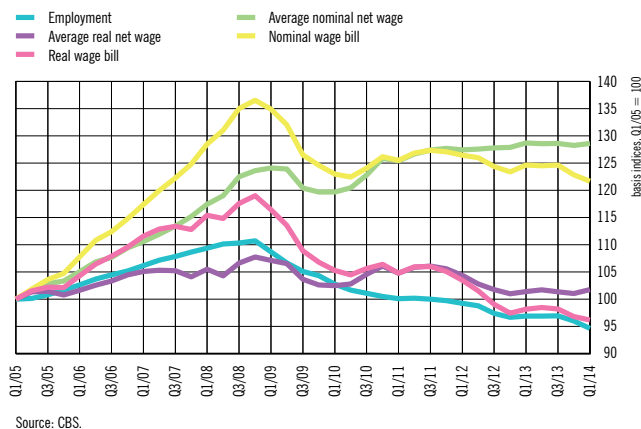
## Figure 45 Currency breakdown of household loans

Legend: In kuna, Denominated in or indexed to foreign currencies



Source: CNB.
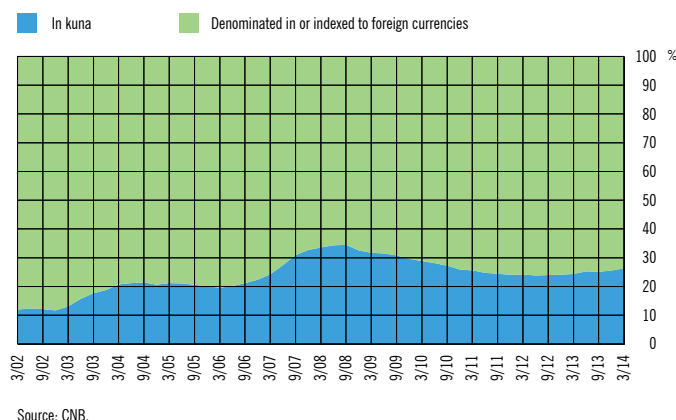
their total stock in late 2013 fell for the first time since the outbreak of the financial crisis (Figure 40), which suggests that the dynamics of new lending is insufficient to offset the repayment and write-off of existing debts. At the same time, the sharp decrease in the share of housing loans in the structure of total newly-granted long-term loans was also evident in the annual decrease in their stock, which was –4.5% in late March 2014, or –4.9% excluding the exchange rate effect (Figure 40).

Sluggish household demand for loans largely reflects the ongoing uncertainty in the labour market (Figure 46), the still low level of consumer optimism (Figure 50) and the tightening of lending standards of banks (Figure 43) in late 2013 and early 2014. The downward trend in employment, which started in late 2008, continued in the period under review (down by –2.3% on an annual level) so that the high exposure of house-

## Figure 46 Household loans by interest rate variability

Up to 1 month | 1 to 3 months | 3 to 12 months | 1 to 3 years | Over 3 years
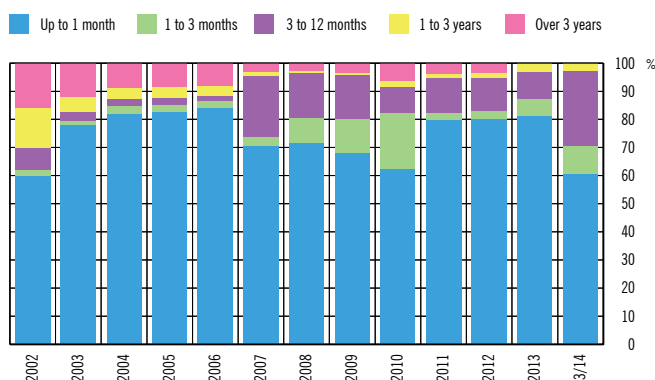


Source: CNB.

## Figure 47 Household debt and debt burden
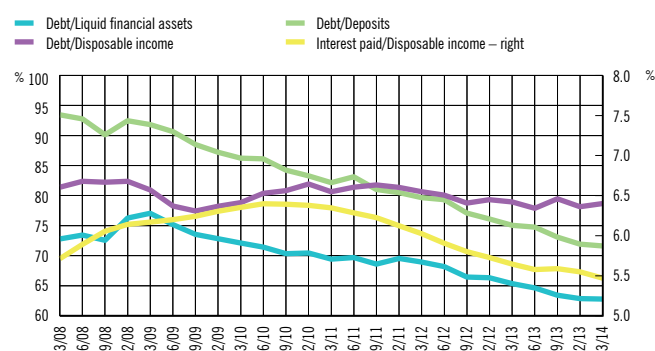
Debt/Liquid financial assets | Debt/Deposits
Debt/Disposable income | Interest paid/Disposable income – right



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

## Figure 48 Household financial assets

Securities and portfolio accounts | Non-banking financial institutionsa
Deposits with banks and housing savings banks | Currency outside banks
Total financial assets – right
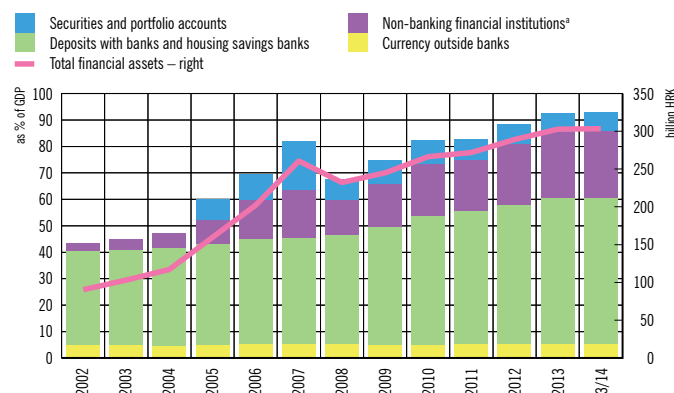


a Data on household claims against open-end and closed-end investment funds and data on claims against insurance companies are based on estimates.
Sources: HANFA, CDCC and CNB.

holds to the risk of unemployment grew further. Coupled with stagnant household income, this could result in a further deterioration of household creditworthiness and hamper debt repayment. With the expected further tightening of lending standards, in particular for housing loans, this will be one of the main limiting factors to stronger lending to the household sector in the forthcoming period.

Exposure of households to exchange and interest rate risks, though slightly lower, remained elevated in the first three months of 2014. At end-March 2014, nearly 74% of loans were denominated in or indexed to foreign currencies (Figure 45). At the same time, more than 97% of loans were those with interest rates variable within a year (Figure 46), although an increase in the share of loans whose interest rates can change in the period from 3 to 12 months slightly improved the structure of this category.

The steady deleveraging trend added to the improvement of most household debt indicators in late 2013 and early 2014 (Figure 47). While decreasing their debt in the period under review, households continued to increase their aggregate savings with credit institutions (by an average of 3.6% on an annual level, i.e. only slightly more than the increase generated by interest on savings). This fuelled the increase in liquid financial assets of households[3] (Figure 48), so that the ratio of debt to these asset categories decreased steadily in the observed period. Notwithstanding a mild drop in household disposable income[4] in late 2013 and early 2014, a much more vigorous reduction of interest payments[5] stimulated an improvement in indicators of the interest payment burden of households, while the debt reduction improved the ratio of household debt to disposable income.

The expected absence of any major economic recovery in 2014 suggests that the downward trend in household debt will continue in the forthcoming period, though at a possibly slower pace. This will be largely attributable to unfavourable trends in the labour market, which will continue to keep personal consumption at low levels and limit demand of some households for new loans. In addition, the uncertainty regarding lending terms and high interest rate and currency risks will further raise the caution of households with regard to raising new loans. Therefore aggregate debt of this sector could come even closer to the level that ensures that the household sector is capable of servicing its credit liabilities on time (see Box 2 Household debt in the EU countries: how much more adjustment do we need?).

3 Household financial assets do not include foreign cash and deposits with foreign banks since their level cannot be precisely estimated.

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

5 Partly also due to changes introduced by the Consumer Credit Act (Official Gazette 75/2009, 112/2012, 143/2013 and 147/2013).

## Box 2 Household debt in the EU countries: how much more adjustment do we need?

Before the outbreak of the global financial crisis, the levels and the dynamics of private sector debt in Central and Eastern European countries had generally not been considered worrisome, either in the domestic or in the international context[1] and were explained mainly by the necessary process of financial integration and deepening and real convergence towards the levels recorded in the rest of the European Union. However, despite this general stance, regulators of some countries, including Croatia, tried to counteract high credit growth rates during that period by activating specific macroprudential measures. Favourable conditions in the international financial markets, high risk appetite, price bubbles in some markets which contributed to (overly) optimistic expectations, an incomplete regulatory framework and the relaxed credit standards of banks competing for market shares supported credit growth during that period, growth that proved to be excessive only after the onset of the financial crisis and the consequential longer or shorter real contraction in many European economies.

Against the backdrop of recession, the real income of the private sector declined substantially. This prompted the process of adjustment of the private sector's balance sheet, which resulted in deleveraging of the household and the non-financial corporate sectors in a large number of countries, including Croatia, a process which persisted over a number of years[2]. Though necessary, the adjustment of unsustainable levels of private sector debt, particularly in households, to the sources available for the servicing of this debt (current income and financial and real assets) may lead to significant economic costs in view of the importance of private consumption as one of the key generators of economic growth. It is therefore vital to achieve a better understanding of the process of household deleveraging (its required intensity and duration) to create adequate expectations of short-term and medium-term economic growth and develop macroeconomic and macroprudential measures in line with the fundamentals.

There is no such thing as a unique balanced level of debt towards which this process of private sector balance sheet adjustment would converge. Stable levels of debt in literature were until recently based mostly on a static threshold value determined on the basis of historical data, such as for instance a specific pre-crisis level, positional value in the distribution of debt of a group of countries[3] or a trend level[4]. However, the level of

debt which is economically reasonable given the current level of income should be determined based on models taking into account key macroeconomic determinants specific for an individual country and period[5]. In doing so, account should be taken of the fact that each macroeconomic indicator, and thus also the mentioned aggregate estimate, should be viewed together with complementary micro indicators that provide the additional information that is usually hidden behind aggregate numbers. This enables a comprehensive examination of an individual problem and adequate development of economic measures[6], as well as efficient identification of the creditworthiness of individual segments of the private sector to which the banks should channel their credit funds.

The purpose of this survey is to assess, on a panel of European Union countries, the level of household sector indebtedness, defined as the ratio of household debt and disposable income, which is determined by key current macroeconomic factors and is thus country- and period-specific. This will also make it possible to determine which part of the necessary short-term balance-sheet adjustment of the household sector in European Union countries has already been made, i.e. how much more deleveraging is needed to adjust household debt with current optimum levels implied by key macroeconomic determinants.

However, it should be noted that this analysis does not attempt to establish the stable level of household indebtedness determined by long-term, stable levels of macroeconomic factors, but primarily the household need for deleveraging determined by household current debt repayment capabilities, and that as such it is much more volatile and its estimate (particularly in recent periods) is somewhat less reliable.

### Figure 1 Household debt in the EU
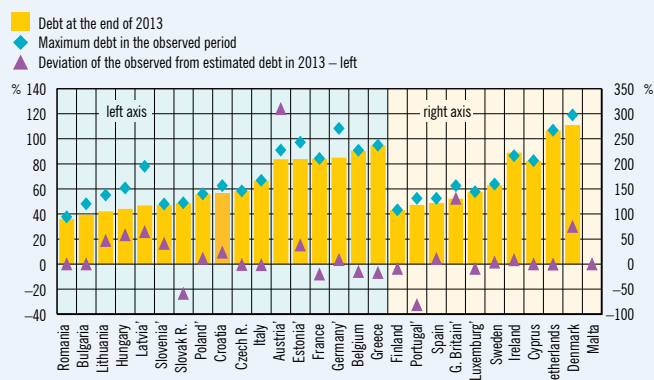


Note: Household debt is measured as the ratio of loans granted to households adjusted for exchange rate changes to their disposable income. The mark ' shows the insignificance of the error correction component, i.e. its positive value.
Sources: Eurostat and CNB calculations.

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1 Kiss, G., M. Nagy, and B. Vonnák (2006): *Credit Growth in Central and Eastern Europe: Convergence or Boom?*, The Central Bank of Hungary, MNB Working Papers 10; Mihaljek, D. (2006): *Rapid growth of bank credit in Central and Eastern Europe: the role of housing markets and foreign-owned banks*, CNB, 12th Dubrovnik Economic Conference; Šonje, V. (2009): *Credit Growth in CEE: Real Effects of Integration and Crisis*, The second Zagreb School of Economics and Management Conference, Zagreb.

2 Historical experience shows that private sector deleveraging in OECD countries lasted on average between six and seven years (Bouis R. et al (2013): *Deleveraging: Challenges, Progress and Policies*, OECD Working Paper 1077).

3 The indicators of macroeconomic imbalances of the European Commission (MIP Scoreboard Indicators) take as the threshold value of the (consolidated) private sector debt to GDP ratio, the level of 133%.

4 Methodology of countercyclical capital buffers.

5 Empirical research of a thus-specified optimum level of debt is extremely rare and has only appeared recently, mainly for the United States of America (Albuquerque B. et al (2014): *Has US household deleveraging ended? A model-based estimate of equilibrium debt*, ECB Working paper series 1643).

6 For instance, in the case of analysis of household indebtedness or the degree of vulnerability of the household sector to specific shocks, it is also necessary to take into account the distribution of the observed economic phenomenon, i.e. the characteristics of individual segments of the observed sector which are often left hidden by averaging, as in earlier CNB analyses of household indebtedness (see, for instance *Financial Stability*, No. 9, July 2012).

Figure 2 Relative deviations from economically justified level of household debt in 2013, in %
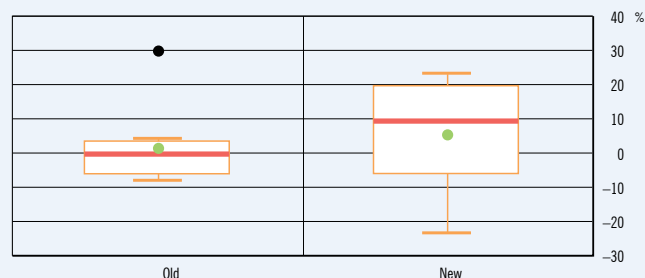


Notes: Member states of the EU are divided in two groups: the so-called "old" and "new" Member States. New Member States of the EU are: Bulgaria, Croatia, Czech R., Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak R. and Slovenia. Only countries for which the estimated error correction model is significant have been presented. The average value of relative deviation is shown as the green dot in the Figure, the medial value as the red line and the orange rectangle and lines show the interval range, i.e. the total range of deviation in an individual group of countries. Non-typical values of distribution are shown as black dot.
Source: CNB calculations.

Figure 3 Observed and estimated level of debt for Croatia



Note: The estimated level of household debt is shown as a four-quarter moving average.
Source: CNB calculations.

The economically determined level of household sector indebtedness has been estimated on the basis of quarterly data for 28 European Union countries in the period from the beginning of 1999 to the end of 2013. The ratio of the amount of loans granted to households corrected for exchange rate changes and disposable income of households has been modelled by a set of macroeconomic factors: cost of borrowing measured by household interest rates, homeownership rate used to assess real estate collateral available for new financing, the consumer confidence index, which captures the economic and financial sentiment of households, and unemployment rate and real GDP growth rate which are used to describe the position of an economy in an economic cycle. Given that the level of household indebtedness is also influenced by real estate prices through direct and indirect wealth effect, the model also includes the ratio of residential property prices to disposable household income[7].

Economic, financial, institutional and historical characteristics specific to European countries have largely influenced the selection of the econometric method for determining an economically justified level of indebtedness. The analysis was made using the error correction model for panels which integrates the estimate of a short-term dynamics of an event and its so-called long-term, stable developments determined, in this case, by macroeconomic factors[8]. However, unlike the often used pooled mean group (PMG) estimator[9] for panels which assumes homogeneity of a long-term relationship between the dependent and a

group of independent variables in all the observed countries (equality of the estimated coefficients in a long-term equation), the mean group (MG) estimator[10] used in this survey estimates separately for each individual country in the data panel the coefficients of the equation of the error correction model. This approach enables better identification of the present specific features in the creation of a relationship between basic macroeconomic determinants and a reasonable level of household indebtedness in European countries[11].

Model results suggest that there are significant differences in estimated sustainable levels of debt and dynamics of household indebtedness in the countries of the European Union, which underlines the importance of an individual approach to the assessment of optimum levels of private sector debt in the given countries. In 2013, in almost one half of the observed countries households were on average capable, given the disposable income, of taking on additional credit burdens (Figure 1), although there were significant differences within this group in terms of the current level of indebtedness. In other countries, there was a need for further household deleveraging (irrespective of the intensity of the adjustments that had been made already) in order for their indebtedness to converge on the level justified from the standpoint of the current economic fundamentals. In 2013, Croatia, together with Ireland, Spain and Sweden found itself in a group of countries with a relatively low need for further adjustment of debt to the disposable amount of income (below 10%). If the countries for which the estimated model did not

7 In addition to the mentioned variables that were included in final model specification, the following variables were also tested: the ratio of the amount of loan and the value of real estate collateral, the share of the population aged 34-55 in the total population and the share of non-performing loans in total housing loans, which have not proved to be significant determinants of indebtedness. The data sources are Eurostat, the European Central Bank, the OECD and the Croatian National Bank, and the completeness of the constructed data panel was very good (around 90%).

8 Before estimating the model, unit-root tests were made for panels, which showed that all variables were integrated of order one (except interest rates, consumer confidence index and real GDP growth rates which were stationary) and the Westerlund cointegration test was used to confirm the existence of a cointegration relationship.

9 Examples of such a use may be found in, for instance, Holly, S., M. H. Pesaran, and T. Yamagata (2006): *A Spatio-Temporal Model of House Prices in the US*, Cambridge Working Papers in Economics 0654, Faculty of Economics, University of Cambridge; Kiss, G., M. Nagy, and B. Vonnák (2006): *Credit growth in Central and Eastern Europe: convergence or boom,* MNB Working Papers 10; Ciarlone, A. (2012): *Wealth effects in emerging economies*, Bank of Italy, Working Paper No. 843.

10 Pesaran, M. H., and R. P. Smith (1995): *Estimating Long-run Relationship from Dynamics Heterogeneous Panels*, Journal of Econometrics, 68, 79-113.

11 Model selection was also made formally by the Hausman test which confirmed the MG estimator as the better choice in this case than the PMG estimator.

prove to be statistically significant are excluded from the analysis, in the process of adjustment, under the existing conditions, 50% of deviations should be eliminated within a period of one to three years.

The comparison of the obtained results shows great differences between the old and new members of the European Union (Figure 2). The range of deviations of the observed levels of household indebtedness in 2013 from those justified by fundamentals is much bigger in the group of countries that joined the European Union after 2004. At the same time, the need for further household deleveraging in these countries, despite relatively lower levels of indebtedness, was much bigger than in the old members of the European Union, which on average still have room for further borrowing, mainly as a result of historically relatively lower interest rates of banks in these member states[12]. The mentioned differences between the observed EU countries are due to the structural macroeconomic and financial problems facing the majority of European developing countries that have deepened the contraction of the real cycle and have made it lengthier, thus reducing the potential for regular servicing of household debts accumulated during the period of credit and economic growth.

