



MACROPRUDENTIAL RISK SCANNER

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Franje Račkoga 6

10000 Zagreb

www.hanfa.hr

Telephone: +385 1 6173 200

Fax: +385 1 4811 406

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1. Introduction

Along with the Croatian National Bank and the Ministry of Finance, the Croatian Financial Services Supervisory Agency (hereinafter: Hanfa) is responsible for the stability of the financial system in the Republic of Croatia, therefore promoting and preserving financial stability, in accordance with the Act on the Croatian Financial Services Supervisory Agency, is one of the basic goals of its work. A **stable financial system** implies the smooth functioning of all its segments (financial institutions, markets, services and infrastructure) in the process of resource allocation, risk assessment and management, and carrying out payments, as well as its resistance to sudden shocks.

Financial stability can be disrupted by the processes that arise and develop within the system, creating vulnerabilities that may materialize in the event of certain shocks in the form of disturbed liquidity and capital positions of financial institutions, disabling the normal functioning of a part or the entire financial system. Such shocks can be transferred from the international environment, but they can also be generated by domestic macroeconomic and financial developments, economic policy or changes in the institutional environment. Therefore, any risk to which the system is exposed and which can have adverse effects on the functioning of the entire financial system or its part, thus causing a serious negative impact on the real economy, represents a **systemic risk**.

Over the past few years, global progress has been made in the area of understanding and consequently identification, evaluation and monitoring of systemic risks of the financial sector. However,

in order to prevent the identified risks in time, and to mitigate the effect of their materialisation, an appropriate set of instruments and tools, i.e. policies aimed at ensuring the stability of the system as a whole, in short **macro-prudential policies**, had to be developed. In the European Union (EU), bodies with macro-prudential powers have been established at the national and international level, and frameworks for international cooperation have been developed along with macro-prudential tools. Although the focus of macro-prudential policies has so far been primarily on the banking sector, the growing share and importance of the non-banking part of the financial system creates structural changes and requires further development of the macro-prudential framework. In addition, financial integration deepens, creating the need for monitoring and addressing vulnerabilities in the cross-sectoral and cross-border context.

This publication therefore seeks to provide insight into the process of identifying, assessing and monitoring the evolution of systemic risks in the financial services sector under Hanfa's supervision, in order to timely take appropriate measures to prevent their materialisation and the impairment of the financial system stability. This will also contribute to a better understanding of systemic risks, particularly in the vulnerability identification and risk spreading segment, it will stimulate action planning and measures that provide adequate protection against the materialisation of such risks and contribute to greater confidence in the financial system and strengthening the system's resistance to shocks.

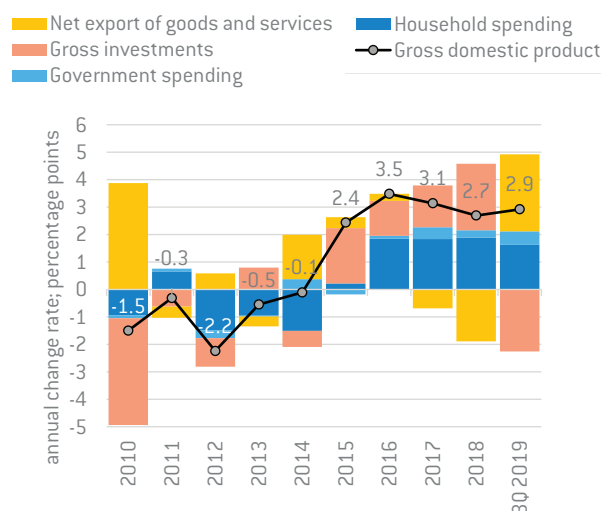
2. Macroeconomic overview

The growth of the domestic economy accelerated slightly in the third quarter of 2019, but over the last four years it remained at the level of average growth, which is lower than in most comparable EU countries. Domestic economic activity reflects growth in consumption, both domestic and foreign, stimulated by extremely low borrowing costs and income growth driven by cyclical and structural factors (labour shortage, foreign transfers, taxation changes). However, the long period of globally low interest rates and expansionary monetary policies in an environment of high uncertainty fails to significantly and in the long term stimulate the global economic activity, which, given the high dependence of the domestic growth on the economic activity of the euro area, and especially the most important foreign trade partners – Germany and Italy¹, highlights negative risks for domestic economic growth. At the same time, the improvement of relative fiscal indicators continued through cyclical growth in tax revenues and economic activities and a decrease in the cost of interest expenses given the positive conditions in the international financial markets. The credit rating improvement broadened the potential investment base in the Croatian sovereign debt and, through rising prices, reflected an increase in the bond assets of the financial services sector, which dominates overall investments, but also reduced returns. The decline in returns on bond investments in the light of market trends can hardly be offset by alternative investments without significantly increasing risk exposure. Therefore, given the expected continuation of the period of low interest rates, the focus of the financial services sector² will continue to be on the search for yields in the coming period.

The economic growth accelerated slightly in the third quarter of 2019, relative to the previous quarter, continuing the expansionary phase of the cycle that began in mid-2014. In the last five years, the cumulative growth of gross domestic product amounted to 14.9%, thus fully compensating the contraction of economic activity recorded in the period from 2008 to 2013. At the end of September 2019, the real annual growth rate of gross domestic product was 2.9% (Figure 1). The largest contribution to GDP growth was achieved by the increase in net export of goods and services (an increase of 6.6% on the annual level) and personal consumption (an increase of 3.1% on the annual level). Although other components of gross domestic product also recorded growth on the annual level,

it slowed down most significantly in gross fixed capital formation.³

Figure 1 | Real growth of GDP and contributions to the growth



Source: CBS

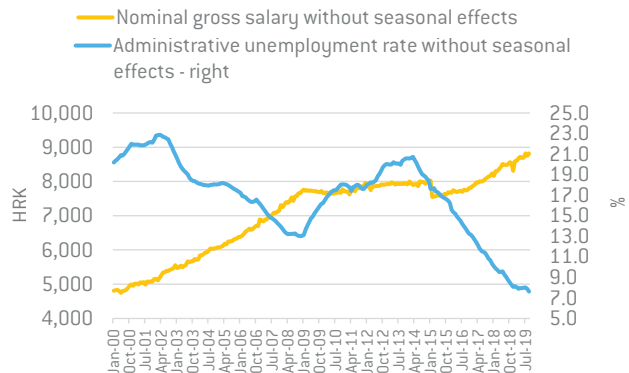
- 1 The projections of their growth during the next two years are below 1%, meaning that economic stagnation may be in place, especially given the fact that a part of German economy rise stems from methodological changes of GDP calculation.
- 2 The financial services sector includes the capital market, pension and investment funds, investment firms, insurance companies and leasing and factoring companies.

- 3 At the end of September 2019, the annual growth rate of gross fixed capital formation was 5%, while at the end of the second quarter it was 8.2%.

The growth of net exports was primarily attributable to the growth of exports, with an equal contribution of goods⁴ and services, but also a slowdown in imports, which increased by only 1.1% on the annual basis (in contrast to the second quarter in which this growth was as high as 8.3%). At the same time, there was a significant increase in the surplus in the current and capital account of the balance of payments⁵, driven by the growth of net exports of services, primarily due to the growth of tourism revenues.⁶ Tourism revenues increased due to higher average consumption, as the growth of tourist arrivals and overnight stays, according to the CBS data, slowed down compared to the same period last year.⁷ More intensive use of EU funds has positive influence on the current and capital account balance. Specifically, the absorption of aid from international organizations doubled relative to the first three quarters of 2018, which, with an increase in VAT revenue (by 8%), contributed to a 9.2% increase in the revenue of consolidated central government in the first three quarters of 2019. At the same time, the expenditure side increased (by 7.2%), mostly due to the increase in social benefits and expenditures for the use of goods and services and an increase in employee remuneration. These trends resulted in the increase in the consolidated general government surplus. At the same time, public debt stagnated at the level of 74.9% of GDP. Therefore, the risk of revaluation of bond assets, which make up the largest part of financial services sector invest-

ments, due to a change in sovereign risk premium, is assessed as moderate in the short run.⁸

Figure 2 | Continued positive trends in the labour market



Note: Data on average monthly gross salary and the number of employed persons in legal entities (used in the calculation of the administrative unemployment rate) from January 2015 onwards were obtained using administrative data from the JOPPD form and are therefore not comparable with the previously published data (January 1998 – December 2014).

Sources: CBS, CNB

In addition to net exports, personal consumption made a positive contribution to economic growth⁹. Positive trends in the domestic labour market continued (annual gross real wage growth of 2.4% at the end of September 2019 and a decrease in administrative unemployment by 1.1 pp compared to the same period last year, Figure 2), which, together with the cyclical growth of economic activity, are the consequence of the structural deficit of labour force. These labour market trends directly influence the increase in the payment of contributions into the second pension pillar and the consequent increase in the assets of pension funds (Figure 7). The increase in consumption is also fuelled by general consumer optimism, so consumer confidence, expectations and sentiment indices are near historically highest levels. Unlike consumer optimism, the analysis of investor sentiment suggests that investors, espe-

4 In the context of exports of goods, in the first three quarters there was a marked increase in exports in the segment of production of other means of transport (primarily ships) and production of pharmaceutical products.

5 The surplus in the current and capital accounts of the balance of payments at the end of the third quarter stood at 4.3% of GDP, looking at cumulative achievements in the last year compared to 2.8% at the end of the first half of 2019.

6 Income from tourism in the first three quarters of 2019 grew by 8.9% compared to the same period in 2018.

7 The number of tourist arrivals in the first three quarters of 2019 increased by 4.4% on the annual level (6.4% in the same period of 2018) and the number of overnight stays in the same period increased by only 1.5% (3.6% in the first three quarters of 2018).

8 With a view of better understanding of all relations between the public sector and the financial services sector for the purpose of preserving financial stability, at the end of this publication there is Box 2. Risks arising from the interconnection between the financial services sector and the public sector.

9 According to the expenditure method, almost half of the total GDP is generated by personal consumption.

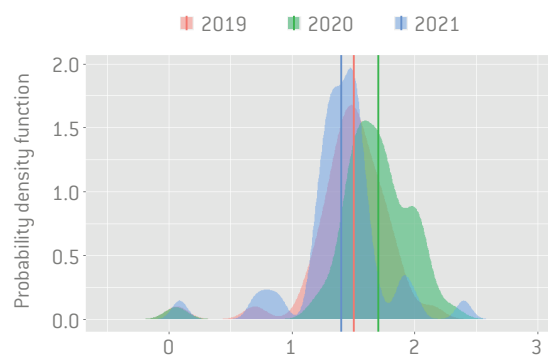
cially retail investors, despite improved macroeconomic conditions and low interest rates, do not systematically behave irrationally, seeking higher returns in the capital market which is saw a mild recovery in 2019 (see Box 1: Croatia's Sentiment Index: are domestic investors irrational?).

Positive conditions on the labour market, combined with historically low financing costs, have contributed to the continued growth of private sector lending, primarily to households via cash loans and, to a lesser degree, housing loans. The increase in lending activity is reflected in the rise in premiums of collateral protection insurance (CPI insurance), which is one of the fastest growing forms of non-life insurance, which transfers some of the credit risk from a credit institution to an insurance company. Regardless of the fact that in most cases the insured amount is small¹⁰, the concentration of these insurance contracts with several companies that have established business relations with credit institutions in adverse cyclical conditions on the labour market can be a non-negligible expense and affect the liquidity of the company. Increased demand for real estate, which has accelerated the growth of housing loans, also influenced the growth of real estate prices, which increased by as much as 10% in the second quarter compared to the same period last year. This brought prices closer to pre-crisis levels, while in some segments of the market they are even higher. Considering the importance of real estate as an investment form in both private and financial sectors, a sudden and significant price correction would have a significant adverse effect on the overall system and also on the financial services sector, especially insurance companies whose approximately 12% of investments are related to the real estate market.¹¹

The main risks for reversing the trends in the domestic economy that are still positive are currently related to developments in the external environ-

ment, related to the potential further strengthening of protectionism at the global level and the possibility of a stronger slowdown in the economic growth of the euro area, especially the most important Croatian foreign trade partners. According to projections of the IMF¹², economic growth in the euro area could slow down to 1.2% in 2019 (from 1.9% in 2018) and only slightly recover in 2020, reaching 1.4%. The projections of the European Commission¹³ are similar, predicting modest growth of 1.1% for 2019, and only a slight increase (to 1.2%) in 2020. Given the expected continuation of a weak growth of the German and Italian economies¹⁴, the likelihood of spillovers of negative impulses of foreign demand to domestic economic activity via the export component is increasing (Figure 3). In addition, the weakening of investment activities, which were in previous periods mainly realised in the public sector and, to a lesser extent, the private sector, which in their financing still relies mainly on bank financing rather than market financing, highlight the structural weakness of the domestic economy, which is based on cyclical trends in private consumption, both domestic and foreign.

Figure 3 | Expectations of euro area economic growth are pessimistic



Note: The Figure presents the statistical distribution of respondents' forecasts regarding the expected growth of the real GDP in the euro area over a three-year horizon, vertical lines indicate the median value of the response for the observed year.

Source: ECB – Survey of Professional Forecasters

10 The insurance of payment of a smaller number of loan annuities, i.e. instalments in case of the debtor is unable to repay the loan, in the circumstances that are specifically defined in the contract.

11 A more detailed analysis of these risks, as well as the impact of real estate prices decrease on the capitalisation of insurers in Croatia, is given within the box Financial services market as a source of systemic risks in the previous issue of the Macroprudential risk scanner (https://www.hanfa.hr/media/4505/macroprudential-risk-scanner-2019_2.pdf).

