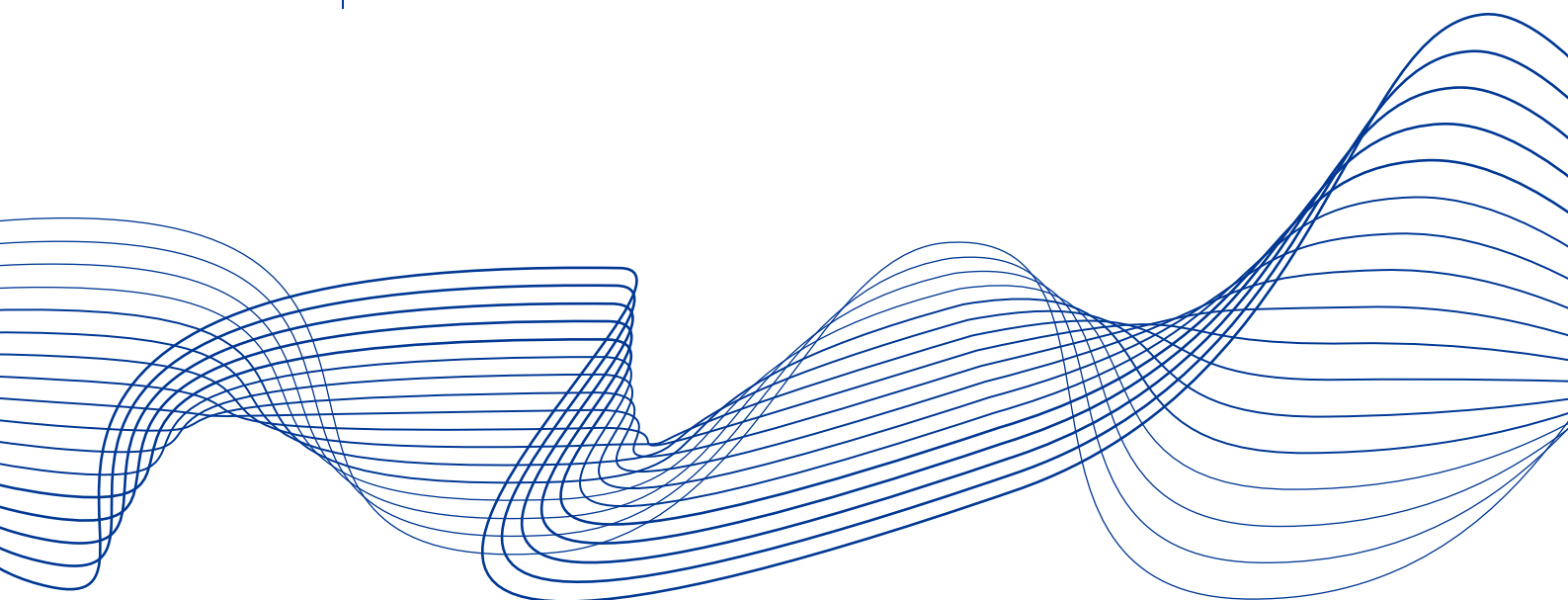


Lower for longer – macroprudential policy issues arising from the low interest rate environment

June 2021

Joint Task Force of
ESRB Advisory Technical Committee (ATC),
ESRB Advisory Scientific Committee (ASC), and
ESCB Financial Stability Committee (FSC)



ESRB
European Systemic Risk Board
European System of Financial Supervision

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Executive summary

Given the prolonged environment of low (and even negative) interest rates accompanied by ongoing structural changes in the EU financial system, at the end of 2019 the European Systemic Risk Board (ESRB) General Board mandated the joint ASC/ATC/FSC Task Force on Low Interest Rates to do as follows.

- Revisit the ESRB's 2016 report "Macroprudential policy issues arising from low interest rates and structural changes in the EU financial system", assess subsequent developments, and compare these to the risks identified in the report. Do we see any new potential sources of systemic risk?
- Review progress in relation to the policy proposals in the earlier report, as well as propose possible new policy actions aimed at mitigating potential systemic risks.

This report therefore analyses the risks engendered by the low interest rate environment (LIRE) and related structural changes in the EU financial system and proposes macroprudential policy actions to mitigate them. While acknowledging country heterogeneity, the focus is mainly on the EU financial system as a whole and on interest rates in the EU. The time horizon for the analysis is medium term: five to ten years ahead. Although we discuss both real and nominal interest rates and the relationship between them, our focus when considering risk-taking is primarily on nominal rates. With stable, low inflation, nominal and real rates move in parallel.

The report must provide a clear view of the relationship between macroprudential policy and monetary policy, partly because monetary policy instruments now go beyond short-term policy rates. We summarise our guiding principles in the introduction to this report.

Persistently low interest rates may endanger financial stability, and macroprudential policies can mitigate these risks. The ESRB's 2016 report discusses the possible causes of the LIRE, distinguishing between a structural view and a financial cycle view. Since then, further development of the "secular stagnation" hypothesis has elucidated structural factors behind the observed long-term decline in the "natural" or "neutral" equilibrium real rate of interest consistent with full employment and low and stable inflation (R^*). In the absence of other measures aimed at closing the savings-investment gap, monetary policy pursuing an inflation target finds policy rates forced down with the declining R^* until policy rates hit the effective lower bound. Moreover, regulatory changes and financial institutions' more risk-averse positioning after the global financial crisis (GFC) boosted demand for safe assets, putting further downward pressure on both real interest rates and risk premia. These forces underlie the maintained hypothesis of this report



presented in **Chapter 2**: a scenario in which interest rates will remain “lower for longer” than envisaged even in the “low for long” scenario set out in the 2016 report.¹

The coronavirus (COVID-19) shock may accentuate the downward trend of nominal and real interest rates and increase the likelihood and persistence of a “low for long” scenario, transforming it into an “even lower for even longer” scenario.

Chapter 3 begins with an overview of the risks identified in the previous ESRB report. These are as follows: (i) a protracted LIRE will put pressure on the profitability and solvency of financial institutions; (ii) financial stability risks may increase in the LIRE due to the search-for-yield, resulting in an excessive build-up of leverage and; (iii) the LIRE is likely to accelerate ongoing structural changes in the EU financial system, such as the rise of non-bank financial intermediation, which will result in higher sensitivity to market shocks. System-wide sensitivity to liquidity risk and cross-sectoral interconnectedness are also likely to increase further.

Since 2016, search-for-yield behaviour has intensified in the banking and investment fund sectors. Banks have increased lending volumes and have tilted their portfolios towards riskier market segments to compensate for declining interest rate margins. They have been granting more fixed-rate loans at increasingly longer maturities. Some segments of the investment fund sector have engaged in riskier activities, while the overall credit quality of the stock of outstanding corporate bonds has deteriorated. In the non-financial corporation (NFC) sector, some non-viable firms (“zombies”) have been able to continue operations only because of low financing costs. Insurers have been assuming greater interest rate risk by increasing duration mismatch. The LIRE has not led to an overall increase in households’ indebtedness in the EU – its impact has varied depending on how households’ wealth is distributed.

We can expect a significant increase in indebtedness beyond the existing high levels in certain segments of the household, NFC and government sectors, leading to vulnerabilities if there were a shock to risk premia. These dynamics could feed off each other to create a “vicious cycle” of higher leverage, increasing asset prices, and heightened risk taking. At end-2019, almost all EU Member States presented negative differentials between government bond interest rates and GDP growth rates which, for any given level of the public-debt-to-GDP ratio, improves debt sustainability in the long term. But the evolution of primary deficits since the outbreak of the COVID-19 pandemic has raised concerns.

The LIRE affects the sustainability of key business models in the financial sector. Reductions in net interest margins and other operating income have impaired banks’ profitability since 2016. The LIRE has multiple effects on banks’ asset quality: it eases debt servicing pressures for

¹ Five years ago, the nominal yield of the 10-year German Bund was 0.27%, but it was -0.26% on 22 April 2021. Inflation in Germany (annual, CPI) was -0.1% in 2016, but it is now 1.7%. So real yields have fallen by approximately 2.3%. We argue they will indeed stay “lower for longer”, i.e. into the medium term. An IMF blog of 22 April 2021 (Adrian et al.) estimates that despite the 70 basis point rise in 10-year US Treasury yields in early 2021, the five-year real yield has fallen by 15 basis points. In any case, we regard the recent US developments as cyclical rather than structural, with no change to the factors underlying the LIRE in the EU.



borrowers, thereby reducing non-performing loans. But low interest rates induce forbearance, allowing banks to “evergreen” past due loans to finance non-viable borrowers (“zombies”).² Public support measures such as loan moratoria, guarantees and grants to households and NFCs as a response to the COVID-19 shock avoided a major increase in defaults and deterioration of asset quality in 2020. This may reverse once the impact of COVID-19 begins to materialise fully on lenders’ balance sheets.

In the LIRE, bank customers may switch to other institutions providing financial services, creating further excess capacity in the EU banking system. The LIRE itself is only one element of the pressure on EU banks – in the LIRE, the structural vulnerabilities of the EU banking system, such as overcapacity and excess costs, gain importance and negatively affect profitability, sustainability and capacity to serve the real economy.

Given insurers’ and occupational pension funds’ negative duration gaps, the LIRE has weakened their balance sheets and threatens their resilience. For insurers, the protracted LIRE presents significant risks arising from their high stock of liabilities providing a guaranteed return, particularly in the life insurance business. Similarly, for pension funds, the major risk in the LIRE stems from defined benefit liabilities. For both sectors, if the cycle of increasing leverage and asset prices were to reverse abruptly with interest rates still low, the higher net present value of liabilities would coincide with a fall in the value of assets – a “double hit” scenario.

While the LIRE may be positive for many asset management businesses, it may also negatively affect the business models of some investment fund categories. The LIRE will represent an increasing challenge for the business model of some money market funds (MMFs) and bond funds unless they increase their shares of riskier high-yield bonds.

