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Trg hrvatskih velikana 3, 10000 Zagreb

Phone: +385 1 45 64 555

Contact phone: +385 1 45 65 006

Fax: +385 1 45 64 687

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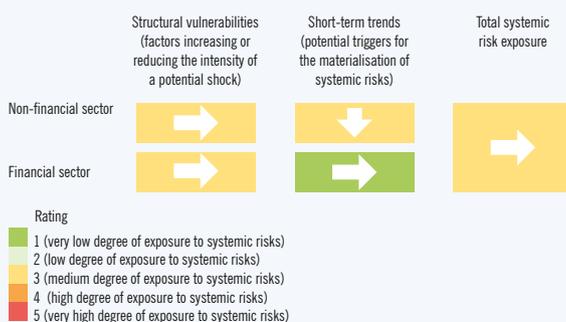
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Contents

Overall assessment of the main risks and challenges to financial stability policy	5
1 Macroeconomic environment	7
Box 1 Systematised measurement of political and geopolitical risks – the case of Croatia	12
2 Government sector	15
3 Household sector	19
4 Real estate	25
Box 2 Trends in the European residential real estate market	28
Box 3 Application of macroprudential measures related to the residential real estate market in the EU and EEA	31
5 Non-financial corporate sector	37
6 Banking sector	43
7 Stress testing of credit institutions	52

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

Risk map, first quarter of 2018



Note: Arrows indicate the changes relative to the Risk map in the fourth quarter of 2017 published in Macroprudential Diagnostics, No. 4, February 2018.
Source: CNB.

Continued economic growth and favourable developments in the international environment had a favourable impact on financial stability. By contrast, the identified vulnerabilities show that a possible deterioration in financing conditions in the international markets and its spillover to increased costs of domestic sectors' financing remains a significant risk to financial stability. Accordingly, the overall exposure of the financial system to systemic risks remains moderate.

The previous year was marked by the crisis at the Agrokor Group, the effect of which on the economy has been limited so far. Furthermore, the impact of this event on the yields on Croatian government bonds was marginal and only temporary. The country's risk perception in international financial markets in 2017 improved significantly on the back of favourable macroeconomic developments and fiscal consolidation. Such an improvement was also recognised by credit rating agencies, which upgraded Croatia's credit rating in early 2018.

Fiscal adjustment, resulting in a further decrease in the general government debt-to-GDP ratio, mitigated risks to financial stability arising from the domestic economy. At the same time, external vulnerabilities were also reduced due to the continued external deleveraging of domes-

tic sectors and exports growth. However, even though fiscal discipline mitigates the potential negative effects of interest rate growth in foreign markets, the levels of general government and external debts are still high and make the country vulnerable to possible changes in financing conditions. This might be one of the most important risks for financial stability in the forthcoming period. Structural vulnerabilities of the economy in the mid-term are also reflected in the relatively low estimated potential growth rates, in particular if significantly higher growth rates in peer European countries are considered. A further reduction in overall risk requires stronger efforts in the implementation of structural reforms, without which it will be impossible to accelerate economic growth and ensure the fundamentals for its long-term sustainability.

Structural vulnerabilities of the financial system remained moderate. They mostly stem from the currency and interest rate structure of credit to the private sector and the high level of banking concentration and exposure concentration. However, the sale of banks' claims intensified in 2017, which led to the improvement in quality of their credit portfolio and to the reduction of risks arising from non-performing placements. During the same period, banks absorbed the largest share of costs related to the restructuring of the Agrokor Group's liabilities and this rise in value adjustments reduced their indicators of ROA considerably. Despite this, the capitalisation of the banking system remained relatively high, and the continued accumulation of significant capital and liquidity surpluses additionally increased potential loss absorption capacities and strengthened the system's resilience to possible disturbances.

Household sector vulnerability was reduced primarily due to the growth of disposable income, which was supported by tax changes coupled with continued economic recovery and employment growth. Despite the reduced household exposure to interest rate and currency risks, the possible increase in interest rates still remains an important source of risk to those debtors with variable interest rates.

Favourable macroeconomic developments, accompanied by the implementation of the government housing loans subsidy programme, had an impact on the moderate recovery in long-term household borrowing and consequently on the rise of the residential real estate prices. Even though the prices in 2017 rose markedly for the first time after the

outbreak of the crisis, this still does not create pressures of the kind seen recently in the real estate markets of some EU member states (for more details, see Box 2 Trends in the European residential real estate market and Box 3 Application of macroprudential measures related to the residential real estate market in the EU and EEA).

The non-financial corporate sector in 2017 was marked by risks associated with the crisis at the Agrokor Group. Due to the stabilisation of the Group's operations in the second half of the year, the risk of over of the crisis onto creditors and suppliers was reduced considerably, while any full elimination of such risks depends on the future process of ownership and business restructuring. Nonetheless, generally good business per-

formance of other corporations and low interest rates led to a reduction of the sector's vulnerability indicators.

The stress testing of credit institutions shows that a simulated, slightly probable, scenario of a new global crisis, the effects of which would be amplified by shocks of the materialisation of credit risk associated with the crisis at the Agrokor Group and a decline in the sovereign credit rating, still would not exhaust the capital and liquidity buffers accumulated in the system. However, the growing diversification of resilience among credit institutions indicates the need to maintain high capital buffers to preserve financial stability.

1 Macroeconomic environment

Even though the global economy is recovering and financial markets record positive results, geopolitical uncertainty in some developed countries, as well as divergent trends among the monetary policies of leading economies are the main source of uncertainty and risk for financial stability in the future period. At the same time, the continued favourable results of the Croatian economy and a lower country risk premium reduce to a certain extent the vulnerability to potential financial shocks.

International environment

Global economic growth accelerated in 2017 to 3.8% and was broadly based across developed and developing countries. Important drivers of the uptick in global GDP were an increase in global trade, expansionary fiscal policy in the USA, rising investment spending in the majority of developed countries and increasingly optimistic expectations of the private sector. In addition, financing conditions remained supportive. The upswing in economic activity in developed countries was particularly noticeable in the USA, Japan and the euro area. The majority of euro area member states recorded better performance, with a stronger acceleration of growth in the Baltic countries, while the largest contribution to overall developments still came from Italy, France and Germany. At the same time, the dynamics of the British economy continued to moderate downwards. The growth in developing countries increased further, primarily driven by a moderate acceleration in the growth of the Chinese economy, but also by the continued recovery of the countries of Latin America and Russia. Data show that the strong positive dynamics of global activity continued in early 2018, in particular in the USA as the result of a positive effect of the tax reform on private sector investments and the

continued fiscal expansion.

In 2017, inflation picked up on a global level. Inflation remained relatively sluggish in developed markets, while developing countries saw diverging developments. Price growth was primarily due to a recovery in the prices of oil and other raw materials on the global market. Such trends were supported by the agreement between OPEC member countries to curtail daily production and the announcement of its extension until the end of 2018, geopolitical uncertainty in the Middle East, as well as by increased demand due to the strengthening global outlook.

Stable global economic growth is expected to continue in the medium term and developing countries will remain the generators of growth. Among these countries, large Asian markets will rise sharply again, in particular India, while growth in China is expected to slow down. By contrast, medium term growth in developed countries is expected to be held back due to uncertainty concerning economic and foreign trade policy in the USA and the structural problems of the euro area countries, coupled with unfavourable demographic trends. Global inflation is expected to rise, but subdued movements in developed countries limit it further.

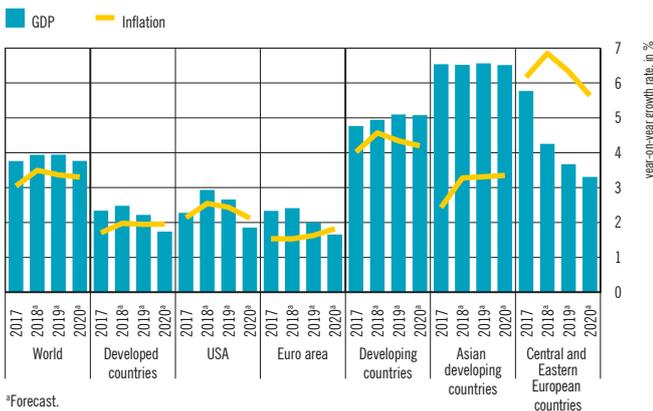
USA continued to normalise monetary policy due to more favourable economic trends, while the majority of the developed countries pursued an accommodative monetary policy further. The Fed reacted to inflationary pressures and improved conditions in the labour market by raising its benchmark rate on three occasions during 2017, by a total of 75 basis points. Furthermore, in October, it began to decrease its balance sheet gradually. In March 2018, the US monetary policy was tightened further by an increase in the interest rate of 25 basis points. By the end of the year, the FOMC (Federal Open Market Committee) announced several additional increases, depending on

how strong the growth dynamics of the US economy will be in the rest of 2018 (Figure 1.2). At the same time, the Governing Council of the ECB decided to leave its benchmark interest rate unchanged, but decreased the purchase of securities from the previous EUR 80bn to EUR 30bn a month, starting from January 2018. Net securities purchases are expected to be conducted until end-September 2018 or even longer unless a sustained adjustment of inflationary developments is achieved in accordance with the target inflation rate level. Given the still weak inflationary pressures, the market expects increase in the ECB's benchmark interest rate, first since 2011, in the second quarter of 2019. Accordingly, financing conditions in the euro area might remain favourable for some time.

High global liquidity and favourable financing conditions have influenced the continuation of positive trends in the capital market in 2017. In the capital market an increase in the price-to-earnings ratio was recorded, raising concerns over overoptimistic risk assessment in some market segments (Figure 1.3). Following a sharp increase at the end of 2016, long-term interest rates mostly held steady in 2017, still remaining lower than in the pre-crisis period. However, the spread between long-term and short-term yields narrowed, which historically was the signal to investors to anticipate that trends in the capital market might change soon. In addition, the spike in prices in the real estate market in the observed markets continued in 2017 (Figure 1.3). In early 2018, stock indices declined while bond yields increased, which partly reflected higher investor concerns about the development of a potential trade war between the USA and China caused by protectionist measures imposed by the USA.

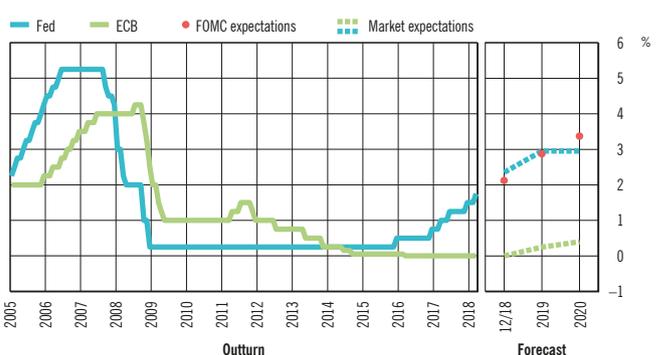
2017 was marked on one hand by relatively low capital market volatility and on the other by significant economic and political uncertainties that compressed towards the end of the year. Over the past two years, economic and political

Figure 1.1 Real economic growth and inflation in selected markets



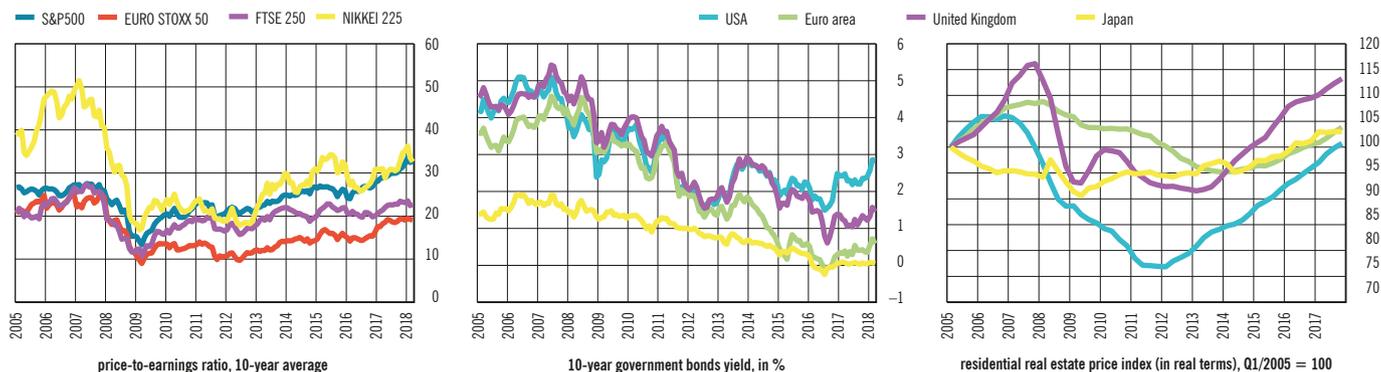
*Forecast. Source: IMF (WEO, April 2018).

Figure 1.2 Monetary policy of the USA and the euro area diverged even further



Notes: The figure shows Fed and ECB benchmark interest rates. The dashed lines in the forecast represent market expectations, while dots represent FOMC expectations from the meeting held on 21 March 2018. Sources: Fed and ECB (outturn) and Bloomberg (forecast).

Figure 1.3 Relatively optimistic equity valuation points to potential risks



Note: Price-to-earnings ratio for the US market (S&P500) was taken from Robert Shiller's website. Sources: Bloomberg, OECD and <http://www.econ.yale.edu/~shiller/>.

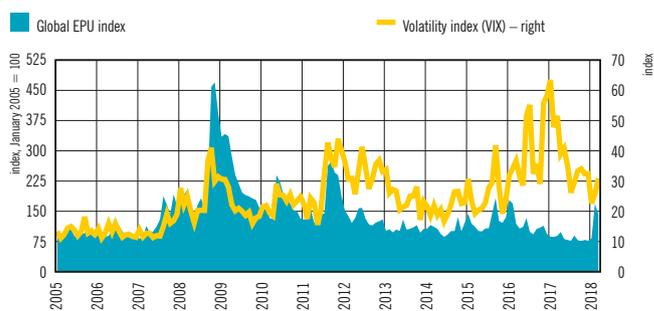
uncertainties increased strongly (for more details, see Box 1 Systematised measurement of political and geopolitical risks – the case of Croatia), mostly as a reaction to the UK referendum on leaving EU membership and the parliamentary elections in the USA and some European countries. At the end of the year, geopolitical risk was reduced, but it was still rather pronounced relative to the volatility in the capital market (Figure 1.4). The capital market was characterised by a stable, historically low volatility, with indications of changes to the trend in early 2018.

The political and economic situation in leading economies had an impact on exchange rate developments. In 2017, the US dollar exchange rate depreciated strongly against the majority of the observed currencies (Figure 1.5). This was mainly driven by the political turmoil in the US administration and the unclear direction of their trading policy. At the same time, positive indicators of economic activity in the euro area and the expectations of a possible halt in normalisation of the ECB's monetary policy spurred the appreciation of the euro and increasing investor appetite for the purchase of EU financial assets.

Current risks in the international environment

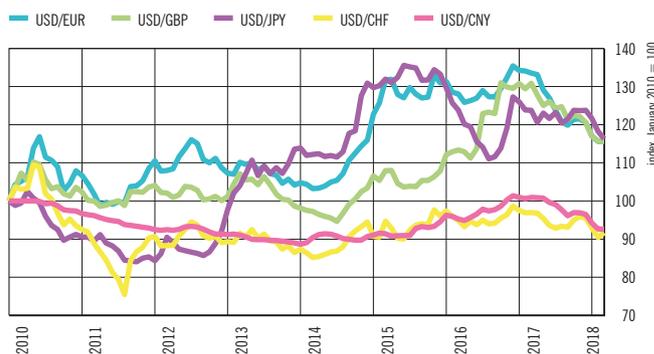
Despite the strong cyclical recovery in leading economies and the continued increase in resilience of the global financial system, potential risks for financial stability still exist. Further tightening of US monetary policy, coupled with uncertainty surrounding further intensity of the fiscal stimulus and foreign trade policy might fuel financial markets' volatility. Such developments could spur a stronger appreciation of the US dollar that would consequently increase global imbalances, in particular in developing countries. The continuation of the financial liberalisation of China could also have a significant impact on developing countries. For EU member states, in addition to structural weaknesses that limit further acceleration of economic growth, uncertainty surrounding the conditions of

Figure 1.4 While market risk in 2017 was at historical lows, geopolitical volatility was significant



Notes: VIX is a measure of expected implicit fluctuations in the S&P500 options, calculated and published by the Chicago Board Options Exchange (CBOE). The global Economic Policy Uncertainty Index (EPU) is an index that shows uncertainty in the future policy-related economic issues and it is weighted using PPP-adjusted GDP of the included countries. Sources: Bloomberg and Policyuncertainty.com.

Figure 1.5 The year 2017 was marked by weakening of the dollar against leading global currencies



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

the UK's exist from the EU still represents a considerable risk.

Due to a long period of low interest rates, accompanied by the significant growth in the value of financial assets and increasing investor appetite for yields, it is not far-fetched to expect a repricing of global risk premia. In addition, uncertainty concerning price movements of the different types of assets, even the new fast-growing ones (e.g. cryptocurrencies) is noticeable. Furthermore, in developed countries, the EU in particular, prices in the real estate market rose sharply (for more details, see Box 2 Trends in the European residential real estate market). Also, risks might transfer to the banking sector or even to other sectors in the market, which indicates the need to strengthen the regulation of such market participants as well.

The materialisation of these risks and a possible sudden surge in investor risk aversion could lead to an increase in the risk premium. Such developments would mostly affect those countries that due to their weak economic recovery and/or geopolitical uncertainties did not benefit from the period of favourable financing conditions on time or actively manage their private and public debt.

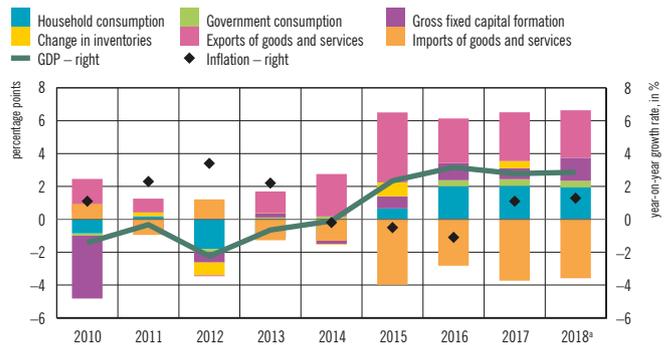
Domestic environment

In 2017, the broad-based growth of economic activity continued, although it slowed compared to 2016. Favourable results in 2017 were mostly driven by the increase in the exports of goods and services as a result of better results in tourism and the strengthening of the activity of the main Croatian foreign trading partners (Figure 1.6). This was also followed by the continuation of favourable labour market developments. At the same time, inflation accelerated due to imported inflationary pressures on the prices of food and energy. The GDP growth rate in 2018 could be similar to that in 2017, with a further pronounced positive contribution of the exports of goods and services as well as investments. Inflation could accelerate only slightly in relation to the previous year.

In 2017, the continued recovery of real estate market prices was recorded in Croatia, while the capital market was marked by a strong downward correction. The Zagreb Stock Exchange started the year with the growth of all key trading indices, but in the rest of the year trading was largely marked by the crisis at the Agrokor Group, especially for companies directly or indirectly associated with the Group's operations. On the other hand, it is evident that the positive growth trend of average residential real estate prices, that started in early 2016, accelerated further in 2017 (for more details, see chapter 4 Real estate), partly under the effect of the government housing loans subsidy programme.

Monetary policy in 2017 continued to be expansionary, thus supporting further recovery of economic activity. This has resulted in the highest level of surplus liquidity in the domestic banking system so far recorded (Figure 1.8). In addition, banks' interest rates continued to decline, while their

Figure 1.6 Exports remain the generator of real growth in 2018



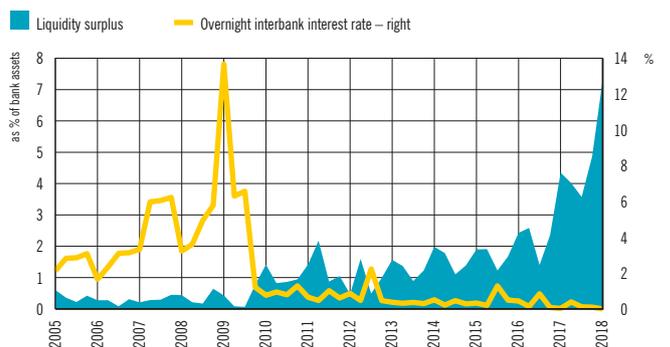
* Forecast.
Note: The figure shows contributions to GDP, the annual real GDP growth rates and consumer price index (CPI) average annual rates of change.
Sources: CBS and CNB.

Figure 1.7 While the capital market is stagnating again, real estate prices are rising



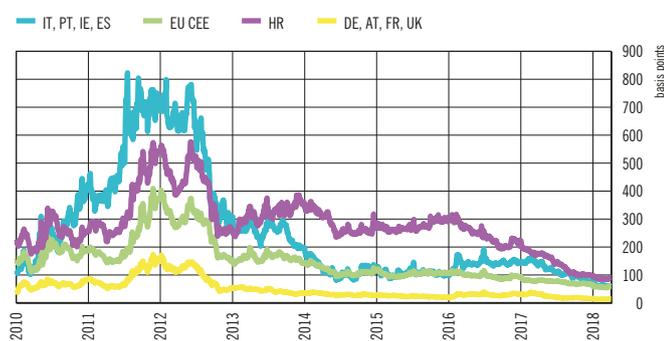
Sources: CBS and Zagreb Stock Exchange.

Figure 1.8 Kuna liquidity surplus in 2017 was double the amount of the previous year



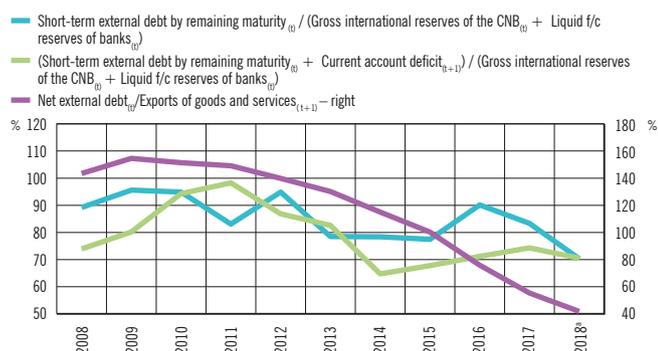
Note: Liquidity surplus is the difference between the balance in bank settlement accounts with the CNB and the amount that banks are required to hold in their accounts after the calculation of reserve requirements.
Source: CNB.

Figure 1.9 Perceived risk for Croatia is diminishing



Notes: 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 1.10 Selected indicators of external vulnerabilities continue to improve



^a 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.

corporate and household lending activity increased further (for more details, see below). At the same time, by the end of 2017, the fluctuation of the exchange rate of the kuna against the euro increased, but in early 2018 it stabilised again, which was influenced by the CNB's foreign exchange intervention.

The decline in short-term and long-term interest rates on government borrowing continued. The lower credit default

swap for Croatia, which more than halved in 2017 (Figure 1.9), also contributed to the more favourable financing conditions for the government. Such developments were also assisted by the consolidation of government finance, which resulted in a general government budget surplus in 2017 and Croatia's exit from the excessive deficit procedure (for more details, see chapter 2 Government sector). Accordingly, the risks to the domestic economy associated with fiscal policy were reduced further. However, it is likely that the public debt-to-GDP ratio will remain elevated for some time.

The several-year trend of decline of external imbalances continued in 2017, but risks for the external position of the RC are still present as a result of the large amount of previously accumulated foreign liabilities. Nominal GDP growth could spur further improvement in the relative indicators of indebtedness. Given that it is not predicted that there will be any significant rise in external debt of the domestic sectors and due to expected further surplus in the current account of the balance of payments in 2018, external vulnerability indicators should continue to improve (Figure 1.10).

Current risks in the domestic environment

The identified vulnerabilities show that a possible deterioration in financing conditions in the international markets that would increase domestic sectors financing costs still remains one of the significant risks to financial stability. A tightening of international financial market conditions could lead to a deterioration of public debt sustainability indicators. Furthermore it could limit private sector access to both domestic and foreign capital and increase the cost of borrowing for them. Such a development would make debt servicing more difficult and have an adverse impact on banking system stability.

In the forthcoming period, a continuation of favourable performances in economic activity is projected, and risks for the materialisation of such developments are balanced. On one hand, economic activity and the key risks to financial stability will also depend on reaching the settlement and the outcome of the restructuring at the Agrokor Group and their effect on investment activity and personal consumption. At the same time, in line with an increase in global economic activity, tourism revenues might rise stronger than currently expected.

Box 1 Systematised measurement of political and geopolitical risks – the case of Croatia

Political and geopolitical risks¹, that is, those involving a geographical and sometimes an economic dimension, are potential triggers of financial instability. The main geopolitical risks to global economic and financial developments have in recent years been generated by events in North Korea, Middle East conflicts, terrorist attacks, the refugee wave to Europe and the elections in the US and major EU countries. In addition, geopolitical volatility is expected to rise in the medium term due to waning support for economic integrations, announcements of international trade restrictions and the increasing adoption of protectionist measures.

There are many channels conducive to the manifestation of geopolitical risks in any country, including Croatia. For example, a major refugee wave, terrorist attacks or public demonstrations may adversely impact the tourist sector and, in turn, overall economic developments. Long-term political uncertainty in the country, on the other hand, could increase the borrowing cost for the government² and all other sectors. Furthermore, heightened political risks may come to bear on the assessment of the business climate, which is important for investors' decisions on investments and, consequently, for investment activity and international capital flows. All this creates the need to monitor political and geopolitical risks and timely recognise their potential consequences.

This box presents two systematised measures of geopolitical or political instabilities. The first measure, based on the interpretations of news items published on domestic internet portals, may be considered as some kind of measure of the initial phase of materialisation of observed risks or of their further intensification. The other, alternative, measure reflects exclusively economic entities' political risk perceptions, obtained by internationally comparable surveys.

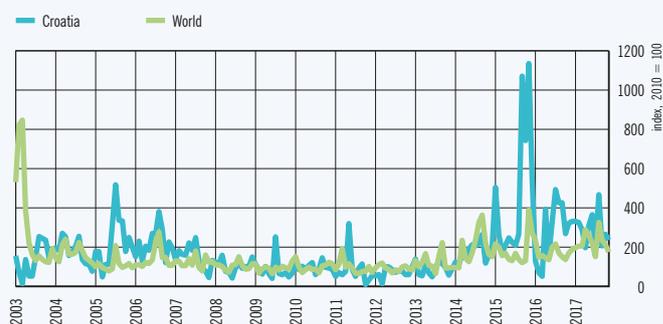
It is first necessary to define formally (geo) political risks. These risks may have a domestic and foreign component, which include, respectively, adverse events occurring in the country or those that occur in the environment and may spill over to Croatia. For the purpose of this analysis, geopolitical risk is defined as risk connected with wars, terrorist acts, tensions, political and social turbulences in Croatia and in the neighbouring countries³ that have an effect on the regular and smooth course of international relations and the domestic economy. This definition, apart from encompassing the risk of the materialisation of an event, also includes the potential effects of this risk's spillover. For example, the materialisation of potential risks in a neighbouring country may generate volatilities in these countries, negatively reflect on their

1 The Croatian Encyclopaedia of the Miroslav Krleža Institute of Lexicography defines geopolitics as a government or any other political activity guided by a certain concept of the geographical content of international and social relationships and their spatial and political interrelations.

2 Gao, P., and Y. Qi (2012): *Political Uncertainty and Public Financing Costs: Evidence from U.S. Municipal Bond Markets*.

3 The index is constructed using the countries with which Croatia shares a land border: Bosnia and Herzegovina, Montenegro, Hungary, Slovenia and Serbia.

Figure 1 Systematised measures of materialised political risks



Notes: The indices are shown on a monthly level (average of daily values) to reduce their variability. A higher index value indicates an increase in risk relative to the reference period. The global GPR index is based on Caldara and Iacoviello (2017).