12 World Economic Outlook, October 2019

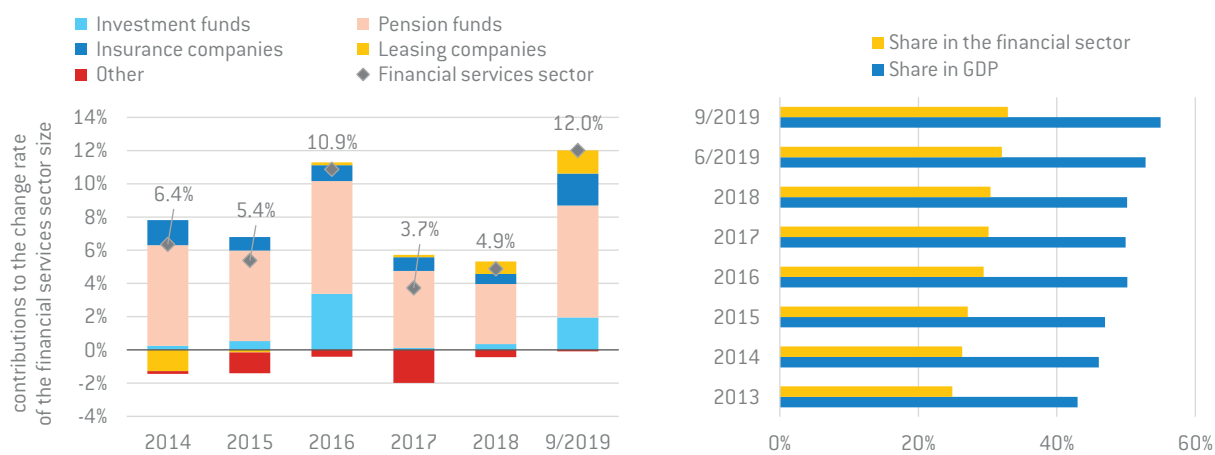
13 European Commission: European Economic Forecast Autumn 2019, Institutional Paper 115, November 2019

14 The European Commission projections estimate that the German economy will grow by just 0.4% in 2019, and by a modest 1.0% in 2020. According to the same projection, the Italian gross domestic product grew by only 0.1% in 2019, and in 2020 it will increase by 0.4%.

3. Overview of risks in the financial services sector

The importance of the financial services sector in Croatia has been steadily increasing for almost ten years, and this trend continued throughout the third quarter of 2019, bringing assets under the management of financial institutions and funds in this market to 33% of total assets of the financial system, or 55 % of the GDP. Following a slowdown in growth over the last two years, the financial services sector recorded a double-digit growth rate of as much as 12% in the first three quarters of 2019 (Figure 4). The main growth generators are still pension funds, whose assets under management are growing primarily due to positive market trends, notably bond investments, but also through new contributions that still far outweigh the payouts. Although relatively smaller than that of pension funds, a significant positive contribution to the overall growth of the financial services sector during 2019 came from the growth in the assets of investment funds, insurance companies and leasing companies. Between 2012 and mid-2019, the Croatian financial services sector grew on average by 7.6% on an annual basis, which is in line with the EU average, while at the same time the assets of credit institutions stagnated (Figure 5). Similar trends were observed in other countries of Central and Eastern Europe, while the Western European countries experienced comparatively lower growth rates in the financial services sector, given their degree of “maturity”. Consequently, the significance of the financial services sector in Croatia is comparable to the significance of this sector in C&E, but it is still much lower than in Western Europe.

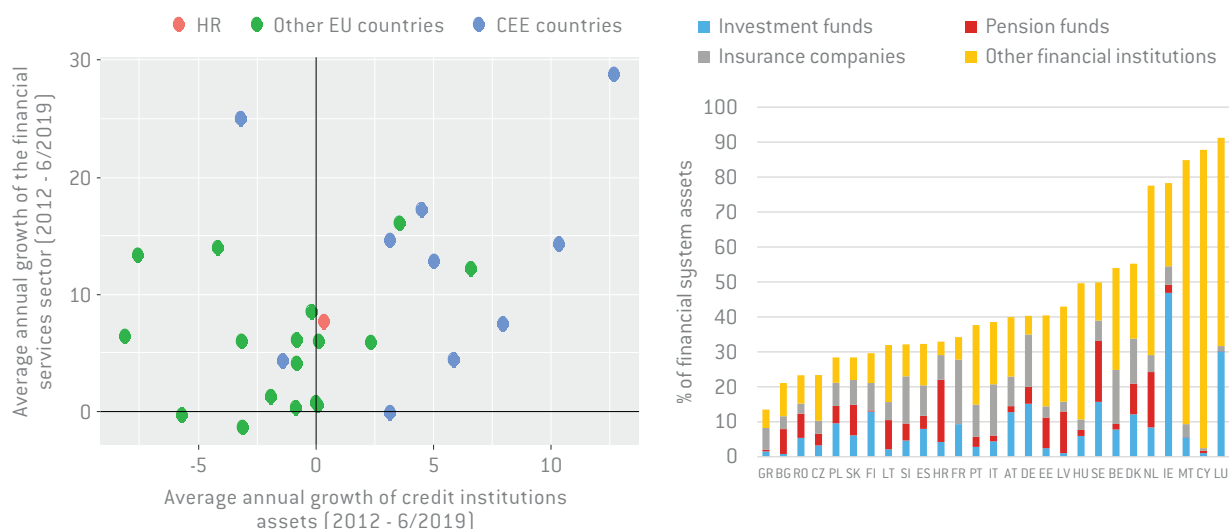
Figure 4 | The importance of the financial services sector has been continuously growing, which is being positively contributed by almost all segments of this market



Note: Apart from the financial services sector, the financial sector also includes credit institutions.

Sources: CNB, CBS, ECB and Hanfa

Figure 5 | Growth dynamics are much higher in the financial services sector than in the banking sector, with the size of the domestic financial services sector comparable to the CEE countries



Note: CEE countries are: BG, CZ, EE, HU, LV, LT, PL, RO, SK and SI. Data for the second quarter of 2019 are presented, while data as at 30/09/2019 are shown for Croatia. Apart from the financial services sector, the financial sector also includes credit institutions.

Sources: ECB and Hanfa

3.1 Concentration

The domestic financial services sector is relatively highly concentrated with regard to the type of financial institutions, since pension funds manage 54% of the sector's total assets (Figure 6). The increase in the amount of contributions paid during the still current phase of the accumulation of pension system funds is stimulated by the increase in bases, given the still positive cyclical macroeconomic developments, the effect that the labour force deficit generates in the private sector salaries and trade union activity in the public sector. Although contribution payments far outweigh the second- and third-pillar pension payouts, pension payments based on capitalised individual savings will intensify over the coming years, which, together with negative demographic trends, could reduce the assets of the pension system, i.e. the concentration of the financial services sector.

During the first nine months of 2019, the growth of pension funds' net assets accelerated and they increased by HRK 13.8bn. In addition to the above-mentioned increase in contributions, positive market trends significantly contributed to this (Figure 7). This is a consequence of the rise in

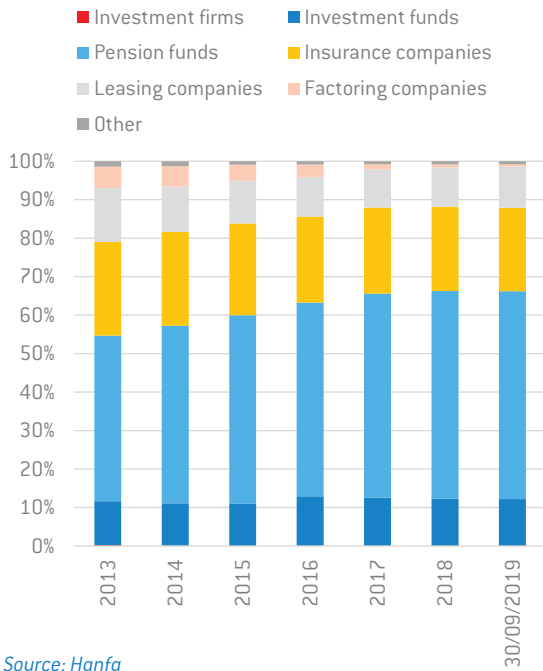
government bond prices in the low interest rate environment, and the return of Croatia to the investment rating in the first half of the year also made a significant impact, which made them an acceptable investment form for a larger number of institutional investors. At the same time, prices in the stock market recovered after a two-year contraction (Figure 20).

Despite these trends, the relative significance of pension funds in the financial services sector stagnated during the first three quarters of 2019, given the comparatively more intensive growth of assets of other segments of this sector, primarily insurance companies, investment funds and leasing companies.

Since domestic bonds are the most represented form of investment by both insurance companies and investment funds, these market trends have positively affected the value of their assets. The increase in leasing companies' assets is primarily based on leasing operations in the segment of vehicles, which has been growing strongly over the last three years. This increase is related to the current expansionary phase of the economic cycle of the Croatian economy, which is also reflected in the increase in road vehicle imports (Figure 8).

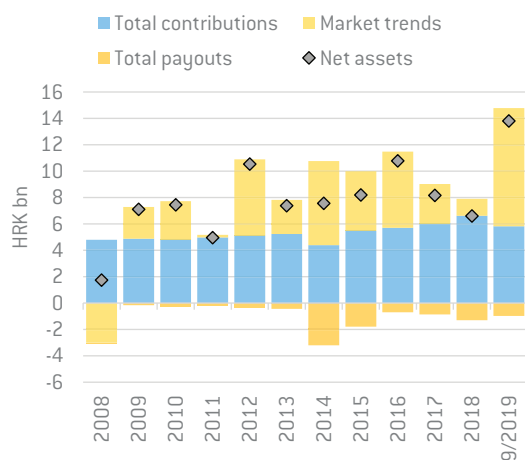
This stopped the long-term growth of the risk of concentration of the financial services market in 2019, but it is still pronounced and pension funds continue to determine the movement of the entire sector.

Figure 6 | Pension funds and insurance companies manage about 75% of the assets of the financial services market



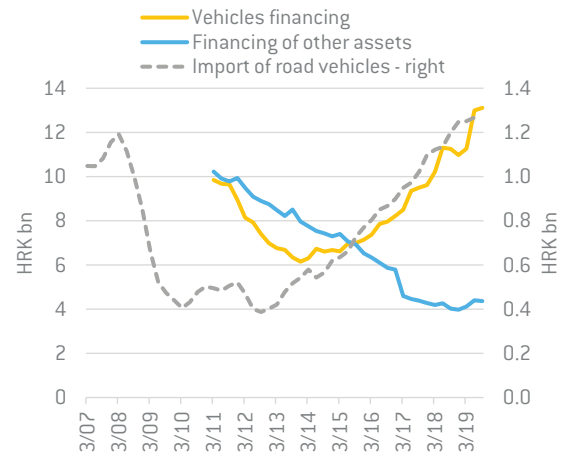
Source: Hanfa

Figure 7 | The increase in net assets of pension funds in the first three quarters of 2019 is primarily influenced by positive market developments



Source: Hanfa

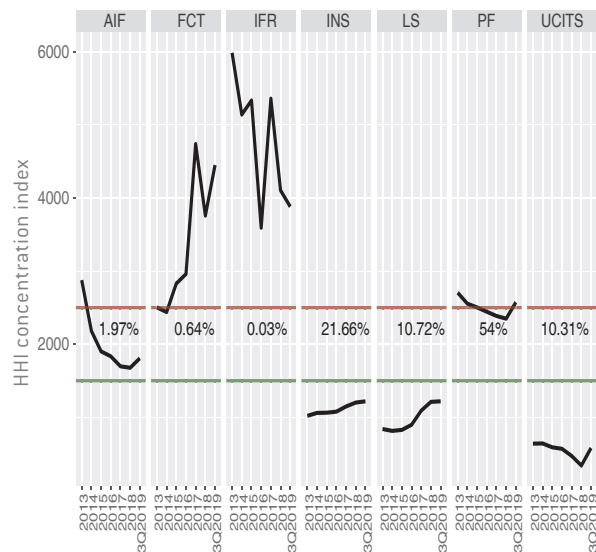
Figure 8 | Strong growth in vehicle leasing activities is related to economic recovery



Note: Shows value of outstanding receivables under lease contracts.

Sources: Hanfa, CBS (seasonal adjustment of the CNB)

Figure 9 | Concentration indices of individual segments of the financial services sector



Note: The level of concentration is represented with the Herfindahl-Hirschman Index, where higher values indicate higher levels of market concentration. Although there is no generally accepted scale according to which markets are classified as having low/high concentration, the US Department of Justice considers markets with index value up to 1500 as competitive, while those with index value above 2500 are considered highly concentrated. Explanation of sector codes can be found in the list of abbreviations at the end of this document. The 2019 data indicate the situation at the end of September 2019.

Source: Hanfa

The most significant sector by size, the pension funds sector (mandatory and voluntary) is in the high concentration zone, which poses a significant structural systemic risk not only for the financial services sector but for the overall financial system. This is due not only to the small number of companies managing these funds, but also to the low activity of insured persons in choosing a pension company or fund. Such insured persons, in accordance with the legally defined mechanisms for allocating new affiliates to individual companies or funds that were in force from the tax reform in 2002 to 2014, were proportionally more often allocated to funds with the largest market share. In addition to pension funds, the area of high concentration also includes investment funds and factoring companies, but these market segments are relatively small, accounting for only 0.7% of the financial services sector at the end of September 2019. The increase in factoring concentration during 2019 is a consequence of the liquidation of one company, while the concentration of investment firms is significantly reduced due to the transfer of assets of one company to the banking sector.

The concentration in the investment fund segment (AIF and UCITS) and the leasing segment increased slightly during the first three quarters of 2019. Nevertheless, the UCITS funds, insurance and leasing segments are considered to be competitive, as they do not exceed the HHI index limit of 1500 points. The domestic insurance sector is relatively competitive compared to CEE countries, with the concentration slightly higher than the EU average in the non-life insurance segment (Figure 10).

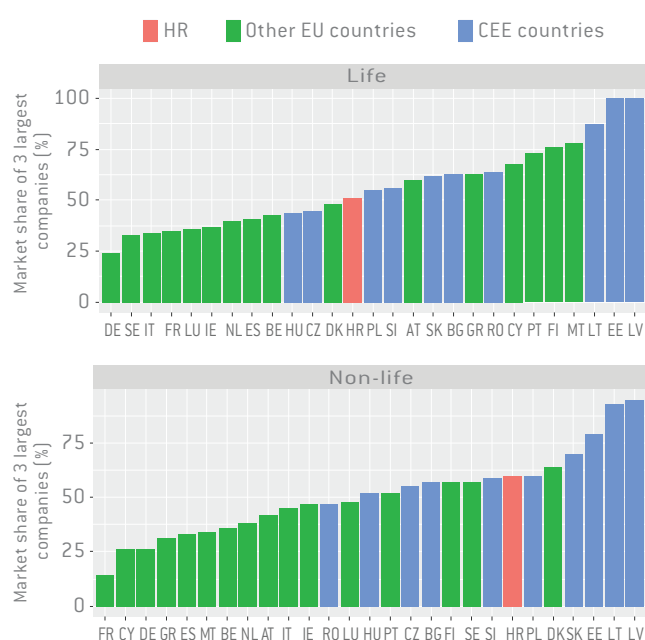
3.2 Interconnection

Continuous growth of the financial services sector assets since 2012 was primarily realized through the effective¹⁵ growth of pension funds' assets (12.7%) and investment funds' assets (20.2%) and insurance companies' assets (5.3%), while financial assets of other segments decreased slightly (-4.5%). Such increase in the financial assets of funds and insurance companies was primarily transposed into increasing the exposure to government debt through financial instruments, and to a lesser extent towards non-financial companies and credit institutions (Figure 11). At the same time, no systematically significant increase in interconnections between individual segments of the financial services sector was noticed during the observed period.