Structural changes in the financial system also present risks in the LIRE. A more market-based financial system provides benefits through diversified sources of funding of the economy but can also bring higher interconnectedness and sensitivity to market risks. Regulatory reforms after the GFC have increased the safety and resilience of the financial system. They have also driven adaptations by banks and other market participants that may affect market-making activities. This evolution could contribute to a system that is more vulnerable to liquidity shocks. Margin requirements and central clearing have lowered credit risk but may have increased liquidity risks, amplified by the LIRE as it fosters higher levels of leverage. The market turbulence in March 2020 provides evidence of this.

Insurance and pension funds have started to transfer investment risks to their customers. These funds have drastically reduced the level of guarantees offered in new contracts, while promoting new products such as unit-linked or multiclass contracts. Customers may manage the associated risks sub-optimally, by reacting in a way that increases procyclicality.

² Evergreening is a practice whereby banks will extend their lending to a firm in order to avoid default.



The LIRE has favoured the rise of passive investment strategies. Exchange-traded funds (ETFs) and other forms of passive investment may affect market functioning and financial stability by increasing correlations across securities and inducing episodes of illiquidity.

The risk assessment takes into account enhanced resilience as well as regulatory reforms and mitigating policies. New regulations implemented after the GFC have sought to raise the banking sector's capacity to withstand adverse shocks (for instance Basel III and IFRS 9) or facilitate the orderly exit of unviable banks (the Bank Recovery and Resolution Directive (BRRD) and the establishment of the Single Resolution Board). A successful transposition into legislation of the European Insurance and Occupational Pensions Authority (EIOPA)'s Opinion on the 2020 Review of Solvency II would reduce LIRE-related risks for the insurance sector. For pension funds, implementation of the IORP II Directive will contribute to better risk management. For investment funds, strengthened monitoring and stress-testing guidelines may not be enough to counter the liquidity risks created by structural changes in the financial system. While borrower-based measures can contain household over-indebtedness, few tools are available to limit NFC debt and search-for-yield behaviour in financial markets.

The risk analysis in Chapter 3 highlights four areas of concern in the LIRE:

Figure 1

Key areas of concern in the LIRE



This report (Sections 4.1 and 4.2) proposes policy options to address the systemic risks³ related to these areas of concern.

Addressing the risks related to the LIRE requires broad-ranging policy responses beyond the scope of existing macroprudential instruments, as set out in Chapter 4. As there are limits to the ability of existing macroprudential instruments to address LIRE-related risks, some policy proposals in this report go beyond traditional macroprudential instruments. Moreover, the current

³ While acknowledging their importance in determining real interest rates, this report does not discuss structural policies but instead focuses on policies addressing systemic risks in the financial system which are related to the LIRE.



macroprudential toolkit does not provide instruments that can be used to deal directly with risks related to structural changes in the financial system. A move from traditional banking activities and related risks to non-bank financial intermediation requires the development of macroprudential policy beyond banking and more activity-based regulation in addition to the current entity-based regulation.

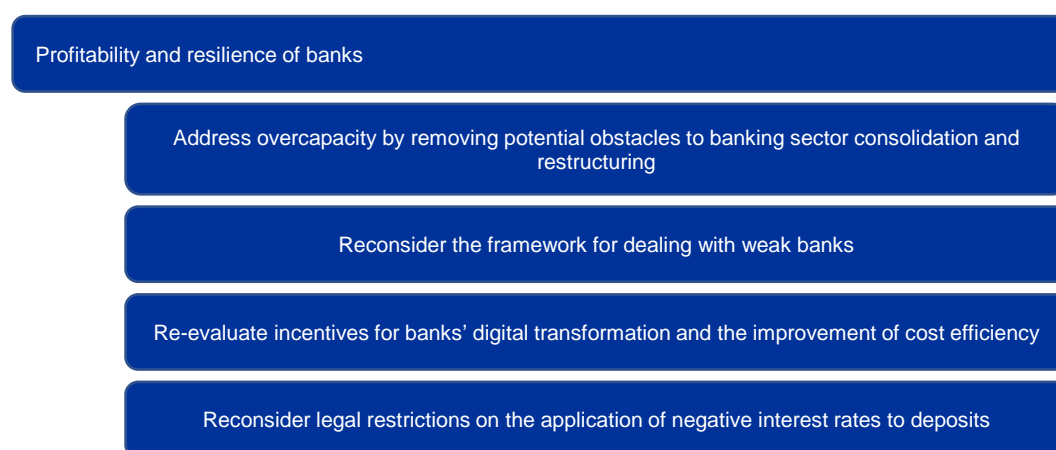
The Task Force recommends the prioritisation of policy areas as shown below. Within each policy area, the order followed is in line with priorities.

1. The profitability and resilience of banks.

The LIRE accentuates the negative effects of existing structural problems in the EU banking sector, including overcapacity and cost inefficiencies. It is therefore necessary to identify unviable banks and manage problems effectively early on, by means of an intervention or an orderly exit. The central role of the banking system in the EU economy, as well as the prospect of “lower for longer”, makes it imperative to improve profitability and address structural factors related to overbanking.

Figure 2

Policy options for addressing risks related to the profitability and resilience of banks

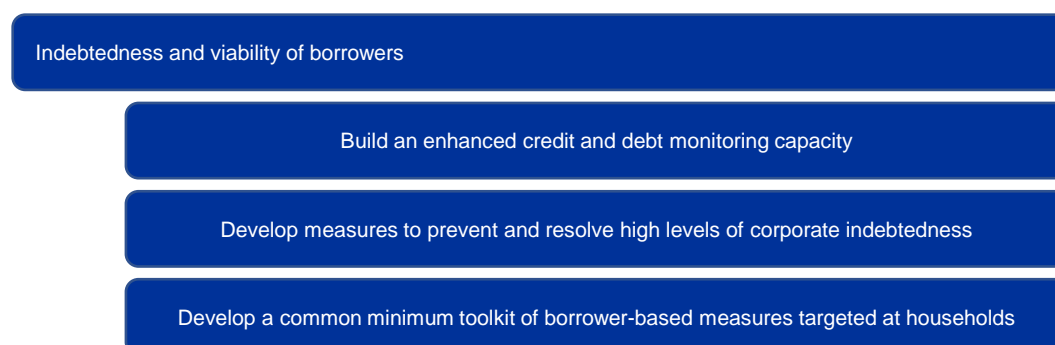


2. The indebtedness and viability of borrowers. The LIRE facilitates higher leverage and encourages a search for yield. Since highly indebted entities are vulnerable to shocks, safeguarding financial stability requires enhancing capacities to monitor debt and factors which could make debt unsustainable. This should involve targeting the most dangerous indebtedness levels and trends. Moreover, measures should be reinforced to restructure viable businesses sufficiently early. Efficient insolvency procedures should be in place to ensure that non-viable firms can be swiftly unwound and resources reallocated to productive uses.



Figure 3

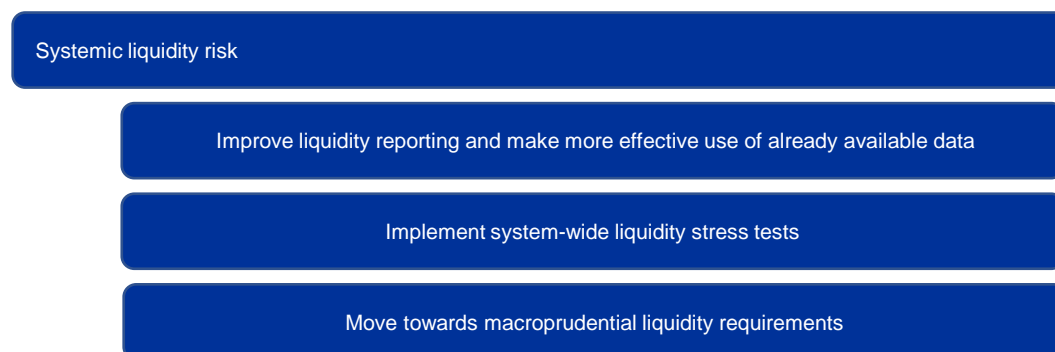
Policy options for addressing risks related to the indebtedness and viability of borrowers



3. Systemic liquidity risk. Whatever the global level of liquidity in the financial system, market liquidity can evaporate under stress. The LIRE and structural changes have given rise to a financial system that is more sensitive to market shocks and systemic liquidity risks through three broad channels of transmission: an endogenous build-up of risk, liquidity illusion and interconnectedness within the financial system. This was confirmed by the systemic liquidity tensions experienced by financial intermediaries during the March 2020 turmoil.

Figure 4

Policy options for addressing systemic liquidity risk

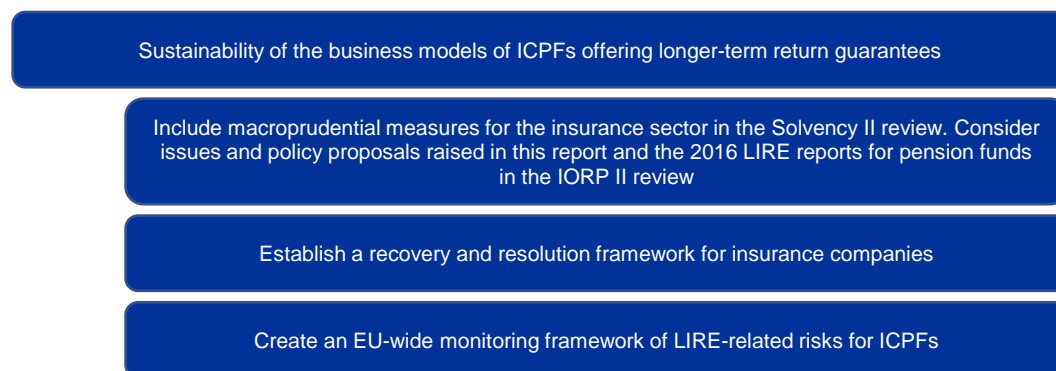


4. The sustainability of the business models of insurance corporations and pension funds (ICPFs) offering longer-term return guarantees. Insurers and pension funds offering longer-term return guarantees have experienced increasing pressures in the LIRE. In accordance with the ESRB report on macroprudential policy for the insurance sector, our policy proposals are summarised in Figure 5.



