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# FINANCIAL STABILITY

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# Financial Stability

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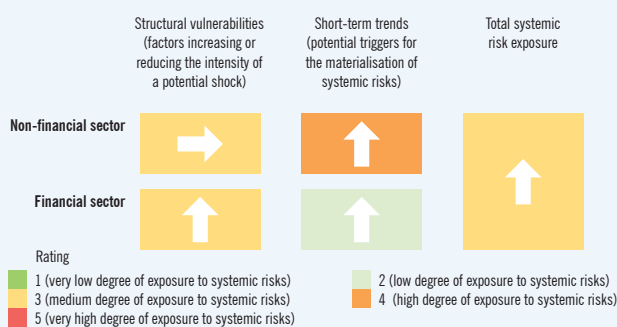
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# Overall assessment of the main risks and challenges to financial stability policy

Risk map, first quarter of 2017



Source: CNB.

Despite further economic growth and continued good macroeconomic indicators, structural vulnerabilities of the domestic sector increased, mainly driven by materialisation of the risks associated with the Agrokor Group. The still uncertain outcome of this company's restructuring increases solvency and liquidity risk in the non-financial corporations sector (shown in the upper right corner of the map) and leads to increased vulnerability in the banking sector (shown in the lower left part of the map). Increased uncertainty also led to an increase in the domestic component of the financial stress index, primarily due to high volatility on the domestic stock market. As a result, this indicator of the risk map also deteriorated, despite continued lenient financing conditions and low risk aversion on the global markets.

Considerable structural vulnerabilities of the domestic economy are confirmed by the continued high risk premium for the Republic of Croatia in the international markets compared to peer countries. High public debt points to the need for sustainable fiscal consolidation over a long term. Therefore, despite a considerable reduction in the structural budget deficit, the lower budget deficit in the previous year should also be viewed in the context of relatively high economic growth rates and relatively favourable financing conditions. To reduce the risks associated with the

government budget, further efforts are needed to reduce the budget deficit and this can be done on a permanent basis only through an increase in potential growth rates of the economy.

Similarly, although much reduced, external vulnerabilities measured by external debt to GDP ratio continued to be present, making the country very vulnerable to possible changes in financing conditions. However, the fact that the banks have almost no net external debt reduces the risk of spillover of a possible banking crisis of parent banks of Croatian banks to the domestic subsidiary banks. In addition, the process of the restructuring of the Agrokor Group, which accounted for a significant share of the Croatian external debt, might reduce the burden of interest or the cash outflow paid by entities from the Republic of Croatia. In addition, a possible debt-to-equity swap would lead to a reduction in the external debt; the restructuring of Agrokor Group companies and their opening to foreign markets would lead to growth in profitability and exports over a medium term as well as a possible growth in foreign direct investment into production capacities. However, such a development is subject to a successful completion of the process of restructuring that has just been initiated.

In the meantime, despite expectations of better operating results in 2017, negative risks prevail in the non-financial corporations sector due to the significance of the Agrokor Group as debtor, and also as buyer of products, particularly in the domestic food industry.

The risks in the household sector declined owing to further deleveraging efforts, supported by economic and employment recovery and the conversion of loans indexed to the Swiss franc. Against the backdrop of such favourable trends, this sector's financial assets continued to rise although the prolonged period of low interest rates affected the changes in its structure. With a small rise in investments funds, a growing number of this sector's deposits are short-term kuna deposits in transaction accounts (for more details, see Box 1 Developments in household sector investments and Box 3 Change in the structure of bank funding sources and potential risks to financial stability). The change in the currency structure of household sector deposits supported growth in the share of kuna lending but also gave rise to some new risks to the banking sector. This is particularly true of the possible currency risk since most

overnight deposits are kuna deposits while most term deposits are in the euro. A sudden transition from a short-term to a long-term category might result in an increase in currency risk.

The banking system stress testing again warns of the risks already mentioned in this publication, such as high exposure to the government sector and exposure concentration which materialised recently in the

case of the Agrokor Group. The results of stress testing are shown in more detail in chapter 7 Stress testing of credit institutions and they show that the banking system is still capable of withstanding slightly probable but possible shocks, even in the situation of a significant write-off of placements to the Agrokor Group. The system's resilience is, among other things, the result of appropriate capital buffers and other measures introduced by the CNB over the past period.



# 1 Macroeconomic environment

Increased volatility of the international financial markets and political uncertainty as regards economic policies in some developed countries increase the risks associated with the possible tightening of financing conditions, while further domestic economic recovery and public finance consolidation partly lessen the risks that might compromise the country's financial stability.

## International environment

**Despite a further slowdown in global economic growth to 3.1% in 2016, the results were better than expected.** The slowdown in growth on an annual level was mostly due to poorer economic results in developed countries. The United States of America saw a slowdown in economic growth due to a significant fall in investments which not even a sharp rise in exports in the second half of the year was able to compensate for. The growth dynamics of the British economy also slowed down, although to a lesser extent than earlier anticipated, and so did that of the euro area, whose growth continued to be limited by subdued investment activity and slower growth in exports. At the same time, the developing countries witnessed a halt in the years-long trend of a slowdown in economic activity. Such developments were mostly driven by a less pronounced slowdown in Chinese economy. Also, the Russian crisis subsided, spurred by a strengthening of domestic demand and a rise in energy prices on the global market. By contrast, most countries of Latin America witnessed negative trends. Subdued investment consumption in many countries in 2016 contributed to a slowdown in global trade (Table 1.1).

**The year 2016 saw a small rise in inflation on a global level.** This was due primarily to a recovery in the prices of oil and other raw materials, which was particularly noticeable towards the end of the year, following the agreement between OPEC member

countries to curtail daily production. At the same time, the developing countries continued to see diverging developments.

**Global economic growth is expected to pick up in the forthcoming years although the risks remain considerable and hard to predict.** The developing countries are likely to remain the generators of global growth. The Chinese economy might continue to grow at a pace equal to that in the previous year owing to the anticipated continued policy support and stronger credit growth. Russia is expected to see further strengthening of economic activity and to exit recession due to stronger domestic demand and easier access to funding, accompanied by a recovery in the prices of raw materials on the global market. The recession in Brazil is also expected to end in 2107 as a result of implementation of reforms, easing of monetary policy and reduced political instability. Like the developing countries, the developed countries are also expected to see acceleration in economic activity growth, though at a somewhat slower pace. The announced fiscal stimulus in the US might provide additional boost to investment and consumption and accelerate this country's real GDP growth. In addition, the United Kingdom and Japan are expected to see better economic results. The expectations for the developed countries are more optimistic than at the end of the previous year, fuelled primarily by earlier mentioned favourable developments towards the end of 2016 and early this year, while growth forecasts in the developing countries have been revised downwards due to poorer expectations in several large countries, particularly from Latin America and the Middle East. Global inflationary pressures might rise additionally as a result of recovery in the prices of raw materials and global demand, fuelling inflation in the current year to levels higher than in 2016, particularly in the developed countries.

**GDP growth forecast in the euro area has been slightly revised upwards from the previous figures, but it remains moderate** (Figure 1.1). The strengthening of domestic demand, again the main generator of aggregate growth, is expected to benefit from the still relatively low price of oil, depreciation of the euro and further favourable conditions of financing. Although investments might grow, the large share of non-performing loans and unfavourable conditions in the labour market in some euro area countries will curb the prospects for faster growth in the forthcoming period.

Croatia's major foreign trade partners in the EU are expected to see a very slight acceleration in growth, with the exception of Italy where growth will be limited by accumulated imbalances and weaknesses in the banking sector. In 2017, inflation is expected to rise both in the euro area and throughout the EU as a result of slightly higher prices of energy but recovery is still insufficient to raise core inflation permanently.

**The financial markets were again characterised by increased volatility.** In 2016, such developments were particularly pronounced after the UK's vote to exit the EU towards the end of June and, to a slightly lesser extent, after American presidential elections in November and the Italian referendum in December. However, faster growth in economic activity, higher inflation, even with a gradual increase in interest rates paved the way for further positive trends in the capital markets in the first months of 2017 (Figures 1.2). The growth in long-term interest rates on a global level has been moderate so far and the interest rates continue to be low in terms of multiyear standards (Figure 1.3). In line with such trends, the long-term interest rates for most government bonds of member states rose towards the end of

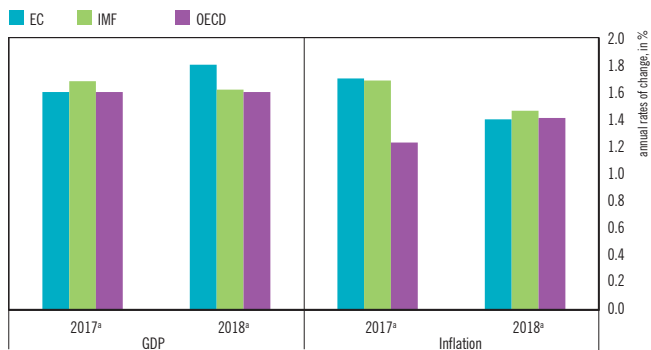
Table 1.1 Economic growth, inflation and trade in selected markets, annual growth rate, in %

|  | Real GDP   |            |                   |                   | Consumer price index |             |                   |                   | World trade volume |            |                   |                   |
|--|------------|------------|-------------------|-------------------|----------------------|-------------|-------------------|-------------------|--------------------|------------|-------------------|-------------------|
|  | 2015       | 2016       | 2017 <sup>a</sup> | 2018 <sup>a</sup> | 2015                 | 2016        | 2017 <sup>a</sup> | 2018 <sup>a</sup> | 2015               | 2016       | 2017 <sup>a</sup> | 2018 <sup>a</sup> |
| <b>World</b>                           | <b>3.4</b> | <b>3.1</b> | <b>3.5</b>        | <b>3.6</b>        | <b>2.8</b>           | <b>2.8</b>  | <b>3.5</b>        | <b>3.4</b>        | <b>2.7</b>         | <b>2.2</b> | <b>3.8</b>        | <b>3.9</b>        |
| <b>Developed countries</b>             | <b>2.1</b> | <b>1.7</b> | <b>2.0</b>        | <b>2.0</b>        | <b>0.3</b>           | <b>0.8</b>  | <b>2.0</b>        | <b>1.9</b>        | <b>4.1</b>         | <b>2.2</b> | <b>3.7</b>        | <b>3.6</b>        |
| Euro area                              | 2.0        | 1.7        | 1.7               | 1.6               | 0.0                  | 0.2         | 1.7               | 1.5               | 6.2                | 3.5        | 4.0               | 4.0               |
| USA                                    | 2.6        | 1.6        | 2.3               | 2.5               | 0.1                  | 1.3         | 2.7               | 2.4               | 0.1                | 0.4        | 3.0               | 2.9               |
| UK                                     | 2.2        | 1.8        | 2.0               | 1.5               | 0.1                  | 0.6         | 2.5               | 2.6               | 5.8                | 2.3        | 2.6               | 0.6               |
| Japan                                  | 1.2        | 1.0        | 1.2               | 0.6               | 0.8                  | -0.1        | 1.0               | 0.6               | 2.3                | 0.8        | 4.6               | 4.5               |
| <b>Developing countries</b>            | <b>4.2</b> | <b>4.1</b> | <b>4.5</b>        | <b>4.8</b>        | <b>4.7</b>           | <b>4.4</b>  | <b>4.7</b>        | <b>4.4</b>        | <b>0.3</b>         | <b>2.2</b> | <b>4.0</b>        | <b>4.3</b>        |
| Central and Eastern European countries | 4.7        | 3.0        | 3.0               | 3.3               | 3.2                  | 3.2         | 5.7               | 5.5               | 5.4                | 6.0        | 5.7               | 5.6               |
| China                                  | 6.9        | 6.7        | 6.6               | 6.2               | 1.4                  | 2.0         | 2.4               | 2.3               | -1.3               | 3.0        | 3.7               | 3.4               |
| Latin America                          | 0.1        | -1.0       | 1.1               | 2.0               | 5.5                  | 5.6         | 4.2               | 3.7               | 1.9                | -1.6       | 4.3               | 4.4               |
| Russia                                 | -2.8       | -0.2       | 1.4               | 1.4               | 15.5                 | 7.0         | 4.5               | 4.2               | -12.7              | -2.3       | 5.8               | 2.9               |
| <b>Croatia</b>                         | <b>1.6</b> | <b>2.9</b> | <b>2.8</b>        | <b>3.0</b>        | <b>-0.5</b>          | <b>-1.1</b> | <b>1.4</b>        | <b>1.3</b>        | <b>8.8</b>         | <b>5.3</b> | <b>8.5</b>        | <b>6.6</b>        |

<sup>a</sup> Forecast.

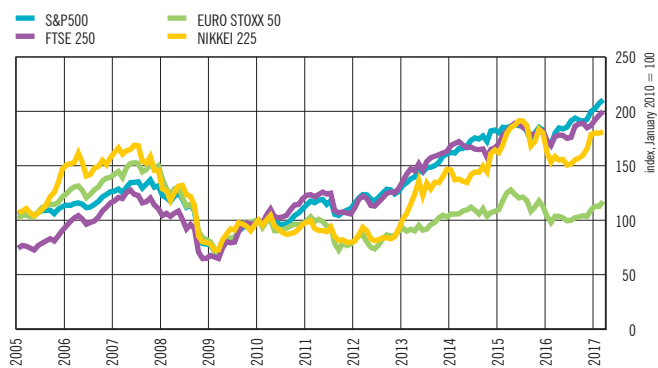
Sources: IMF (WEO, April 2017) and CNB (for Croatia).

Figure 1.1 Economic growth and inflation forecast in the euro area remains moderate



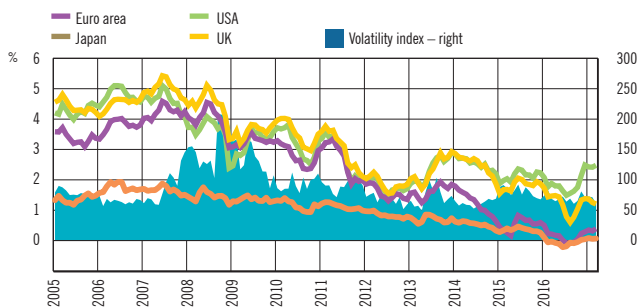
<sup>a</sup> Forecast.  
Sources: European Commission (Winter Forecast, March 2017), IMF (WEQ, April 2017) and OECD (Interim Economic Outlook, March 2017).

Figure 1.2 Continued positive trends in the capital market



Source: Bloomberg.

Figure 1.3 Rising yields on government bonds in the past months

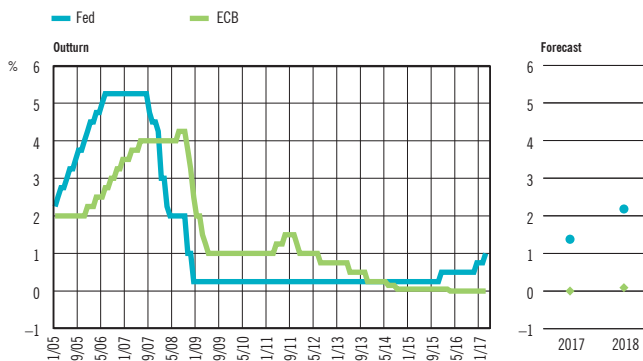


Note: The figure shows the returns on ten-year bonds of selected markets and the MOVE (Merill Lynch Option Volatility Estimate) index which measures the implicit volatility of US one-month T-bills options.  
Source: Bloomberg.

2016 and in early 2017.

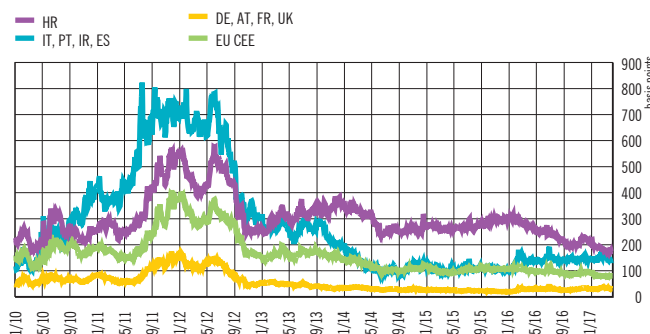
**In 2017, the US and euro area monetary policies are expected to continue to be diverging. This could affect the international flows of capital and have an unfavourable impact on growth forecasts in some of the emerging market economies.** After a prolonged postponement, spurred by positive indicators of economic activity in the US, the Fed raised its benchmark rate by 25 basis points in December 2016 (Figure 1.4). The benchmark rate was raised again by the same amount in March 2017 and it can be expected to see another two such increases by the end of the year. At the same time, the Governing Council of the ECB decided in March this year to keep the interest rate on the main refinancing operations and the marginal lending facility and deposit facility unchanged at the level of 0.00% and 0.25%, and -0.40%, respectively.

Figure 1.4 Monetary policy of the USA and the euro area diverged even further



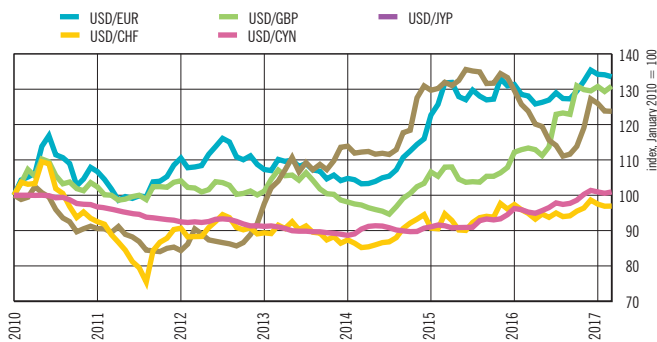
Note: The figure shows Fed and ECB benchmark interest rates.  
Sources: Fed and ECB (outturn) and Bloomberg (forecast).

Figure 1.5 Perceived risk for EU countries is diminishing



Note: The figure shows CDS spreads for 5-year bonds of selected markets. CDS spread for the selected group of countries was obtained as a simple average.  
Source: S&P Capital IQ.

Figure 1.6 The year 2016 was marked by strengthening of the dollar against leading global currencies



Note: The rise in the index shows currency depreciation against the dollar.  
Source: Bloomberg.

By contrast, so far the main announced change in monetary policy in 2017 will be a slowdown in the pace of securities purchase from EUR 80bn to EUR 60bn a month. Net securities purchases are expected to be conducted until end-2017 or even longer unless a sustained adjustment of inflationary developments is achieved in accordance with the target inflation rate level.

**The continued accommodative monetary policy pursued by the ECB fuels expectations that short-term interest rates in the euro area will continue to be maintained at low levels in the forthcoming period.** Yields on government bonds continue to be low, even negative in some countries, and the differences between the yields for EU countries have also fallen (Figure 1.5). The conditions of financing continued to improve in the European interbank market as well, as shown by a fall in EURIBOR. However, low interest rates and the ECB's expansionary monetary policy, coupled with banks' non-performing loan burden, also fuel risks associated with low profitability of banks and insurance companies and somewhat negatively impact the financial intermediation process.

**The beginning of the new cycle of interest rates rise in the USA which began in mid-2016 and the political situation in leading economies had a significant impact on exchange rate developments.** Thus, the American dollar appreciated strongly against the euro and the yen in the second half of 2016 (Figure 1.6). Many emerging market economies were also faced with volatile exchange rates. The weakening of the euro towards the end of 2016 was influenced by rising risk aversion and political risks, but this currency strengthened strongly against the pound sterling after Brexit. A change in the expectations on the financial market regarding further periods of low short-term interest rates and their diverging developments in leading global economies might lead to an even greater volatility on the financial market, particularly on the exchange rate market.

## Current risks in the international environment

**Despite a recent rise in investor confidence, there might be manifold challenges to the financial markets in the near future.** Further tightening of the US monetary policy, coupled with uncertainty surrounding the fiscal stimulus might fuel financial markets volatility. Over a medium term, such developments might also have an unfavourable impact on the developing countries. In addition, increased propensity to protectionism might slow down global trade, while increased risk aversion might lead to an even greater deterioration in the global conditions of financing.

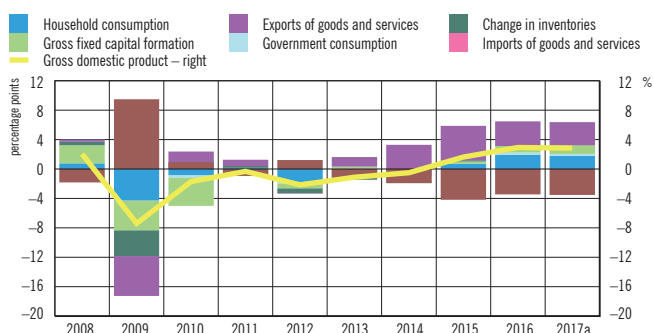
**In addition to structural impediments in the euro area, political risks in this area might also contribute to poorer economic results.** Namely, uncertainties associated with the envisaged parliamentary elections in some member states, coupled with the still undefined process of the exit of the UK from the European Union might have an unfavourable impact on economic activity. Such developments, coupled with a possibly more pronounced global spillover of a rise in American interest rates, could exert a growing pressure on risk premiums in some member states and banking groups.

**After a long period of low interest rates, it is not too far-fetched to expect a repricing of global risks.** The materialisation of all these risks and a possible sudden surge in investor risk aversion would primarily affect countries with high financing needs such as Croatia.

## Domestic environment

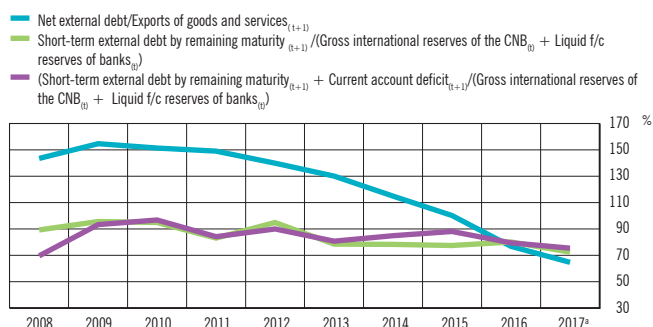
**After faster than expected economic recovery in Croatia in 2016, the forecasts for 2017 point to further favourable real developments.** However, GDP growth rate in 2017 might be only slightly below its outturn in 2016 and stand at approximately 2.8% (Figure 1.7). A positive contribution to overall economic activity in 2017 is expected to be made by foreign demand as a result of the economic recovery of the main foreign trade partners, growing competitiveness of the domestic economy and positive developments in tourism. At the same time, goods and services imports might also pick up resulting ultimately in a net negative and greater contribution of foreign demand than in the previous year. In addition, forecasts suggest a rise in personal consumption and recovery in investment consumption, though smaller than earlier anticipated due to the unfavourable impacts that the financial problems of the Agrokor Group might have on the Croatian economy. The use of EU funds is also expected to rise in 2017. Recovery in domestic and foreign demand, the rising optimism of enterprises and consumers and the expansionary character of the monetary policy (for more details, see chapter Banking sector) are expected to boost a small recovery in the credit activity of banks.

Figure 1.7 Export, household consumption and investment recovery are expected to make the biggest contribution to growth in 2017



<sup>a</sup> Forecast.  
 Note: The figure shows contributions to GDP growth and real growth.  
 Sources: CBS and CNB.

Figure 1.8 Selected indicators of external vulnerabilities continue to improve



<sup>a</sup> Forecast.  
 Note: The net external debt is calculated as the difference between gross external debt and gross international reserves and foreign assets of banks.  
 Source: CNB.

**Despite expected improvement in indicators of external vulnerability, the risks to the external position of the RC are still present as a result of a large amount of previously accumulated foreign liabilities.** The gross external debt might continue to decline, primarily due to strong deleveraging of banks and most other sectors as well. Nominal GDP growth, coupled with lower debt stock, could spur improvement in the relative indica-

tors of indebtedness. Since it is not predicted that there will be any significant rise in external debt of the domestic sectors and because of the expected further surplus in the current account of the balance of payments in 2017, the indicators of external vulnerability continued to improve (Figure 1.8).

**Further stronger fiscal consolidation in 2016 led to a further fall in the risks to the domestic economy associated with the fiscal policy. However, it is likely that the GDP to public debt ratios will remain elevated for some time.** The risk premium for Croatia is still much higher than the risk premium for peer Central and Eastern European countries, but it should be stressed that this gap has been narrowing, particularly in the first months of 2017 (Figure 1.5).

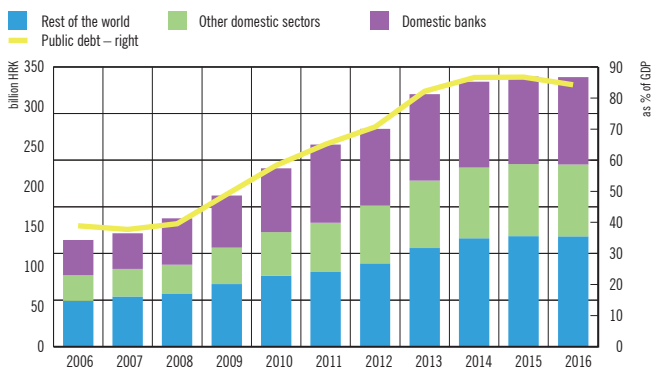
## Current risks in the domestic environment

**The identified vulnerabilities show that a possible deterioration in financing conditions in the international markets and its spillover to increased costs of financing of the domestic sectors remains one of the significant risks to financial stability.** The materialisation of the shocks mentioned above could result in a tightening of international financial market conditions. This could lead to a deterioration of public debt sustainability indicators and an increase in the price of borrowing and limit and push up the price of access to both domestic and foreign capital for the private sector. Such a development would make debt servicing more difficult and have an adverse impact on banking system stability.