Direct interconnection of financial services sector through equity, debt and cash forms of financial assets was generally less than 5% of total financial assets of each sector at mid-2019. (Figure 12). Insurance companies had somewhat larger exposure (up to 15% of financial assets) towards investment funds, determined by their internally set investment strategies.

What is significantly more important than the direct connection is the indirect interconnection of segments of the financial services sector, through individual forms of investment. Relatively high returns on sovereign debt in the previous multi-year period, legally determined investment limits, or minimums, regulatory treatment of bond investments, especially in investments in domestic government securities in local currency, are the main reasons why insurance companies, pension

Figure 10 | Concentration of the EU insurance sector (end-2018)



Note: The concentration was measured by the share of the three largest companies in the total gross written premium.

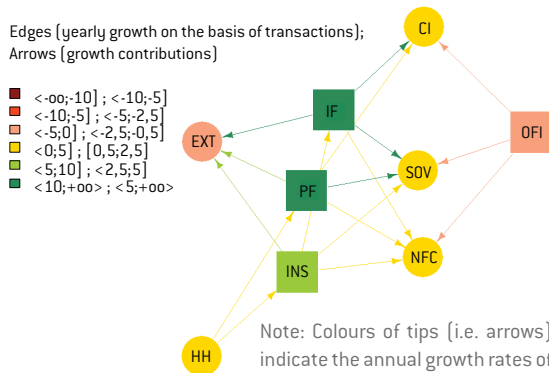
Source: EIOPA

15 The growth of financial assets based on transactions, not including exchange rate changes, price changes and other changes in assets. More info about the methodology is available [here](#).

funds and investment funds directed a significant part of their investments towards the government (Figures 11 and 12). In mid-2019, receivables from government arising from financial investments amounted to between 46.2% of financial assets of insurance companies and 67.7% of financial assets of pension funds, which puts them at the top of the EU countries distribution, in relative terms (Figure 5 in Box 2 Risks arising from the interconnection of the financial services sector and the public sector)¹⁶.

The concentration of investment in sovereign debt instruments in a low interest rate environment exposes financial service providers to the risk of reinvestment (Figure 13). Over the next three years, almost one third of the government bond investments of this sector will mature, so the continuation of the same conservative investment strategy could have a significant impact on the profitability of the entire sector in the medium term (more about the reasons behind the interconnection between financial institutions and the public sector, but also about the risks to financial stability arising from that link can be found in Box 2 Risks arising from the interconnection between the financial services sector and the public sector).

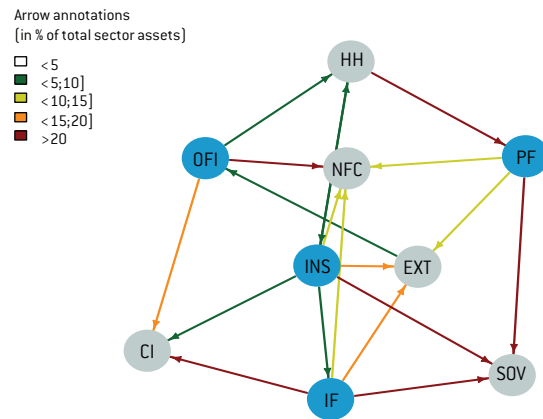
Figure 11 | Pension and investment funds and insurance companies record the highest growth rates of financial assets (from 2012 to 2Q 2019)



Source: Hanfa's calculation according to data from financial accounts (CNB)

16 At the level of the entire financial services market, investments in government bonds account for 50% of the financial assets of the market.

Figure 12 | Mutual exposure of financial intermediaries and exposure to other institutional sectors

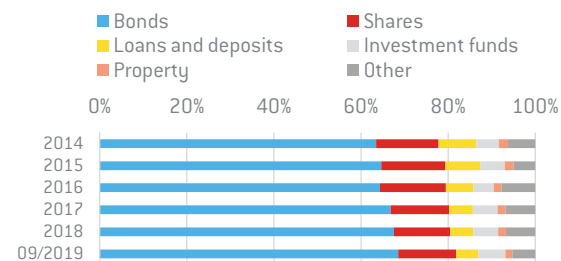


Note: Blue circles indicate Hanfa's supervised entities. The interconnection of the sector through financial assets as at 30/06/2019 is shown. Interrelationships between sectors that are not supervised by Hanfa are omitted for better transparency. Explanation of sector codes can be found in the list of abbreviations at the end of this document.

Source: Hanfa's calculation according to data from financial accounts (CNB)

In search of higher returns on investment, financial service providers are slowly turning to the non-financial companies sector, both to domestic and increasingly to international sector. Although these exposures are still relatively low (Figure 14), the more intensive activity of institutional investors on the domestic capital market has been reflected in the increase of the stock index. In accordance with the nature of their business, leasing and factoring companies were more significantly exposed to domestic non-financial companies in the amount of more than 50% of financial assets (Figure 15).

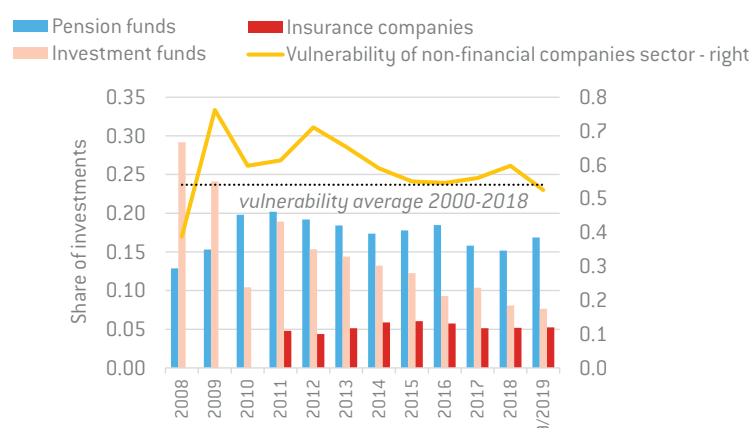
Figure 13 | Investment structure of financial services sector with respect to investment type



Note: Only investments by insurance companies, pension funds and investment funds are shown, which together account for almost 90 % of the assets of the financial services market.

Source: Hanfa

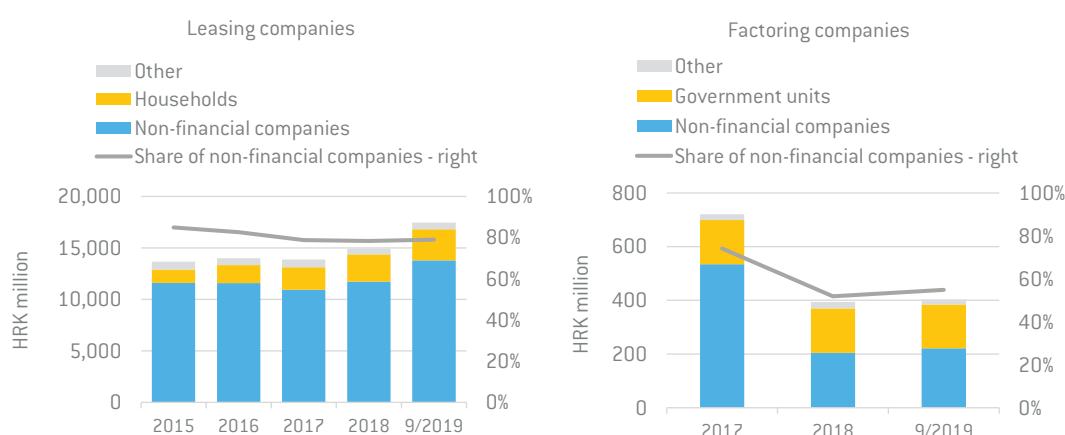
Figure 14 | Equity investments and the vulnerability indicator of the non-financial companies sector



Note: More info about the vulnerability calculation as regards non-financial companies in [Financial stability, No 20](#). The horizontal line indicates the long-term average of vulnerability indicators of the non-financial companies sector.

Sources: CNB and Hanfa

Figure 15 | Portfolio structure of leasing and factoring companies is dominated by the exposure to non-financial companies



Note: Showing the structure of the outstanding value of active contracts for leasing companies, and the structure of receivables for factoring companies.

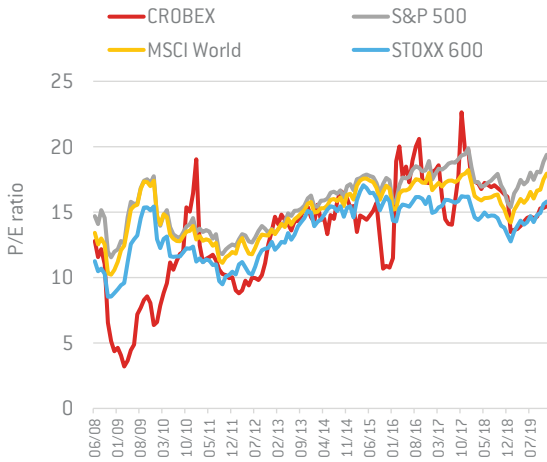
Source: Hanfa

3.3 Market risks

The intensification of protectionism and uncertainty associated with the withdrawal of the United Kingdom from the EU resulted in a sharp increase in economic uncertainty in international financial markets during 2019 (Figure 17). Nevertheless, after a temporary stronger correction at the end of 2018, the multi-year trend of rising prices in international stock markets and their moving away from the fundamentals continued (Figure 16). Stock markets in the euro area recorded a slight fall in prices in early August 2019, in response to

the intensification of the US-China trade war and an indication of a possible currency war amid the global economic downturn. However, the announcement of further expansionary action by the ECB in September 2019 reduced investor fears, so the level of stress in European financial markets stagnated in 2019 (Figure 18). At the same time, for the third time in 2019, the FED reduced its reference interest rate by an additional 0.25 pp, which mitigated the expectations of recession as measured by the slope of the yield curve, but these still remained strong (Figure 20).

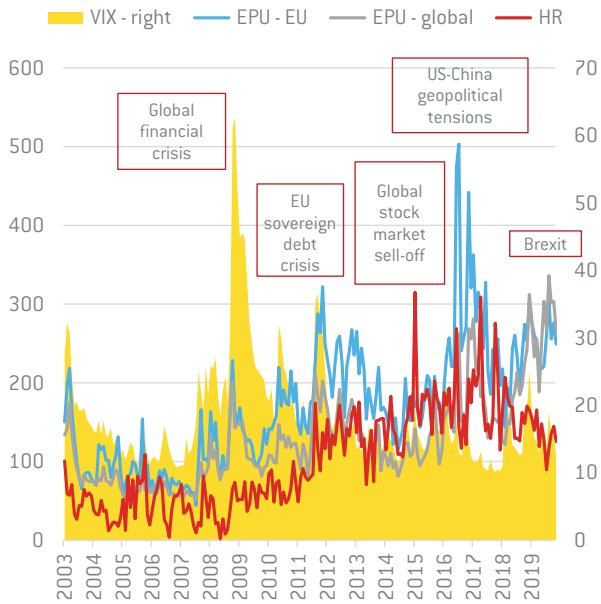
Figure 16 | Following a slight correction at the end of 2018, a multi-year increase trend continued on global stock markets



Note: The price to earnings ratio (P/E ratio) is the measure of the share price relative to earnings generated by the company per share.

Source: Bloomberg

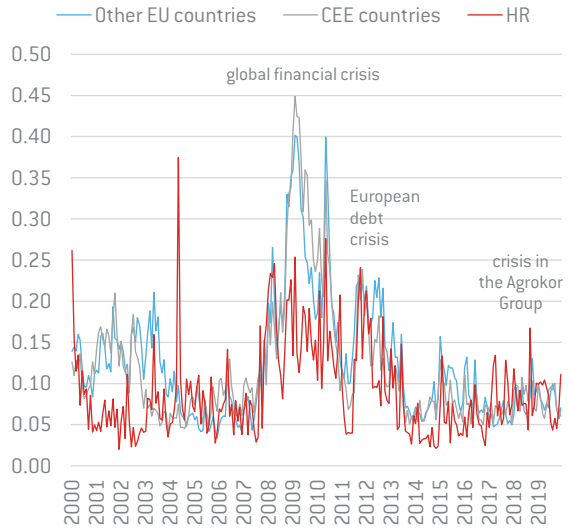
Figure 17 | Economic uncertainty and volatility on financial markets on the rise



Note: EPU indicator measures economic uncertainty generated by economic policies. EU indicator shows an average indicator value for IT, DE, FR and UK. VIX index shows the expected volatility of the equity market. It is published by the Chicago Board Options Exchange (CBOE).

Sources: Economic Policy Uncertainty and St. Louis FED

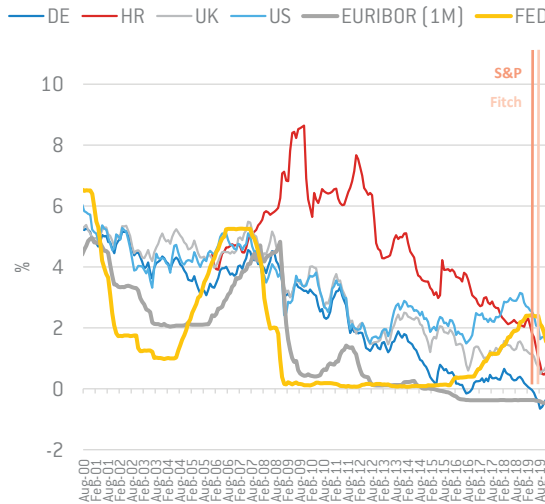
Figure 18 | The level of financial stress stagnated in 2019



Note: The CLIFS index is a financial risk indicator that includes six measures. These measures cover equity markets, bond markets and foreign exchange markets. The trend shown applies to Croatia, the countries of Central and Eastern Europe and Germany.