Figure 5

Policy options for addressing risks related to the sustainability of the business models of ICPFs offering longer-term return guarantees



Moreover, ESRB (2016) had already presented 17 policy options in a comprehensive macroprudential approach aimed at enhancing financial stability and mitigating systemic risks in the LIRE. These focused on monitoring, analysing and containing risks, increasing the resilience of financial institutions to shocks, and promoting the orderly exit from the market of failing institutions. Section 4.2 identifies a range of actions needed to complete the implementation of these policy proposals. In particular, given concerns regarding the sustainability of business models, we emphasise an ESRB (2016) policy recommendation related to insurance and pension funds offering longer-term return guarantees.

Macroprudential tools available to address the financial stability risks stemming from the LIRE are limited to banking sector and borrower-based measures for households based on national legislation (Figure 6). Section 4.3 considers how existing macroprudential instruments could be used to address financial stability risks stemming from the LIRE, arguing that while the LIRE is mostly associated with structural risk factors, it can also amplify cyclical developments. The LIRE induces broad-based risk-taking that could lead to excessive credit growth and asset price inflation, as well as increases in indebtedness and leverage. These developments may be due to cyclical as well as structural factors. Several macroprudential authorities in the EU have used the countercyclical capital buffer (CCyB) to address these risks, insofar as they have judged that risks have arisen from cyclical forces, potentially amplified by the LIRE. While several countries have used systemic risk buffers to address a variety of structural risks, no EU Member State has justified their usage on the basis of systemic risks related to the LIRE. Moreover, borrower-based measures have been widely used by Member States to increase borrowers' resilience.

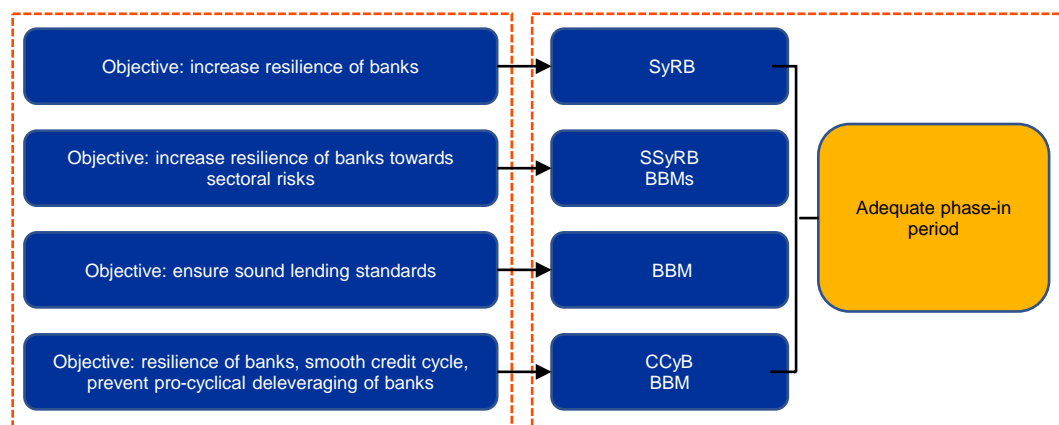
Macroprudential authorities may consider implementing either system-wide or targeted capital buffers, depending on the effects of the LIRE. While inducing a broad-based search for



yield, the LIRE can also result in a build-up of non-synchronised imbalances in specific market segments that could contribute to an increase in systemic risk in the banking sector. The CCyB is the primary tool targeting excessive credit growth and leverage related to cyclical developments which could be amplified by the LIRE. In the CRD V⁴ the systemic risk buffer (SyRB) can also be applied in a sectoral manner (SSyRB), so it is a suitable instrument for addressing sectoral structural risks related to the LIRE.⁵

The design and calibration of borrower-based measures, which would remain the responsibility of national macroprudential authorities, might require adjustments in the LIRE. Such adjustments should reflect the debt-servicing capacity of households. They should also consider the potential implications of households' market access and any impact on inequality.

Figure 6
Existing macroprudential tools for addressing LIRE-related systemic risks



⁴ See EBA (2020), **Final Guidelines** on the appropriate subsets of sectoral exposures to which competent or designated authorities may apply a systemic risk buffer in accordance with Article 133(5)(f) of Directive 2013/36/EU.

⁵ The introduction of such a measure should be approached with care, and calibration should carefully consider the targeted risks and the proportionality of the measure.



Summary of policy options

This report presents several policy options for mitigating systemic risks and improving systemic risk analysis. The Task Force suggests prioritising the policy option areas as shown below. In each of the policy areas, the order is in line with priority.

Policy options for mitigating systemic risks

1. The profitability and resilience of banks:

- address overcapacity by removing potential obstacles to banking sector consolidation and restructuring;
- reconsider the framework for dealing with weak banks;
- re-evaluate incentives for banks' digital transformation and improving cost efficiency;
- assess legal restrictions on the application of negative interest rates to deposits.

2. The indebtedness and viability of borrowers:

- develop measures to prevent and resolve high levels of corporate indebtedness;
- develop a common minimum toolkit of borrower-based measures targeted at households.

3. Systemic liquidity risk:

- move towards macroprudential liquidity requirements.

4. The sustainability of the business models of insurers and pension funds offering longer-term return guarantees:

- include macroprudential measures for the insurance sector in the Solvency II review and in particular, the ESRB should support EIOPA's Opinion issued as part of the review of the Solvency II Directive, in line with the views expressed in the ESRB report on macroprudential policy for the insurance sector;
- establish a recovery and resolution framework for insurance companies;
- consider issues and policy proposals raised in this and the 2016 LIRE reports for pension funds in the IORP II review.

Policy options for improving systemic risk analysis

2. The indebtedness and viability of borrowers:

- build an enhanced credit and debt monitoring capacity.

3. Systemic liquidity risk:

- improve liquidity reporting and a more efficient use of already available data;
- implement system-wide liquidity stress tests.

4. The sustainability of the business models of insurers and pension funds offering longer-term return guarantees:

- create an EU-wide monitoring framework of LIRE-related risks for ICPFs.



1 Introduction

Given the prolonged environment of low and even negative interest rates accompanied by ongoing structural changes in the EU financial system, at the end of 2019 the ESRB General Board mandated the joint ASC/ATC/FSC Task Force on Low Interest Rates to do as follows:

- Revisit the ESRB's 2016 report "Macprudential policy issues arising from low interest rates and structural changes in the EU financial system", assessing subsequent developments and comparing them to the risks identified in the report. Do we see any new potential sources of systemic risk?
- Review progress in relation to the policy proposals in the earlier report and propose possible new policy actions aimed at mitigating potential systemic risks.

This report therefore analyses the risks engendered by the LIRE and related structural changes in the EU financial system and proposes macroprudential policy actions aimed at mitigating them. Since the ESRB's 2016 report, the macro-financial environment has continued to feature very low nominal interest rates. These rates have in fact turned negative across a large part of the yield curve in the United States and Europe (see Chart 1 and Chart 2, which take German rates to represent European rates for these time series, which start from the mid-1960s). The LIRE is not just a short-term phenomenon: rates have trended downwards since the early 1980s. The recent period of very low – indeed negative – rates is not an anomaly: negative real rates were seen in the mid-1970s. There have been extended periods of very low rates in a number of advanced countries over the past century⁶, and a recent study⁷ reports that a downward trend in global rates started several centuries ago.

Reflecting these developments, along with new evidence on the impact of the LIRE on the EU financial system, this report revisits the ESRB's earlier assessment of the implications and related policy proposals for the EU financial system. The report also proposes further policy actions aimed at mitigating the new vulnerabilities that have emerged.

⁶ Hamilton, et al. (2016).

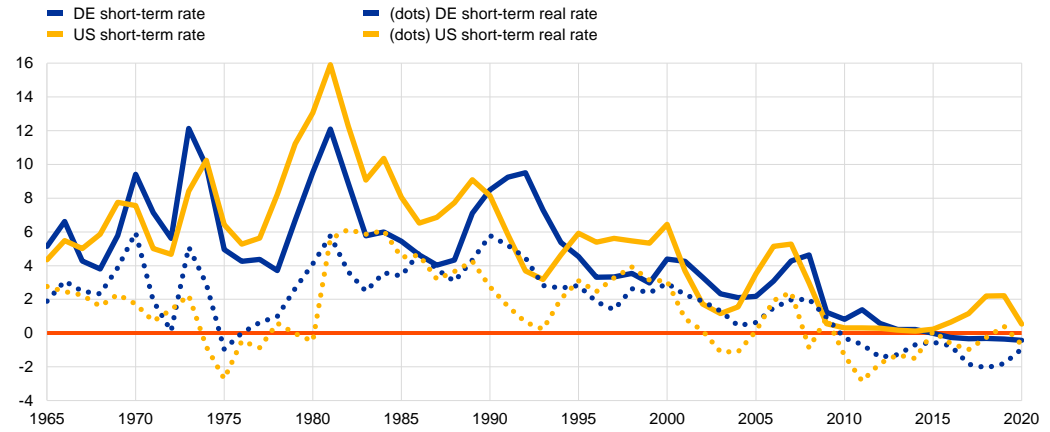
⁷ Schmelzing (2020).