Despite the fact that the process of household deleveraging in Croatia started as early as at end-2008, the recession that is now in its sixth year calls for further reduction in credit liabilities if they are to be adjusted with the falling income of households. The estimated model shows that Croatian households have reduced in each quarter deviations of aggregate indebtedness from the level justified by the fundamentals by approximately 10%. Most of the macroeconomic variables included in the model have been shown to be statistically significant and to carry the expected sign, with the estimated parameters for Croatia not deviating substantially from those of comparable EU countries (Table 1). Thus, in the conditions of economic growth, optimism, low borrowing costs and a rise in the prices of real property, which is frequently used as a collateral, the amount of household debt reasonable in terms of household income tends to rise. Growing aggregate unemployment and the ensuing fall in income also lead to an increased level of indebtedness in the model. However, this growth is the result of a relatively greater inertia of credit cycles relative to real economic cycles[13], i.e. the fact that growing unemployment reduces aggregate current income faster that the total amount of debt. The negative impact of the homeownership rate is due to the extremely high level of ownership of housing units in Croatia at the end of the 90s as a result of the historical heritage, but this ownership fell slightly in the 2000s[14].

In the period of strong credit expansion and economic growth in Croatia, the aggregate creditworthiness of households measured by economical-

Table 1 Estimated error correction model for Croatia

| | Coefficient | |
| --- | --- | --- |
| **Long-term** | | |
| Unemployment | 1.17 | |
| Rate of real estate property ownership | −1.08 | *** |
| Ratio of real estate price to income | 0.63 | *** |
| Interest rates | −2.83 | ** |
| Growth rate of real GDP | 1.35 | * |
| Consumer confidence index | 0.17 | * |
| Constant component | 99.62 | |
| **Short-term** | | |
| Error correction component | −0.10 | *** |
| D (unemployment) | −0.03 | |
| D (rate of real estate property ownership) | 0.55 | ** |
| D (ratio of real estate price to income) | −0.04 | *** |
| D (interest rates) | 0.10 | |
| D (growth rate of real GDP) | −0.07 | * |
| D (consumer confidence index) | 0.00 | |
| Constant component | 9.52 | * |

Notes: Marks *, ** and *** indicate the significance of variables at 10%, 5% and 1% level. D represents the differentiation operator.
Source: CNB calculations.

ly justified level of indebtedness rose steadily, so the underestimation of the realised levels of household debt compared to those implied by the fundamentals left room for further borrowing. However, with the slowdown in economic growth in early 2007, the potential for further borrowing first started to decline, and then vanished completely with the outbreak of the global financial crisis and its spillover onto the domestic real sector. The last six years of recorded recession in Croatia prompted households to adjust their credit liabilities to some degree to their disposable income (since end-2008 by approximately 10%). However, this debt reduction was on average slower than the fall in income, with the result that in the entire recession period the need for further short-term household deleveraging fluctuated around a relatively low 4% (Figure 3)[15].

The conducted analysis of household indebtedness showed that for an adequate estimate of optimum, economically justified levels of indebtedness, it is necessary to apply the so called dynamic, individual approach, which takes into account all the specific features of an individual economy, largely neglected before the outbreak of the global

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12 During the observed period (1999-2013), interest rates on household loans were on average 44% lower in the developed EU countries than in the developing EU countries.

13 For more information on economic cycles, see Box 4 Financial cycles and countercyclical capital buffer calibration.

14 This is the result of maturing and independence of new generations in the period of credit expansion. Nevertheless, in European terms, the level of ownership of housing units in Croatia remains extremely high.

15 The fall in credit worthiness (economically justified level of indebtedness) and impaired creditworthiness of households (increased need for further deleveraging) since the beginning of the crisis was mostly triggered by a fall in real estate prices, coupled with a growth in the homeownership rate and a fall in consumer optimism, in contrast with a simultaneous small slowdown in the fall of real economic activity followed by rising unemployment and a fall in bank's interest rates which had an opposite effect.

financial crisis. The example of European Union countries shows clearly how strong credit expansion in mid-2000s in most Central and Eastern European countries which influenced real economic growth, following the outbreak of the financial crisis, resulted in a significant divergence of the estimated and observed levels of indebtedness between individual countries, depending on the stability of the economic fundamentals following the crisis.

Despite the slow deleveraging of Croatian households in the past six consecutive years, negative economic growth rates and relatively low consumer confidence keep up the need for further short-term reduction in the debt burden. The model assessed suggests that in conjunction with economic growth and increased consumer confidence, the need for

deleveraging would vanish, that is, there would be opportunities for this sector to take on further debt. This might help the several-year-long suppressed household demand, without an increase in the risks to financial stability. In the meantime, although aggregate measures suggest that in the short term it is necessary additionally to harmonise the aggregate indebtedness of households with current economic factors, there is still a potential for credit growth in the household sector, even if it is hard to identify (particularly in aggregate measures)[16]. The banks thus have to exert more effort to identify and attract clients operating in the profitable and less risky segments of the private sector[17] than was the case before the crisis, by setting up adequate policies and procedures for granting loans, which will stabilise their income over a medium term.

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16 A rough estimate of indebtedness determined by long-term, stable levels of the observed macroeconomic fundamentals confirms that Croatia has never faced a problem of exceptional structural excessive indebtedness of the household sector. Quite the opposite, in the period of real contraction of the domestic economy, though relatively low, the aggregate potential for lending to this sector was still present and over a medium and particularly over a long-term, it is likely to increase further given the expected long-term dynamics of macroeconomic fundamentals.

17 Most notably private non-financial corporations the economic activities of which will stabilise the current income of households and thus their debt burden.

# Real estate[6]

- Bank housing loans
- Domestic bank loans to real estate industry
- External debt of the real estate sector[b]
- Domestic bank loans to construction industry
- Annual growth rate of loans to the real estate sector adjusted by exchange rate changes – right
- Annual growth rate of nominal loans to the real estate sector – right
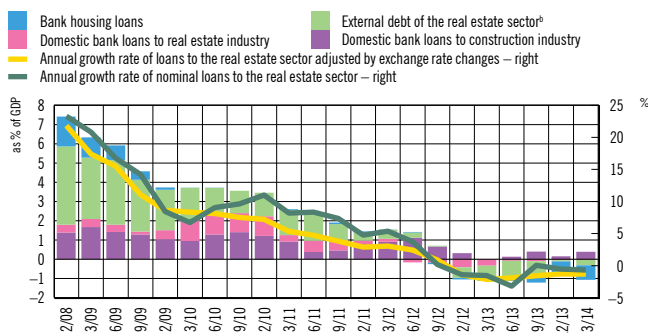


[a] Changes in debt adjusted by exchange rate changes.
[b] External debt includes the debt of real estate and construction industries.
Note: The figures relating to domestic loans granted to the real estate sector before 2010 were slightly modified due to the new classification of activities.
Source: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

Figure 50 Household debt, unemployment rate, consumer optimism and real estate market expectations

- Household debt
- Year-on-year rate of change in the index of planned purchase or construction of real estate – right
- ILO unemployment rate, seasonally adjusted – right
- Expected change in equilibrium prices of real estate over the next year[a] – right



[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.

Though at a slower pace, the deleveraging of the household and corporate sector segments active in the real estate market continued towards the end of the previous year and early this year and was marked by a steady trend of a fall in the foreign and an increase in the domestic component of the corporate sector debt. Such developments are expected to continue in the remaining part of 2014, given the likelihood of stagnation in economic activity, which will not boost demand on the real estate market.

The long-term contraction in real economic activity that has led to negative developments in the labour market, coupled with low consumer confidence, has continued to influence the dynamics of debt associated with real estate. At the end of the last and early this year, the total corporate debt associated with the real estate market declined at an average annual rate of –0.6%, i.e. –1.3% if the exchange rate effects are excluded (Figure 49).

The direction of the impacts of the domestic and foreign components of debt on its dynamics remained the same as in the previous year, although lately a noticeable strengthening of the positive contributions of the domestic liabilities of the corporate segments associated with the real estate market has been observed (Figure 49). The servicing of foreign liabilities made the biggest contribution to the fall in total debt (by, towards the end of the previous year and early this year, an average –0.2% of GDP), bringing the share of external debt in total debt onto

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6 In this chapter developments in the real estate market are analysed and operations of non-financial corporations in the construction and real estate activities are monitored.

## Figure 51 Housing loans and HREPI[a] on a quarterly basis

- Growth in bank housing loans – right
- HREPI for Croatia
- HREPI for Croatia excl. Adriatic coast
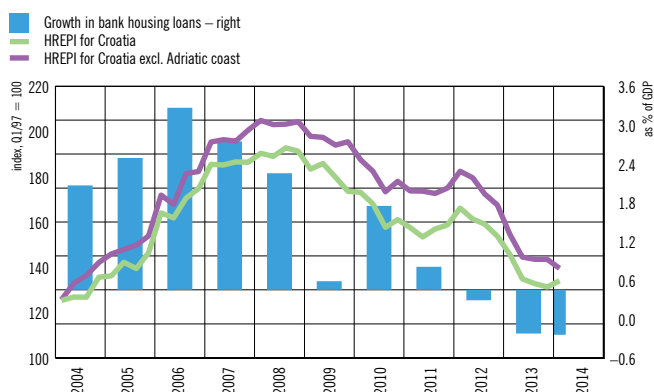


[a] The hedonic real estate price index takes into account qualitative characteristics of the real estate.
Source: CNB calculations.

## Figure 52 Comparison of interest rates on newly-granted housing loans in Croatia and the eurozone

- Nominal interest rate on f/c indexed housing loans in Croatia
- Real interest rate on f/c indexed housing loans in Croatia[a]
- Nominal interest rate on housing loans in the eurozone
- Nominal interest rate spread – right
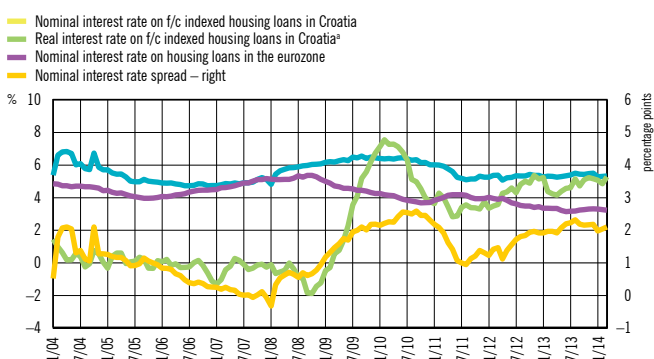


[a] The real interest rate on f/c indexed housing loans was deflated by the change in the average nominal net wage, excluding the effect of the crisis tax.
Sources: ECB and CNB.

## Figure 53 Financial availability of residential property

- HREPI excl. Adriatic coast to average nominal net wage
- Loan payment to household disposable income
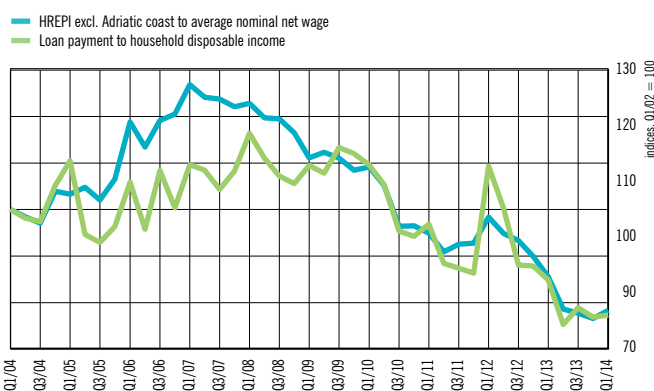


Sources: CBS and CNB calculations.

a slow but steady downward path in the past four years. The fall was generated in approximately equal amounts by private and public sector non-financial corporations. However, while private construction companies reduced their domestic credit liabilities (by –0.3% of GDP), public sector construction companies more than offset the reduction in their debt to foreign creditors (0.1% of GDP) by an increase in liabilities to domestic banks (0.6% of GDP). During the same period, the contribution of the reduction in the domestic debt of corporations in real estate activities and the reduction in housing loans to the dynamics of total debt of the segments of all the sectors associated with real estate came to –0.8% of GDP on an aggregate level.

A downward trend in real estate prices present for several years continued at the end of the previous year and early this year, resulting in a further fall of 12% on average on an annual level (Figure 51). At the end of 2013, the prices achieved for residential real estate in Croatia fell cumulatively by approximately 30%[7] from their highest levels reached in 2008. This correction entirely offset the sharp increase in prices in the period before the crisis, bringing the prices back to end-2004 levels. Given that the expected further fall in prices, coupled with low levels of consumer optimism, will continue to put downward pressure on prices, the described developments in the real estate market are likely to continue in the remaining part of the year (Figure 50).

Growing unemployment and falling disposable income for consumption and investments of households against the backdrop of still high uncertainty as regards economic recovery have continued to influence decisions to postpone plans for the purchase/building of housing units (Figure 50). Reluctance on the part of households to borrow money for home purchase or investment activities is further boosted by the still present expectations of further price corrections in the future. The slightly lower interest rates of banks failed to fuel household demand for new housing loans (Figure 52)[8]. Therefore, despite the continued favourable financial availability of housing units (Figure 53), the recovery of the real estate market will continue to depend primarily on economic recovery, developments in the labour market and the associated economic and financial moods of households.

7 The asking prices of real estate measured by market indices suggest that the cumulative fall was slightly lower during that period (around 20%); however given the adjustments between asking and offered prices common when negotiating a sale, the listed price correction is realistic.

8 This may be due, among others, to the amendments to the Consumer Credit Act, which defines interest rates of banks as the sum of a clearly determined variable parameter and an invariable margin (*Financial stability*, No. 12). The selection of EURIBOR and similar indices as a variable interest rate component on account of its historically low level greatly improves the chances for future growth of the variable component and therefore also of the total interest rate, and it is possible that it reduces household demand for such loans.
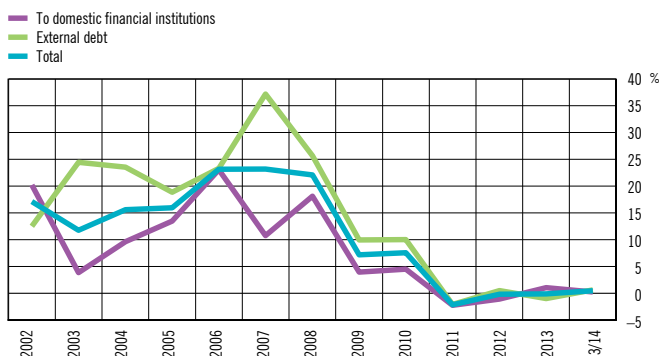
# Non-financial corporate sector

## Figure 54 Change in and stock of non-financial corporate debt



Legend:
- To other financial institutions
- To banks
- External debt
- Total debt – right

(left axis: as % of GDP, −4 to 16; right axis: as % of GDP, 0 to 100)

Years: 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 3/14
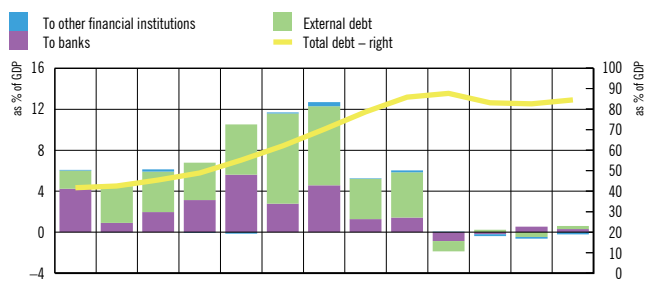
a The figure is based on revised data and includes changes in the classification of sectors. Data on total corporate debt exclude debt to leasing companies in order to avoid a break in the data series caused by the change in the methodology for reporting the value of leasing contracts from 1 January 2011 onwards. Data on external debt exclude round-tripping transaction.
Note: The change in the debt stock of non-financial institutions excludes effects of the sale of a portion of claims of a major bank to a company in the direct ownership of the parent bank in December 2012 and 2013 and the assumption of a portion of shipyard debt by the government in June 2012. The external debt stock also includes the debt of the CM from 2002 onwards.
Sources: HANFA and CNB.

## Figure 55 Annual growth rate of non-financial corporate debt



Legend:
- To domestic financial institutions
- External debt
- Total

(axis: %, −5 to 40)

Years: 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 3/14

Note: The year-on-year rates of growth of the debt of non-financial institutions exclude effects of the sale of a portion of claims of a major bank to a company in the direct ownership of the parent bank in December 2012 and 2013 and the assumption of a portion of shipyard debt by the government in June 2012.
Sources: HANFA and CNB.

Unlike 2013 which was marked by deleveraging of the non-financial corporate sector abroad mainly as a result of replacement of debt by equities, the first quarter of 2014 saw a minor growth of this sector's external debt. At the same time, debt to domestic banks held steady.

Corporate interest rate risk rose slightly as a result of shortening of periods of possible interest rate changes, however, further fall in average interest rates has so far been compensated by increased risk of interest rate changes. The exposure to currency risk has held steady at a high level, in contrast with a fall in the liquidity risk of the non-financial corporate sector.

After falling to 82.7% of GDP in 2013, the debt of the non-financial corporate sector rose to almost 84.6% of GDP in the first quarter of 2014. The fall in debt in 2013 was driven by a sale of a part of one bank's receivables in December 2013, the bankruptcy of one smaller bank, methodological changes in book-entry system for fees, replacement of external debt by equities, as well as deleveraging of the public sector corporations abroad (Figures 54 and 55). The total external debt fell by approximately 0.5% of GDP in 2013, with the external debt of the public corporate falling by 0.9% of GDP and that of the private corporate sector rising by 0.4% of GDP. The most significant decline in external debt of the public corporate sector in 2013 was due to deleveraging in construction, manufacturing, transport, storage and communications. The biggest external debt deleveraging in the public non-financial corporations sector was seen in manufacturing and construction activity, accompanied by concomitant borrowing from domestic banks (refinanc-

## Figure 56 Non-financial corporate debt



Legend:
- To other financial institutions
- External debt
- To banks

y-axis: as % of GDP (0 to 90)
x-axis: 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 3/14
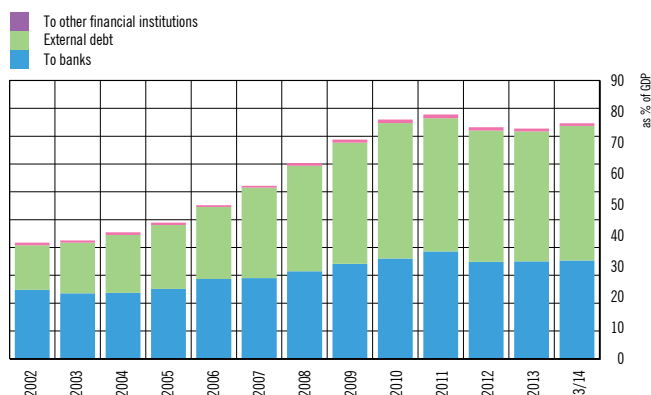
Sources: HANFA and CNB.

## Figure 57 Change in demand and conditions for granting loans to corporates



Legend:
- Conditions for granting total loans to corporates
- Total corporate demand for loans

y-axis: in net % (−25 to 55)
x-axis: Q3/12, Q4/12, Q1/13, Q2/13, Q3/13, Q4/13, Q1/14, Q2/14
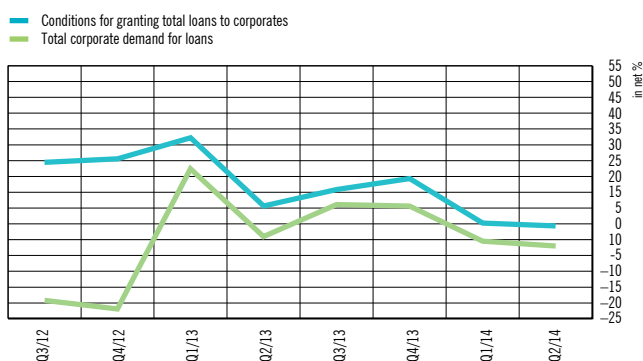
Note: Positive and negative values show the growth and decrease in demand.
Source: CNB.