**Economic activity and the key risks to financial stability will also depend on the recovery of EU countries, particularly Croatia's main foreign trading partners.** A slowdown in the recovery of the main foreign trading partners might spur a fall in Croatian exports. In addition, the economic activity of domestic sectors in the forthcoming period might also largely depend on further development of business activities in the Agrokor Group and the spillover of the negative effects on affiliated economic entities, and on political stability in the country. By contrast, the contribution of revenue from tourism might be greater as suggested by developments in the previous two years and the perception of Croatia as a safe country.

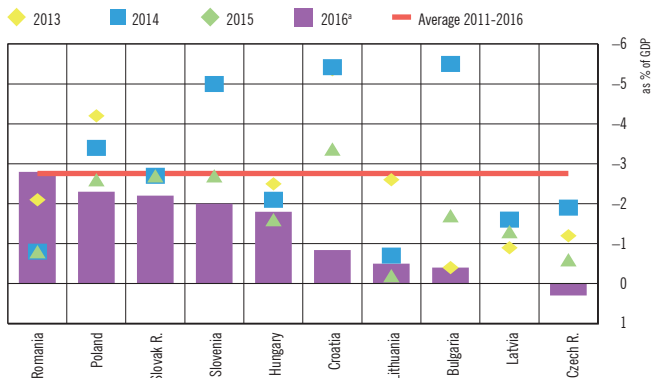
# 2 Government sector

Figure 2.1 General government debt



Sources: CNB and EC (projection).

Figure 2.2 General government deficit



\* Estimate.  
Sources: EC and CNB.

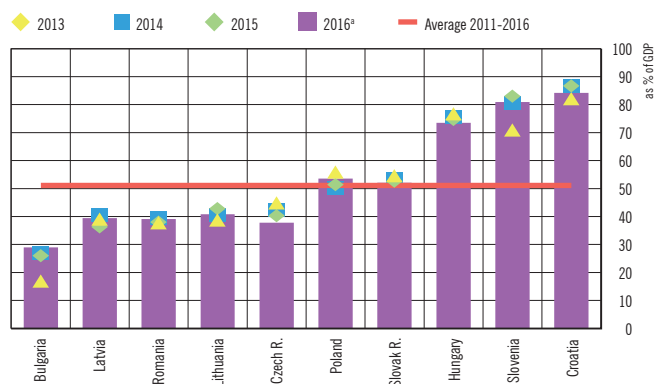
Fiscal consolidation, initiated in 2015, continued into 2016. The reduction in the general government deficit to 0.8% of GDP and in public debt to 84.2% of GDP largely reduces the risk to financial stability of the government sector. Despite a significant improvement in the structural deficit, the reduction in the general government deficit was achieved in conjunction with a favourable economic cycle.

**In 2016, the government sector continued with the fiscal consolidation initiated in 2015.** The general government deficit fell to only 0.8% of GDP and the public debt fell to 84.2% of GDP. The consolidation of public finances in 2016 was marked by political risks, the most important of which were early parliamentary elections. In this context, the government sector ended the budget year with a technical budget revision towards the end of the year due to reorganisation of the Government.

**The reduction in the budget deficit was achieved largely under the favourable economic impact of the recovery on budget revenue growth.** The improvement in budget indicators based on the reduced deficit and public debt of the general government was mainly driven by an increase in budget revenues as a result of an excellent tourist season and growth in personal consumption. The favourable developments in GDP also had a positive impact on the labour market and the rise in employment of 1.9% in 2016. At the same time, due to political circumstances, expenditures grew slower than revenues in 2016, resulting in a significant fall in the general government deficit to only 0.8%.

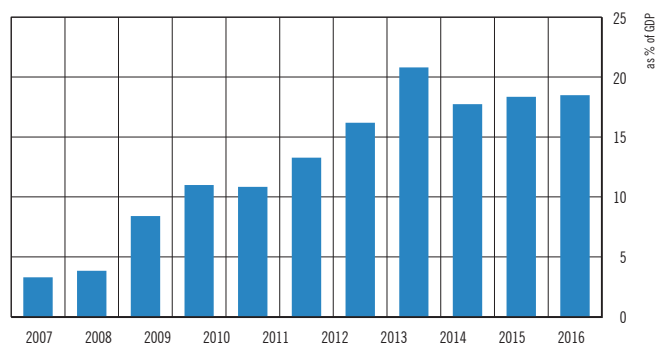
**Compared to peer countries, Croatia has improved its general government deficit position considerably.** The reduction in the general government deficit to only 0.8% of GDP has placed Croatia among the countries with significant fiscal

Figure 2.3 Public debt



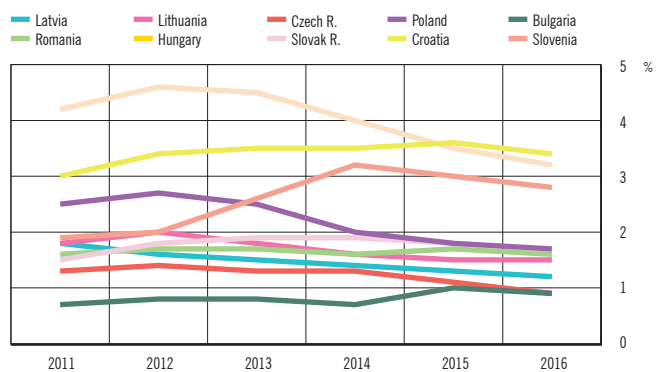
\* Estimate.  
Sources: EC and CNB.

Figure 2.4 Financing needs



Note: Amounts include T-bills.  
Source: CNB.

Figure 2.5 General government interest expenses



Source: EC.

Table 2.1 Thresholds of the fiscal sustainability risk indicators<sup>a</sup>

| Indicator  | Direction to be safe | Threshold | Observation for Croatia | Change |
|--|----------------------|-----------|-------------------------|--------|
| $r - g^b$ (p.p.)   | <                    | 1.1       | 3.5                     | ↓      |
| General government public debt (as % of GDP)                     | <                    | 42.8%     | 84.2%                   | ↓      |
| Cyclically adjusted primary balance (as % of potential GDP)      | >                    | -0.5%     | 2.0%                    | ↑      |
| Gross financing needs (as % of GDP)                              | <                    | 20.6%     | 18.4%                   | ↑      |
| Share of short-term debt as a ratio of total debt                | <                    | 44.0%     | 9.3%                    | ↑      |
| Debt denominated in foreign currencies                           | <                    | 40.3%     | 70.1%                   | ↓      |
| Weighted average maturity of public debt (years)                 | >                    | 2.3       | 4.8                     | ↓      |
| Short-term external public debt (as % of international reserves) | <                    | 61.8%     | 7.8%                    | ↓      |

<sup>a</sup> Baldacci, E., I. Petrova, N. Belhocine, G. Dobrescu, and S. Mazraani: *Assessing Fiscal Stress*, IMF Working Paper, WP/11/100.

<sup>b</sup> Imputed interest rate on general government debt, deflated by the GDP deflator (5-year average), minus real GDP growth rate (5-year average).  
Sources: IMF WP/11/100 and CNB.

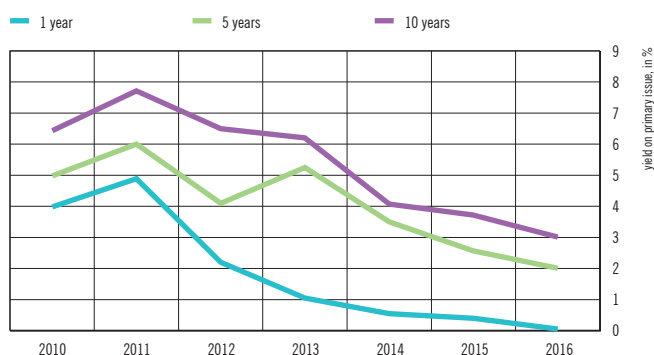
consolidation in 2016. The general government deficit in Croatia last year was thus decreased many times from the average in the previous five years and interest expenses for the first time declined on yearly basis.

**Despite a reduction of 2.5 percentage points, public debt in Croatia is still one of the highest among peer countries.** A reduction in the public debt to GDP ratio in 2016 was the result of a significant nominal growth in GDP. The nominal reduction in the public debt was also influenced by appreciation of the kuna against the euro, in which 68% of the total public debt is denominated.

**The indicators of the risk to fiscal sustainability confirm a reduced risk to financial stability of the government sector.** In 2016, all indicators of the risks to fiscal sustainability improved from the previous period. Only three indicators are in an unfavourable territory but all of them recorded positive moves towards the safe territory. Other indicators are in the safe territory and some of them are well below the threshold limit.

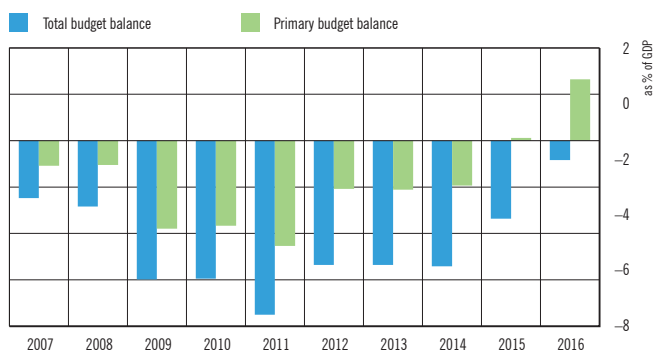
**The currency structure of public debt has been improving steadily while currency structure has maintained a favourable ratio.** The maturity structure of Croatian public debt has been favourable for many years now and this segment of public debt management has been reducing risks to financial stability. The structure of public debt by type of interest also keeps a favourable position, as 86.2% of public debt was agreed at a fixed interest rate which greatly reduces the interest rate risk to public debt and thus reduces the risk to financial stability. At the same time, the currency structure of public debt remains

Figure 2.6 Yield on primary issue of euro and euro-indexed securities



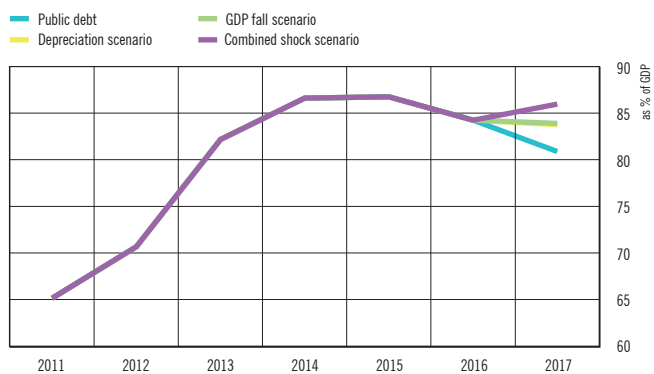
Source: Bloomberg.

Figure 2.7 General government deficit



Source: CNB.

Figure 2.8 Projection of public debt under various scenarios



Sources: CNB and EC.

unfavourable and highly risky to financial stability since 70% of public debt is in the euro and the dollar. Therefore, under the stress scenario, the key risk to financial stability lies in the depreciation of the kuna. However, the share of financing in the domestic currency from domestic banks rose in 2016 (for more details, see chapter 6 Banking sector).

**The financing needs might increase in 2017 but only in relation to debt repayments while the needs for deficit financing have been growing only slightly.** The reduction in the general government deficit to below 1% of GDP significantly reduces financing needs, with the exception of repayments of previous liabilities falling due. In 2017, a sum equivalent to approximately 19% of GDP has to be paid for amounts falling due and this includes the amount of approximately 8% of GDP in T-bills. Most of the financing needs this year should be met on the domestic market, with only one large issue of bonds being foreign. The strategy of external debt refinancing by domestic debt reduces the risk to financial stability.

**The Croatian budget has a large burden of interest payments.** With a 3.4% share in GDP, Croatia’s budget has the greatest burden of interest payments of all the peer countries. Peer countries, with the exception of Hungary and Slovenia, have much smaller interest expenses, averaging 1.3% of GDP. However, in 2016, Croatia recorded for the first time a fall in interest expenses and expects them to fall further in 2017, as shown by a reversal in the negative trend present for many years.

**Yields on government securities with and without a currency clause have continued to fall in 2017.** In mid-2017, the yields were almost twice as small as in the same period of 2016, which is the result of reduced fiscal risks and a favourable outlook for the Croatian economy. However, as the yields of other peer countries have also fallen, Croatia still pays the highest price for borrowing of all the peer countries.

**Fiscal consolidation in 2017 reduces risks under the stress scenario.** Further fiscal consolidation in 2017 is expected to keep the general government deficit at the 2016 level while the structural deficit might rise slightly. Coupled with the expected growth in GDP, this should result in a public debt reduction to 80.9% of GDP. The stress scenarios included a reduction in GDP growth rate in 2017 and a 5% depreciation of the kuna. The materialisation of such a combined stress scenario would lead to an increase in the share of public debt to 86% of GDP, an increase of only 1.8 percentage points from the level achieved in 2016. The encouraging result of stress testing is due to the favourable economic cycle, the factor upon which fiscal consolidation largely depends.

## Current risks to financial stability in the government sector

The achieved fiscal consolidation can mainly be attributed to rising revenues driven by a recovery in the domestic economy

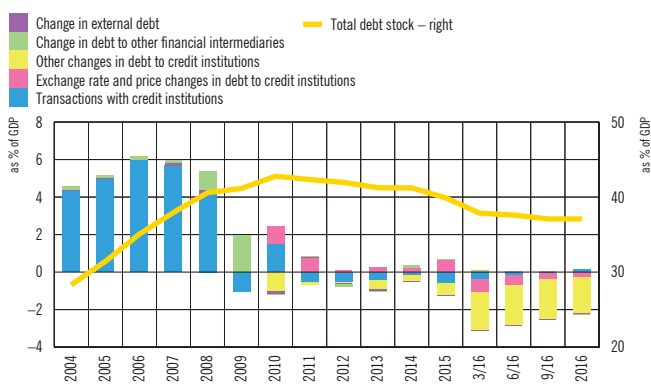


and reduction in interest expenses. A significant rise in risk aversion on the global markets would be expected to increase the cost of borrowing of the Republic of Croatia and interest expenses in the budget. In addition, such a scenario would have a negative impact on economic developments and budget rev-

enues (for more details, see Macroprudential Diagnostics, No. 1). A reduction in these risks could be achieved by means of reforms that will have a favourable impact on potential GDP growth while containing the procyclical growth in government consumption.

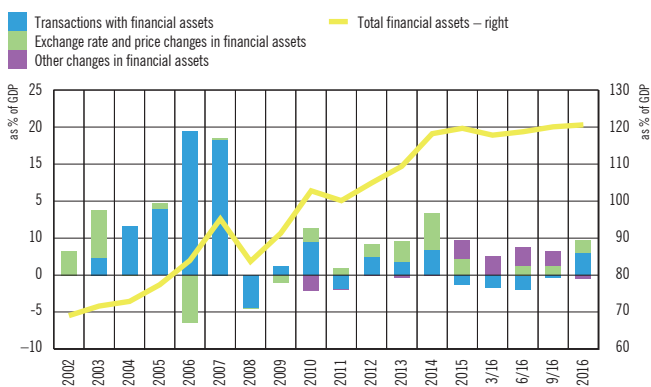
# 3 Household sector

Figure 3.1 Further deleveraging of the household sector influenced by placement write-offs



Note: All changes are shown on an annual level.  
Source: CNB.

Figure 3.2 Financial assets of households are rising



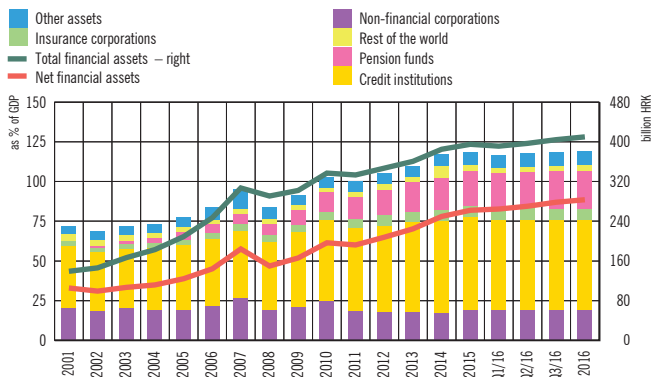
Note: All changes are shown on an annual level.  
Source: CNB.

Should the overall economic activity continue to accelerate in 2017, and the interest rates hold steady at the achieved low levels, systemic risks to the household sector can be expected to continue the positive trend of fall. By contrast, the interest rate risk, associated with a possible rise in reference interest rates, remains a significant source of risks to the household sector.

**In 2016, the debt of the household sector based on transactions grew at an annual rate of 0.4%, for the first time after five years in which it fell steadily (Figure 3.1).** Towards the end of 2016, the annual balance of transactions of the household sector with credit institutions was slightly positive (measured by the difference between newly-granted loans and actual repayments), halting a steady trend of negative transaction values present since end-2011 and indicating a small acceleration in credit activity. At the same time, total debt which, in addition to actual repayments (transactions) includes exchange rate, price and other changes, fell by -5.3% on an annual level, mostly driven by a fall in household debt to credit institutions as a result of the effects of statutory conversion of loans indexed to the Swiss franc. The fall in household sector debt is also associated with write-offs of a part of household placements (recorded in the category of Other changes in debt to credit institutions, Figure 1) in view of the requirement for value adjustment of non-performing placements based on the CNB decision<sup>1</sup> (Figure 6.17). Households also reduced slightly their liabilities to foreign creditors and other domestic financial intermediaries during the observed period (Figure 3.1). The fall in total debt with a simultaneous growth in aggregate income reduced aggregate indebtedness of this sector towards the end of 2016 to the pre-crisis level of 37.1% of GDP (Figure 3.1).

<sup>1</sup> Decision on the classification of placements and off-balance sheet liabilities of credit institutions (OG 41A/2014).

Figure 3.3 Household deposits again dominant in the structure of financial assets



Source: CNB.

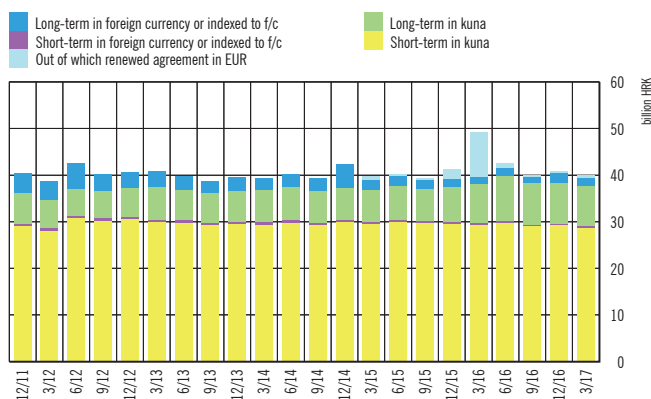
While reducing their total debt households also increased their financial assets, which stood at 120.6% of GDP at the end of December 2016 (Figure 3.2). The sector's total financial assets rose by over HRK 14bn, or 3.6%. As an alternative to investment in savings deposits, last year investors partly turned to investments in investment funds (net inflow in investment funds in 2016 stood at HRK 4bn (for more details, see Box 1 Household sector investments). Nevertheless, there were no bigger changes in the structure of assets, so claims on credit institutions in the form of deposits still constitute the dominant form of household savings, accounting for almost one half of total financial assets of this sector (Figure 3.2).

Even though credit activity started to recover in 2016, due to the earlier mentioned effect of the statutory conversion of loans indexed to the Swiss franc, write-offs and sale of placements, and appreciation of the currency, the total loan amounts continue to fall steadily (Figures 3.4, 3.5 and 3.6). After falling in 2015, new household borrowing accelerated in 2016 at an annual rate of 2.8% (excluding renewed agreements for long-term housing loans). Housing and cash loans made the biggest positive contribution (14.2%<sup>2</sup>) to the annual growth in long-term borrowing in 2016, having grown by 117.1%<sup>3</sup> or 15.3%, respectively, while credit card loans fell by -5.4% (Figure 3.5). At the same time, for the first time since 2007, newly-granted short-terms loans fell on an annual level by 1.3%. Despite growth in newly-granted housing loans, the total amount of housing loans fell by 11.1% on an annual level (Figures 3.6 and 3.9). Other types of loans also recorded a downward trend (Figure 3.6), with the exception of cash loans, which grew by 2.3% on an annual level, being the only type of loans which has grown steadily since the outbreak of the financial crisis.

2 This excludes the effect of conversion of Swiss franc-denominated loans and the renewed agreements on the amount of newly-granted long-term loans.

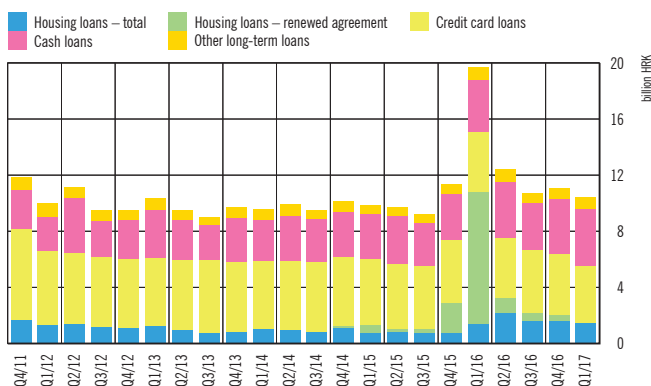
3 If secondary refinancing arising from the conversion (subsequently from euro to kuna) is excluded, the growth of newly-granted housing loans is estimated at 40-50%.

Figure 3.4 Credit activity intensified slightly in 2016



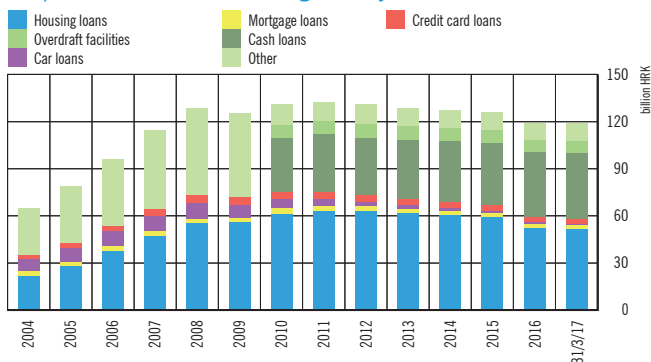
Source: CNB.

Figure 3.5 Small recovery in new long-term borrowing in 2016



Source: CNB.

Figure 3.6 Continuing decrease in total loan amounts despite an increase in lending activity



Note: Cash loans and overdraft facilities have been excluded from the category of other household loans since the end of 2010 because they have become new categories.  
Source: CNB.

The recovery in new long-term household borrowing was spurred by positive signals from the labour market (Figure 3.10) and growing consumer confidence, while relaxed credit standards might fuel further acceleration in credit activity in 2017 (Figures 3.7 and 3.8). The relaxed standards for granting housing loans present throughout 2016 continued in early 2017. This was the result of stronger competition among banks, reduced costs of sources of financing as well as positive expectations regarding economic developments. At the same time, the standards for granting consumer and other loans to households, after having tightened slightly towards the end of 2016 (standards tightened in one large bank<sup>4</sup>), continued to relax in the first quarter of 2017 (Figure 3.7).

Positive trends in the labour market (Figure 3.10), rising consumption of households and rising prices in the real estate market, coupled with growing consumer confidence contributed to the growth in the demand of households for loans in 2016 (Figure 3.8). At the end of 2016 and in early 2017, the intensity of the expected growth in credit demand fell, mostly influenced by the expected decline in demand for loans in several large banks. At the same time, other credit institutions expected to see a further fall in demand for both groups of loans, which points to a growing competition among banks in retail banking.

Further recovery in credit demand of households in 2017 might receive a boost not only from the expected growth in economic activity but also from two legislative proposals that have been submitted to the Parliament for parliamentary procedure, namely the Consumer Home Loan Act and the Act on State-subsidised Housing Loans. The expected adoption and entry into force of these loans might spur household borrowing in the second half of 2017 in view of the possibility of reduction of the currency risk assumed by households when taking housing loans in a foreign currency by activating the option of a one-off currency conversion of loans or by subsidising a part of monthly loan annuities.