Chart 1

Short-term nominal and real interest rates in Germany and the United States

(1965-2020, percentages)

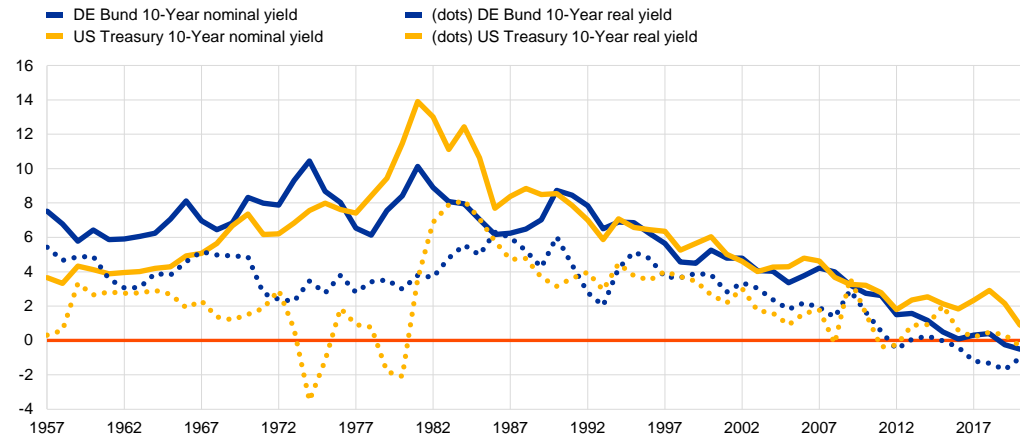


Source: OECD and ESRB calculations. Note: Short-term interest rates are based on three-month money market rates. Real rates are calculated by subtracting the annual CPI inflation rate.

Chart 2

Nominal and real ten-year government bond yields in Germany and the United States

(1957-2020, percentages)



Source: OECD and ESRB Calculations. Note: Yields are based on ten-year constant maturity government bond yields. Real yields are calculated by subtracting the annual CPI inflation rate.



The time horizon for the analysis is the medium-term: five-ten years ahead. The horizon is important – in recent weeks, we have observed an uptick in current and expected US 10-year Treasury rates as well as expected inflation. This trend is not yet apparent in Europe, although we could expect an increase in inflation this year, stemming from the COVID-19 crisis. We do not intend to discuss these short-term developments in interest rates, which may be related to changes in risk premia or term premia.⁸ We do, however, admit the possibility that macroeconomic developments or shocks to risk premia could temporarily raise rates, although we find convincing arguments that rates will remain low in Europe over the medium term. From the figures above, we note that although US and German market rates have followed similar trends since the mid-1980s, there have been significant divergences – even over the past few years – as short-term policy rates have come down to reach the effective lower bound in both the United States and Europe.⁹

Although we discuss both real rates and nominal rates and the relationship between them, our focus in considering risk-taking is primarily on nominal rates. For these, however, the relevant rates may be at the shorter or the longer end of the term structure, depending on the context.

Chapter 2 provides the analytical basis of the report, examining the forces that underlie the report’s maintained hypothesis: “lower for longer”. The ESRB’s 2016 report discussed the possible causes of the LIRE, distinguishing between the structural view and the financial cycle view. Since then, the development of the “secular stagnation” hypothesis has elucidated the factors behind the observed long-term decline in R^* – the “natural” or “neutral” equilibrium rate of interest consistent with full employment and low and stable inflation. The COVID-19 shock may strengthen the downward trend of nominal and real interest rates and may increase the probability and persistence of the “lower for longer” scenario, transforming it into an “even lower for even longer” scenario.

Chapter 3 analyses the financial stability risks related to the LIRE. The protracted LIRE puts pressure on the profitability and solvency of financial institutions. Moreover, financial stability risks may increase in the LIRE due to the search for yield, resulting in an excessive build-up of leverage. The LIRE also augments systemic liquidity risk through several channels of transmission. In addition, the LIRE is likely to accelerate the transition towards a more market-based structure of the EU financial system, with some associated risks. The analysis in Chapter 3 is detailed and supported by extensive evidence. Nevertheless, it is important to recognise that we cannot attribute the identified risks only to the LIRE – causality is always difficult to establish in economics, and no less in this case, where there are many confounding factors. That said, where the evidence strongly suggests there is an important role for the LIRE with implications for systemic stability, there may also be a role for macroprudential policies, which we proceed to explore.

⁸ The risk premium and term premium are related but distinct (Berardi et al. 2021). It appears that the risk premium on US 10-year Treasuries was flat from the late 1980s until the GFC and has trended down over the past decade.

⁹ The BIS Quarterly Review of December 2020 suggests that the divergence between US and German 10-year government bond yields in August-October 2020 was due to a widening of the term premia spread. Here, as well as later in this report, we maintain that our medium-term view should not be influenced by these short-term developments.



Chapter 4 proposes policy options for addressing LIRE-related systemic risks which create macroprudential concerns. Section 4.1 presents new policy options, which at this stage should not be seen as ESRB recommendations but, instead, as blueprints for medium-term policy objectives. The ESRB may choose some of these proposals to be refined and serve as a basis for more concrete ESRB recommendations. Moreover, the ESRB's 2016 report had already presented 17 policy options as part of a comprehensive macroprudential approach aimed at enhancing financial stability and mitigating systemic risks in the LIRE. Section 4.2 identifies a range of actions needed to complete the implementation of these policy proposals. Finally, Section 4.3 reviews existing macroprudential instruments that could address systemic risks related to the LIRE and how these instruments could be adjusted and used going forward.

This report attributes the trend decline in rates and the persistence of the LIRE primarily to “structural factors” (see Section 2.1). But the report is concerned with financial stability and the macroprudential policies needed to maintain it. It is therefore beyond our remit to consider “structural policies” that might influence the LIRE itself, e.g. policies regarding labour markets, innovation, competition policy or non-financial regulation.

A clear view of the relationship between macroprudential policy and monetary policy underlies the report. This is partly because monetary policy instruments now go beyond short-term policy rates, and the topic has been discussed extensively by both academics and policymakers over the past two decades.¹⁰ The report does not consider the full range of interactions between macroprudential policy and monetary policy, however, nor does it consider whether monetary policy should respond to the risks arising from the LIRE.

We have been guided by the following principles (see also the EU regulation on the ESRB¹¹).

- Macroprudential policy seeks to contain systemic risk. It must take into account the effects of monetary policy on financial stability, while financial stability is necessary for the appropriate transmission of monetary policy.
- Macroprudential policy can be complementary to monetary policy in mitigating any negative effects monetary policy may have on financial stability or in dealing with financial stability issues that monetary policy cannot address, whatever the reason.
- Macroprudential policy has a limited macroeconomic stabilisation role insofar as it can moderate the credit cycle (borrower-based measures, countercyclical capital buffer, limits on leverage). But its primary role is to safeguard financial stability. Its time horizon may extend

¹⁰ There is a wide range of literature. See, for example, IMF (2013), Portes (2014), Weidmann (2014), Hellwig (2015), Gouriou et al. (2018), Farhi and Werning (2020), Martin et al. (2021) and Villeroy de Galhau (2021).

¹¹ “The ESRB is responsible for the macro-prudential oversight of the financial system within the Union and contributes to the prevention or mitigation of systemic risks in the Union as a whole or parts thereof, including identifying and discussing financial stability risks regardless of their origin. Monetary conditions may have implications for financial stability and it falls under the ESRB's macro-prudential oversight mandate to discuss those implications while fully respecting the independence of central banks.” (Regulation (EU) 2019/2176 of the European Parliament and of the Council, 18 December 2019).



beyond that of monetary policy, because the financial cycle is typically longer than the real economy cycle.

- To fulfil its role, macroprudential policy must extend beyond banking to include non-bank financial institutions and financial markets and infrastructures. Monetary policy and the LIRE affect all these entities and activities.
- Maintaining financial stability is not the primary role of monetary policy. As recent and historical examples show, however, the monetary authorities may intervene as lenders or market-makers of last resort in order to avoid or mitigate a systemic crisis and safeguard the monetary policy transmission mechanism. Macroprudential policy should seek to limit the need for such intervention.
- The institutional framework is important as background to this report. The ESRB oversees EU macroprudential policy, which is carried out primarily at the national level. The ESRB has a close institutional relationship with the ECB and is chaired by the ECB President; all EU central bank governors and heads of the European Supervisory Authorities (ESAs)¹² are members of the ESRB General Board. The ESRB takes an EU-wide view while working with national regulators and macroprudential authorities, as well as the ESAs, some of whose responsibilities have macroprudential dimensions. It must therefore take into account spillovers of national macroprudential policies to other countries in the EU as well as the impact of third-country policies on EU financial stability. In addition, the ESRB must also take into account the extent to which EU macroprudential policies have a global systemic impact, partly because such spillovers may have second-round effects on the EU.¹³

¹² European Banking Authority (EBA), European Securities and Markets Authority (ESMA) and European Insurance and Occupational Pensions Authority (EIOPA).

¹³ ESRB, Report of the Advisory Scientific Committee No 10, February 2020, "The global dimensions of macroprudential policy".