## Figure 58 Newly-granted bank loans and absolute change in the stock of gross loans



Legend:
- Newly-granted long-term loans
- Newly-granted short-term loans
- Absolute change in short-term loans – right
- Absolute change in long-term loans – right

left y-axis: billion HRK (0 to 32)
right y-axis: billion HRK (−6 to 6)
x-axis: 6/04, 12/04, 6/05, 12/05, 6/06, 12/06, 6/07, 12/07, 6/08, 12/08, 6/09, 12/09, 6/10, 12/10, 6/11, 12/11, 6/12, 12/12, 6/13, 12/13
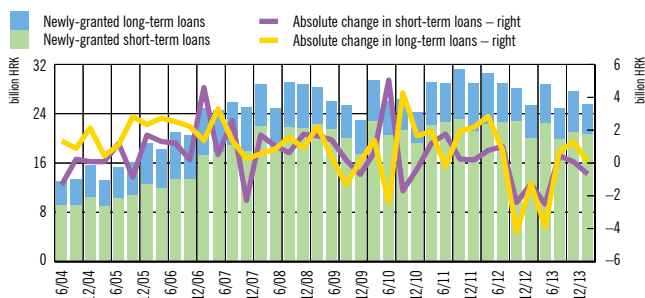
Note: Due to a change in the methodology of monitoring of stock and maturity of loans which are the consequence of change in the classification of sectors, the data from 31 December 2011 onwards are revised in line with the new methodology. The decrease in the stock of loans in December 2012 and 2013 is the result of the sale of a portion of claims of a major bank to a company in the direct ownership of the parent bank, with the decrease in June 2012 being the result of the assumption of a portion of shipyard debt by the government.
Source: CNB.

ing), while the external debt of public corporations held steady in the first quarter.

As regards private non-financial corporations, the biggest decline in external debt in 2013 was seen in the construction sector, hotels and services, with corporations in the hotel business mostly resorting to domestic refinancing. The replacement of debt by equities was particularly noticeable in manufacturing and service activities. In other activities there was no replacement of external debt by domestic debt on the sector level as corporations deleveraging abroad in most cases were not those borrowing from the domestic banks. A significant growth in external debt of the private sector in 2013 and in early 2014 was seen in the branches of trade, manufacturing and transport, storage and communications.

The debt of non-financial corporations to the domestic banks, with earlier mentioned corrections included, rose by 0.23% of GDP in 2013, with further growth on account of weakening of the exchange rate of the kuna against the euro standing at approximately 0.3% of GDP. In the first quarter of 2014, the debt with the domestic banks held steady if the effect of an increase in the exchange rate of the kuna against the euro is excluded.

In accordance with the results of the bank lending survey, the end of 2013 was marked by a slightly increased demand for loans in the segment of large corporations and long-term loans, in contrast with a small fall in demand for loans of small and medium-sized corporations. Survey results for early 2014 point to a small increase in demand for loans in the segment of small and medium-sized corporations, following its fall throughout 2013, and stagnation in other segments. The survey also shows a substantial tightening of the standards for granting loans to corporations caused by negative expectations regarding general economic developments, growing costs related to the capital position of banks, industry-specific or corporation-specific risk and collateral risk (Figure 57).

The share of newly-granted short-term loans in total newly-granted loans rose in the first quarter of 2014, resulting in a faster growth in the absolute stock of short-term loans. At the same time, newly-granted long-term loans have been falling slowly for 4 consecutive months, while the stock of long-term loans (excluding the effect of the previously mentioned sale of a part of a non-performing loans portfolio of one bank in December 2012 and December 2013 and the assumption of shipyards' debt by the government in June 2012) rose in 2013 and held steady in the first quarter of 2014 (Figure 58).

The fastest current growth rates of external debt in the fourth quarter of 2013 and the first quarter of 2014 were seen in the trade sector, while the dynamics of change in the external debt of the manufacturing sector and the sector of transport, storage and communications was falling, which can be attributed to the deleveraging of public sector corporations. Changes in

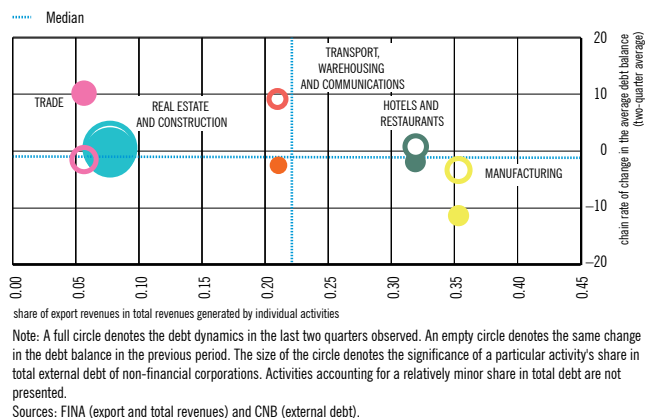**Figure 59 External debt allocation by sectors from September 2013 to March 2014**



Note: A full circle denotes the debt dynamics in the last two quarters observed. An empty circle denotes the same change in the debt balance in the previous period. 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 60 Allocation of domestic bank loans by sectors from September 2013 to March 2014**



Note: A full circle denotes the debt dynamics in the last two quarters observed. An empty circle denotes the same change in the debt balance in the previous period. 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).

**Figure 61 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 62 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.
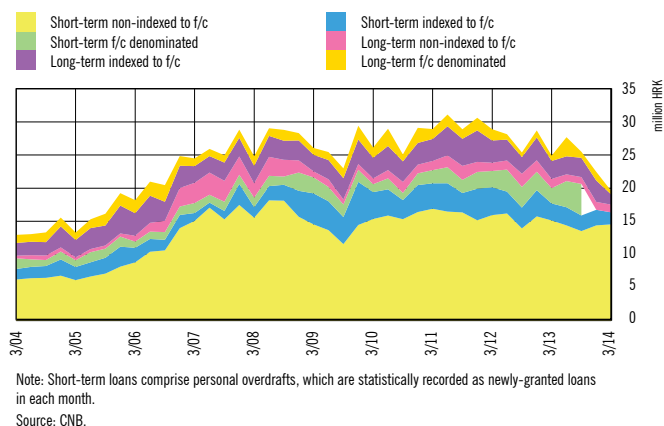
the external debt of other observed sectors in the observed six-month period were not significant. Current growth rates of domestic banks' loans in construction, transport, storage and communications and hotels and restaurants, though still positive, fell on average, while the growth rates of loans to trade and manufacturing have turned to negative as a result of significant deleveraging, clearly influenced by the earlier mentioned sale of a part of claims of one bank (Figures 59 and 60).

The currency structure of newly-granted short-term loans has been changing in favour of loans non-indexed to foreign currency, while short-term loans indexed to foreign currency and particularly foreign currency short-term loans have been falling in the last two quarters. Newly-granted long-term loans non-indexed to foreign currency also grew during the observed period, though more slowly than short-term loans of the same type while currency-indexed and foreign currency long-term newly-granted loans fell substantially during the same period (Figure 61). The share of corporate foreign currency debt in total debt has been stagnating, with only minor oscillations, more evident in short-term debt, which has been growing in the last quarter (Figure 62). Currency exposure by sectors also held steady (Figure 63).

The structure of loans by interest rate variability shows an increase in the share of loans with a variable interest rate in the period from 1 to 3 months. The total share of loans with an interest rate variable within 12 months still remained at a high 99.9% (Figure 64).

The changes in the average level of interest rates in Croatia follow the dynamics of interest rates in the eurozone, which were still holding steady at their lowest levels during the observed period, while the fall in interest rates on short-term loans in Croatia in the last two quarters probably contributed to a faster growth of newly-granted short-term loans. The price of long-term loans, except for a small increase in early 2014, was stable, as expected on account of stagnation in demand for long-term loans and the high perception of client risk by banks, as

## Figure 63 Currency exposure in March 2014



Note: A full (empty) circle denotes the share of non-kuna debt in September 2012 (March 2012). The size of the circle denotes a particular activity's share in total debt of non-financial corporations. Activities accounting for a relatively minor share in total debt are not presented.
Sources: FINA (export and total revenues) and CNB (loans by activity).
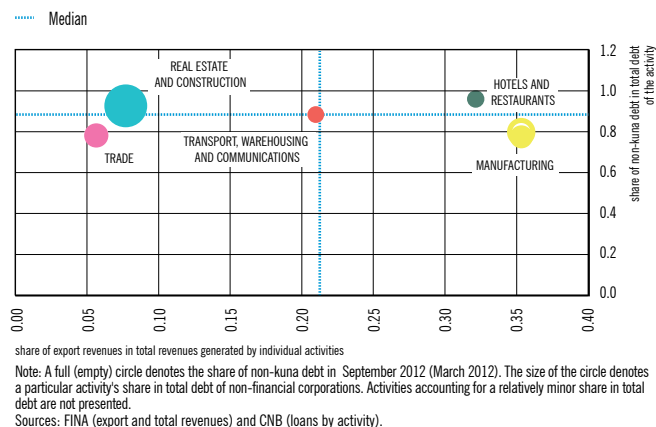
## Figure 64 Breakdown of bank loans to non-financial corporations by interest rate variability



Source: CNB.
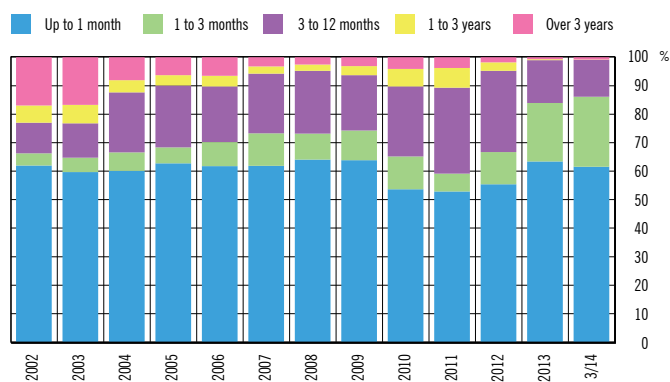
## Figure 65 Interest rates on long-term loans to non-financial corporations in Croatia and the eurozone



Sources: ECB, FINA and CNB.
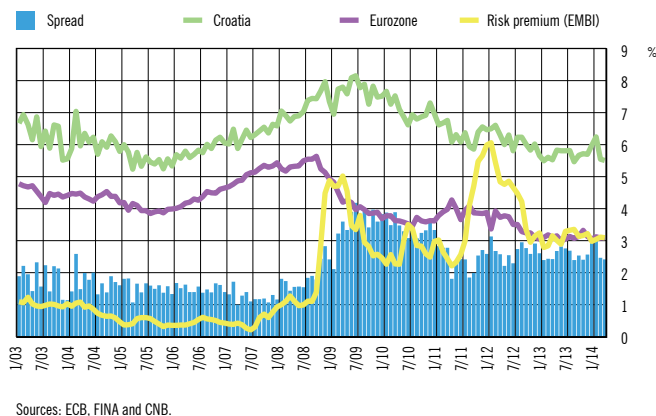
## Figure 66 Interest rates on short-term loans to non-financial corporations in Croatia and the eurozone



Sources: ECB, FINA and CNB.
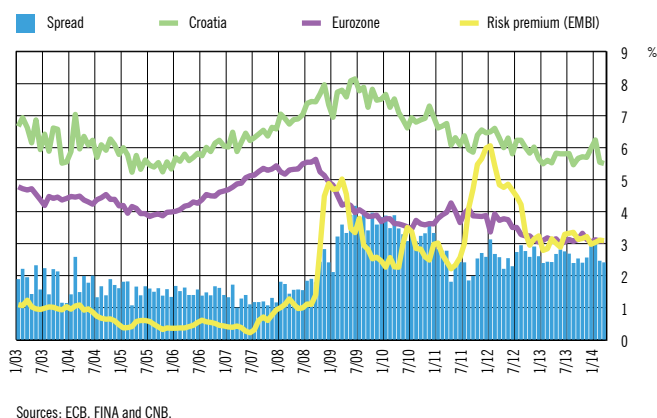
## Figure 67 Ratio of transaction account deposits of non-financial corporations to gross value added



Source: CNB.
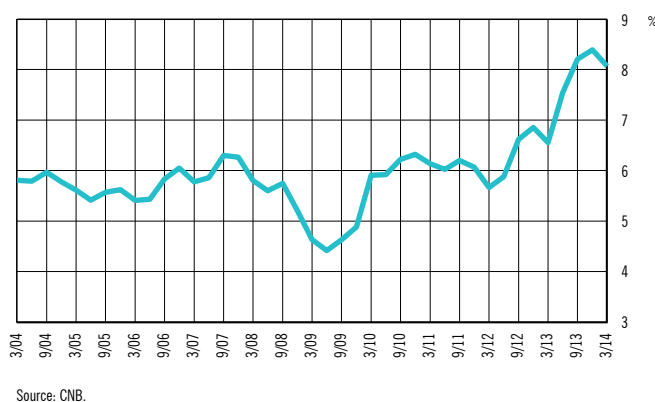
suggested by the results of the bank lending survey. Differences in interest rate developments compared to those in the eurozone are influenced by the country's risk premium (Figure 65 and Figure 66).

The liquidity risk of non-financial corporations measured by the ratio of deposits in transaction accounts of non-financial corporations and gross value added held steady at a low level but fell further towards the end of 2013 and in early 2014 (deposits to GVA ratio stood at approximately 8%) possibly also due to fiscalisation, which is channelling currency to the transaction accounts of corporations (Figure 67).

# Banking sector

Figure 68 Major banking sector balance sheet items,[a]
year-on-year rates of change

- Loan portfolio
- Foreign assets
- Liabilities to residents
- Other domestic assets
- Capital, issued securities and other liabilities
- Liabilities to non-residents
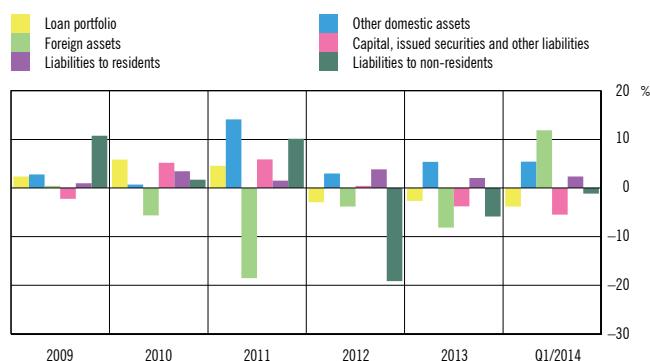
[a] An increase in balance-sheet items at end-March 2014 was calculated relative to March 2013.
Source: CNB.

Figure 69 Banking sector assets

- Loan portfolio
- Other domestic assets
- Foreign assets

| | 2009 | 2010 | 2011 | 2012 | 2013 | Q1/2014 |
|---|---|---|---|---|---|---|
| Foreign assets | 14 | 13 | 11 | 10 | 10 | 10 |
| Other domestic assets | 25 | 26 | 29 | 30 | 32 | 32 |
| Loan portfolio | 77 | 82 | 85 | 83 | 80 | 79 |
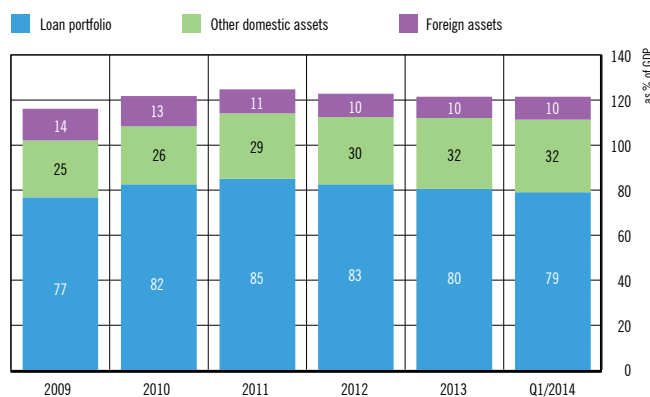
Source: CNB.

The rise in the vulnerability of banks results from their growing exposure to the government. The main buffers against potential shocks and the possibility of stable financing in prolonged recessionary conditions are created in capital buffers which, at the turn from 2013 to 2014, are stimulated by standard supervisory measures, such as the new classification of placements and stricter criteria for real estate risks, as well as new macroprudential measures, such as the structural systemic risk buffer. The resilience of banks was maintained owing to a satisfactory operating efficiency and decreased pressure on capital by uncorrected non-performing loans.

## Balance sheet vulnerabilities

Changes in the structure of banks' balance sheets at the end of the last and in the beginning of the current year disclose their main balance sheet vulnerabilities. On the asset side, the rising trend of lending to the government continued; this sector has accounted for most of the new gross loans since the beginning of the crisis, which, due to a transition to a new fiscal regime, can become a constraint for the expansion of the balance sheets. On the liability side, dangers arise in relying on the currently cheap inflow of deposits from residents whose long-term stability is uncertain due to the weakening of household income and reduced preference for time deposits over the past years. At the same time, the share of non-affiliated non-residents in loans and deposits received is growing, which exposes the banks to the risk of refinancing (Figure 68).

## Figure 70 Banking sector liabilities[a]



- Capital, issued securities and other liabilities
- Liabilities to residents
- Liabilities to non-residents
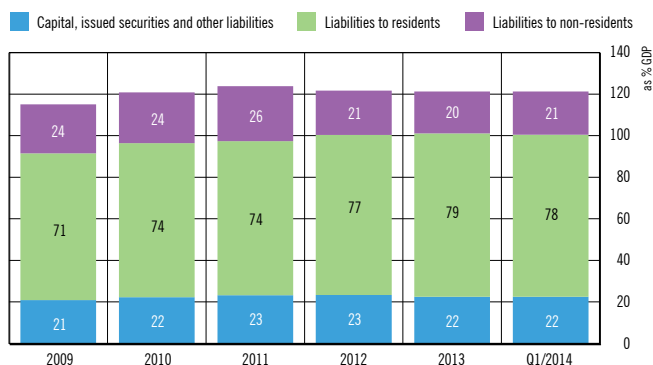
[a] Collectively assessed impairment provisions represent the difference between banking sector assets and banking sector liabilities and capital.
Source: CNB.

## Figure 71 Structure of liabilities



- Resident kuna deposits
- Resident f/c deposits (incl. deposits indexed to foreign currency)
- Non-resident loans and deposits
- Resident loans
- Other
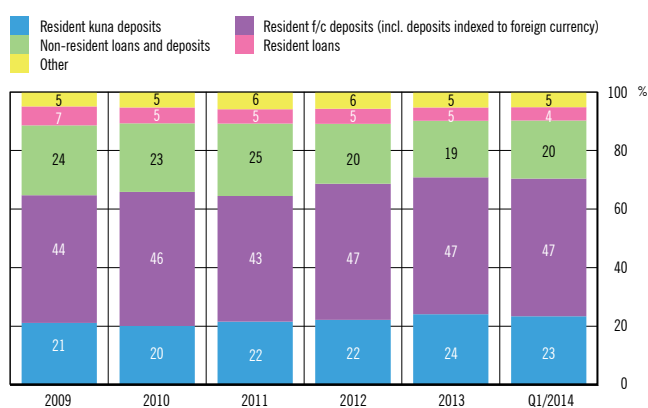
Source: CNB.

## Figure 72 Structure of foreign-source funds



- Share capital
- Retained and current earnings
- Reserves, subordinated and hybrid instruments
- Deposits from owners
- Loans from owners
- Deposits from other non-residents
- Loans from other non-residents
- Price of foreign financial institutions' funds – right
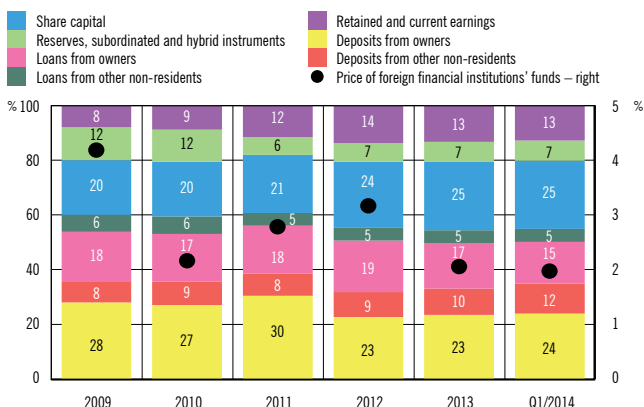
Source: CNB.