Sources: CNB (author's calculation) and <https://www2.bc.edu/matteo-iacoviello/gpr.htm>.

relations with Croatia and create additional unfavourable consequences for both economies.

The first systematised measure is calculated based on the methodology by Caldara and Iacoviello (2018)⁴, who constructed an algorithm that counts the frequency of articles in leading financial newspapers in the United States, the United Kingdom and Canada that use selected words⁵ defining geopolitical risk. Based on the results obtained, they constructed a monthly index of global geopolitical risk (from the North American and British perspective). The authors empirically establish that geopolitical risk measured in this way has an adverse effect on macroeconomic developments and share prices, with the result that capital is withdrawn from emerging markets and channelled to major financial centres, such as the US.

Applied to the case of Croatia, this algorithm uses news items published on Croatian internet portals⁶ and searches for words used by Caldara and Iacoviello to define geopolitical risk (translated and localised for Croatia⁷). This involves measuring the share of news items covering adverse (geopolitical) events in Croatia and its close environment in the total number of news items in a given day, which represents its reference value for that day.

Croatian and global risk developments are similar, although their causes may differ (Figure 1). An exception was the invasion of Iraq in 2003, which influenced global geopolitical trends, but had no effect on Croatia. Three periods of heightened risks are relevant for the case of Croatia. The first period, from the end of 2005 to the first half of 2006,

4 Caldara, D., and M. Iacoviello (2018): *Measuring Geopolitical Risk*, Working Paper, Board of Governors of the Federal Reserve Board, January.

5 The words are listed in the 8th section of the Appendix of the paper (cited in footnote 4).

6 The analysis includes the following news portals: *Jutarnji list*, *Večernji list*, *Novi list*, *Index.hr*, *Net.hr* and *Dnevnik.hr*.

7 For example, the logical conjunction includes the roots of the words "refugee crisis", but does not include the term "nuclear war".

was primarily marked by uncertainties surrounding the secession of Montenegro from the State Union of Serbia and Montenegro and the emergence of such aspirations in Kosovo and Republika Srpska (Bosnia and Herzegovina). Such trends, and the potential escalation of conflicts, can also produce economic consequences for Croatia, due to its strong foreign trade connections with these countries⁸ and the importance of regional security perception for tourism.

While this period was influenced by exogenous factors, the following period of growing risks, in mid-2009, was mainly affected by domestic political developments. The stepping down from power by the then prime minister caused a short-lived increase in the index. It should be noted that only significant and long-lasting divergences from trends can be economically significant.

However, the measured risks peaked in the recent period, from 2014 to the present day, due to various reasons. The year 2014 was primarily marked by the social unrest in Bosnia and Herzegovina. A significant rise in the index in the following two years can mostly be attributed to Croatia's parliamentary elections and the refugee crisis, which had an effect on Croatia and the surrounding countries. It was precisely this crisis that had a major effect on a noticeable, but brief increase in the domestic index at the end of 2015. Increasingly frequent threats and terrorist attacks in Europe, coupled with geopolitical developments in the Middle East, also had negative influences on risks. Although the level of measured risks has decreased over the last year, due primarily to improved political conditions (stability) and the de-escalation of the refugee crisis in Europe, they have persisted.

In contrast with the described index, the alternative measure of geopolitical risk was constructed based on the weighted averaging⁹ of the indicators showing the perception of political risk and related economic risk (The Worldwide Governance Indicators¹⁰). The indicators were obtained from a survey, completed by experts from the public, private and non-government sectors, concerning various sources of risk, including political stability, socioeconomic conditions, investment climate, internal and external instability, corruption, military, religious and ethnic tensions, the legislative framework, democratic rights, public service quality, etc.

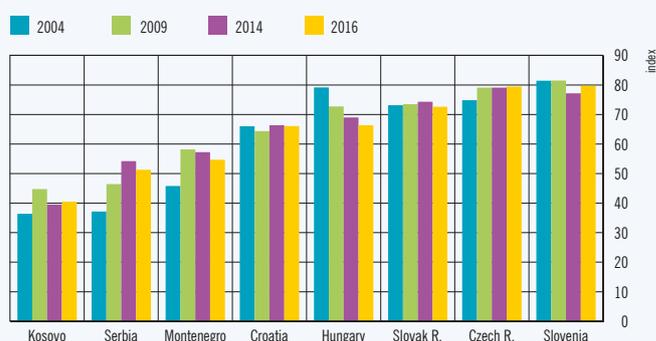
The alternative measure of the perception of political risk, an important geopolitical component, identifies trends similar to those of the previously mentioned index (Figure 2). However, being research-based, this measure is discontinuous and much more stable. As regards Croatia, political risk perception is relatively stable and is more favourable than that in non-EU member countries from the environment, but still less favourable than that in most other EU member states.

8 Croatia's share of trade in goods with Bosnia and Herzegovina, Serbia and Montenegro stood at about 12% in 2005 and 2006.

9 The publicly released weights used by the PRS Group for the construction of the political risk index were used for this purpose. For details, see International Country Risk Guide Methodology.

10 The methodology of the compilation of data and the construction of indicators is described in detail in Kaufmann, D., A. Kraay, and M. Mastruzzi (2010): *The Worldwide Governance Indicators: Methodology and Analytical Issues*.

Figure 2 Alternative measure of political risk perception



Note: A higher indicator value suggests an improvement in the perception of political risk and it can only be interpreted in a relative relation.
Sources: The Worldwide Governance Indicators (WGI) and CNB.

Impact of geopolitical risks on net capital inflows

The analysis of the impact of geopolitical risks on macroeconomic developments in Croatia is still in an early stage. The levels of these risks are generally low, which makes it difficult to measure their impact on economic variables. In addition, the materialisation of some risks in recent years has had twofold consequences. Specifically, an increase in risk need not only have a negative impact on the economy, but the effects can sometimes be positive, as evident from the strong growth of the tourism industry in Croatia amid the perception of lessened security in competitive Mediterranean destinations.

Given the importance of capital flows for economies relying on foreign financing sources, such as Croatia, it is interesting to analyse whether they are exposed to geopolitical risks. This is why an estimation was made of a simple model (linear regression) of the determinants of capital flows, which confirms the negative effect of the level of geopolitical risks on net capital inflows¹¹.

The following model was formally estimated for the period from the first quarter of 2003 to the second quarter of 2017:

$$y_t = +\beta X_t + \gamma GPI_t$$

where y is a normalised¹² variable of the share of net capital inflows in nominal GDP, GPI a measure of geopolitical risk for Croatia and X a vector of other explanatory variables.

The results shown in Table 1 suggest that an increase in domestic GDP driven by improved economic conditions makes for a more

11 Net capital inflows include all direct investments, portfolio investments and other investments, while changes in CNB's international reserves and debt liabilities (especially on repo agreements) are excluded.

12 The variable was normalised by subtracting the median and relativised by standard deviation.

Table 1 Regression analysis results

Explanatory variable	Coefficient
GDP growth rate	0.0590*
Geopolitical index (HR)	-0.0025***
Overnight ZIBOR	0.2295***
General government balance	-0.1393**
EMBI EURO	-0.0049***
Difference between geopolitical indices (-1)	-0.0013**
Constant	-0.1998

Notes: *, **, *** mark the significance levels of 10%, 5% and 1%, respectively. The explanatory variables comprise the measure of geopolitical risk for Croatia, GDP annual growth rate (in %), interest rate, general government balance (as % of GDP), EMBI for three European emerging markets (by levels) and the difference between the Croatian and global GPR index. The positive value of the dependent variable represents foreign capital inflows to Croatia. Due to the seasonality of data on net capital inflow, its average value over four quarters was analysed.
Source: CNB.

supportive investor environment and thus triggers capital inflows. In contrast, the general government balance has a negative impact on net capital inflows because the budget deficit (negative balance) increases government financing needs, stimulating its borrowing from foreign investors. In addition, a rise in yields on the government bonds of European developing countries (measured by the EMBI), which may indicate a growing reluctance to invest, results in the reduction of foreign capital inflows¹³.

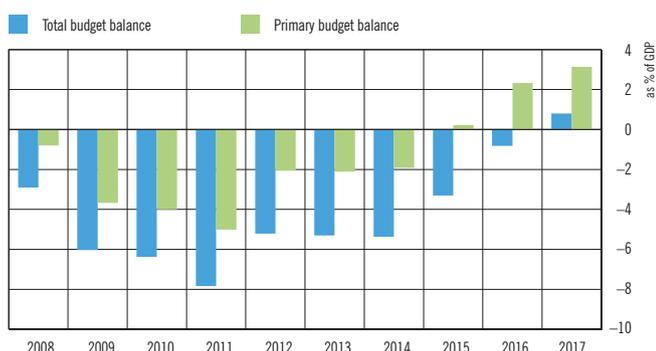
Geopolitical risk is statistically significant in this estimation and, as expected, has an adverse impact on net capital inflows, in the same way as divergent geopolitical developments in Croatia and in the global sphere (measured by the difference between the Croatian and the global GPR index). This may be attributed to a growing risk aversion and potential increase in volatility in the international and domestic markets.

In conclusion, the constructed indicators may come in useful as explanatory variables for trends in capital flows and in many other economic variables, such as borrowing costs and the prices of equities or any other financial instruments. Therefore, they should continue to be developed to improve their accuracy and other performances.

¹³ These results correspond with the results of some previous research, e.g. *Determinants of Capital Flows to the New EU Member States Before and During the Financial Crisis* (Jevčák, A., R. Setzer, and M. Suardi, 2010).

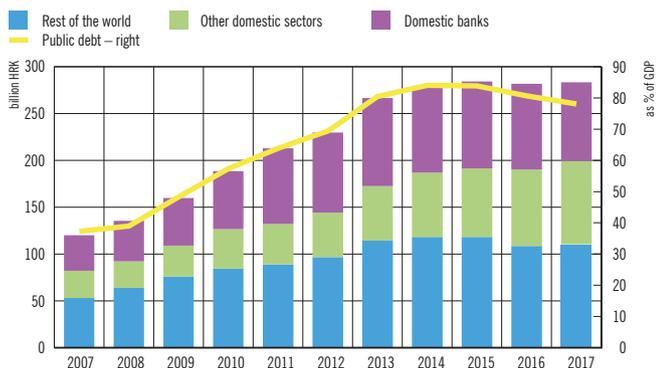
2 Government sector

Figure 2.1 General government balance



Source: Eurostat.

Figure 2.2 General government debt



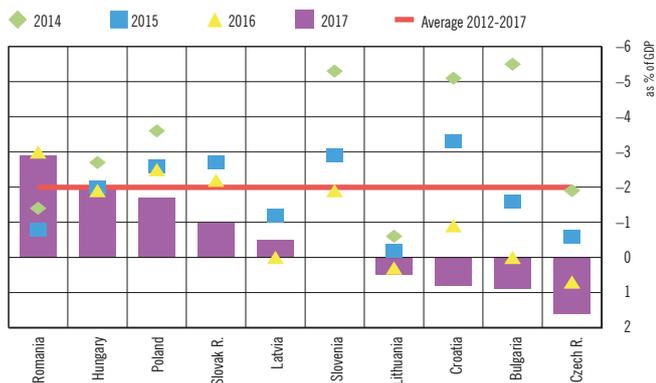
Sources: CNB and EC (projection).

The strong fiscal consolidation initiated in 2015 continued in 2017, driven by the continued economic recovery. As a result, Croatia exited the excessive deficit procedure in the first half of 2017. After a long period, a general government budget surplus was recorded in the previous year at the level of 0.8% of GDP, while the public debt to GDP ratio dropped to 78%. This has continued the trend of a reduction in government sector risks to financial stability.

Fiscal consolidation continued in 2017 with the aim of achieving long-term sustainability of public finances. The year was marked by the crisis in and restructuring of the Agrokor Group. However, the effect on the economy, and on the government sector indirectly, was limited. In this context, the government sector ended the budget year with a minor budget revision in November, as a consequence of higher-than-expected revenues and the reallocation of a part of expenditures.

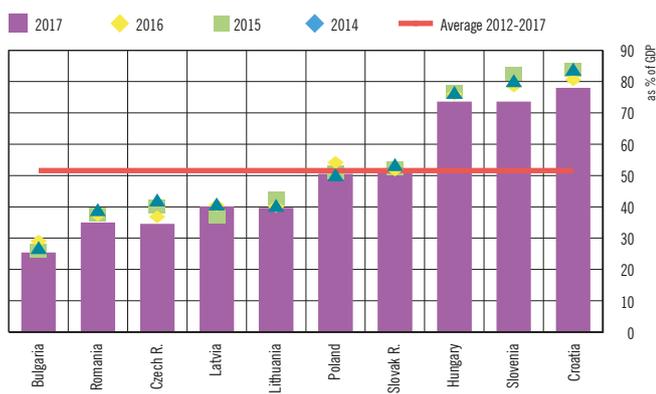
The achieved fiscal consolidation is the result of budget revenue growth and a moderate decline in expenditures. On the revenue side, revenues from indirect taxes grew the most on the back of the favourable effect of the economic cycle. The decline in capital expenditures strongly contributed to the reduction on the expenditure side of the budget and the positive trend of the decrease in interest expenses, started in 2016, continued in 2017. As a result of such developments, a general government budget surplus in the amount of 0.8% of GDP was achieved last year for the first time (Figure 2.1). Furthermore, a reduction in the public debt to GDP ratio to 78% was recorded, which was the result not only of favourable fiscal developments but also of a nominal GDP growth, as well as the appreciation of the kuna against the euro (Figure 2.2). Euro-denominated debt and foreign currency-indexed debt still prevailed with a total share of 73% in the public debt currency structure.

Figure 2.3 General government deficit



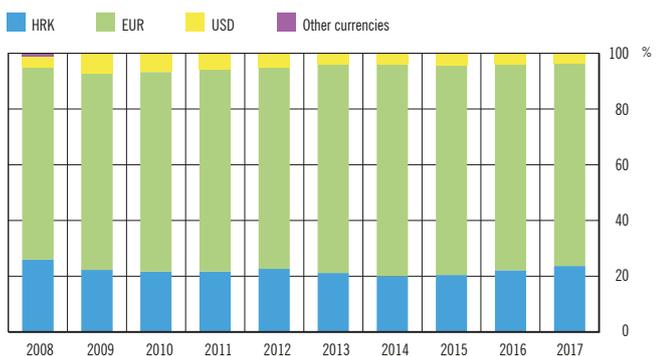
Source: Eurostat.

Figure 2.4 Public debt



Source: Eurostat.

Figure 2.5 Currency breakdown of public debt



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

Table 2.1 Thresholds of the fiscal sustainability risk indicators in 2017^a

Indicator	Direction to be safe	Threshold	Observation for Croatia	Change from the previous year ^c
$r - g^b$ (p.p.)	<	1.1	2.0	↓
General government public debt (as % of GDP)	<	42.8%	78.0%	↓
Cyclically adjusted primary balance (as % of potential GDP)	>	-0.5%	3.0%	↑
Gross financing needs (as % of GDP)	<	20.6%	18.3%	↑
Share of short-term debt as a ratio of total debt	<	44.0%	4.8%	↓
Debt denominated in foreign currencies	<	40.3%	76.3%	↑
Weighted average maturity of public debt (years)	>	2.3	5.4	↑
Short-term external public debt (as % of international reserves)	<	61.8%	11.4%	↑

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

^b Imputed interest rate on general government debt, deflated by the GDP deflator (5-year average), minus real GDP growth rate (5-year average).

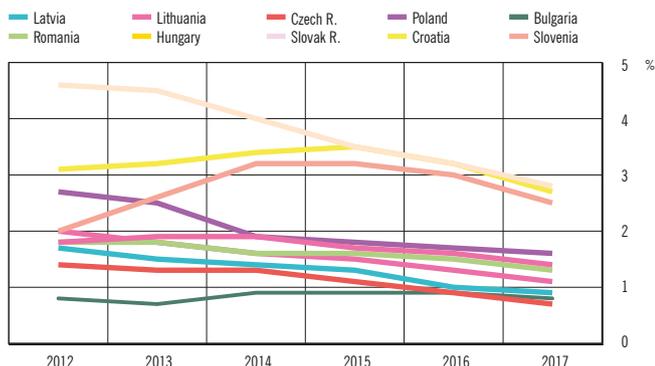
^c Indicators outside safe territory are marked blue, while the direction of change compared with the previous publication is marked with an arrow. Sources: IMF WP/11/100 and CNB.

Compared to peer countries, Croatia has improved its general government balance position in 2017. The continuation of positive trends in public finances and the budget surplus improved the position of Croatia in the group of other peer countries (Figure 2.3). Nevertheless, Croatia remains the country with the highest public debt to GDP ratio (Figure 2.4).

The indicators of the risk to fiscal sustainability indicate a reduced risk to financial stability of the government sector. The majority of the indicators were in safe territory, while the unfavourable ones mostly recorded positive moves (Table 2.1). In addition, at the end of the previous year, the government early refinanced a significant portion of the debt of road enterprises in the public sector, under much more favourable conditions, which will have a positive effect on interest expenses in the forthcoming period. Such an improvement was also recognised by rating agencies, which upgraded Croatia's credit rating to a grade just below the investment grade.

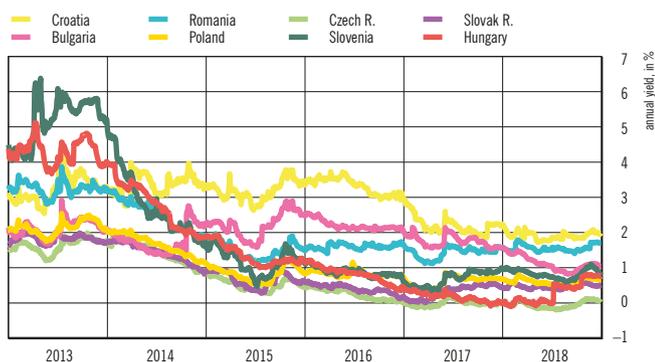
The currency and maturity structure of public debt continued to improve in 2017. The maturity structure of Croatian public debt held relatively steady over a number of years with a very high share of long-term debt above 90%. Such a structure is favourable for preserving the current level of financial stability. The favourable structure of public debt by type of interest rate was maintained because the main portion of public debt was contracted at a fixed interest rate, which decreases interest rate

Figure 2.6 General government interest expenses



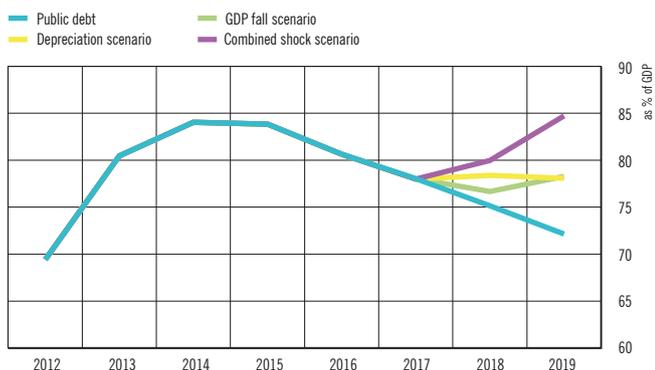
Source: Eurostat.

Figure 2.7 Movements of generic yields on debt securities of selected countries from Central and Eastern Europe (CEE)



Source: BoA Merrill Lynch.

Figure 2.8 Projection of public debt under various scenarios



Sources: CNB's Financial Stability Department and Government of the RC.

risk from the perspective of public finances. At the same time, the currency structure of public debt with a high portion of debt denominated in foreign currencies (EUR and USD) above 76% is still relatively unfavourable (Figure 2.5). Therefore, the vulnerability of the government sector to a possible stronger depreciation of the exchange rate of the kuna against the euro remained high (for more details, see chapter 7 Stress testing of credit institutions). However, financing in the domestic currency has risen since 2016 and it continued into 2017, contributing to the lowering of risks to financial stability.

The financing needs are expected to be lower in 2018 than in the previous year, mainly because of the smaller amount of liabilities falling due. The general government in 2018 will have to refinance due liabilities in the amount of about 14% of GDP¹, which is much lower than in the previous years. On the other hand, the projections of the Government of the Republic of Croatia published in the Convergence Programme² show that a moderate budget deficit is expected in 2018, in spite of the budget surplus in 2017, the financing of which will require additional borrowing on the part of the government. While lower total financing needs have a favourable effect on the trend of reduced exposure of domestic credit institutions to the government, they are still an important source of systemic risks for banks (for more details, see chapter 6 Banking sector).

The Croatian budget still has a considerable burden of high interest payments, although their share in GDP in 2017 dropped below 3%. However, the comparison with other CEE countries shows that Croatia, along with Hungary and Slovenia, is among the countries with the highest general government interest expenses, which reflect the high level of debt, but also the higher price of borrowing (Figure 2.6). The trend of lower interest expenses is expected to continue on the back of a significant improvement in the general government balance and the expected continuation of favourable borrowing conditions in 2018.

Comparable generic yields of CEE countries on average fell slightly and were mostly stable during 2017 (Figure 2.7). The continued fall in yields on Croatian bonds is reflected favourably in lower fiscal risks, as well as in the possibility of a continued trend of more favourable borrowing by the government and other institutional sectors. Attention should be paid to the upward trend in the movement of reference interest rates of the central banks of leading world economies that could lead to changes in expectations and market sentiment already during the current year, and thus impact the movement of yields on domestic long-term debt securities (for more details, see chapter 1 Macroeconomic environment).

1 The amount includes the refinancing of EUR 1.8bn of loans of government-owned road enterprises that has been agreed with a domestic bank syndicate at the end of March 2018.

2 Convergence Programme of the Republic of Croatia for the period 2018-2021 (available in Croatian only).

Fiscal consolidation could be halted temporarily in 2018.

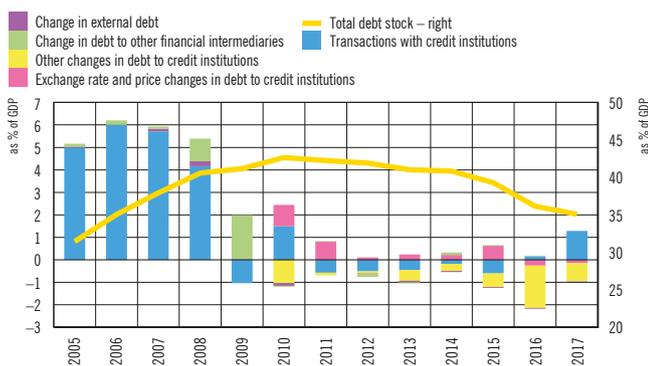
According to the projections of the Government of the RC, a budget deficit of 0.5% of GDP is planned in 2018, largely as the consequence of the planned increase in capital investments. Although public debt might increase slightly, a stronger growth of nominal GDP should result in a decline of the relative debt indicator to 75.1% of GDP, which should continue in the following year. Such developments and the improvement in most of the other fiscal indicators suggest that fiscal risks continue to decline. On the other hand, the sensitivity analysis of public debt to changes in basic macroeconomic indicators shows that the simultaneous slowdown of GDP growth during the two-year period, accompanied by the depreciation of the kuna by 5% annually, might increase the public debt to GDP ratio to almost 85% at the end of 2019 (Figure 2.8). Such a considerable impact of these two shocks on the materialisation of risks in a negative scenario can be attributed equally to a fast and strong deterioration of the so far favourable trend of the economic cycle and the unfavourable impact of the currency structure of general government debt.

Current risks to financial stability in the government sector

The expected continuation of positive trends in fiscal consolidation contributes to the reduction of risks to financial stability. However, the rise in risk aversion in the world markets might have an indirect unfavourable effect on budget expenditures due to which the cost of government borrowing and interest expenses might increase. It is realistic to expect that a relatively long and stable period of low global risk premium in financial markets is coming to an end and that sudden changes might have an effect on the fast tightening of financing conditions, in particular for countries with relatively high financing needs, such as Croatia. Nevertheless, the unfavourable impact of the rise in interest rates could be mitigated to a considerable extent by the improved perception of riskiness for Croatia, assuming the successful continuation of the fiscal consolidation carried out so far. Along with the efforts to contain the procyclical growth in government consumption, additional endeavours in the implementation of structural reforms are necessary for a further reduction of overall risks from the government sector, without which it will not be possible to speed up economic growth and impact a further reduction of structural imbalances.

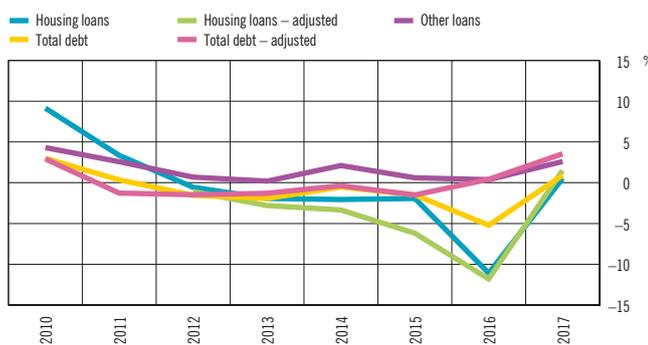
3 Household sector

Figure 3.1 Years-long deleveraging of households was halted in 2017



Note: All changes are shown as the difference between the end of the previous year and relativised share in GDP. Source: CNB.

Figure 3.2 Nominal and effective household debt is growing at an annual level



Note: The growth rate of the total adjusted debt and adjusted housing loans indicates a change in the amounts, which excludes exchange rate changes, price changes and other changes. Source: CNB.

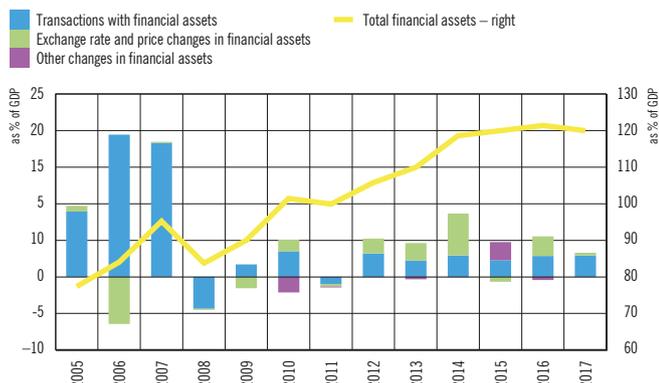
Households increased their debt moderately in 2017, spurred by economic recovery and positive trends in the labour market. Positive trends of household aggregate debt restructuring continued, which reduced their exposure to currency and interest rate risks, as well as the overall exposure to systemic risks.

Despite the nominal and effective growth of household sector's total debt, the recovery of overall economic activity, accompanied by a moderate price increase, reduced their aggregate indebtedness slightly to the level in 2006 (35.1% of GDP, Figure 3.1). After falling for several years, household debt increased by 0.9% in nominal terms in 2017, i.e. effectively by 3.5% (Figure 3.2). The acceleration of new household lending, which is reflected in the growth of transactions with credit institutions (the difference between new lending and existing debt repayments) more than offset the decline in household debt to credit institutions based on write-offs (recorded in other changes in debt to credit institutions), as well as the impact of the moderate appreciation of the exchange rate. In 2017, households did not change their debt to other financial intermediaries or to foreign creditors.

At the same time, households increased their aggregate level of financial assets by 2.7% so that they stood at the level of 120% of GDP, at the end of 2017 (Figure 3.3). Deposits with financial institutions still constituted the dominant form of financial savings (at the end of 2017, 44.6% of total financial assets were deposited with credit institutions, Figure 3.4), and demand deposits continued to replace savings and time deposits. Pension fund contributions, the main alternative form of investing funds, as well as holding cash, also rose.

After the process of conversion of loans indexed to the Swiss franc ended in mid-2016, when the volumes of new household lending mostly stagnated, in 2017, intensification of

Figure 3.3 Financial assets of households are rising



Note: All changes are shown as the difference between the end of the previous year and relativised share in GDP. Source: CNB.