Source: ECB

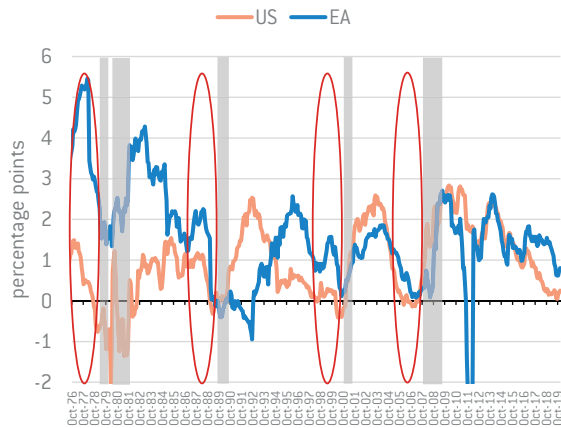
Figure 19 | Returns on ten-year government bonds and trends of reference interest rates



Note: Vertical lines indicate the moments of raising the credit rating of HR to the investment grade.

Sources: Eurostat, Bloomberg and St. Louis FED

Figure 20 | Yield curve inversion has historically been a reliable crisis indicator



Note: The curves in the figure indicate the difference between returns on 10-year and 2-year government bonds, while grey-marked areas indicate recessions in the USA (more on the definition at the [address](#)). Red areas indicate the periods in which the inversion of yield curve on US bonds occurred.

Sources: St. Louis Fed and ECB

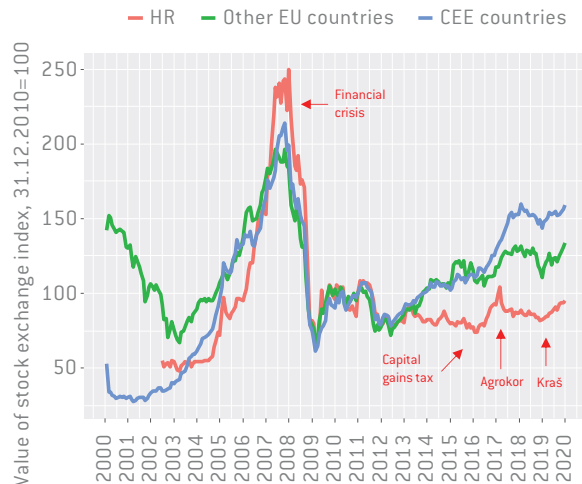
The accommodative monetary policies of leading central banks were reflected in the continued downward trend in returns on long-term government bonds, which were reduced to historically low levels (Figure 19). The returns on long-term Croatian government bonds were also significantly reduced by as much as 1.45 percentage points since the beginning of 2019, so at the end of September they stood at 0.59%.¹⁷ The drop in returns is the result of, among other things, the return of Croatia to the investment class¹⁸ and the consequent expansion of the pool of potential investors. This additionally highlighted the already present environment of low interest rates, so in the third quarter of 2019, stock markets were marked by search for yields. The domestic stock market in 2019 recorded a slight increase in prices after two years of stagnation. However, the post-crisis price recovery on the domestic market still significantly lags behind the comparable countries of the CEE and the Western European countries (Figure 21).

17 Returns on long-term bonds in local currency; more info about the methodology is available [here](#).

18 In April, the Moody's credit rating agency upgraded Croatia's credit rating to Ba2 with a positive long-term outlook, and in July, the Fitch credit rating agency upgraded Croatia's credit rating to BBB- with a positive outlook.

In this regard, volatility in the domestic stock market increased slightly in September 2019, although its level is still rather low compared to past episodes of crisis (Figure 22), so there are no indications of systemic stress in the domestic financial market (Figure 18).

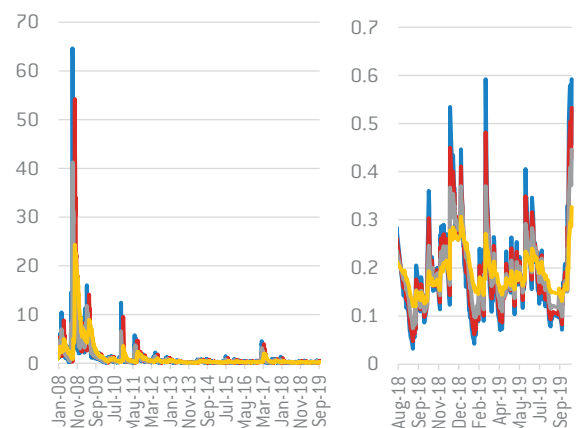
Figure 21 | After two years of stagnation, prices on the domestic stock market slightly recovered in 2019, but the recovery is lagging behind comparable CEE countries



Note: Showing the average values of the most liquid stock indices in each EU country. CEE countries are: BG, CZ, EE, HU, LV, LT, PL, RO, SI and SK.

Sources: Bloomberg and Hanfa

Figure 22 | Volatility of CROBEX index slightly increased in 2019

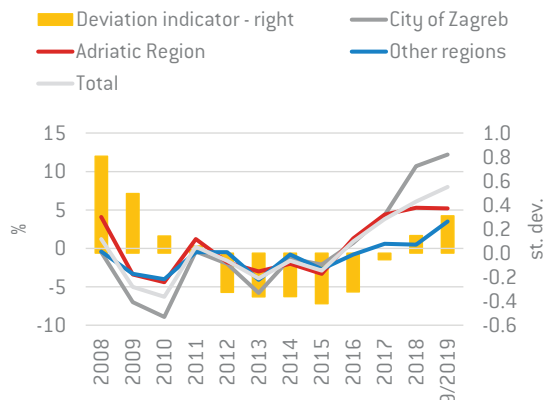


Note: The CROBEX index volatility was estimated using the EWMA model (the exponentially weighted moving average where the most recent samples are weighted most highly) with various smoothing parameters.

Sources: ZSE and Hanfas' calculation

In addition to shares, higher returns on investment were also sought in the real estate market, where prices¹⁹ continued to rise in the third quarter of 2019. Although the cyclical recovery of real estate prices in Croatia started a little later than in other EU countries (Figure 24), it is extremely uneven geographically (it is primarily concentrated in the city of Zagreb and the Adriatic Coast), so the risk of overvaluation is cumulating in some segments of the market (Figure 23). Although returns on commercial real estate investments have generally been stagnant over the last year, such investments remain a more desirable alternative to traditional forms of investment (Figures 25 and 26), and are chosen particularly by some insurance companies, exposing them to the potential for significant losses in the sudden price correction scenario (Figure 27).

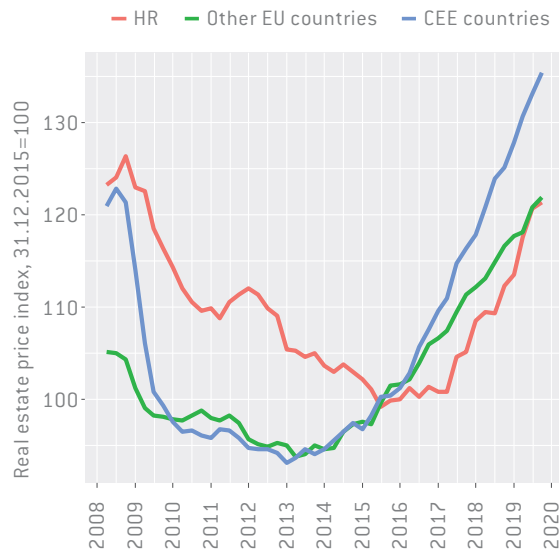
Figure 23 | Annual growth rates of residential real estate prices and deviation of prices from the level based on macroeconomy



Sources: CBS and CNB

19 At present, only official statistical data on the trends of residential real estate prices are available in Croatia, while there are still no official statistical data on price trends in the commercial real estate market. However, based on theoretical and empirical research, it is known that trends in these two segments of the real estate market are correlated. In addition, in the absence of official statistics, commercial sources are often used as an indicator of price trends (data of commercial real estate agents). At the moment, coordinated activities are being carried out at the EU level aimed at collecting and expanding official harmonised statistics on trends in the real estate market, given the importance of real estate investments in the financial sector and consequential risks. For more information, see [Recommendation of the European Systemic Risk Board of 31 October 2016 on closing real estate data gaps \[ESRB/2016/14\]](#).

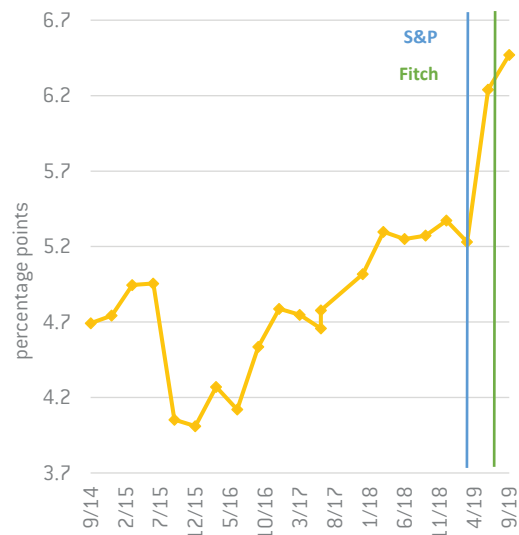
Figure 24 | Real estate prices are rising sharply in most EU countries



Note: Showing the average values of real estate price indices in each EU country. CEE countries are: BG, CZ, EE, HU, LV, LT, PL, RO, SI and SK.

Source: Eurostat

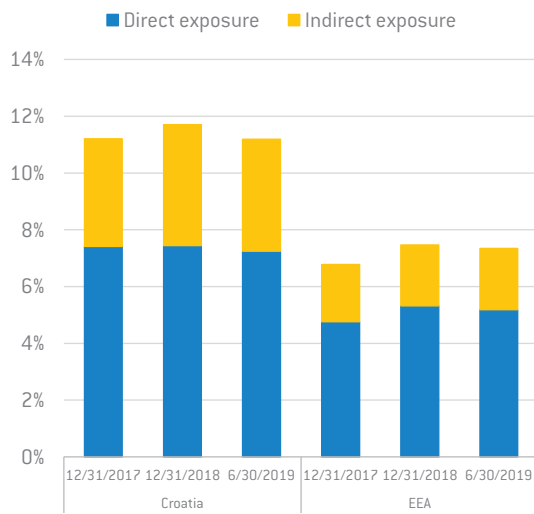
Figure 25 | Difference between returns on commercial real estate investment and returns on ten-year government bonds



Note: The difference in returns shown is only an indication of the trend in return on investment in commercial real estate and government bonds, since the data on returns on real estate investment are estimated and are not necessarily representative of the entire commercial real estate market in Croatia.

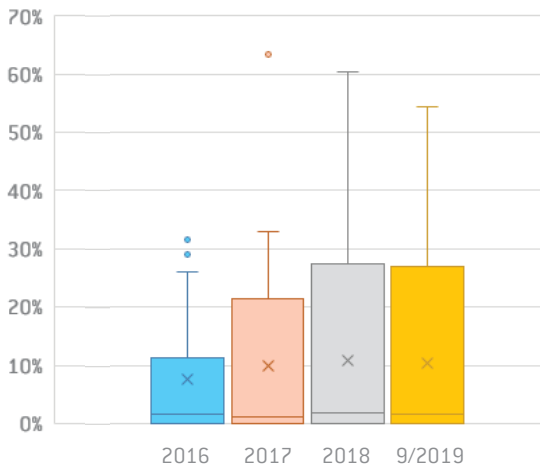
Sources: Bloomberg and Propertas

Figure 26 | Insurance companies' exposure to the real estate market, presented as a share in total investments



Source: EIOPA

Figure 27 | The dispersion of the share of real estate investment by individual companies is significant, hence the exposure to price correction risk



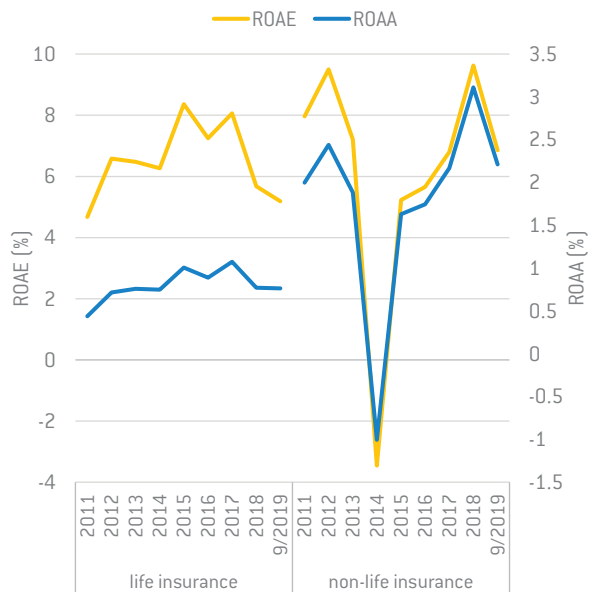
Note: The box-plot chart shows the standard quantiles of distribution by companies, x representing the average.

Source: Hanfa

3.4 Profitability and capitalisation of financial services providers

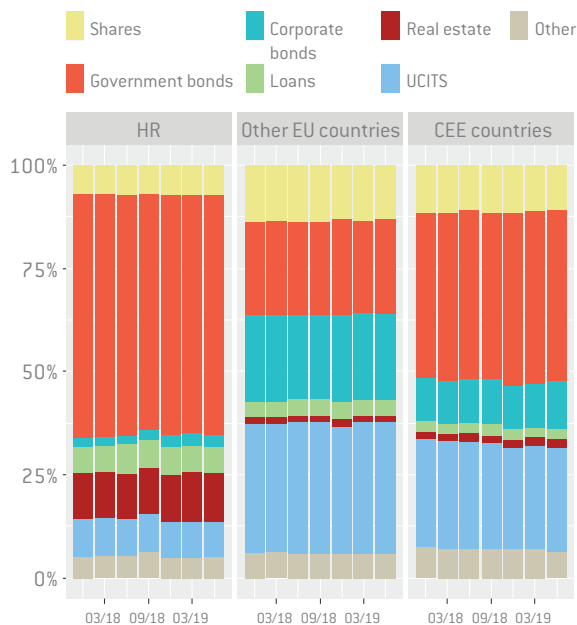
The financial services sector's profitability was at satisfactory levels in the third quarter of 2019 despite the challenging environment of generally low interest rates (Figure 28). At the moment, such environment is most burdensome for insurance companies, especially those dealing in life insurance, because almost 90% of their portfolio carries certain guaranteed returns for policyholders, contracted at periods when interest rates were significantly higher. Although no significant changes in the investment structure of insurance companies have yet been recorded (Figures 29 and 30), the long-term liabilities of companies in the prolonged period of low returns will create a motive to take higher investment risks and will gradually change investment policies.