2 The lower for longer interest rate environment

2.1 Long-term factors behind the trend decline in interest rates in the EU

The ESRB's 2016 report discussed the possible causes of the LIRE by organising the explanations given in the literature according to two views: the “structural” view and the “financial cycle view”. The former relies on changes since the 1980s in the structure and the functioning of the real side of the economy which have reduced both the natural (or neutral) equilibrium real rate of interest R^* (the rate consistent with full employment and low and stable inflation) and the risk premium component of nominal interest rates. Various demand and supply factors have led to structural imbalances between the demand for investment and the supply of savings at the global level and, as a consequence, to lower global equilibrium real rates. In the absence of other measures aimed at closing the savings-investment gap, monetary policy which pursues an inflation target sees policy rates forced down to follow the declining R^* , until policy rates and other nominal rates hit the effective lower bound. Factors causing the falling R^* include: (i) demographic developments such as rising life expectancy and falling population growth rates;¹⁴ (ii) the falling (relative) price of investment goods and the rising share of intangible investment;¹⁵ (iii) the slowing pace of technological innovation;¹⁶ (iv) the falling marginal product of capital (related to demography and technical progress);¹⁷ (v) rising wealth and income inequality;¹⁸ (vi) rising savings rates in developing countries and the consequent rising demand for assets issued by advanced economies¹⁹ and; (vii) the evolution of the consumption/wealth ratio.²⁰ It is important to note that many of these developments (and the trend decline in R^*) hold not just for the euro area, but also

¹⁴ The increase in life expectancy lengthens the period of retirement and generates additional incentives to save, exerting downward pressure on real interest rates (Acemoglu and Johnson 2007 and Backus et al., 2014). Similarly, a decline in population growth leads to a higher capital/labour ratio, which depresses the marginal product of capital and therefore the demand for investment and the equilibrium real interest rate. As growth prospects worsen the propensity to save increases, especially among the middle-aged cohort, exerting further downward pressure on real rates (Aksoy et al., 2019).

¹⁵ The falling price of investment goods (machines, equipment and buildings) implies that the same amount of savings can finance more investment. As labour and capital are not perfect substitutes, the marginal productivity of an additional unit of investment decreases. The supply of investment opportunities is smaller, leading to a fall in the required rate of return (Karabarbounis and Neiman, 2014, and Thwaites, 2015). Moreover, the rising share of intangible investment (including IT) relative to machinery and structures tends to reduce the overall volume of investment expenditure.

¹⁶ The decline in technological innovation reduces total factor productivity and investment growth. Lower output and productivity growth dampen the marginal product of capital and, as a consequence, the real interest rate (Gordon, 2016).

¹⁷ Cochrane (2021).

¹⁸ As higher aggregate income shares are attributed to the households with a lower propensity to consume, interest rates fall due to the increase in aggregate savings (Summers, 2014).

¹⁹ The transformation of developing countries from net borrowers to net lenders has brought about an increase of the demand for safe assets issued by advanced economies and a consequent reduction of risk-free rates (Bernanke, 2005).

²⁰ Gourinchas et al. (2020).

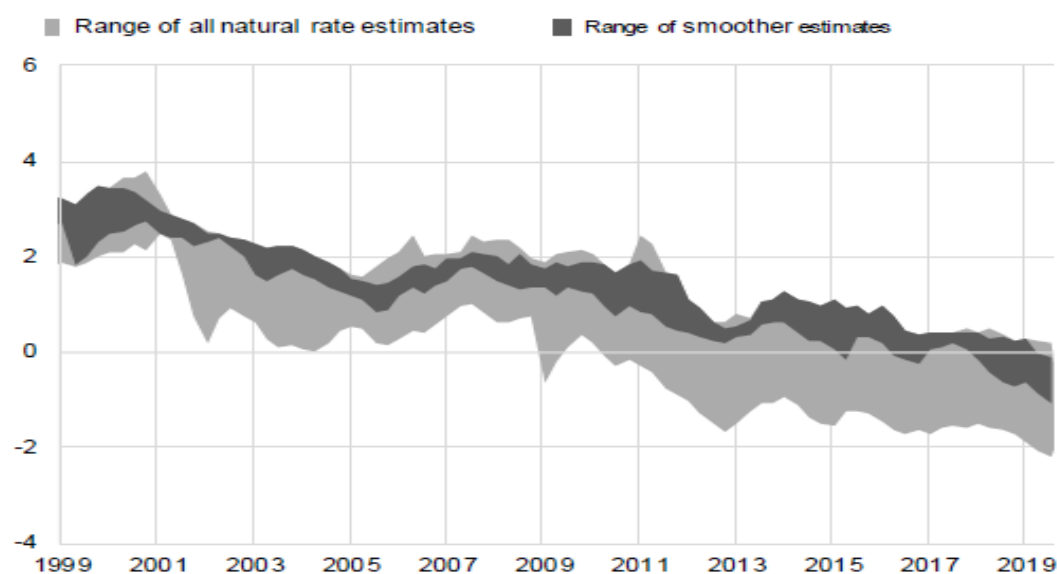


for the United States and Japan, and to some extent interest rates are transmitted globally (the “global financial cycle”²¹).

Much of the above and the related literature may be viewed as developing or commenting on the “secular stagnation” hypothesis revived by Summers (in his speech at the IMF Research Conference in 2013). It is a story about the long-term decline in R^* (see Chart 3).

Chart 3
Estimates of euro area equilibrium real rate

(Q1 1999 – Q4 2019, percentages)



Source: Schnabel (2021). Notes: Ranges span point estimates across models to reflect model uncertainty and no other source of R^* uncertainty. The dark-shaded area highlights smoother R^* estimates that are statistically less affected by cyclical movements in the real rate of interest. Latest observation: Q4 2019.

Summers used it to argue for expansionary fiscal policy, because given the lower bound on nominal (policy) rates monetary policy could not bring rates down to a level that would support full employment (a motivation for “unconventional” monetary policies). But this is not our concern here – we simply note that the secular stagnation view encompasses many of the structural forces

²¹ Rey (2013).



behind “low for long”.²² In addition, regulatory changes and the more risk-averse positioning adopted by financial institutions after the GFC have further boosted the demand for safe assets, putting more downward pressure on real interest rates and on risk premia. Looking forward, these factors are also consistent with a scenario in which interest rates and inflation remain “low for long”.^{23 24 25}

The financial cycle view focuses on the role played by financial factors. The deregulation of financial and credit markets, excessively expansionary monetary policies and overly optimistic expectations for future macroeconomic and financial prospects during the “Great Moderation” (from the mid-1980s to the start of the GFC in 2007) may have favoured an excessive increase in the supply of funds, a compression of risk premia and a reduction of real and nominal interest rates.²⁶ A sharp correction in the financial cycle occurred with the outbreak of the GFC and was followed by a persistent and severe contraction in aggregate demand. Compared with a “normal” recession, in a “balance sheet recession” such as that following the GFC,²⁷ monetary policy needs to be more accommodative, as traditional transmission channels, which operate through intertemporal substitution, are less effective.²⁸ Moreover, the implementation of unconventional monetary policies (such as quantitative and qualitative easing, QQE, and the asset purchase programme, APP), the increase in risk aversion and precautionary savings create demand for relatively safer and long-term assets.^{29 30} All of these factors further compress term premia and lower inflation expectations

²² A contrarian view that has recently attracted attention in the financial press is that of Goodhart and Pradhan (2020). They claim that some factors – such as the rise of China with its huge labour supply, which has weakened labour’s bargaining power and increased income inequality within advanced economies, and other broad demographic trends which have favoured a fall in R^* and contributed to low inflation in recent years – will soon be reversed. The fall in the working-age population and the rising numbers of elderly people in China will increase the dependency ratio. This will bring about a fall in savings and an increase in aggregate demand, revive inflation and raise nominal interest rates as well as R^* at the global level. This argument goes against the empirical work of Aksoy et al. (2019) and Ferrero et al. (2019) as well as the extensive theoretical and empirical secular stagnation literature. It is also inconsistent with the experience of an important ageing society, Japan, over the past two decades. Even with regard to demography there are opposing factors, such as rising participation rates, retirement ages and life expectancies in advanced economies and the rapidly growing labour forces in Africa and India. Moreover, the analysis also ignores many non-demographic factors – we do not find it convincing.

²³ Rachel and Summers (2019) provide an extensive analysis of the decline in R^* . These arguments have been further developed in a conference issue of the IMF Review (Vol. 64(4), 2016) and an EC-CEPR-JEDC conference in November 2020. See also Eggertsson et al. (2019).

²⁴ Kiley (2020) reviews the literature and adds his own econometric study. He concludes: “A range of approaches to estimating the equilibrium real interest rate confirm a pronounced downward trend among advanced economies in the level of real short-term interest rates likely to prevail over the longer term.” Gourinchas et al. (2020) conclude: “Our estimates indicate that short-term real risk-free rates are expected to remain low or even negative for an extended period of time”.

²⁵ Applying two different modelling approaches based on the secular stagnation literature, Harenberg (2020) finds that the euro area neutral real rate trended downwards, falling from 6.6% in 1980 to around -2% in 2018. The most important driver of this was demography, although falling total factor productivity growth and the relative price of investment goods played significant roles.

²⁶ Lo and Rogoff (2015) and Borio et al. (2017).

²⁷ Koo (2008).

²⁸ Mian and Sufi (2014).

²⁹ Vayanos and Vila (2020) and King (2019).

³⁰ In general, a reduction in the outstanding amount of assets belonging to a given class of risk and maturity should not affect their price. However, the presence of price-sensitive agents or institutions (such as pension funds and insurers) means that certain types of assets (generally those with a lower counterparty risk and longer duration) are not perfectly substitutable with other financial assets. When demand for such assets increases significantly and the outstanding amount falls the price of such assets increases and their returns decrease.



as well as real and nominal interest rates (see Chart 4). According to the “financial cycle” view, however, once the balance sheet issues have been resolved, interest rates would be expected to go back to “normal” levels.

Chart 4

Market expectations of the nominal short-term risk-free rate in ten years

(1 Jan 2013 – 9 Feb 2021)



Source: Bloomberg and ECB calculations. Note: implied 3 month interest rates, ten years ahead based on overnight interest rate swaps (OIS).