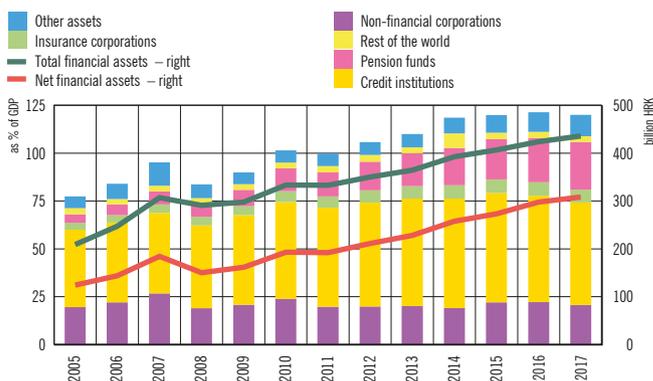
new long-term borrowing is noticeable (Figure 3.5). The total amount of loans granted to households in 2017 was up 1% (Figure 3.7). In addition to cash loans, the newly-granted amounts of which had grown almost constantly in the previous ten years, during the fourth quarter of 2017, newly-granted housing loans grew sharply (almost by 50% at an annual level), which was largely supported by the implementation of the government’s housing loans subsidy programme. A total of 2,321 housing loans were granted within the programme³. Due to the strong interest, the continuation of such a form of government incentives for meeting housing needs was announced in April 2018 for the period until 2020⁴. The new conditions are somewhat modified in comparison to last year’s programme (primarily with regard to the subsidy amount, which will depend on the degree of development of the town or municipality in which the real estate is located). It can be expected that the programme will most likely continue to boost housing loan demand, concentrated in the period of the programme’s implementation. Moreover, the implementation of the programme could have an uneven impact on the movement in the prices of residential real estate in certain geographical areas.

Relaxation of lending terms in 2017 contributed to the recovery of long-term household borrowing (Figure 3.8). A significant easing of credit standards (in the segment of the amount of interest margin, fees and collateral requirements) was recorded in mid-2017. According to the responses of credit institutions covered by a survey, it was primarily the result of stronger competition and reduced costs of funding sources. The Information list containing the offer of loans for consumers was published on the CNB website in September 2017. In addition to other basic information concerning individual types of loans offered to consumers, the list also contains the data on current interest

3 <http://www.mgipu.hr/default.aspx?id=47687> (available in Croatian only).

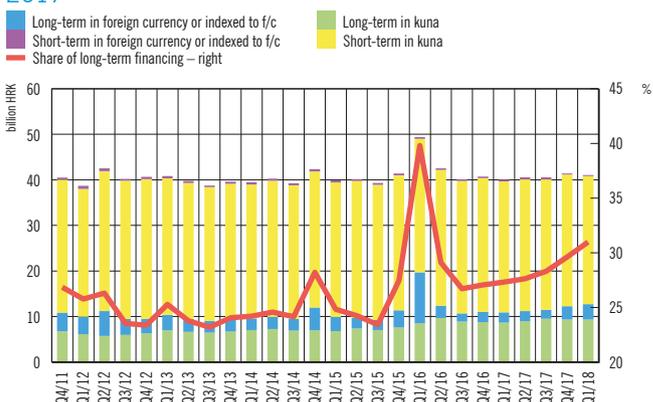
4 <http://www.mgipu.hr/default.aspx?id=56241> (available in Croatian only).

Figure 3.4 Household deposits are the dominant form of investments



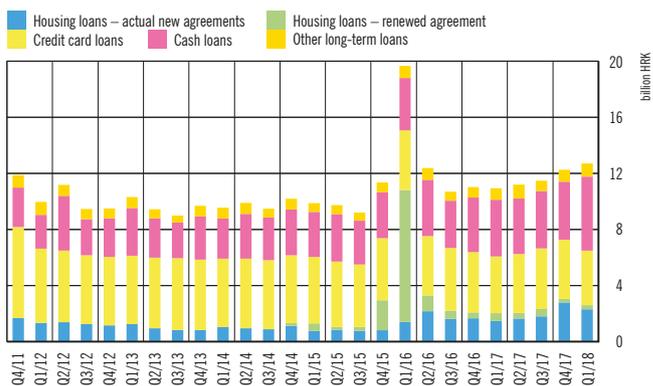
Source: CNB.

Figure 3.5 New long-term household borrowing accelerated in 2017



Source: CNB.

Figure 3.6 Government subsidy programme had a considerable impact on the growth of new housing loans at the end of 2017



Source: CNB.

rates, which will increase the transparency of the credit market and contribute additionally to competition among credit institutions. This could boost the demand of households for loans (Figure 3.9), coupled with favourable developments in the labour market (Figure 3.10) and growing consumer confidence.

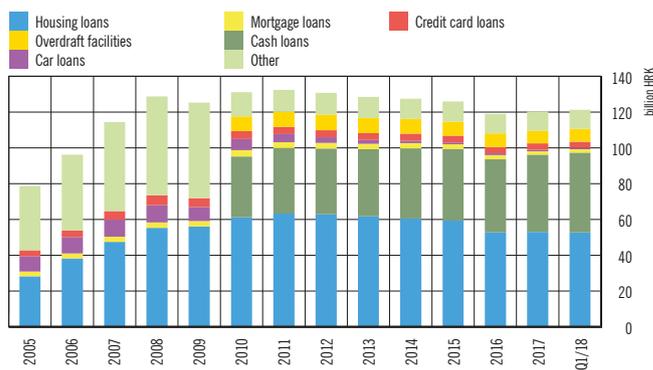
By contrast, the implementation of the Decision on the additional criteria for the assessment of consumer creditworthiness and on the procedure of collection of arrears and voluntary foreclosure might be a limiting factor for new housing lending in 2018, limiting the creditworthiness of some households⁵. From the beginning of 2018, credit institutions must take into consideration minimum living costs of a client, or of the client's family, as an important element of creditworthiness assessment when granting loans. The minimum living costs cannot be lower than the amount of the unseizable portion of the income. In mid-2017, under the Act on Amendments to the Foreclosure Act, the unseizable portion of income was increased, which applies to debtors with a net wage below the average. This amount is limited to three quarters of the average nominal net wage for below average incomes, which weakens the creditworthiness of such debtors. The fact that it is mostly younger households that are seeking to meet their housing needs but as a rule have lower income levels (Figure 3.11) and income stability (Figure 3.12) indicates a possible negative impact of this decision. Nevertheless, an adequate creditworthiness assessment that takes into consideration minimum living costs constitutes a reasonable microprudential and macroprudential approach necessary to maintain financial stability, while the housing issue of young families in the conditions of current demographic movements can be solved only through other measures.

Household exposure to currency risk decreased considerably over the past five years, at the end of 2017 almost half of the loans granted to households being denominated in kuna (Figure 3.13). By contrast, in the last quarter of 2017 and the first quarter of 2018, long-term household borrowing in the euro started again, which can be attributed to the presentation of the Euro Strategy for the adoption of the euro as the official currency in Croatia and slightly lower interest rates on such loans relative to kuna loans (Figure 3.14). However, based on the provisions of the Consumer Home Loan Act that allow consumers a one-off conversion of the loan currency at any moment during the period of duration of the credit relationship, the described trends should not have a significant impact on the effective increase in the household exposure to currency risk.

At the end of 2017, almost 40% of loans granted to households were loans with fixed interest rates (Figure 3.15), which indicates a considerable reduction in household exposure to interest rate risk over the past years. Thus, from mid-2016, new household borrowing, in particular in the form of

5 By this Decision, two guidelines of the European Banking Authority (EBA) have been transposed into the Croatian legislation, i.e.: the EBA Guidelines on creditworthiness assessment (EBA/GL/2015/11) and the EBA Guidelines on arrears and foreclosure (EBA/GL/2015/12).

Figure 3.7 Dynamics of new lending halted the several-year decrease in total loan amounts



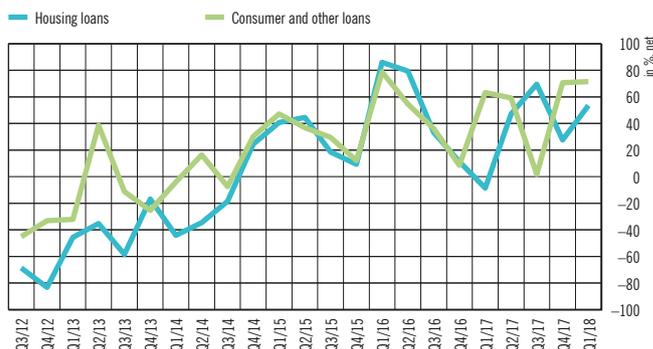
Note: Cash loans and overdraft facilities have been excluded from the category of other household loans since the end of 2010 because they have become new categories. Source: CNB.

Figure 3.8 Lending terms eased in 2017



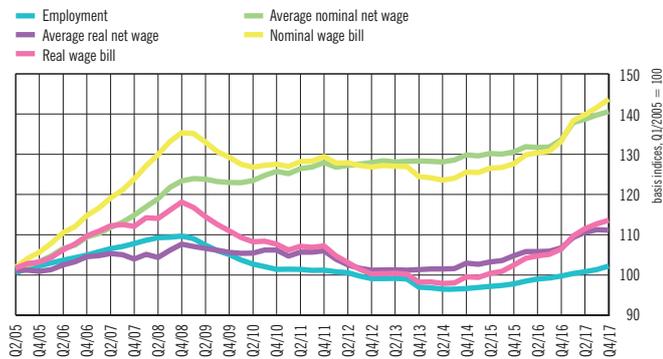
Note: Positive values show the tightening of credit standards, whereas negative values show the easing of credit standards. Source: CNB, Bank lending survey.

Figure 3.9 Banks expect credit demand to strengthen



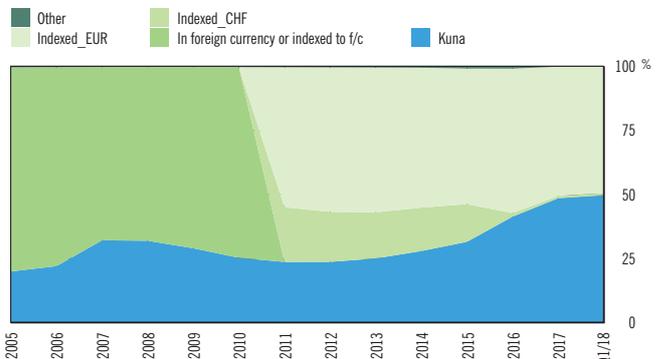
Note: Positive values show the increase in demand, whereas negative values show a decrease in expected demand. Source: CNB, Bank lending survey.

Figure 3.10 Positive trends in the labour market continued throughout 2017



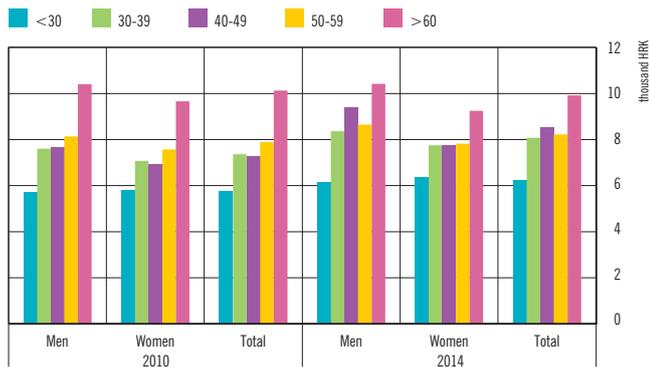
Note: As of 2015, net wage amounts have been reported in accordance with the JOPPD form, which makes it impossible to compare them directly with the amounts in the previous periods.
Sources: CBS and CPII.

Figure 3.13 Household debt to credit institutions denominated in kuna reached a historical high



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 3.11 Average monthly gross wage paid, by gender and age groups, employers with more than ten employees



Source: Eurostat, Structure of earnings survey 2010 and 2014.

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



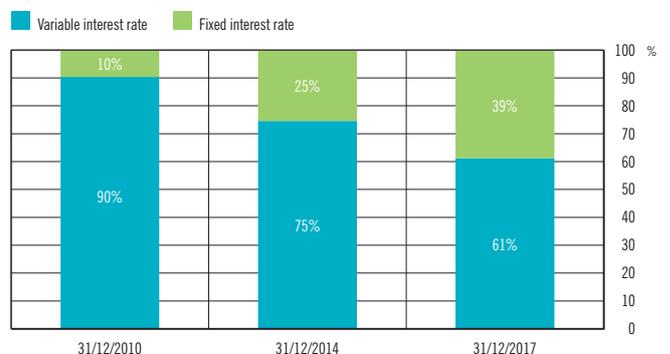
Source: CNB.

Figure 3.12 Share of temporarily employed in the total number of employed persons by age groups



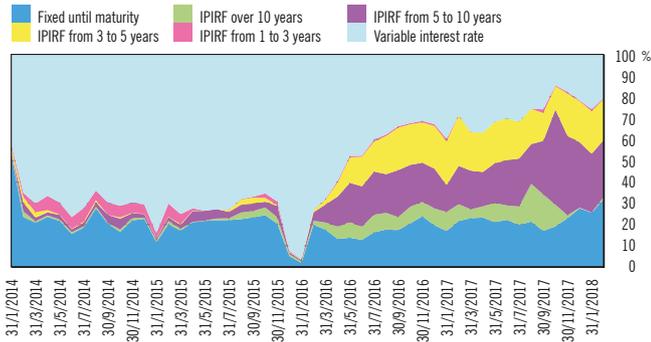
Notes: Temporary employment refers to employment contracts whose termination by agreement between the employee and the employer is determined in advance by an objective condition being met (date, completion of an assignment or return to work of a temporarily absent employee). This form of employment includes seasonal employment, employment through temporary work agencies and vocational training.
Source: Eurostat.

Figure 3.15 In the structure of household debt to credit institutions, the share of loans with floating interest rate



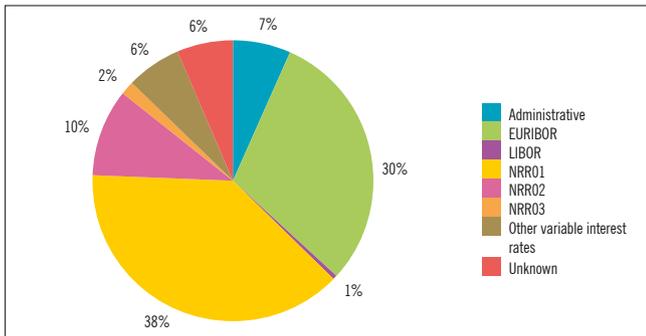
Source: CNB.

Figure 3.16 Rates that protect consumers from interest rate risk over the long term are the most represented



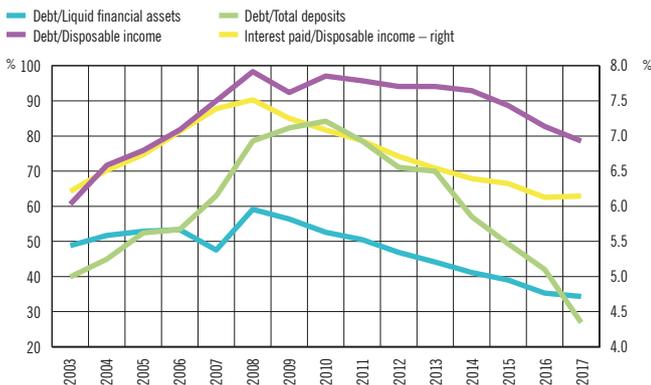
Notes: The structure presented is based on the information on the initial period of interest rate fixing (IPIRF) and serves as an approximation. Fixed rates are fixed to maturity and variable rates are those which are variable or fixed up to a period of 12 months.
Source: CNB.

Figure 3.17 Variable interest rates on the majority of loans granted to households are linked to the movement of the national reference rate (NRR), as at 31 December 2017



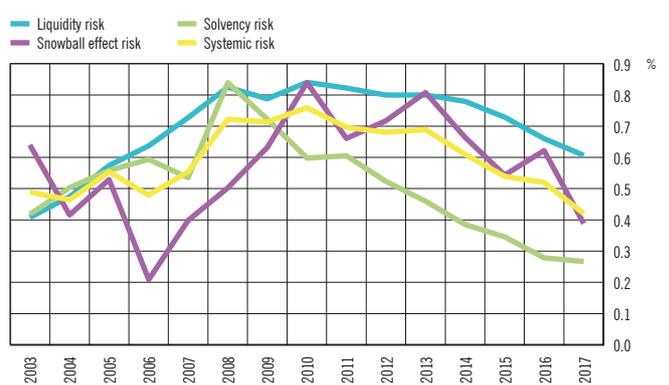
Note: The structure shows the reference parameter to which the change in the variable interest rate is linked, i.e. to which the change in interest rates is linked after the expiry of the initial period of interest rate fixing.
Source: CNB.

Figure 3.18 Debt and interest rate burden of households is decreasing



Source: CNB.

Figure 3.19 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:

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

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

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

Source: CNB.

housing loans, was done predominantly with interest rates that protected consumers from interest rate risk for a certain period (Figure 3.16). This trend in 2017 accelerated in addition to the increase in the representation of rates fixed during the whole loan repayment period, i.e. those protecting consumers from interest rate risk for a longer period (over five years).

However, although these trends contribute to the stability of the financial system because of the smaller exposure of households to interest rate risk, i.e. the exposure of credit institutions to interest rate-induced risk, loans granted with variable interest rates still prevail in the structure of household debt owed to credit institutions. The change of these rates is predominantly linked to the movement of the national reference interest rate (Figure 3.17). In September 2017, the CNB issued the Recommendation to mitigate interest rate and interest rate-induced credit risk in long-term consumer loans, taking into account the interest rate structure of the existing household debt, their levels and income distribution and the likely end of the period of globally low interest rates, considering the initiated, or announced, normalisation of monetary policies of the leading central banks. This measure applies to consumers in existing long-term credit relationships, in which the risk of a considerable growth in the burden of repayment due to a change in interest rates is the most pronounced. The CNB recommends that credit institutions actively offer to consumers the possibility of replacing variable interest rates with fixed interest rates at the prevailing market conditions and without any additional costs for consumers. Therefore, it can be expected that providing protection from interest rate risk to households in conditions of the still low interest rates, with a parallel rise in

consumer information,⁶ will contribute to a further decrease in the exposure of households to this risk.

Indicators of indebtedness and interest rate burden mostly continued to improve in 2017 (Figure 3.18). Even though the nominal debt of households increased slightly in 2017, positive trends in the labour market, coupled with a growth in liquid financial assets of households reduced the indicators of their indebtedness. A further decrease in interest rates were reflected positively in the burden of households with interest rate repayment. The above developments contributed to the decrease in overall systemic vulnerability of households as well as in its individual components (Figure 3.19).

Current risks in the household sector

The household exposure to systemic risk is unlikely to change significantly in 2018. The growth of disposable income should mostly offset the possible continuation of a moderate growth in

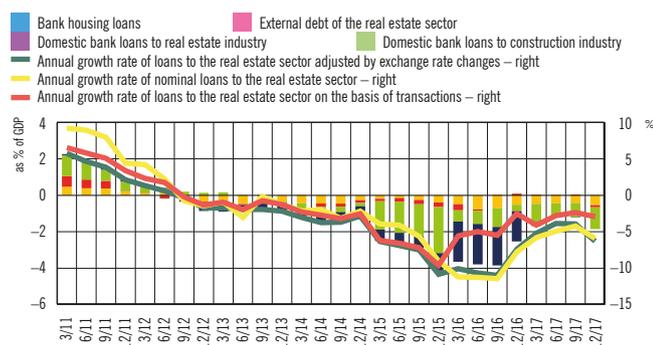
the nominal amount of household debt. Significant changes of interest rate costs are not expected within the short-term period considering the growing representation of fixed interest rates, the levels of which are only slightly higher than the current level of variable rates, i.e. the prevailing link of variable rates to the national reference rate, which introduces a certain inertia into the transfer of higher interest rates on international markets to the domestic capital market. Nevertheless, interest rate risk remains an important source of risk for consumers in the medium term through the potential increase in reference interest rates, particularly with regard to the initiated normalisation of monetary policies of the leading central banks. The outcome of the restructuring of the Agrokor Group remains a negative risk. More than 100,000 jobs⁷ directly or indirectly depend on the modality of this restructuring, which might influence the incomes and creditworthiness of a group of households, although this has already been effectively reduced by recent changes of legislation.

⁶ Information list with the offer of loans to consumers.

⁷ The number of employed persons in the Agrokor Group companies and companies associated with the Agrokor Group in 2016.

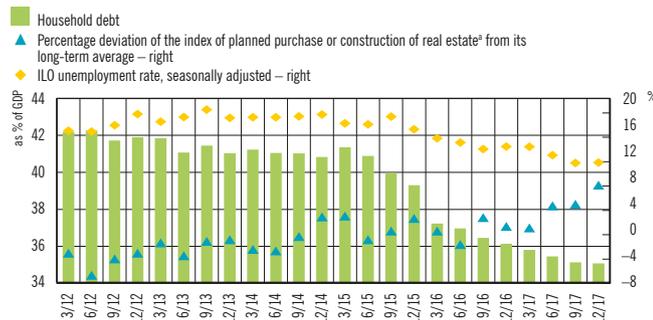
4 Real estate⁸

Figure 4.1 Real estate sector deleveraging slowed down considerably in 2017



Notes: Changes in debt are related to the same period of the previous year and adjusted for exchange rate effects. External debt includes the debt of real estate and construction industries. Transactions refer to housing loans and loans granted to real estate and construction industries.
Source: CNB calculations.

Figure 4.2 Increases in the prices of residential real estate and consumer confidence are mutually reinforcing amid positive macroeconomic developments



^a Index of planning the purchase or construction of real estate was calculated according to 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.

Following several years of contraction, the residential real estate market stabilised in 2017 driven by economic recovery and the effects of the government's housing loans subsidy programme. Considering that economic growth is expected to continue at a similar rate, the risk of imbalances in the real estate market may be considered low.

The real estate sector continued to deleverage vis-a-vis credit institutions in 2017; however, the trend was considerably slower than in the previous years. By the end of 2017, the nominal debt of households and corporations associated with the real estate market dropped by 5.9%. Under the exclusion of exchange rate changes, the total debt declined by 6.3% at the annual level, which is significantly less than in 2016 (when respective decreases of 10.4% and 9.8% were recorded, on average, Figure 4.1). The most significant contribution to the slowdown in the deleveraging of the real estate sector came from the reversal of the downward trend in the housing debt of households after its significant decline a year earlier as a result of the statutory conversion of Swiss franc-indexed loans. The recovery of housing loans could continue to slow down the dynamics of the sector's deleveraging in the upcoming period considering the announced continuation of the housing loans subsidy programme, particularly if the banks do not significantly tighten price and other lending conditions. At the same time, corporations in construction and real estate activities continued to reduce their debt to domestic credit institutions at relatively low, but steady rates (their total annual debt fell by 0.7% of GDP by the end of 2017). Only the deleveraging vis-a-vis foreign creditors intensified in 2017, particularly in the last

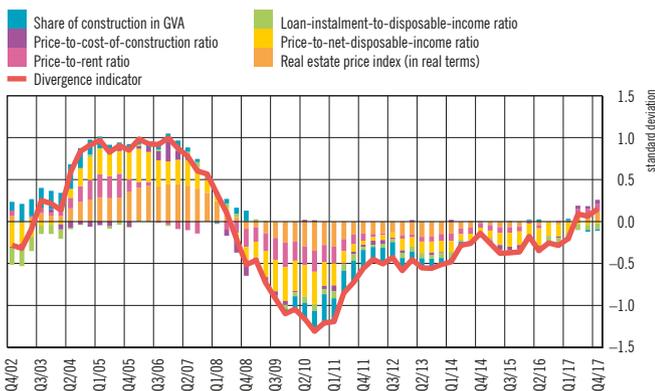
⁸ In this chapter developments in the real estate market are analysed and operations of non-financial corporations in the construction and real estate activities are monitored.

Figure 4.3 Prices of residential real estate saw a significant increase at the end of 2017



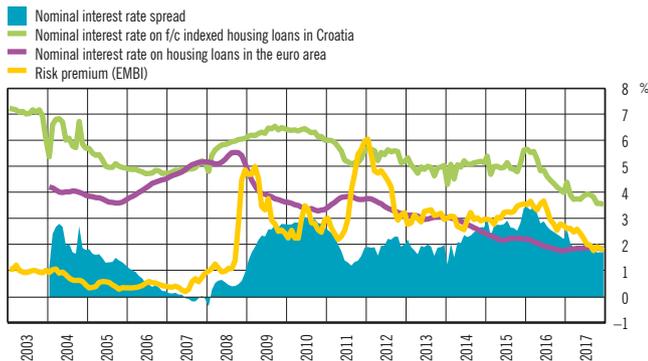
Notes: The index takes into account qualitative characteristics of the real estate in standardising residential units. The amount of newly-granted housing loans excludes refinancing. Sources: CBS and CNB.

Figure 4.4 Prices of residential real estate hover around the level based on macroeconomic fundamentals



Source: CNB.

Figure 4.5 Drop in the 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.

quarter, reducing the total effective debt of the real estate sector by 1.2% of GDP.

The rise in consumer confidence reflected in the intentions of residential real estate purchase (Figure 4.2), as well as the government’s continued implementation of the housing loans subsidies programme, could encourage new housing borrowing of households. However, the recovery of the credit cycle will significantly depend on the developments in the aggregate income of households (positive trends in the labour market are expected to slow down in 2018 and 2019), i.e. on the ability to compensate for amended regulatory⁹ and potentially unfavourable future market financing conditions with higher and more stable income.

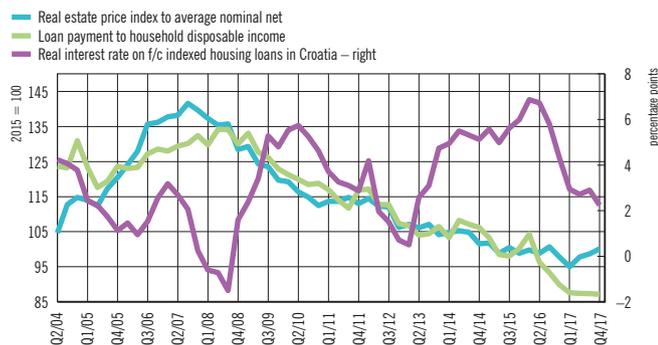
Prices of residential property, which were mainly in line with underlying macroeconomic factors at the end of 2017, are expected to grow further in 2018 (Figure 4.4). The expected rise in prices will probably not be as sharp as in 2017, when prices rose by 7.6% from the year before (Figure 4.3). This substantial increase in the prices of both existing (8.3%) and newly-built (4.1%) real estate was significantly spurred by the government’s implementation of the housing loans subsidy programme, which was reinforced by the somewhat eased lending standards of banks and accompanied by relatively low interest rates (Figure 4.5). The announced continuation of the implementation of the programme until 2020 could affect real estate prices further, and its implementation could be reflected in the intensity and the geographical distribution of price increase. As the rise in prices was not accompanied by an equally strong increase in household income, the improvement of the financial availability of real estate¹⁰ ended in 2017 (Figure 4.6). It is necessary to note that aforementioned indicators measure the change in the availability of residential real estate in all segments of the housing market and for all household segments, but do not reveal the existing differentiation of the financial availability of residential real estate at the geographical level, i.e. for individual households considering their socio-economic and demographic features.

Against the backdrop of the expected lack of economic growth, of unfavourable demographic trends and the structural characteristics of the domestic labour market, possible upward pressures on real estate prices in the foreseeable future may only derive from the announced continued implementation of the government’s housing subsidy programmes. Additional positive upward impact on prices might come from the spillover of higher construction costs (due to the lack of qualified labour and the increase in the prices of raw materials influenced by global developments) to the prices of residential units. One should also add to this possible speculative pressures of domestic and

⁹ Act on Amendments to the Foreclosure Act and the Decision on the additional criteria for the assessment of consumer creditworthiness and on the procedure of collection of arrears and voluntary foreclosure.

¹⁰ 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.