Figure 28 | Profitability of insurance companies pressured by low interest rate environment



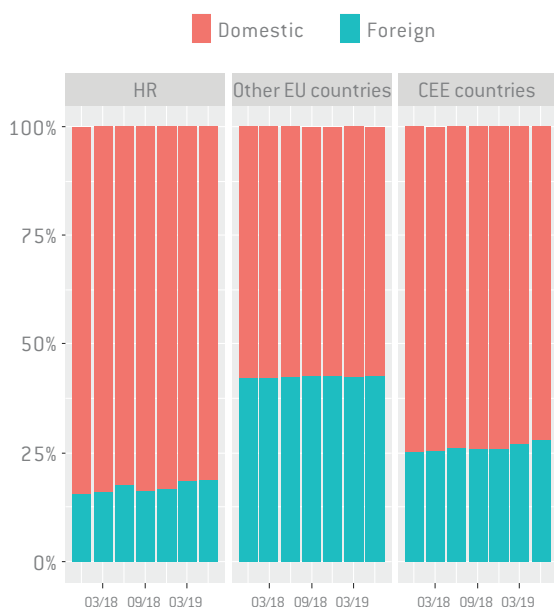
Source: Hanfa

Figure 29 | Domestic insurance companies invest in bonds more, compared to other EU countries



Source: EIOPA

Figure 30 | Insurance companies are slowly turning to cross-border exposures

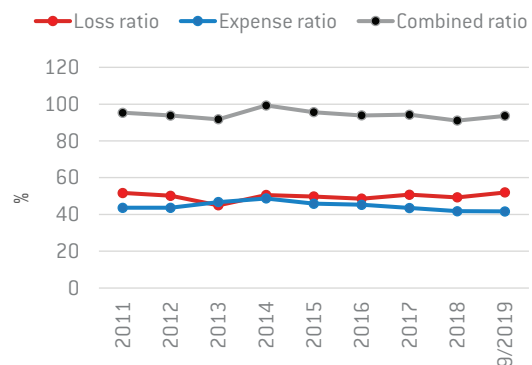


Source: EIOPA

The profitability of non-life insurance segment also continuously declined throughout 2019, due to increased claims expenditures, which, despite the economic growth and intensification of lending activity during the first nine months of 2019, was not fully offset by a 6.15% increase in number of contracts or gross written premiums by 11.6%.

Although companies partially depreciate the growth of loss ratio²⁰ through greater efficiency in the part of operating costs (Figure 31), domestic segment of non-life insurance is less efficient compared to other European insurance markets (Figure 32). The problem of business efficiency is particularly pronounced in some companies that have a significant market share in the non-life insurance segment.

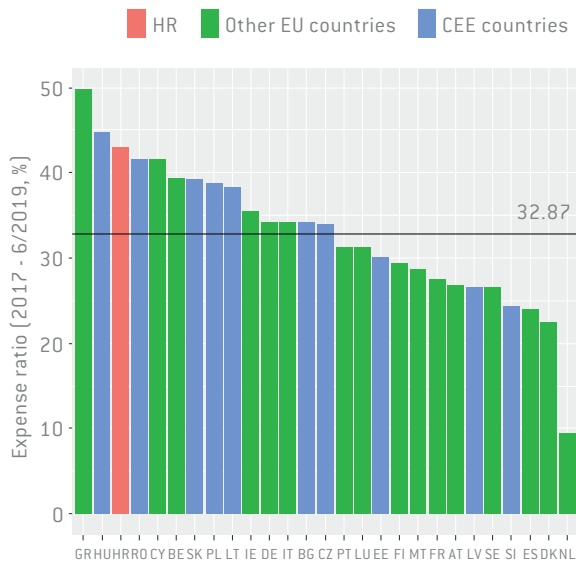
Figure 31 | Gross ratios for non-life insurance



Source: Hanfa

²⁰ Loss ratio, gross, represents the ratio of total expenditures related to claims and earned premiums, and it is calculated as the ratio of the sum of claims settled, change in provisions for claims outstanding, change in mathematical provisions and other technical provisions, change in special provision, result of investments of assets of special provisions for life insurance where the investment risk is borne by the policyholder and the sum of gross written premium, value adjustment and charged premium value adjustments and change in gross provisions for unearned premiums, multiplied by -100. Expense ratio, gross, represents the ratio of all operating costs and earned premiums, and it is calculated as a ratio of the sum of operating expenses, other insurance and technical income and other technical expenses and the sum of gross written premium, value adjustment and charged premium value adjustments and changes in gross provisions for unearned premiums, multiplied by -100. Combined ratio, gross, represents the ratio of total expenditures and earned premium, and it is calculated as the sum of loss ratio and expense ratio.

Figure 32 | Expense ratio of domestic companies is relatively high compared to other EU countries



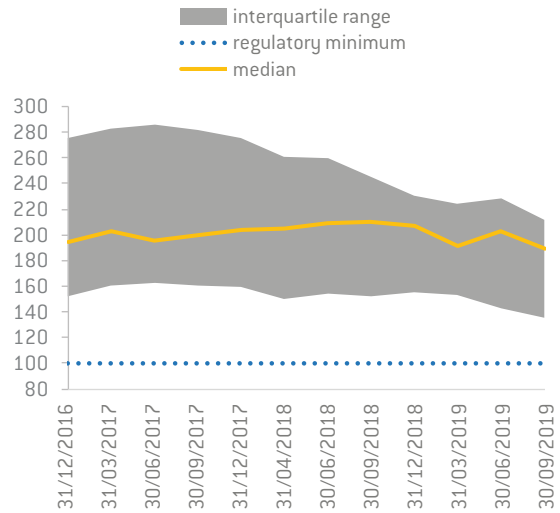
Source: EIOPA

Solvency indicators²¹ of the insurance sector are relatively stable, with a median solvency ratio well above the regulatory minimum²² (Figure 33). The shift downwards in the overall distribution of the insurers' capitalisation in third quarter of 2019 is primarily due to a further decrease in the discount rate in determining technical provisions. Since the impact of low interest rates on technical provisions, i.e. liabilities of insurance companies, was greater than the impact that lower yields have, through the inverse yield/price ratio, on the value of companies' bond assets, own funds of companies necessary to cover the solvency capital requirement were reduced during that period.

21 Solvency 2 defines two levels of required capital: Minimum Capital Requirement (MCR) representing the minimum allowed capital level and Solvency Capital Requirement (SCR) representing the level of capital that enables an insurance or reinsurance undertaking to absorb almost all adverse events and solvent business operations considering the underwriting risk.

22 An insurance company is obliged to have eligible own funds covering the Solvency Capital Requirement and Minimum Capital Requirement, i.e. maintain the ratio of eligible own funds to SCR and MCR above 100%.

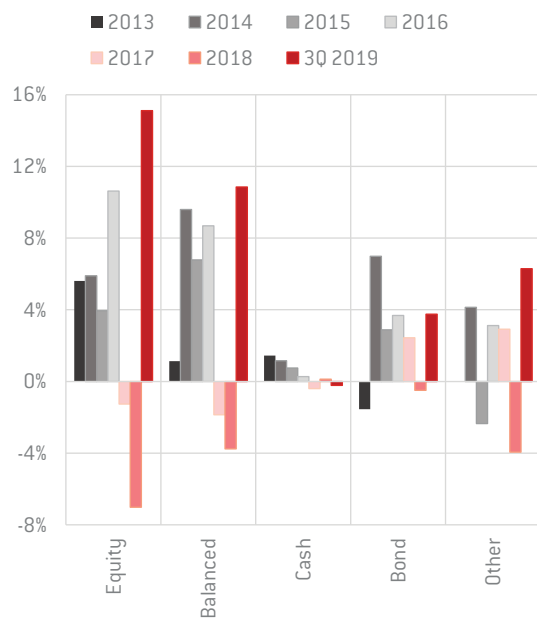
Figure 33 | Solvency ratios of insurance companies



Source: Hanfa

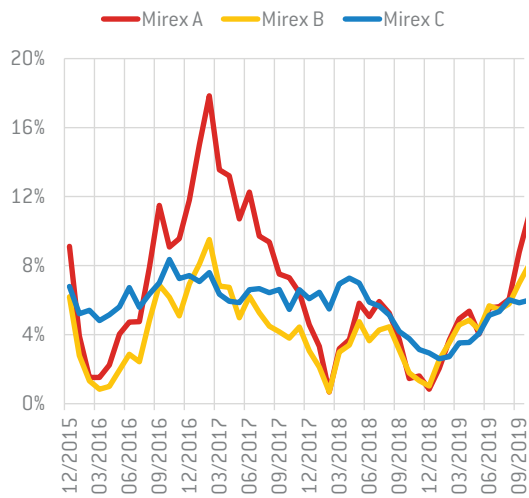
The increase in returns of almost entire fund industry in the third quarter of 2019 was generated primarily by the increase in the price of domestic sovereign debt securities due to a drop in returns, but also by the growth of stock markets during the third quarter of 2019 (Figures 34 – 36).

Figure 34 | Average annual returns of UCITS weighted by the share in assets



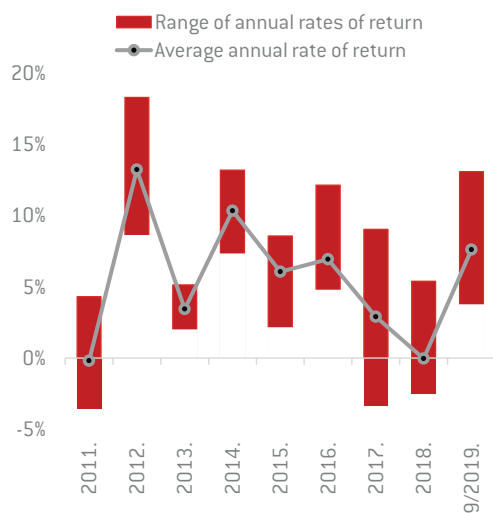
Source: Hanfa

Figure 35 | Annual returns of Mirex indices



Source: Hanfa

Figure 36 | Returns of voluntary pension funds



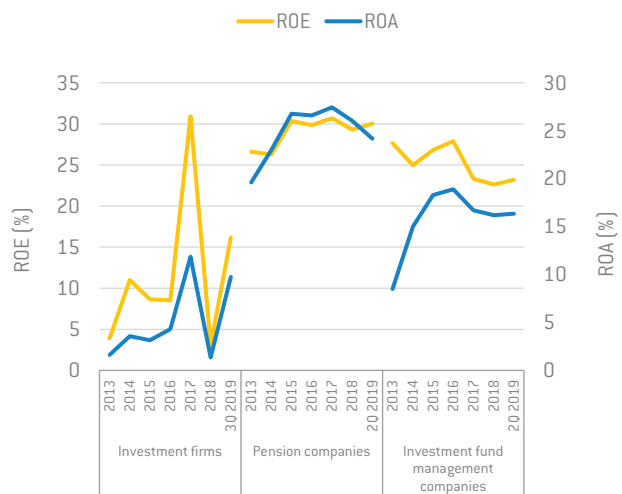
Source: Hanfa

A slight increase in demand for investment activities on the domestic market, with a tendency to increase activities on foreign markets, improved the profitability of investment firms in the third quarter of 2019. In view of the recovery of the profitability of investment firms in 2019 (Figure 37), capitalisation at system level also increased slightly (Figure 38).

The growth of profitability during the third quarter of 2019 was also recorded by investment fund management companies through a higher amount

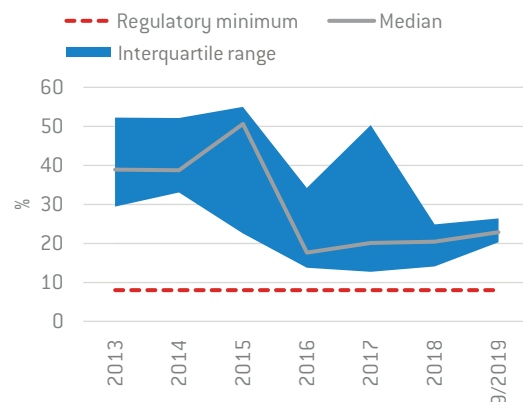
of management fees in view of the increase in the amount of assets they manage. At the same time, the return on assets of pension fund management companies was reduced, as a result of statutory changes from the beginning of 2019, which reduced the amounts of entry and management fees for mandatory pension funds, as well as the cancellation of entry fees for voluntary pension funds.

Figure 37 | Profitability of investment firms and pension and investment fund management companies



Source: Hanfa

Figure 38 | Investment firms' capital adequacy slightly increased



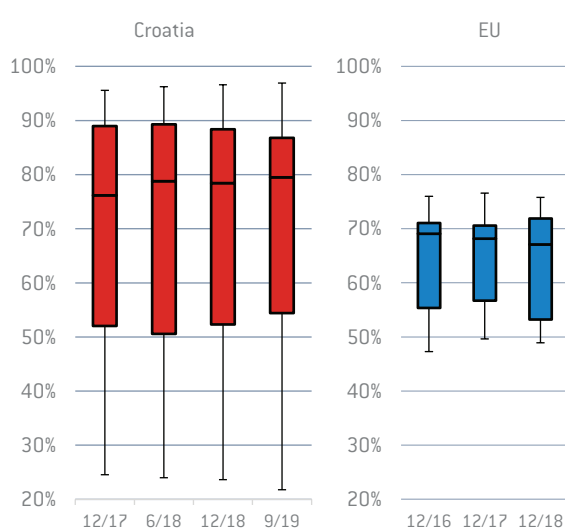
Note: Total capital ratio is the ratio of the Common Equity Tier 1 capital of an investment firm to the total risk exposure amount.