Moving away in part from the previous ESRB report, where the financial cycle was used to justify a “back to normal” scenario, we now suggest two reasons why this explanation could also be consistent with the “lower for longer” scenario (Chart 5). The first reason relates to hysteresis effects. Deleveraging, tight credit conditions, heightened uncertainty and changes in regulations not only have severe effects on aggregate demand during a “balance sheet recession”, they may also have long-lasting (hysteresis) effects on the growth rate of potential output and the natural real rate of interest.³¹ Financial crises may create a “missing generation” effect: new firms that would have been created never appear. Since firm dynamics are slow, the initial effects of lower entry on aggregate variables may be small, but they are very persistent.³² Moreover, financial crises and the subsequent changes in regulations may have, as a side effect, a long-lasting restrictive impact on the financing of the most innovative and risky projects, thus permanently reducing technological innovation, factor productivity growth, potential output growth and real interest rates.³³ The second reason relates to the highly expansionary monetary policies adopted by central banks in response to “balance sheet recessions” following the GFC, which included both policy rate cuts and QQE. The larger the expansion of the central bank balance sheet and the

³¹ See Hall (2017).

³² See Bloom (2009) and Gourio et al. (2016).

³³ See Reifschneider et al. (2015).



longer the maturity of the assets purchased in QQE, the longer expansionary measures would be expected to be maintained and the more persistent would be the compression of the term and risk premia of interest rates. Market expectations appear to support this view (Chart 4), although the “five-year five-year” rates showed an uptick very recently.³⁴

Several recent explanations of the trend decline in nominal interest rates have examined the nature of the shocks hitting the economy as well as the risk premium component of interest rates.

It has been argued that a significant increase in the risk of rare disasters (such as financial crises) is necessary to reconcile the decrease in interest rates and the increase in the equity risk premium observed over the past 30 years.³⁵ Another explanation of these two phenomena is based on inflation risk premia, which appear to have been declining in advanced economies since the mid-1980s.³⁶ They may even have turned negative in the post-GFC environment,³⁷ which is consistent with the view that the low growth and low inflation environment was expected to prevail as a result of unfavourable demand shocks, and that investors were willing to accept a negative inflation risk premium.³⁸ A newly developed model featuring the lower bound on interest rates finds that inflation risk premia are on average positive when policy rates are sufficiently far from the lower bound, but negative when policy rates reach it.³⁹ An analysis in a macro-financial framework argues that most of the decline in nominal interest rates in the United States and the euro area since the mid-1980s has been due to the real term premium.⁴⁰ Empirical studies have found that the term premium co-moves with the covariance between stocks and bonds, which was positive in the 1980s but negative after 2000 and, in particular, during the 2001 and 2008 recessions.^{41 42}

In some advanced economies, nominal interest rates rose temporarily before the outbreak of the COVID-19 crisis.

This was in part due to a modest cyclical increase in risk-free real and nominal rates related to the economic recovery in some countries (notably the United States), as well as a temporary increase in risk premia in peripheral EU countries. The contrasting decline of short and long-term nominal interest rates in most EU countries into negative territory does not mean that in a LIRE nominal interest rates will remain negative indefinitely, but rather that they could be negative cyclically. Looking forward, expansionary monetary policies in a LIRE and cyclical flight-to-safety phenomena could temporarily move risk premia and nominal interest rates further into negative territory. Contractionary monetary policies (responding to a temporary rise in inflation) and increases in term premia (due to a temporary surge of uncertainty) could increase

³⁴ This must be seen in perspective: Real five-year euro area rates were 0.5% in 2017, -1.2% in mid-2019 and early 2021, and are now (March 2021) -0.9%, and 0.0% in the United States. The gap between US and euro area rate expectations appears to have widened in recent years.

³⁵ See Farhi and Gourio (2018). For a discussion of the increase in the equity premium over the past 30 years, see Caballero et al. (2017) and Delle Monache et al. (2020).

³⁶ See Miller et al. (2020).

³⁷ See D'Amico et al. (2016).

³⁸ See Campbell et al. (2017).

³⁹ See Gourio and Ngo (2016).

⁴⁰ See Hördahl et al. (2016).

⁴¹ See Campbell et al. (2017).

⁴² Note again that the term premium is not identical to the risk premium (Berardi et al., 2021).



rates, but as long as the structural factors that have exerted downward pressure on the natural rate of interest persist, as we expect, the LIRE will remain in place, at least in the medium term.

If the drivers of the trend decline in real rates are indeed structural, then the trend is unlikely to turn around in the short to medium term. But a large positive change in aggregate demand in the United States or the euro area could trigger a short-run turnaround that would affect world savings and investment and lead to a rise in the global real rate. Historically, such a rise has led to a widening of spreads in markets ranging broadly from emerging markets to sub-investment grade corporate bond markets and has put leveraged balance sheets under stress. To this residual uncertainty should be added the poorly understood dynamics of inflation expectations. It is very unlikely that any broad-based inflation dynamics could arise directly from the US stimulus mitigating the economic impact of the COVID-19 pandemic (a fortiori in the EU). Nevertheless, some prices could rise sharply during the recovery, and because of their salience or the reactions of financial market participants, this could have a broader effect on expectations, triggering market dynamics different from those to which we have become accustomed.^{43 44} Hence, even though in the short run the effect is unlikely to be large (in the case of the real rate) or even to materialise (in the case of inflation expectations), it is of course necessary to watch them both closely (see also the discussion below of the effects of the COVID-19 shock).

⁴³ In a postscript added to their book in the summer of 2020, Goodhart and Pradhan (2020) say: "But what will then happen as the lock-down gets lifted and recovery ensues, following a period of massive fiscal and monetary expansion? The answer, as in the aftermaths of many wars, will be a surge in inflation, quite likely more than 5%, or even of the order of 10% in 2021 (assuming that the pandemic gets tamed by the end of this year – the longer the outbreak takes to tame, the weaker will be the ensuing surge in real activity and then inflation)." Without presuming to forecast (nor commenting on the assumed relationship between the duration of the pandemic and the strength of the recovery), we view this outcome as highly unlikely for the United States and a fortiori for the euro area, even given the large US fiscal stimulus launched recently.

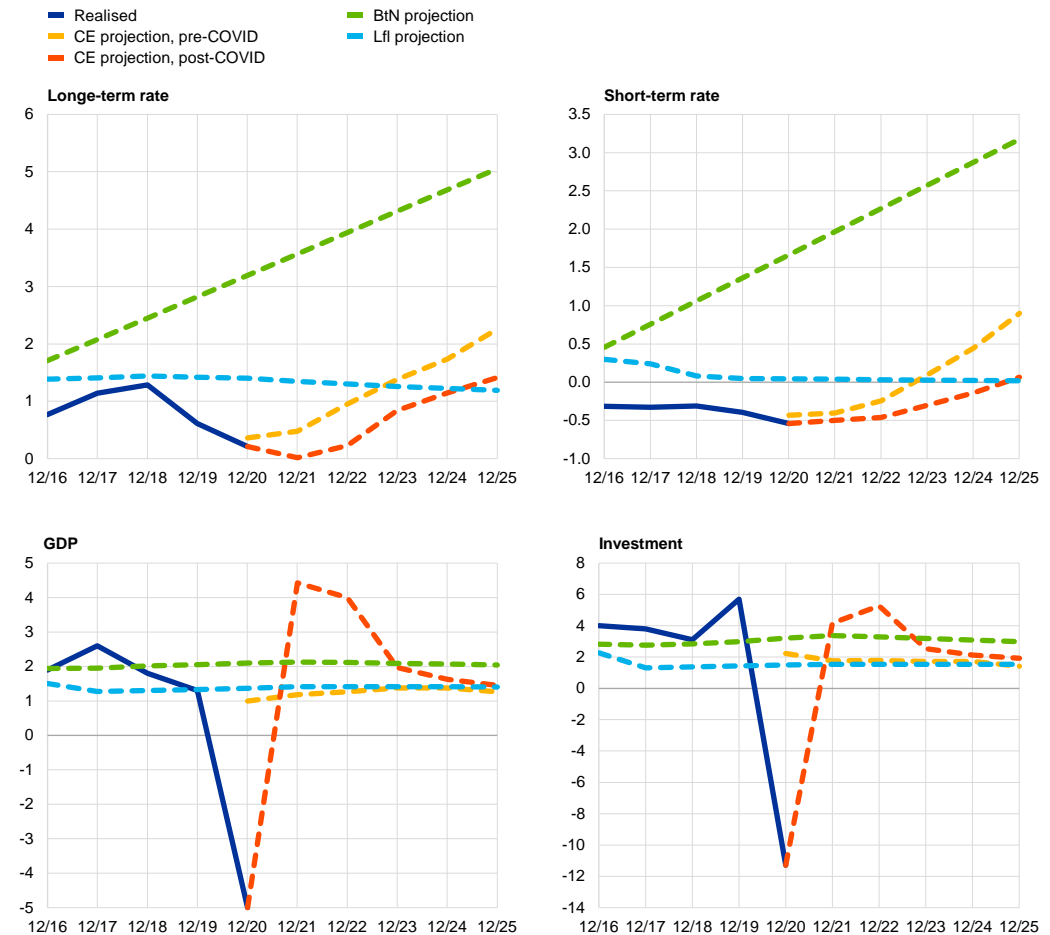
⁴⁴ There seems to have been "pent-up demand to talk about inflation". A Google Trends news search for "inflation" currently shows the highest interest in this topic recorded in the past thirteen years. The previous peak was in 2011 and was not followed by any de-anchoring of (low) inflation expectations. Note also the weak relationship between bond yields and inflation (Gagnon and Sarsenbaev, 2021).



Chart 5

Projected and realised macroeconomic variables

Comparison of projected and subsequent realised macroeconomic variables under the ESRB's 2016 scenarios alongside medium-term Consensus Economics (CE) forecast projections pre- and post-COVID-19 shock.



Sources: ECB, Consensus Economics and Eurostat.

Notes: Realised values refer to real growth rates, except for the long and short-term rates, which are in levels. CE refers to Consensus Economics long-term projections, where pre-COVID-19 are projections as of January 2020 and post-COVID-19 are projections as of January 2021. CE forecasts for the euro area long-term rate are approximated via a debt-weighted average of long-term rate projections for DE, ES, FR, IT and NL. GDP for 2020 reflects Eurostat's preliminary flash estimate (Euroindicators 23/2021, published 16 February 2021) and investment data refer to Q3 2020. BtN stands for "Back to normal" and Lfl stands for "Low for long": both projections were obtained from a VAR(X)-model used in the ESRB's 2016 report. Short-term rate refers to the three-month EURIBOR. The large shock produced by the COVID-19 pandemic is reflected in the growth rates of GDP and investment.