The diminished propensity of households to assume currency risk has been present since end-2012 when the substitution of lending indexed to a foreign currency by kuna lending first started to be observed. Having intensified in 2016, the share of kuna loans in total loans at the end of 2016 rose to thus far the highest level ever of 41.4% (Figure 3.14). A sharp rise in kuna housing loans in 2016 was partly associated with the conversion of loans in Swiss francs and the fact that some clients who initially converted loans in Swiss francs to euro loans refinanced these euro loans in the same or another bank, by kuna loans. In addition to a reduced propensity to borrow in a foreign currency due to the Swiss franc experience, increased kuna lending was also due, among other things, to an increase in kuna sources in the structure of bank liabilities (particularly deposits in transaction accounts, Figure 6.4), which amid a general fall in interest rates contributed to a drop in the interest rates on kuna loans and a reduction of the spread between in-

4 This is the result of calculation of the indicators: net percentage of banks with respect to the response is weighted by the share in total loans to households.

Figure 3.7 Relaxed household credit standards

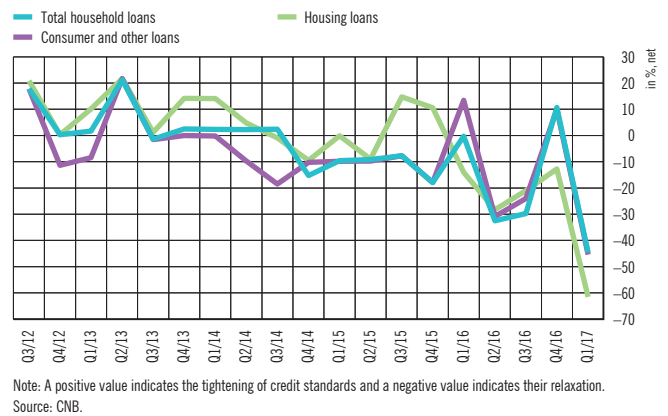


Figure 3.8 Banks expect growth in credit demand of households for consumer loans

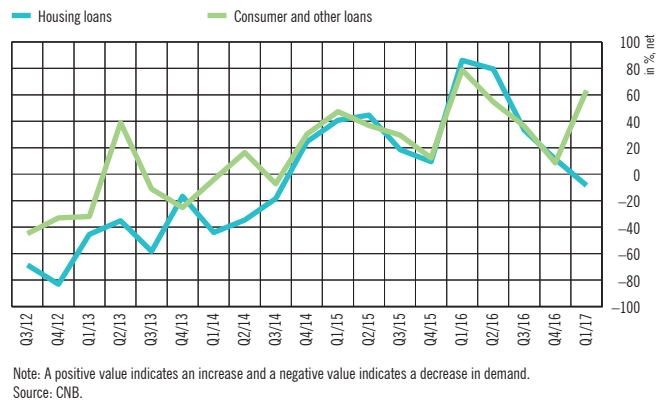


Figure 3.9 Dynamics of placement write-offs is reflected in changes in total household debt

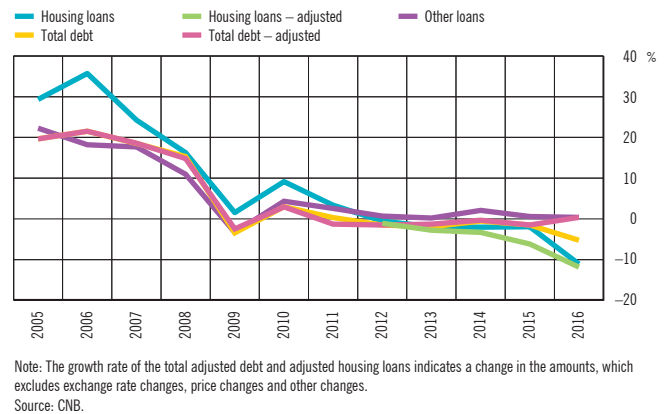
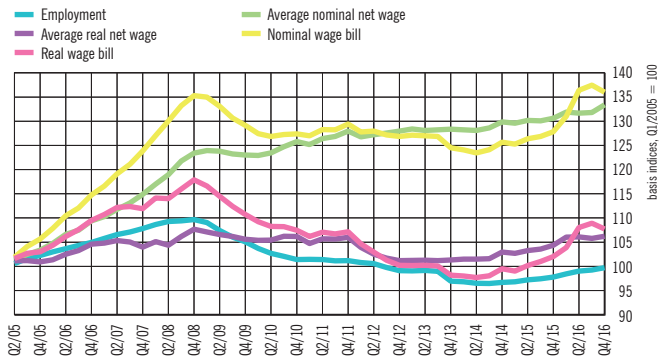
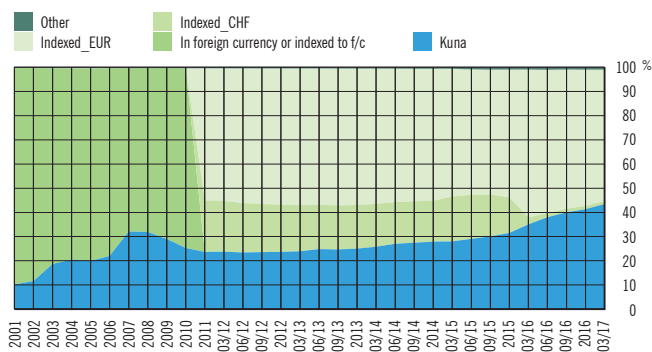


Figure 3.10 Positive signals from the labour market



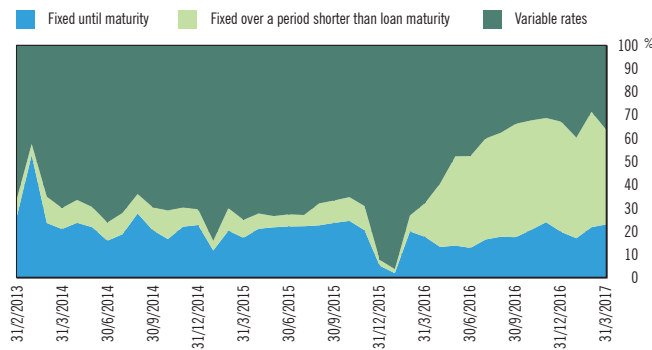
Note: As of 2015, net wage amounts have been reported in accordance with the JOPPD form, which makes it impossible to compare them directly with the amounts in the previous periods.  
Sources: CBS and CPII.

Figure 3.11 Share of kuna loans is on the increase



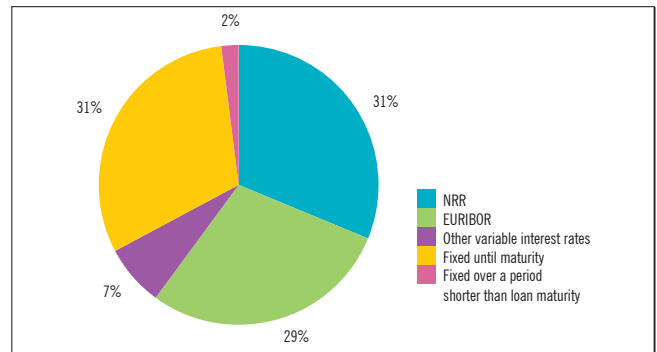
Note: Since the end of 2010, the category of foreign currency loans or foreign currency-indexed loans has been divided into two subcategories: euro-indexed and Swiss franc-indexed loans.  
Source: CNB.

Figure 3.12 Share of fixed rates in newly-granted loans is on the increase



Note: The structure presented is based on the information on the period of initial interest rate fixing and serves as an approximation. Fixed rates are fixed to maturity and variable rates are those which are variable or fixed up to a period of 12 months.  
Source: CNB.

Figure 3.13 Variable interest rates continue to be dominant in household lending (31 March 2016)



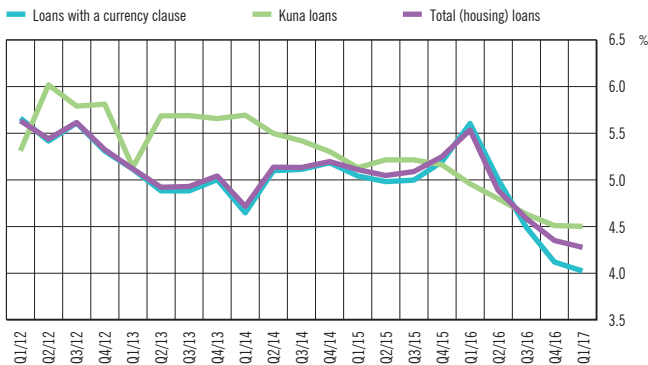
Source: CNB, Survey on interest rate variability.

terest rates on kuna and euro loans (Figure 3.14). By contrast, regulatory changes aimed at better consumer awareness have led to growing competition among banks, which, coupled with expansionary monetary policy measures of the CNB, spurred a higher supply of kuna loans by banks (for more details, see Ljubaj I., Petrović S., A Note on Kuna Lending, CNB, Survey, December 2016).

**Even though household exposure to interest rate risk remains high, during 2016 it could be seen that credit demand of households was rechannelled to loans with fixed interest rates. This trend is particularly pronounced in long-term housing lending where the interest rate risk, given the maturity of liabilities, is most pronounced.** In 2016, this intensified new housing borrowing of households at fixed interest rates in periods shorter than a loan's maturity. At the end of 2016, the share of these loans reached 47% (Figure 3.12). Such trends suggest higher client awareness with regard to the assumption of interest rate risk and the ensuing efforts of banks to adjust their products accordingly in the conditions of relatively low credit growth. The change in consumer preferences was partly also spurred by active CNB efforts over the years to warn consumers, through regular publications and special information materials<sup>5</sup> about the risks arising from credit relationships, and hence also about interest rate risk, thus encouraging the banks to offer such products. Despite noticeable trends in new lending, the bulk of total household debt was granted at a variable interest rate (67% at end-March 2016, according to data obtained from the Survey on interest rate variability). In the structure of loans granted at a variable interest rate, EURIBOR and the national reference rate (NRR) are used almost equally as benchmark variable parameters (46% and 43% of loans, respectively, Figure 3.13).

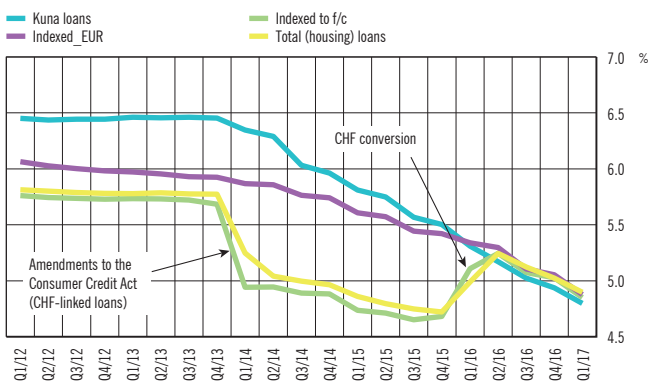
5 Financial Stability, No. 12, February 2014, Financial Stability, No. 15, Box 2 Interest rate risk in the Republic of Croatia, July 2015, Risks to the consumer in a credit relationships, June 2016, Macroprudential Diagnostics, No. 1, January 2017.

Figure 3.14 Continued general downward trend in interest rates on newly-granted (housing) loans



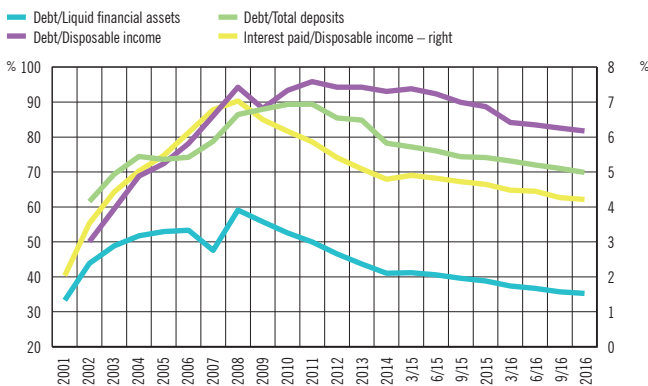
Source: CNB.

Figure 3.15 Interest rates on kuna-denominated and euro-denominated housing loans are on the same level



Source: CNB.

Figure 3.16 Decreasing household debt and interest burden



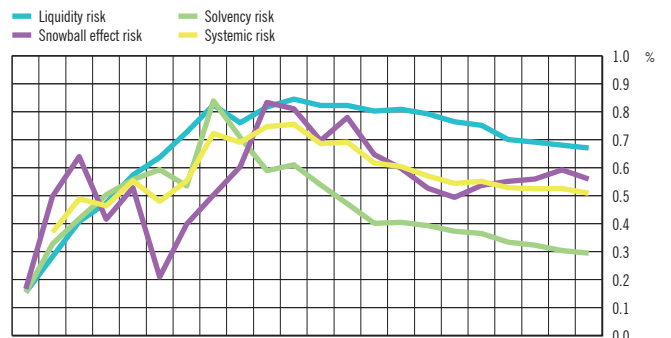
Source: CNB.

The indicators of household indebtedness and interest burden continued to improve throughout 2016 (Figure 3.16). The fall in total nominal household debt and the ensuing interest cost (down by 5.3% and 5.4%, respectively, during the observed period), in the conditions of low interest rates, coupled with a concomitant growth in liquid financial assets (4.3%), reduced the burden of household debt and interest to levels last seen more than ten years ago. This, coupled with growth in disposable income and employment, led to a reduction in the vulnerability of the overall system and of its individual components (Figure 3.17).

### Current risks associated with the household sector

A further positive trend of fall in systemic risks is also likely to take place this year since interest rates are expected to stay at low levels (Figures 3.14 and 3.15) and total economic activity is expected to pick up and, together with tax reform earlier this year, influence disposable income, while nominal debt could hold steady. However, the interest rate risk associated with a possible rise in reference interest rates remains an important source of risks to clients, given a the domination of household sector financing at variable interest rates (Figure 3.13). The risk is even higher if currently very low, even negative, reference interest rates of the ECB and the Fed's further changes in monetary policy direction, which could also take place in the euro area over the next medium term, are taken into account.

Figure 3.17 Further fall in the systemic vulnerability of households



Note: Household sector vulnerability is measured by the household systemic risk, i.e. by the average of liquidity risk (LR), solvency risk (SR) and "snowball effect" risk (SNR) which are defined as follows:

$$LR_t = 0.5 \cdot \frac{Debt_t}{Disposable\ income_t} + 0.5 \cdot \frac{Interest\ payments_t}{Disposable\ income_t}$$

$$SR_t = \frac{Debt_t}{Net\ financial\ assets_t}$$

$$SNR_t = \frac{Interest\ payments_t}{Debt_t + Debt_{t-1} + Debt_{t-2} + Debt_{t-3}} \cdot \left( \frac{Disposable\ income_t}{Disposable\ income_{t-4}} - 1 \right)$$

Source: CNB.

## Box 1 Developments in household sector investments

The past few years witnessed a noticeable trend of change in the structure of received deposits of the household sector. This trend was analysed in the previous issue of this publication (see Financial Stability, No. 17) and in this issue, in Box 3 Change in the structure of bank funding sources and potential risks to financial stability. The aim of this box is to estimate the effects of the possible spillover of a part of deposits from transaction accounts to other liquid forms of assets such as investments in investment funds and shares.

The funds deposited in transaction accounts rose visibly from mid-2013. This trend accelerated in 2014, 2015 and 2016 (Figure 1).

This was partly due to regulatory changes relating to the reclassification of foreign current and giro accounts of households<sup>1</sup>, legislative amendments relating to taxation of income from capital of natural persons and a steady trend of fall in interest rates on time deposits. Given that under amendments to the Income Tax Act income from interest up to 0.5% annually, earned in transaction accounts is exempted from taxation, these legislative changes also had an impact on the structure of household deposits in credit institutions<sup>2</sup>.

In addition to the fall in the share of time deposits in the structure of total deposits and their transfer to sight deposits, their average initial maturity was also noticeably extended, assumed also to be due to the currently low interest rates and their long-term falling trend. In the light of the fall in interest rates observed since mid-2012 on both kuna and foreign currency time deposits and the introduction of taxation of savings income in the form of interest payments, household income from savings has been falling steadily. To a small extent, investors have turned to other financial intermediaries as an alternative to investing in savings deposits. This refers in particular to investments in investment funds (Figure 2).

If developments in total net assets of investment funds are broken down by fund types, it is clear that some categories of funds have been growing fast, if measured by the balance or difference between payments into and disbursements from the funds in the past several years. In 2016 alone, the net inflow measured by the difference between new payments into and disbursements from all types of funds exceeded HRK 4bn, with the fastest growth being recorded in the group of cash funds and bond funds (Figures 3 and 4).

Also, a considerable rise in the assets managed by bond and cash funds in the past few years shows that investors are not ready yet to assume a higher degree of risk and still prefer to choose more conservative forms of investments with lower yields (Figure 5), such as investments in bond and cash funds.

1 Under the Decision on amendments to the Decision on statistical and prudential reporting (OG 127/2014), the direct link between an individual instrument and accounts of a bank's chart of accounts was cancelled.

2 Financial Stability, No. 17, July 2016, p. 26, Box Household deposits.

Figure 1 Monthly change by investment instrument (household sector)

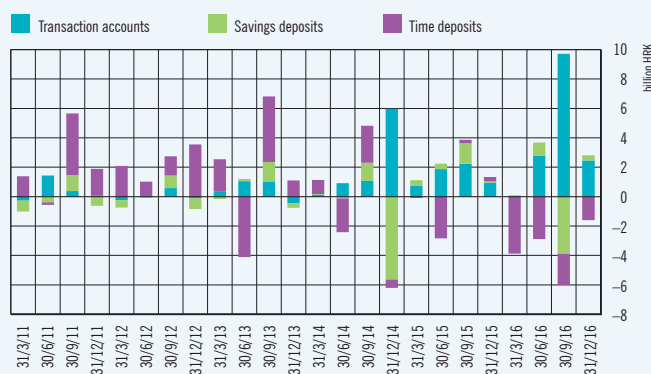


Figure 2 Developments in assets by fund types

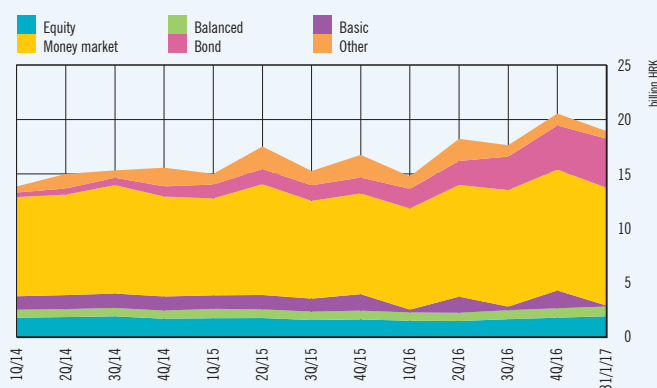


Figure 3 Developments in the balance between payments into and disbursements from open-end funds

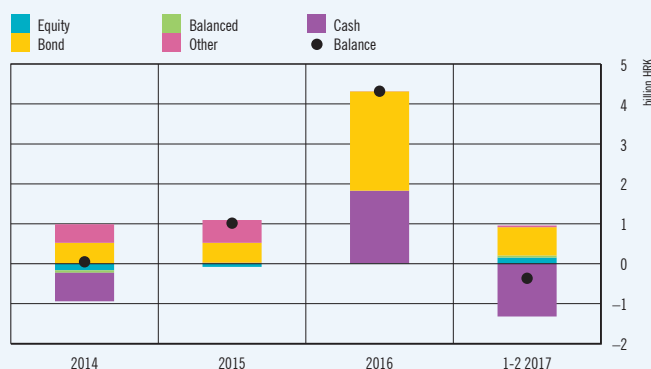
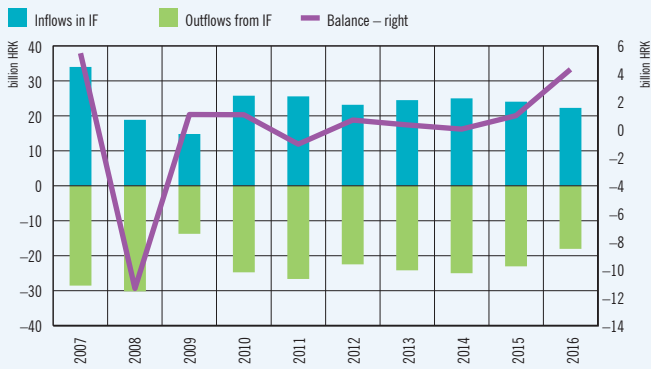


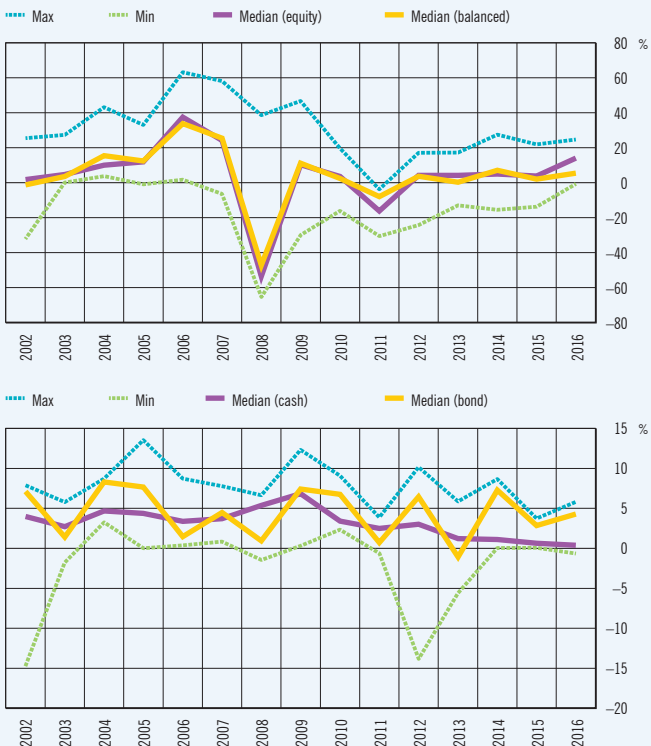
Figure 4 Balance between payments into and disbursement from individual types of open-end investment funds



Source: HANFA.

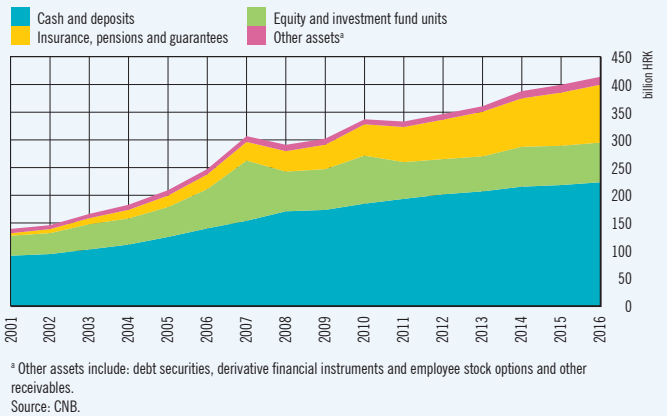
A contributing factor was also the delayed introduction of taxation of capital gains from investments in investment funds in relation to the previous amendments to the Income Tax Act which related to taxation of income from property. Namely, the new provisions of the Income Tax Act and taxation of capital gains from investments in open-end investment funds only came into force in early 2016. As taxation of interest income was introduced a year before, room was created for regulatory arbitrage,

Figure 5 Developments in investment fund yields by years



Source: HR Portfolio.

Figure 6 Developments in total financial assets of households



<sup>a</sup> Other assets include: debt securities, derivative financial instruments and employee stock options and other receivables.  
Source: CNB.

so it is assumed that investors from the group of natural persons invested some of the funds from bank transaction accounts into cash and bond funds, i.e. those types of funds which carry lower risks and yield returns relatively similar to or higher than traditional bank savings, i.e. investments in deposits.

### Investments in investment funds

Even though it appears that changes in tax regulations and the fall in deposit interest rates have affected household preferences and behaviour, which, in search of new types of low-risk investments, channelled a smaller portion of their financial assets mainly directly to shares and bond and cash funds, the net effect of such rechanneling of savings towards the group of other financial intermediaries, i.e. to investment funds was, if overall financial assets of households are taken into account, negligible (Figure 6). The structure of total financial assets of households did not change much either, with pension funds being the only segment that grew strongly over the past ten year period, mainly owing to constant and to an extent foreseeable payments into funds and their predominant orientation towards investment in government debt securities.

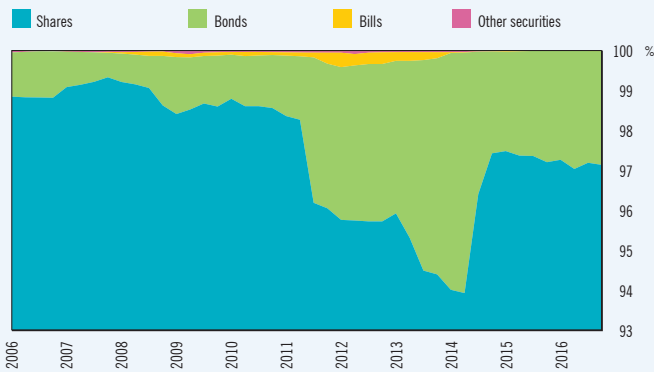
### Structure of other financial assets of households

As regards the structure of other financial assets of households, it did not change much after the crisis and the most common form of investment was again investment in equity, while investments in bonds rose slightly (Figure 7).