Source: Hanfa

3.5 Liquidity risk

Comparison of the median shares of liquid assets in the total assets of insurance companies at the EU and Croatian level shows significant differences in amounts, but also in their movements in the observed period (Figure 39). In addition to the fact that the median share of liquid assets of insurance companies in the Republic of Croatia is by ten percentage points higher than the relevant indicator at the EU level, it also has a continuous growth trend (increase of 3.3 p.p. compared to the end of 2017), while at the EU level there is a decrease in the median share of liquid assets in the total assets of insurance companies (decrease of -0.9 p.p. in the same period). Therefore, observing only the median share of liquid assets could lead to the conclusion that the liquidity risk in the Republic of Croatia does not significantly burden the segment of insurance companies. However, the distribution of liquidity indicators by individual companies shows a high level of dispersion, suggesting that while exposure to the liquidity risk of the entire insurance market is relatively low, its individual segments may become illiquid due to certain negative developments in the market in the short run.

Figure 39 | Dispersion of liquidity indicators of domestic insurance companies, i.e. liquidity indicators of insurance industry in individual EU countries



Sources: EIOPA and Hanfa

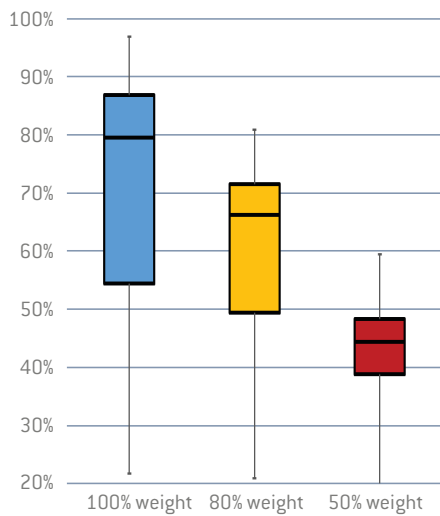
The indicator in question is greatly influenced by the already long-term environment of low interest rates, often with a negative sign, which has a more significant impact on the changes in the investment strategy of companies in the EU than in the Republic of Croatia in view of comparatively still relatively high yields generated by older Croatian sovereign debt issues. EU companies take more and more risks in their “search for yields” primarily through investments in more profitable, but mostly less liquid instruments, such as corporate bonds, sometimes with relatively low credit ratings. At the end of 2018, the share of corporate bond investments at the EU level (32.6%) was several times higher than in the Republic of Croatia (4.9%).

On the other hand, insurance companies from Croatia traditionally invest the most in government bonds (63.6% of total investments at the end of 2018), which are considered one of the most liquid forms of investment. The average of insurance companies’ investment in government bonds at the EU level is only 31.5%. The highest degree of liquidity is assumed for investments in domestic government bonds, equal to the liquidity of cash or deposits. However, given the currently very limited capacity to use domestic government bonds in ECB operations²³ and the specifics of the monetary policy framework in Croatia²⁴, domestic companies, unlike those in the euro area, are still unable to use government bonds in the same way to finance liquidity. In addition, given the low level of secondary liquidity of domestic bond issues, a lower degree of marketability of government bonds is presumed to determine the liquidity of the domestic insurance market. Even a relatively moderate reduction in the assumed liquidity weight of these investments in view of their high representation significantly reduces the share of liquid assets both at system average and company level (Figure 40).

23 The ECB’s government bonds redemption programme covers only bonds of euro area Member States, while under ordinary operations with the ECB only Croatian government bonds denominated in foreign currency are eligible collateral.

24 The monetary policy framework of the CNB is based on maintaining the stability of the nominal exchange rate of the kuna against the euro. The stable HRK/EUR exchange rate represents the so-called nominal anchor of monetary policy by which the CNB stabilises inflationary expectations, and eventually inflation.

Figure 40 | Simulation of the decrease in the share of liquid assets in view of the presumed marketability of government bond issues



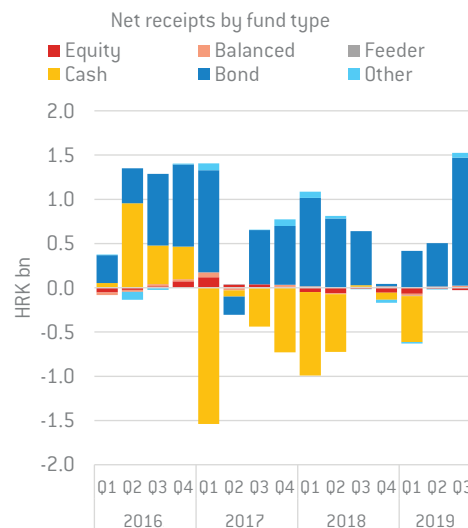
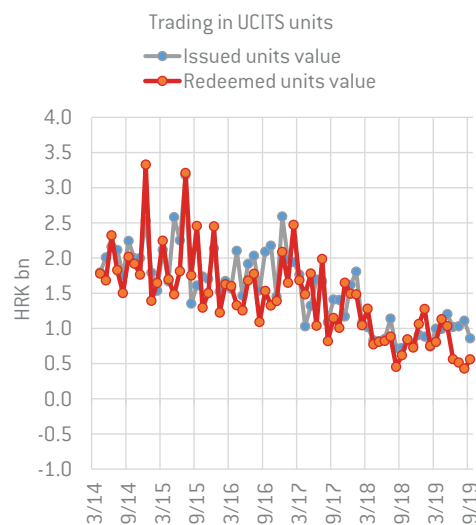
Note: Simulated decrease in government bond liquidity by 20%, is derived from EIOPA methodology for liquidity ratios construction that assigns the following liquidity weights to each asset class: 0%, 30%, 80% or 100%. Considering relatively large range of central weights and that a weight of 30% essentially implies the level of government bonds illiquidity that is significant for crisis episodes, liquidity reduction of 50% was simulated, which is at the middle of the range of assumed marketability.

Source: Hanfa

The liquidity of UCITS was also stable in the third quarter of 2019, with regard to the balance of payments into funds and withdrawals from funds. Moreover, in the first three quarters of 2019, positive net issues of shares were recorded, primarily relating to entry into bond funds (Figure 41). Although in the first part of the year this increase in net payments into bond funds was due to reclassification caused by regulations and the consequent spillover of money from cash funds to short-term bond funds, the same trend continued in the third quarter of 2019, so it can be concluded that investors direct a small portion of the surplus to the capital market, but still with a relative aversion to take risks. Although there are no liquidity pressures in the current relatively favorable macroeconomic and market conditions, in the case of certain disturbances (shocks) the liquidity of funds will significantly depend on the structure of their port-

folio, that is on the type of fund. In that case, the marketability of even the most liquid forms of assets, such as government bonds, can diverge significantly depending on the credit quality of the issuer (see Box 2. Risks arising from the interconnection of the financial services sector and the public sector). In such crisis conditions, additional pressure on the liquidity of investment funds arises from the comparatively relatively easy withdrawal of investors in relation to some other forms of financial investment.

Figure 41 | Liquidity of UCITS is stable



Source: Hanfa

3.6 Operational risks

In the third quarter of 2019, operational risk remained high, primarily due to the uncertainties that surrounded the Brexit deal at the time, as issues related to Brexit involve a wide range of risks (in addition to the operational risk), such as business continuity and contagion risk, and macroeconomic consequences. At the same time, geopolitical uncertainties kept posing an increasing risk to global financial markets and the euro area economic outlook.

Cyber risk is still one of the most significant types of operational risk in the financial sector, and the

sensitivity of the system to cyber attacks is expected to grow in the medium and long term, particularly as regards business continuity and the integrity of proprietary data. Therefore, cyber crime prevention presents an ever growing challenge to financial service providers, which leads to an increasing need to invest in new IT systems and puts pressure to modernise IT infrastructure. On the other hand, more efficient IT structure of the “traditional” financial sector makes it competitive with fintech and bigtech companies. In the third quarter of 2019, neither the euro area nor Croatia recorded any significant cyber attacks.

Box 1 Croatia's Sentiment Index: are domestic investors irrational?

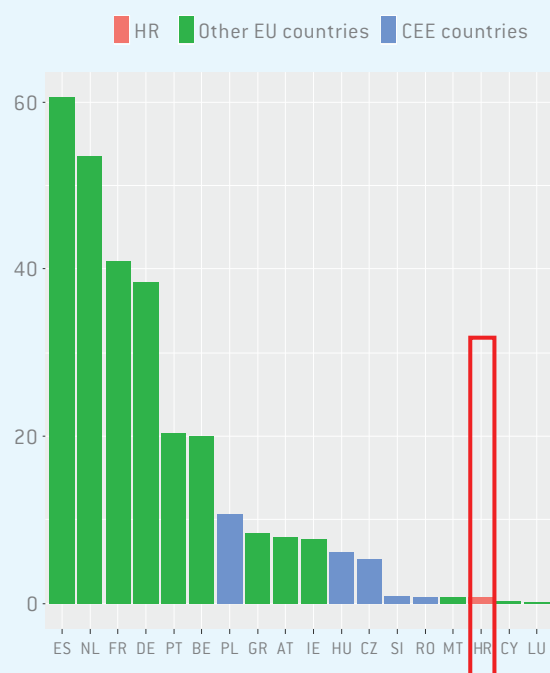
Following the period of expansion and growth in the mid-2000s, the deepening global financial crisis and its penetration into the domestic real and financial sector contributed to the contraction of the domestic capital market. In spite of the recovery in economic activity since 2015, impacts of economic growth hardly spill over to the domestic capital market, which has mostly remained at a low activity level (Figure 1). Certain idiosyncratic events that happened in this period neutralised periodic signs of slight recovery of the market and systematic revival of investment activities recorded in other EU stock markets (Figure 21 in Chapter 3 Overview of risks in the financial services sector).

Even though financial market trends are driven only by economic fundamentals according to the classical theory, the behavioural theory describes them as being mostly determined by subjective assessment and investors' expectations about future developments in the real and financial section of both national economies and the global market. On the other hand, expectations are also affected by events in all economic spheres and information from numerous sources, that is not necessarily always complete, accurate and true (media, financial institutions, regulators, policies), but is built into financial decisions and determines financial relationships.

Subjectivity and expectations are not easy to measure, but it is important to measure them, as this determines the level of investor confidence in the capital market and may suggest how far investor expectations match macroeconomic factors. This fact led to the construction of the Investor Sentiment Index for the domestic capital market, which shows the collective perception and expectations of all investors about current and future fluctuations. Two indicators were constructed for this purpose: Direct Sentiment Index and Indirect Sentiment Index²⁵.

The Direct Investment Sentiment Index (DISI) was constructed on the basis of data on the keyword search volume obtained through the Google

Figure 1 | Average proportion of share turnover in GDP (in the 2014-2018 period)



Sources: World Bank, WFE

25 A similar approach was used in: Khan, M. A., Ahmad, E.: Measurement of Investor Sentiment and Its Bi-Directional Contemporaneous and Lead-Lag Relationship with Returns: Evidence from Pakistan, 2018.

Trends platform²⁶ (Google Search Volume Index, GSVI). The initial search list contained 60 words selected from financial glossaries²⁷. Words that showed an insignificant number of searches²⁸ were disregarded, which reduced the list of words used to construct the DISI index by means of the Principal Component Analysis²⁹ to a total of 40 terms³⁰. The Principal Component Analysis (PCA), commonly used in the construction of this index³¹, describes the variability of the set of words searched with several series, called principal components³². The key advantage of the direct method

is the fact that it takes account of both psychological dimensions and socio-economic characteristics of investors, thus trying to encompass investors' heterogeneous expectations, as investors may differ greatly in their characteristics (primarily as retail or institutional investors). The main disadvantage of this method is the limited sample size and, consequently, representativeness.

The Indirect Investment Sentiment Index (IISI) is based on macroeconomic indicators aggregated in a common index. The advantage of this approach is in the simplicity of calculation at any moment, without significant time lags. However, it is sometimes difficult to determine which indicators should be included in the calculation, which is a significant factor in obtaining the results of the analysis. The following indicators were used for the construction of the index:

- 26 Index values relate to the number of searches of a term in a certain period relative to the total number of Google searchers in that period. The data have been normalised and shown in a range from 0 to 100, with 0 denoting no searches in a certain period of time, and 100 indicating a maximum number of searches in that period. More details on Google Trends at: <https://newsinitiative.withgoogle.com/training/lesson/4876819719258112?image=trends&tool=Google%20Trends>.
- 27 Account has to be taken of the fact that the set of words used needs to be general enough (for very specific terms there is usually no sufficient number of observations), but also specific enough to ensure the sentiment is adequately approximated.
- 28 Those were words for which Google Trends showed no results and words which had not been searched for for more than 28 months during the total observed period of 190 months, i.e. where the GSVI value equalled 0.
- 29 Monthly data from the beginning of 2004 to the end of the third quarter of 2019 were used. As the purpose was to construct the Sentiment Index for Croatian investors, the search area was restricted to the Republic of Croatia.
- 30 The final set included the following words (in Croatian): assets, ask, bank, gdp, bid, bloomberg, broker, stock exchange, cds, crobex, default, share, dividend, profit, debt, euribor, fond, loss, Hanfa, CNB, inflation, invest, IPO, interest+rate, capital, loan, purchase, liquidation, ministry of finance, unemployment, option, portfolio, consumption, return, yield, prospectus, risk, reorganisation, capital market, contract.
- 31 Some examples of this research, in addition to those already mentioned, are the following: Petiti, J. J. G., Lafuente, E. V., Vietes, A., R.: How information technologies shape investor sentiment: A web-based investor sentiment index, *Borsa Istanbul Review*, Vol. 19, No. 2, pp 95-105, 2019; Changsheng, H., Yongfeng, W.: Investor Sentiment and Assets Valuation, *System Engineering Procedia*, Vol 3, pp 166-171, 2012
- 32 Principal components are actually uncorrelated linear combinations of initial variables.