2.2 The COVID-19 pandemic and its impact

The high uncertainty regarding both the medical and the economic aspects of the pandemic shock and the limits of the models used to infer its economic consequences make it very difficult to predict its overall effects on the macroeconomy and interest rates. There is uncertainty about the economic environment with regard to: (i) the persistence of the pandemic



itself and the size and persistence of the direct impact of the shock on aggregate supply and demand and their components;⁴⁵ (ii) the effectiveness of the various fiscal and monetary measures adopted; (iii) the interactions of the transmission mechanisms of those measures; (iv) the immediate and delayed spillovers of the effects of the shock on economic sectors, market segments and countries; (v) the effects on the sustainability of public and private debt; (vi) the effects on the decision-making process and the expectation formation of economic agents and; (vii) possible lasting changes to economic structures induced by the shock. In addition, pandemic shocks such as COVID-19 are very rare events which previously occurred in times and places with economic structures which were very different from those that characterise today's advanced economies. Moreover, they are likely to have non-linear effects on the main macroeconomic variables. Consequently, it is particularly difficult for both reduced form and structural models to provide reliable forecasts.

A number of factors and mechanisms set in motion by the COVID-19 shock may strengthen the downward trend of nominal and real interest rates and increase the probability and persistence of a “low for long” scenario, transforming it into an “even lower for even longer” scenario (Table 1). As long as the negative effects on aggregate demand are greater than those on aggregate supply inflation is expected to decline, thus putting downward pressure on nominal interest rates (since central banks will react by lowering policy rates as long as they are not constrained by the effective lower bound and by implementing QQE). To the extent that expected inflation does not decline by as much as nominal interest rates, real interest rates will also decrease.⁴⁶ Moreover, borrowing and liquidity constraints will exert downward pressure on the natural interest rate even when the size of the supply shock initially exceeds the size of the shock on aggregate demand.⁴⁷ Mobility restrictions and social distancing measures reduce effective labour supply and, as a consequence, investment demand, thus depressing the natural real rate.⁴⁸ Restrictions also constrain consumption, especially in the case of services. In addition to this forced saving, increased uncertainty over the pace and timing of the recovery may induce households to react to the shock by voluntarily saving more, either to replace wealth depleted during the peak of the calamity⁴⁹ or as a result of the surge in precautionary motives that is common in bad and uncertain times.⁵⁰ The precautionary saving boost could become particularly persistent if reinforced by a “scarring of beliefs”, i.e. a persistent change in the perceived probability of an extreme negative shock in the future.⁵¹

⁴⁵ A recent discussion of these uncertainties is in Blanchard and Pisani-Ferry (2021).

⁴⁶ McKibbin and Fernando (2020).

⁴⁷ Guerrieri et al. (2020). The mechanism is the following: workers in affected sectors lose their incomes and cut back spending in every sector. Even if the unaffected workers partially compensate by switching some demand from the affected sectors to the unaffected sectors, the switch may not be great enough to avoid a recession in the unaffected sectors. The reason for this is that the marginal propensity to consume of the unaffected workers is lower than that of the affected workers, owing to the large income losses and borrowing constraints suffered by the latter.

⁴⁸ Rachel and Smith (2017).

⁴⁹ Jordà et al. (2020).

⁵⁰ Malmendier and Nagel (2011).

⁵¹ Kozłowski et al. (2020).



Other factors could exert a positive effect on real interest rates, thereby averting a further downward trend. If the negative effects on aggregate supply are greater than those on aggregate demand, inflation would be expected to increase over a medium-term horizon. Short-term nominal interest rates would rise because of the increase in policy rates that would most likely be implemented by the monetary authorities as a response to higher inflation. At longer maturities, higher nominal yields are driven by savers and investors who require greater compensation for higher (expected) inflation. The effect on real interest rates would depend on the relative size of the increases in expected inflation and nominal interest rates. Real interest rates might increase even if aggregate demand fell more than aggregate supply. In particular, if the effective lower bound on short-term nominal interest rates became binding and APPs were ineffective in lowering long-term nominal interest rates, inflation expectations could fall more than nominal interest rates.⁵² Government expenditure aimed at mitigating the consequences of the pandemic crisis, financed by the issuance of large amounts of safe government debt, may lead to a rise in interest rates.⁵³ If the expansion of government expenditure is directed toward structural reforms and investments in technology, the digital economy transformation could raise productivity growth, exerting a positive effect on real interest rates in the long run. Moreover, the high level of uncertainty created by the pandemic shock should exert upward pressure on the risk premium component of interest rates.⁵⁴

Most analyses that use very long time series to trace back to episodes similar to those which have occurred during the COVID-19 pandemic, or which involve the structured modelling of the economic interactions driven by the pandemic shock and the policy responses to it, conclude that the COVID-19 shock has exerted further downward pressure on market real interest rates and the natural real rate of interest. Research using very long time series for Europe (starting in the 14th century and including 19 major pandemic events during which more than 100,000 people died) to estimate the effect of a pandemic shock finds that, following a pandemic, the natural real rate of interest declines steadily over two decades, with the natural real rate of interest ending up about 150 basis points lower than if the pandemic had not taken place.⁵⁵ Only after four decades does the natural real rate of interest return to the level it would be expected to be at had the pandemic not taken place. The effect is also significant, albeit smaller, in an empirical exercise adapting the standard estimates of the natural real rate of interest⁵⁶ to take the particular characteristics of COVID-19 into account.⁵⁷ An analysis of the US economy's performance following past events that triggered outsized and sudden increases in uncertainty concludes that through the uncertainty channel, the pandemic is likely to weigh on the economy persistently, depressing economic activity, inflation and nominal interest rates well beyond the near term.⁵⁸ The effect of a persistent change in the perceived probability of an extreme

⁵² Fornaro and Wolf (2020).

⁵³ Rachel and Summers (2019); Goy and van den End (2020).

⁵⁴ McKibbin and Sidorenko (2006).

⁵⁵ Jordà et al. (2020).

⁵⁶ According to Holston et al. (2017).

⁵⁷ Holston et al. (2020).

⁵⁸ Leduc and Liu (2020).



negative shock such as COVID-19 is expected to leave its mark on the economy for many years to come, even if everyone is protected by vaccines in a year's time.⁵⁹ In response to a lockdown lasting two months, short-term risk-free real interest rates would fall by almost 1 percentage point.

Table 1 summarises these arguments, without seeking to strike a balance.

Table 1
COVID-19 effects on interest rates: an overview

Rates stable or down	Rates up
Larger negative effects on aggregate demand than on aggregate supply	Larger negative effects on aggregate supply than on aggregate demand, expected medium-term rise in inflation
Lower expectations of a decline in inflation than a decline in nominal interest rates (McKibbin and Fernando, 2020)	Increase in nominal rates at short maturities due to the increase in policy rates in response to higher inflation. At longer maturities, higher nominal yields driven by savers and investors requiring higher returns to compensate for higher (expected) inflation (Goodhart and Pradhan, 2020)
Market frictions, borrowing and liquidity constraints, even when the supply shock initially exceeds the shock on aggregate demand (Guerrieri et al., 2020)	Binding effective lower bound and APPs are ineffective in lowering long-term nominal interest rates, and inflation expectations could fall more than nominal interest rates (Fornaro and Wolf, 2020)
Population growth slows and social distancing reduces effective labour supply and, according to the neoclassical growth model, lessens investment demand, thus depressing the natural real rate of interest (Rachel and Smith, 2017)	The issuance of large amounts of government debt to finance crisis-related government expenditure may reduce savings surplus and push interest rates up (Rachel and Summers, 2019; Goy and Van den End, 2020)
	Fiscal stimulus in the United States will raise growth rates and therefore interest rates – this will be transmitted globally
	“Pent-up” demand from “excess savings”
Increased uncertainty induces households to increase savings, either to replace wealth (Jordà et al., 2020) or for precautionary motives (Malmendier and Nagel, 2011); the propensity to save can be reinforced by “scarring beliefs” (Kozłowski et al., 2020)	High levels of uncertainty exert upward pressure on the risk premia component of interest rates (McKibbin and Sidorenko, 2006)
“Excess savings” are overestimated (Bilbiie et al. 2021)	
Fiscal multipliers will be low because of accumulated savings, and US stimulus will be temporary	
“Mortgage convexity hedging” in the United States will subside	
EU fiscal stimulus falling and significantly lower than estimates of output gap, which may be on the low side (Sandbu, 2021; OECD, 2021)	

⁵⁹ Kozłowski et al. (2020).



3 Financial stability risks in the low interest rate environment

This chapter reviews the LIRE-related risks identified in the ESRB's 2016 report and highlights potential new risks. It takes into account relevant regulatory and policy actions and the potential need for macroprudential policy action to address such risks. The analysis covers the EU financial system as a whole, including banks, non-banks (insurance companies, pension funds and other financial institutions such as investment funds) and market infrastructures, as well as the functioning of financial markets. Developments or risk characteristics may be heterogeneous within a sector (e.g. investment funds) or across countries, and we signal important differences.

Overview of the risks identified in the 2016 report

The main financial stability risks associated with the prolonged LIRE in the ESRB's 2016 report referred to (i) risks to the business models in some sectors of the financial system; (ii) broad-based risk taking affecting financial markets; and (iii) structural changes in the financial sector.