The market value of shares owned by domestic natural persons rose from HRK 23bn in mid-2012 to over HRK 61bn by the end of last year. The bulk of this growth took place in the second half of 2014 and was not the result of growth in the market value of the investment but was predominantly due to ownership changes with the amount exceeding HRK 30bn being transferred contractually from a foreign legal to a domestic natural person. The value of domestic shares started rising at a somewhat faster rate in the second half of last year, as evidenced by a faster growth in the local share index CROBEX (Figure 8). As regards



Figure 7 Dominance of equity in the securities portfolio – domestic natural persons



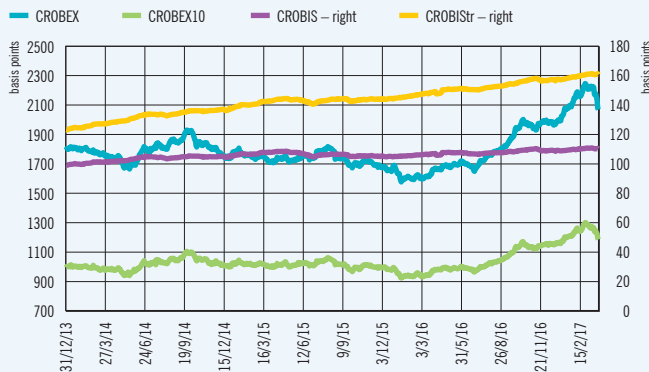
Source: CDCC.

cash inflows in or outflows from individual types of funds, according to HANFA data, cash inflows in equity funds only started rising earlier this year while investments in cash funds started falling during that period (Figure 4). Given the still modest increase in investments in risky and more volatile types of funds, household preferences do not seem to be changing in this respect.

**Key risks associated with developments in investments of the household sector**

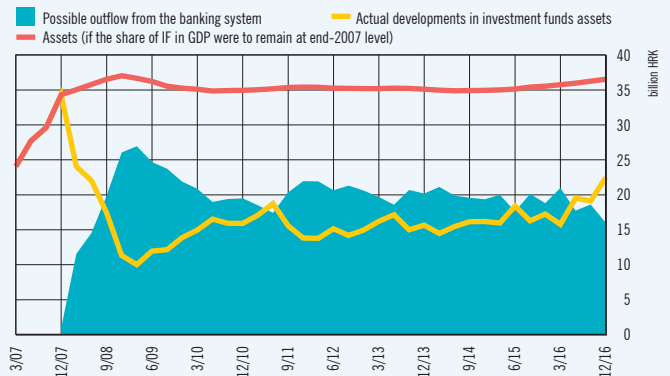
The obtained data and the analysis made show that even in the situation of a significant rise in investments in riskier forms of assets such as shares and equity investment funds similar to that which took place during the investment euphoria in the domestic market before 2008, the domestic banking system is not threatened by any significant materialisation of risks of a possible spillover of assets from highly liquid transaction deposits to investments in open-end investment funds or shares.

Figure 8 Developments in share and bond indices CROBEX and CROBIS



Source: Zagreb Stock Exchange.

Figure 9 Departure of actual investment fund assets from their projection in relation to the 2007 GDP level



Sources: CDCC and CBS.

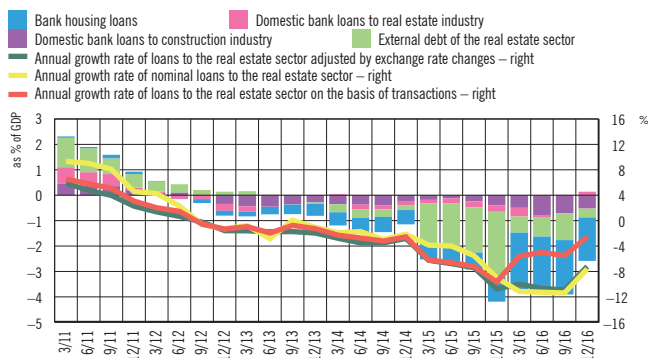
In Figure 9, the developments in investment funds' assets (yellow line) are compared with the dotted red line which shows the possible level of assets in investment funds under the assumption of its same proportion in relation to the 2007 GDP when the prices of riskier classes of assets such as shares and investments in equity funds rose the most, shows that the possible inflow in all types of investment funds would amount to approximately HRK 15bn and less than 10% of this amount would be due to the increase in the valuation. One should add to this the impact of direct investment of households in shares which, due to numerous changes in the status of listed shares, their delisting and dubious valuation (since most shares are not listed on a regulated market), is much more difficult to assess. However, in an extreme scenario, if the estimated maximum inflow of HRK 15bn into the funds were to be financed exclusively from the transaction accounts of households in banks, i.e. if a significant short-term deposit outflow were to take place, the liquidity of the banking system, measured by the LCR ratio would still remain largely above the regulatory minimum (currently set at 80%).

The impact on each individual bank would naturally depend on its individual liquidity position and investment decisions of its clients. However, it is not realistic to expect clients to change their preferences regarding investments and savings suddenly and over a short term, even more so if one takes into account the fact that only a longer-term recovery in the capital market would provide reassurance to clients about sustainability of growth in the prices of riskier asset classes.

It should be noted that rising interest of households in investment in riskier forms of assets in the past months coincided to an extent with faster economic growth and an improvement in macroeconomic indicators of the domestic economy. However, the conducted analysis shows that the household sector still refrains from increasing its investment of assets into riskier financial instruments and is only willing to allocate a smaller part of its financial wealth in such a manner. Also, the recent debt and liquidity crisis of the Agrokor Group is by no means helping to reduce the perception of the risk of investing directly in shares and indirectly in equity funds.

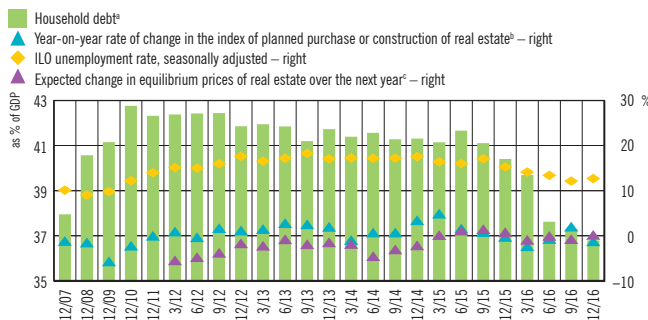
# 4 Real estate<sup>6</sup>

Figure 4.1 Real estate sector continued to deleverage



Note: Changes in debt are adjusted by exchange rate changes. External debt includes the debt of real estate and construction industries. Transactions refer to housing loans and loans granted to the real estate and construction industries. Source: CNB calculations.

Figure 4.2 Despite positive labour market trends, households have continued to refrain from long-term investments



<sup>a</sup> 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. <sup>b</sup> Index of planning the purchase or construction of real estate was calculated based on consumers' answers to the question on plans regarding the purchase or construction of real estate in the next 12 months from the CNB's consumer confidence survey. Source: CNB.

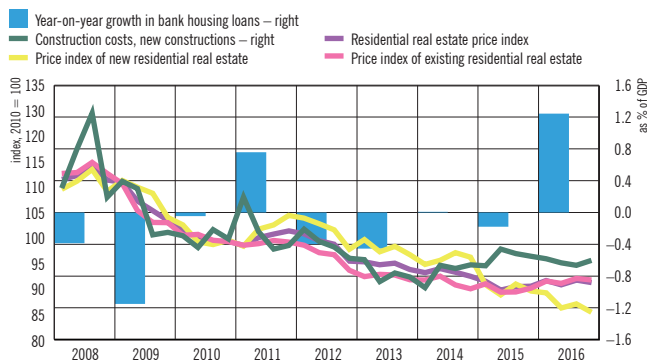
Despite the improved financial availability of residential real estate, full recovery in the real estate market is not possible without growth in demand for residential units, which could result from the announced government interventions.

**The years-long deleveraging process in the corporate and household sector associated with the real estate market that started in late 2012 continued throughout 2016.** Under the influence of the statutory conversion of loans initially granted in Swiss francs, the greatest cumulative contribution to the debt reduction at the end of 2016 came from housing loans (down by 1.7% of GDP). This occurred despite the strong annual rise in newly-granted housing loans at the 2016 level, totaling 117.1%, if we exclude primary refinancings directly arising from the conversion of loans in Swiss francs. It is noteworthy that a portion of this growth was generated by the refinancing of converted CHF loans into kuna loans in the second step<sup>7</sup> (Figure 7), which are not reported separately in statistical reports. At the same time, construction companies additionally reduced their domestic credit liabilities, by 0.5% of GDP, while real estate companies increased their credit liabilities to domestic creditors, by 0.2% of GDP (changes in debt amounts adjusted by exchange rate changes). The combined external debt of these two sectors decreased by 0.4% at the end of the year. The overall debt thus reduced by 7.6% within the one-year period, or 7.1% if the effects of the exchange rate changes are excluded (Figure 1). A review of the overall debt based on actual debt

<sup>6</sup> This chapter analyses developments in the real estate market and monitors the operations of non-financial corporations in the construction and real estate industries.

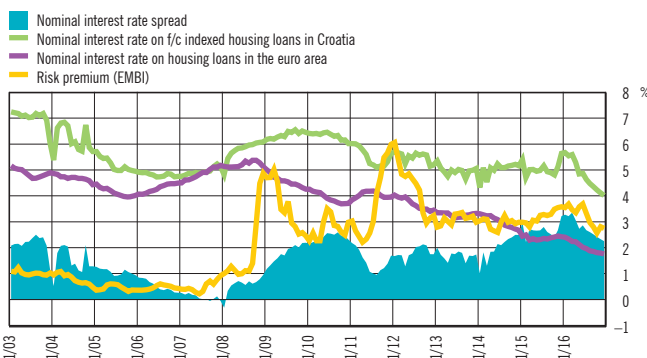
<sup>7</sup> If the estimated secondary refinancings arising from conversion (from euro into kuna loans) are excluded, the estimated growth of newly-granted housing loans might range between 40% and 50%.

**Figure 4.3 Prices of new residential real estate continued to decrease**



Note: The index takes into account qualitative characteristics of the real estate in standardising residential units. The amount of newly-granted housing loans excludes refinancing. Sources: CBS, Eurostat and CNB.

**Figure 4.4 Lower risk premium reduces the interest rate spread**



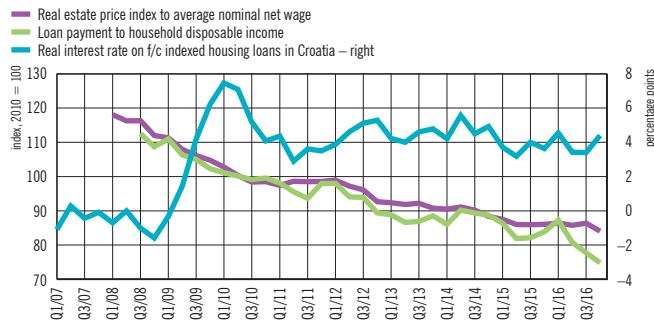
Note: Since December 2011, interest rates have been calculated according to the new methodology (for more details on the new interest rate statistics, see CNB Bulletin, No. 204, June 2014). Sources: ECB and CNB.

repayments (transactions<sup>8</sup>) to credit institutions shows that within a one-year period debt decreased 2.5% (Figure 4.1).

**Despite improvements in the labour market and the growth in disposable income, the household sector continued to refrain from significant long-term investments in real estate.** Namely, the optimism related to purchase, planning or construction of real property, after having grown in the middle of last year, registered a new drop (1.2%), showing that households are still reluctant to use long-term borrowing for purchase or construction of residential property (Figure 4.2). Residential property prices continued the positive trend in the annual growth rates started in 2016 (Figure 4.3). However, in

8 As for the overall debt of the real estate sector, all changes but transactions have been excluded from the domestic component (housing loans and loans granted to the real estate and construction industries).

**Figure 4.5 Residential property much more financially available than before**



Note: 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, and it is presented as the moving average of three successive time periods. Loan instalment refers to an average housing loan for the purchase of residential property of 50 square meters at the price relevant in the reference period (measured by the real estate price index). Sources: CBS and CNB calculations.

contrast to developments linked to the average prices of existing facilities, which have been growing uninterrupted since the last quarter of 2015, the average prices of new residential facilities registered a continued negative trend since early 2012. They were thus 4.7% lower on an annual level at the end of 2016. Among other things, corrections were a result of the changes in buyers' frame of mind at the time of purchase. In contrast to the pre-crisis period when buyers were less careful, purchase decisions are presently reached much more cautiously, taking into account the quality of construction, location and other qualitative characteristics of the property.

**Indicators of financial availability of residential property continued to improve (Figure 4.5).** The aggregate financial availability of real estate property<sup>9</sup> continued to trend upwards in 2016, indicating that the time for investment in this market is still favourable (for more details see Box 2 Divergence of real estate prices in Croatia from intrinsic value). These developments were caused by, among other things, the continued decline in interest rates on new housing loans (Figure 7), which, together with the country's lower risk premium, led to the reduction in the interest spread at the end of the year (Figure 4.4). At the same time, the rise in disposable income, paired with the appreciation of the kuna against the euro, contributed to the continuation of favourable aggregate financial availability of residential property (Figure 4.5).

**Although these trends point towards the beginning of real estate market stabilisation, stronger recovery will not be possible without an increase in demand for residential units, which could result from the announced government interventions.** The Act on State-subsidised Housing Loans<sup>10</sup> aimed

9 Measured as the ratio of the average loan payment to average household disposable income and as the ratio of the real estate price index to the nominal net wage.

10 Within the framework of this regulatory solution the Croatian Real Estate Brokerage Agency will enter into an agreement with commercial banks selected after the closing of a public tendering procedure.

at aiding those under 45 years of age in purchasing their first house or flat under specific conditions might spur some activity growth in the real estate market from its current low, especially since the prices of newly-built flats have been additionally lowered (Figure 4.3). On the other hand, however, the latest tax reform of the beginning of 2017, in addition to reducing the rate of real estate turnover tax, which was lowered from the 5% to 4%, repealed the tax exemption for those purchasing their first real estate property. This act changes the overall cost of purchase for first-time buyers who were thus far at least partially exempt from this tax. Nevertheless, the aggregate effect of the mentioned statutory changes on first-time buyers might be positive if paired with state-subsidised loans, although they will probably not cover all households purchasing their first real estate property. In addition, real estate tax is expected to be introduced as of 1 January 2018, aiming to replace the municipal service fee, as already envisaged by the Local Taxes Act.

## Current risks in the real estate market

The expected more favourable developments in the labour market and the growth of disposable income due to the tax reform of the beginning of 2017 might have a positive impact on the aggregate financial availability indicators of residential property in the forthcoming period. However, a more sizeable growth in the prices of residential real estate that would create market imbalance in the long-term is currently not expected. Possible risks arise from the uncertainty linked to the impact of the introduction of real estate tax at the beginning of the year and from the introduction of a construction fee and a contribution

for development of communal infrastructure<sup>11</sup> envisaged by the draft Public Utilities Act, which will constitute an additional construction cost. The introduction of the said measures is expected to increase the tax burden and negatively affect the recovery of the real estate market.

Risks are also present in the commercial segment of the real estate market given the announced process of Agrokor's restructuring. Data on this market segment are scarce, rendering it impossible to quantify the effect that Agrokor's restructuring might have on the market of commercial real estate. Namely, it is expected that it will surely encompass a share of the retail facilities and logistics centres of the Agrokor Group.

The mentioned lack of data on all segments of the real estate market, its systemic importance and effect on the economy and the financial system has been recognised at the EU level, among other things, due to its pro-cyclical nature. The ESRB thus adopted the Recommendation on closing real estate data gaps (ESRB/2016/14) at the end of 2016, aimed at adjusting the framework for monitoring real estate market by sub-sector at EU level (residential, buy-to-let and commercial segments) by taking into account the size and significance of the individual segment at national level. The Recommendation lays down that macroprudential policymakers need to set up a data collection system to help identify the build-up of systemic risks in this market in the future. The implementation of this Recommendation in the Republic of Croatia should provide economic policy-makers with a more detailed data set on the real estate market in order to ensure their timely reaction in reducing and preventing imbalances arising from this market.

<sup>11</sup> The construction fee is planned as a fee for the use of the already built communal infrastructure, while the contribution would be paid for the construction of new infrastructure. Levies would be paid by the investor upon construction, depending on the location.

## Box 2 Divergence of real estate prices in Croatia from intrinsic value

Developments in real estate prices are directly associated with the overall business cycle through several channels of interaction of real estate prices with macroeconomic variables:

- Direct wealth effect – since residential real estate accounts for a substantial portion of household wealth, thus affecting their aggregate demand. Ciarlone (2012) stressed results that reflect that the housing (price) wealth effect on demand is higher in emerging economies than in more advanced economies, while the opposite is true for the financial wealth effect. The impact of housing wealth on aggregate demand in Croatia has been inter alia, confirmed in papers by Ahec Šonje, Čeh Časni, Vizek (2012)<sup>1</sup>, Čeh Časni (2014)<sup>2</sup>.
- Indirect wealth effect – real estate property as the main source of collateral for debt assumption (indirect wealth effect) ultimately increases the transfer channel of the change in real wealth on household consumption. As a result, real estate price dynamics might significantly affect the stability of the financial system given the variations in collateral value and the credit risk arising from bank exposure to the real estate sector. At the same time, real estate market developments largely determine the investment activity of the construction sector thus supporting the business cycle.

If, however, real estate price developments are not based on economic and financial fundamentals, they may in the upward phase of the business cycle serve as an accelerator of unsustainable credit and construction growth, consequentially causing a stronger fall and longer recovery in the downward phase. The importance of cyclical and structural characteristics of the real estate market for financial and overall economic stability and the thus connected relatively modest availability and adequacy of available data on this market, which is not specific only to Croatia, has been recognised at EU level.

At the end of 2016, the European Systemic Risk Board adopted and published the *Recommendation on closing real estate data gaps*<sup>3</sup>. The main intention of the Recommendation is to establish a harmonised framework at EU level for monitoring developments in the real estate market (residential, buy-to-let and commercial segments), including the definitions and methods for calculating indicators linked to this market in order to enable the early identification of vulnerabilities that could lead to future periods of crisis. The implementation of this Recommendation in Croatia, which has been planned by the end of 2020, will

1 Ahec Šonje, A., A. Čeh Časni, and M. Vizek (2012): *Does housing wealth affect private consumption in European post transition countries? Evidence from linear and threshold models*, Post-Communist economies, 24(1).

2 Čeh Časni, A. (2014): *Housing Wealth Effect on Personal Consumption: Empirical Evidence from European Post-Transition Economies*, Czech Journal of Economics and Finance. 64 (2014), 5, pp. 392–406.

3 ESRB (2016): *Recommendation of the ESRB on closing real estate data gaps* (ESRB/2016/14).

Table 1 Composite indicator calculation weights

| Indicator                                  | Weight |
|--|--------|
| Real estate price index                    | 8.15%  |
| Price-to-rent ratio                        | 20.60% |
| Price-to-net-disposable-income ratio       | 23.47% |
| Price-to-cost-of-construction ratio        | 7.16%  |
| Price-to-net-wage ratio                    | 25.58% |
| Loan-instalment-to-disposable-income ratio | 15.04% |

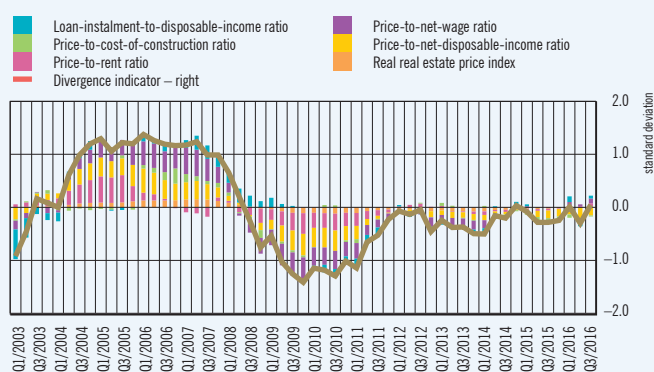
Source: CNB calculations.

surely additionally improve analyses and estimates of developments in the real estate market, aiming at the timely and adequate formation of macroprudential measures directed at reducing systemic risks stemming from this market.

Therefore, in order to identify periods in which real estate in Croatia is under- or over-valued in relation to market factors, a composite index of residential real estate price “divergence” from the so-called fundamental price has been calculated. The principal component analysis method has been used to determine weights employed for aggregation (Table 1).

The analysis reflects different periods of residential real estate over-valuation considering the manner in which trend was removed from the data. If the trend removal approach recommended by Hamilton (2016) is used, the period of over-valuation had already started by the beginning of 2005 and it lasted until 2007. There was a strong correction in all sub-indices already at the end of 2007 and at the beginning of 2008, so model prices in the period from 2009 to 2012 were under-valued relative to the fundamental level. Since early 2012 prices have been in the area of mild imbalance, with a tendency towards balancing.

Figure 1 Indicator of residential real estate price divergence from the long-term trend

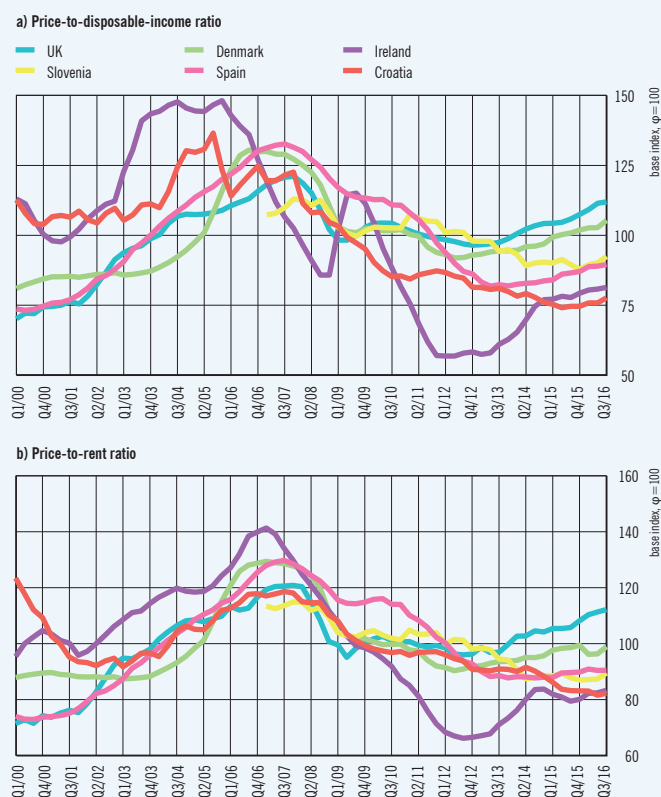


Source: CNB calculations.

An additional review of several simple indicators that may point towards under/overvaluation of residential real estate prices, such as the price-to-disposable-income ratio (P-I) or the price-to-rent ratio (P-R) ( $\phi(2000-2016q3)=100$ ), for Croatia and selected EU countries, reflects almost overlapping periods of real estate over-valuation in all comparable countries. At the same time, there is a noticeable variation in the intensity of over-valuation (measured by the price-to-disposable-income ratio), with the over-valuation in Croatia being lower than in comparable countries such as Ireland, Denmark and Spain (Figure 3). In the post-crisis period these indicators in Croatia trended downwards due to the fall in real estate prices paired with stagnation in disposable income and amount of rent (Figure 3).

The constructed composite misalignment indicator of real estate price from core will help in the identification of the stages of excessive risk accumulation at system level that arises from excessive real estate price growth, and contributes to the mounting of risks in the financial system through the channels mentioned earlier in the text. Although current indicators (the composite indicator of under/overvaluation, as well as the available model measure of price divergence from the equilibrium) do not indicate a generation of cyclical risks associated with the real estate market, the structural characteristics of this market that are reflected in the still relatively low real estate liquidity and increased credit risk of corporates linked to the market, require detailed attention and multi-layered analysis from the macroprudential aspect, which in turn requires an adjustment of the existing information databank.

Figure 2 Comparison of individual indicators



### Calculation methodology:

In this case, the fundamental price is determined on the basis of factors that reflect developments on both sides of the real estate market, the supply and the demand side. Relevant literature uses different empirical methods for assessing divergence of real estate value from the fundamental level, which may roughly be summed up into two methodological lines:

- different econometric techniques that show real estate prices in relation to determinants on the supply and demand side (the ECM model<sup>4</sup> was devised for the Croatian market) and
- asset pricing framework, such as the ratio between the user cost and rental income. The present value methodology represents a similar approach, which shows the ratio between the discounted future rental income and the current real estate price.