Figure 4.6 The increase in prices put an end to the improvement of the financial availability of residential real estate



Note: 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 residential real estate price index).
Sources: CBS and CNB calculations.

foreign investors who, seeking higher yields in an environment of low interest rates, contributed to the increase in the prices of residential and commercial real estate in a large number of European Union countries (see Box 2 Trends in the European residential real estate market). These unsustainable and macroeconomically unfounded developments in some European real estate markets created the need for extending and enhancing the regulatory framework in order to take adequate action at the micro- and macroprudential level aimed at containing the upturn in the credit cycles of some of the member states, i.e. to strengthen the solvency and liquidity positions of credit institutions, particularly those with systemic importance (see Box 3 Application of macroprudential measures related to the residential real estate market in the EU and EEA).

Current risks in the real estate market

Residential real estate market is expected to continue to recover in the upcoming period, with its influence on financial stability primarily contingent on the simultaneous trends in the macroeconomic factors associated with it. Specifically, if the recovery of the real estate market is not accompanied by an equivalent increase in income, a slight overvaluation is to be expected with regard to the general level of prices of residential property, which currently hover around their equilibrating level based on macroeconomic fundamentals (Figure 4.4). Consequently, their financial availability will also decline. Although current demographic developments and the expected increase in aggregate income do not suggest that domestic household demand for residential real estate will provide a significant contribution to the upward trend in real estate prices at national level, domestic and foreign investment demand could create unbalancing pressures through the adjustment to the tourist potential in certain individual housing market segments. As the aforementioned demand is only partially financed in the credit market and since current regulatory provisions require the allocation of a higher amount of capital for such financing due to elevated risk, the exposure of credit institutions to this segment of the real estate sector is not likely to change substantially. Developments in the commercial real estate market will remain under the influence of the restructuring of the Agrokor Group in both 2018 and 2019 because of the size of the Group's retail distribution network as well as the significance of its logistic facilities.

Box 2 Trends in the European residential real estate market

Following a five-year period of stagnation and decline that began in 2009 after the onset of the global financial crisis, residential property prices began to recover gradually from 2014 onwards, with almost two thirds of EU countries recording uninterrupted annual rates of growth over the past three years. During that period, the recovery intensified and spread across countries amid improved economic conditions (GDP growth, unemployment rate decline and stronger consumer confidence) accompanied by low market interest rates and abundant liquidity resulting from unconventional monetary policy measures implemented by the ECB (Figure 1).

All member states with the exception of Italy recorded an increase in residential real estate prices in 2017. The geographical distribution of the recovery of residential property prices was heterogeneous: in some countries, prices began to increase only recently (over the past two years), while in others (Estonia, Luxembourg, Denmark, the United Kingdom, Germany), prices have been growing steadily for a longer period of time (Figure 2). The intensity of the recovery was also unequally distributed, with some markets exhibiting moderate rates of price increase and others recording two-digit annual rates of growth, contributing to the growing concern over unsustainable growth and the possibility of a new price bubble in the real estate market. However, one should exercise caution when assessing the current situation, considering that the sharp price increase in some markets is attributable to quite strong price correction in the post-crisis period, especially in the CEE region (Figure 3). A reaction on the residential real estate supply side was recorded in parallel with the upward trend in prices as indices of issued building permits and construction work volume (production in construction) went up alongside the prices (Figure 4). However, in spite of intensified activity in the construction sector, both indicators on the supply side remain far from pre-crisis levels. On the other hand, short-term constraints on the supply side can put further pressure on price increase and, accompanied by a speculative rise in prices, lead to resource misallocation and vulnerability. It is therefore necessary to address the issue of whether current growth is sustainable and based on economic fundamentals.

The alignment with macroeconomic fundamentals can be assessed via the simple indicators of the price-to-rent (P-R) and the price-to-income (P-I) ratio. Economic theory suggests that the dynamics of real estate prices, rent and income should move with similar dynamics in the long term¹. This is due to the fact that if prices of real estate diverge from the prices of rent, households will “switch back and forth” between purchase and rental, which will ultimately equilibrate prices. In the same way, prices of real estate should not, in the long term, deviate greatly from the financial ability of households to acquire such property, i.e. from the disposable income of households.

The analysis of the deviation of the price-to-disposable income and price-to-rent ratios from their long-term trend at EU level suggests that

1 Himmelberg C., C. Mayer and T. Sinai (2005): *Assessing High House Prices: Bubbles, Fundamentals and Misperceptions*, Federal Reserve Bank of New York Staff Reports No. 218.

Figure 1 Distribution of the annual change in the prices of residential property at EU level

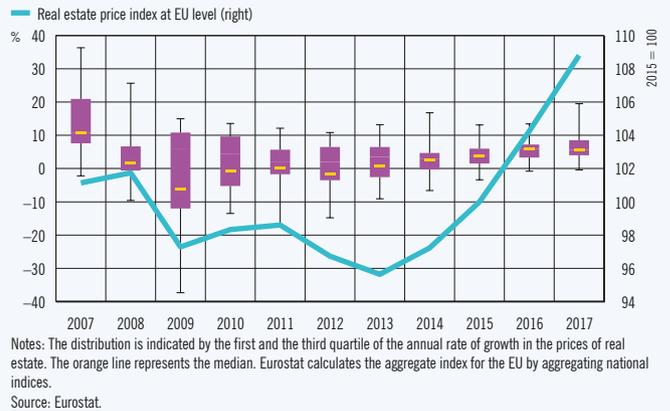


Figure 2 Steady growth in real estate prices is geographically widely distributed

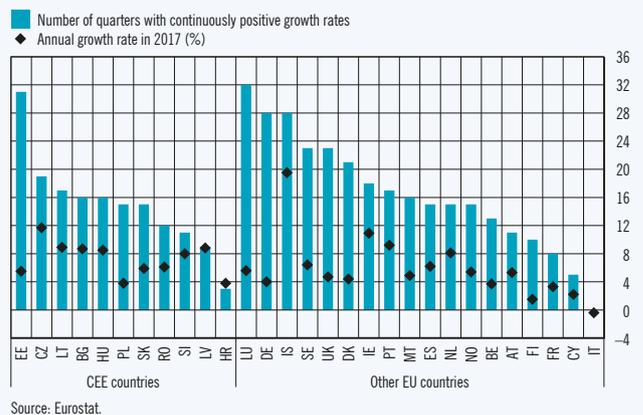


Figure 3 The sharp increase in residential real estate prices in some markets may be associated with a steeper decline in the post-crisis period

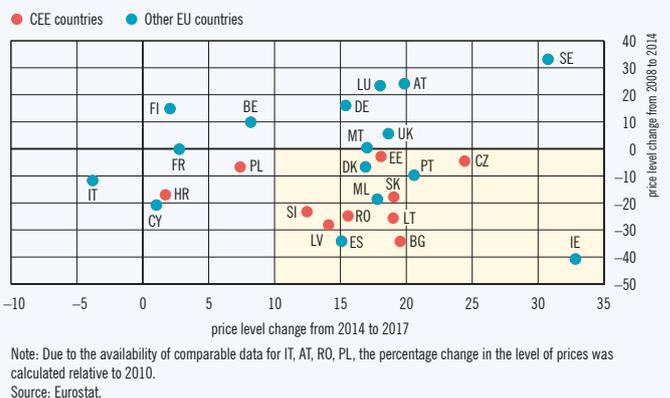


Figure 4 Positive developments on the supply side



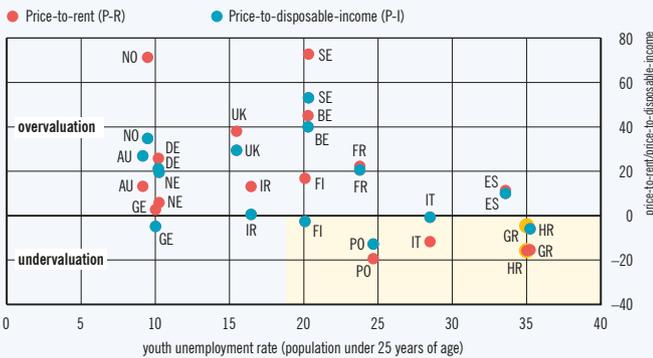
Source: Eurostat.

Figure 5 Percentage of overvaluation/undervaluation relative to the long-term average, 2016



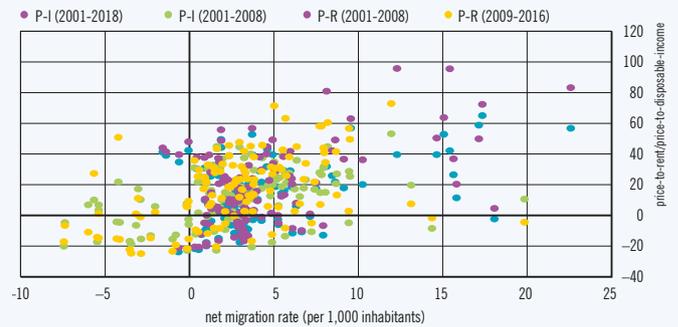
Note: The long-term average refers to the period from 2000 to 2016.
Source: OECD, Analytical House Price Database (data processed by the CNB).

Figure 6 P-I^a and P-R^a relative to the unemployment rate among population under 25 years of age, 2016



^a Percentage deviation from the long-term average.
Sources: OECD, Analytical House Price Database (data processed by the CNB), Eurostat (data processed by the CNB) and CNB.

Figure 7 P-I and P-R relative to the migration rate (per 1,000 inhabitants)



^a Percentage deviation from the long-term average.
Note: The calculation is based on the following countries: SE, NO, BE, UK, DE, FR, AU, NE, ES, FI, IR, GE, IT, HR, GR and PO.
Sources: OECD, Analytical House Price Database (data processed by the CNB), Eurostat (data processed by the CNB) and CNB.

Figure 8 Lower housing credit debt of the household sector in the CEE region

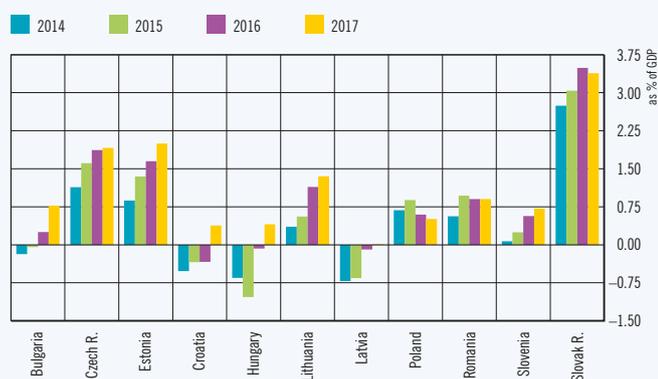


Source: ECB.

current prices are above their long-term (estimated) trend in a significant number of countries (Figure 5). The price undervaluation relative to the long-term average seen in the countries of Southern Europe such as Italy, Greece and Portugal (Figure 6) may be attributed to the fact that these countries were significantly affected by the latest crisis, which is why the prices of real estate are still declining or have only begun to trend upwards. Furthermore, the high unemployment rate and the migration of younger groups of the working age population (young families) that normally account for the largest share of demand in these countries are more prominent than in the countries of Western Europe (Figures 6 and 7).

Such developments may point to a structural problem between the supply (fixed in the short term) and the growing demand for residential real estate, but also to the situation in the market where, owing to the currently low interest rates, investors seeking higher yields affect the prices with their speculative behaviour. The increasing significance of the trends in interest rates and the expected yield in the formation of short-term dynamics of real estate prices is also emphasised in many

Figure 9 Strong increase in new housing loans in the CEE region, transaction-based



Source: ECB.

empirical analyses, notably in Sutton et al.² and Ganoulis and Giuliodori³. In addition to macroeconomic factors, many institutional and country-specific factors may influence the developments in residential real estate prices, such as psychological and demographic factors, costs of construction, market regulation, the banking market and asymmetric information in the real estate market.

In addition to monitoring the price dynamics in the residential real estate market using the aforementioned indicators, imbalances and vulnerabilities associated with this market can be monitored using indica-

tors of indebtedness, or the share of the volume of household housing loans in GDP (or, alternatively, in disposable income). Indebtedness is associated with home ownership or absence thereof, which, in turn, is linked with culture-specific habits, the historical heritage and the degree to which the rental market is regulated as well as the functional alternative to home ownership⁴. Considering the aforementioned differences in the reasons for home ownership and bearing in mind that the acquisition of residential property is usually financed through loans, the high level of housing debt among the countries of Western Europe (Belgium, Denmark, the Netherlands, the United Kingdom), where housing loans constitute more than 85% of the total volume of household loans, is not surprising (Figure 8). In contrast, although housing loans constitute a relatively small share of total loans in a large number of CEE countries, housing credit activity strengthened over the past several years in many countries such as Slovakia, the Czech Republic and Estonia (Figure 9).

Still, even though the recovery of the European and domestic housing market is a welcome development, it is necessary to monitor carefully the trends in real estate market indicators as well as the evolution of related systemic risks due to the great importance of this market to the entire economy. This enables the timely and adequate application of macroprudential and other measures aimed at preventing unsustainable growth in real estate prices and potentially excessive exposures of credit institutions to the real estate market (for more information, see Box 3 Application of macroprudential measures related to the residential real estate market in the EU and EEA), the consequences of which could, according to previous experience, have a major significance for the entire economy.

² Sutton G. D., D. Mihaljek and A. Subelyte (2017): *Interest rates and house prices in the United States and around the world*, BIS Working Papers No 665.

³ Ganoulis, I., and M. Giuliodori (2011): *Financial liberalization and house price dynamics in Europe*, Applied Economics, 43:21, 2671-2688.

⁴ For more information see: Wind, B. J., P. Lersch, and C. L. Dewilde (2015): *Housing wealth inequalities across occupational classes: a comparison of European housing wealth accumulation regimes*, Working Paper, No. 9, Tilburg University, Tilburg.

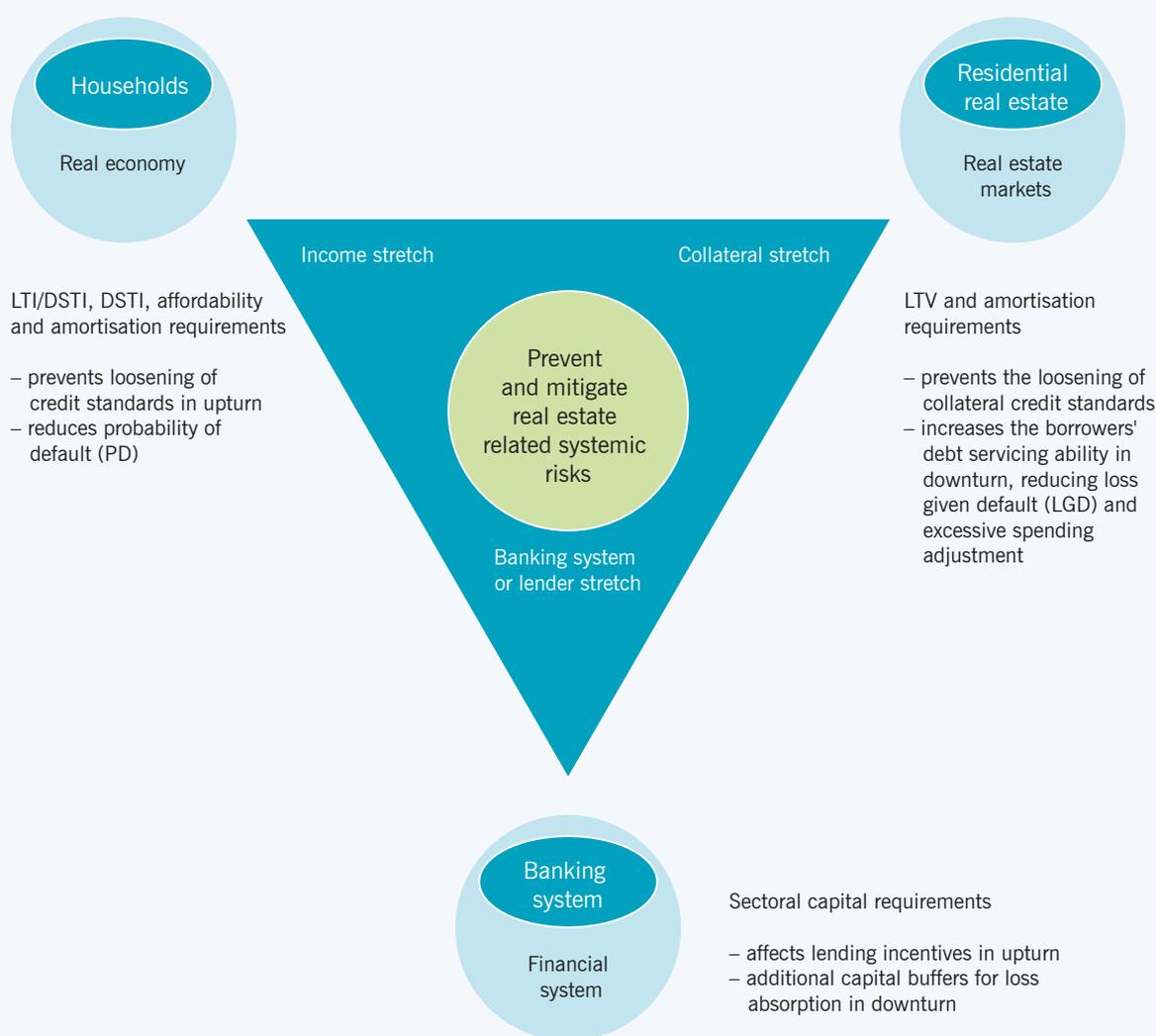
Box 3 Application of macroprudential measures related to the residential real estate market in the EU and EEA

Prices in the EU real estate market have been recovering for several years now, reaching two-digit rates of growth in some countries as a result of improved economic conditions, low interest rates and abundant liquidity (for more information on the subject, see Box 2 Trends in the European residential real estate market). Consequently, there is growing concern regarding the sustainability of its further growth, particularly considering the experience from previous financial crises¹, which have

shown that cycles of strong growth in real estate prices may seriously jeopardise the stability of the financial system. Recessions linked with credit crunches and plummeting real estate market prices are not isolated or rare occurrences and are, by and large, long-lasting and have great influence on employment and economic activity². Economic costs arising from such recessions may be as much as two or three times higher³ than the costs of other crises.

Vulnerabilities in the real estate market are usually accumulated in the upward phase of the cycle and are then negatively reflected in economic activity and financial stability in the downward phase. Careful monitoring of trends in the real estate markets enables the early identification

Figure 1 Types of instruments (measures) aimed at the real estate market



Source: ESRB, Report on residential real estate and financial stability in the EU, 2015.

1 Reinhart, Carmen M., and Kenneth S. Rogoff (2009a): *This Time Is Different: Eight Centuries of Financial Folly*, Princeton University Press, Princeton, NJ.

2 For more information see Table 1.1 ESRB, *Vulnerabilities in the EU residential real estate sector*, November 2016.

3 Claessens S., M. A. Kose, and M. E. Terrones (2008): *What Happens During Recessions, Crunches and Busts?*, December.

of imbalances and the creation of macroprudential policy measures and mechanisms aimed at mitigating such developments.

There are several problems associated with the application of macroprudential policy aimed at the real estate market. Risk identification is difficult, as it frequently relies on less available and lower-quality data. This, combined with insufficient knowledge about the nature and effects of individual measures, may lead to difficulties in the calibration of instruments used to influence identified risks. It is also necessary to consider the possible interaction of macroprudential policy measures with other policies (e.g. microprudential, monetary or fiscal policies), bearing in mind that their good coordination may enhance the effectiveness of macroprudential measures.

Intervention timing is a particular challenge due to the inaction bias: whereas the costs of activating macroprudential measures are immediately evident, their benefits are long-term and less obvious, which is why they are frequently unpopular⁴.

Types and characteristics of measures/instruments

Macroprudential policy instruments aimed at the residential real estate market may be used to affect borrowers (households), pledged assets (collateral) and lenders (banks). Instruments affecting borrowers and collateral are used to curb borrowing, i.e. the accumulation of risks, while measures aimed at lenders are used to increase their resilience, i.e. to enable them to absorb possible losses related to the residential real estate market more easily (Figure 1).

Instruments and measures aimed at borrowers (income stretch instruments and measures) are used to reduce systemic risks associated with excessive growth in loans or real estate prices. These measures impose restrictions on the maximum amount of loan relative to the income of the borrower. Loan-to-income (LTI), debt-to-income (DTI) and debt service-to-income (DSTI) ratios and tighter amortisation requirements (repayment of debt principal and interest in a particular amount under agreed-upon dynamics) are aimed at borrowers with a higher propensity towards excessive borrowing and borrowers at the tail of the housing loan distribution. The aforementioned measures are also used to increase indirectly the resilience of the financial system, as they reduce the costs related to debt servicing and therefore the *ex-ante* probability of default. Instruments aimed at borrowers are often supplemented with sensitivity tests (e.g. assessment of the effect of a change in interest rate levels on debt servicing costs).

Instruments using pledged assets (collateral) to hedge against the materialisation of risks associated with housing loans (collateral stretch instruments) are used to increase the borrower's capacity for loan repayment. By affecting the loan-to-value (LTV) ratio it is possible to influence, either in advance or retrospectively, the capacity for time-

ly repayment and the degree of risk associated with the granted loan. When granting loans, banks may regulate conditions for the valuation of collateral at their own discretion, provided that such conditions are in line with the regulatory framework, while the regulatory authority may impose restrictions in terms of a percentage share of loans that is not allowed to exceed a prescribed share of the total volume of loans granted, i.e. a share in the bank's total loan portfolio (the so-called LTV restriction). Both measures referred to above contain risk materialisation before potential losses begin to affect the banks' balance sheets and may help in reducing risks arising from a change in the value of assets used as collateral.

In addition to income and collateral stretch measures, banking or lender stretch measures (measures aimed at credit institutions, i.e. the banking system) are used. These measures are applied to affect the credit institutions' capital in order to increase their loss-absorbing capacity both individually and in aggregate. They include capital requirements aimed specifically at the residential real estate sector, risk weights for exposures to the real estate market and assumed loss given default (LGD) and are usually introduced in the upward phase of the increase in real estate market prices⁵. Special capital requirements (i.e. capital buffers), such as the countercyclical capital buffer (CCB) or the systemic risk buffer (SRB) are used when risks linked with loans for residential real estate purchase are expected to spill over to other parts of the economy. In such conditions, banks are required to hold additional capital due to greater exposure to the real estate market, which may, directly or indirectly, contribute to a decline in the supply of housing loans or lead to an increase in interest rates of housing loans. In that regard, some central banks take a granular approach that is differentiated according to market segment, currency or geographical area. Such a narrow application of macroprudential policy measures targeting a specific problem or credit instrument usually results in the mitigation of systemic risks, but may render the measures less effective, mainly due to the possibility of their circumvention. On the other hand, the broader approach based on the simultaneous application of several different macroprudential policy instruments also has its disadvantages, such as the difficulty of calibrating different instruments whose interaction may, at times, lead to unwanted outcomes.

Assessments of the effectiveness of measures in containing negative trends and preventing shocks in the real estate market can be found in the professional literature, but their findings have thus far varied. Still, there are indications that measures directed at the real estate market may be effective.⁶ Some analyses suggest that income-based measures, such as LTI, DTI and DSTI restrictions, may be effective in curbing the growth in housing loans and housing loan prices (Igan and Kang, 2011, Wong et al., 2011, Kuttner and Shim, 2013, Vandenbussche et al.,

⁴ The problem could be alleviated by a rule-based approach. However, any significant change in that sense requires more reliable indicators and a thorough understanding of instrument effectiveness. In addition to reliable indicators, good knowledge of the channels through which risks are materialised is also a pre-requisite for the application of macroprudential measures in the real estate market.

⁵ These measures are contained in the EU regulatory framework, namely in CRD IV (Capital Requirements Directive) and CRR (Capital Requirements Regulation).

⁶ It is necessary to note that the assessment of the impact of macroprudential measures is very challenging as most measures were, in the recent years, introduced during a period of cyclical upturn in the prices of real estate, while their actual effect can usually only be assessed *ex-post*, i.e. in a potential future crisis.

2015, McDonald, 2015, Cizel et al., 2016)⁷, while LTV ratio restrictions may enhance the resilience of borrowers as well (Wong et al., 2011, Hallissey et al., 2014). On the other hand, DSTI restrictions have been proved to be more effective than LTV restrictions (Kuttner and Shim, 2013), the use of which in combination with other instruments, such as DTI, is advised (ECB 2014).

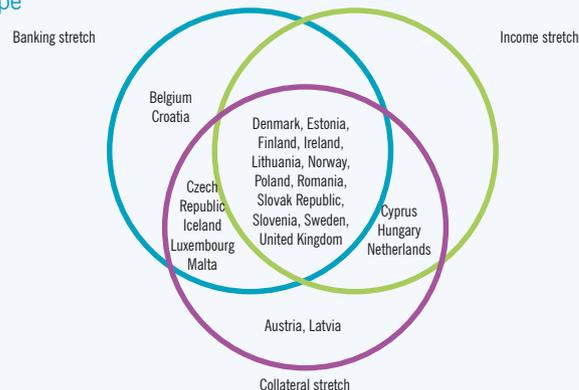
Application of measures in the residential real estate market in European countries and Croatia

Due to negative experiences from the last cycle in the European real estate market, the European Systemic Risk Board (ESRB) has been seeking to establish a unified macroprudential framework over the past several years in order to monitor the conditions and developments in the real estate market and its individual components. In doing so, it regularly assesses residential real estate market-related vulnerabilities that may become a source of systemic risk to financial stability in all EU member states over the medium term. In 2016, the ESRB issued warnings for eight member states on account of identified vulnerabilities, while in others it did not find any significant vulnerabilities pertaining to the residential real estate sector, or, where such vulnerabilities were found, they were already being addressed by adequate macroprudential policy measures.

In 2017, a large number of member states reacted to the developments in the residential real estate market by amending the regulations governing the application of individual measures in line with the current and expected changes in market conditions. According to the data for 2017, almost 70% of EEA member states had or put in place a macroprudential measure targeting the residential real estate market⁸. Since the increase in real estate prices began later in Croatia than in the majority of other EU countries, no medium-term vulnerabilities have been observed thus far, which is why the Croatian National Bank did not introduce any new macroprudential measures for residential real estate. As for the previously described sets of measures (applied instruments), most member states applying them do so by applying all available types of measures (Figure 2).

Numerous macroprudential measures are being applied in the EU and EEA. The countercyclical capital buffer (CCB) with a rate different from zero is currently in force in five countries: the Czech Republic, Slo-

Figure 2 Application of instruments (measures) according to type



Source: ESRB, A Review of Macroprudential Policy in the EU 2017 (draft) (data adjusted by the CNB).

vakia, Sweden, Norway and Iceland, and its activation in 2018 was announced by the United Kingdom and Lithuania. The introduction of the CCB in countries referred to above was motivated by strong credit expansion, primarily in the segment of commercial and residential real estate. Moreover, some EU member states adopted measures based on Article 458 of the CRR, introducing stricter national capital criteria associated with residential real estate (Belgian and Finnish measures). The Belgian measure introduced a minimum risk weight for the exposure to real estate for banks applying the so-called internal ratings-based approach – IRB, while the Finnish measure, entering into force in the course of 2018, refers to the application of a binding maximum loan-to-collateral ratio of 85% to average residential mortgage loans (with the exception of loans used for first home purchase). Sweden also announced the introduction of a measure targeted at borrowers (their income) by applying an amortisation rate to the debt depending on the loan amount and real estate value. The introduction of macroprudential measures in the residential real estate market was enabled in Austria as well on the basis of legislative changes adopted at end-2017; however, instruments envisaged by the changes, targeting borrowers and collateral, are not yet in force. Only specific measures relating to the LTV ratio are applied in Austria in credit institutions subject to a special law and in insurance firms.

As regards macroprudential measures or measures with a macroprudential character in Croatia, only measures affecting lenders are currently applied in the residential real estate market segment, namely the *stricter criteria for the application of a preferential weight for exposures secured by residential real estate*. Specifically, a preferential risk weight of 35% can be used in Croatia for credit exposures fully secured by residential mortgage, but the introduced measure tightens the criteria for its application (the owner of the real estate purchased by the loan is not allowed to own more than two residential units, excluding holiday homes, and the real estate must be occupied by the owner or a tenant). In this way, the use of the preferential risk weight has been significantly limited in practice.