After noticeable deleveraging in 2012, which decreased significantly in 2013, as observed in the stabilisation of the banking sector's assets in GDP, a continuation of the trend of gradual deleveraging by banks can be expected, until preconditions for a more significant growth in their balance sheet are achieved, i.e. until the macroeconomic outlook is changed (see the Macroeconomic environment, Household sector and Non-financial corporate sector sections). When interpreting the movements in assets, in which only securities exhibit a clear upward trend, it is important to take into consideration the corrections for the effects of several factors of a predominantly regulatory character directed at a lowering of the pressure on capital from bad quality assets. These corrections in aggregate balance sheet statistics are caused by changes in the treatment of the classification of placements and placement approval fees, by a continuation of the sale of bad placements by a large credit institution and bankruptcy proceedings over Centar banka.

The continuation of a mild increase in the deposits of residents, which at an aggregate level is close to the level of the implicit deposit interest rates in the period of a relatively weak demand for loans, has led to the continuation of the channelling of banks' assets to liquid assets and securities. This in turn has led to a moderate growth in liquidity indicators and the growth in the share of securities in banks' assets (11.4%), ongoing since the beginning of the crisis (Figures 68, 69 and 74).

Consequently, banks' assets during the year until March 2014 decreased by around 1%, and the ratio of bank assets to GDP at the end of December 2013 and March 2014 stood at 121.2% and 121.3%, respectively, which is down from the end of 2011 and 2012, when it was 123.8% and 121.7%, respectively (Figures 69 and 70).

After a noticeable decrease in 2012, foreign funds with banks remained relatively stable and even increased somewhat at the beginning of 2014 (Figures 71, 72 and 73). Also, encouraged by the low price of foreign funding sources, banks increased liabilities to non-affiliated non-residents to some extent. However, despite the stabilised share of foreign liabilities of banks, which suggests the halting of deleveraging in accounting terms, current movements should be commented on with caution, and from an economic standpoint, potential sources of risk should also be taken into consideration. Thus some foreign liquid assets are deposited with the owners, and the growth of investment in equity securities also continued at the beginning of 2014. Furthermore, although currently low-priced, foreign sources from non-residents with which banks are not affiliated, are of an unpredictable nature, as has been proved by the jumps in the cost of funding in international markets since 2008.

The movements in the structure of banks' balance sheets described reflect a period of good liquidity and satisfactory support by foreign owners. However, the rise of exposure to the government in the earlier period when public debt expanded significantly, increased the risks of the banking sector which might materialise if a considerable change in the country's risk perception takes place. In addition, on the liability side, a

## Figure 73 Breakdown of bank owners' funds by instrument



Legend:
- Loans
- Deposits
- Subordinated and hybrid instruments
- ● Share of owners' funds in total liabilities – right
- Legal reserves, reserves provided for by the articles of association and other reserves
- Share capital
- Retained earnings and current year profit
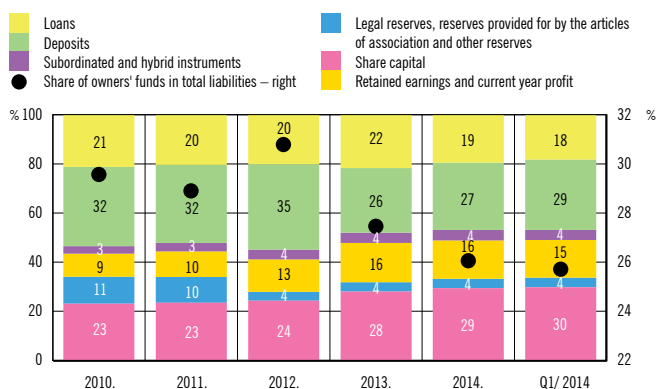
Source: CNB.

## Figure 74 Liquidity indicators



Legend:
- Foreign liquid assets to foreign short-term liabilities
- Foreign liquid assets to total foreign assets
- Total liquid assets to total short-term liabilities – right
- Total liquid assets to total assets (FSI) – right
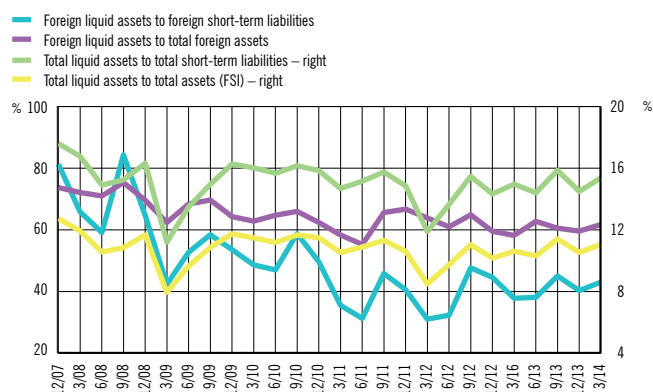
Source: CNB.

## Figure 75 Currency breakdown of deposits



Legend:
- F/c denominated deposits
- F/c indexed kuna deposits
- Kuna deposits
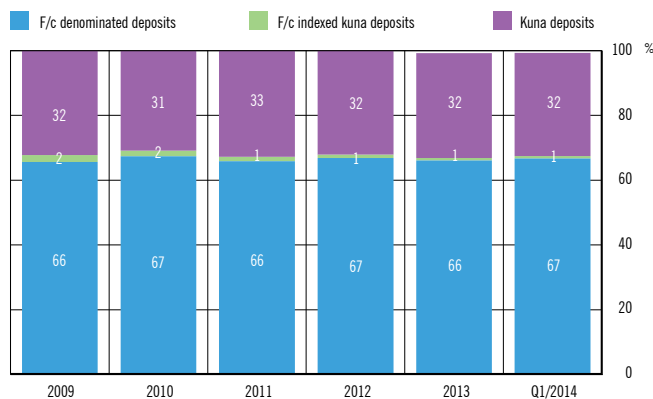
Source: CNB.

## Figure 76 Currency breakdown of loans



Legend:
- F/c indexed kuna loans
- F/c denominated loans
- Kuna loans
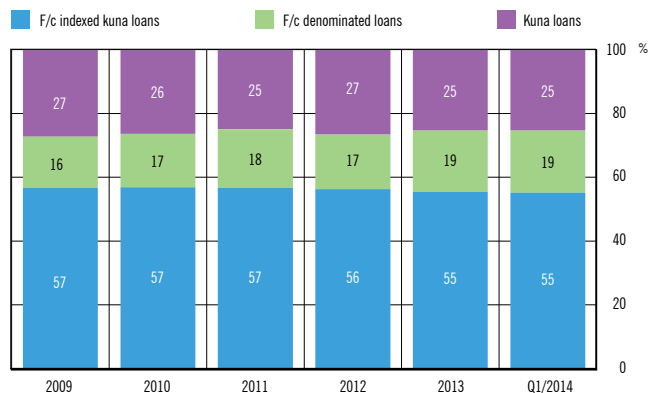
Source: CNB.

possible underestimation of risks by the banks, a contribution to which might be made to a certain extent by the currently low costs of banks' funds (Figures 5 and 6 in the Macroeconomic environment section) in the domestic and foreign market, volatility in which can have a negative impact on their performance.

In the period of stagnation of loans and deposits, their currency structure remained relatively stable (Figures 75, 76 and 77). On the loans side, the dynamics in the currency structure is the result of the continuation of the decline in the share of loans indexed to the Swiss franc, which in the case of car purchase loans decreased to only 20% as a result of repayment (Figure 78). Despite the prevailing share of foreign currency loans, as a result of loans' indexation, direct currency risk of banks remains low (Figure 79).

Despite a low direct exposure to currency risk, indirect risks arising from the unhedged foreign currency exposure of clients remained high (Figures 79 and 80). As a rule, the portion of loans unhedged against the CICR in total loans is high despite a downward trend in this indicator in the corporate sector present for several years.

In the forthcoming period, in addition to the continuation of recessionary trends, the above analysed risks that have an impact on the banks' balance sheets, such as the long-term deleveraging by households, might become important. Such changes would lead the banks to an unfavourable situation, but potentially, they would force them to redefine business strategies based on excessive risk-aversion. In such a case, banks would somewhat more strongly support entrepreneurial projects, which the CNB has consistently been trying to encourage, in particular during the last year, by preparing specific measures and models of support to corporate lending. To a certain extent, this could be assisted by a relative extension of liabilities maturity, which in some measure probably place a constraint on the maturity transformation process, and on lending activities (Figure 81).

## Figure 77 Currency breakdown of non-kuna loans

Euro    Swiss franc    Other currencies



Source: CNB.

## Figure 80 Share of unhedged loans in total loans exposed to CICR[a]

Total loans    Total housing loans
Total loans to households    Total loans to corporates



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

## Figure 78 Breakdown of Swiss franc-indexed loans

Other loans    Housing loans
Investment loans    Construction and mortgage loans
Car loans
Relative importance of Swiss franc-indexed housing loans – right
Relative importance of Swiss franc-indexed car loans – right



Source: CNB.

## Figure 81 The share of assets and liabilities of banks with a remaining maturity of more than 1 year

Liabilities – left    Assets – right



Source: CNB.

## Figure 79 Bank exposure to direct currency and interest rate risks

Share of received loans and deposits with interest rate variable within a year
Share of granted loans with interest rate variable within a year
Permissible net open foreign exchange position – right
Net open foreign exchange position – right
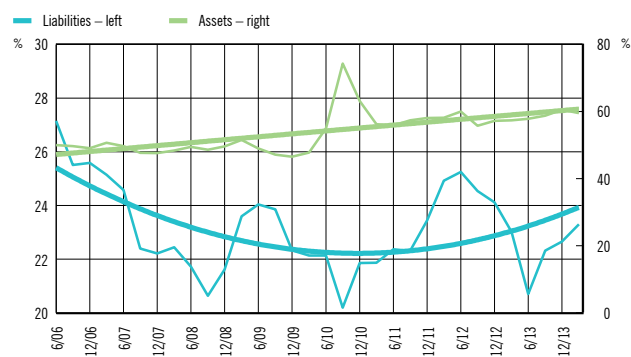


Source: CNB.

## Figure 82 Change in selected business performance indicators

Net interest income    Net non-interest income
General administrative expenses and depreciation    Net income
Total expenses on loss provisions – right
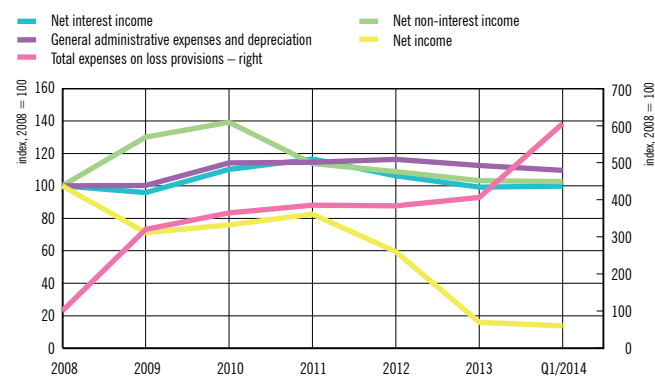


Source: CNB.

## Figure 83 Contribution of ROAA categories

Legend:
- Total expenses on loss provisions
- General administrative expenses and depreciation
- Net other non-interest income
- ROAA (with expenses on value adjustments as in 2012)
- Net income from fees and commissions
- Net interest income
- Return on average assets (ROAA)



Source: CNB.
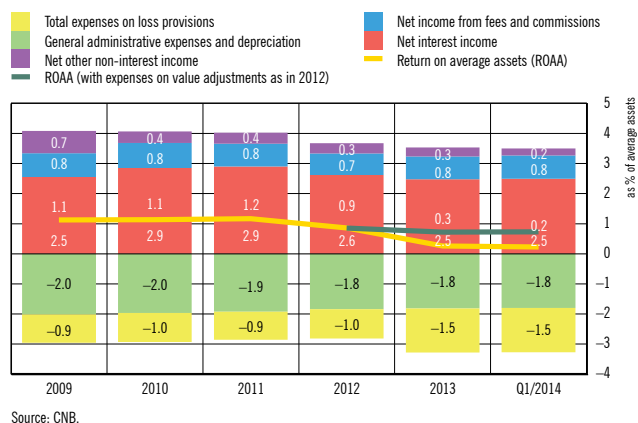
## Figure 84 Contribution of ROAE categories

Legend:
- Profit tax
- General administrative expenses and depreciation
- Net income from fees and commissions
- Return on average equity (ROAE)
- Total expenses on loss provisions
- Net other non-interest income
- Net interest income
- ROAE (with expenses on value adjustments as in 2012)



Source: CNB.
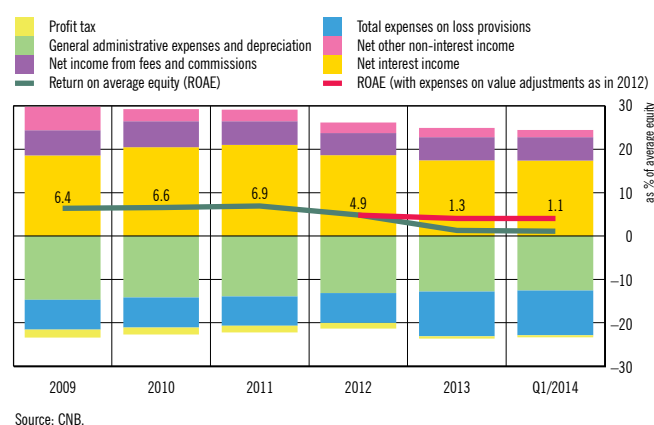
## Figure 85 Structure of total income

Legend:
- Other income
- Income from fees and commissions
- Income from interest on loans granted
- Income from trading activities
- Income from debt securities and deposits



Source: CNB.
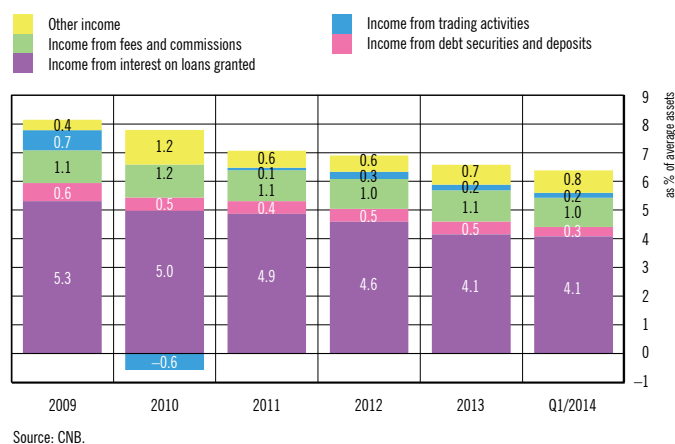
# Strategic risks[9]

An increase in loan loss provision expenses already at the end of 2013 reflected a new credit risk management policy induced by amendments to the Decision on the classification of placements and off-balance sheet liabilities of credit institutions, which provided additional incentives to the process of cleaning the loan portfolio, by strengthening their resilience to further credit risk materialisation. Banks thus recorded a drop in earnings at the end of last year, as they did in the late 90s, when they were also faced with the necessity to address the issues of non-performing loans. However, excluding the above effects of changes of the regulatory framework, the trend of decrease in banks' earnings is less pronounced (Figures 82, 83 and 84).

Primarily as a result of the growth in value adjustment costs, banks' net earnings decreased by about 73% in 2013 and continued to decrease in the first quarter of 2014. On the other hand, operating income decreased only mildly, but its downward trend is noticeable, and has lasted since 2011.

The years-long recession marked by an improved net financial position (see Box 2 and the Household sector and Corporate sector sections), that is, by deleveraging by a part of the private sector and growth in government liabilities affected the change of the banking sector's balance sheet structure, preserving their earnings in the short run. However, the increased orientation by banks to the government sector, which represents a less risky exposure from the regulatory standpoint (the application of a zero risk weight to the government), as well as from the economic standpoint (the ability of the units of central and local government to repay their liabilities and government-guaranteed loans) is the result of the current change in the structure of demand for loans, but in the long run it can have a negative impact on banks' ability to generate income. Nevertheless, to generate stable revenues over the mid-term (in particular with declining interest rates on sovereign debt) it will be necessary to reallocate a portion of the funds to corporations and households and at the same time rely more strongly on the credit quality evaluation which will, contrary to the current performance of the private sector as a whole, be guided by the differences in the direct business environment and creditworthiness of individual entities. Interest income would thus, with adequate risk assessment of newly-granted loans, be primarily supported by the growth that will be generated by the real sector, instead of lagging behind the recovery of aggregate demand.

Growth of less risky, but generally less income-generating positions in banks' balance sheets, together with a significant growth of assets generating no income, directly limit the banks' profit strength. As a result, banks' capacity to respond to changes in

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9 Income statement items up to March 2014 were annualised to be comparable with those for the preceding whole year periods. This was made by summing up banks' business results in the last three quarters of 2013 and the first quarter of 2014.

## Figure 86 Structure of income from fees and commissions

Income from fees for other banking services
Income from fees for payment operations services to other persons
Income from fees for payment operations services to corporates
Income from fees for payment operations services to households
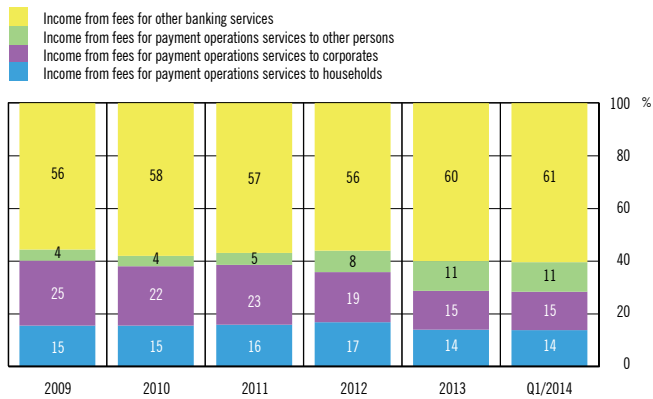


Source: CNB.

## Figure 87 Structure of total expenses

Other expenses
Expenses on fees and commissions
Total expenses on loss provisions
General administrative expenses and depreciation
Interest expenses on loans and deposits received from residents
Interest expenses on loans and deposits received from non-residents
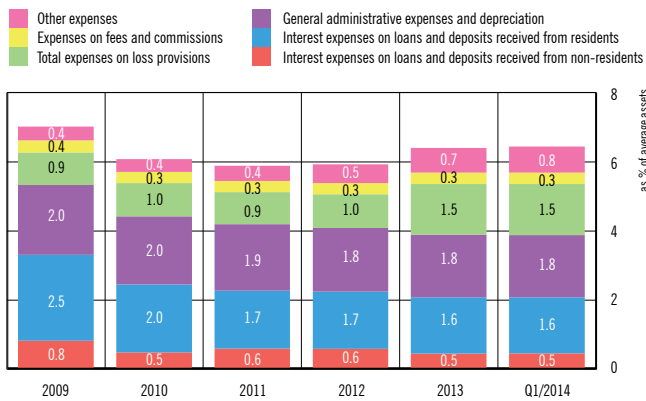


Source: CNB.