The flaw in the techniques described above is their susceptibility to significant uncertainties in the calculation process given the need to meet the assumptions for individual models, as well as data availability. Therefore, composite indicators have been constructed and used more and more both in recent literature and empirically. They are composed of relative economic indicators on the demand and supply side of the real estate market, most often weighted by use of principal component analysis (PCA). The opinion of authors using this method is that the conclusion should be more reliable if a greater number of indicators reflects a similar development in the market (under/over-valuation). Since 2012 the USB has thus been constructing the Swiss index, the *UBS Swiss Real Estate Bubble Index*<sup>5</sup>, which comprises six sub-indices, by combining a greater number of indicators that reflect divergence of residential real estate prices from the stable level by using multivariate technology. A similar methodology is used by Schneider (2013)<sup>6</sup> for Austria, Lenarcic, Damjanović (2015)<sup>7</sup> for Slovenia and Micallef (2016)<sup>8</sup> for Malta.

Taking into consideration the mentioned examples, in order to construct a Misalignment indicator of residential real estate prices in Croatia from macroeconomic and financial factors, six indicators showing the main market drivers were used: the residential real estate price index, the price-to-rent ratio, price-to-disposable-income ratio, that is the ratio of

4 The assessed ECM model contains independent variables of supply and demand constructed using the principal component analysis, real interest rate on housing loans indexed to foreign currency and consumer confidence index. The dependent variable in the model is a logarithmed hedonic index of real estate prices deflated by the consumer prices index. For more detail see: Box 2 Real estate price model, Financial Stability, No. 12, February 2014.

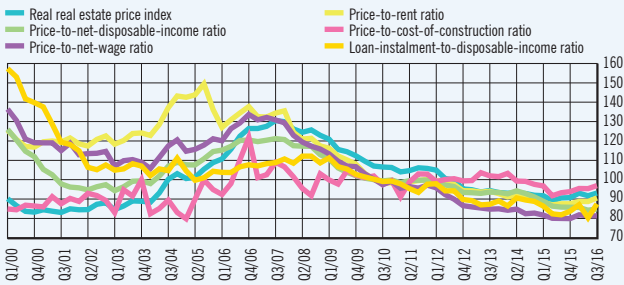
5 UBS Swiss Real Estate Bubble Index: Q3 2016.

6 Schneider, M. (2013): *Are recent increases of residential property prices in Vienna and Austria justified by fundamentals*, Monetary Policy & the Economy Q4/2013, pp. 29-46.

7 Lenarcic, C., and M. Damjanovic (2015): *Slovene residential property prices misalignment with fundamentals*, Banka Slovenije Working Paper 2015.

8 Micallef, B. (2016): *Property price misalignment with fundamentals in Malta*, Working Paper, No. 03/2016, Central Bank of Malta.

Figure 3 Developments in residential real estate prices and individual macroeconomic and financial indicators



Note: Developments in rental prices are obtained from the Consumer Price Index – 04.1 Actual rentals for housing. Net wage is calculated as the average wage in the previous three months following the principle of the month in which the wage was earned and not the month in which it was paid out. Loan instalment refers to an average housing loan for the purchase of residential property of 50 square meters at the price relevant in the reference period (measured by the real estate price index). The construction cost index is calculated from aggregated indices of the price of construction materials and construction costs for new buildings, and it is taken over from Eurostat. Sources: CBS, Eurostat and CNB.

price to average net wage, the ratio of the average loan instalment to average household disposable income, and the price-to-construction cost ratio for new constructions (Figure 3).

Data in the “gap” form, i.e. their divergence from the trend, were used when interpreting the phase of the real estate cycle based on the composite index. The one-sided standard HP filter with a smoothing parameter of  $(\lambda) = 400,000$  is often used to calculate divergence from the linear trend. It is in line with the ESRB<sup>9</sup> recommendation for calculating the countercyclical capital buffer given that the credit cycle can be much longer than the traditional business cycle. In contrast to the traditional HP filter approach, we use the alternative approach, as suggested in his critical review by Hamilton (2016)<sup>10</sup>, arguing that we should define trend as a component that we should be able to predict two years in advance and a cyclical component as errors linked to this prognostic model<sup>11</sup>.

Finally, by employing the OECD methodology for constructing composite indicators<sup>12</sup>, the principal component method<sup>13</sup> was used to determine weights used in the aggregation. This method reduces a greater number of possibly correlated variables to a smaller number of non-correlated variables (linear combinations of initial variables) referred to as principal components. The first component explains the greatest proportional share of data variability, and each following component explains the maximum remaining share of variability.

9 ESRB (2014): *Operationalising the countercyclical capital buffer: indicator selection, threshold identification and calibration options*, European Systemic Risk Board, Occasional Paper Series, No. 5.

10 Hamilton, J. D. (2016): *Why You Should Never Use the Hodrick-Prescott Filter*, Department of Economics, UC San Diego.

11 We use the OLS regression to estimate  $y_{t+h}$  with a constant and four most recent values of  $y$  as of date  $t$ . In case of quarterly data  $h = 8$ , which gives us a trend function.

$$y_{t+h} = \beta_0 + \beta_1 y_t + \beta_2 y_{t-1} + \beta_3 y_{t-2} + \beta_4 y_{t-3} + v_{t+h}$$

where regression residuals offer a good way of removing the trend and obtaining a cyclical component.

$$\hat{v}_{t+h} = y_{t+h} - \hat{\beta}_0 + \hat{\beta}_1 y_t + \hat{\beta}_2 y_{t-1} + \hat{\beta}_3 y_{t-2} + \hat{\beta}_4 y_{t-3}$$

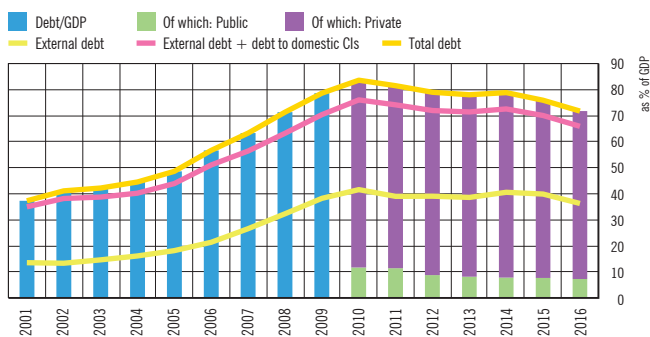
12 OECD (2008): *Handbook on Constructing Composite Indicators: Methodology and User Guide*.

13 Weight  $v_i$  is calculated by multiplying the squared factor loading  $a_{ij}$  and variable  $i$  for factor  $j$ , with the explained fraction of dataset variance  $\sigma_j^2$  by factor  $j$ , where factor  $j$  represents the factor on which variable  $i$  has the highest loading. The number of factors was selected in such a way that by taking the smallest number of factors we explain the greatest possible fraction of the variance in the dataset. The weight for all variable was normalised to 1.

$$y_{t+h} = \beta_0 + \beta_1 y_t + \beta_2 y_{t-1} + \beta_3 y_{t-2} + \beta_4 y_{t-3} + v_{t+h}$$

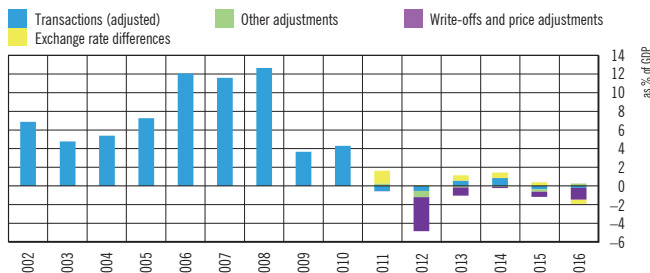
# 5 Non-financial corporate sector

Figure 5.1 Indebtedness of the corporate sector dropped by 4.2 basis points in 2016



Note: Indebtedness of the non-financial corporate sector as the debt-to-GDP ratio. The difference between external debt and debt to domestic credit institutions, and total debt (other debt) is the debt to domestic leasing companies, insurance companies and other financial institutions.  
Sources: HANFA and CNB.

Figure 5.2 GDP growth, sale of claims and appreciation of the kuna have significantly contributed to a reduction in external and domestic indebtedness



<sup>2</sup> The presentations are based on audited data from the consolidated balance of the financial accounts and aligned with changes in the sector classification under the ESA 2010 methodology.  
Note: Decomposition of changes in non-financial corporate indebtedness as the ratio of the change in debt to GDP. Other adjustments refer to a portion of the shipyard debt assumed by the government in June 2012, the sale of non-performing claims, the winding-up of domestic banks in 2013 and 2016 and the methodological changes in the recording of fees in 2013.  
Sources: HANFA and CNB.

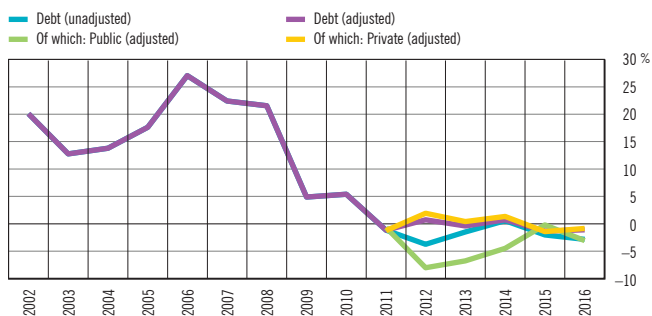
Structural vulnerabilities of the non-financial corporate sector have been steadily mitigated mostly due to the ongoing positive trends in the economy in 2016 and equal expectations for 2017. Nevertheless, some risks in 2017 arise from the still uncertain outcome of the Agrokor Group restructuring and the accompanying secondary effects.

**The total indebtedness of the non-financial corporate sector continued to decline slowly in 2016.** It dropped to 71.7% of GDP at the end of 2016, down from 75.9% of GDP at the end of 2015 (a decrease of 4.2 basis points, Figure 5.1). Net transactions<sup>12</sup> had a slight positive effect on the change in indebtedness, reducing it by 0.2 percentage points, while, including the effect of the external debt-to-equity swap in the last year, the effect of transactions adjusted in this way was twice as low, at some 0.1 percentage points. Nevertheless, the bulk of the decrease in total indebtedness relates to the GDP growth effect (a decrease of 2.0 percentage points) and to a substantial sales of claims by domestic credit institutions (a decrease of 1.3 percentage points), which are shown as other adjustments in Figure 5.2, together with the winding-up of a small domestic bank. In addition, a large impact on the reduction in non-financial corporate sector indebtedness was made by the appreciation of the kuna against the euro (of 0.4 percentage points), which further reduced the debt repayment burden. As a result of debt repayment, the external debt of both private and public enterprises decreased further in 2016. At the same time, both sectors slightly raised their debt to domestic credit institutions. Similar trends in net transactions of the domestic and external debt continued in the first quarter of 2017.

<sup>12</sup> Net transactions are equal to new borrowings – repayments.



Figure 5.3 Non-financial corporations, particularly those in the public sector, have reduced their debt



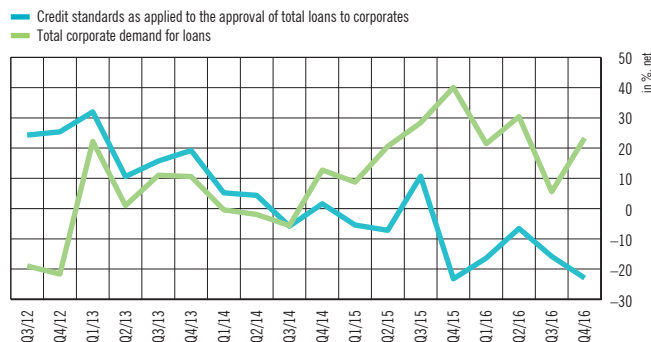
Note: Annual rates of change in non-financial corporate debt. Annual rates of change in the debt of non-financial institutions exclude the impact of exchange rate differences, the sale of non-performing claims, a portion of the shipyard debt assumed by the government in June 2012, the winding up of domestic banks in 2013 and 2016 and the methodological changes in the recording of fees in 2013. Sources: HANFA and CNB.

The resultant adjusted rate of change in the total debt of the sector of non-financial corporations as well as of private corporations was slightly negative (around -1%) in 2016, while it stood at around -3% for public non-financial corporations (Figure 5.3).

From the standpoint of activity, the sharpest rate of decrease in foreign loans with the parallel strongest growth in loans from domestic credit institutions was seen in enterprises in the hotels and restaurants activity. In view of the strong increase in the number of tourist nights and tourism revenues over the last two years and even better expectations for the 2017 season, corporations in the hotel business, mostly large international hotel chains, decreased their foreign loans, whereas the growth in domestic loans to that sector was due to investment in additional capacities and working capital for domestic tourism service providers. The considerable reduction in foreign loans of the activity was due to principal payments as well as considerable write-offs and adjustments, while corporations in the trade and construction sectors reduced their external loans largely by repayment. An increase in loans from domestic credit institutions was also recorded in the manufacturing industry, while other activities reduced their loans, with external being reduced more than domestic loans.

The results of the bank lending survey in the last three quarters of 2016 point to the ongoing increase in loan demand by enterprises and a relaxation of lending terms, which pertains to almost all corporate segments and loan categories (Figure 5.4). Favourable trends in credit standards have been steady in the last two years; along with an improvement in the general economic outlook, these developments in loan supply characteristics were mostly spurred by the situation in the banking market (exceptionally high liquidity of banks and their intensified competition). Against this background, loan demand is expected to continue its years-long upward trend in the forthcoming period. The described movements in 2016 have already been reflected in a more dynamic growth of newly-granted loans by domestic banks (Figure 5.5). In the last nine months of 2016 they increased, on average, by 25.2% (long-term) and

Figure 5.4 Ongoing increase in demand and more favourable trends in supply characteristics of corporate loans in 2016

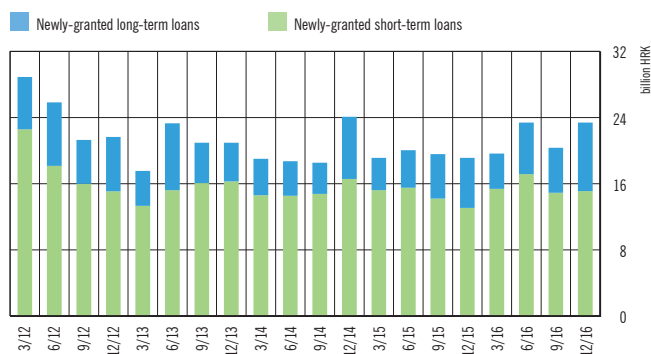


Note: Positive values show the increase in demand, i.e. the tightening of credit standards, whereas negative values show a decrease in demand, i.e. the easing of standards. Source: CNB.

10.2% (short-term) on an annual basis, and in almost equal absolute amounts. Furthermore, demand for loans could be further boosted in 2017 by the restructuring of the Agrokor Group, mostly due to new loans to the Group itself and to its suppliers, as well as the expected greater need to refinance the existing debt of suppliers.

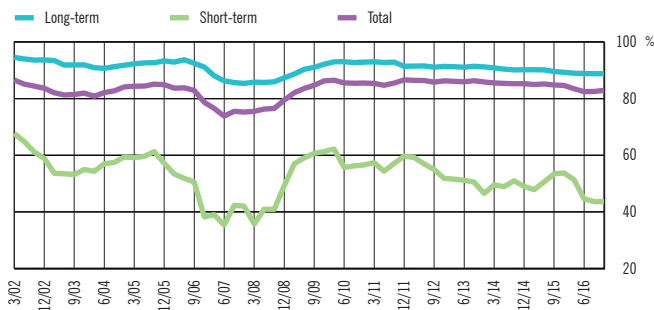
The growth in newly-granted loans to non-financial corporations in the last three quarters of 2016 was insufficient to offset the dominant impact of write-offs and sales of claims, and appreciation of the domestic currency on movements in the stock of debt to domestic banks, which led to its further decrease (Figures 5.3 and 5.5). As mentioned earlier, loan growth was equally accounted for by short- and long-term financing, and was mostly in domestic currency. In the period from the second to the fourth quarter of 2016, the share of kuna loans in total newly-made loans rose on average to 9% from the

Figure 5.5 Regardless of the currency, newly-granted corporate loans increased



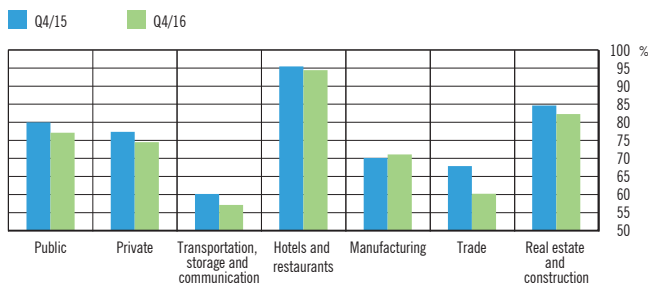
Note: The figure shows newly-granted domestic bank loans to non-financial corporations. Source: CNB.

Figure 5.6 Share of corporate non-kuna debt<sup>a</sup> decreased marginally



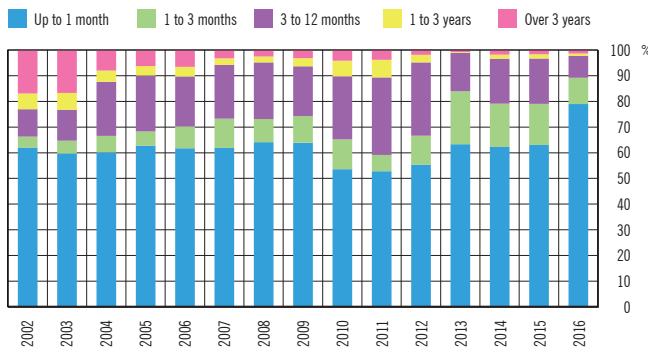
<sup>a</sup> It is assumed that total external debt is denominated in foreign currencies. Debt indexed to foreign currencies (a foreign currency clause) is also included.  
Note: Presented is the share in total corporate debt (by maturity).  
Source: CNB.

Figure 5.7 Most activities and sub-sectors have reduced their currency risk exposure, particularly the trade sector



Notes: 1 The figure shows the share of corporate non-kuna debt in total loans (by sub-sector and activity). 2 Percentages on the horizontal axis indicate the share of export revenues in total revenues of the activity in 2015. 3 It is assumed that total external debt is denominated in foreign currencies. 4 Debt indexed to foreign currencies (a foreign currency clause) is also included.  
Sources: FINA and CNB.

Figure 5.8 Risks associated with growth in interest rates on corporate loans did not change much



Note: The figure presents a breakdown of bank loans to non-financial corporations by interest rate variability.  
Source: CNB.

7% of the previous year for long-term but fell from 58% to 54% for short-term loans. The predominance of short-term loans in the structure of total newly-granted loans was conducive to the slight decrease in the share of total newly-granted loans in kuna from 65% to 63% in the period under review. Similar movements in newly-granted loans, in terms of the maturity and currency structure, were also seen in early 2017.

**Amid the more intensive corporate deleveraging abroad relative to the increase in funding from domestic banks, the overall exposure of the non-financial corporate sector to currency risk went down slightly but remained high (Figure 5.6).** In that regard, the decrease in currency risk relates both to the private and public sectors. Broken down by activity, the greatest contribution to the slight decrease in the currency exposure of the sector came from enterprises dealing in trade as 73% of the decrease in their total debt related to foreign currency debt, most of which was to external creditors. Currency risk exposure of enterprises engaged in other activities remained mostly unchanged (Figure 5.7).

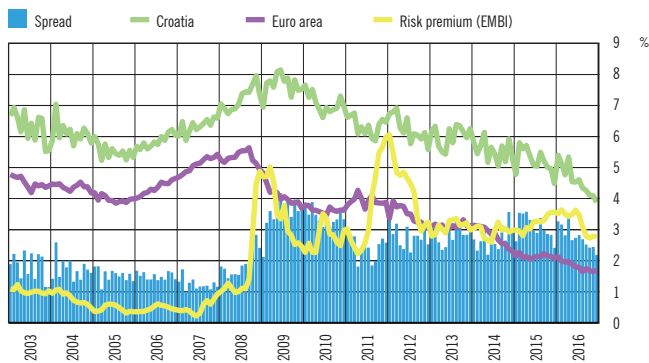
**Corporate exposure to interest rate risk held steady in 2016 from the end of 2015, so that the possibility of its materialisation in the event of interest rate growth did not change much, but remained at high levels.** In particular, the structure of loans by interest rate variability shows an increase in the share of loans with an interest rate variable within a month (of almost 16 percentage points), which offset the decrease in the share of loans with an interest rate variable in the period from 1 to 12 months (Figure 5.8). Parallel with this, the share of loans with an interest rate variable over 12 months went down by approximately 1 percentage point, adding to the marginal increase in the already large share of loans with an interest rate variable within a year.

**In the last three quarters of 2016, short-term interest rates of domestic banks held steady, while their long-term rates continued on the downward trend seen for several years.** The price of short-term corporate financing ranged within its usual fluctuation band, averaging 4.15%. On the other hand, the mild fall in yields to maturity on long-term government bonds of Croatia together with ample liquidity and enhanced competition among domestic banks were among the factors contributing to a substantial drop in the price of long-term corporate financing from March to December of 2016 (by approximately 0.9 percentage points). As a result, at the end of 2016, the weighted long-term interest rate dipped below 4% for the first time. The interest rate movements in Croatia described continued in early 2017.

Also, the downward trend in interest rates in the euro area continued, though slowing down slightly in the last quarter of 2016. In such conditions, the spread between interest rates on corporate loans in Croatia and the euro area widened with regard to short-term loans and narrowed for long-term loans, reflecting the persistent, relatively high country risk premium (Figures 5.9 and 5.10).

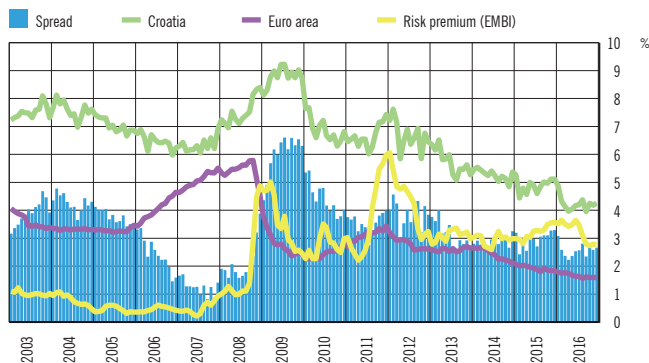
**In line with favourable economic trends in 2016, all three**

Figure 5.9 Decline in interest rates on long-term loans to non-financial corporations in Croatia gained momentum



Sources: ECB, Bloomberg and CNB.

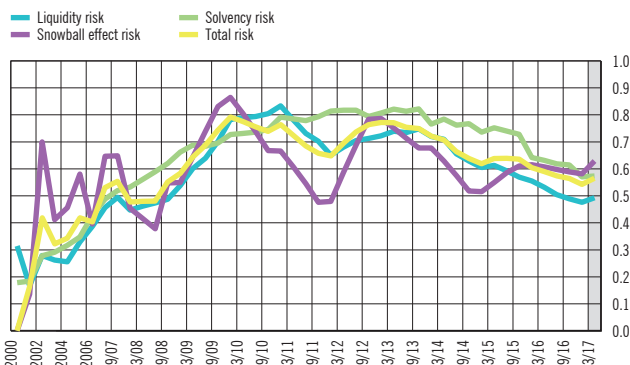
Figure 5.10 Having fallen noticeably early in 2016, interest rates on short-term loans in Croatia held steady in the remaining part of the year



Sources: ECB, Bloomberg and CNB.

**vulnerability indicators of the non-financial corporate sector have decreased and are expected to continue falling in 2017 (Figure 5.11).** Nevertheless, this reduction in non-financial corporate risk could be threatened by the restructuring of a systemically significant group that has been faced with difficulties in settling due liabilities (Agrokor Group). Depending on the outcome of restructuring, the risk's impact on vulnerability indicators in 2017 is uncertain. In particular, an unfavourable outcome could trigger an increase in liquidity and snowball effect risks, which would raise the overall riskiness of the non-financial corporate sector with secondary effects of the risk spilling over onto other sectors, in particular the banking and household sectors. On the other hand, a positive outcome of the restructuring process could induce a further decline in liquidity risk if the period for paying liabilities to suppliers and the state is shortened and if the indebtedness of the Group is reduced by the sale of assets and the rationalisation of operations. However, such a positive scenario would be played out gradually over a longer period.

Figure 5.11 Steady positive trends in the economy and good business performance expected in 2016, along with the debt decrease, facilitated a further reduction in corporate sector risk



Note: Vulnerability indicators of the non-financial corporate sector. The vulnerability of the non-financial corporate sector was estimated by three indicators. The liquidity risk indicator was calculated as the ratio of the sum of the total debt amount and interest payments of the sector to gross operating profit, i.e. EBITDA:

$$LR_t = 0.5 \cdot \frac{Debt_t}{EBITDA_t} + 0.5 \cdot \frac{Interest\ payments_t}{EBITDA_t}$$

The solvency indicator was calculated as the debt-to-equity ratio:

$$SR_t = \frac{Debt_t}{Equity_t}$$

The snowball effect risk was calculated as the ratio of interest payments to the average debt adjusted by the growth in gross operating profit, i.e. EBITDA:

$$SNR_t = \frac{Interest\ payments_t}{Debt_t + Debt_{t-1} + Debt_{t-2} + Debt_{t-3}} - \left( \frac{EBITDA_t}{EBITDA_{t-4}} - 1 \right)$$

These indicators were normalised to the value range 0 – 1 and the total risk was calculated as the average of the three mentioned normalised indicators:

$$TR_t = \frac{LR'_t + SR'_t + SNR'_t}{3}$$

Expected profit (EBITDA) of corporations was estimated in line with GDP growth in 2016.