Furthermore, since recently, banks in Croatia are required to define in their internal bylaws the minimum level of costs of living, which is considered an important element when determining the creditworthiness of

7 Igan D. and H. Kang (2011): *Do Loan-To-Value and Debt-To-Income Limits Work? Evidence from Korea*. IMF Working Papers, p. 297; Wong, E., K. Li, and H. Choi (2011): *Loan-to-Value Ratio as a MacroPrudential Tool – Hong Kong’s Experience and Cross-Country Evidence*, Working Papers 1101, Hong Kong Monetary Authority; Kuttner, K. N., and I. Shim (2013): *Can non-interest rate policies stabilise housing markets? Evidence from a panel of 57 economies*, BIS Working Papers, p. 433; Vandenbussche J., U. Vogel, and E. Detragiache (2015): *Macroprudential Policies and Housing Prices: A New Database and Empirical Evidence for Central, Eastern, and Southeastern Europe*, Journal of Money, Credit and Banking No. 47, pp. 343-377; McDonald, C. (2015): *When is macroprudential policy effective?*, BIS Working paper No. 496.; Cizel, J., J. Frost, A. Houben, and P. Wierts (2016): *Effective Macroprudential Policy: Cross-Sector Substitution from Price and Quantity Measures*, IMF Working Paper No. 94.

8 A list of measures applied in EU and EEA countries is provided as an appendix to this box.

consumers and their families⁹. The minimum amount referred to above must not be lower than the amount laid down by the Foreclosure Act: according to amendments adopted in August 2017, three quarters of the debtor's salary are exempt from forced collection (instead of two

thirds, which was previously the case). This implicitly increased the DSTI restriction for all borrowers, which will have a limiting effect on the demand for housing loans (primarily influencing borrowers with lower incomes).

Table 1 List of macroprudential measures for real estate applied in EU member states and EEA countries notified to the ESRB

	Collateral stretch Reduces LGD	Income stretch Reduces PD	Banking/lender stretch Reduces long-term sensitivity to interest rate change
Austria	LTV: 60% for mortgage-covered bonds; 80% for mortgage loans granted by building societies; 60% for mortgages included in the coverage funds in the insurance sector	–	–
Belgium	–	–	Risk weights: 5-percentage point risk weight add-on for risks arising from mortgage loans to Belgian residents
Cyprus	LTV: 80% in cases where the loan was granted for financing the primary permanent residence of the borrower; 70% for all other cases	DSTI: difference between total monthly income and total monthly expenditures; limited to 35% of the borrower's total monthly income and limited to 80% of net disposable income (65% for loans denominated in foreign currency)	–
Czech Republic	LTV: from 100% (2015) to 90% (2017); share of loans with LTV ranging from 80% to 90% limited to 15% per quarter (2017); 60% for high-risk buy-to-let financing	–	–
Denmark	LTV: 95%; share of interest-only lending where the LTV exceeds 75% of the lending limit must not exceed 10% of the total lending volume per quarter	LTI: where LTI > 4, households should have positive net wealth after 10% decrease in house price (25% decrease where LTI > 5)	Maturity: 30 years at maximum
Estonia	LTV: 85%; 90% with KredEx guarantee; up to 15% of new housing loan volume may exceed the restriction in a quarter	DSTI: 50%; up to 15% of new housing loan volume may exceed the restriction in a quarter	Maturity: 30 years at maximum for housing loans; up to 15% of new housing loan volume may exceed the restriction in a quarter
Finland	LTV: 90%; 95% for first-time buyers	The borrower is stress-tested with 6% mortgage loan interest rate in 25 years' maturity	Risk weights: 10% minimum for an average risk weight for housing loans
Croatia	–	–	Stricter criteria in the application of the preferential weight for exposures secured by residential real estate
Hungary	LTV: between 35% and 80% (depending on the currency denomination of the loan)	PTI: 10% -60%; depending on currency and net income of the borrower; HUF 300,000 de minimis	–
Iceland	LTV: 85% for second-time and subsequent buyers; 90% for first-time buyers; 70% for buy-to-let housing (loans); 75% for preferential risk weighting	–	–
Ireland	LTV: 80%; 90% for first-time buyers	LTI: new housing loans with LTI > 3.5 should be ≤ 20% of aggregate value of new loans	Stress test: lenders are required to assess whether borrowers can continue repaying their mortgage loans in case of a minimum (2%) interest rate increase above the offered rate; risk weights: LTV < 75% for preferential risk weighting

⁹ Pursuant to the Act on Consumer Housing Loans (OG 101/2017) and having regard to EBA Guidelines on creditworthiness assessment (EBA/GL/2015/11), the CNB adopted the Decision on the additional criteria for the assessment of consumer creditworthiness and on the procedure for the collection of arrears and voluntary foreclosure (OG 107/2017).

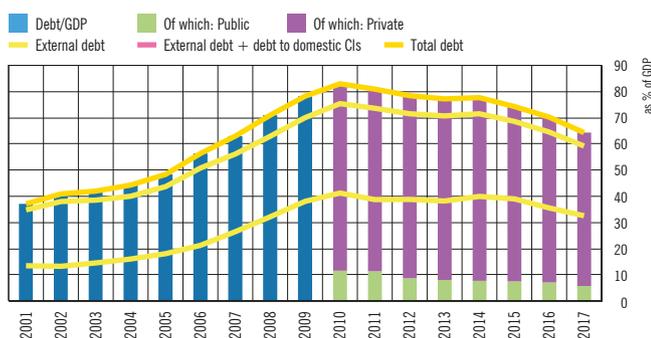
	Collateral stretch Reduces LGD	Income stretch Reduces PD	Banking/lender stretch Reduces long-term sensitivity to interest rate change
Latvia	LTV: 90%; 95% for loans supported by a state guarantee under the Law on Assistance in Resolution of Dwelling Issues (since July 2014)		–
Lithuania	LTV: 85%	DSTI: 40% of net income; stressed DSTI of 50% under the scenario of a 5% interest increase; up to 5% of the total value of new housing loans is allowed to exceed the DSTI restriction of 40% within a calendar year (overall capped at 60%)	Maturity: 30 years at maximum for new housing loans
Luxembourg	LTV > 80%, risk weight must be 75% for the part of the mortgage loan above the collateral	–	Risk weights: 75% for the part of the mortgage loan exceeding 80% of real estate value; risk weights: average minimum risk weight of 15% for household housing loans; stress test: strict stress test for mortgage loans and requirements for banks to have adequate internal management policies Risk weights: average minimum risk weight of 15% for household housing loans Stress test: strict stress test for mortgage loans and requirements for banks to have adequate internal management policies
Malta	LTV: 70% when applying a 35% risk weight	–	Risk weights: LTV < 70% for exposures secured by mortgage on residential property under the application of a 35% risk weight
Netherlands	LTV: from 106% (2012) to 100% (2018)	DSTI: limit depending on income and interest rates; LTI: limit depending on income and interest rates LTI: limit depending on income and interest rates	–
Norway	LTV: 85%; 70% for home equity lines of credit; 60% for secondary homes in Oslo. The limit may be exceeded by 10% of the mortgage volume per quarter, the limit is 8% for mortgages 'for amortisation requirements in Oslo' where LTV > 70%	Amortisation: 2.5% rate for housing mortgage loans with LTV > 60%. 10% of the mortgage volume per quarter is allowed not to meet the regulatory requirements, the limit is 8% for mortgages in Oslo; amortisation requirement for mortgage loans with LTV exceeding 70% LTI: total debt should not exceed the gross annual income by more than five times. 10% of mortgages per quarter are allowed not to meet regulatory requirements; the limit is 8% for mortgages in Oslo	Risk weights: tighter requirements for residential mortgage lending models Stress test: stress rate testing/sensitivity testing is performed when assessing the borrower's debt servicing ability. 10% of mortgage volume is allowed not to meet regulatory requirements; the limit is 8% for mortgages in Oslo
Poland	LTV: 80% since 2017, down from 90% (2015); potential of attaining 90% if the additional part (above 80%) is secured/secured by funds in bank accounts	DSTI: internal bank limits for all household loans; banks are required to pay special attention to loans with DSTI > 50%	Maturity: 35 years at maximum; banks are required to assess creditworthiness assuming maturity of up to 25 years Risk weights: 150% for exposures fully secured by mortgages on residential real estate where the principal or interest instalments depend on changes in the exchange rate of one or more foreign currencies that differ from the borrower's income currency
Romania	LTV: between 60% and 85% (depending on loan currency)	DSTI: maximum level for consumer loans depending on currency, interest rate and income risk; debt includes mortgage loans	Stress test: foreign currency depreciation accounting and interest rate shocks defined for consumer loans
Slovak Republic	LTV: 100%; share of new loans with LTV > 90% should not exceed 10%, and the share of new loans with LTV > 80% should not exceed 40%	DSTI: restriction of 90% for the borrower's disposable income; in case of loans with variable interest rate, an interest rate increase of two percentage points is assumed	Maturity: 30 years at maximum; 10% of new loans may exceed this restriction
Slovenia	LTV: 80%	DSTI restriction of 50% for monthly income up to EUR 1.700 and 67% limit for monthly income above this	Risk weights: minimum level of 35%
Sweden	LTV: 85%; amortisation required where LTV > 50%	Amortisation: annual repayment of at least 1% on loans with 50% < LTV ≤ 70% and 2% if LTV > 70%	Risk weights: minimum level of 25%

	Collateral stretch Reduces LGD	Income stretch Reduces PD	Banking/lender stretch Reduces long-term sensitivity to interest rate change
United Kingdom	Requirement for a credible repayment strategy for borrowers receiving an interest-only mortgage loan	LTI: new residential mortgage loans with LTI ≥ 4.5 times income should be < 15% of aggregate volume of new loans; de minimis exception; recommendation by the FPC on interest rate stress in affordability assessment and measures by the PRA on underwriting standards for buy-to-let lending	Stress testing including annual commercial property market downturn scenario; possibly followed up by management actions and Pillar 2 measures

Source: ESRB, A Review of Macroprudential Policy in the EU in 2017, January 2018 (data processed by the CNB).

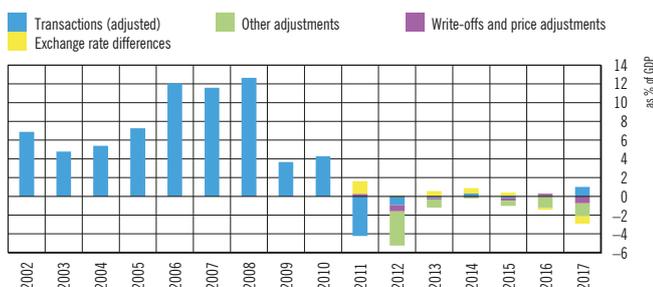
5 Non-financial corporate sector

Figure 5.1 Indebtedness of the corporate sector continued to fall in 2017



Note: The difference between total consolidated debt and the sum of external debt and debt to domestic credit institutions is the debt to domestic leasing companies, insurance and other financial institutions (funds, factoring companies, etc.).
Sources: CNB and HANFA.

Figure 5.2 Sale of claims and GDP growth have significantly contributed to a reduction in total debt



Notes: Shows the decomposition of changes in indebtedness at an annual level. Transactions exclude the net amounts of sold claims of credit institutions, and from write-offs, the portion that refers to the claims sold (their value adjustments). Other adjustments include the sale of non-performing claims in gross amounts (see footnote 11), 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: CNB and HANFA.

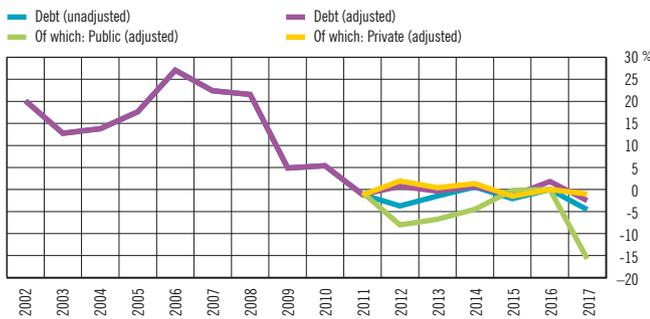
In the context of the crisis of the Agrokor Group, the downward trend in the indebtedness of non-financial corporations continued in 2017 under the impact of one-off effects of adjustments, while new borrowing exceeded the repayment of old debt. The revival of domestic credit activity partly served for the refinancing of due foreign loans. Despite the unfavourable events concerning the Agrokor Group, smaller vulnerability of the non-financial corporate sector was observed, primarily due to the reduced debt repayment burden.

The year 2017 was marked by the crisis at the Agrokor Group, whose delay in settling its liabilities caused difficulties for many of the enterprises and creditors affiliated with the Group through business operations and/or equity. However, thanks to the stabilisation of operations of the Group in the second half of the year, the risk of the spillover of the crisis onto creditors and suppliers was reduced considerably, in line with the current course of the final phase of the settlement process with creditors. The process of ownership and business restructuring of the Agrokor Group is still creating uncertainty in the non-financial corporate sector, and the extent to which, and the pace at which, the risk will be reduced depends on its final model and implementation.

The total indebtedness of the non-financial corporate sector continued to decline and at the end of 2017 it dropped to 64.7% of GDP (Figure 5.1). The significant sale of non-performing claims of domestic credit institutions¹¹ was the main

11 Statistical data overestimate the decrease in indebtedness of the non-financial corporate sector, since a number of new creditors are not covered by statistical analyses. The sold claims still constitute the debt of the non-financial corporate sector, only

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



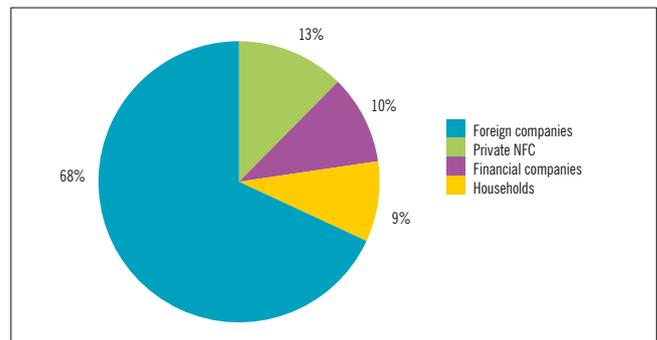
Notes: Annual rates of change in non-financial corporate debt. Annual rates of change in the debt of non-financial corporations exclude the impact of exchange rate differences, the sale of non-performing claims, a portion of shipyard debt assumed by the government in June 2012, the winding-up of a domestic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

factor behind the decline (by a total of 5.9 percentage points of GDP from the end of 2016) (in Figure 5.2 shown under other adjustments) in addition to other write-offs and price adjustments, mainly of external debt. In addition, the reduction in debt was also brought about by the moderate appreciation of the kuna against the euro and GDP growth. However, if the effects of the exchange rate fluctuations, write-offs, price adjustments and the sale of claims are excluded, non-financial corporations increased their debt based on transactions in 2017, i.e. they assumed more new liabilities than the old ones they repaid. The effect of these net transactions of the non-financial corporate sector on the increase in the sector indebtedness was 1.2 percentage points, of which a considerable amount refers to the agreement with Agrokor within the process of settlement with creditors (the roll-up loan agreement).

The total debt stock of the non-financial corporate sector, after stagnation in the previous year, dropped by about 5% in 2017 (Figure 5.3). The annual rate of change of total debt adjusted by exchange rate and price changes, the sale of non-performing claims and other methodological changes was slightly lower and stood at about -2.5%. As already mentioned, the sale of claims contributed largely to the decrease in total debt. Through sales, claims have been transferred from the credit institutions sector to other sectors, so that they remain the liability of the non-financial corporate sector (although they are mostly not covered by the currently available statistics). The majority of the claims were purchased by foreign entities, while a significant portion of the claims was purchased by domestic non-financial corporations and natural persons, albeit at a higher purchase price than the price paid by foreign buyers. This is noticeable from the share of their payments in the total purchase price (Figure 5.5) being relatively higher than the value of their gross portfolio in the total gross value of the claims

to other entities: factoring companies and other corporations and individuals dealing with the purchase of receivables. Debts sold should be easier to settle after the sale, but there is no precise information about this.

Figure 5.4 Majority of gross non-financial corporate debt was purchased by foreign enterprises

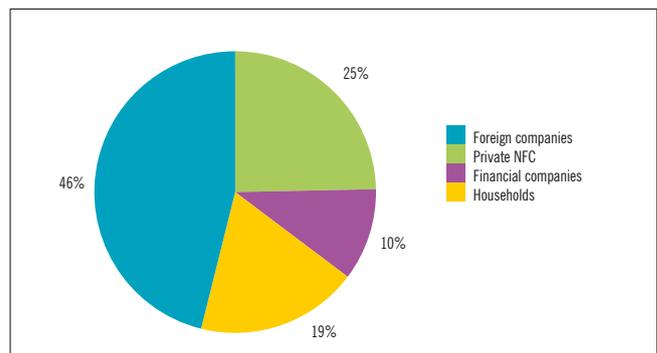


Note: Shows the sectoral shares in the nominal gross value of the claims sold in 2017 including off-balance sheet claims.
Source: CNB.

sold (Figure 5.4). Natural persons that purchase claims from credit institutions are often persons affiliated with the original debtors, therefore, they are more ready to pay a higher purchase price using own funds, with the aim of maintaining control over the corporation, while financial corporations mostly purchase at higher discounts, as a result of a larger manoeuvring space for generating earnings in addition to the lower quality of the purchased portfolios.

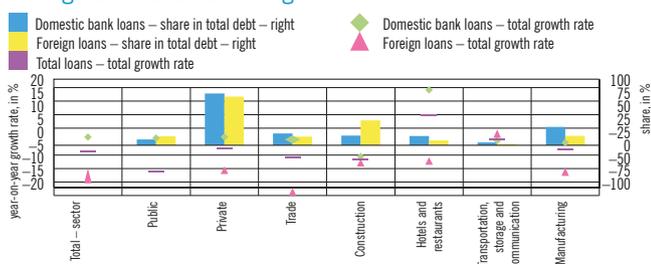
Public non-financial corporations reduced their total indebtedness strongly, while private corporations reduced their total debt moderately (Figure 5.6). The deleveraging of the public corporate sector in the segment of loans was mostly under the effect of the reduction in their liabilities on foreign loans (by about 20%), mainly manufacturing enterprises, management activities, transportation and energy (which also deleveraged to domestic credit institutions). Although public corporations

Figure 5.5 Foreign and domestic financial corporations paid relatively the lowest purchase price



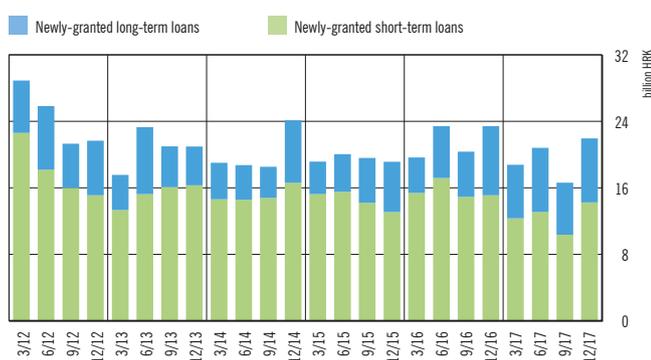
Note: Shows the sectoral shares in the purchase value of the claims sold in 2017.
Source: CNB.

Figure 5.6 Deleveraging in the non-financial corporate sector is also characterised by a partial refinancing of foreign loans through domestic borrowing



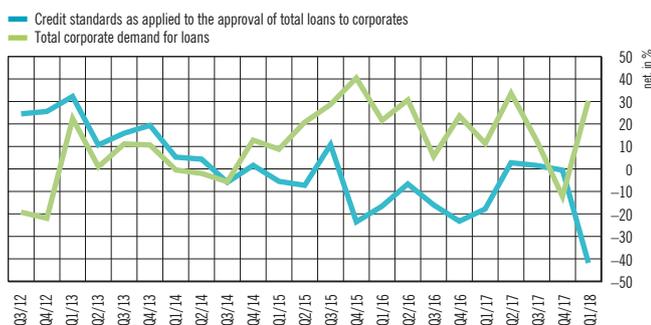
Notes: The annual rates of change in foreign loans and domestic bank loans by activity from 31 December 2016 to 31 December 2017. The structure of the change in loans by activity is presented only for the sector of private non-financial corporations, while percentages on the horizontal axis indicate the share of export revenues in total revenues of the activity in 2016. The right hand side axis shows the share of domestic and foreign loans in total domestic and foreign loans respectively. Growth rates are the result of borrowing transactions and loan repayment in the observed period (without corrections for sale, exchange rate and other adjustments).
Sources: CNB and FINA.

Figure 5.7 Newly-granted corporate loans decreased slightly in 2017 from the previous year



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

Figure 5.8 Demand for loans continues to grow after the temporary decline at the end of 2017



Notes: 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. Data show the net percentage of banks weighted by the share in total corporate loans.
Source: CNB.

borrowed from domestic credit institutions at the same time, their total credit liabilities declined, which was reflected in the total reduction in their debt.

Private corporations reduced their total debt liabilities in 2017 very moderately, while lending even increased in the activities of the hotel business, transportation, storage and communication.

The fall in total debt was brought about by the repayments of foreign loans and their partial refinancing by domestic borrowing. The foreign loans of private non-financial corporations have been repaid to a smaller extent than the loans of public corporations, while in certain activities, e.g. telecommunications, foreign loans are growing. The refinancing of a part of the foreign loans by new loans from domestic credit institutions was more pronounced in the hotel business, trade and manufacturing. The refinancing in the domestic market leads to a moderate growth of total domestic loans to private non-financial corporations, which is an indication of better financing conditions of corporations from these activities with domestic credit institutions, but also the consequence of improved financing conditions due to lower interest rates in the domestic market (Figure 5.12). Domestic loans increased on the back of new borrowing in almost all activities of private non-financial corporations (except construction). The borrowing of enterprises in the hotel business is facilitated by their good business results in the conditions of the sharp rise in the number of tourist nights and tourism revenues. The maintained high share of foreign currency loans in total loans, taking into consideration the prevailing foreign exchange structure of revenues, does not have any impact on the change in the currency-induced credit risk of the hotel business (Figure 5.10).

In 2017, the long-term borrowing of non-financial corporations with domestic banks increased, while their short-term borrowing decreased. The balance of loans granted to non-financial corporations with domestic banks increased moderately in 2017, while new lending slowed down from 2016. Newly-granted corporate loans (Figure 5.7) in 2017, relative to 2016, declined approximately by 10%, which was mostly attributed to the reduced need for kuna financing with shorter maturities. However, unlike short-term financing, the need for long-term financing (regardless of the currency) grew in the same period. The described movements also had an effect on the change in the currency structure of newly-granted loans, so that the share of kuna loans in total newly-granted loans in 2017 dropped to 58% from 63% in 2016. The generally good business performance of corporations, the reduced need for the financing of inventories and working capital, as well as the restructuring of debt by borrowing from domestic banks in the second half, i.e. the last quarter of 2017 (in accordance with the results of the Bank lending survey) are some of the reasons for such movements in the structure of newly-granted loans.

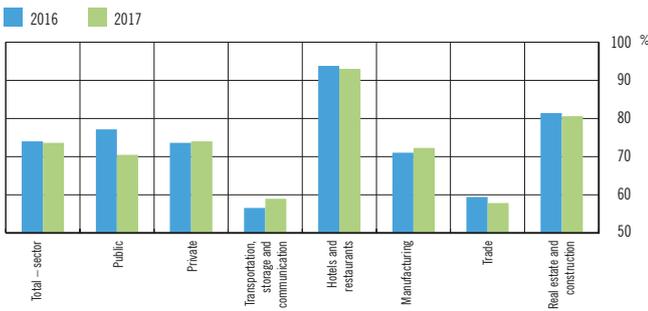
The results of the bank lending survey during the previous year point to the increase in corporate demand for loans, which was temporarily halted at the end of the year, and to almost unchanged lending terms (Figure 5.8). After several

Figure 5.9 The share of total corporate debt in foreign currency stagnated



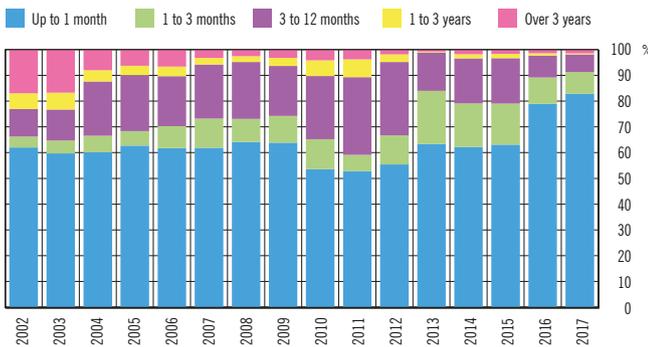
Notes: Presented is the share in total corporate debt (by maturity). It is assumed that total external debt is denominated in foreign currencies. Debt indexed to foreign currencies (a foreign currency clause) is also included. Source: CNB.

Figure 5.10 Public corporations strongly reduce their exposure to currency risk



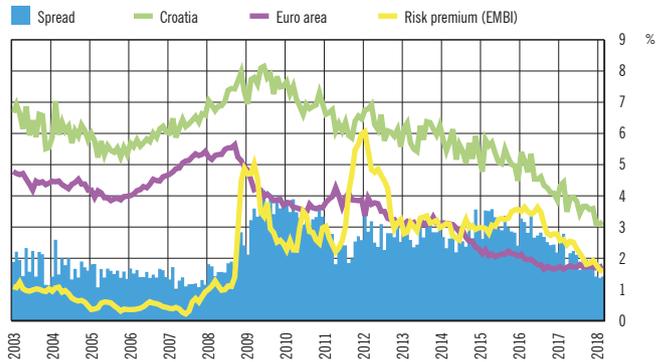
Notes: The figure shows the share of total corporate non-kuna debt in total loans (by sub-sector and activity). Percentages on the horizontal axis indicate the share of export revenues in total revenues of the activity in 2016. It is assumed that total external debt is denominated in foreign currencies. Debt indexed to foreign currencies (a foreign currency clause) is also included. Sources: CNB and FINA.

Figure 5.11 Risks associated with growth in interest rates on corporate loans remain high



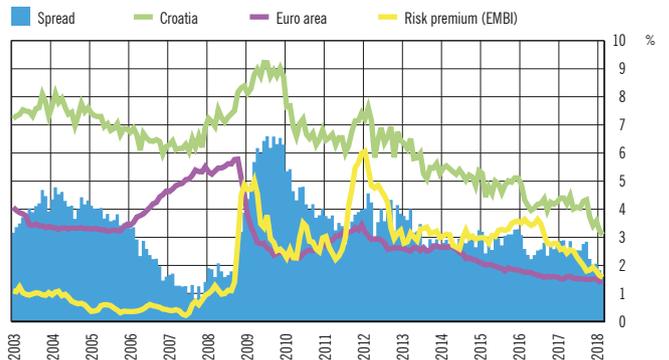
Note: The figure presents a breakdown of bank loans to non-financial corporations by interest rate variability. Source: CNB.

Figure 5.12 As compared to the euro area, interest rates on long-term corporate loans in Croatia continued to decrease



Sources: ECB, Bloomberg and CNB.