## Figure 88 Growth of placement to the government in selected countries

Bulgaria
Lithuania
Czech R.
Hungary
Croatia
Poland
Latvia
Romania – right
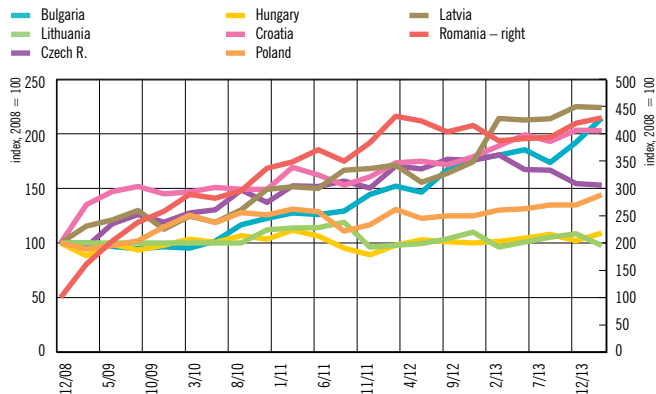


Source: ECB.

## Figure 89 Change in bank profitability in various segments of financing in the period of crisis

Implicit lending interest rate (1)
Implicit deposit interest rate (2)
Share in the loan portfolio – right
Charges for value adjustments (3)
Spread after charges for value adjustments (1-2-3)
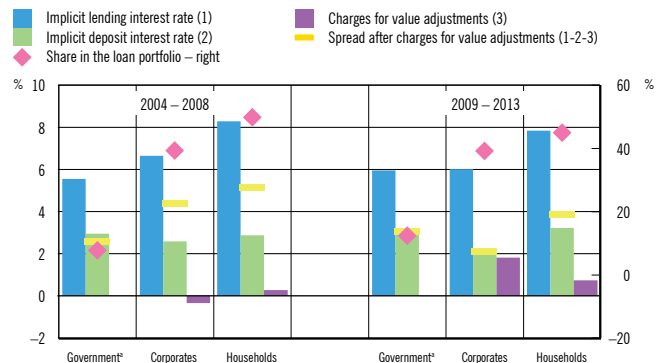


a Includes loans and debt securities for the central government, local government and social security funds.
Source: CNB.

## Figure 90 International comparison of raw and modified data on return on assets (ROA)

Eurozone – ROA
Croatia – ROA
CEE – ROA+TIV
CEE – ROA
Eurozone – ROA+TIV
Croatia – ROA+TIV
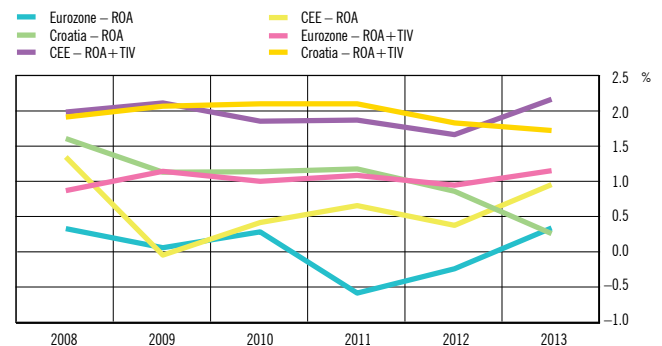


Note: ROA is modified by adding charges for value adjustments in order to estimate the operational efficiency of banks.
For a group of countries, indicators are calculated as simple averages.
Source: ECB.

## Figure 91 Selected interest rates (quarterly average of monthly interest rates)

Total short-term loans
Time kuna deposits
Total long-term loans
Time f/c deposits
EURIBOR + EMBI
6-month ZIBOR
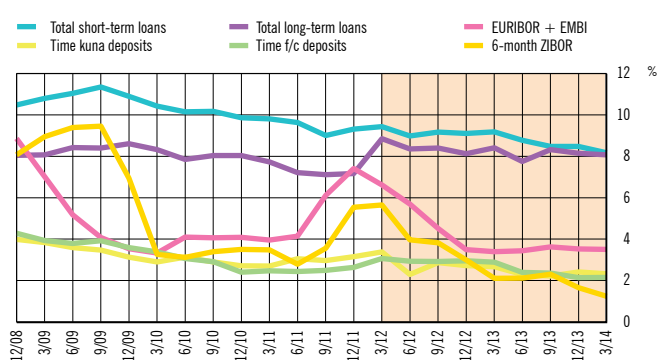


Note: Methodological break in bank interest rates series after January 2012.
Source: CNB.

## Figure 92 Interest rate spread (quarterly average of monthly interest rates on newly-granted loans) and annual net interest income

Legend:
- Annual net interest income – right
- Interest rate spread (excl. personal overdrafts)
- Adjusted annual net interest income – right
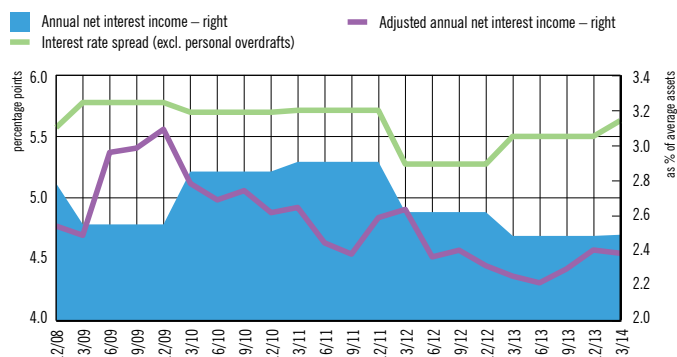
Note: Net interest income of banks has been adjusted by income from trading activities and exchange rate differences.
Source: CNB.

## Figure 93 Share of short-term loans in total newly-granted loans (quarterly average)

Legend:
- Total loans
- Corporate loans
- Household loans
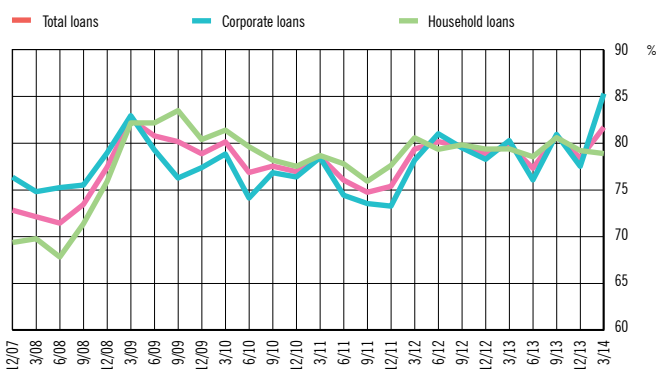
Source: CNB.

## Figure 94 Ratio of non-performing loans to total loans

Legend:
- Total loans to the private sector
- Housing loans
- Car loans
- Other household loans
- Corporate loans
- Mortgage loans
- Credit card loans
- Total loans
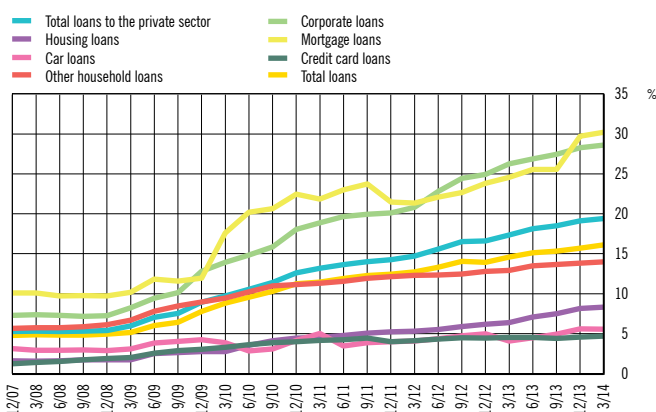
Source: CNB.

the market depends considerably on liquid assets which have lately been mostly financed by the growth of domestic deposits, or revenue from paid loans. Another reason for a decline in banks' interest income refers directly to the household segment, the result of the Consumer Credit Act having lowered the interest rates (Figures 85 and 86).

On the other hand, a specific strategic risk in the forthcoming period for banks lies in potentially unfavourable movements in expenditure which are not under the impact of their internal policies. This primarily refers to costs related to the European asset quality assessment, EBA's change in placement classification and regulations related to value adjustment costs which are now automatic, to a considerable extent, or administrative costs which are directly related to the distribution network structure (Figure 87). In addition, costs of secondary sources can in the short run significantly vary and jeopardise banks' operational cost-to-income ratio. Total banks' interest expenses also depend on factors in international financial markets and are only partially under the influence of banks, in particular in the short run (see Box 3 Model of net operating income of credit institutions).

The above mentioned orientation of the banks to lending to the domestic government as an institutional sector with high demand for loans is not specific to Croatia, but it is actually a typical recessionary behavioural pattern of banks in CEE countries (Figure 88). In Croatia, the orientation to the government as a client was thus the result of weak demand for loans by other sectors. However, regulatory treatment of such placements was used in part as a technique of reducing asset risk weights, although since 2013 risk weights applicable to exposure to the government were used within the framework of credit institutions' internal capital adequacy assessment procedures.

A comparison of the actual implicit net interest income by sectors suggests that, at the time of crisis, the government as a client came close to the household sector in terms of profitability. Thus profitability of lending to the private sector decreased mostly in the segment of corporate lending, and then by a lower intensity in the segment of household lending (Figure 89). However, the corporate sector can again significantly contribute to a higher and more stable interest income of banks, but only with a proper risk assessment, which was obviously missing in the pre-crisis period, while it is now affected by pessimism concerning future economic movements.

Steady growth of the share of the income-generating and, in terms of perception, non-risky sector of the government in the loan portfolio helped the banking sector in achieving stable operating profitability. International comparison of profitability of assets and operating efficiency ratio suggests that Croatia is only slightly above the average for CEE countries by operating efficiency. Also, it is obvious that Croatia achieved higher assets profitability since 2010 (after value adjustment), as compared to other CEE countries, thanks to lower value adjustment costs, which changed by the end of 2013 (Figure 90).

Figure 95 Ratio of non-performing loans to total loans by loan categories and the currency of indexation

Legend:
- Total loans – Swiss franc
- Housing loans – Swiss franc
- Total loans – euro
- Housing loans – euro



Source: CNB.
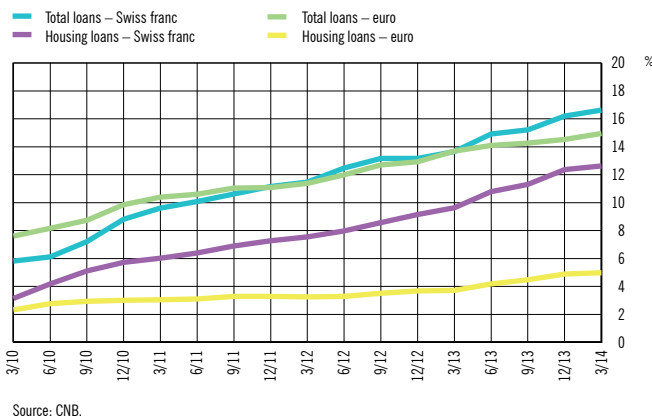
Figure 96 Coverage of total placements and contingent liabilities by value adjustments

Legend:
- Total non-performing loans
- Non-performing household loans
- Total placements and contingent liabilities – right
- Non-performing corporate loans
- Non-performing housing loans



Source: CNB.
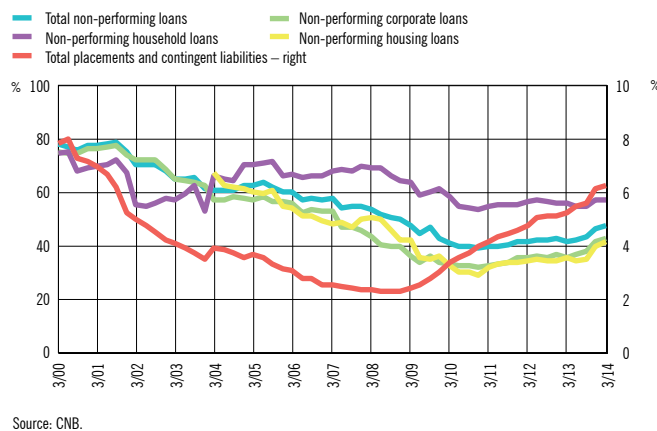
Figure 97 Capital adequacy ratios

Legend:
- Own funds to total risk exposure (CAR)
- Original own funds to total risk exposure
- Capital-to-assets ratio
- Non-performing loans (net) to bank capital – right
- Average credit risk weight – right



Source: CNB.
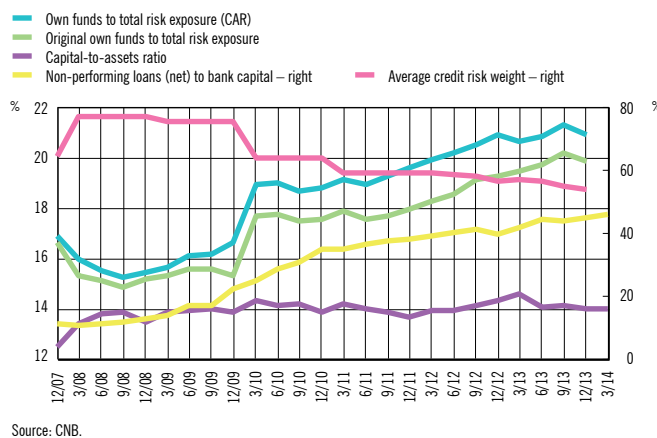
Figure 98 Distribution of insolvency risk

Legend:
- Z-score – 25th percentile
- Z-score – 75th percentile
- Z-score – median
- Weighted Z-score



Source: CNB.
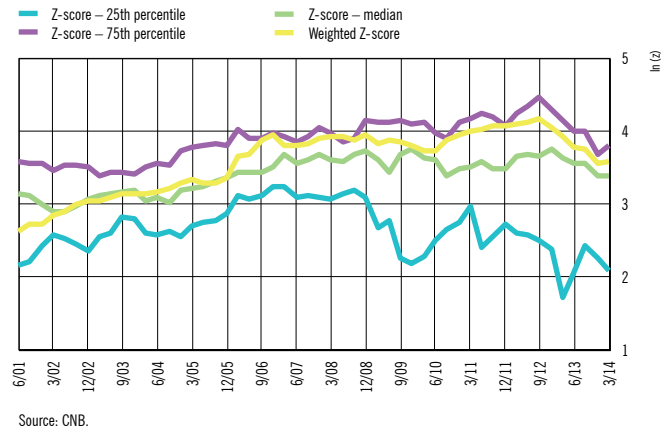
Under the impact of low deposit interest rate expenses and the growth in the share of short-term loans, the interest margin of banks grew moderately (Figures 91, 92 and 93). At the same time, lower interest rates have not led to stronger lending since low demand is caused by weak economic activity, relatively high debt and risk aversion both by clients and the banks themselves. Sustainable strengthening of the profitability of financial intermediation primarily requires economic recovery and the accompanying change of business models of banks, in addition to proper cleaning up of the banks' balance sheets, or the strengthening of capital, which will contribute to making the banks ready for the above mentioned exogenous factors of an increase in earnings.

# Credit risk and capital adequacy

In the six-year period of decline in economic activity, the non-performing loans ratio continued to grow, so that by the end of March 2014, their aggregate share reached 16.1% (19.4% for the private sector). Had some non-performing loans not been sold (mostly by one foreign bank) the aggregate share of non-performing loans would be slightly below 18%.

Although the corporate sector was still the major contributor to the growth of total non-performing loans, the contribution from households has risen significantly, indicating the link between the household sector and the performance of corporations in which this sector is employed, which is difficult to avoid during prolonged and stronger crises, in particular because of the excessive lending in the expansionary phase.[10] As the corporate sector was the first to feel the beginning of the crisis, it is possible that the share of non-performing loans in this sector, which at the end of March 2014 was slightly below 29%, is approaching its peak, although models used for stress

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10 Box 4 Financial cycles and countercyclical capital buffer calibration.

testing indicate a further growth of the share of non-performing loans.[11] At the same time, household non-performing loans are increasing primarily as a result of a growth in non-performing housing loans which react to macroeconomic movements with a certain inertia (Figure 95).

The ongoing deterioration of loans and the increase in value adjustment costs in the short run represent a considerable burden on banks' earnings. However, the growth in the coverage of non-performing loans leads to the weakening of effects of potential shocks, protects capital and eventually stimulates a faster resolution of the issue of non-performing loans. Somewhat slower growth of the aggregate share of non-performing loans at the beginning of 2014 is the result of a number of factors: the growth of the share of non-performing housing loans indexed to the Swiss franc slowed down considerably, non-performing loans to the construction sector declined for the first time since the beginning of the crisis, and more than half of the banks recorded a decrease in the share of non-performing loans at the beginning of 2014.

The maintenance of banks' loss-absorption capacities in an ongoing recession is one of the primary tasks of the CNB's co-ordinated microprudential and macroprudential policy in this year. The CNB carries out the above process through supervisory tools by which it has made risk weighing criteria for real estate stricter and sped up provisioning for non-performing loans, that is, by activating the structural systemic risk buffer[12] at the end of May by 1.5% for banks of smaller volume and complexity of operations, and by 3% for systemically important banks, by which it has raised regulatory capital requirements effectively above 13%. Amendments to the Credit Institutions Act from the beginning of the year, transposing CRD IV, have thus only briefly reduced the regulatory capital ratio to 10.5%. Also, in relation to capital adequacy, under the effect of the new rules on classification of placements, a rise in the burden on capital by unadjusted value of non-performing loans was almost halted (Figure 97).

As the banking sector still maintains significant capital above regulatory minimum, these amendments do not represent regulatory pressure. The growth of maintained capital adequacy of banks after the beginning of the crisis was entirely stimulated by the growth of the share of assets subject to a zero risk weight, while the ratio of capital and the unweighted assets stayed at about 14%.

The above measures should have a compensating effect on the rise of insolvency risk which due to a decline in aggregate earnings over the past year has shown a systemic character and at the same time burdens the balance sheets of larger banks (Figure 98).

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11 See projections of non-performing loans and banking system stress testing results.

12 Box 1 Introducing a structural systemic risk buffer.

## Box 3 Model of net operating income of credit institutions

The modelling of net income of credit institutions is an important tool used in the assessment of their resilience. Without projections of earnings, it is not possible to forecast with precision the future capital adequacy ratio of credit institutions or any possible need of these institutions for additional capital. In addition, the projections of credit institutions' earnings may help in the design of macro-prudential policy measures and the determination of their intensity as well as in the optimal timing for their introduction in conjunction with a simulation of their effects.

Previously used models of bank earnings were developed for all credit institutions jointly, without taking into account the differences in their business models. In addition, after several years of crisis, the need has arisen for a reestimation of parameters. And finally, previous models did not enable the introduction of additional shocks such as liquidity shocks and sovereign valuation haircuts. As a result, it was necessary to develop a new, diversified model, which should, in addition to satisfying the condition of being integrated in a stress test model, give better estimates of future earnings and at the same time provide a better picture of the earnings determinants coming from bank lending and bank deposit rates (Figure 1).

The model developed was the result of the aggregation of four separate models arising from net operating income of credit institutions broken down into the following segments: interest income, interest expense, net non-interest income and general administrative expenses and depreciation.[1] All elements of banks' earnings are expressed and modelled in terms of their ratios to assets. These models were developed for three groups of credit institutions in accordance with their business model.[2] Regression analysis was used in modelling based on panel data by individual institutions. In view of the purpose of the model (projection of earnings for the purpose of more precise stress testing), independent variables with a lag of four quarters were used, thus eliminating seasonality.[3]

### Modelling net interest margin

Interest expenses and interest income of credit institutions were modelled based on the modelling of the implicit deposit and lending rates,

Figure 1 Relationship between credit institutions' earnings and resilience analysis
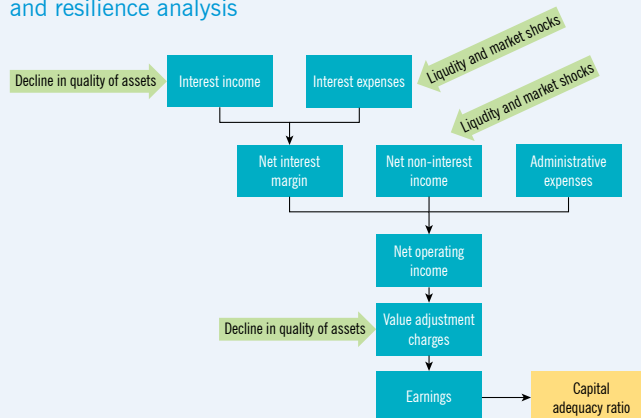


Source: CNB.

i.e. interest expenses (income) to assets of credit institutions ratio.[4] Net interest margin is defined as the difference between the implicit lending and the deposit rate. A separate regression analysis was made for each group of credit institutions, but since there are differences between institutions belonging to the same groups that the model cannot account for, and which do not vary through time, leading to different evolutionary paths in implicit rates, fixed effects were used for institutions, providing additional information on the behaviour of each individual institution.