The shaded area and the corresponding values of the vulnerability indicator denote a simulation of the negative effects of the Agrokor Group restructuring.

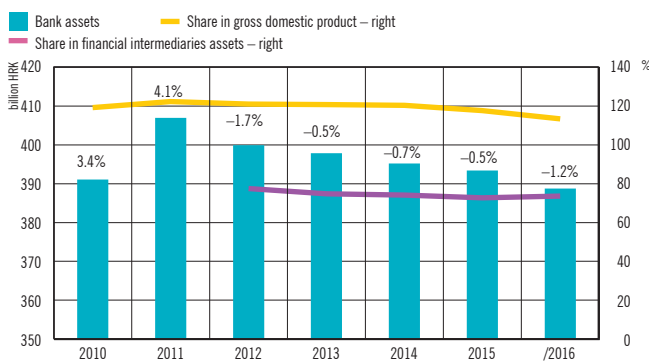
Sources: FINA and CNB.

## Current risks associated with the non-financial corporate sector

Should favourable economic trends continue, the risks to financial stability coming from this sector should decrease steadily, above all due to the expected further growth in profitability of the non-financial corporate sector and accumulated profit from previous years, which could provide a capital buffer to maintain the sector's liquidity in the short run. The anticipated continuance of increasingly more available and less costly funding for the corporate sector, accompanied with the improved currency structure of new borrowing (in kuna) should alleviate the debt repayment burden and contribute to the decrease in currency and interest rate risks. On the other hand, the high level of total non-financial corporate sector debt still presents a significant structural vulnerability, while increased volatility of the international financial markets as a result of the many political risks might ultimately result in unfavourable financing conditions. In addition, depending on the progress in the restructuring of the Agrokor Group, the foreseen decrease in the risk of this sector could be offset in 2017.

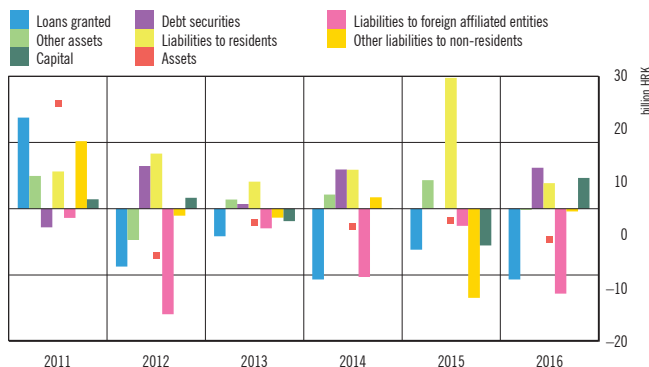
# 6 Banking sector<sup>13</sup>

Figure 6.1 Years-long downward trend in total bank assets continued into 2016



Note: The figures indicate the annual rate of change in total net assets of the banking sector. Source: CNB.

Figure 6.2 Reduction of the credit portfolio and deleveraging with respect to foreign owners set the trends in bank balance sheets



Note: The year-on-year rates of change in major banking sector balance sheet items. Source: CNB.

Although the trends seen in 2016 point to a reduction in risks thanks to further improvements in credit portfolio quality, profitability growth and larger diversification of funding sources, there are still structural vulnerabilities of the banking sector, such as the high level of concentration in the sector and currency-induced credit risk.

## Balance sheet vulnerabilities

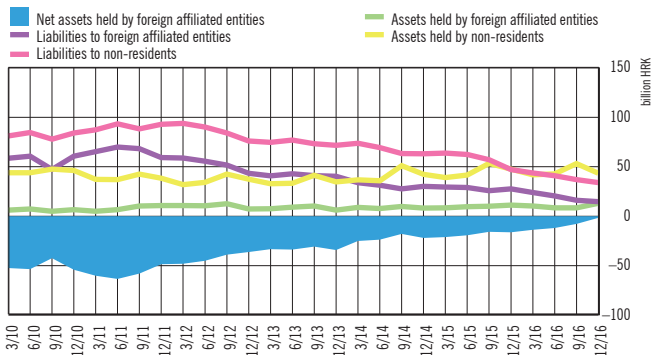
**Bank assets decreased for the fifth year in a row (Figure 6.1).** As the steady reduction of the credit portfolio made domestic funding sources sufficient for banks, they continued to deleverage substantially with respect to foreign affiliated entities in 2016 (Figure 6.2). However, the reduction of the credit portfolio for five consecutive years was not due to weaker credit activity, but was mostly the outcome of intensified selling of non-performing claims, the partial principal write-off due to the conversion of Swiss franc-indexed loans, exchange rate fluctuations and the exit of two banks from the system<sup>14</sup>.

**There is still persistent unfavourable interconnectedness between the financial system and the central government, which is particularly evident in the considerable concentration of exposure to the Republic of Croatia, whose relatively high public debt may become the catalyst of serious systemic disturbances amid accumulated risks.** Regardless of the currently more favourable currency structure of exposures to the

13 The data used in this section refer exclusively to banks and savings banks and do not include branches.

14 Bankruptcy proceedings have been opened against Banka splitsko-dalmatinska d.d., while total assets and liabilities of BKS Bank d.d. have been transferred to its foreign parent bank as part of its transformation into a branch.

Figure 6.3 Bank liabilities to foreign affiliated entities were almost equal to their assets at end-December 2016



Note: Net bank assets with respect to foreign affiliated entities are presented as the difference between assets and liabilities.  
Source: CNB.

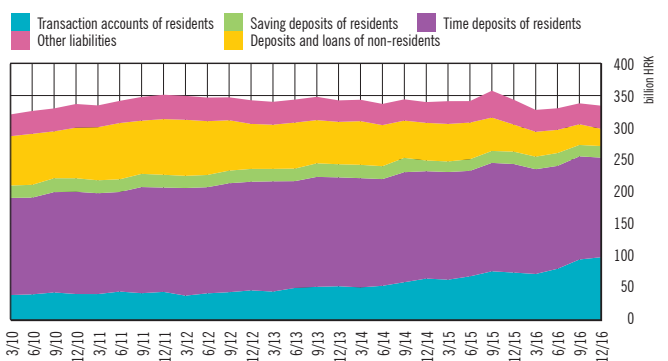
central government and the fact that such a banking business model in the post-crisis period mostly enhanced the quality of assets and added to the stability of bank earnings, the share of placements to the government in the total assets of the banking system has remained at a relatively high level (18.8% at the end of 2016), which is the outcome of the banks' reliance on funding to the government, which is perceived as less risky (Figure 6.6).

Another strong trend perceived in the banks' credit portfolio is the refinancing of maturing loans to the Croatian central government (mostly in euros) by kuna bonds and subscriptions of long-term MoF treasury bills. Total placements to the government decreased by only 0.8% in 2016, but the refinancing changed the structure of banking system assets (Figure 6.6), so that securities reached a historical high of almost HRK 50bn, or 12.8% of total banking system assets at end-2016. It is likely that this change was also triggered by the forthcoming end of the treatment of exposures to central governments and central banks denominated and funded in the domestic currency of any member state as risk-free exposures<sup>15</sup>. In addition, by replacing loans to the government with T-bills and bonds, banks have increased their liquidity coverage ratio (LCR) and the share of assets that may be used as collateral in regular and structural repo operations.

In terms of risks, the larger share of government securities held in portfolios traded at market values makes banks vulnerable, particularly in view of liquidity disturbances in secondary markets that could be triggered by a sudden change in the subdued global risk premium.

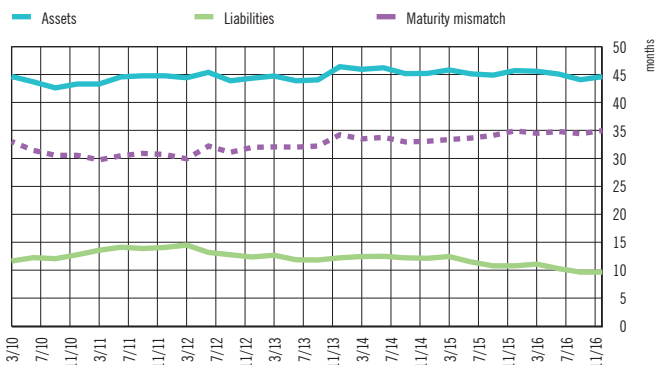
<sup>15</sup> Under the provisions of Regulation (EU) 575/2013 on prudential requirements for credit institutions and investment firms, until 31 December 2017, the same risk weight shall be assigned in relation to those exposures as would be applied to such exposures in their domestic currency, i.e. a 0% risk weight. Starting from 2018, their calculated risk weighted exposure amounts will gradually (up to 2020) be adjusted to the risk level arising from the credit assessments assigned to them by recognised external credit assessment institutions.

Figure 6.4 Strong growth of funds in banks' transaction accounts



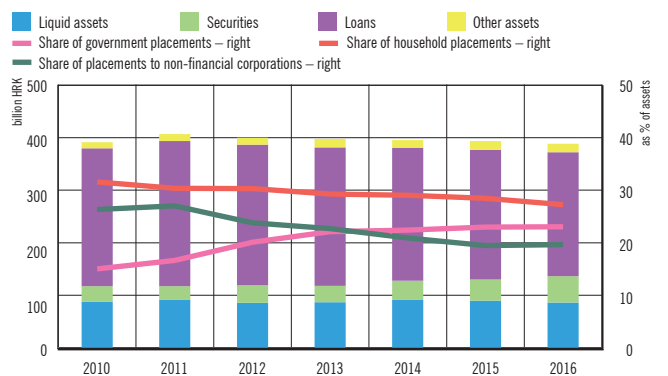
Note: Structure of banking sector liabilities.  
Source: CNB.

Figure 6.5 Growth in the maturity mismatch of bank assets and liabilities mostly due to the shortened maturity of liabilities



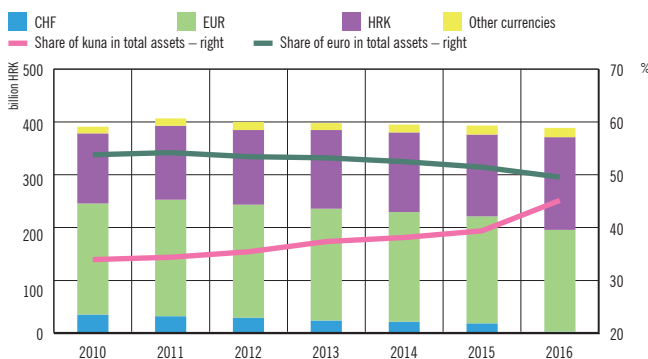
Source: CNB.

Figure 6.6 Share of loans in total bank assets dropped to 61%



Note: Structure of banking sector assets.  
Source: CNB.

Figure 6.7 Share of kuna assets in total bank assets went up to 45%



Source: CNB.

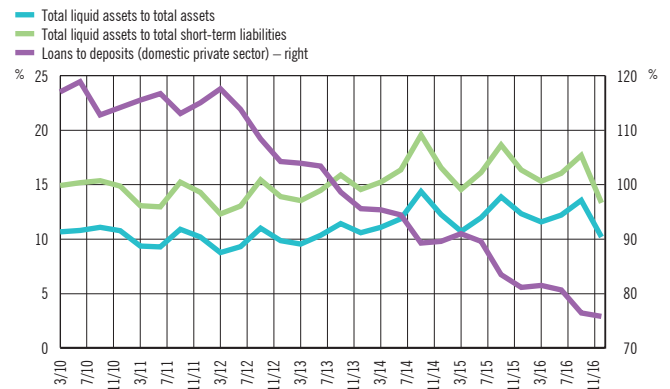
The year 2016 witnessed a continued replacement of cross-border funding sources by domestic funding that is cheaper but also has a shorter maturity. This has increased bank risks arising from the maturity transformation of liabilities to assets. As a result of the several-year banking sector deleveraging with respect to foreign affiliated companies, liabilities to foreign affiliated companies and loans and deposits with these companies were almost the same at end-2016 (Figure 6.3). Net bank assets with respect to foreign affiliated entities stood at only HRK –1.6bn, or –0.4% of total bank assets. As a result of such trends, the dependence of banks on cross-border financing fell to a record low, so that liabilities to non-residents accounted for only 10% of total bank liabilities at end-2016. At the same time, total foreign assets increased and exceeded foreign liabilities by HRK 9.6bn at the end of December 2016, which means that domestic banks became net creditors to non-residents (Figure 6.3).

As liabilities to non-residents declined, the share of resident deposits increased, accounting for 81% of total bank liabilities at end-December 2016 (Figure 6.4). Such movements make the sources of bank funding less dependent on parent banks. Time deposits continued to be transferred to transaction accounts (Figure 6.4), which increased the maturity mismatch between bank assets and liabilities (Figure 6.5) and the associated interest rate risk, risk of liquidity outflows and, in view of their currency structure, the currency risk of banks (for more details see Box 1 Developments in household sector investments and Box 3 Change in the structure of bank funding sources and potential risks to financial stability).

The mentioned increase in kuna liabilities of banks was also boosted by HRK 993.4m worth of long-term kuna liquidity which the CNB placed to banks within four structural repo operations in 2016.

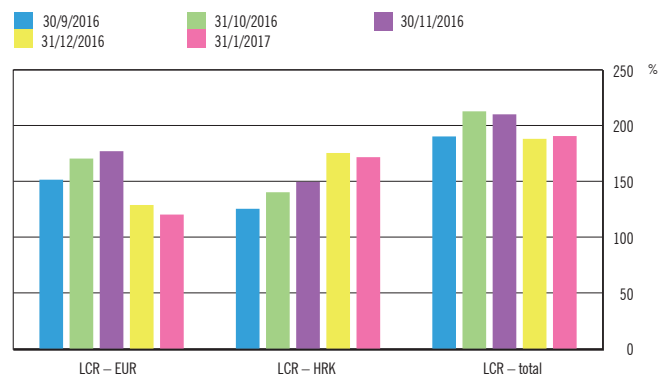
At the same time, the currency structure of bank assets changed in favour of the share of assets denominated in the domestic currency. In 2016, foreign currency items in bank assets de-

Figure 6.8 High liquidity indicators remained on a several-year upward trend



Source: CNB.

Figure 6.9 Liquidity coverage ratio (LCR) is much above the regulatory minimum



Source: CNB.

creased and assets denominated in the domestic currency increased (Figure 6.7). As a result, the share of kuna assets in total bank assets went up to 45% at the end of December 2016.

## Exposure to direct and indirect risks

**Liquidity indicators of the Croatian banking sector remained relatively high in 2016**, primarily due to the reduction of the banks' credit portfolio triggered by the sale of claims and the conversion of Swiss franc-indexed loans. The loan-to-deposit ratio dropped to its lowest level since 2004, to below 80% at the end of December 2016 (Figure 6.8).

The liquidity coverage ratio (LCR)<sup>16</sup> of the system is considerably above the regulatory minimum (currently at 80%<sup>17</sup>) and has even increased in the recent period. Owing to the increase in debt securities of the central government (Figure 6.2), banks have recently strengthened their liquidity buffer and, regardless of the shortened maturity of sources, kept their overall LCR much above the regulatory minimum; in line with this, their kuna LCR moved in the opposite direction from their euro LCR (Figure 6.9)<sup>18</sup>.

Banks continued to have a relatively small currency mismatch of assets and liabilities, and in turn, exposure to direct currency risk, but are still significantly exposed to indirect currency risk as around 86% of loans were not hedged against currency-induced credit risk at the end of 2016 (Figure 6.10). A stronger decrease in this type of risk is impossible without provision of long-term kuna liquidity for bank funding. Furthermore, partial protection of consumers against currency risk by means of a one-off conversion of housing loans indexed to the foreign currency to kuna loans – provided under the Draft Consumer Home Loan Act – indirectly reduces banks' exposure to currency-induced credit risk but raises their exposure to direct currency risk. Should the latter risk materialise, banks would probably try to reduce this exposure in the foreign exchange market, which would create pressures on foreign currency reserves in case of a sudden upsurge in demand for foreign currency. Such effects are expected only in the longer run as the provisions on the conversion of the housing loan currency to an alternative currency refer exclusively to loans granted after the entry into force of the act in question.

Increased caution on the part of clients as regards interest rate risk assumption (by contracting fixed interest rates at least for part of the loan period) has lowered the persistently high level of currency-induced credit risk. With the conversion of Swiss franc-indexed loans to euro-indexed loans<sup>19</sup>, interest rate risk in the non-trading book dropped to below 1% of own funds and remained there throughout 2016 (Figure 6.11). By contrast, though partially limited by the provisions of the Consumer Credit Act (OG 143/2013) that restrict a sharp growth in interest rates on consumer loans, bank exposure to interest

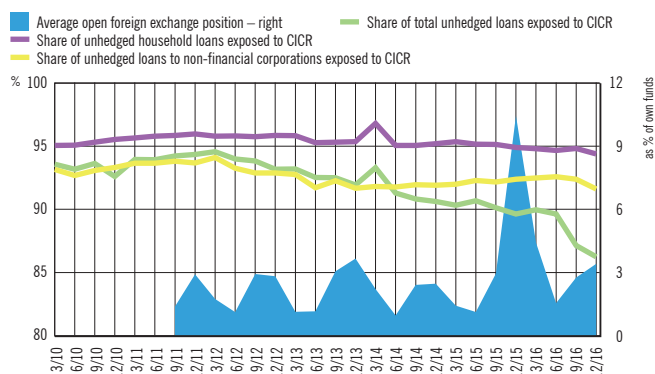
16 One of important reforms of the EU regulatory framework on capital requirements, aimed at ensuring a higher level of banking system resilience, is the introduction of a requirement to maintain the liquidity coverage ratio. Banks are required to maintain a liquidity buffer that covers the potential gap between liquidity inflows and outflows at any time during the 30-day stress period.

17 The liquidity coverage ratio requirement has been phased in; it is 80% for 2017 and is to be 100% as of 1 January 2018.

18 The regulatory requirement on the minimum LCR is not defined at the level of individual currencies and it does not take into account the currency mismatch of liquid assets and potential net outflows. The regulatory minimum refers only to the total LCR that is maintained far from the restricted area.

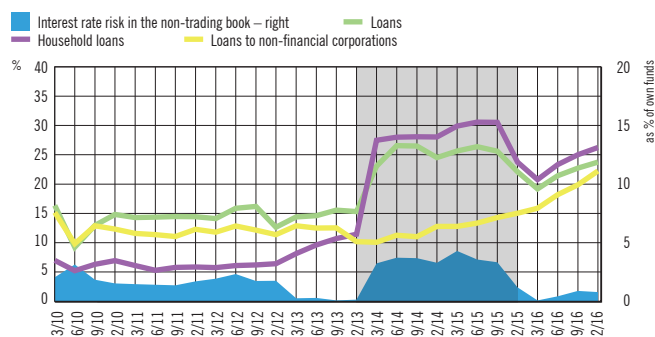
19 Under the Act on Amendments to the Consumer Credit Act (OG 143/2013), interest rates on Swiss franc-indexed loans were fixed as of January 2014, which was reflected in an increase of interest rate risk in the non-trading book.

Figure 6.10 Bank exposure to currency and currency-induced credit risks



Source: CNB.

Figure 6.11 Bank exposure to interest rate and interest rate-induced credit risks



Note: Depicted is the share of loans with a fixed interest rate and a remaining maturity longer than one year in total loans with a remaining maturity longer than one year. The marked area denotes the period in which interest rates on Swiss franc-indexed loans were fixed by law.

Source: CNB.

rate-induced credit risk has remained significant. However, among loans with a remaining maturity longer than one year (as those considered relevant for interest rate-induced credit risk), the share of loans with a fixed interest rate increased and stood at 24% at end-2016 (Figure 6.11). The continuance of such trends without a change in bank funding sources, could fuel an increase in direct interest rate risk in the non-trading books.

## Strategic risks

Owing to the reduction in value adjustments and provisions, as well as considerable one-off revenue, bank profitability improved strongly in 2016. Profit from continuing operations (before taxes) stood at HRK 6.2bn in 2016, which definitely added to banks' capacities to cover unexpected losses. As in the previous years, bank earnings in 2016 were primarily determined by the movements in the amount of value adjustments

and provisions, which were HRK 2.8bn in 2016, their lowest level since 2011. Bank profits before charges for value adjustments somewhat improved in 2016, standing at HRK 9bn, compared with around HRK 7bn in the four preceding years. This was also due to the positive impact made by substantial one-off revenues associated with equity investments<sup>20</sup> and sales of irrecoverable claims, with the latter being made at prices higher than the net book value. This resulted in HRK 338.6m in income from this source, up from HRK 209.3m in 2015.

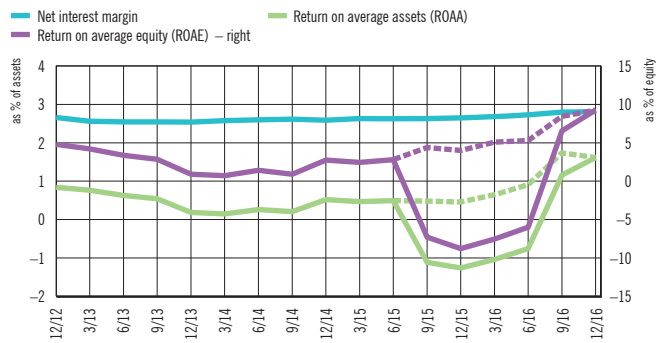
The ROAA and ROAE of banks improved sharply over the last year and reached 1.6% and 9.3% respectively at the end of December 2016 (Figure 6.12). Bank profitability was also favourably influenced by the mild increase in the net interest margin of banks, which was, in turn, due to the faster decrease in bank interest expenses relative to the decrease in their interest income. The continuance of this trend in the future depends on movements in interest rates on deposits and loans, as well as the structure of deposits (the increase in the share of transaction deposits generally reduces bank interest expenses) (Figure 6.13).

A strong impact on bank earnings in 2017 is also expected from charges for value adjustments and provisions associated with exposures of the group of entities related to the Agrokor Group and its suppliers, which the banks have already begun to set aside. Although in the final run these effects will largely depend on the method and dynamics of the Agrokor debt restructuring, as well as effects on its suppliers, they could be considerable for some banks, particularly in case of a disorderly restructuring (see chapter 7 Stress testing of credit institutions).

**The high level of banking system concentration and its continued unfavourable trend still constitute significant structural vulnerabilities for the banking system** (Figure 6.15). Capital buffers for other systemically important credit institutions and structural systemic risk, which also covers system vulnerabilities associated with significant concentration, make capital requirements for important credit institutions larger, and thereby build up buffers for covering potential losses. However, business models of some banks make them more vulnerable to such risks, which could be particularly relevant when taking account of losses or a reduction in revenues generated by exposures to the Agrokor Group. Consolidation of the banking system is also to be continued by the forthcoming merger of two systemically important institutions.

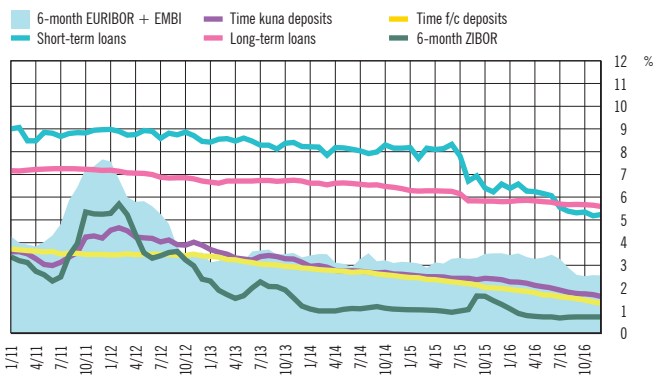
<sup>20</sup> Banks made an income of HRK 656.8m based on the sale of the shares of Visa Europe Ltd., while a strong boost to profit was also made by one bank's income from equity investment into a subsidiary of HRK 342.8m and the sale of one bank's share in a credit card company, resulting in HRK 251m in profit.

Figure 6.12 Bank profitability grew strongly compared with the previous years thanks to relatively lower value adjustments



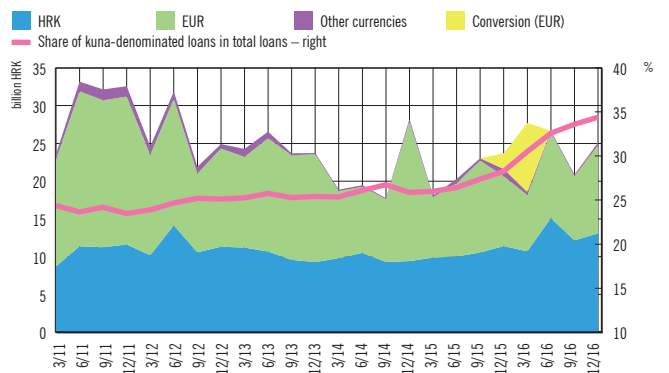
Note: Broken lines represent indicator values without the effect of the conversion of Swiss franc loans. Source: CNB.