1. **AVDC_t** (Advance-Divide Ratio) – ratio of the number of stocks that decreased in value to the number of stocks that increased in value over the observed period. A rising (falling) index signals investors are optimistic (pessimistic).
2. Stock market turnover, which should be positively correlated with investor sentiment (a higher index indicates increased optimism)
3. Interest rates quoted on the interbank market (ZIBOR_1 month) as the approximation of investment costs
4. Money Flow Index (MFI_t)³³, which indirectly measures buying and selling pressure on the stock market, taking into account the relationship between price and trading volume³⁴

33 Money Flow Index is defined as: $MFI_t = \frac{\sum_{i=1}^n MFI_{it}}{n}$ for each share issuer i and for each time period t , where MFI_{it} is defined as: $MFI_{it} = 100 \cdot \frac{\text{positive } MFI_{it}}{\text{negative } MFI_{it}}$ and the flow MFI_{it} as: $MFI_{it} = (TC_{it} \cdot \text{Turnover}_{it})$ and the typical price as: $TC_{it} = \frac{\text{highest}_{it} + \text{lowest}_{it} + \text{last share price}_{it}}{3}$.

The positive (negative) money flow is the money flow for which the typical price of one day is above (below) the previous day. The positive (negative) money flow in a 7-day period is the sum of all positive (negative) flows during seven consecutive days.

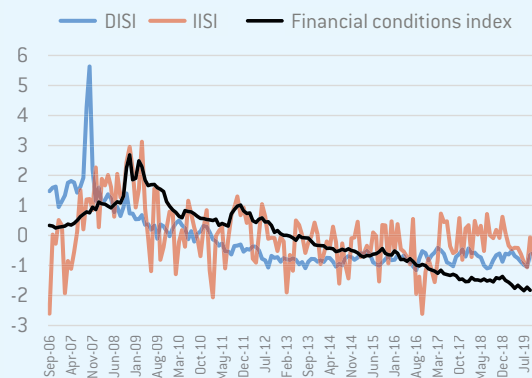
34 The index takes values between 0 and 100, where values below 20 (above 80) are considered oversold (overbought) levels.

5. Relative Strength Index (RSI_t)³⁵, which measures buying and selling pressure, taking account of prices, and not of the trading volume. The literature on this subject often uses some other indices as well, but they were not included in the calculation due to their weak predictiveness and/or lack of time series that are not long enough³⁶. As the relevant literature has shown that changes of these indices lead to changes in the Indirect Investment Sentiment Index with a certain time lag, the calculation of the IISI was made by using the expanded principal component method³⁷, which includes all indicators, except for the interest rate, in the calculation with a time lag.

Both Sentiment Index construction methods point to investor optimism in the period preceding the crisis, with market confidence reaching its peak in the period between end-2007 and end-2008 (Figure 2). However, the beginning of the financial crisis also marked the beginning of the decreasing market confidence, which continued for the following five years. In spite of the favourable macroeconomic developments and financial market conditions, no significant volatility in the evaluated indices have been recorded since 2013, which suggests that investors' expectations have remained moderate and their behaviour rational, in particular in the light of the unstoppable search for yield. However, it should be noted that the constructed indices (in particular the direct index)

primarily describe the sentiment of less represented retail investors, who form their expectations based on Google searches. Institutional investors, who are much more significant for the domestic market, obviously rely on other sources of information (Bloomberg and Reuters), which shape their expectations.

Figure 2 | Comparison of the Investor Sentiment Index and the Financial Conditions Index



Note: The Direct Investor Sentiment Index shown is calculated as a standardised linear combination of the first four principal components, which explain 50% of the variance of input data, with weights used being shares of each of the four components mentioned in the percentage of the variance explained by them, i.e. the weight of the i component is $\frac{\lambda_i}{\lambda_1 + \lambda_2 + \lambda_3 + \lambda_4}$, where λ_i is the corresponding eigenvalue of the i principal component. The Indirect Investor Sentiment Index shown is calculated as a standardised linear combination of the first two principal components, which explain 88% of the variance of input data, with weights used being shares of each of the two components mentioned in the percentage of the variance explained by them, i.e. the weight of the i component is $\frac{\lambda_i}{\lambda_1 + \lambda_2}$, where λ_i is the corresponding eigenvalue of the i principal component.

Sources: *The Institute of Economics, Zagreb and Hanfa*

In addition to the increasing credit activity and real estate prices, since mid-2019 there has been a mild recovery in the domestic capital market as well. This suggests that the financial cycle in Croatia, measured in all the three markets – credit, real estate and capital, has been rising. Although there have been certain concerns as regards the foundation and thus also the stability of the price level of real estate, a traditionally highly attractive investment in Croatia, often financed by loans with

35 Relative Strength Index (RSI_t) is defined as: $RSI_t = \frac{\sum_{i=1}^n RSI_{it}}{n}$, where $RSI(7)_{it} = 100 \cdot \frac{\sum_{i=1}^7 (P_{t-i} - P_{t-i-1})_+}{\sum_{i=1}^7 |P_{t-i} - P_{t-i-1}|}$, and

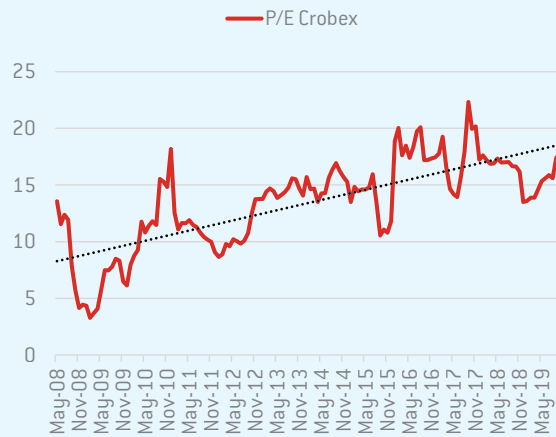
$$(P_{t-i} - P_{t-i-1})_+ = \begin{cases} P_{t-i} - P_{t-i-1}, & P_{t-i} > P_{t-i-1} \\ 0, & \text{inače} \end{cases}$$

36 The other indices often used are: Dividend Premium, defined as the difference between the logarithms of the dividend-payers' and non-payers' average market-to-book ratios, number of initial public offerings and the Closed-End Fund Discount, calculated as the difference between the share price and NAV, divided by the NAV; etc.

37 The first step involved the assessment of the first component by using all indicators (the original and adequate time-lagged indicators). The second step included the calculation of the correlation of all indicators with the assessed first component, while the result of the third step was a decision, based on the calculated correlation, whether the final model would include the original indicator or the one with an adequate time lag.

that very real estate as a collateral, the assessment of the deviation of the private sector loan and income ratio from long-term trends does not currently point to the overheating of the financial cycle³⁸. The signs of the overheating reflected in a significant deviation of stock prices from the fundamentals are not visible even on the domestic capital market (Figure 3), as opposed to some foreign stock markets (Figure 16 in Chapter 3.3. Market risks). Therefore, currently there is no significant risk of revaluation of domestic stocks of investors who, in the low deposit interest rate environment and due to the high liquidity of the domestic financial system, still do not realise their strategies aimed at searching for higher yields on investments on the domestic stock market.

Figure 3 | Deviation of the CROBEX P/E ratio from the long-term trend



Source: Hanfa

38 <https://www.hnb.hr/documents/20182/a40a1e6e-fac6-3c1b-ee48-d00dd89a30c9>

Box 2 Risks arising from the interconnection of the financial services sector³⁹ and the public sector

Financial services sector assets have been rising continuously since 2012, with the inflow of new funds primarily being directed towards the increase in the exposure to the government through debt securities (Figure 11 in Chapter 3.2 Interconnection). As a consequence, at the end of June 2019, financial services sector segments were strongly connected through the exposure to the government (Figure 12 in Chapter 3.2 Interconnection) although there is no significant direct connectedness of individual industries of the financial services sector.³⁹

In addition to the fact that the public sector has a significant impact on the overall macroeconomic stability through fiscal policy, this lays additional emphasis on the systemic importance and role of the public sector in the preservation of the stability of the financial services sector. It is therefore necessary to acquire a deeper understanding of the relationship between the public sector and financial services sector, including all direct and indirect channels of their interaction. It is also important to take a holistic view of this system and observe these sectors and identified channels of interconnection as a single, mutually connected and inseparable whole, which integrally determines the stability of the financial system of a certain country (Figure 1).

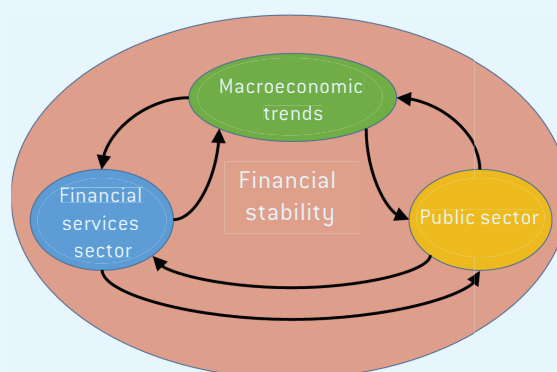
Direct and indirect connectedness of the government and financial sector

There are not many papers in the relevant scientific literature analysing the channels of intercon-

nection of the public sector and financial services sector and the research is mostly focused on the analysis of the interconnection between banks and the government⁴⁰. However, except for certain differences and industry-based specificities, the identified systemic risk propagation channels between banks and the public sector are equally present in the financial services sector.

The correlation between the financial and public sector within the context of the national economy integrated into global economic flows may be presented in a simplified description through the three main relations (Figure 1): 1) macroeconomic developments and state treasury, 2) state treasury and financial sector and 3) financial sector and macroeconomic developments.

Figure 1 | Conceptual representation of the interdependence of the financial services sector and the government



Source: Hanfa

39 The financial services sector includes financial institutions supervised by Hanfa.

40 A number of conclusions presented in this frame follow the conclusions contained in the ECB publication [Managing the sovereign-bank nexus](#), which analyses the interconnection between banks and the public sector.

Fundamental characteristics of the local economy, i.e. domestic macroeconomic imbalances should be reflected in the perceived credit risk of the government, i.e. public sector. It should be emphasised that every type of investment involves certain risks; while investments in government securities are considered to be a relatively safe type of investment, they are definitely not risk free. On the other hand, the stable and responsible state treasury has a significant impact on macroeconomic developments and stability through the interest rate structure, tax policy, public investment activities and fiscal policy in general.

In addition to structural characteristics and cyclical movements in domestic economy, the credit risk of the public sector is also under the impact of developments, i.e. risks in the both domestic and global financial services sector. Empirical research⁴¹ has shown that the sovereign credit risk⁴² is highly connected with developments on global financial markets (investor sentiment and risk appetite, yield curve, investment capital flows, etc.). Moreover, vulnerability spillover between the financial sector and state treasury is a direct result of the high exposure of financial institutions to the government through investments in securities. Liquidity issues in financial institutions may therefore lead to a sudden bond sell-off, which may result in a significant price fall and liquidity pressure on the bond market. Government bond buyback measures taken by the European Central Bank have also shown that there is a certain two-way feedback between public sector credit risk and liquidity of bond issues: by providing liquidity to banks through its bond buyback programmes, the ECB has made a direct impact on bond market liquidity, but also an indirect impact on issuer

credit risk⁴³. This risk relationship between the financial and public sector is emphasised in extreme situations, such as the insolvency of a systemically important institutional investor, which would create pressure for government intervention and bail-out. In these situations, a consequential rise in public debt may have a negative impact on the price of government bonds, but also of other securities on the market, and produce a negative effect on the financial system in the next cycle. Likewise, since securities are actively traded on financial markets, any shocks in the public sector may rapidly result in a spillover onto financial institutions' balance sheets, potentially jeopardising the functioning of the entire system.

Finally, apart from being directly linked, the stability of the financial and public sector is also indirectly interconnected through the effect they have on the overall economy. Therefore, this interdependence between the financial services and public sector has significant implications for the preservation of financial stability.

Even though all the above-mentioned interconnection channels between the public sector and financial system are highly important from the perspective of financial stability, the following text will provide a more detailed analysis of their direct linkage through the investment channel. Direct exposure of the financial system to the government is primarily a result of financial institutions' investments in securities. There are three main reasons why financial institutions invest in the public debt: a) liquidity needs, b) investment reasons and c) regulatory provisions. All the three reasons need to be discussed within the context of the analysis of systemic risk and preservation of financial stability.

Investments in (domestic) government bonds have been recognised and defined in the international regulation governing financial systems as one of the most liquid and easily marketable asset types (market liquidity). In addition to the fact that they provide liquidity through secondary

41 Acharya, V.V., Drechsler, I., Schnabl, P. (2011): [A Pyrrhic Victory? - Bank Bailouts and Sovereign Credit Risk](#); Ang, A., Longstaff, F.A. (2011): [Systemic Sovereign Credit Risk: Lessons from the U.S. and Europe](#)

42 Sovereign credit risk is usually measured by credit default swap or CDS premium (CDS is a financial derivative that enables its buyer to transfer the credit risk of an underlying entity to the seller of the instrument).

43 Pelizzon, L., Subrahmanyam, M.G., Tomio, D., Uno, J. (2015): [Sovereign Credit Risk, Liquidity, and ECB Intervention: Deus ex Machina?](#); Longstaff, F.A., Pan, J., Pedersen, L.H., Singleton, K.J. (2007): [How Sovereign is Sovereign Credit Risk?](#)

markets, government bond investments are also important in terms of liquidity management process and as regards the usage of government securities as collateral in various financial transactions (e.g. repo transactions, in particular with the central bank – liquidity financing).

However, the liquidity of public debt instruments and their potential to be marketed easily, as assumed in the regulation, often fail to correlate with the actual marketability of debt issues, especially by issuers having comparatively lower credit quality. The research has shown that bond liquidity is highly driven by bonds' specific characteristics such as duration, issuer rating, time to maturity and amount issued⁴⁴.

The divergence between the assumed and actual liquidity (i.e. the impact of the above-mentioned characteristics on the liquidity) is especially emphasised during the times of financial disturbances, when the liquidity potential of these investments is highly needed. In addition to investing for liquidity purposes, financial institutions may also make investments in government securities for investment reasons, if the securities offer a favourable return-to-risk ratio compared with other investment classes.

However, a high level of domestic sovereign exposures of certain financial systems, particularly in times of crisis, is not necessarily a result of rational investment decisions, but may also be due to the existing level of connection between the financial and public sector, economic and political context, and regulatory treatment of these exposures. The current regulatory framework implicitly reinforces the tendency to invest in government bonds, as it provides for preferential regulatory treatment of these exposures, in particular in the case of domestic sovereign exposures denominated in national currency⁴⁵, as regards the fulfilment of capital requirements and the above-mentioned liquidity needs, considering the fact that

these exposures are not adjusted for the issuer credit risk.