The model of the implicit deposit interest rate of credit institutions has been set up in the following manner:

$$imdr_{bq} = \alpha + \beta \cdot ir_q(-4) + \gamma \cdot for_q(-4) + \delta \cdot growth_q(-4) +$$
$$+ \theta \cdot share_{bq}(-4) + \vartheta_b + \varepsilon_{bq}$$

where: $b$ – the bank, $q$ – the quarter, $imdr$ – the implicit deposit rate, $ir$ – nominal interest rate on newly-received foreign currency deposits, $for$ – the share of foreign liabilities in total liabilities of all credit institutions, $growth$ – asset growth of all credit institutions, and $share$ – the share of liquid assets in total assets. The share of liquid assets was the only institution-specific variable.[5]

Not surprisingly, the growth in referent deposit rates on the market (shown by nominal interest rates on newly-received foreign currency deposits) is transposed into a higher interest expense in the future period. Although newly-received deposits account for a relatively small share of total liabilities (approximately 1%), their price is a good indicator of current developments in the deposit market.[6] A negative sign

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1 Further in the text, general administrative expenses and depreciation are referred to as administrative expenses.

2 Independent models were estimated for small banks, housing savings banks and large banks.

3 To ensure that parameters are as reliable as possible for the existing credit institutions, the following steps were taken: First and foremost, the analysis included only those banks that are present today. Also, all dependent and independent variables with observed outliers were winsorised to 1%. Unit root tests were made for all dependent variables and the correlation of independent variables was checked. And finally, given that ratios are modelled in the survey, a logarithmic transformation of dependent variables was used.

4 The approach to decomposing bank earnings was also suggested by: Andersen, H., S. Berg, and E. Jansen (2010): *The macrodynamics of operating income in the Norwegian banking sector.* The authors also use a lag of four quarters for independent variables and interest rates for modelling bank margins.

5 Even though the results vary greatly in terms of samples, when modelling net interest margin most authors use a similar set of variables: volatility of benchmark rates, share of loans in assets, share of liquid assets, GDP growth, loan quality, etc.

6 The volatility of benchmark rates was used in earlier models which resulted in a fall in net interest margin of banks, which is in line with findings presented here.

of the share of foreign financing is generally a sign of more favourable and more flexible bank financing from non-residents over the observed period.[7] Consequently, a higher share of foreign financing reduces the implicit deposit rate, the effects of which are later transferred to bank clients in the form of cheaper financing. A lower funding cost of credit institutions can also be due to a fall in the assets of the entire sector, given that in situations of a falling degree of financial intermediation, the banks reduce deposit interest rates due to lack of demand for their loans. And finally, the share of liquid[8] assets in total assets of a credit institution reduces the funding cost as it ensures more manoeuvring room in sources management and also enables the use of collateral for cheaper borrowing (Table 1 and Figure 2).

#### Table 1 Results of the model for the implicit deposit rate

| Independent variable | Coefficient |
| --- | --- |
| NIR foreign currency deposits (–4) | 0.1475*** |
| Share of foreign financing (–4) | –0.0038** |
| Growth in sector assets (–4) | 0.0037*** |
| Share of liquid assets (–4) | –0.0024*** |
| Constant | –4.2461*** |
| R² | 0.73 |

Significance: * p<.1, ** p<.05 and *** p<.01
Source: CNB calculations.

#### Figure 2 Contributions to the change in the (log) value of the implicit deposit rate



Note: Contributions are calculated on the basis of the change in independent variables for one standard deviation.
Source: CNB calculations.

The model of the implicit lending interest rate of credit institutions has been set up in the following manner:

$$imlr_{bq} = \alpha + \beta \cdot gdp_q(-4) + \gamma \cdot imdr_{bq}(-4) + \delta \, lass_{bq}(-4) + $$
$$+ \theta \cdot nplr_{bq}(-4) + \vartheta_b + \varepsilon_{bq}$$

where: $imlr$ – implicit lending interest rate, $gdp$ – annual growth of real GDP in a quarter, $imdr$ – implicit deposit interest rate, $lass$ – loans to assets ratio, and $nplr$ – the share of non-performing loans in total loans of a credit institution. The loan to assets ratios and the share of non-performing loans are credit institution-specific variables while other variables are equal for all credit institutions as they describe the macro environment essential for operating activities.

The results of the estimated model show that GDP growth leads to growth in the implicit lending interest rate, which is not surprising given that in favourable periods, credit institutions generate bigger interest income as a result of a rising share of more expensive loans for financing consumption, such as car purchase loans. The estimated relationship between the implicit lending and deposit interest rates is also positive, reflecting the efforts of banks to manage their net interest margin and the fact that a large number of loans have so far been implicitly associated with funding costs. Clearly, a higher loan to assets ratio also makes a positive contribution to the implicit lending interest rate as credit institutions generate higher income per total assets by employing higher proportions of assets. The remaining assets of credit institutions are invested in safer but less profitable forms of assets such as liquid assets, debt securities and other assets.[9] And finally, a higher share of the existing non-performing loans of a credit institution leads to lower future interest income, since non-performing loans do not generate the contractual income (Table 2 and Figure 3).

#### Table 2 Results of the model for the implicit lending rate

| Independent variable | Coefficient |
| --- | --- |
| GDP growth (–4) | 0.0168*** |
| Implicit deposit rate (–4) | 0.0763*** |
| Loans to assets ratio (–4) | 0.0027*** |
| Share of NPL (-4) | –0.0044*** |
| Constant | –2.9795*** |
| R² | 0.66 |

Significance: * p<.1, ** p<.5 and *** p<.01
Source: CNB calculations.

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7 Schweiger, M. S., and D. Liebeg (2006): *Determinants of Bank Interest Margins in Central and Eastern Europe*, Financial Stability Report 12, OeNB. Higher share of foreign financing in earlier models resulted in a lower net interest margin of banks, which is in line with findings presented here.

8 Liquid assets are the sum of money assets, deposits with the central bank, deposits with other credit institutions and T-bills of the Ministry of Finance which meets the definition of highest quality assets under LCR.

9 This leads to a trade-off between safety and profitability, as credit institutions should on the one hand have sufficient liquidity to keep funding costs low and on the other employed assets sufficiently to generate income. By relaxing its measures and allowing banks to reduce reserves and increase the amount of employed assets, the regulator may boost interest income or earnings of banks. This was exactly the situation in Croatia following the outbreak of the financial crisis when such measures were taken to make it easier for the banks to cope with the effects of prolonged recession.

## Figure 3 Contributions to the change in the (log) value of the implicit lending rate
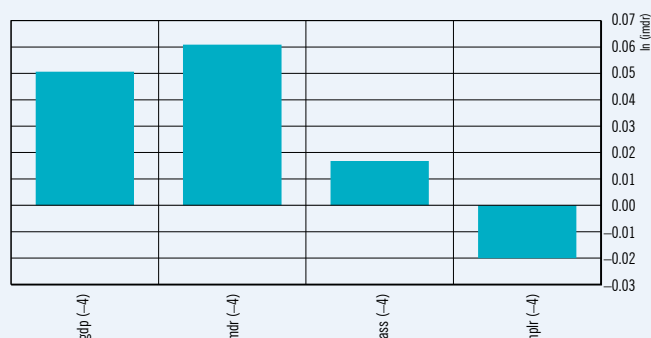


Note: Contributions are calculated on the basis of the change in independent variables for one standard deviation.
Source: CNB calculations.

The comparison between the actual and estimated values of the components of net interest margin in the 2002-2013 period shows that the differences between the two amounts come to approximately 0.3% of the sector's assets, which is an improvement over the previous models. Also, the coefficients of correlation between the actual and model-estimated lending and deposit interest rates stand at 0.7 and 0.8, respectively. Figure 4 shows a relatively good fit for the long-term trends.

### Modelling non-interest income and administrative expenses

Precise modelling of non-interest income and administrative expenses is relatively complicated as they depend on short-term decisions of the bank's management board, possible extraordinary events (such as sale of assets, investment in new operating units, etc.) and changes in the structure of products (for instance, higher income from investment banking, changes in fee collection policy, etc.) However, the level of this income and these expenses tends to be relatively stable over time.

In net non-interest income and operating expenses modelling, a panel regression analysis with an autoregressive component was used to take account of the empirical fact that these elements of credit institutions' earnings were similar to those in the previous period.

The net non-interest income model was set up in the following manner:

$$nnii_{bq} = \alpha + \beta \cdot nnii_{bq}(-1) + \gamma \cdot nim_{bq}(-4) + \delta \cdot asgdp_{bq}(-4) + \varepsilon_{bq} \, ,$$

where: $nnii$ – net non-interest income, $nim$ – net interest margin, and $asgdp$ – sector's assets in relation to nominal GDP.

As expected, the autoregressive component made the biggest contribution in this model. In addition, net interest income of large banks makes a positive, though economically small contribution. And finally, the degree of financial intermediation, shown by the assets of credit institutions to GDP ratio, mostly has the expected positive impact, though small in economic terms for non-interest income of banks (Table 3 and Figure 4).

## Table 3 Results of the model for net non-interest income

| Independent variable | Coefficient |
| --- | --- |
| Net non-interest income (–1) | 0.6778*** |
| Net interest income (–4) | 0.0062* |
| Sector assets/GDP (–4) | 0.0000*** |
| Constant | 0.0062*** |
| R² | 0.53 |

Significance: * p<.1, ** p<.05 and *** p<.01
Source: CNB calculations.

## Figure 4 Comparison of the outturn and model estimates of net interest margin components, as % of assets
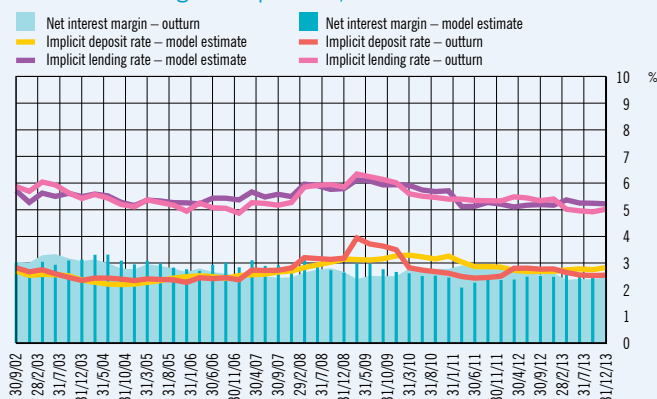


Source: CNB calculations.

As in the case of net non-interest income, administrative expenses were modelled using a regression analysis with an autoregressive component. The model of administrative expenses was set up in the following manner:

$$ad_{bq} = \alpha + \beta \cdot ad_{bq}(-1) + \gamma \cdot imdr_{bq}(-4) + \delta \cdot ms_{bq}(-4) + \varepsilon_{bq} \, ,$$

where: $ad$ – administrative expenses, $imdr$ – implicit deposit interest rate, and $ms$ – market share of a credit institution.

Unsurprisingly, the autoregressive component again made the biggest contribution, pointing to the relative stability of this type of income.

## Table 4 Results of the model for operating expenses

| Independent variable | Coefficient |
| --- | --- |
| Operating expenses (–1) | 16.1292*** |
| Market share (–4) | –0.0145*** |
| Implicit deposit rate (–4) | 3.6328*** |
| Constant | –4.1240*** |
| R² | 0.72 |

Significance: * p<.1, ** p<.05 and *** p<.01
Source: CNB calculations.

Figure 5 Comparison of the outturn and model estimates of
net non-interest income and operating expenses, as % of assets

Source: CNB calculations.



Figure 6 Comparison of the outturn and model estimates of
net operating income of credit institutions, as % of assets

Source: CNB calculations.
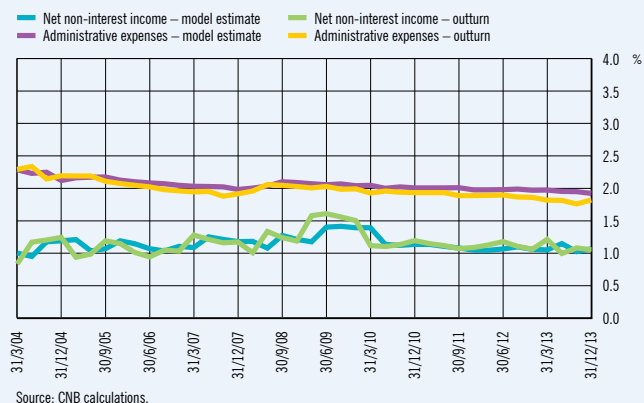
The inverse relationship between operating expenses and market share was significant, which is the result of the economy of scale, which has been confirmed both theoretically and empirically in the case of administrative expenses in banking. And finally, the relationship between the implicit deposit interest rate and administrative expenses was positive (Table 4).

The comparison between the actual and estimated values of net non-interest income and administrative expenses shows that model estimates are close to the actual values. The correlation coefficient between the actual non-interest income and those obtained from the model stood at 0.6 and that of operating expenses at 0.7. Also, the difference between the actual and estimated values stood on average at approximately 0.1% of the sector's assets, for both components of banks' earnings, which is acceptable for earnings modelling (Figure 5).

In conclusion, model estimates of the components of net operating income of credit institutions exhibit satisfactory prediction power. Somewhat larger model errors were observed in the 2010 to 2012 period when the fall in net operating income of credit institutions was much slower in reality than projected under the model (Figure 6). However, with an average deviation of model values relative to the actual values of net operating income of credit institutions of 0.3%, the model is much better at predicting developments in bank earnings than the previously used models, while the model errors shown are in line those in similar empirical surveys.

## Figure 99 Balance sheet buffers to amortise shocks and the CAR corrected by the fall in the coverage of non-performing loans

- Value adjustment charges to net income ratio
- Value adjustment charges to own funds ratio
- Corrected CAR – right
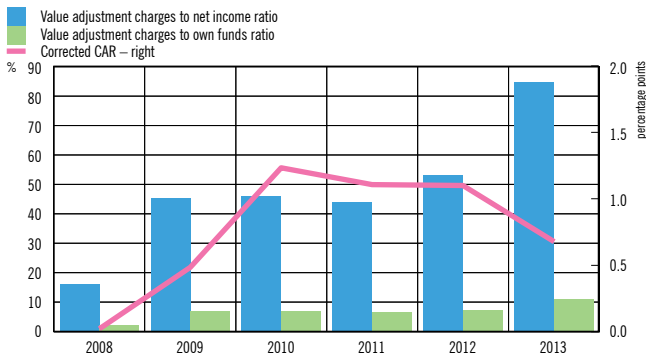


Note: The correction of banks' CAR for the fall in the coverage is made in relation to the coverage level of 50%, which is an average for the 2004–2013 period.
Source: CNB.

## Figure 100 The share of bank assets selected by potential risk indicators

- Growth of credit quality in the period of eroded earnings
- NPLR below the average with the relatively low coverage level
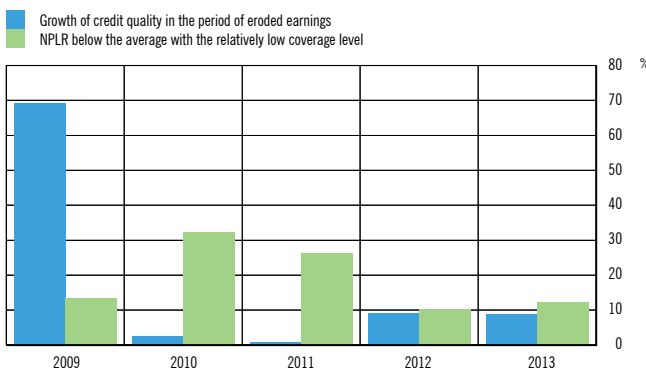


Source: CNB.

## Figure 101 Distribution of NPLR

- Average
- Standard deviation – right
- Median
- Weighted total NPLR
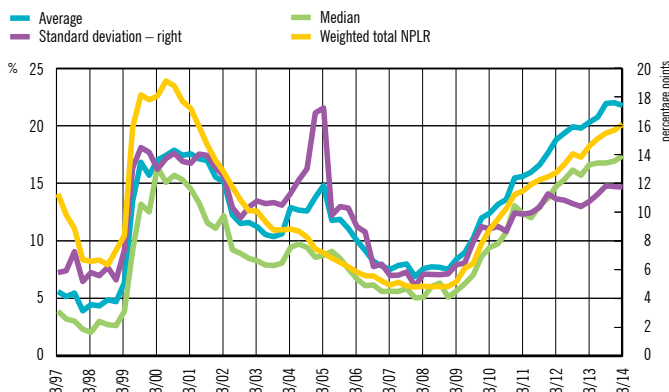


Source: CNB.

# Banking sector resilience[13]

The growth in value adjustment costs in 2013, which was the result of the implementation of the European assets quality review and pending international stress testing of the financial system as well as the amended regulation on placement classification, momentarily burdened current earnings, but it nevertheless protected the capital from shocks that might threaten from the existing credit portfolio, whose expansion was considerably limited, which by itself reduced any potential positive effects of the dilution of non-performing placements. Thanks to the growth of the coverage of non-performing loans (at the end of March, this indicator was 47%, by which it approached its ten-year average) the risk of additional losses on existing non-performing placements was reduced due to insufficient provisions as compared to earlier testing when a lower coverage relativised the results. However, banks still incur losses through high value adjustment costs, which in 2013 reached almost 85% of net operating income and accounted for about 10% of own funds (Figure 99).

The assets share of banks that are selected by potential risk indicators remained stable. This share, following the acute stage of the crisis, decreased considerably. The share of sector assets concentrated in banks which in the period of income erosion estimated growth in credit quality or had a relatively weak coverage with a parallel below-average level of non-performing loans has been retained at around 10%, the amount it came to at the end of 2012 (Figure 100).

At the same time, the aggregate share of non-performing loans continues to grow, even if only at a slow pace. After the growth in value adjustment costs during 2013, at the beginning of 2014, almost half of the banks recorded a decline in the share of non-performing loans, which decreased the average share of non-performing loans (Figure 101). Additionally, the corporate sector's contribution to the share of non-performing loans has decreased over the past two years, while the construction sector (with a 30% share in non-performing corporate loans) recorded a decline in the share of non-performing loans at the beginning of 2014. Also, the Consumer Credit Act has already made the position of debtors with loans indexed to the Swiss franc easier, as manifested in the halting of the growth of the share of non-performing loans indexed to the Swiss franc (Figure 95).

The conducted stress testing exercise for the banking sector from 2014 to 2015 indicates that the banks' buffers created in the previous period continue to be sufficient at an aggregated

13 Stress testing was conducted on the basis of banks' data and capital adequacy regulations valid as at 31 December 2013. The same regulation will not be applicable at the end of 2014 and 2015, and for this reason, the projected capital adequacy ratio at the end of the observed period, as well as any capital adequacy reference thresholds (8%, 10% and 12%) are only for information purposes, so that the regulator's reaction cannot be read from them. A more detailed overview of the new regulation is presented in Box 4 Financial cycles and countercyclical capital buffer calibration, and in Box 5 Monitoring systemic risk and designing macroprudential policy, *Financial Stability*, No. 12, February 2014.