Figure 6.13 Lending and deposit interest rates continued to fall



Note: The interest rates on loans and deposits refer to the stock of observed items. Source: CNB.

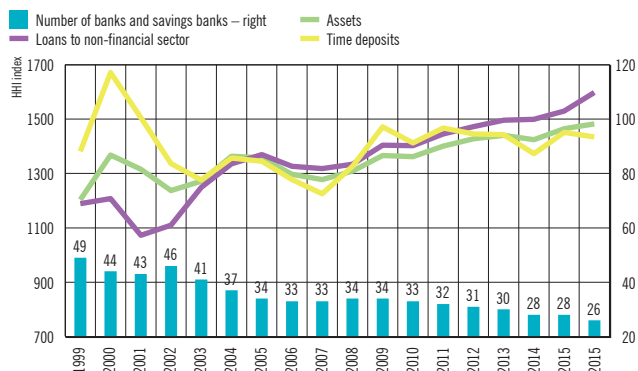
Figure 6.14 Structure of newly-granted long-term bank loans, broken down by currency



Source: CNB.



Figure 6.15 Growth in banking system concentration continued in 2016



Note: Concentration of items observed is presented by means of the Herfindahl-Hirschman index of concentration. Source: CNB.

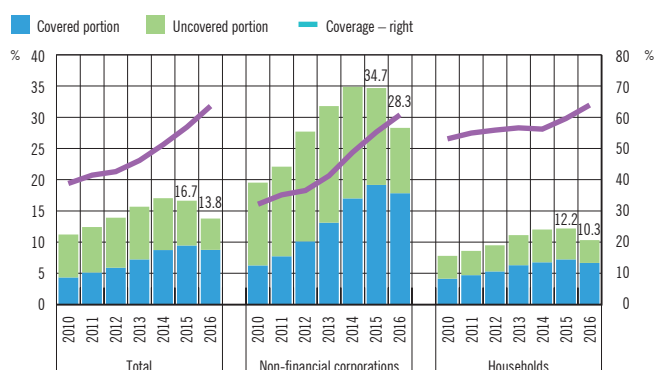
## Credit risk

With the steady and intensified process of banks' balance sheet clean-up, the improvement in asset quality that began in the second half of 2015 continued into 2016. The ratio of non-performing loans to total loans (NPLR) stood at 13.8% at end-2016, down by nearly 3 percentage points from the end of 2015 (Figure 6.16). As these movements were mostly influenced by the sale of non-performing loans, which was more intense in the sector of non-financial corporations, the decrease in NPLR was particularly evident in that sector. The coverage of non-performing loans continued to grow in 2016, so that the coverage of total non-performing loans of banks stood at 63.6% at the end of 2016.

An improvement in the quality of credit portfolios in 2016 was primarily prompted by the intensified process of banks' balance sheet clean-up, i.e. write-offs of non-performing placements that were, above all, influenced by the increased sale of such placements. Induced by the strategies adopted at the level of their international groups and the progressive character of requirements for value adjustments for non-performing placements under the Decision on the classification of placements and off-balance sheet liabilities of credit institutions (OG 41A/2014), as well as increased demand for the purchase of such placements by enterprises specialising in collecting and managing claims, banks sold almost HRK 6bn worth of non-performing placements in 2016, which is as much as 13% of their total amount at end-2015 (Figure 6.17).

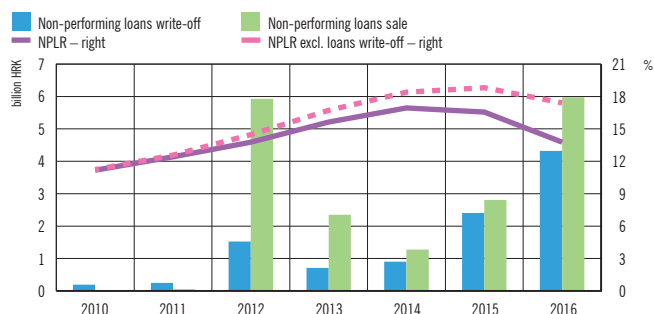
The credit portfolio quality in terms of NPLR improved in 2016, even excluding the effect of the write-off of non-performing loans in that year (Figure 6.17). Some of that effect may be attributed to the process of conversion of Swiss franc-indexed loans, which, improved the creditworthiness of some clients and their ability to repay loans due to the reduction of the principal, as well as the consequent increased refinancing of loans by the same or some other bank. Still, some of the improvement

Figure 6.16 The quality of banks' credit portfolios continued to improve



Source: CNB.

Figure 6.17 Intensification of the process of resolving the issue of non-performing loans by write-offs, which are influenced by enhanced sale of placements



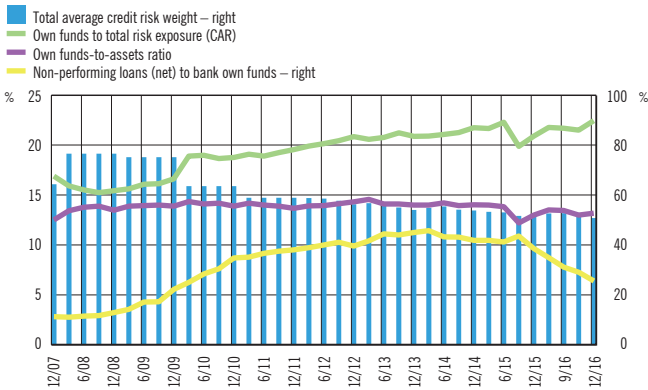
Note: Broken lines show trends in NPLR excluding the effect of loan write-offs after 2010, i.e. under a scenario where banks are not actively involved in clearing their balance sheets in the period under review. Source: CNB.

in the credit portfolio quality may definitely be associated with the recovery of some non-performing loans thanks to economic growth.

**However, the credit portfolio quality in the forthcoming period will also be strongly influenced by inflows of fully and/or partially irrecoverable placements to the Agrokor Group and economically related entities.** Noticeable even in the scenario of an orderly restructuring of the Agrokor Group, under which there are no significant negative effects on macroeconomic developments (see chapter 7 Stress testing of credit institutions), is a considerable contribution to the increase in NPLR as a result of difficulties in Agrokor debt servicing. However, the steady intensive process of banks' balance sheet clean-up (which will probably include placements to Agrokor), in a context where improvements in the credit portfolio quality are not due solely to the sale of claims (Figure 6.17), may add to improvement in the credit portfolio quality.

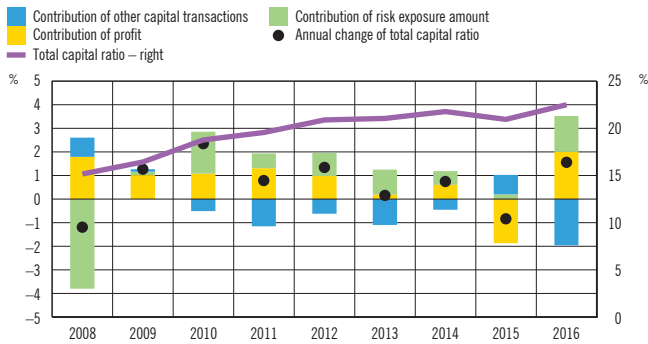
In addition, due to difficulties in debt servicing, credit risk is largely determined by expected losses in the process of Agrokor

Figure 6.18 Recovery of capital adequacy ratios following a temporary deterioration in the second half of 2015



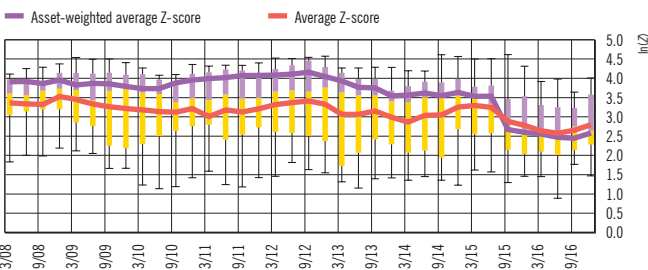
Source: CNB.

Figure 6.19 Total capital ratio increased in 2016 due to relatively high bank earnings and a further decline in bank exposure to credit risk



Note: The growth of the total capital ratio may be the result of the growth in own funds or the fall in the amount of risk exposure.  
Source: CNB.

Figure 6.20 Insolvency risk has decreased despite increased volatility of bank earnings in the last two years



Note: The Z-score is a widely accepted indicator of the individual stability of banks and is calculated as:  $Z = \frac{k + \mu}{\delta}$  in which  $k$  is the equity and assets ratio,  $\mu$  is the average indicator of ROA (in the last two years) and  $\delta$  is the volatility of earnings (standard deviation of profitability of assets for the last two years). A higher score denotes a higher stability of the bank, i.e. a lower risk of bank failure. Also, the score can be divided into two components: earnings stability index and equity stability index.  
Source: CNB.

restructuring and effects on economically related entities. The estimate of expected losses directly depends on assumptions about the method and dynamics of restructuring as well as the effects on economically related entities (for more details see chapter 7 Stress testing of credit institutions), but they definitely contribute to higher credit risk in banks.

## Bank capitalisation

Capital adequacy indicators of banks, which deteriorated temporarily in late 2015 due to the conversion of Swiss franc-indexed loans, remained at relatively high levels in 2016. The total capital ratio of banks stood at 22.5% at the end of December 2016 (Figure 6.18). Thanks to record high sales and write-offs of non-performing loans, their pressures on own funds of banks were significantly alleviated in 2016. The ratio of non-performing loans to the own funds of banks stood at 26% at end-2016, which is a decrease of almost 13 percentage points from the end of 2015 (Figure 6.17).

A more detailed look at contributions of individual components to changes in the total capital ratio on an annual basis shows that in the period after 2008 the most significant positive contribution to the growth in that ratio came from the reduction in risk-weighted exposure amounts (Figure 6.19). With the exception of 2015, when banks recorded significant losses associated with the conversion costs of Swiss franc-indexed loans, the total capital ratio was also boosted by relatively good bank earnings. By contrast, other capital transactions, i.e. profit payments in the period under review, partially offset the positive contribution of earnings to the growth in the banks' capital adequacy. Cumulative dividend payments of banks amounted to HRK 14.8bn from 2008 to 2016, or around 73% of cumulative profits in the same period. Such trends will likely continue in 2017.

The risk of any institution in the banking system becoming insolvent, in terms of the Z-score, was relatively high in 2016 as compared to the period before 2015. This was mostly due to increased volatility of earnings, which dropped significantly in 2015 as a result of considerable bank costs associated with the conversion of Swiss franc-indexed loans (Figure 6.20). However, insolvency risk in terms of the Z-score decreased in the second half of 2016 and it is expected to return to its pre-2015 level of more than 3 in the forthcoming period.

## Current risks associated with the banking sector

While most of them are favourable, current trends in the banking sector have failed to reduce substantially the exposure of the financial system to systemic risk, but have mostly led to the transfer and changes in the form of the main risks to financial stability.

The high level of banking system concentration and its continued unfavourable trend, as well as the concentration of banks' exposures, still present significant structural vulnerabilities of the banking sector. Regardless of the currently more favourable currency structure of exposures to central governments, there is still a persistent unfavourable interconnectedness between the financial system and the central government, which is particularly evident in the considerable concentration of exposure to the Republic of Croatia, the relatively high public debt of which may become the catalyst of serious systemic disturbances amid accumulated risks.

While the larger reliance on domestic funding sources has somewhat diminished the risks associated with their concentration, it is at the same time related to an increase in the maturity mismatch between assets and liabilities. This increases bank risks arising from the maturity transformation of liabilities to assets.

Regardless of the steady improvement in the credit portfolio quality from the second half of 2015, debt servicing difficulties of the Agrokor Group and their effects on economically related entities have increased the credit risk of banks.

### Box 3 Change in the structure of bank funding sources and potential risks to financial stability

The environment of low interest rates, which has been present in international financial markets for several years, triggered a change in the behaviour of depositors and in the structure of bank deposits in both Croatia and other EU member states. Low interest rates have also led to increased risks that, if financing conditions are tightened, could materialise for some bank clients and for the banks themselves in the form of interest rate-induced credit risk (see publication Macroeprudential Diagnostics, No. 1).

In addition, banks in Croatia will also be exposed to potential currency risk if the change in the structure of deposits in favour of transaction accounts comes to an end, i.e. if the share of time deposits that are usually linked to the euro grows again. In particular, increased affinity of bank clients for kuna loans<sup>1</sup> is currently not accompanied by increased affinity of bank depositors for long-term savings in kuna, but rather by an increase in transaction deposits in kuna.

#### Basic trends and developments in the structure of deposits in Croatian and European banks

The high liquidity of the Croatian banking system and relatively mild financing conditions in international financial markets resulted in the lowest-ever interest rates on time deposits of Croatian banks. Interest rates on newly-received time deposits dropped by around two percentage points from early 2011 to late 2016, standing at 0.6% at the end of December 2016 (Figure 1). Approximately the same reduction in interest rates on newly-received deposits was also observed in banks in the euro area, which stood at 0.3% at the end of December.

It is interesting that the traditionally higher interest rates on kuna savings in Croatia have failed to attract more depositors towards long-term kuna savings (Figure 2). Instead, the currency structure of time deposits has remained relatively stable in the last six years, the share of euro time deposits in total time deposits hovering around 70%. In addition, in the past two years, i.e. since the introduction of taxes on (kuna and foreign currency) savings, a sizeable portion of the fall in euro time deposits (which decreased by HRK 16.4m from the end of 2014 to 2016) led to an increase in funds in euro transaction accounts (which increased by HRK 15.3bn in the same period).

The upward trend in the share of overnight deposits of households and non-financial corporations in Croatia was also observed in other EU member states (Figure 3). The decrease in interest rates also influenced the extension of maturity of time deposits (Figure 4).

A further boost to the increase in funds in transaction accounts in Croatia was also made by the introduction of taxes on (kuna and foreign

Figure 1 Interest rates on time deposits of household and non-financial corporate sectors

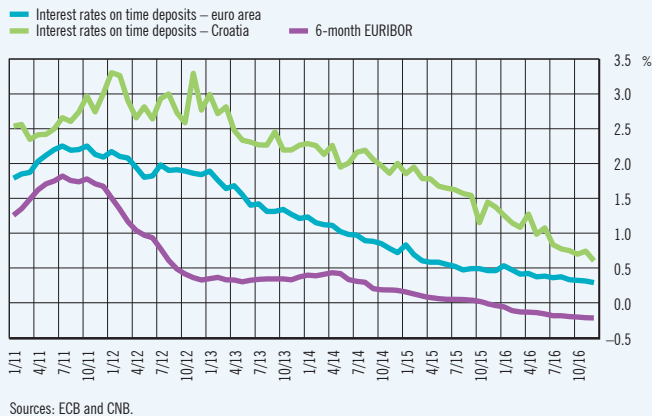


Figure 2 Interest rate on Croatian banks' newly-received time deposits in euro and in kuna

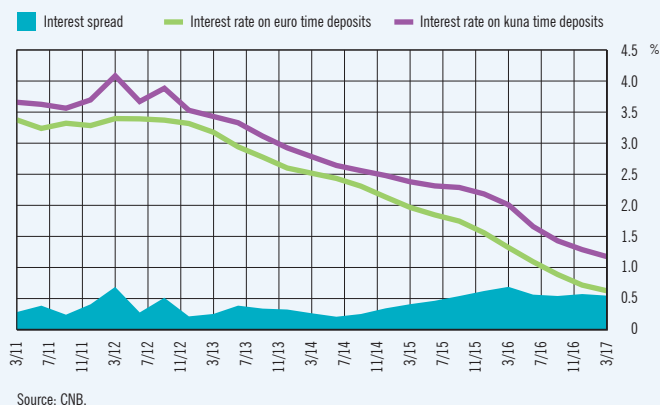
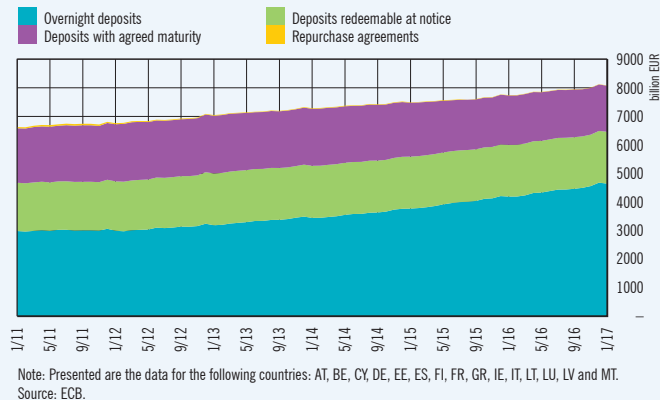
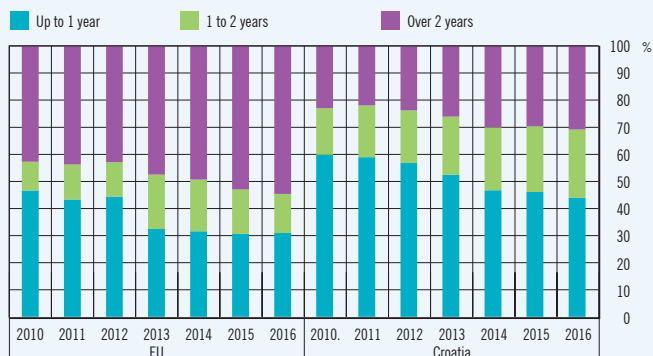


Figure 3 Structure of bank deposits received from household and non-financial corporate sectors, broken down by the type of instruments, in selected euro area member states



<sup>1</sup> For more details see A Note on Kuna Lending: <https://www.hnb.hr/documents/20182/1197894/s-21.pdf/d11069c9-d484-496c-91b2-59282b6e4eaa>.

Figure 4 Structure of bank time deposits from household and non-financial corporate sectors, broken down by maturity, in selected EU member states and Croatia



Note: Presented are the data for the following countries: AT, BE, CY, DE, EE, ES, FI, FR, GR, IE, IT, LT, LU, LV and MT. Sources: ECB and CNB.

currency) savings, after which this trend picked up speed<sup>2</sup>; also contributing were regulatory changes in the classification of deposits in late 2014<sup>3</sup> (for more details see Financial Stability, No. 17).

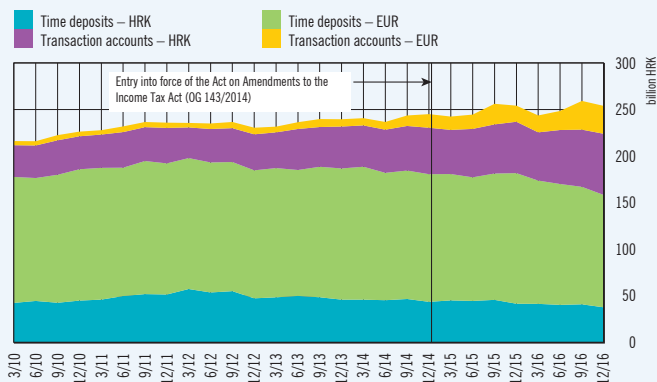
For a more detailed overview of the risks associated with a potential spillover of transaction deposits into other forms of financial assets see Box 1 Developments in household sector investments.

### Risks arising from increased liquidity of liabilities

At end-December 2016, funds in transaction accounts of banks accounted for 35% of total bank deposits received, i.e. 30% of total bank liabilities, which has exposed banks to interest rate risk in conditions of the expected growth in interest rates in the medium term. Direct interest rate risk is transferred to clients due to the high share of variable interest rates (see chapter 3 Household sector and chapter 5 Non-financial corporate sector). However, it is possible that interest rate risk may materialise for some clients (those with loans whose interest rates change in the longer run), which means that interest rate-induced credit risk may materialise for banks (for more details see Macprudential Diagnostics, No. 1).

The maturity mismatch of bank assets and liabilities also increased, mostly due to the shortened remaining maturity of liabilities, while the

Figure 5 Structure of time deposits and transaction accounts of banks, broken down by currency



Source: CNB.

remaining maturity of assets remained relatively stable in the observed period (Figure 5 in chapter 6 Banking sector). Increased maturity transformation with lower interest rates for shorter periods has affected bank earnings and reduced the national reference rate (NRR), primarily for kuna. Should the structure of sources change in favour of longer-term deposits, the NRR is expected to increase even in the absence of strong growth in interest rates on particular types of deposits. While this would reduce interest rate risk effects for banks, it would also increase the burden of loan repayment for loan users whose loans are linked to the NRR.

Furthermore, as depositors seek higher yields, there is potential for outflows towards types of assets with expected higher yields. Nevertheless, analyses presented in Box 1 Developments in household sector investments, as well as developments in the real estate market (see chapter 4 Real estate) do not currently indicate a tendency for any significant reallocation of assets outside the banking sector.

Finally, the described change in the structure of deposits has also increased potential risks of currency mismatches. In particular, an increase in the share of transaction deposits also implies higher currency risk in view of the fact that most transaction deposits are in kuna (at end-2016, 65% of total funds in transaction accounts were in kuna), while most time deposits are in euro (70% of total time deposits were denominated in the euro at the end of 2016) (Figure 5).

2 Under the Act on Amendments to the Income Tax Act (OG 143/2014), a 12% tax on interest on kuna and foreign currency savings (sight, time and annuity) was introduced as of 1 January 2015. Interest receipts on funds in current and giro accounts are not taxed if the interest rate is below 0.5% per annum.

3 Decision on amendments to the Decision on statistical and prudential reporting (OG 127/2014).

# 7 Stress testing of credit institutions

The importance of classic stress testing at a credit institution lies primarily in the fact that this specific macroprudential tool helps regulators to assess the current ability of credit institutions to withstand unexpected losses after the materialisation of systemic risks. Such information enables the formulation of policies aimed at ensuring more than just the mere business continuity of individual banks for it also endeavours to ensure sufficient system capacity for the uninterrupted provision of financial intermediation services under stress conditions, limiting their duration and contributing to faster economic recovery.

Although the domestic banking system has gone through a years-long period of declining earnings and materialisation of specific shocks, such as the costs of conversion of loans indexed to the Swiss franc, which has weakened its autonomous loss absorption capacities, this iteration of stress testing unambiguously showed that its resilience is still great. Not even the simulated, highly unlikely, scenario of a new global crisis, the blows of which would be amplified by a series of idiosyncratic shocks and a decline in the sovereign credit rating, would deplete the capital and liquidity buffers accumulated in the system. The results of the stress test indicate the need to maintain high capital conservation buffers for the purpose of maintaining banking sector stability.

## Initial simulation conditions

The experience from the last crisis, viewed through the prism of domestic bank performance in terms of the intensity of their credit activity and their operating results, largely confirmed the already known fact that these indicators lag behind the real cycle. The processes of the crisis are thus reflected in changes in the banking sector for a relatively long time, even after the economic recovery has actually started. This determines the initial simulation conditions for stress testing and further interpretation of the results and also reveals the development of some new risks, especially until the mentioned recovery gains sufficient strength. For instance, since the onset of the crisis to date, the number of credit institutions diminished by one fifth as a result of bankruptcy proceedings and transformation processes (transformation to branches and acquisitions among domestic

entities)<sup>21</sup>. Excluding the undergoing merger of two large banks initiated early this year, the majority of banks in question were smaller and less capitalised banks, which in principle marginally improved their capitalisation. In contrast to previous stress test iterations when capitalisation lost some two percentage points due to the cost of conversion of loans indexed to the Swiss franc, the banking system now faces the potential cost of Agrokor's restructuring, which could, under the worst-case scenario of a disorderly restructuring, including the indirect effects on the solvency and liquidity of affiliated entities and suppliers, exceed the listed effects on capital.

The recent recovery of bank profitability will facilitate the absorption of this shock. The envisaged record profit payments, if they actually see the light of day, could reduce the capital surplus accumulated in the system. After the years-long growth of provisions (which considerably improved the coverage of non-performing loans), we may expect lower additional provisions for old bad placements. Finally, a slightly more favourable medium-term growth perspective than registered in the last stress test iteration widens the difference between the results under the baseline and the adverse scenario.

## Scenario features

### a) Baseline scenario

The baseline scenario is based on expected economic developments, taking into account the recent developments in monthly indicators and the mounting of certain risks associated with the Agrokor Group. It primarily reflects favourable developments in foreign demand, i.e. a stable recovery in the economies of Croatia's main trading partners, except Italy, and lower energy prices, but also the continued growth of the US economy. Domestic demand is expected to positively react to impulses coming from the reduction in the tax burden on labour from the beginning of the year and the gradual increase in the base for the wage calculation to employees in the public sector throughout the year. The intensification of real activity contributes to greater employment and the growth of disposable income of households in general, which will continue to boost consumer optimism. This would be additionally facilitated if favourable financing conditions in external markets continued, given their

positive impact on domestic financing conditions. Accordingly, private investments are expected to grow, boosted by stronger withdrawal of EU funds and partly by the preparation of accommodation capacities amid expectations of a good tourist season. The resolution of Agrokor's financial difficulties will have a partially limiting effect on investments and the labour market through the degree of legal and political uncertainty burdening the restructuring process. Nevertheless, given the government's active role in line with the adjusted legal framework, it is realistic to expect an orderly restructuring of the company.