Figure 5.13 Interest rates on short-term corporate loans in Croatia held steady in the major part of 2017



Sources: ECB, Bloomberg and CNB.

years of noticeable easing, credit standards for corporate loans tightened slightly in the second and third quarter of 2017, and improved again from the end of the year. In this context, the outlook of industry or individual corporations from the group of small and medium-sized enterprises made the largest contribution to the tightening of credit standards, while exceptionally favourable liquidity of banks, in addition to stronger competition among banks and the potential of financing in the market continued to make an impact on the easing of credit standards. Moreover, the demand for all types of corporate loans is growing, with the exception of a temporary slight decrease in the last quarter of 2017, exclusively as the consequence of the decline in demand by large corporations for long-term loans at one fairly large domestic bank. The slowdown in the intensity of demand in the second half of the year from the first two quarters of 2017 was mostly contributed to by the slightly smaller needs of small and medium-sized enterprises to finance inventories and working capital and investments, all regardless of the financing deadlines. In addition, the reason for the reduced need

Figure 5.14 Further deleveraging, the consequent decrease in the debt servicing burden and the decrease in interest rates had a positive effect on the reduced riskiness of the non-financial corporate sector



Notes: 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 surplus (GOS), i.e.

$$LR_t = 0.5 \cdot \frac{\text{Debt}_t}{\text{GOS}_t} + 0.5 \cdot \frac{\text{Interest payments}_t}{\text{GOS}_t}$$

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

$$SR_t = \frac{\text{Debt}_t}{\text{Equity}_t}$$

The snowball effect indicator is based on the ratio of debt servicing burden $b_{t-1} = \text{debt}_{t-1} / \text{GOS}_{t-1}$, adjusted by implicit interest rates i_t and growth rates of gross operating surplus g_t :

$$SNR_t = \frac{i_t - g_t}{1 + g_t} b_{t-1}$$

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:

$$TR_t = \frac{LR_t + SR_t + SNR_t}{3}$$

Sources: CNB and FINA.

for financing might also include good business performance of corporations over the past years, which created certain reserves for the financing of needs in both the short- and the long-term.

Despite the dynamic deleveraging of corporations abroad last year, the total exposure of the non-financial corporate sector to currency risk did not change significantly, and still remained at high levels (Figure 5.9). The mentioned deleveraging with respect to foreign creditors in 2017 was mostly reflected in the reduced currency risk in the public corporate sector. However, unlike public corporations, private corporations reduced their kuna exposure with domestic creditors more significantly, by which their currency risk remained almost unchanged, which, due to their dominant share in total debt (about 90% at the end of 2017) resulted in exposure to currency risk of the whole corporate sector remaining almost unchanged. Broken down by activity (Figure 5.10), the largest decrease in currency exposure refers to the corporations that usually generate low foreign currency revenues, i.e. enterprises in the activities of trade, real estate and construction, which adjusted the movements of their foreign financing to the movements of export revenues from sales. By contrast, manufactur-

ing enterprises largely contributed to the decrease (about 31%) of the sector's kuna exposure, which eventually had an effect on the relative increase in the currency risk of the sector. Currency risk exposure of enterprises engaged in other activities remained mostly unchanged.

Corporate exposure to interest rate risk in 2017 did not change significantly, but the possibility of its materialisation in the event of interest rate growth for corporations 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 4 percentage points), while the share of loans with an interest rate variable in the period from 1 to 12 months decreased (Figure 5.11). Although the total share of loans with an interest rate variable over 12 months remained unchanged, standing at a very high 98%, the increase in interest rates in the world and domestic markets in the future may be the trigger for the materialisation of such systemic risk.

The several-year trend of the decrease in long-term interest rates of domestic banks continued, and short-term interest rates also started to decline at the end of 2017, after almost two years of stagnation. The price of short-term corporate financing held steady around its average level of 4.24% in the most part of 2017. However, a sharp decline was recorded in the last quarter, primarily for short-term financing in the domestic currency. Thus the weighted short-term interest rate dipped below 4% for the first time, and the downward trend continued at the beginning of the year (to 3.09% in February 2018). By contrast, long-term interest rates of domestic banks on corporate loans decreased continually for a number of years, and at the end of February 2018 dropped to 3.18%. Favourable conditions in the banking market (high liquidity of banks and their intensified competition), as well as a significantly reduced risk premium for the country (approximately by 0.9 percentage points in 2017, measured by EMBI) were some of the factors that contributed to the continued decrease in interest rates of domestic banks in the corporate sector (regardless of currency). Interest rates in the euro area did not change significantly from the levels at the end of 2016. Corporate financing with shorter maturity had an average interest rate of 1.53%, while long-term interest rates remained at the level of 1.72%. In such conditions, the spread between interest rates on corporate loans in Croatia and the euro area reflected the still relatively high country risk premium, although the spread was narrowing (Figures 5.12 and 5.13).

All of the three indicators and the overall indicator of non-financial corporate sector vulnerability continue to decrease (Figure 5.14). A further fall in the non-financial corporate sector debt and the amount of paid interest in the previous year was accompanied by the growth of gross operating surplus (the measure of corporate earnings), which was partially responsible for the continued fall in the liquidity risk indicator. Similarly, in addition to the fall in debt, the estimated increase in capital and reserves from total operating profit in line with general economic growth also had a positive impact, bringing down the

solvency risk indicator. Furthermore, the snowball effect risk was marked by volatile movements in the past two years. This risk was reduced slightly in early 2017 after a temporary increase in 2016, and in the second half of 2017 it stagnated because the spread between the implicit interest rate and the rate of growth in corporate earnings narrowed. All of the described movements of individual indicators had an effect on the continued decrease in the total indicator of the non-financial corporate sector vulnerability.

Current risks in the non-financial corporate sector

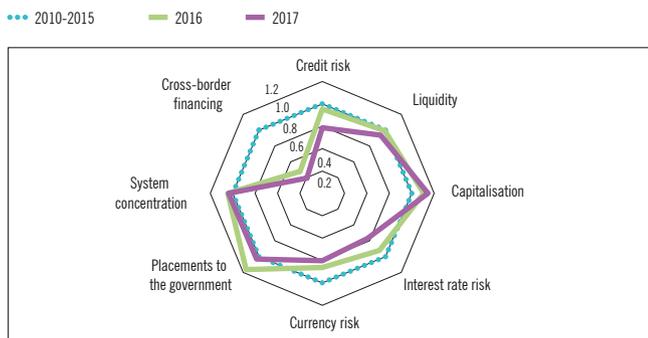
A contribution to the further stabilisation in the financial system and the prevention of potential shock scenarios in the following years should also be made by the obligatory appli-

cation of the International Financial Reporting Standard 9 – Financial Instruments (IFRS 9) from the beginning of 2018.

Under this standard, a timely recognition of the fair value of financial instruments based on the expected credit risk and its continued monitoring throughout the life cycle is required for all credit institutions and non-financial corporations quoted on securities markets or that are subject to financial statements audit. This is an attempt to eliminate the main shortcomings of the previous accounting standard (IAS 39), the inefficiency of which in the recognition of credit losses and provisioning only upon their occurrence, in the previous recession period, according to the experiences of the banking system, inhered in it doing “too little and too late”. It was exactly the failure to recognise the credit risk on time and its underestimation in the non-financial corporate sector in the past that resulted in belated active clearance of the part of non-performing portfolio of credit institutions with the high rates of write-offs.

6 Banking sector¹²

Figure 6.1 Banks' risk exposure continued to decrease with capital and liquidity surpluses maintained at high levels^a



^a All the indicators were scaled as indices, with an average indicator value for the 2010 to 2015 period amounting to 1. The following indicators are shown: credit risk (the NPLR), cross-border financing (the share of liabilities to non-residents in total liabilities), the banking system concentration (the HHI asset index), placements to the government (the share of government loans and securities in total assets), currency risk (the share of foreign currency assets in total assets), interest rate risk (the share of loans with a floating interest rate in total long-term loans), liquidity (the share of liquid assets in total assets) and capitalisation (the total capital ratio).
 Note: A higher indicator value signifies an increase in risk or, in the case of liquidity and capitalisation indicators, in capital and liquidity buffers.
 Source: CNB.

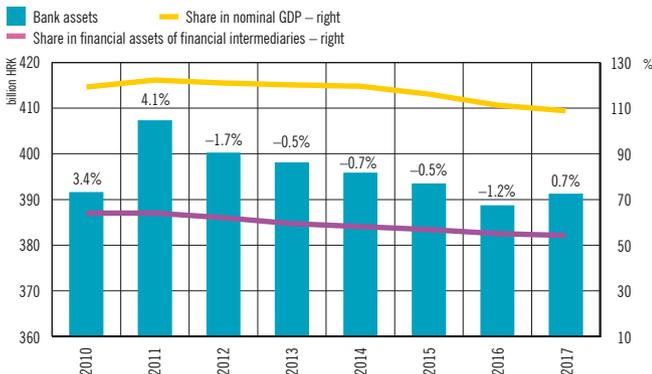
In 2017, the banking sector continued to accumulate capital and liquidity surpluses, which was accompanied by a decrease in some systemic risks (currency-induced credit risk, interest-induced credit risk) and a continued reduction in dependence on cross-border financing. Due to the on-going banks' balance sheet clean-up process and continuing favourable macroeconomic developments, the quality of banks' credit portfolios improved further despite losses generated by the Agrokor crisis. However, some risks, such as a rising banking system concentration and relatively high levels of exposure to the government, make banks exposed to significant systemic risks. Nevertheless, the system's overall resilience was in 2017 further strengthened and its risk exposure additionally reduced (Figure 6.1).

Main balance sheet trends and systemic risks

Total bank assets halted their years-long downward trend in 2017, edging up by 0.7% (Figure 6.2). Total banking system assets stopped their downward trend due to a growth in private sector lending. Bank loans to the corporate and household sectors increased by HRK 5.5bn (3.2%) in 2017. However, due

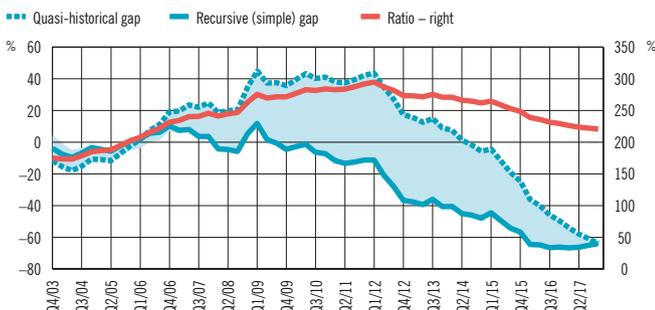
¹² The data used in this section refer exclusively to banks and savings banks and do not include branches.

Figure 6.2 Years-long downward trend in total bank assets halted in 2017



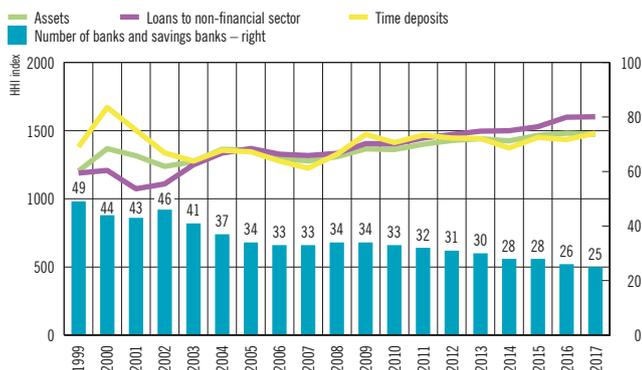
Note: The figures indicate the annual rate of change in total net assets of the banking sector. Source: CNB.

Figure 6.3 Continued absence of credit growth generated cyclical pressure



Notes: The figure shows the indicators of relative indebtedness (the credit-to-GDP ratio) and the short-term gap (the relative deviation of the ratio from its long-term trend). The quasi-historical gap is calculated on the entire sample and the recursive gap is calculated on the right-hand side moving sample (of available data for each quarter). Sources: CBS and CNB.

Figure 6.4 Banking system concentration growth continued in 2017



Note: The concentration of items observed is shown by the HHI concentration index. Source: CNB.

to a significant decrease in banks' exposure to the central government¹³, the banking system's credit portfolio decreased for the sixth consecutive year and its end-2017 share in total assets amounted to only 58% (Figure 6.5). On the other hand, banks' liquid assets grew additionally and with liquidity surpluses at their historical high (see chapter 1 Macroeconomic environment) bank deleveraging against foreign affiliated entities (Figure 6.7) continued in 2017.

The described divergent trends in the credit portfolio, partly caused by the termination of preferential treatment for a part of the exposures to central governments and central banks, generally reduced balance sheet vulnerabilities by weakening the nexus between the financial system and the central government and increased the diversification of the credit portfolio. On the other hand, the already started growth¹⁴ in the share of government securities held in portfolios traded at market values exposes banks to higher market risks, especially in view of potential liquidity disturbances in secondary markets that could be triggered by a sudden change in the subdued global risk premium. Specifically, having surged in 2016¹⁵ the share of debt securities in bank assets continued to grow, reaching HRK 52.3bn or 13.4% of total banking system assets at the end of 2017.

Given the continued sale of non-performing placements and the corporate sector's deleveraging abroad, the mentioned credit activity of the household and corporate sectors has not yet generated a cyclical pressure stemming from credit growth that would require additional capital buffers. This was also confirmed by an assessment of the reference indicator for the required level of countercyclical capital buffer, which was therefore kept at 0% for another year¹⁶.

The high concentration of the banking system and its continued growth constitute significant structural vulnerabilities for the banking system (Figure 6.4). The number of banks fell in 2017 again, almost halving since 1999. The soon to be realised merger of two other systemically important institutions (O-SIIs), coupled with the continued growth of the banking system concentration¹⁷, will additionally increase the mentioned structural vulnerabilities, which are taken into account in the calibration of the structural systemic risk buffer (which is higher than the O-SIIs buffer and is therefore used as a buffer for contingent losses that may arise from these structural vulner-

13 Regarding the reasons for the drop in exposure to the central government, see the section Termination of preferential treatment for part of exposures to central governments and central banks.

14 See chapter 6 Banking sector, Financial Stability, No. 18, May 2017.

15 See chapter 6 Banking sector, Financial Stability, No. 18, May 2017.

16 For more details, see: <https://www.hnb.hr/en/core-functions/financial-stability/macprudential-measures/countercyclical-capital-buffer>.

17 There were announcements for the merger of a housing savings bank with its parent bank, the voluntary winding-up of a bank and the acquisition of a bank that had undergone resolution proceedings.

abilities).

The financial system's exposure to central government remained elevated. Due to the stricter treatment of some CGCB exposures and the gradual termination of their exemption from the limitation of large exposures, as well as to continuing fiscal consolidation (see chapter 2 Government sector), the nexus between the financial system and the central government may be

expected to continue loosening. However, bank placements to the government still accounted for more than one fifth of banking system assets (20.5%) at the end of 2017 (Figure 6.6), considerably exceeding its own funds (152.9%). Such an exposure structure is a source of systemic risk, especially given that the still relatively high public debt may act as a catalyst for serious systemic disturbances.

Termination of preferential treatment for part of exposures to central governments and central banks

Pursuant to Regulation (EU) 575/2013 on prudential requirements, exposures to central governments and central banks (CGCB exposures) of the Member States denominated and funded in the domestic currency are assigned a risk weight of 0%¹⁸, in other words, they are treated as risk-free exposures for the bank. Such a treatment of exposures is in disagreement with the fundamental philosophy underlying Basel Accords¹⁹, which promote the establishment of capital requirements in proportion with the level of assumed risk. Until the end of 2017, such preferential treatment was also given to CGCB exposures denominated and funded in the domestic currency of any Member State, so that, for example, all banks' exposures to the Republic of Croatia denominated and funded in euro were treated as risk-free exposures. Such a perception of risk undoubtedly encouraged banks in the post-crisis period to opt for the perceivably less risky financing of the government, which resulted in the strengthening of the nexus between the financial system and the central government.

However, this preferential regulatory treatment for exposures denominated in the currencies of other Member States was terminated at the end of 2017 (domestic currency exposures are still treated as risk-free exposures). In the transition period until 2020, the treatment of CGCB exposures denominated in the currency of another Member State will be gradually²⁰ adjusted with risk established according to their credit rating assigned by recognised external credit assessment institutions (ECAIs) or, in the case of credit institutions applying the IRB approach, according to the internal rating system. Regulation 2017/2395 also enabled competent authorities to continue applying the exemption to CGCB exposures denominated in the foreign currency of a Member State, which was adopted by the CNB in the Decision on amendments

to the Decision on large exposures (OG 12/2018). The exposures made before 12 January 2017 are completely exempted from the application of the limit on large exposures, while the limits applied to those that were made on that day or subsequently are to be gradually strengthened – up to 100% of tier 1 capital in 2018; up to 75% of tier 1 capital in 2019 and up to 50% tier 1 capital in 2020.

The increase of risk-weighted assets, that is, capital requirements for the mentioned exposures, is accompanied by an increase in the risk-weighted assets for indirect exposures, that is, exposures arising from guarantees and financial collateral received from central governments²¹. According to valid ratings assigned to the Republic of Croatia, the relevant risk weight for exposures to the country is 100%. Should the Republic of Croatia's rating be moved back to investment grade, these impacts would be considerably lessened as risk weights assigned based on investment grade ratings do not exceed 50%.

The total impact of the termination of the preferential risk weight assigned to CGCB exposures denominated in the currency of another Member State arising from existing direct and indirect exposures could, when fully applied (as of 2020), increase the total risk exposure amount (recorded at the end of 2017) by about 18%. Although the existing capital surplus at the banking system level is sufficient for the coverage of the increase in capital requirements resulting from the termination of the preferential weight²², it is a reasonable assumption that banks will continue to adjust their CGCB exposures. The need to rapidly adjust these exposures was considerably lessened by Regulation 2017/2395, which provided for the continued exemption of these exposures from the limitation of large exposures, the termination of the preferential risk weight notwithstanding. This provision considerably mitigated potential negative effects that might result from the abrupt adjustment of foreign currency-denominated CGCB exposures, and potential pressures on the foreign exchange market and those on kuna liquidity due to an increase in demand for kuna placements from the central government.

18 This (preferential) regulatory treatment is used by institutions that establish the level of risk exposure (the calculation of risk-weighted exposure amounts for credit risk, dilution risk and counterparty risk) by the standardised approach, which is based on regulatory prescribed risk weights. This is precisely the approach used by a large majority of credit institutions in the Republic of Croatia. However, even the institutions applying the internal ratings-based approach (IRB approach) for these purposes may permanently exempt CGCB exposures from the IRB approach, that is, they may apply the standardised approach and assign these exposures a risk weight of 0%.

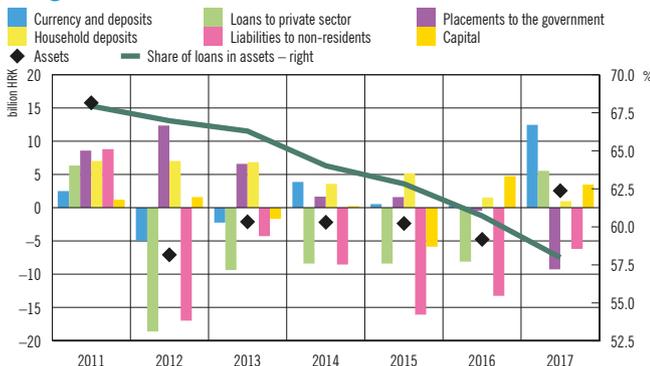
19 Basel II: *International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version* and Basel III: *A global regulatory framework for more resilient banks and banking systems – revised version*, June 2011.

20 20% of the risk weight established based on the credit rating will be applied in 2018, 50% of the risk weight in 2019, while the full application of the risk weight established based on the credit rating will begin as of 2020.

21 For example, under the financial collateral simple method, the secured portion of the exposure is not assigned the risk weight of the debtor, but the risk weight of the collateral provider, which in the case of central government will no longer necessarily amount to 0%.

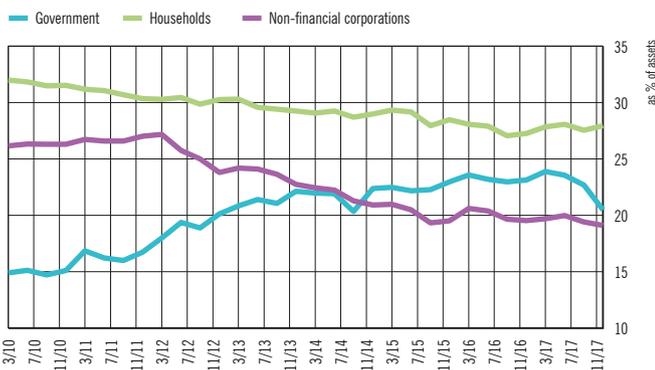
22 While these regulatory changes will not have a major impact on the capital adequacy of the whole system, they could have more significant consequences for individual banks.

Figure 6.5 Bank balance sheet trends determined by a decrease in placements to the government and deleveraging against foreign owners



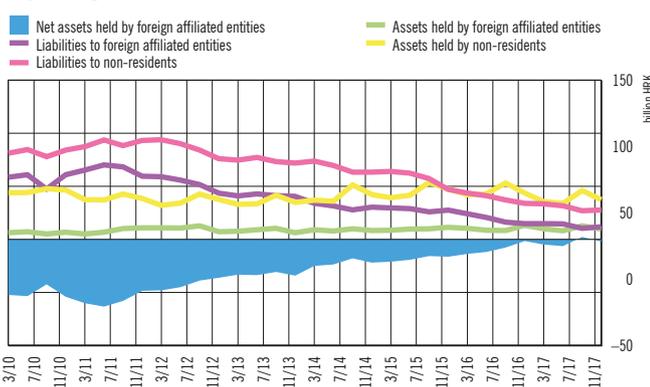
Note: The figure shows the year-on-year rates of change in major banking sector balance sheet items. Source: CNB.

Figure 6.6 Share of banks' exposures to the government decreased in 2017 after a years-long upward trend



Source: CNB.

Figure 6.7 Bank liabilities to foreign affiliated entities almost equalling assets at the end of 2017



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

In 2017, cross-border funding sources continued to be substituted for by domestic funding that is cheaper but also has a shorter maturity. Due to such trends, bank funding became less dependent on parent banks. However, this in fact resulted in the substitution of risks related to bank funding, with a decrease in risk of cross-border outflows accompanied by an increase in risk of maturity transformation arising from the shortening of maturity of liabilities. The several-year deleveraging of the banks against foreign affiliated companies made the share of these liabilities in total liabilities of banks drop to a low of 3.5% at the end of 2017 (Figure 6.7). As a result, at the end of 2017 banks became net creditors both to foreign owners and to non-residents in general, with the share of the latter in banks' liabilities decreasing to 8.3% (down by 17 percentage points from the end of 2010, when cross-border funding sources accounted for one fourth of total bank liabilities).

The decline in liabilities to non-residents resulted in a rise in the share of resident deposits, which accounted for as much as 84% of total bank liabilities at the end of 2017. Their structure continued to demonstrate the transfer of time deposits to transaction accounts, whose balance at the end of 2017 equalled that of time deposits (Figure 6.7). This is because the very low interest rates in financial markets and the introduction of tax on interest income from savings deposits²³ in 2015, reduced depositors' propensity to deposit their surplus funds, these funds thus remaining in current accounts.

Although the growing reliance of banks on domestic funding is perceived as less risky than cross-border financing, the observed change in the funding structure led to an increase in the maturity mismatch between loans and deposits (Figure 6.9), which in turn increased interest rate risk, liquidity outflow risk, and, due to its currency structure, banks' currency risk (for more detail see Box 3 Change in the structure of bank funding sources and potential risks to financial stability in Financial Stability, No. 18).

The share of domestic currency in the currency structure of bank assets continued to increase. There are preconditions for an upswing in kuna lending on both the demand and supply sides. Specifically, as funds in current accounts are mostly kuna-denominated, the share of banks' kuna funding grew to account for almost a half of total bank liabilities at the end of 2017 (Figure 6.10). In addition, as cross-border funding is primarily foreign-currency denominated, the mentioned bank deleveraging against non-residents resulted in a decline in banks' foreign currency funding. The increase in the share of banks' kuna liabilities was also supported by HRK 1.5bn worth of long-term kuna liquidity, placed to banks by the CNB in five structural repo operations in the previous two years. These trends eventually led to the narrowing of the spread between interest rates on the traditionally more expensive kuna loans and the relatively cheaper foreign currency loans.

23 The Act on Amendments to the Income Tax Act (OG 143/2014).

At the same time, due both to negative experience with Swiss-franc-indexed loans and the lowered interest rates on kuna loans, clients increasingly turned to kuna loans. The transaction-based growth of credit to the private sector (Figure 6.11) suggests a years-long substitution of kuna loans for foreign currency loans, a trend which is more conspicuous in the household sector. Three main sectors (household, corporate and government) thus opted for the substitution of kuna loans for a part of their foreign currency loans, with the result that their total currency risk exposure decreased and that banks' exposures to currency-induced credit risk decreased too, because the share of foreign currency loans in total loans fell by 13 percentage points from 2014, down to 62% in 2017 (Figure 6.12).

The continuation of the substitution of kuna loans for foreign currency loans will depend on the sufficiency of kuna sources of funds and on depositors' preferences. Although the CNB may offer banks access to longer-term sources of kuna liquidity through structural repo operations, the change in the level of loan euroisation primarily depends on the propensity to save in the domestic currency. Should bank clients, prompted, for example, by an increase in interest rates, again resort to saving more in foreign currency, this could result in a currency mismatch in the banks' balance sheet.

Consumers who enter into an agreement on a new foreign currency-indexed housing loan should be partly protected from currency risk by the Consumer Home Loan Act²⁴, which allows bank clients a one-off conversion of a foreign-currency-indexed housing loan to a kuna loan. A potential materialisation of this risk could worsen the foreign exchange position of banks and create pressures on the foreign exchange market and on CNB's international reserves. However, the accumulation of this risk is possible no sooner than in the medium term, because only housing loans contracted after the coming into force of this act may be converted, and until the adoption of the euro in Croatia.

Banks' credit portfolios contain an increasingly large number of loans with an interest rate that is fixed, at least in the initial phase of the loan repayment period. The share of loans with a variable interest rate in loans with a remaining maturity longer than one year decreased to 64% at the end of 2017, down by 12 percentage points from the end of 2014 (Figure 6.13). This is an indication that clients' previous negative experiences made them more active in managing their interest rate and currency risks in the recent period. CNB activities²⁵ aimed at increasing transparency, reducing the information gap in the loan market and fostering price competitiveness in the banking system undoubtedly made a major positive contribution to these trends.

24 See chapter 3 Household sector.

25 Information list with the offer of loans to consumers and the Decision on the content of and the form in which consumers are provided information prior to contracting banking services (OG130/2012).