On the other hand, investments in government securities are explicitly stimulated by relatively high limits or minimum thresholds for sovereign debt exposures set by the law. This leads to the strengthening of the linkage (and dependence) between the financial and (domestic) public sector in an indiscriminate manner.

These economic and regulatory reasons encouraging financial institutions to invest in government securities are particularly emphasised in times of crisis. The empirical literature has shown that behaviour in crisis situations (as was observed after the global financial crisis in 2008 and European debt crisis in 2011) is very often followed by a significant increase in the level of financial institutions' exposure either to the domestic sovereign or to high-quality government issues. There are several theoretical assumptions explaining such behaviour in crisis situations that point to investment reasons, in addition to the liquidity potential related to credit institutions' operations with the central bank. This is due to the fact that in times of crisis the level of risk aversion rises along with the general level of yields required, making government bonds a comparatively attractive type of investment compared to alternative investment options involving a significantly higher risk level (e.g. shares). However, at the same time this is mostly accompanied by the fragmentation of the government debt market, causing the most conservative investors' flight to safety (as regards investment types and issuers).

Therefore, in times of crisis the divergence of government bond yields becomes more evident depending on the (perceived) credit rating of issuers, with more perceivable fundamental characteristics that reflect, in the public sector, structural characteristics of the economy, but also features, i.e. risks of the financial sector⁴⁶. On the other hand, during the rising phase of the cycle, common regional and global factors are more relevant for determining sovereign credit risk than local macroeconomic specificities of each economy, which

44 Galliani, C., Petrella, G., Resti, A.: [The liquidity of corporate and government bonds: drivers and sensitivity to different market conditions](#)

45 Regulatory institutions (ESRB, BIS) have recognised the importance of revising the regulatory treatment of sovereign exposures.

46 The bailout of key institutions leads to the transfer of systemic and/or idiosyncratic risks of the system or individual institutions to sovereign credit risk.

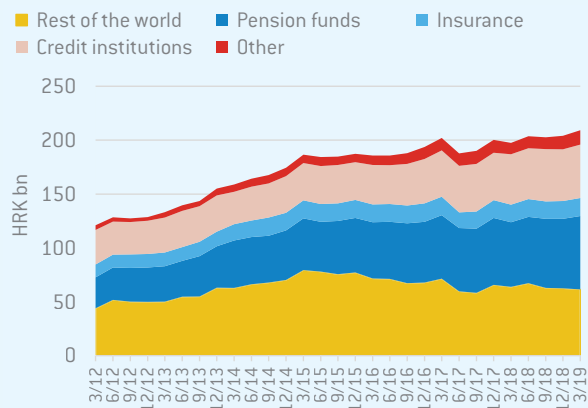
causes the convergence of yields on government debt of certain issuers (Figure 19 in Chapter 3 Overview of risks in the financial services sector). It should however be emphasised that these effects of the contraction and expansion of government debt yield distribution are particularly highlighted in the case of issuers whose credit rating moves between investment categories. The rise of Croatia's investment grade from the speculative to investment level in 2019 led to a significant decrease in the government debt yield (Figure 3). However, the effect of a potential fall from the investment to the speculative category will not be symmetrical and could have much stronger negative effect on the yield in comparison with the observed positive effect. With this in mind, for the purpose of determining the stability of yields on investments in government debt, it is very important to understand the nature of rating change, i.e. whether it has been caused by idiosyncratic fundamentals of an economy or cyclically conditioned by global developments on international financial markets.

Financial sector exposure to sovereign debt in the Republic of Croatia

Croatia has also seen a growing trend in financial sector sovereign exposure, with the amount of loans and bonds of the Republic of Croatia held by financial institutions⁴⁷ having risen by more than 40% over seven years, from HRK 126bn in March 2012 to HRK 178bn in June 2019. (Figure 2). The period since end-2015 has seen substitution of the external debt of the Republic of Croatia with debt towards domestic financial institutions, as a result, among other things, of a continuous growth in the investment potential of the financial services sector, primarily pension funds, which build up their sovereign exposure due to the limited supply on the domestic market, but also to regulatory investment restrictions.

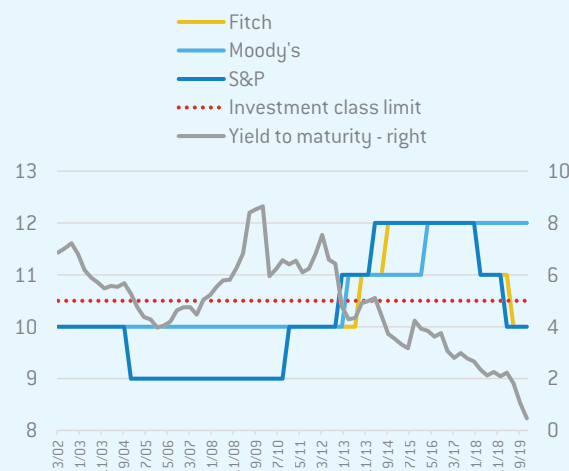
47 Credit institutions, pension and investment funds and insurance companies

Figure 2 | Structure of the bonds of the Republic of Croatia by counterparty



Sources: CNB, Hanfa

Figure 3 | Yields on the bonds of the Republic of Croatia reflect credit rating movements between investment categories



Source: Eurostat – EMU convergence criterion bond yields and Trading Economics

A comparative analysis of long-term government bond yields shows that the yields on the bonds of the Republic of Croatia in the period after 2008 have amounted to an average of 4.5%, which is by 0.8 percentage points more than the yields in comparable countries of Central and Eastern Europe, and by as much as 2.3 percentage points more than the yields in other EU countries. The attraction of investments in the bonds of the Republic of Croatia for domestic investors is additionally proven by the fact that the annualised yield of the Croatian stock market index CROBEX reached only 1.4% in the period from end-2008 to the end of

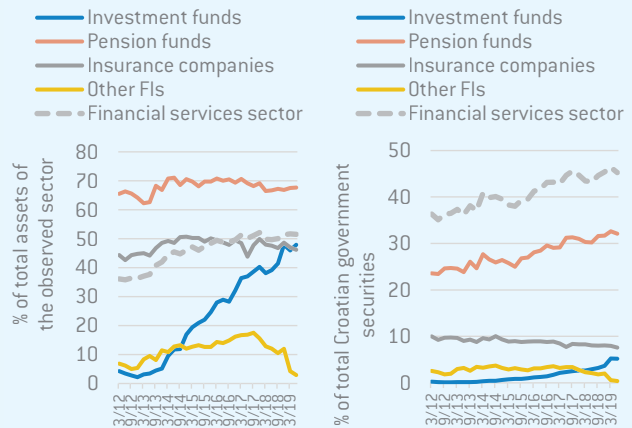
November 2019, which is by 3.4 percentage points lower than the average yield on the long-term bonds of the Republic of Croatia in the same period. These trends led to the relatively strong interconnection of the financial services sector and public sector in Croatia (Figure 5). At the end of June 2019, the bonds of the Republic of Croatia accounted for more than 51.5% of total financial services sector assets (Figure 4 – left). High concentration of sovereign exposure in total investments makes this sector exceptionally vulnerable to public sector developments, and their interconnection has been described above. A look at the other side of this relationship reveals that the financing of public debt through securities relies heavily on the financial services sector, which held 45% of issued securities of the Republic of Croatia at the end of June 2019, a share that shows a growing trend (Figure 4 – right).

The risks to financial stability arising from the connectedness of the state treasury and the financial services sector are even more noticeable when the fact is taken into account that at the end of June 2019 Croatian pension funds and insurance companies were much more exposed to the general government through securities financing than the rest of the EU (Figure 5).

Even though this investment model generated competitive yields in the preceding period, it puts pressure on the profitability of financial institutions and exposes them to the reinvestment risk in the current, extremely low (even negative) government bond yield environment. Almost 30% of the government bond portfolios of funds and insurance companies will have become due by the end of 2022, and their average annual coupon amounts to 5.79%. On the assumption that intermediaries and funds will, upon the maturity of these investments, invest the same amount of funds in new government debt issues placed in average with a 1% coupon, the average estimated annual income loss of the financial services sector recorded only on the coupon would reach HRK 1.37bn per year, i.e. as much as 83% of the current coupon income on these bonds.

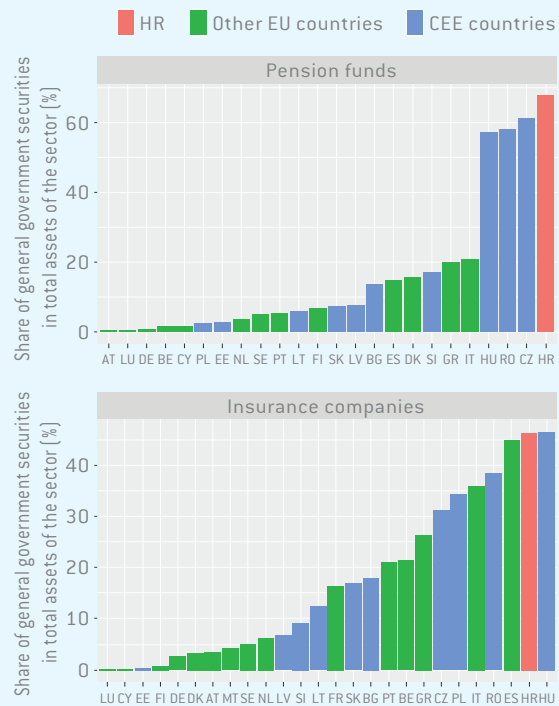
The search for yield shifts institutions from the financial services markets to riskier types of investments, which reflect a certain overvaluation of prices in some markets, leading to a growing exposure to the risk of sudden and significant investment revaluation.

Figure 4 | More than a half of total financial services sector assets are made up of government securities (left), which account for as much as 45% of total issued securities of the Republic of Croatia (right)



Sources: CNB and Hanfa

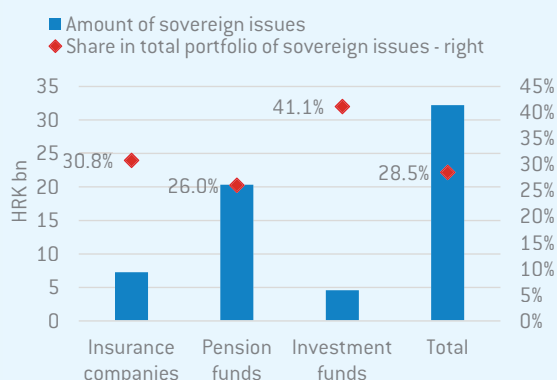
Figure 5 | Even when compared to other EU countries, pension funds and insurance companies show a relatively high level of exposure to the government through securities (end-June 2019)



Note: Pension systems in EU countries are not necessarily comparable considering the specificities of local regulations and characteristics of the system; therefore, the above-mentioned comparison should be interpreted with caution.

Sources: ECB (Quarterly Sector Accounts) and Hanfa

Figure 6 | Share of government bonds maturing by the end of 2022 in the sovereign debt portfolio



Source: Hanfa

It should be pointed out that, on the other hand, the fall in government bond yields increases the value of bond portfolios of financial services market institutions that are marked to market. Therefore, the net impact of currently low interest rates is determined by bond investment valuation policies and specificities of business operations and regulations of specific industries in the financial services market⁴⁸.

Significant investments in government securities not only lead to a high concentration of financial institutions' exposures to a single issuer, but also hinder the development of other domestic financial markets and types of investments. In addition to credit institutions, pension funds and insurance companies with their life insurance business should, due to the nature of their business, be the main source of financing of long-term invest-

ments, which are an important factor of the sustainable economic growth.

A decrease in the current, from the systemic aspect high level of the connectedness of the financial system as a whole and the government, may be achieved through: (i) the widening of the investor base (foreign investors and/or retail investors), which would direct the surpluses into debt issues of the public sector and increase secondary liquidity of these issues ("the chicken or the egg" problem⁴⁹), (ii) the differentiation of the liquidity of government issues in accordance with credit risk and relating recognition and correction of the dilatation between the liquidity of certain investments that is defined by regulations and the one that has been actually recognised, and (iii) the broadening of investment options by including other investment forms, but taking account of risk management and acceptable investment risk. In this regard, a positive contribution to minimising the systemic risk arising from the connectedness of the government and financial sector was made, as regards insurance companies, by amendments to the Insurance Act (Official Gazette, No. 30/15), that at the beginning of January 2016 removed restrictions on investments of assets covering mathematical and technical provisions, and as regards pension funds, by the Act on Amendments to the Mandatory Pension Funds Act (Official Gazette, No. 115/18), providing that as of October 2019, new insured persons, in the case where they fail to select their pension fund within a month from setting up a mandatory pension scheme, are assigned to the pension fund of category A, the one with the highest degree of investment freedom.

48 Low interest rates have an impact both on the value of insurance companies' assets and on the value of their liabilities (technical provisions) through the discount rate.

49 This problem relates to the dilemma whether high secondary liquidity is necessary to make government debt issues attractive and to broaden the investor base or whether it occurs as a result of this.

List of abbreviations

AIF	– alternative investment funds
bn	– billion
CBS	– Croatian Bureau of Statistics
CDCC	– Central Depository and Clearing Company
CEE	– Central and Eastern Europe
CFD	– contract for difference
CI	– credit institutions
CNB	– Croatian National Bank
DE	– Federal Republic of Germany
ECB	– European Central Bank
EIOPA	– European Insurance and Occupational Pensions Authority
ESMA	– European Securities and Markets Authority
EU	– European Union
EUR	– euro
EXT	– external sector
FAC	– factoring companies
GDP	– gross domestic product
GOV	– general government sector
Hanfa	– Croatian Financial Services Supervisory Agency
HH	– households sector
HR	– Republic of Croatia
IFR	– investment firms
IF	– investment funds
IMF	– International Monetary Fund
INS	– insurance and reinsurance companies
KN, HRK	– Croatian kuna
LS	– leasing companies
m	– million
MCR	– Minimum Capital Requirement
NFI	– non-financial companies sector
OFI	– other financial institutions
PF	– pension funds
pp	– percentage points
SCR	– Solvency Capital Requirement
UCITS	– undertakings for collective investment in transferable securities
UK	– United Kingdom
USA	– United States of America
VAT	– value added tax