### b) Adverse scenario

One of the recognisable features of the post-crisis period is poor investment activity linked with relatively slow economic growth<sup>22</sup>. What is called secular stagnation is an explanation of recent macroeconomic developments, underlining limitations for the implementation of stimulating economic policy measures, as well as for their efficiency in achieving a more long-term and stronger increase in effective investment demand.

The dwindling growth of the US economy due to monetary policy tightening might trigger a new crisis episode on the path of secular stagnation. The growing likelihood of a new recession in the US can be read out from the Fed<sup>23</sup> and IMF model estimates, although the latest expectations have been lowered under the influence of recent events. In addition, the probability of recession rises as the period of the global economy expansion elapses<sup>24</sup>.

The cross-border effects of recession in the US might unfavourably affect the GDPs of European countries through trade channels, and care should be taken of the rising interconnectivity in the financial stress on these markets with correlation levels registered during the last crisis being exceeded<sup>25</sup>. This partially reflects the negative effects of expansionary politics because ample liquidity put additional pressure on nominal interest rates and stimulated risk taking or made risk differentiation difficult, bloating the prices of financial assets and, in some areas, of real estate<sup>26</sup>.

It is hard for fiscal policy to generate investment demand in a satisfactory volume amid such conditions because compensating for private investments would require an exceptional level

21 This pertains to three institutions since the last stress test iteration carried out more than a year ago (December 2015).

22 EIB (2016): *Investment and Investment Finance in Europe – Financing productivity growth*, European Investment Bank ([http://www.eib.org/attachments/efs/investment\\_and\\_investment\\_finance\\_in\\_europe\\_key\\_findings\\_2016\\_en.pdf](http://www.eib.org/attachments/efs/investment_and_investment_finance_in_europe_key_findings_2016_en.pdf)).

23 Ergungor, E. O. (2016): *Recession Probabilities*, Economic Commentary, Federal Reserve Bank of Cleveland (<https://www.clevelandfed.org/newsroom-and-events/publications/economic-commentary/2016-economic-commentaries/ec-201609-recession-probabilities.aspx>).

24 In the next two years the probability of a new crisis exceeds 88%, see Summers, L. (2016): *Crises in Economic Thought, Secular Stagnation, and Future Economic Research* in NBER Macroeconomics Annual 2016, Volume 31, ed. Martin Eichenbaum and Jonathan A. Parker.

25 ECB (2016): *Box 1 Is euro area financial stress becoming more global?*, Financial Stability Review, pp. 26-27

26 ESRB (2016): *Vulnerabilities in the EU residential real estate sector*, report on vulnerabilities in the EU residential real estate sector ([https://www.esrb.europa.eu/pub/pdf/reports/161128\\_vulnerabilities\\_eu\\_residential\\_real\\_estate\\_sector.en.pdf](https://www.esrb.europa.eu/pub/pdf/reports/161128_vulnerabilities_eu_residential_real_estate_sector.en.pdf)).

Table 7.1 Macroeconomic scenario

| Indicators  | Baseline scenario |       | Adverse scenario |       |                |       |
|---|-------------------|-------|------------------|-------|----------------|-------|
|   |                   |       | Basic            |       | Differentiated |       |
|   | 2017              | 2018  | 2017             | 2018  | 2017           | 2018  |
| Financing conditions on the foreign market                                    |                   |       |                  |       |                |       |
| ECB main ref. rate, %   | 0.00              | 0.00  | 0.00             | 0.00  | 0.00           | 0.00  |
| Fed funds tar. rate, %  | 1.40              | 2.10  | 1.05             | 0.25  | 1.05           | 0.25  |
| EURIBOR 3M, %   | -0.32             | -0.29 | 0.00             | 0.00  | 0.00           | 0.00  |
| GDP (real growth in the EU), %  | 1.60              | 1.60  | -1.50            | -2.15 | -1.50          | -2.15 |
| Financing conditions on the domestic market                                   |                   |       |                  |       |                |       |
| Bond yields, average change in p.p.   | 0.22              | 0.35  | 1.37             | 2.16  | 1.37           | 2.16  |
| Long-term interest rates, average change in p.p.                              | -0.14             | 0.03  | 1.26             | 1.74  | 1.26           | 1.75  |
| Short-term interest rates, average change in p.p.                             | -0.13             | -0.02 | 1.28             | 1.70  | 1.28           | 1.70  |
| Money market interest rates, average change in p.p.                           | -0.28             | -0.05 | 1.31             | 5.85  | 1.31           | 5.85  |
| Exchange rate   |                   |       |                  |       |                |       |
| EUR   | 7.48              | 7.48  | 7.86             | 8.23  | 7.86           | 8.23  |
| CHF   | 7.00              | 6.93  | 7.46             | 7.92  | 7.46           | 7.92  |
| Real sector   |                   |       |                  |       |                |       |
| Investment, real (yoy, %)   | 5.9               | 7.0   | 0.6              | -5.6  | 0.4            | -6.4  |
| Personal consumption, real (yoy, %)   | 3.1               | 2.9   | 0.1              | -3.9  | -0.1           | -4.4  |
| GDP, real (yoy, %)  | 2.8               | 3.0   | 0.3              | -2.5  | 0.2            | -2.9  |
| Unemployment rate (%)   | 13.9              | 13.6  | 14.3             | 16.1  | 14.4           | 16.3  |
| Real estate prices (yoy, %)   | -0.4              | 1.7   | -1.6             | -4.4  | -1.6           | -4.5  |
| Consumer prices (yoy, %)  | 1.4               | 1.3   | 1.9              | 2.5   | 1.9            | 2.5   |
| Memo:   |                   |       |                  |       |                |       |
| Credit quality step for the risk weight of exposure to the central government |                   | 4     |                  | 6     |                | 6     |

Source: CNB.

of public investments, which is impossible if fiscal rules are obeyed, and it would negatively affect investor perception and the country's credit rating. In addition, recent political changes, such as Brexit or US withdrawal from the TTIP, indicate that there are limits to expected stimuli to investment activity that could come from the expansion of trade agreements, heightening the risks of protectionism in economic policy.

Such developments could jeopardise the projected growth path in the euro area and consequently of the Croatian economy which is highly dependent on global developments. The order of negative shocks would depend on internal vulnerabilities and the specifics of the banking system, which are outlined in brief in the text below.

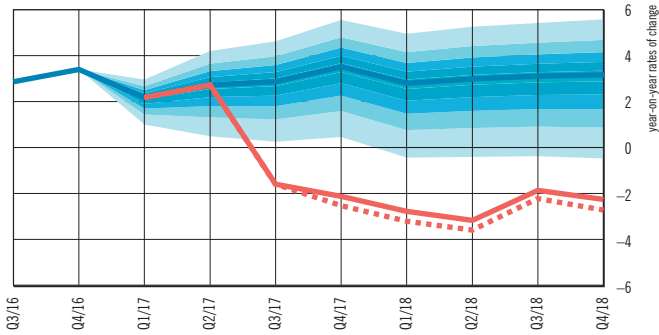
i) During a prolonged period of investor reluctance characterised by the absence of noteworthy growth of credit to the private sector, and by years-long deleveraging, banks in Croatia turned towards government financing, perceived as less risky. Although this growth model contributes to a "better" quality of assets and stabilisation in bank earnings, at the same time it increases the interconnectivity of the financial system and the state. The intensity of this connection affects the capital adequacy of the banking system after the first year of the simulation horizon when the preferential treatment of exposures to central governments and central banks of EU Member States denominated and financed in foreign currencies<sup>27</sup>, provided for by regulations, expires. The said regulatory pressure will result in the rise of the amount of risk exposure, that is, capital

<sup>27</sup> See chapter Banking sector in this issue of Financial Stability.

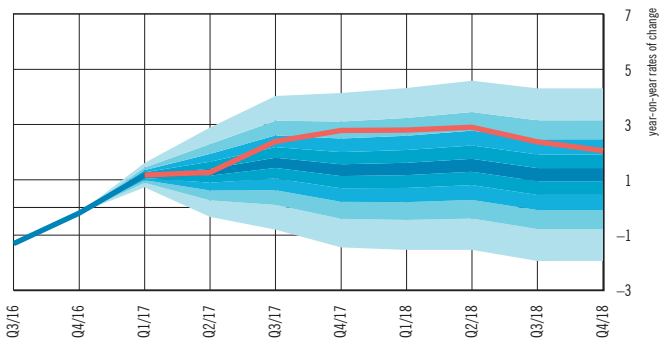


Figure 7.1 Adverse scenario probability

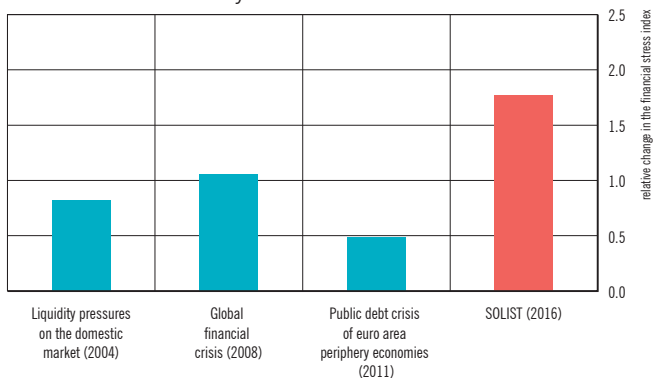
a) GDP dynamics under the adverse scenario relative to the risks of materialisation of the baseline scenario



b) Consumer price dynamics under the adverse scenario relative to the risks of materialisation of the baseline scenario



c) Degree of disturbance in the financial market induced by stress conditions in the economy



Note: The baseline scenario is in line with the monetary projection of the CNB; red (broken line) is used for the path of the underlying variable under the adverse (differentiated) scenario.  
Source: CNB.

requirements for the mentioned exposures, as well as for indirect exposures arising from the guarantees and financial collateral received from central governments. The effects of these changes in the treatment of exposures to central governments and central banks were simulated in the baseline scenario, while the adverse scenario simulated additional effects arising from the assumed deterioration in the country's credit rating.

ii) In contrast to the basic and baseline scenario the adverse scenario differentiates the intensity of credit risk materialisation during Agrokor's restructuring, including legal risks. Used for this purpose are operative assumptions on direct and indirect losses based on empirical research on the characteristics of the restructuring process in companies having difficulties with debt repayment (troubled debt restructuring, TDR)<sup>28</sup>. These characteristics differ depending on the stage of the cycle and activity. The scheme of potential losses of credit institutions in Agrokor's restructuring is defined by combining empirical probabilities of loss: for direct exposures in an orderly restructuring this cost is 50%, for indirect exposures to enterprises affiliated with the Group 20% (under the sub-scenario of disorderly restructuring 70% and 40%, respectively). At the same time, it is assumed that the economy<sup>29</sup> will be faced with certain secondary effects, which are not significant, however. Under both scenarios, due to the way in which the restructuring process is legally regulated, the cost of interest lost for all exposures is equal in both simulations.

iii) Over the past few years the trend of restructuring the business model of credit institution or their very governing structure, i.e. the trend of their transformation to branches<sup>30</sup>, continued across Europe. If we take it into account that the owners of Croatia's largest banks are Italian parents that still operate under unfavourable conditions, the simulation has to consider the possibility of organisational transformation in that group of banks and thus connected tensions in the financial market.

## Quantification of scenarios and result sensitivity

a) Quantification of simulated conditions

The integration of the estimated effects of the orderly restructuring of the Agrokor Group into the baseline scenario, taking into account the multiplicative effects among its suppliers and the perception of risk in the market, maintained this year's

28 Schuermann, T. (2004): *What Do We Know About Loss Given Default?*, The Wharton Financial Institution Centre, 04-01 ([https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=525702](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=525702)).

29 The effects of the short-term decline in investment activity on aggregate level that are partially encompassed by the satellite models within the stress testing framework go up to 2% of exposure to Agrokor and affiliated enterprises in an orderly restructuring, that is, up to 6% in a disorderly restructuring.

30 Financial Stability, No. 17, Box 4 The single passport and its impact on financial stability, July 2016.

GDP growth dynamics at approximately the last year's level, with stable growth in 2017 and 2018. An onset of crisis under the imagined adverse scenario would cause economic activity to stagnate already in 2017 (0.3%), while in 2018 the economy would contract by 2.5%. The probability of this shock is quite small (Figure 1a). Under this scenario interest costs would surge as a result of the panicky market reaction and sudden risk revaluation. The average increase in yields on government bonds under the adverse scenario is 137 basis points within the simulation horizon, which assumes a decrease in the value of government bonds in bank portfolios by an average of some 13%. Exchange rate volatility might reach extreme levels (10% kuna depreciation against the euro within the period of two years). The global fall in demand for goods and services would halt inflationary pressures in the domestic market (Figure 1b). In general, the intensity of the simulated stress disturbance and tension among the participants in the domestic financial market exceeds the examples registered in the past decade (Figure 1 under c). Under these conditions we could expect the unemployment rate to grow to 14.3% and 16.1% vis-a-vis 13.9% and 13.6% in the baseline scenario, and investments and personal consumption to contract (stronger than the GDP contraction). All this would contribute to a perception of greater country risk, which would be reflected in the change of its credit rating, indicating a deterioration in the quality step for the risk weight of exposure to the government (from 4 to 6).

The baseline scenario builds on quite restricted effects of Agrokor's restructuring, along the lines of relatively slight corrections in investments and consumption which do not have a return effect on the market, credit and foreign currency markets or an effect on the general price level. The adverse scenario provides for a possibility of a worse outcome of the restructuring process due to the scenario of a global investment crisis and the consequent stress conditions in the domestic market. Growth prospects under such a differentiated scenario of a disorderly restructuring of Agrokor group were additionally reduced, but marginally (by 0.1 percentage points in 2017 or 0.4 percentage points in 2018).

#### b) Test results under the baseline scenario

Under the baseline scenario the quality of banks' credit portfolio did not improve from the end of 2016 due to the assumed deterioration in the portfolio of direct and indirect exposures to Agrokor and affiliated enterprises. It is expected that the aggregate bank portfolio, which contained 13.8% of bad loans at the beginning of the simulation horizon, will register an increase in this share to 15.6% in 2017 and 14.9% in 2018. Approximately a fifth of the said ratio is accounted for by the mentioned exposures generated through the financing of Agrokor's operations. Were it not for the Agrokor case, the credit portfolio quality would have continued recovering at the pace of roughly one percentage point per year, mainly as a result of the projected economic recovery but also due to the effect of sale and write-off of bad placements over the previous years.

Although this is why income from cancellation of provisions is not included in the baseline scenario, the induced rise in value adjustment costs are nevertheless modest, totalling some HRK 1bn in the two years, cumulatively, in relation to the end of 2016. The expected continuation of robust growth in banks' operating earnings at the rate of nearly 10% stabilises bank profit and increases the Common Equity Tier 1 rate from 20.6% to almost 24% in 2017 and more than 27% in 2018. Not even the cancellation of the preferential risk weight for exposures to foreign central governments in foreign currency<sup>31</sup> at the beginning of 2018 would in normal circumstances create a more serious pressure on balance sheets of domestic credit institutions.

The traditionally good short-term liquidity of the financial system may be expected to additionally improve in the upcoming two years. The current liquidity coverage ratio (LCR) shows that it could rise to up to two times as much as the required regulatory minimum (this year it is 80%, with its full implementation starting as of next year). Although differences in individual banks are noticeable, under this scenario almost all meet the liquidity standard (liquidity buffers were insufficient at only one smaller institution, which was also caused by their inadequate level at the beginning of the simulation exercise). This was aided by the expected support from the central bank but also the accumulated surplus which was not depleted by the start of the credit expansion.

#### c) Test results under the adverse scenario

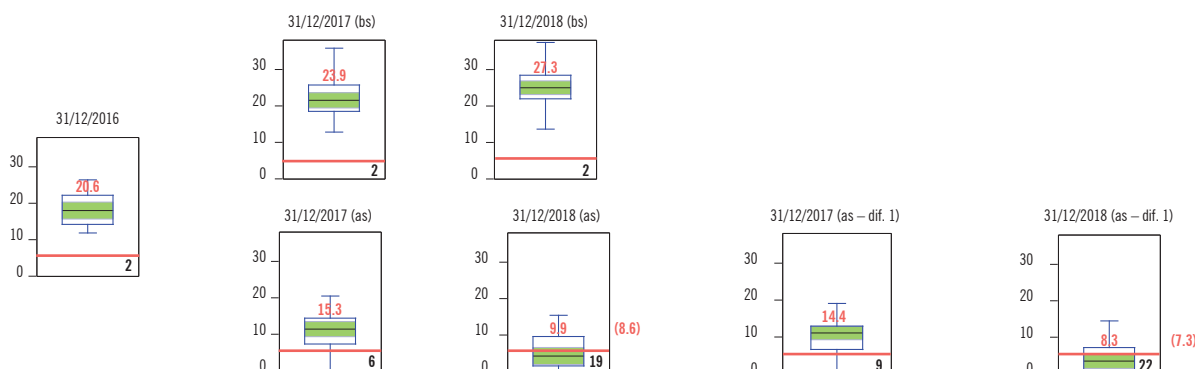
The loan portfolio would deteriorate much more strongly under adverse conditions, that is, under an orderly restructuring of the Agrokor group the share of non-performing loans might increase to 18.8% in 2017 and 23.4% in 2018, while under the sub-scenario of the adverse scenario, which builds on the assumption of a disorderly restructuring, this share would near 20% in the first and 25% in the second year of the simulation. Assuming that the effects of restructuring are predominantly concentrated in the corporate portfolio, the share of bad loans of this sector could reach a maximum of 40% (if the restructuring is orderly) and 52% (if the restructuring is disorderly). As expected, the simulated economic and financial shocks erode the creditworthiness of all clients, so the housing and consumer credit portfolios also registered speedy deterioration. The share of bad household loans thus increased from the average 9% under the baseline scenario to 12% under the adverse scenario and only marginally higher under the differentiated adverse scenario.

The decrease in capitalisation under stress conditions was also affected by the increase in risk-weighted assets, due to the

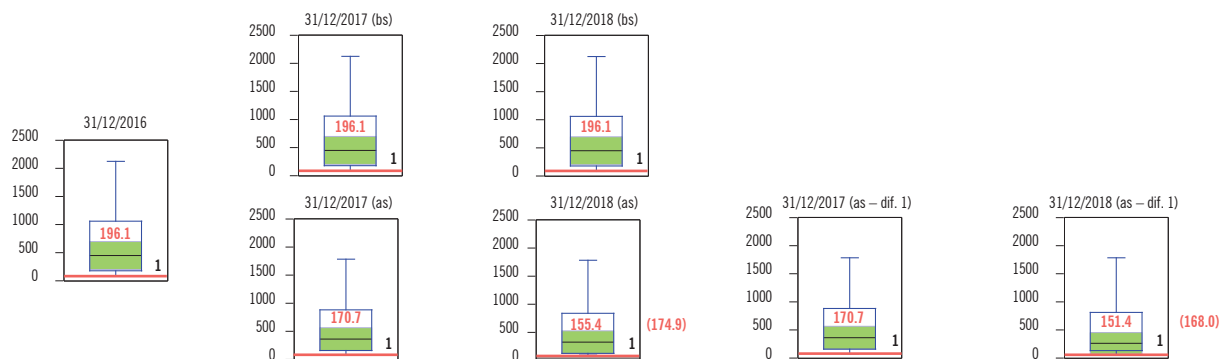
31 According to the provisions of Regulation (EU) No 575/2013 on prudential requirements for credit institutions and investment firms the risk weight applied to these exposures will be 20% of the risk weight arising from the credit rating that has been assigned to them. Under the baseline scenario the simulation was run under the assumption that the credit quality step for these exposures is maintain, i.e. that in 2018, when the risk-free treatment of these exposures expires their risk weight is 20%.

Figure 7.2 Solvency and liquidity of credit institutions under the baseline and adverse scenario

a) Capital adequacy



b) Liquidity coverage



Note: a) The red line shows the threshold value of the capital adequacy ratio of common equity tier 1 capital (6.5%), i.e. the liquidity coverage ratio (100%).  
 b) Red represents the liquidity coverage ratio, i.e. the capital adequacy ratio on system level, while ratios in brackets are those that would apply if one larger bank, due to its transformation into a branch, would not be shown as a part of the system (based on the consolidated balance sheet, while for individual institutions, the negative accounting values of capital were reduced to zero).  
 c) The number of institutions which have not passed the test (in the solvency and liquidity block) is shown in the lower right angle.  
 d) Jadranska banka d.d., undergoing resolution proceedings, is excluded from the shown distributions but included in the number of sensitive credit institutions in terms of capital. Tesla štedna banka d.d. had negative common equity tier 1 capital ratio and tier 1 capital ratio as at 31 December 2016, while the amount of its tier 2 capital was positive and sufficient to hold the total capital ratio above the critical threshold. As a result it was excluded from the shown distributions but taken into account in the calculation of the system average.  
 Source: CNB.

depreciation of the kuna and the rise in the weight for exposures to the central government in foreign currency if the country's rating is downgraded<sup>32</sup>. Under this scenario the common equity tier 1 capital ratio goes down to 15.3% in 2017 and 9.9% in 2018, with 6 banks failing to meet the capital requirements in the first year and 19 in the second.

Under the differentiated scenario of Agrokor's disorderly restructuring the common equity tier 1 ratio is 14.4% in the first year and 8.4% in the second. The number of credit institutions requiring recapitalisation amid such conditions is quite high; it would climb to 9 in the first year and 22 in the second. Since, however, this encompasses a relative small proportion of total assets, capitalisation at system level remains above the critical

test threshold (6.5%) and indicates robust resilience to simulated rare and extreme shocks. Nevertheless, it should be noted that there is the potentially negative contribution to the weighting of the system average if any of the larger and relatively better capitalised institutions is transformed into a branch, which could reduce the common equity tier 1 capital of the lower number of subsidiaries encompassed by the test by as much as a whole percentage point. Under stress conditions the LCR at system level would total some 170% at the end of 2017, which is almost 30 percentage points down from the initial level, conditioned primarily by the revaluation of the available portfolio of the government. However, none of the additional institutions fell below the critical test threshold (100%). Slightly stronger losses in liquidity buffers may be expected in the second year of the simulation horizon, under pressures arising from the difficulties a certain number of institution would experience with their solvency. The listed shocks would thus reduce the LCR of the system to 155% at the end of 2018. The differentiated scenario does not provide for a significantly different system

32 In the simulation credit quality step is degraded from 4 to 6 so the risk weight of 30% (one fifth of 150% risk weight) will be applied in 2018.

liquidity profile and under this version of the adverse scenario the aggregate LCR might go down by additional marginal 4 basis points.

The results of integral tests confirm the resilience of the system to potential losses that might be generated in case of another global crisis even amid the conditions of still pronounced structural vulnerabilities of the economy and a series of idiosyncratic shocks that were simulated under this test iteration. This is a relatively satisfactory result, although the sensitivity of the system to disturbances in general is slightly higher than

before (the accumulated capital shortage at system level at the end of the simulation horizon twice exceeds the result from the previous exercise cycle) and in accordance with the intensity of the simulated stress. However, after the simulated blows, the banking system would find it difficult to withstand them being multiplied more lastingly<sup>33</sup>, or the materialisation of the risks earlier mentioned as a possibility. From the macroprudential perspective current levels of capital and liquidity buffers may be considered satisfactory, their perspective showing future growth, even under the materialisation of the highly unlikely scenarios imagined here.

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<sup>33</sup> The ESRB task force on stress testing of credit institutions, in which the CNB is a member, launched a discussion in the middle of last year on the creation of long horizon test scenarios for this reason in particular. It should also be borne in mind that the last crisis led to a six-year period of declining earnings in the banking sector.

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## 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                                   |
| CIHI    | – Croatian Institute for Health Insurance                        |
| CIs     | – credit institutions  |
| CM      | – Croatian Motorways   |
| CNB     | – Croatian National Bank   |
| CPII    | – Croatian Pension Insurance Institute                           |
| DAB     | – State Agency for Deposit Insurance and Bank Resolution         |
| EAD     | – exposure at default  |
| EBA     | – European Banking Authority                                     |
| EBITDA  | – earnings before interest, taxes, depreciation and amortisation |
| EC      | – European Commission  |
| ECB     | – European Central Bank  |
| EFSS    | – 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  |
| IBIR    | – interbank interest rates                                       |
| ILO     | – International Labour Organization                              |

|            |  |
|------------|--|
| IMF        | – International Monetary Fund                            |
| IR         | – interest rate  |
| LTIR       | – long-term interest rates                               |
| 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 |
| OF         | – own funds  |
| 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                                   |
| RWA        | – risk-weighted assets                                   |
| SDR        | – special drawing rights                                 |
| TTIP       | – Transatlantic Trade and Investment Partnership         |
| 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               |