Figure 6.8 Continued substitution of cross-border funding sources by residents' sight deposits

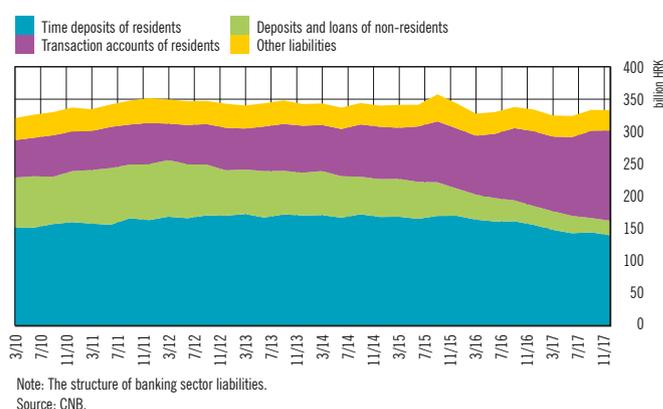


Figure 6.9 Growth in the maturity mismatch between bank loans and deposits mostly due to the shortened maturity of liabilities

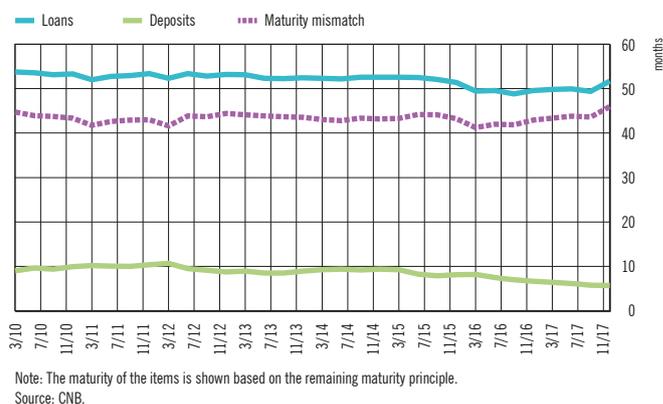


Figure 6.10 Share of kuna assets in total bank assets reached 49%

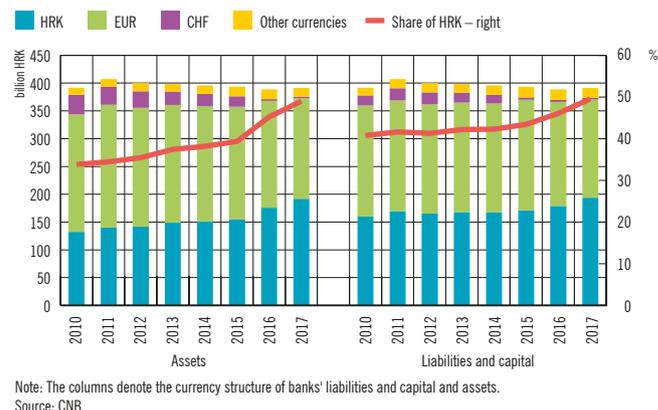
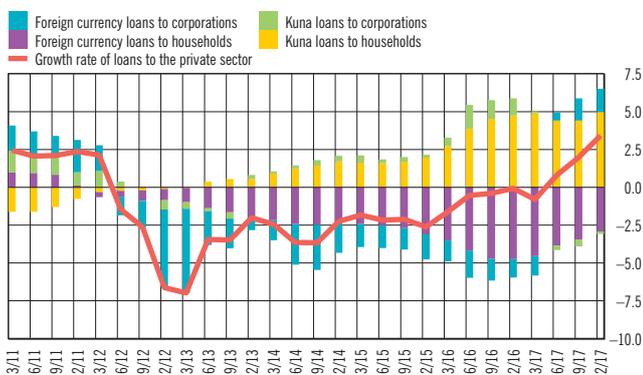
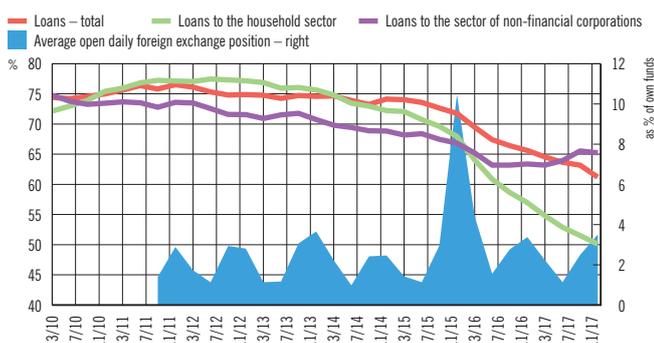


Figure 6.11 Decomposition of growth in credit to the private sector



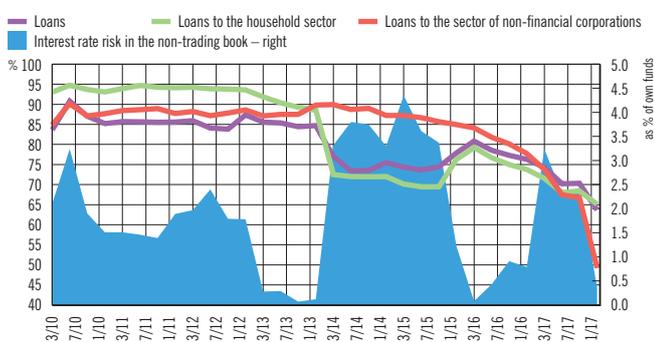
Note: All values refer to the transaction-based annual growth rate.
Source: CNB.

Figure 6.12 Continued decrease in banks' exposures to currency-induced credit risk



Note: The lines mark banks' exposures to currency-induced credit risk, which is measured by the share of foreign currency loans in total loans.
Source: CNB.

Figure 6.13 Continued decrease in banks' exposure to interest-induced credit risk



Note: The lines mark banks' exposure to interest-induced credit risk, which is measured by the share of loans with a variable interest rate in loans with a remaining maturity longer than one year.
Source: CNB.

Notwithstanding recent positive developments, bank clients' interest rate risk exposure remained high. Recognising the importance of reducing this exposure, in September 2017 the CNB adopted the Recommendation to mitigate interest rate and interest-induced credit risk in long-term consumer loans, recommending banks to expand their offer of loans by introducing loans with a fixed interest rate, while reducing accompanying costs for consumers to the minimum.

The increase in the share of loans with a fixed interest rate in banks' credit portfolios also has an impact on the interest rate risk exposure of consumer loans with a variable interest rate. This is because the Consumer Credit Act (OG 143/2013) limits the level of variable interest rate on consumer loans by the level of the average market interest rate. In the case of a rise in interest rates, the speed of adjustment of variable interest rates on consumer loans would therefore depend on the adjustment of the average market interest rate, whose inertia is directly related to the share of loans with a fixed interest rate in total consumer loans.

Direct bank exposure to interest rate risk measured by the interest rate risk in the non-trading book, was at relatively low level of below 1% of own funds at the end of 2017²⁶ (Figure 6.13). However, although it is currently very low, direct interest rate risk in banks' non-trading books could grow in the medium term due to a decrease in the interest rate risk for banks' clients²⁷. Still, as banks generally have easier access to the markets of financial instruments that they can use for hedging against these risks (e.g. derivatives or financial loss insurance) or transferring them to third parties, these trends should nevertheless result in the mitigation of the system's interest rate risk exposure.

Profitability

After significant losses generated in 2015 generated by the conversion of Swiss franc-indexed loans and the subsequent strong recovery in 2016, bank profitability remained relatively high in 2017, despite losses related to the operations of the Agrokor Group. Bank pre-tax profits stood at HRK 4.3bn in 2017, adding to their capacities to cover contingent losses. As in the previous years, bank earnings were in 2017 primarily determined by movements in charges for value adjustments and provisions (6.15), mainly influenced by the deterioration of banks' exposures to the Agrokor Group. Consequently, the ROAA and ROAE of banks were slightly lower in 2017 than in

26 Pursuant to the Credit Institutions Act (OG 159/2013), where a credit institution's interest rate risk in the non-trading book exceeds 20% of its own funds, the CNB is obliged to impose supervisory measures on that credit institution.

27 Direct risks to banks (interest rate risk in the non-trading book or currency risk) are in general connected with (interest rate or currency) risks to clients, that is, if seen from banks' perspective, with (interest rate or currency) induced credit risk, in such a way that a decrease in risk to clients (due to contracting fixed interest rates or kuna loans) results in an increase in direct risk and a decrease in induced credit risks in banks.

2016, amounting to 1.1% and 6.1% respectively (Figure 6.14). The losses related to the restructuring of the Agrokor Group could have a prolonged effect on banks' earnings. However, it should be noted that banks had already taken into account charges for value adjustments on exposures to Agrokor and affiliated entities in 2017, thus limiting the room for potential additional losses on these exposures.

Banks' financing conditions continued to improve in 2017 due to a continued downward trend in interest rates on kuna and foreign currency time deposits, which hit their historical lows of 1.2% and 0.9% respectively at the end of the year (Figure 6.16). The profitability of banks further benefited from a continuing increase in the share of transaction and savings accounts in their total liabilities, because they pay negligibly low interest on funds in transaction accounts, which accounted for as much as 42% of banks' total liabilities at the end of 2017 (Figure 6.7). However, banks' overreliance on funds in transaction and savings accounts would also expose them to a considerable interest rate risk should interest rates rise due to clients increasingly opting for depositing these funds with longer maturities and at higher interest rates.

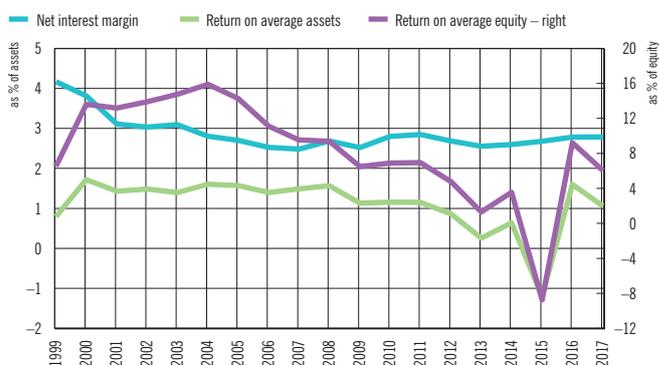
Credit risk

The process of banks' balance sheet clean-up by the sale of non-performing placements continued and was the main reason for the further improvement of the banks' credit portfolio²⁸. The ratio of non-performing loans to total loans (NPLR) stood at 11.4% at the end of 2017, down by 5.3 percentage points from the end of 2015 (Figure 6.17). As these trends were primarily influenced by the sale of non-performing loans (Figure 6.18), which is more pronounced in the sector of non-financial corporations, the NPLR in that sector decreased especially sharply and was, even with the inflow of new non-performing loans due to the Agrokor Group crisis, down by 6 percentage points in 2017 alone. The years-long growth in the coverage of non-performing loans halted in 2017 due to the sale of highly covered non-performing loans, but also to the deterioration in the quality of loans of the Agrokor Group and affiliated companies. Nevertheless, the coverage of non-performing loans amounted to a relatively high 61.5% at the end of 2017.

The credit portfolio quality in terms of the NPLR improved in 2017, even after the exclusion of the effect of write-offs of non-performing loans (Figure 6.18). Part of this improvement was definitely facilitated by the recovery of some non-performing placements amid economic growth and the easing of financing conditions related to the downward interest rate trend (Figure 6.16).

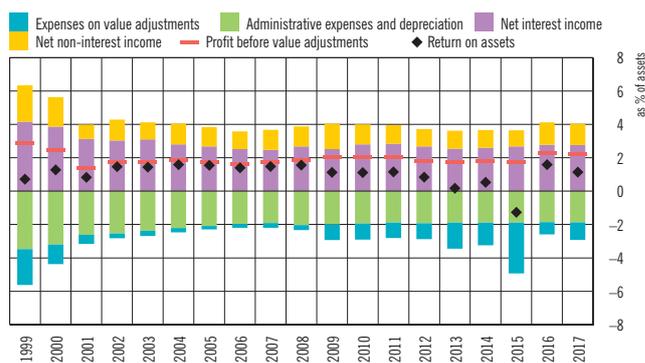
28 For more details on trends in the quality of bank loans so far see Box 1 Cyclical movement of loan quality in Croatia, in Macroprudential Diagnostics, No. 3.

Figure 6.14 Bank profitability affected by increased value adjustments



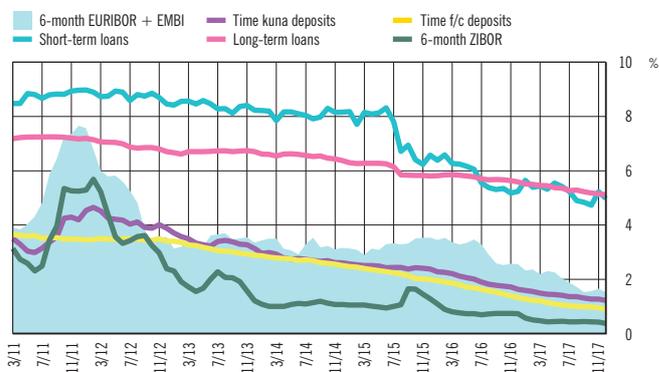
Source: CNB.

Figure 6.15 Value adjustment charges had the largest impact on profitability declining in 2017 relative to 2016



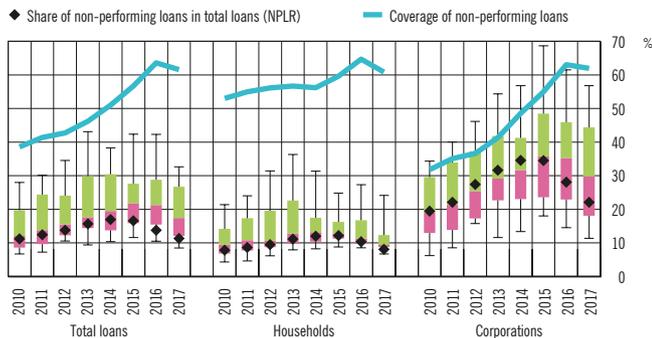
Source: CNB.

Figure 6.16 Continued decline in lending and deposit interest rates



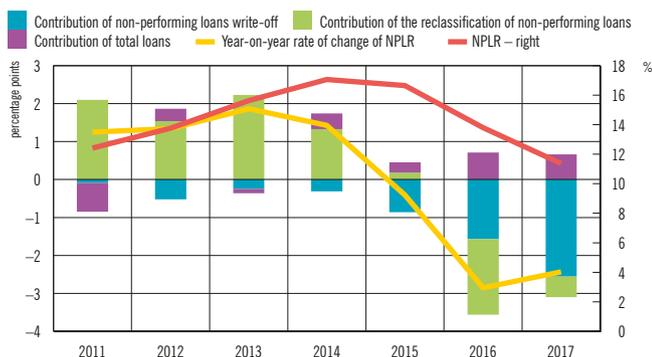
Note: The interest rates on loans and deposits refer to the stock of observed items. Sources: Bloomberg and CNB.

Figure 6.17 Continuing improvement in banks' credit portfolio quality



Note: The NPL distribution by banks is shown by a box plot presenting the 10th, 25th, 50th, 75th and the 90th percentile. Source: CNB.

Figure 6.18 Improvement of loan quality primarily due to the sale of non-performing loans



Note: A positive contribution of the reclassification of non-performing loans marks the deterioration of the credit portfolio quality and vice versa. Source: CNB.

On top of favourable developments in the aggregate NPLRs, a decrease in this indicator over the last two years was observed in almost all banks, demonstrated by the lowering of its overall distribution (Figure 6.17). This trend is also evident individually in the household and corporate sectors.

Expected to continue in the following period, these trends will primarily depend on the continuation and dynamics of the sale of banks' non-performing placements and on economic recovery. In addition, due to the significance of the Agrokor Group for the overall economy, the remaining uncertainties surrounding the outcome of its restructuring may also influence these indicators. An agreement that is unfavourable for other affiliated companies could produce a negative impact on the recently observed positive trends in the loan quality of the whole non-financial corporate sector. On the other hand, if banks step up the sales of non-performing placements, including those related to the Agrokor Group, this could favourably impact NPLR trends.

It also needs to be mentioned that International Financial Reporting Standard 9 Financial Instruments (IFRS 9), which began to be applied by credit institutions in the Republic of Croatia on 1 January 2018, is expected to provide for a more timely recognition of loan quality deterioration because expected credit losses in recognising a financial instrument, that is, in the case of its loan quality deterioration, should be recognised and evaluated earlier²⁹.

Liquidity and capitalisation

The liquidity coverage ratio (LCR)³⁰ of the system, already considerably above the regulatory minimum (80%³¹ for 2017), increased in the recent period. LCR trends in 2017 were marked by the deleveraging of the central government and public enterprises with respect to domestic banks and an increase in banks' deposits with the central bank. Despite the shortening of the maturities of funding sources, the LCR thus remained considerably above the regulatory minimum³² throughout 2017 (Figure 6.19). However, the high liquidity does not guarantee the currency match of liquid assets and potential net outflows during a 30-day stressed period, which makes the LCR more volatile in some major currencies. The LCR for the euro decreased in the first half of 2017 due to a drop in liquid assets and potential euro inflows, recovering considerably in the second half of the year on account of inflows in foreign currency (at least partially, resulting from the deleveraging of the central government and public enterprises).

Capital adequacy indicators of banks improved further in 2017. The total capital ratio of banks reached its all-time high of 23.2% at the end of 2017 (Figure 6.20). The total capital ratio rose by 0.8 percentage points in 2017, with equal contributions coming from a decrease in total risk exposure and an increase in own funds. Thanks to record high sales and write-offs of non-performing loans, the pressures on own funds of banks were significantly alleviated in 2017. The ratio of net non-performing loans to the own funds of banks stood at 20.5% at end

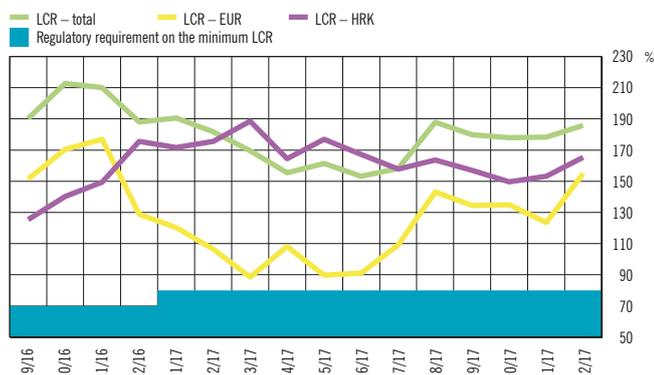
29 In contrast with IFRS 9, the so far existing International Accounting Standard 39 (IAS 39) provided for the recognition of credit loss by credit institutions only when value impairment was clearly evident.

30 One of the important reforms of the EU regulatory framework on capital requirements, aimed at ensuring a higher level of banking system resilience, is the introduction of the liquidity coverage requirement. Banks are obliged to maintain a liquidity buffer covering potential differences between liquidity inflows and outflows during a 30-day stressed period.

31 The liquidity coverage requirement was phased in; it was 80% in 2017 and has been 100% since January 2018.

32 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, which is maintained far from the restricted area.

Figure 6.19 Liquidity coverage ratio (LCR) considerably above the regulatory minimum



Source: CNB.

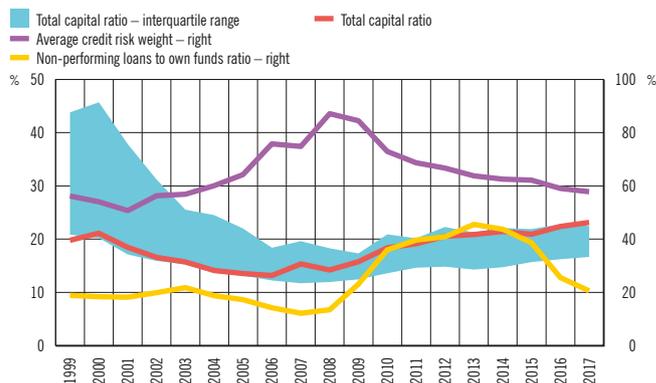
of the year, which is a decrease of almost 18 percentage points from the end of 2015 (Figure 6.20).

The application of IFRS 9 will tend to result in a decrease in bank capital due to the initial recognition of financial instruments in banks' balance sheets as of 1 January 2018. In order to mitigate potential negative impacts of the initial application of IFRS 9, Regulation (EU) 2017/2395 enabled institutions (which choose this option)³³ to increase tier 1 capital by the share of increased provisions over a transitional five-year period.

Current risks associated with the banking sector

Regardless of positive trends of government deleveraging and increased lending to the private sector, and their expected continuation, the unfavourable nexus between the financial system and the central government has remained, particularly with regard to high public debt, which may become a catalyst of serious systemic disturbances amid accumulated risks. The high concentration of banks' exposures, the high level of con-

Figure 6.20 Recovery of capital adequacy ratios following a temporary deterioration in the second half of 2015



Source: CNB.

centration of the banking system, and its continued unfavourable trend, constitute significant structural vulnerabilities of the banking sector.

While the increased reliance on domestic funding sources has somewhat diminished risks associated with their concentration, it is also related to an increase in the maturity mismatch between assets and liabilities and therefore exposes banks to growing risks from the increasingly large maturity transformation of liabilities to assets. This makes banks, in the case of an interest rate growth, more exposed to potential interest rate risk, but also to currency risk. Furthermore, structural vulnerabilities related to the euroisation of the banking system, although on the decrease, still constitute a significant systemic risk.

The remaining uncertainties regarding the restructuring of the Agrokor Group and its impact on affiliated economic entities may decelerate positive trends involving the improvement of credit portfolio quality and reduction of interest rate risk in banks. However, the process of banks' balance sheet clean-up has strengthened the banks' solvency position and alleviated the sensitivity of the banking system to unlikely, but possible stress scenarios, including losses related to a disorderly restructuring of Agrokor (see chapter 7 Stress testing of credit institutions).

³³ Banks may also change their decision once during the transitional period.

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 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 such stress conditions, consequently limiting their duration and contributing to faster economic recovery.

The continued “clearing” of non-performing placements from the banks’ balance sheets, their adjustment to recent regulatory changes and continued favourable developments in the macroeconomic environment strengthened autonomous loss absorption capacities despite the losses associated with the Agrokor Group crisis. Therefore, not even the simulated highly unlikely scenario of a global crisis, the impact of which would be amplified by idiosyncratic shocks of credit risk materialisation resulting from the Agrokor Group crisis and a downgrade of the sovereign credit rating, would not deplete accumulated capital and liquidity buffers. Still, growing differences in resilience among credit institutions indicate that the maintenance of high capital buffers is necessary to ensure the stability of the banking system.

Initial simulation conditions

The downward trend in the number of credit institutions operating in the post-crisis period continued in 2017³⁴ and is expected to continue in the upcoming period³⁵. The consolidation of the banking system had the most significant influence on

³⁴ One bank has adopted the decision on dissolution and the initiation of voluntary winding-up proceedings since the last iteration of stress testing.

³⁵ A merger of one housing savings bank with its parent bank has been announced, as well as the voluntary winding-up of one bank, while the acquisition of one bank that underwent resolution proceedings has been announced.

the reversal of the five-year trend of declining balance sheets of banks³⁶. Lending activity to the private non-financial sector increased, partly due to lending to the Agrokor Group³⁷, primarily associated with the roll-up facility granted under extraordinary administration. On the other hand, the exposure of credit institutions to the government decreased, mainly as a result of the debt restructuring process in enterprises included in the general government sector³⁸ and lower amounts of new placements due to the government's reduced need for financing as a consequence of fiscal consolidation. In addition, the cancellation of the preferential weight of 0% for exposures to central governments and central banks (CGCB) denominated in the currency of another EU member state also contributed to the trend³⁹ (for more information, see chapter 6 Banking sector: Termination of preferential treatment for part of exposures to central governments and central banks).

The operation of credit institutions in 2017 was strongly affected by events related to the resolution of the Agrokor Group crisis. Registered value adjustments and provisions for exposures to the Agrokor Group and affiliated entities, the dynamics of which were in line with the assumptions from the last iteration of stress testing, reduced the potential of unexpected losses associated with such exposures. At the same time, the rise in the non-performing exposures related to the Agrokor crisis only slowed down the recovery of loan portfolio quality supported by the enhanced sale of non-performing placements, resulting in an improvement of the system's capitalisation by the end of 2017. On the other hand, the process of sale of well-covered placements and the inflow of new non-performing loans associated with the Agrokor Group put an end to the upward trend in the coverage of bad loans by value adjustments. Despite the losses arising from difficulties in the debt servicing of the Agrokor Group and affiliated entities, bank profits and return indicators remained relatively high, reflecting the high levels of capital adequacy indicators and banking system liquidity.

In the upcoming period, capital positions of credit institutions will be influenced by the application of new accounting standards relating to financial instruments (IFRS 9). Having entered into force in early 2018, IFRS 9 contributed to a decrease in the capital of credit institutions at the very beginning of the simulation horizon of stress testing through the initial recognition

of financial instruments in their balance sheets⁴⁰. Furthermore, the application of IFRS 9 over the two-year period of simulation influences the increase in bank provisions resulting from the earlier recognition of expected credit losses in the segment of performing placements⁴¹. The effects of the application of IFRS 9 and the simulation of portfolio deterioration induced by stress conditions in the non-financial corporate sector were implemented by recalibrating⁴² the existing model of probability of default (PD)⁴³ and using assumptions that take into account the prescribed supervisory level of loss given default. Loan quality in the household sector was also assessed against that effect, assuming an equal relative degree of risk in the household and the non-financial corporate sector at individual credit institution level.

Scenario features

a) Baseline scenario

The baseline scenario is based on expected macroeconomic and financial developments within standard projection categories. Favourable macroeconomic developments seen in 2017 are thus expected to continue in the simulation horizon. The expected economic growth in the euro area will continue to stimulate domestic economic growth, particularly through the performance of Croatia's major trading partners such as Slovenia, Germany and Austria.

All components of domestic demand should provide a positive contribution to the increase in economic activity in the upcoming period. The expected continuation of favourable labour market developments will stimulate personal consumption, although at a slower rate than in the preceding year. At the same time, investment activity is expected to pick up, particularly as a result of better utilisation of EU funds, which will provide further stimulus to higher employment and a rise in the disposable income of households. Although the Agrokor crisis has not had a significant

36 One bank was recapitalised in the course of a takeover, and one bank in the region completed equity investments.

37 Company of systemic importance for the Republic of Croatia as defined in the Act on Extraordinary Administration Proceedings for Companies of Systemic Importance for the Republic of Croatia (OG 32/2017).

38 The debt restructuring process in Croatian Roads (HC), Croatian Motorways (HAC) and Rijeka-Zagreb Motorway (ARZ).

39 Regulation (EU) No 575/2013.

40 Although the provisions of Regulation (EU) 2017/2395 enabled credit institutions to neutralise the impact of the cost of increased provisions on their capitalisation over a transitional period of five years (see chapter 6 Banking sector), this iteration of stress testing was performed under the conservative assumption that none of the institutions would use this option. Although such an assumption is not necessarily realistic, it enables the direct comparison of effects among institutions.

41 When an instrument transitions from stage 1 (performing placement) to stage 2 (underperforming placement), the estimated expected credit loss (ECL) increases in general as the risk parameters based on which it is estimated are changed from a period of one year to the entire lifetime of the financial instrument (lifetime ECL).

42 In the adverse scenario, the model is recalibrated according to the default rate (DR) determined by regression, reflecting macroeconomic indicators shown in Table 7.1.

43 For more information on the model used, see Grebenar, T. (2018): *A Behavioural Model of Assessment of Probability of Default and the Rating of Non-Financial Corporations*, CNB Working Papers.

Table 7.1 Macroeconomic scenario

Indicators	Baseline scenario		Adverse scenario			
			Basic		Differentiated	
	2018	2019	2018	2019	2018	2019
Financing conditions on the foreign market						
ECB main ref. rate, %	0.00	0.30	0.00	0.00	0.00	0.00
Fed funds tar. rate, %	2.35	2.90	1.05	0.25	1.05	0.25
EURIBOR 3M, %	-0.26	0.18	0.02	0.37	0.02	0.37
GDP (real growth in the EU), %	2.20	1.90	-1.20	-2.20	-1.20	-2.20
Financing conditions on the domestic market						
Bond yields, average change in p.p.	0.30	0.07	0.55	0.86	0.55	1.29
Long-term interest rates, average change in p.p.	-0.25	0.31	0.03	1.05	0.03	1.06
Short-term interest rates, average change in p.p.	-0.31	0.31	0.82	2.50	0.82	2.50
Money market interest rates, average change in p.p.	0.01	0.31	1.52	5.30	1.52	5.30
Exchange rate						
EUR	7.44	7.44	7.78	8.12	7.78	8.12
CHF	6.35	6.24	6.82	7.26	6.82	7.26
Real sector						
Investment, real (yoy, %)	7.1	6.9	2.0	-4.4	2.0	-7.0
Personal consumption, real (yoy, %)	3.4	2.9	0.8	-3.1	0.8	-3.7
GDP, real (yoy, %)	2.9	2.8	0.6	-2.3	0.6	-3.0
Unemployment rate (%)	11.3	10.2	11.6	11.9	11.6	12.1
Real estate prices (yoy, %)	3.5	2.1	1.4	-3.7	1.4	-3.7
Consumer prices (yoy, %)	1.3	1.4	1.9	2.7	1.9	2.7
Memo:						
Credit quality step for the risk weight of exposure to the central government		4		5		5

Source: CNB.

impact on economic developments thus far, negative risks to investment activity and personal consumption are still possible as a result of potential problems with the Group's restructuring.

The expected continuation of favourable fiscal developments will be reflected in the further improvement of the general government's indicator of indebtedness, which, in turn, could contribute to an improved risk perception of Croatia. However, recent events in certain shipyards, union pressures, arrears in the healthcare system and potential arbitration proceedings all pose a risk to fiscal consolidation.