## Figure 102 Projections of macroeconomic variables under various scenarios

Legend:
- Actual annual real GDP growth
- Annual real GDP growth under the shock scenario
- Annual change in the euro exchange rate – right
- Annual change in the euro exchange rate under the baseline scenario – right
- Annual change in the euro exchange rate under the shock scenario – right
- Weighted exchange rate change under the baseline scenario – right
- Weighted exchange rate change under the shock scenario – right
- Annual real GDP growth under the baseline scenario
- Weighted exchange rate change – right

Source: CNB.

## Figure 103 Projections of NPLR under various scenarios

Legend:
- Actual NPLR – aggregate
- NPLR under the shock scenario – aggregate
- NPLR under the baseline scenario – aggregate
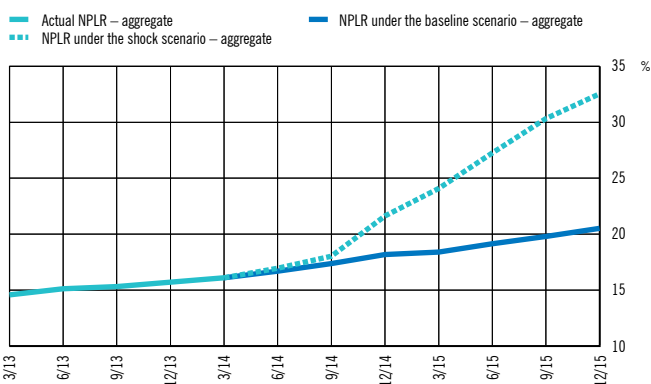
Source: CNB.

level in the case of highly unlikely but plausible unfavourable macroeconomic shocks (Figures 107, 108 and Table 6).[14] A stress test was conducted in two scenarios. The most probable, baseline scenario, includes the cessation of negative trends in economic activity, but still without any very significant economic growth, with real GDP in 2014 decreasing by 0.2% and the kuna/euro exchange rate remaining relatively stable.[15]

Somewhat more favourable trends in the baseline scenario are expected for 2015 when real GDP would grow by 0.4% and the exchange rate would remain stable. 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 1.8% in 2014 and 3.4% in 2015.[16] In such a scenario an exacerbation of recession in the eurozone and a deterioration in bank financing conditions is assumed, as well as a one-off depreciation of the kuna by 10% at the end of 2014, in which the euro/Swiss franc ratio would be like that in the baseline scenario (Figure 102).

As a result, in the baseline scenario the share of non-performing loans in total loans could rise from 16.1% at the end of March 2014 to approximately 18% and 20.5% at end-2014 and end-2015, respectively. In the shock scenario there would be a much stronger rise in the share of non-performing loans, which would be about 22% and 33% (Figure 103). The share of non-performing corporate loans in March 2014 stood at 28.6%; under the baseline scenario it would rise to around 33% and 38% at end-2014 and end-2015, respectively, and under the shock scenario to around 39.5% and 63% in the same period. Households would record considerably slower changes in the share of non-performing loans, with the share of non-performing consumer loans which stood at 13.9% at the end of March 2014 reaching at end-2014 and end-2015 around 15.5% and 17% under the baseline scenario, respectively, or around 16.5% and 21% under the shock scenario, while the share of non-performing housing loans, so far relatively low (8.3% at the end of March 2014), would grow moderately to around 9% and 9.5% under the baseline and around 12.5% and 17% under the shock scenario (Figures 104 and 105). However, in reality, the share of non-performing housing loans could be lower, as model estimates do not take into consideration the interest rates, which decreased significantly for debtors with housing loans indexed to the Swiss franc, under the Consumer Credit Act.

By the end of 2015, the changes in the legislative framework in the segment of classification of placements and interest rate regulations should cut earnings by around 1.4 percentage points in the capital adequacy ratio. 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 only provisionally to be so, because banks would be investing it in their own resilience, that is, in the development of capital buffers. On the other hand, changes related to consumer lending do not strengthen banks' capital directly, leading in the short run to a growth in costs. Nevertheless, in the long run, these changes alleviate the burden of the repayment of loans, which has a positive impact on their quality (Figure 95).

Following the continued negative trend (ongoing since 2011) in 2014, net income of banks under the baseline scenario would

## Figure 104 Projections of non-performing loans to corporates and other loans under various scenarios

- Actual NPLR – corporates
- NPLR under the shock scenario – corporates
- NPLR under the baseline scenario – other loans – right
- NPLR under the baseline scenario – corporates
- Actual NPLR – other loans – right
- NPLR under the shock scenario – other loans – right

%  80
70
60
50
40
30
20

4  %
3
2
1
0

3/13  6/13  9/13  12/13  3/14  6/14  9/14  12/14  3/15  6/15  9/15  12/15

Source: CNB.

## Figure 107 Breakdown of banks and their assets by CAR under the baseline scenario

- Share of banking sector assets with CAR below 12%
- Share of banking sector assets with CAR below 10%
- Share of banking sector assets with CAR below 8%
- Number of banks with CAR below 12% – right

%  6
5
4
3
2
1
0

8
6
4
2
0
number of banks

31/12/2013     31/12/2014     31/12/2015

Source: CNB.

## Figure 105 Projections of non-performing housing and consumer loans under various scenarios

- Actual NPLR – housing loans
- NPLR under the shock scenario – housing loans
- NPLR under the baseline scenario – consumer loans
- NPLR under the baseline scenario – housing loans
- Actual NPLR – consumer loans
- NPLR under the shock scenario – consumer loans

25  %
20
15
10
5
0

3/13  6/13  9/13  12/13  3/14  6/14  9/14  12/14  3/15  6/15  9/15  12/15

Source: CNB.

## Figure 108 Breakdown of banks and their assets by CAR under the shock scenario

- Share of banking sector assets with CAR below 12%
- Share of banking sector assets with CAR below 10%
- Share of banking sector assets with CAR below 8%
- Number of banks with CAR below 12% – right

%  40
35
30
25
20
15
10
5
0

20
16
12
8
4
0
number of banks

31/12/2013     31/12/2014     31/12/2015

Source: CNB.

## Figure 106 Projection of bank net income

- Actual net operating income
- Shock scenario
- Baseline scenario

as % of assets
2.5
2.0
1.5
1.0
0.5
0.0

2008  2009  2010  2011  2012  2013  2014  2015

Source: CNB.

## Figure 109 Contribution of individual components to the change in CAR under various scenarios

baseline scenario ←          → shock scenario

in %/percentage points
25
20
15
10

22.5
−0.1
−1.8
−1.4
+4.6
21.0
+4.1
−1.4
−3.4
−5.2
15.2

| CAR 12/2015 | Direct impact of the exchange rate and CICR | Credit risk, CICR excluded | The impact of measures | Net income | CAR 12/2013 | Net income | The impact of measures | Credit risk, CICR excluded | Direct impact of the exchange rate and CICR | CAR 12/2015 |

Source: CNB.

Table 6 Dynamics of CAR under various scenarios

| | Baseline scenario | |
|---|---|---|
| | 31/12/2014 (p.p.) | 31/12/2015 (p.p.) |
| | 0.8 | 1.4 |
| Balance 31/12/2013 (%) | | |
| 21.0 | | |
| | Shock scenario | |
| | 31/12/2014 (p.p.) | 31/12/2015 (p.p.) |
| | –2.1 | –5.9 |

Source: CNB.

record a moderate fall in 2015 (of around 1%). Under the shock scenario, in 2015, net income of banks would record a fall of around 23%, affected by liquidity pressures, the rise in the price of funding sources and intensified process of loss of banks' earning power (Figure 106).[17] At the same time, banks' non-interest income as well as their administrative expenses would remain stable.

Assuming that all profit made is retained, the capital adequacy ratio in the sector would under the baseline scenario rise by 0.8 percentage points at end-2014, or 1.4 percentage points at end-2015, as compared to December 2013 (Figures 106, 107 and Table 6). The reason for a somewhat higher growth in the capital adequacy ratio, as compared to the previous testing, results from the fact that time horizon of stress testing is prolonged here so that the expected mid-term elements of economic recovery were used in the baseline scenario for the first time.

As compared to the baseline scenario, under the shock scenario, along with a lower projected net income, there will be additional growth in value adjustment costs of loans under the impact of a considerable decrease in GDP and a change in the exchange rate that activates currency-induced credit risk. Under such a scenario, the capital adequacy ratio of the banking sector would decrease by 2.1 percentage points in 2014, and by additional 3.8 percentage points in 2015, so that at end-2015 it would be by around 7.3 percentage points lower than under the baseline scenario, where a potential kuna depreciation appears to be the most important factor of capital adequacy decline, since besides activating credit risk, the depreciation of the kuna weakens capital adequacy autonomously because banks' capital is expressed in kuna, and assets are mainly expressed in euros (Figure 108).

Under this scenario, if no additional measures for strengthening capital adequacy are taken, by end-2015, nineteen banks that hold about 37% of the assets of the sector would have a capital adequacy ratio lower than 12%. Ten banks, which hold a little less than 5% of the assets of the sector, would have a capital adequacy ratio lower than 8% (Figure 107).[18]

17 See Box 3 Model of net operating income of credit institutions.

18 All of the above projections are based on the assumption that banks neither increase nor reduce capital in the period under review.

## Box 4 Financial cycles and countercyclical capital buffer calibration

As of 1 January 2015, the CNB will have at its disposal a new capital buffer instrument directed at mitigating the volatility of credit activities related to the accumulation of systemic risks – the countercyclical capital buffer. It is basically a variable regulatory capital requirement the amount of which will reflect any excessive growth of loans to the private sector. Although the Croatian economy is currently still in the contraction phase of the economic cycle and there is no need for activation of such an instrument in the short run, the new regulation[1], as of next year, foresees a constant monitoring of the cyclical component of the systemic risk and a regular (quarterly) publishing of the reference (calibrated) and legal (prescribed) rate of the countercyclical capital buffer which is set at the amount from 0% to 2.5% of the total risk exposure amount.

Imperfections which appear in financial markets such as (overly) optimistic lending (the so-called financial instability hypothesis), the disaster myopia characteristic of the economic upswing phase, herd behaviour, and even the pro-cyclicality of regulations itself, which tied provisioning policies in credit institutions to credit risk materialisation and not to its prevention, cause a suboptimal allocation of resources and contribute to the development of financial cycles. Financial cycles, such as those in the real estate, loans and stocks markets, are usually much longer than the real cycles and are mutually supported (e.g. the credit cycle and the real estate prices cycle[2]), while because of the importance of different financial market segments in the modern economy they have a significant impact on the real cycle. It is also important to emphasise that the longest recessions usually occur when the troughs of the economic and financial cycle overlap[3]. In addition, financial cycle peaks most frequently overlap with banking crises in which undercapitalisation of the system occurs and consequently the inability to support current and capital needs for the financing of clients, with strong effects of "contagion" and intensified risk perception of the country.

A relatively long history of financial market regulation abounds in interventions the aim of which is to reduce the above mentioned imperfections and dampen financial cycles. Regulators relied on different instruments and measures: market and administrative, formed ad-hoc, capital, liquidity, sectoral, etc.[4] Croatia is no exception. On the contrary, the CNB was active in using different measures to impose limits on credit growth and strengthen capitalisation and liquidity of credit

### Figure 1 Reference rate of the countercyclical capital buffer as the function of the financial cycle



$$CCB_{ref} = \begin{cases} 0 & \text{for } gap \leq L \\ \dfrac{gap - L}{H - L} \cdot CCB_{max} & \text{for } gap < gap < H \\ CCB_{max} & \text{for } gap \geq H \end{cases}$$
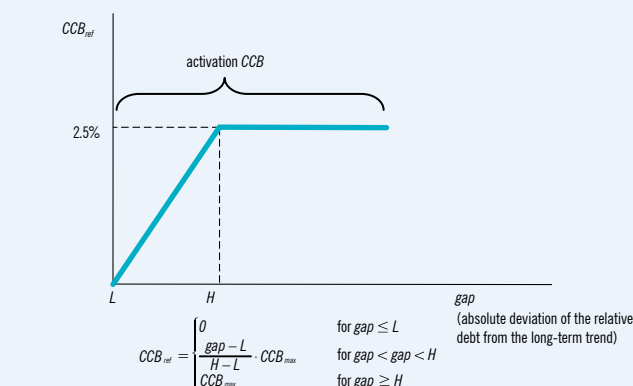
Source: CNB.

institutions[5] in the stage when the majority of players in domestic and international markets, as well as the general public, were influenced by short-term positive effects of the economic upswing, in particular in the conditions of cheap and available foreign capital, which definitely contributed to the accumulation of systemic risks and destabilisation of the financial system. However, the latest financial crisis, which had a global character and devastating consequences on income and business expectations, in addition to huge fiscal costs, not to mention a potential loss of production and the actual social costs of the crisis, raised the question of formalising instruments to target the above mentioned risks preventively. This meant legally to prescribe a predominantly automated action by regulators and credit institutions in the conditions of the accumulation of risks in the financial system.

Only a year after the beginning of the crisis a new regulatory framework (Basel III)[6] was set up, providing for the introduction of a countercyclical capital buffer as a linear function[7] of the aggregate financial cycle (Figure 1). It is approximated by the short-term volatility in the ratio of household loans and loans to non-financial corporations and GDP to avoid the unwanted penalisation of the structural process of financial deepening. Short-term fluctuations of the reference ratio (absolute deviation of relative debt from the long-term trend or simply put – the *gap*) are isolated by applying the Hodrick-Prescott method of detrending time series with a sufficiently large smoothing parameter to take into consideration also a relative length of the financial cycle. The breaching of the floor of reference ratio gap tolerance (*L*) is the signal for the activation of

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1 See the Credit Institutions Act, OG 159/2013, Articles 118 to 128.

2 Olivier Jeanne, O., and A. Korinek (2010): *Managing Credit Booms and Busts: A Pigouvian Taxation Approach*, Working Paper 16377, NBER.

3 Mechanisms of their mutual intensification and transferring of shocks through the system deepen economic crises significantly, in the short run even up to 50%. See: Drehman, M., C. Borio, and K. Tsatsaronis (2012): *Characterizing the financial cycle: don't lose sight of the medium term!*, BIS Working Papers, No. 380.

4 See, for example: Elliott, J. D., G. Feldberg, and A. Lehnert (2013): *The History of Cyclical Macroprudential Policy in the United States*, Finance and Economics Discussion Series, Federal Reserve Board, Washington, D.C.

5 To a large extent those were precisely the measures of macroprudential character, used to complement monetary policy's conventional measures.

6 It is transposed into domestic legislation by Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and the Credit Institutions Act, while ESRB guidelines are also binding (See: ESRB, 2014): *Recommendation of the European Systemic Risk Board of 18 June 2014 on guidance for setting countercyclical buffer rates*.

7 The time and modalities of releasing the capital requirement are the regulator's discretionary decision.

the instrument. This floor must be sufficiently low to enable the banks to accumulate additional capital buffers gradually. In contrast, the reference rate reaches the maximum value in the ceiling (*H*) which must be set so that the buffer is filled before the outbreak of a banking crisis[8]. In this case, the reference rate serves as a guideline to regulators for prescribing the legal, mandatory countercyclical capital buffer rate[9].

As this capital buffer accumulates in the expansive stage of the cycle, it automatically raises the cost of lending, in particular having in mind that capital is relatively more expensive than other sources of funding and can help dampen the amplitudes in the financial cycle. Also, reference and legal rates of the countercyclical buffer are public, which may act as a signal of riskiness that can also act in the same direction. Each credit institution calculates the specific countercyclical capital rate [CCB*spec*] which it applies, and which depends on the distribution of its exposure in individual countries (*Ei*), or on legal rates which are introduced in such countries:

$$CCB_{spec} = \sum\nolimits_{i=1}^{n} CCB_i \cdot (E_i / \sum\nolimits_{i=1}^{n} E_i)$$

**Countercyclical buffer calibration for the Croatian economy**

The approach to the designing of this instrument considered is the starting point for its calibration, which implies the selection of an optimal reference ratio gap and the floor of tolerance for the specific country. In this phase, national regulators must also take into consideration the factors that diminish the alignment of international cycles. The first step represents the dating of financial disturbances or banking crises against which predictive properties of individual indicators are assessed. Expert assessment of crises by central banks members of the ESCB is based on the identification of crisis episodes according to two criteria:

(i) shocks in the banking sector which are manifested in bankruptcies of significant banks, withdrawals of deposits, huge losses of the capital in the system (related to a non-performing loan ratio of over 20% or bankruptcy proceedings against institutions that hold more than one fifth of the system's assets) or a significant fiscal support in stress conditions;

(ii) assessment of the probability that the mentioned scenario would have materialised had there not been a certain response by the regulator or an external event which prevented it.

According to these criteria, a banking crisis in Croatia took place in the period from the first quarter of 1998 to the second quarter of 2000[10]. However, the above criteria are too strict for the Republic of Croatia because they do not allow for the identification of crisis episodes with

Figure 2 Indicators of the crisis episodes in the banking system in the last two decades



Sources: DAB and CNB.

8 BIS (2010): *Countercyclical capital buffer proposal – Consultative Document*; Drehman, M., C. Borio, L. Gambacorta, G. Jimenez, and C. Trucharte (2010): *Countercyclical capital buffers: exploring options*, BIS Working Paper, No. 317.

9 See the Decision on capital buffers and capital conservation measures (OG 8/2014) and Box 5 Schematic representation of procedures in the implementation of capital buffers, p. 59.

10 For dating of the banking crisis in other EU countries see: Behn, M., D. Carsten, T. A. Peltonen, and W. Schudel (2013): *Setting Countercyclical Capital Buffers based on Early Warning Models: Would it Work?*, ECB Working Paper Series, No. 1604.

milder symptoms, but which are important from the standpoint of the materialisation of accumulated cyclical risks, which is important for the countercyclical buffer calibration. Such an episode can be determined by analysing the dynamics of the recent bankruptcies in the banking system and the decline in aggregate earnings of banks for several consecutive quarters, both of which are linked to the credit cycle and the patterns of increasing risks typical for such processes (Figure 2). Accordingly, the vulnerable period for a part of the domestic banking system followed after the beginning of contraction in real activity and can be dated back to the third quarter of 2011.

To determine the projection horizon, or the dependent variable, the standardized approach was used which recognises the signal of a disturbance in the period from 20 to 3 quarters prior to the occurrence of a crisis episode (signal = 1), while the period preceding it is the one in which the crisis signal is absent (signal = 0), and the crisis periods themselves are excluded from the sample. Predictive properties of independent variables and optimisation of the tolerance floor (L) are tested using the AUROC statistics (measuring correctly and wrongly classified outcomes).

Most frequently used in practice is the *static approach* in which the time series of the gap depends on the assessment on a historical sample. In taking into consideration that new information in time change the assessment of a long-term trend as the sample changes, therefore causing gap revisions, the reliability of this statistics, or the quality of the reference indicator can be questionable[11]. This can have serious implications for a premature or late response by the macroprudential policy maker, i.e. an unwanted temporal and quantitative distribution of the regulatory cost burden.

In order to bridge the above mentioned shortcomings, a *recursive approach* is used in literature which in real time, or using the latest data available, assesses the gap, while historical data about the gap remain unchanged[12]. This partially compensates for the unreliability of gap measurement in the current period.

However, as the estimated historical gap is nevertheless changed by recursive calculation of the long-term trend, the correction of only the latest calculated gap might not be sufficient. From the aspect of precision, it is useful to also take into consideration the stability of gap assessment in real time. For this purpose, a *recursive approach with iteration* is used in this box, expanding in every iterations the sample for gap calculation in the time from *T0* to *Tm* for the entire historical series of estimated gaps[13].