Since global inflationary pressures, still relatively subdued at the time, are not expected to create a need for fast and intensive change of direction of the monetary policies pursued by leading central banks, monetary policies are likely to continue to normalise gradually. Even though the process of monetary normalisation should not result in the significant tightening of global financing conditions, a possible increase in borrowing costs re-

mains a negative risk to fiscal stability and the balance sheets of the private non-financial sector. Furthermore, households and non-financial corporations are not likely to experience currency pressures, owing to the expected continuation of the maintenance of a stable exchange rate of the kuna against the euro.

b) Adverse scenario

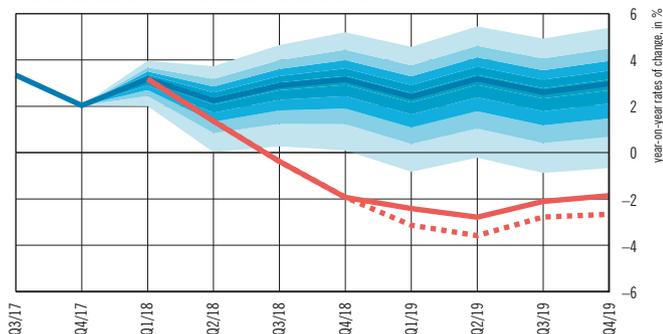
In the recent years, private consumption has been the key driver of global growth, while the contribution of investments has remained low⁴⁴. Recent empirical research has shown that growth driven by personal consumption rather than investments is less sustainable⁴⁵, particularly if it subsequently leads to increased

44 European Commission (2017): Investment in the EU member states: *An Analysis of Drivers and Barriers*, Institutional Paper 062.

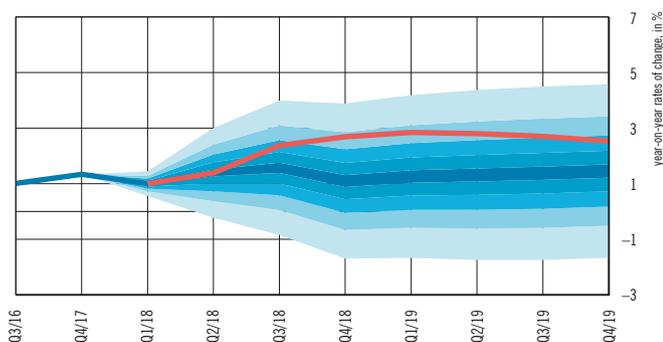
45 BIS (2017): *Consumption-led expansions*, Quarterly Review, pp. 25-37, March.

Figure 7.1 Adverse scenario probability

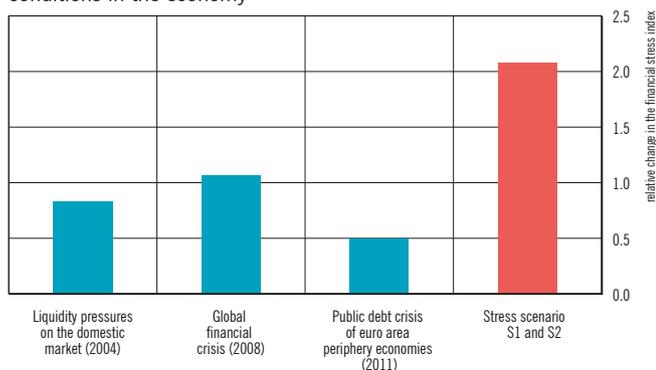
a) GDP dynamics under the adverse scenario relative to the risks of materialisation of the baseline scenario



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: In a) and b) the red line indicates the path of the underlying variable in the S1 adverse scenario, the red broken line indicates the path of the underlying variable in the S2 adverse scenario, while blue indicates risks of baseline scenario materialisation based on the CNB's monetary projection.
Source: CNB.

macroeconomic imbalances and heavier debt burdens. In order to increase potential economic growth, investments are necessary in activities having a potential for technological progress which, in the long term, increases economic production capacities and the standard of living. In the pursuit of an answer to the question why the contribution of investments to economic growth remains low in spite of improved financing conditions, empirical evidence suggests that the uncertainty regarding future economic conditions and profit patterns play a key role in encouraging investment, rather than financing conditions⁴⁶. Secular trends⁴⁷ in the economy of Europe and the US may account for the drop in investment rates and slow rates of economic growth⁴⁸.

In such conditions, the initial shock could come from the recessionary effect of a tightening of the US monetary policy more severe than announced⁴⁹. The effect of a contraction in economic activity in the US would spill over to European markets regardless of the monetary expansion in Europe. According to IMF models, Europe is more exposed to the risk of a recession, and cross-border effects of a recession in the US coupled with current protectionist tendencies⁵⁰ could, through trading channels, cause a direct strong contraction of GDP in Europe.

In addition to slowing down potential growth, limiting free trade could result in the acceleration of global inflation, which would imply a faster rate of monetary policy normalisation and a consequent deterioration in financing conditions. The accelerated tightening of monetary policies would lead to adjustments of leading global stock markets and the revaluation of different classes of assets relative to the fundamentals and possible risks (risk premium adjustment), accompanied by a rise in market volatility. The influence would primarily be manifested in riskier assets such as the government bonds of highly-indebted countries with a low credit rating, such as Croatia. This would cause depreciation pressures to strengthen in Croatia, driving the exchange rate to levels previously recorded in periods of

46 (i) BIS (2015): *(Why) Is investment weak?*, Quarterly Review, March, (ii) ECB (2016): *Business investment developments in the euro area since the crisis*, Economic Bulletin No. 7.

47 The term "secular stagnation" was originally coined by Alvin Hansen in 1938 to describe difficulties associated with the sluggish recovery of the US economy following the Great Depression.

48 The secular stagnation theory was used in the previous iteration of stress testing as well.

49 The adverse scenario assumes a more severe tightening of the Fed's monetary policy at the beginning of the first year of simulation than announced (2018). However, following the recessionary effects of such a policy, it is assumed that the US monetary policy will become more accommodative and eased over the rest of the simulation horizon, which is why the Fed's benchmark rate at end-2018 and in 2019 is lower in the adverse than in the baseline scenario.

50 The US withdrew from the Trans-Pacific Partnership (TPP) agreement in 2017 and suspended negotiations on the Transatlantic Trade Investment Partnership, while lately the strained trade relations between the US and China have further raised uncertainty.

stress disturbances.

The aforementioned scenario would certainly affect the expected growth rate of the Croatian economy that is highly dependable on euro area developments via trade channels and the tourism sector. The development of negative shocks imported from abroad would depend on the current vulnerabilities of the domestic economy and the conditions and specifics of the domestic banking system reflected in:

(i) High exposure of the financial sector to the government

Although the cancellation of the preferential weight for a part of exposures to central governments and central banks supported the deleveraging of the central government following a long period of strong interconnectedness between the financial system and the central government (see chapter 6 Banking sector), the still relatively high public debt may become the catalyst of serious systemic disturbances amid accumulated risk. The aforementioned interconnectedness affects the capital adequacy of the banking system as early as in the first year of the simulation horizon through the termination of the preferential treatment of a part of exposures to central governments and central banks and intensifies in the second year of the simulation horizon in line with the conditions prescribed for the transitional period⁵¹. The said regulatory treatment would result in an increased amount of risk exposure and increased capital requirements for such exposures, as well as for indirect exposures arising from the guarantees and financial collateral received from central governments in line with the assumed downgrade of Croatia's credit rating in the S1 and the S2 scenario. Still, owing to the country's decreased risk perception at the beginning of the simulation horizon, the assumed deterioration of Croatia's credit rating does not result in risk weight increase⁵².

(ii) Restructuring process in the Agrokor Group

As the outcome of the Agrokor Group crisis will undoubtedly be reflected in the capital positions of credit institutions, two adverse scenario modalities were simulated as in the previous iteration of stress testing: (a) the baseline adverse scenario (S1 scenario) which, in addition to the previously described recessionary impact of a US tightening of monetary policy on the domestic economy, assumes a settlement and an orderly restructuring process in the Agrokor Group and b) the differentiated adverse scenario (S2 scenario), which is different from the S1 scenario in that it assumes a disorderly restructuring of the

Agrokor concern, which implies its bankruptcy and credit risk materialisation. The coverage by value adjustments for bank exposures to the Agrokor Group and affiliated entities reaches the level of expenses previously assumed under the S1 scenario at the very beginning of the testing period⁵³, which may partly be attributed to the preparation of credit institutions for the case of disorderly restructuring. Therefore, the S1 scenario, which implies orderly restructuring, assumes only additional expenses related to value adjustments that the credit institutions recognised at the beginning of the current year; in line with the mandatory progressive approach, they are assumed to increase every 180 days until they meet the conditions for reclassification as performing exposures⁵⁴. The S2 scenario is based on the assumption that banks will complete forming value adjustments in the amount of total exposure to the Agrokor Group within the first year of simulation. The only exceptions are credit institutions that participated in the roll-up loan, which gives them priority in the payment of the old and the new debt in the same amount.

Quantification of scenarios and result sensitivity

a) Basic quantitative scenario elements

Following the recent favourable macroeconomic performance, the projected horizon of the baseline scenario (2018 and 2019) is expected to see similar positive rates of GDP growth of 2.9% and 2.8%, respectively.

In contrast to the baseline scenario, the adverse macroeconomic S1 scenario would result in a considerably lower growth in the first year of stress testing (0.6%), while in the following year, economic activity would shrink by 2.3% (Figure 1a). In such conditions, a deterioration of labour market conditions may be expected, causing the unemployment rate to climb to 11.9% (taking into account the current migration process of working age population). Negative trends would affect a drop in personal consumption (by 3.1%) and investments (by 4.4%) in the second year of the adverse scenario horizon. The likelihood of such a scenario is very small, but certainly plausible.

⁵¹ The effects of changes in the treatment of such exposures in line with regulatory provisions are already evident in the baseline scenario.

⁵² In the adverse scenarios, Croatia's credit rating has been downgraded to B (S1 scenario) and B- (scenario S2), so that the credit quality step does not fall below 5 in any scenario and, consequently, does not increase the risk weight. Still, even a slight additional decrease in Croatia's credit rating (by two grades in the adverse scenario and only one grade in the differentiated scenario) would trigger a substantial risk weight increase of 50%.

⁵³ Operative assumptions on potential losses in the restructuring of the Agrokor Group of 50% for direct exposures and 20% for indirect exposures to affiliated entities in the scenario assuming orderly restructuring and 70% and 40% respectively in the scenario assuming disorderly restructuring were obtained based on a scheme combining historical probabilities of loss. See chapter 7 Stress testing of credit institutions, Financial Stability 18 from 2017.

⁵⁴ Decision on the classification of exposures into risk categories and the method of determining credit losses (OG 114/2017) A part of restructured exposures that still represents placements is classified into risk category B1 for at least 12 additional months (minimum value adjustments of 2%) and, after the expiry of the 12-month period, adjustments are increased by the further 5% of receivables based on principal every 180 days.

The previously mentioned re-evaluation of prices and rising volatility in financial markets would be reflected in the rise in the yield on the government bond, which would, on average, increase by 55 basis points in the first year and by 86 additional basis points in the second year of the adverse scenario. The reversal of economic trends, which would put pressure on fiscal consolidation and have an unfavourable effect on the country's risk perception, would result in the lowering of credit quality step for exposures to Croatia from 4 to 5, which still would not increase the risk weight in simulated stress conditions.

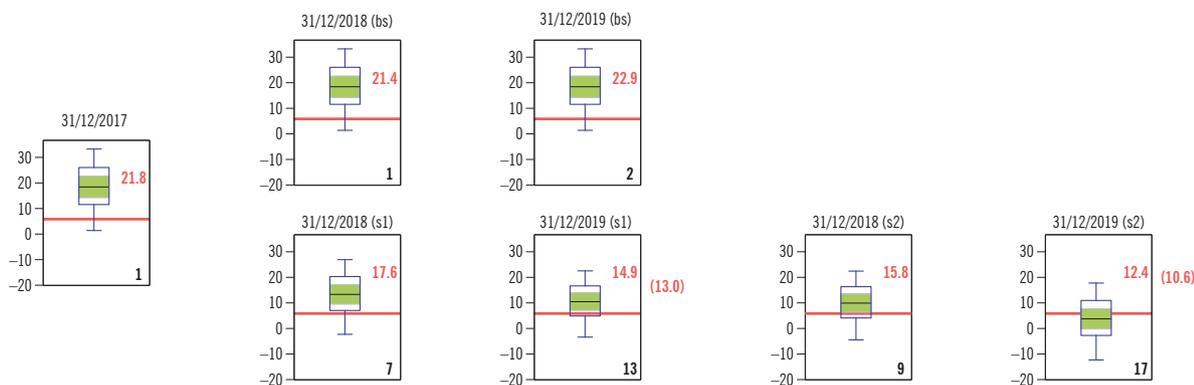
The rise in benchmark interest rates of leading central banks would spill over to interest rates in the domestic money market and, coupled with the increase in the country's risk premium, significantly increase the cost of financing for the private non-financial sector. Considering the dynamics of shock dis-

tribution⁵⁰, short-term interest rates would react more strongly than long-term interest rates in this adverse scenario, resulting in a flatter interest rate curve. Exchange rate volatilities could reach levels rarely recorded. Nevertheless, inflationary pressures in the domestic market would be moderate (Figure 1b). Taking into account the degree of shocks to financing conditions in the domestic market and the exchange rate dynamics described above, the generated degree of stress in the domestic market would exceed any similar events previously recorded (Figure 1c).

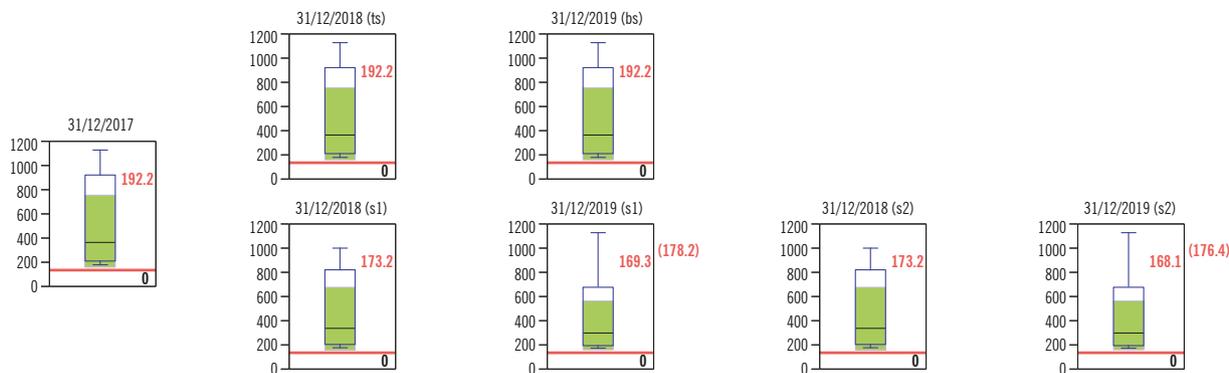
Since the process of settlement with Agrokor Group creditors is not yet completed, its outcome, as well as the future restructuring of the Group, could be reflected in the capitalisation of credit institutions through two channels. Direct influence will manifest itself in the materialisation of the credit risk associ-

Figure 2 Solvency and liquidity of credit institutions in the baseline and the adverse scenario

a) Capital adequacy



b) Liquidity coverage



Notes:

- a) Red line indicates 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 at system level, while ratios in brackets are those that would apply if one larger bank, due to its transformation into a branch, were not shown as a part of the system.
 - c) The number of institutions that have not passed the test (in the solvency and liquidity block) is shown in the lower right angle.
- Source: CNB.

55 Due to temporal distribution, the initial shock is activated in the second half of the first year of simulation.

ated with the Agrokor Group and affiliated entities⁵⁶. Indirect influence on the quality of the banks' loan portfolio may be expected through lower investments and employment as well as decreased personal consumption. These secondary effects were simulated in the S2 scenario via the assumed layoff of some of the employees in the Agrokor Group and affiliated entities⁵¹ (the unemployment rate is assumed to be 12.1% in 2019 under the S2 scenario), which, in turn, is transmitted to a decline in the quality of the banks' loan portfolio through an additional drop in investments (by 2.6 percentage points) and personal consumption (by 0.6 percentage points) in the simulated S2 scenario relative to the S1 scenario. Therefore, against the backdrop of adverse global conditions described above and their recessionary effect on the domestic economy (fall in GDP of 2.3% in the S1 scenario), the bankruptcy of the Agrokor Group could, under the assumptions included in the simulation, cause economic activity to contract even more (by 3% in 2019 under the S2 scenario⁵⁷).

b) Sensitivity to conditions in the baseline scenario

Under the baseline scenario implying the continuation of positive macroeconomic trends, loan portfolio quality is expected to improve over the two-year stress horizon, with the share of bad loans likely to drop from 11.4% at end-2017 to 9.9% in 2018 and 9.3% in 2019.

Operating earnings are expected to see a moderate decrease in the projected period characterised by low interest rates, hovering around HRK 7.7bn. Taking into account the projected expenses on value adjustments of HRK 4bn in the first and HRK 1.5bn in the second year of simulation, the system's common equity tier 1 ratio is likely to see a slight drop to 21.4% in the first year and a rise to 22.9% in the second year. System capitalisation is thus predominantly influenced by the rise in risk-weighted assets considering the cancellation of the preferential risk weight for exposures to central governments in EU member state currencies. Having regard to the expected continuation of favourable macroeconomic and financial developments, short-term liquidity of the domestic financial system

56 Since events similar to the Agrokor Group crisis have never materialised in Croatia, the effect that a disorderly restructuring of Agrokor would have on investments and personal consumption was simulated by relying on international empirical analyses of the restructuring of over-indebted corporations (Chung, J., and L. Ratnovski (2016): *Benefits and Costs of corporate Debt Restructuring: An Estimation for Korea*, IMF Working Paper, WP/16/204, October). Building upon international experience it was assumed, based on the number of employed persons taken from the FINA database for 2016, that 35% of Agrokor Group and 15% of persons employed with affiliated entities would be laid off.

57 A decline in economic activity of 3% in 2019 in the S2 scenario is a result of simulated stress conditions in the international and global environment (S1 scenario) with the addition of the disorderly restructuring of the Agrokor Group. Due to the complex structural interconnectedness of the overall economy and the use of a consistent macroeconomic scenario, which form the basis of the methodology of stress testing, it is difficult to isolate the exclusive effect of Agrokor bankruptcy on GDP in the analysis of the simulations described herein.

(measured by the liquidity coverage ratio – LCR⁵⁸) is likely to remain high over the next two years (192%), whereby all credit institutions will meet the regulatory minimum.

c) Sensitivity to conditions in the adverse scenario

In stress conditions, loan portfolio quality would experience a stronger reaction. Under the S1 scenario, which, in addition to a slowdown in economic activity and stress in financial markets, assumes the orderly restructuring of the Agrokor group, the share of bad loans would grow to 13.1% in 2018 and 17.4% in 2019 at system level. In the corporate sector portfolio structure, the share of bad loans could increase to 22.3% in 2017 and to 37% by the end of 2019. At the same time, simulated shocks would influence the creditworthiness of the household sector and, as a result of its fast deterioration, the share of bad loans in the household and consumer loan portfolio could climb to 9% and 10% respectively by the end of the projected horizon.

In the S1 scenario, the expenses on value adjustments resulting from portfolio deterioration, the recognition of which would be additionally accelerated by the implementation of IFRS 9 and additional provisions for Agrokor, would amount to HRK 6.4bn in the first year and HRK 10bn in the second year of simulation, while cumulative loss at system level would total HRK 3.4bn due to the simultaneous drop in earnings to HRK 6.3bn in the first and HRK 6.7bn in the second year of simulation. System capitalisation would also be greatly affected by risk-weighted assets as a result of kuna depreciation and the increase in the weight for the government's exposure in foreign currency. The common equity tier 1 ratio is expected to drop to 17.6% in 2018 and 14.9% in 2019, with seven credit institutions failing to meet minimum capital standards in the first year, and 13 credit institutions failing to do so in the second year. Even under simulated stress conditions, credit institutions would continue to hold significant surplus liquidity. The system's liquidity coverage ratio would thus decline to 173% in the first year of the simulation horizon and to 169% by the end of 2019, with all institutions meeting minimum liquidity standards.

Under the S2 scenario, which, in addition to recessionary conditions, implies the bankruptcy of the Agrokor Group, provisions of credit institutions are expected to grow by an additional HRK 3.6bn, which would reduce common equity tier 1 capital adequacy at system level to 15.8%, with nine institutions below the regulatory minimum in the first year and 12.4% in the second year, and 17 credit institutions having insufficient minimum capital adequacy. Therefore, a disorderly restructuring of the Agrokor Group could, considering the already weakened capital positions of banks due to recessionary conditions in the S1 scenario, push two more credit institutions below the

58 The implementation of the LCR in its full scope of 100% will start in 2018. A transitional period provided for the gradual introduction of the LCR, so credit institutions were required to maintain an LCR of at least 60% in 2015, of at least 70% in 2016 and of at least 80% in 2017.

required minimum capital standard in 2018 and four more in 2019. It is, however, necessary to note that the credit institutions in question are mostly smaller in size, which is why capital adequacy at system level would still suffice to withstand the highly unlikely, but extreme simulated shocks. The additional projected impact on liquidity under the S2 scenario is marginal (LCR would decrease by one percentage point relative to the results of the S1 scenario), with one smaller institution dropping below the critical test threshold of 100%.

The results of integrated liquidity and solvency tests confirm the still high resilience of the banking system to the materialisation of imagined, but unlikely scenarios. However, growing diversification of resilience among credit institutions points to the need for maintaining high capital buffer levels in order to ensure the stability of the banking system.

List of figures and tables

Risk map, first quarter of 2018	5	Figure 3.1 Years-long deleveraging of households was halted in 2017	19
Figure 1.1 Real economic growth and inflation in selected markets	8	Figure 3.2 Nominal and effective household debt is growing at an annual level	19
Figure 1.2 Monetary policy of the USA and the euro area diverged even further	9	Figure 3.3 Financial assets of households are rising	20
Figure 1.3 Relatively optimistic equity valuation points to potential risks	9	Figure 3.4 Household deposits are the dominant form of investments	20
Figure 1.4 While market risk in 2017 was at historical lows, geopolitical volatility was significant	9	Figure 3.5 New long-term household borrowing accelerated in 2017	20
Figure 1.5 The year 2017 was marked by weakening of the dollar against leading global currencies	9	Figure 3.6 Government subsidy programme had a considerable impact on the growth of new housing loans at the end of 2017	20
Figure 1.6 Exports remain the generator of real growth in 2018	10	Figure 3.7 Dynamics of new lending halted the several-year decrease in total loan amounts	21
Figure 1.7 While the capital market is stagnating again, real estate prices are rising	10	Figure 3.8 Lending terms eased in 2017	21
Figure 1.8 Kuna liquidity surplus in 2017 was double the amount of the previous year	10	Figure 3.9 Banks expect credit demand to strengthen	21
Figure 1.9 Perceived risk for Croatia is diminishing	11	Figure 3.10 Positive trends in the labour market continued throughout 2017	
Figure 1.10 Selected indicators of external vulnerabilities continue to improve	11	Figure 3.11 Average monthly gross wage paid, by gender and age groups, employers with more than ten employees	22
Box 1	12	Figure 3.12 Share of temporarily employed in the total number of employed persons by age groups	22
Figure 2.1 General government balance	15	Figure 3.13 Household debt to credit institutions denominated in kuna reached a historical high	22
Figure 2.2 General government debt	15	Figure 3.14 Continued downward trend in interest rates on newly-granted (housing) loans	22
Figure 2.3 General government deficit	16	Figure 3.15 In the structure of household debt to credit institutions, the share of loans with fixed interest rates is growing	22
Figure 2.4 Public debt	16	Figure 3.16 Rates that protect consumers from interest rate risk over the long term are the most represented	23
Table 2.1 Thresholds of the fiscal sustainability risk indicators in 2017	16	Figure 3.17 Variable interest rates on the majority of loans granted to households are linked to the movement of the national reference rate (NRR), as at 31 December 2017	22
Figure 2.5 Currency breakdown of public debt	16		
Figure 2.6 General government interest expenses	17		
Figure 2.7 Movements of generic yields on debt securities of selected countries from Central and Eastern Europe (CEE)	17		
Figure 2.8 Projection of public debt under various scenarios	17		

Figure 3.18 Debt and interest rate burden of households is decreasing	22	Figure 5.10 Public corporations strongly reduce their exposure to currency risk	40
Figure 3.19 Further fall in the systemic vulnerability of households	22	Figure 5.11 Risks associated with growth in interest rates on corporate loans remain high	40
Figure 4.1 Real estate sector deleveraging slowed down considerably in 2017	25	Figure 5.12 As compared to the euro area, interest rates on long-term corporate loans in Croatia continued to decrease	40
Figure 4.2 Increases in the prices of residential real estate and consumer confidence are mutually reinforcing amid positive macroeconomic developments	25	Figure 5.13 Interest rates on short-term corporate loans in Croatia held steady in the major part of 2017	40
Figure 4.3 Prices of residential real estate saw a significant increase at the end of 2017	26	Figure 5.14 Further deleveraging, the consequent decrease in the debt servicing burden and the decrease in interest rates had a positive effect on the reduced riskiness of the non-financial corporate sector	41
Figure 4.4 Prices of residential real estate hover around the level based on macroeconomic fundamentals	26	Figure 6.1 Banks' risk exposure continued to decrease with capital and liquidity surpluses maintained at high levels	43
Figure 4.5 Drop in the risk premium reduces the interest rate spread	26	Figure 6.2 Years-long downward trend in total bank assets halted in 2017	44
Figure 4.6 The increase in prices put an end to the improvement of the financial availability of residential real estate	27	Figure 6.3 Continued absence of credit growth generated cyclical pressure	44
Box 2	28	Figure 6.4 Banking system concentration growth continued in 2017	44
Box 3	31	Figure 6.5 Bank balance sheet trends determined by a decrease in placements to the government and deleveraging against foreign owners	46
Figure 5.1 Indebtedness of the corporate sector continued to fall in 2017	37	Figure 6.6 Share of banks' exposures to the government decreased in 2017 after a years-long upward trend	46
Figure 5.2 Sale of claims and GDP growth have significantly contributed to a reduction in total debt	37	Figure 6.7 Bank liabilities to foreign affiliated entities almost equalling assets at the end of 2017	46
Figure 5.3 Non-financial corporations, particularly those in the public sector, have reduced their debt	38	Figure 6.8 Continued substitution of cross-border funding sources by residents' time deposits	47
Figure 5.4 Majority of gross non-financial corporate debt was purchased by foreign enterprises	38	Figure 6.9 Growth in the maturity mismatch between bank loans and deposits mostly due to the shortened maturity of liabilities	47
Figure 5.5 Foreign and domestic financial corporations paid relatively the lowest purchase price	38	Figure 6.10 Share of kuna assets in total bank assets reached 49%	47
Figure 5.6 Deleveraging in the non-financial corporate sector is also characterised by a partial refinancing of foreign loans through domestic borrowing	39	Figure 6.11 Decomposition of growth in credit to the private sector	48
Figure 5.7 Newly-granted corporate loans decreased slightly in 2017 from the previous year	39	Figure 6.12 Continued decrease in banks' exposures to currency induced credit risk	48
Figure 5.8 Demand for loans continues to grow after the temporary decline at the end of 2017	39	Figure 6.13 Continued decrease in banks' exposure to interest-induced credit risk	48
Figure 5.9 The share of total corporate debt in foreign currency stagnated	40		

Figure 6.14 Bank profitability affected by increased value adjustments	49	Figure 6.19 Liquidity coverage ratio (LCR) considerably above the regulatory minimum	51
Figure 6.15 Value adjustment charges had the largest impact on profitability declining in 2017 relative to 2016	49	Figure 6.20 Recovery of capital adequacy ratios following a temporary deterioration in the second half of 2015	51
Figure 6.16 Continued decline in lending and deposit interest rates	49	Table 7.1 Macroeconomic scenarios	54
Figure 6.17 Continuing improvement in banks' credit portfolio quality	50	Figure 7.1 Adverse scenario probability	55
Figure 6.18 Improvement of loan quality primarily due to the sale of non-performing loans	50	Figure 7.2 Solvency and liquidity of credit institutions in the baseline and the adverse scenario	57

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