This approach results in a higher number of observations that reflect the variability of gap assessment revisions in the past, which enables the calibration of instruments in conditions of a modest statistical databank and a smaller number of crises, i.e. a small sample. On the one hand, in cases such as the one of Croatia it is directly useful from the standpoint of the necessity of testing on a sample of the recent crisis, but it equally enables testing on samples of individual countries, instead of a panel of countries which need not best reflect the specificities of each economy. The application of such a sample to the example of Croatia clearly

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11 Edge, R. M., and R. R. Meisenzahl (2011): *The unreliability of credit-to-GDP ratio gaps in real-time and the implications for countercyclical capital buffers,* Staff working papers in the Finance and Economics Discussion Series (FEDS), Federal Reserve Board, Washington, D.C.

12 Alessi, L., and C. Carsten Detken (2009): *Real Time' Early Warning Indicators for Costly Asset Price Boom/Bust Cycles: A Role for Global Liquidity*, ECB Working Paper Series, No. 1039.

13 The initial sample from *T0* to *Tn* ($n+1$ observations) is expanded in the recursive approach to *Tm* (i.e., by *m-n* observations), while in a modified recursive approach with perturbations this sample expands by iterations with all reviewed gap assessments for each *T* as new data are included in the calculation (from *Tn* to *Tm*), that is $N = (m + n - 1) \cdot [n + 1 + 1/2(m - n)]$.

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Figure 3 Distribution of revised estimates of the gap in each time point (on the test sample)



average gap estimation value is red-coloured

gap (absolute deviation of the ratio from the long-term trend)
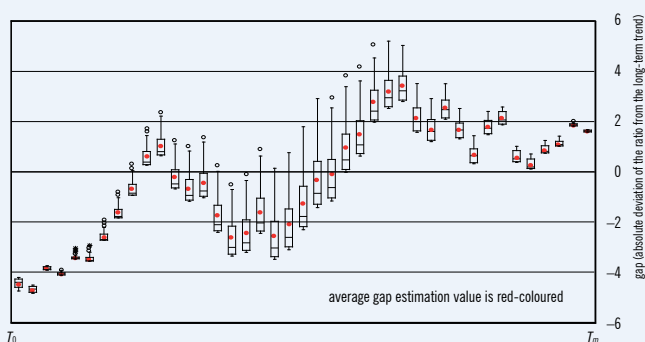
Note: The gap calculated from the ratio of loans to households and non-financial corporations and quarterly GDP is taken as an example.
Source: CNB.

illustrates the problem of the unreliability of gap assessment, as shown in Figure 3. It is important to notice that the dispersion of assessments is the biggest precisely at the most sensitive moment for the adoption of a critical assessment about the credit cycle overheating (horizontal line in Figure 3).

For the purpose of countercyclical capital buffer calibration tested was a total of nine relative indebtedness indicators for three different specifications of the smoothing parameter (λ) in detrending of time series (in total, 27 potential reference ratios were tested). Ratios differ by:

(a) the scope of loans to the private sector: domestic loans (N1), domestic claims (N2), domestic and external debt (B);

(b) the treatment of total debt amount: stock of loans (S) or annualised change in stocks (P);

(c) standardisation of ratios: annualised values (A) or quarterly values (T) of aggregate income.

On the other hand, different values of (λ) serve for the testing of sensitivity to the assumption of a relative length of the cycle, which in an economy with high structural imbalances, weaker technological capacity and high unemployment can be somewhat shorter than the standard assumption of a financial cycle four times longer than the real one (to which the value of λ=400,000 corresponds). The results are summarised in Table 1.

Calibration of tolerance floor is made by using two optimisation functions: the Youden Index (*J*), which maximises accurately foreseen signals in the dependent variable and the loss function (*G*), which minimizes type 1 (*T1*) and type 2 (T2) errors in dependent variable projections, depending on the regulator's preferences expressed by parameter θ (in the first iteration θ is 0.5):

Table 1 Forecast quality of tested ratios of relative debt and optimal corresponding lower tolerance tresholds

| Definition of ratio | | λ = 26000 | | λ = 130000 | | λ = 400000 | | Trend smoothing effect (the slope of the AUROC value curve for different λ) |
|---|---|---|---|---|---|---|---|---|
| Debt | GDP | AUROC | L | AUROC | L | AUROC | L | |
| N1 (S) | A | 0.86 | −0.97 | 0.88 | −1.19 | 0.89 | −0.01 | 0.02 |
| N2 (S) | A | 0.85 | −1.03 | 0.87 | −0.16 | 0.88 | −0.18 | 0.02 |
| B (S) | A | 0.85 | −0.97 | 0.88 | −1.18 | 0.71 | 1.26 | −0.07 |
| N1 (S) | T | 0.90 | 1.52 | 0.91 | 1.25 | 0.91 | 1.05 | 0.00 |
| N2 (S) | T | 0.84 | −5.48 | 0.87 | −0.41 | 0.87 | −0.66 | 0.01 |
| B (S) | T | 0.65 | 4.59 | 0.65 | 5.34 | 0.65 | 5.43 | 0.00 |
| N1 (P) | A | 0.40 | 9.02 | 0.39 | 8.66 | 0.38 | 8.51 | −0.01 |
| N2 (P) | A | 0.48 | 7.12 | 0.46 | 7.49 | 0.45 | 6.07 | −0.01 |
| B (P) | A | 0.62 | 4.16 | 0.62 | 4.89 | 0.62 | 4.94 | 0.00 |

Note: Critical values for the recommended standardised measure are yellow-coloured and critical values for the measure giving the best result are blue-coloured.
Source: CNB.

1) $J = Max(S_p + S_n)$

2) $G = Min[\theta \cdot T1 + (1 - \theta) \cdot T2]$

Where: $S_p$ – specificity (share of accurately projected absences of a signal), $S_n$ – sensitivity (share of accurately projected crisis signals), other symbols known from before.

The ratio of narrowly defined loans (N1) to GDP (AUROC=0.9), for which the optimal gap tolerance floor ($L$) is 1 percentage point, is shown to be optimal. In a ratio which is considered standardised[14] – broader defined loans (B) to annualised GDP – the reliability of classification of a crisis episode is considerably smaller (AUROC=0.7), while $L$ is somewhat above 1 percentage point (the Basel Committee optimised $L$ to 2 percentage points). Such relatively weaker predictive properties can partially be explained by frequent and significant revisions in external debt statistics, which reduces the reliability of the assessed gap according to the criteria for signalling a crisis. As national regulators have been recommended to rely on different indicators, and not exclusively on "standardised" relative debt gap assessments, these two ratios seem to be optimal candidates. Also, in taking into consideration relatively low $L$ values, it is not practical to set restrictions on missed signals of a crisis ($T1$), that is, $\theta > 0.5$.

The countercyclical capital buffer reference rate is calculated on the basis of calibrated values in the domestic financial cycle. Its movement on a historical sample shows relatively satisfactory instrument features (Figure 4).

This buffer would be activated three years before the occurrence of a crisis episode and it would gradually accumulate before the crisis itself,

Figure 4 Domestic financial cycle and calibrated reference rate of the countercyclical capital buffer
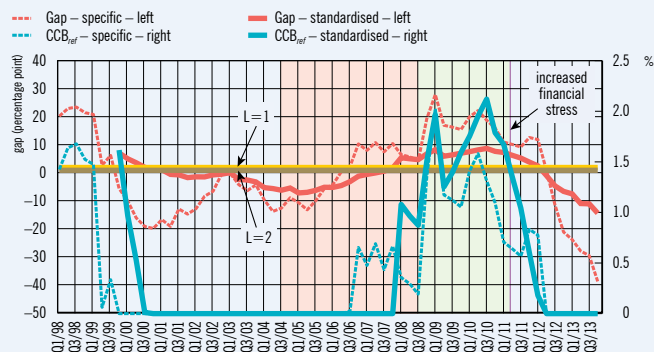


Note: The red shaded area shows the period when the CNB historically tightened macroprudential measures, while the green shaded area shows the period of relaxation of these measures.
Source: CNB.

which would also coincide with a high-frequency signal of stress disturbance in financial markets[15], when relaxation of introduced measures should be started. When comparing these findings with the measures of a macroprudential character historically introduced by the CNB, it is noticeable that the central bank reacted even sooner to the imbalances that took place, and started unwinding them somewhat earlier. This was motivated by the understanding of the fundamental generator of the domestic financial cycle, primarily by lending to households, in particular in foreign currency, with a parallel inflation of the value of collateral through the real estate market, which showed signs of serious "overheating" even before the gap determined by total loans to the private sector. Since on the one hand it was supported by consumer optimism, and on the other by cheap and available capital abroad, capital

14 ESRB (2014): *The ESRB Handbook on Operationalizing Macro-Prudential Policy in the Banking Sector* (https://www.esrb.europa.eu/pub/pdf/other/140303_esrb_handbook.pdf?b464ed34c93807f422c9d160c863d744).

15 For this purpose, the CNB has developed special tools for monitoring systemic disturbances in financial markets, presented in Box 1 High-frequency financial stress indicators, *Financial Stability*, No. 12, Year 7, February 2014.

inflows in banks' liabilities, i.e. foreign exchange indexed loans, required a combination of continued sterilisation, making foreign borrowing more difficult and limiting domestic placement growth. The described movements in the Republic of Croatia are an example of how cyclical risks are integrated with the development of structural systemic risks as the development of the financial cycle stimulated the boom in real estate prices in one direction and reduced the degree of protection from foreign currency risk in the other[16].

### Potential shortcomings in the practical application of this instrument

With regard to reduced reliability of gap assessment of relative debt in real time as well as the fact that imbalanced relations in different segments of the financial sphere can develop with asynchronous time division, it is recommendable to monitor a broader group of cyclical risk indicators, and not rely exclusively on an automatic reference rate calculation. Above all, these include the indicators of real estate overvaluation, credit growth, current account of the balance of payments, capitalisation of the system or model-based indicators such as the assessment of aggregate creditworthiness of the household sector[17]. Also, the regulation foresees the application of the prescribed countercyclical capital buffer rate one year after its publication, except in extraordinary circumstances. This principle introduces certain delays in the application of instruments and it could, in certain conditions, boost short-term lending of an arbitrary character, which in some cases could be used to try to avoid additional capital requirements and have a potentially destabilising effect in the credit growth "overheating" phase.

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16 Such phenomena precisely are addressed in the Recommendation of the European Systemic Risk Board (ESRB) on limiting lending in foreign currencies which intensifies the financial cycle (*Recommendation of the European Systemic Risk Board of 21 September 2011 on lending in foreign currencies* (ESRB/2011/1), Official Journal of the European Union).

17 See Box 2 Household debt in the EU countries: how much more adjustment do we need?

# Box 5 Schematic representation of procedures in the implementation of capital buffers

Figure 1 Procedures for implementing a structural systemic risk buffer [SSRB]
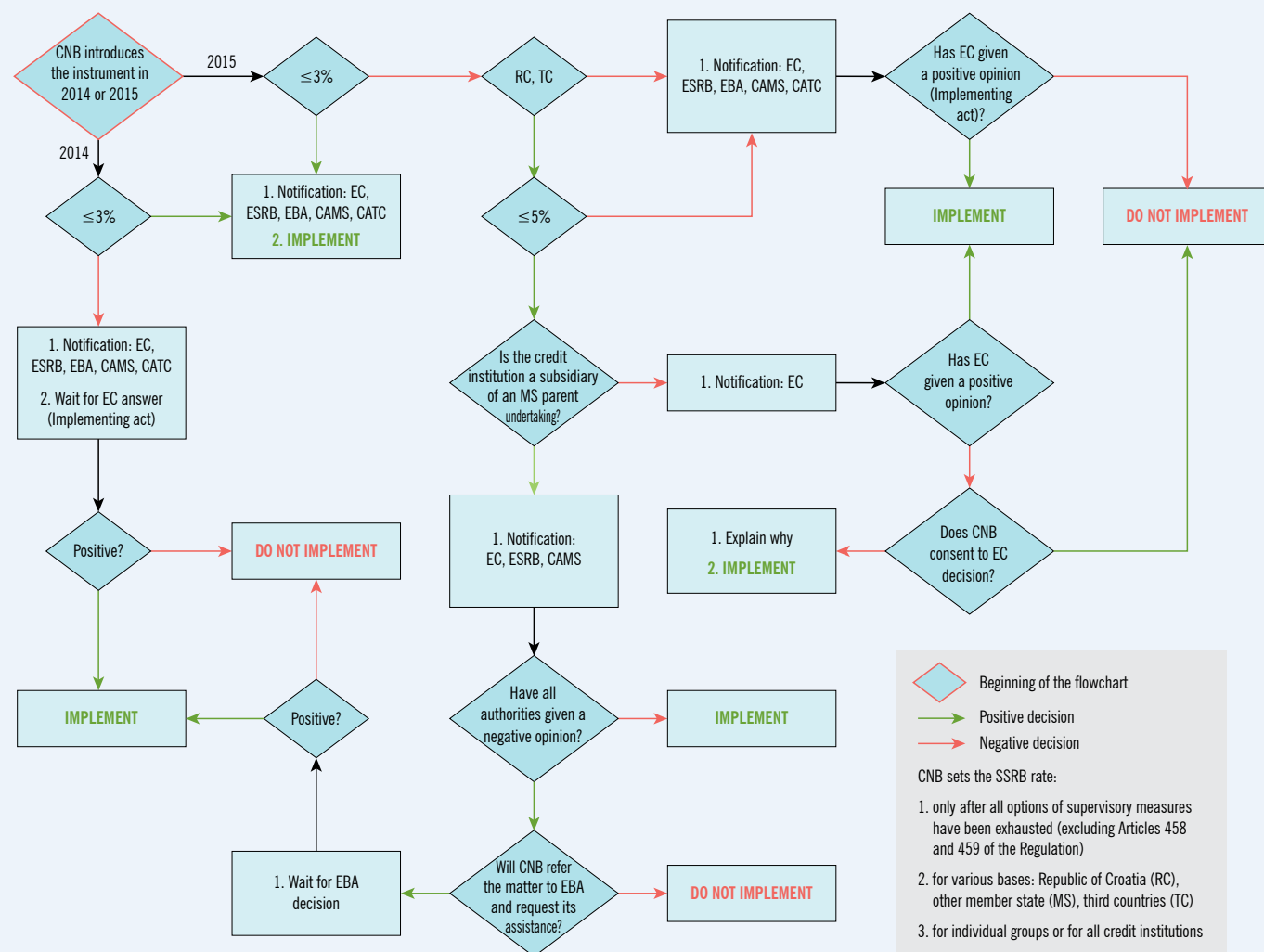


Source: CNB.

# Figure 2 Procedures for implementing a countercyclical capital buffer (CCB)

CNB introduces the instrument in the transitional period (from 2015)

1. Publication of guidelines

$0\% \leq X_{RC_1} \leq 2.5\%$

In exceptional circumstances that justify stronger protection:

$X_{RC_2} > 2.5\%$

Beginning of the flowchart

Positive decision

Negative decision

Credit institution calculates an INSTITUTION-SPECIFIC CCB by summing up the weighted rates $X_{RC}$, $X_{MS}$, $X_{TC}$, where the weights are the shares of capital requirements set for each country in total capital requirements.

$0\% \leq X_1 \leq 2.5\%$

1. Publication of recognition

$X_{MS_1} > 2.5\%$

from 2018

$\leq 2.5\%$?

Will CNB recognise the rate >2.5%?

$X_{MS_2} = 2.5\%$

$X_{TC_2} > X$

$X_{TC_3} \leq 2.5\%$

$X_{TC_4} > 2.5\%$

1. Notification: EC, ESRB, EBA, CAMS

1. Publication of the rate that CNB prescribes for TC

Will CNB recognise the rate $X \leq 2.5\%$?

1. Publication of recognition

Will CNB recognise the transitional period?

DO NOT IMPLEMENT

$\leq 2.5\%$?

Will CNB recognise the rate $X > 2.5\%$?

$X_{TC_1} \geq 0\%$

$X_{TC_5} = 2.5\%$

MS introduces the instrument in the transitional period (from 2014 to 2018)

1. Publication of the rate the CNB prescribes for TC

TC introduces the instrument and publishes the rate?

Source: CNB.

Figure 3 Procedures for implementing a capital buffer for other systemically important institutions (O-SII)



Beginning of the flowchart   → Positive decision   → Negative decision

Is an O-SII a subsidiary of an EU O-SII or G-SII to which an O-SII buffer is implemented on a consolidated basis?

≤ 1% and ≤ G-SII buffer or O-SII buffer on a consolidated basis

≤ 2%

1. Notification: EC, ESRB, EBA, CAMS

**2. IMPLEMENT**
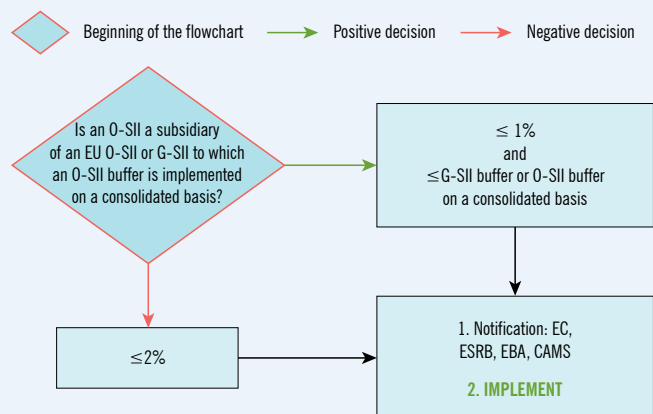
Source: CNB.

Figure 4 Rules for setting a combined buffer requirement (relation among rates)



Is a G-SII or O-SII subject to an SSRB on a consolidated basis for all domestic exposures but not for foreign exposures?

Applies on a consolidated basis: Max[G-SII buffer, O-SII buffer] V Max[G-SII buffer, O-SII buffer, SSRB]

Applies on a consolidated basis: Max[G-SII buffer, O-SII buffer] ∧ SSRB

Meets a combined buffer requirement (CBR) on an individual basis: CBR ≥ CC buffer + CCB + O-SII buffer + SSRB

Meets a combined buffer requirement (CBR) on an individual basis: CBR ≥ CC buffer + CCB + Max [O-SII buffer, SSRB]

Applies on that basis: Max[SSRB, O-SII buffer]

Applies on that basis: SSRB ∧ O-SII buffer

Is an O-SII subject to a SSRB on an individual or sub-consolidated basis for all domestic exposures but not for foreign exposures?

Beginning of the flowchart
Positive decision
Negative decision

Source: CNB.

# List of figures and tables

# Abbreviations and symbols

## Abbreviations

| | | |
|---|---|---|
| bn | – billion |
| CAR | – capital adequacy ratio |
| CBS | – Central Bureau of Statistics |
| CCE | – Croatian Chamber of Economy |
| CDCC | – Central Depository & Clearing Company |
| CDS | – credit default swap |
| CEE | – Central and Eastern European |
| CES | – Croatian Employment Service |
| CICR | – currency-induced credit risk |
| CM | – Croatian Motorways |
| CNB | – Croatian National Bank |
| DAB | – State Agency for Deposit Insurance and Bank Rehabilitation |
| 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 |
| HH | – households |
| 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 |
| NFC | – non-financial corporations |
| NPLR | – ratio of non-performing loans to total loans |
| OECD | – Organisation for Economic Co-operation and Development |
| ON USLIBOR | – overnight US dollar London Interbank Offered Rate |
| pp | – percentage points |
| RC | – Republic of Croatia |
| ROAA | – return on average assets |
| ROAE | – return on average equity |
| RR | – reserve requirements |
| SDR | – special drawing rights |
| yoy | – year-on-year |
| ZIBOR | – Zagreb Interbank Offered Rate |
| ZSE | – Zagreb Stock Exchange |

## Two-letter country codes

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

## Symbols

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