The protracted LIRE exerts pressure on the profitability and solvency of financial institutions. In the LIRE, traditional guaranteed-return business models may become unviable, with recovery and resolution facing challenges. This might be the case for institutions that have a negative duration gap and provide longer-term return guarantees, such as certain life insurance products and defined benefit pension funds. The LIRE also weakens the resilience of the EU banking sector as a result of the negative impact on bank profitability of lower net interest income.

Financial stability risks may increase in the LIRE due to search-for-yield behaviour, accompanied by an excessive build-up of leverage. Intense search-for-yield behaviour can also result in crowded positions in risky assets, as well as uncertainty regarding fundamental asset price values. Asset repricing can become disorderly if market liquidity evaporates, and there may be a simultaneous adverse effect on financial sectors which have become more closely interconnected through exposures to correlated assets.

The LIRE is likely to accelerate the transition towards a more market-based structure of the EU financial system. The growth of non-bank financial intermediation provides a complementary source of finance for the real economy, although it also brings higher sensitivity to market shocks. As a broader consequence of the structural changes fostered by the LIRE, system-wide sensitivity to liquidity risk and cross-sectoral interconnectedness are likely to increase further.



The evolution of financial stability risks since 2016

3.1 Broad-based risk taking

Since 2016, search-for-yield behaviour has intensified in most sectors of the financial system.

The LIRE has generated demand for riskier assets with higher expected returns. This has been met by a rise in the supply of such assets – in particular, debt issued by less financially sound borrowers. Because lower interest rates reduce debt servicing costs, they allow higher levels of indebtedness and leverage, *ceteris paribus*, and thus also make it possible for more highly indebted corporates or governments to issue more debt (Chart A.1, Chart A.2 and Chart A.3).

Search-for-yield behaviour has led to compressed risk premia and elevated asset prices.

The increasing demand for riskier financial assets, driven by search-for-yield behaviour, has also led to a compression of risk premia and a perception that the fundamentals that determine financial asset values cannot always explain prevailing market prices (Chart A.4, Chart A.5 and Chart A.6). Beyond bond prices, particularly high-yield corporate bonds (Chart A.7), other asset prices, such as residential real estate prices, have risen steadily across EU countries, even during the COVID-19 pandemic (Chart A.8 and Chart A.9). Moreover, search-for-yield behaviour may also appear in the compression of expected volatility and the surge in the valuations of alternative asset classes such as crypto currencies (Chart A.10). Indeed, in recent years the ESRB's risk assessments have considered the repricing of risk premia to be the key financial stability risk for the EU financial system.⁶⁰ A part of this dynamic and additional risk-taking is intended by policymakers: accommodative monetary policy seeks to stimulate investment (risk-taking) and economic growth. Recent research has investigated the risk-taking response of financial institutions to lower nominal rates – the risk-taking channel of monetary policy.⁶¹ Taking a financial stability perspective requires assessing to what extent the resulting risk-taking may be excessive.

In recent years, banks have increased lending volumes and tilted their portfolios towards higher credit risk market segments to compensate for declining interest rate margins.

Since 2016, the reduction in banks' net interest margins as a result of the LIRE has been met by growth in banks' lending volumes and by lending moving into higher credit risk exposures.⁶² In particular, EU banks have increased their lending exposures to commercial real estate, consumer lending and

⁶⁰ See **ESRB Annual Reports** from 2014 until 2018. In the ESRB Annual report 2019, the risk assessment takes the COVID-19 situation into account as of June 2020.

⁶¹ Borio and Zhu (2012), Altunbas et al. (2014), Jiménez et al. (2014, 2018), Dell'Ariccia et al. (2017), Delis et al. (2017) and Bonfim and Soares (2018) all provide evidence of a risk-taking channel of monetary policy for US and European banks. Whether low-for-long rates increase risk taking across all types of financial institutions, however, depends on the circumstances in which policy rates are cut and the shape of the yield curve. In addition, there is also evidence of an international risk-taking channel related to US monetary policy and the global financial cycle (Rey 2013; Kalemli-Ozcan 2019; Ioannidou et al. 2015; Lee et al. 2019). Some recent studies focus specifically on the effects of the ECB's policy of negative interest rates and report more risk taking by euro area banks, although they have differing views as to the driving mechanisms (Bubeck et al., 2019; Heider et al. 2019; Bottero et al. 2019), while other studies do not find a relationship between negative interest rates and risk taking (Arce et al., 2018). Box 1 discusses negative rates further.

⁶² See, for example, Kerbl and Steiner (2020).



SMEs Chart A.11 and Chart A.12), i.e. moving towards exposures with higher credit risk.⁶³ Thus, the overall increase in lending volumes and search-for-yield behaviour has compensated for the decline in net interest margins, leading to a relatively stable level of net interest income.⁶⁴ This happened during an economic upturn, however, so it may also reflect some changes in credit demand and structural changes in the sources of funding of the economy as a result of growing market-based finance (Chart A.29). During a downturn, lower net interest margins may not be offset by higher credit volumes and lower levels of non-performing loans.

Public support measures have guaranteed the flow of credit throughout the COVID-19 pandemic.

In response to the COVID-19 economic shock, governments and supervisory authorities have implemented extensive measures aimed at supporting NFCs through public guarantees and loan moratoria and banks by releasing previously built-up capital buffers and providing capital relief by allowing banks to operate temporarily below Pillar 2 Guidance. The latter increased banks' balance sheet capacity in order to avoid a credit crunch, ensuring that they could continue to lend to the real economy.⁶⁵ Indeed, lending to NFCs increased significantly in 2020, while lending to households remained broadly stable. There are, however, significant cross-country differences among EU Member States. Box 2 in the Appendix discusses credit risk in euro area SMEs.

In contrast to the evidence presented in the ESRB's 2016 report, euro area banks have since been granting more fixed-rate loans at increasingly longer maturities (Chart A.13).

Since 2019, across the euro area more than 50% of all mortgages have had a ten-year fixed interest rate, reversing the trend towards more variable-rate loans noted in the ESRB's previous report.⁶⁶ In the case of fixed-rate loans banks bear the interest rate risk, although interest margins are higher than they are for floating rate contracts. When interest rates are low and are expected to remain so for a long period of time, this should not be a major concern.⁶⁷ But long maturities combined with the possibility of an unexpected rise in interest rates may create significant vulnerabilities which are, in a way, reminiscent of the cause of the US savings and loans crisis of the 1980s.

⁶³ Following the GFC, the two loan categories with the highest level of non-performing loans in the EU were loans related to SME and CRE exposures. Moreover, consumer credit is generally not collateralised. In Basel III, the risk weights in the standardised approach for CRE exposures are 70-110%, for SMEs 75-85% and for retail exposures 45-100%. One would need to use micro data to reach a better understanding of the riskiness of individual exposures. These exposures are not necessarily the riskiest from a systemic risk point of view.

⁶⁴ Net interest margin is the differential between the interest rate earned on assets such as mortgages or loans and the interest paid on deposits or market funding. The net interest income is the average net interest margin multiplied by the interest earning assets (or total assets).

⁶⁵ See the ECB's press release "**ECB Banking Supervision provides temporary capital and operational relief in reaction to coronavirus**", 12 March 2020.

⁶⁶ This trend may be explained by both demand and supply factors. On the one hand, in the LIRE banks may prefer a fixed source of income if they cannot achieve perfect hedging of the interest rate risk on variable-rate loans, instead of a variable income with very low interest payments. On the other hand, it may indicate that households prefer to reduce interest rate risks and lock in low interest rates. The reduction of the term premium component of longer-term interest rates, determined since 2015 by the ECB's APP, may have played an important role in moving demand towards longer-term contracts with fixed interest rates. Nonetheless, there is still considerable country heterogeneity.

⁶⁷ Banks can also use derivatives to hedge against interest rate risk, although the extent to which they do so appears rather limited (see Abad et al., 2016; Hoffmann et al. 2019).



Analyses conducted by regulatory and supervisory authorities also find evidence of increased search-for-yield behaviour in the investment fund sector. Search-for-yield behaviour has, until recently, led to a tightening of credit spreads across different asset classes to unprecedented levels. After the sharp increase which followed the outbreak of COVID-19, credit spreads have returned to near pre-pandemic levels against the backdrop of strong policy measures such as the pandemic emergency purchase programme (PEPP) (Chart A.14). Non-bank financial intermediaries now hold a larger share of riskier bonds than they did in 2016⁶⁸, and the growing influence of fund managers' search-for-yield behaviour is giving higher weights to riskier, less liquid and longer-dated debt securities⁶⁹. The share of cash holdings and highly liquid assets held has fallen (Chart A.15). Funds invested in European debt securities have increased their share of corporate bonds relative to government bonds and bank debt securities. Also during this period, the share of AAA compared with AA- bonds in funds' portfolios has fallen, as funds have substituted them with lower-rated bonds that provide greater returns, and the residual maturity of bond portfolios has increased from 7.0 to 7.75 years, continuing the pre-2016 trend (Chart A.16). Moreover, the upturn (which lasted until the COVID-19 shock) in euro area commercial real estate markets reflects, in part, the strong appetite of global investment funds for such assets. The ESRB's NBFi Risk Monitor (October 2020) argues that the LIRE supports strong investor demand for leveraged loans, which offer higher rates of return but also carry greater risks.⁷⁰ In addition, in some segments of the fund industry the use of leverage has increased. The ECB (2019) reports that synthetic leverage (using derivatives) for UCITS has increased,⁷¹ while ESMA (2020) shows that the leverage of alternative investment funds has also risen, in particular for hedge funds.⁷² Box 3 analyses investment funds in Luxembourg. Finally, since 2016, euro public debt MMFs have all but disappeared (as negative yields mean that such funds cannot maintain a stable NAV), while inflows into MMFs investing mainly in private money market instruments have grown. The increase in such MMFs may be partly explained by slightly higher yields compared with bank deposits.

Table A.1 illustrates the heterogeneity of investment fund types and activities. It provides an overview of how investment funds and other financial institutions (OFIs) are involved in various risky activities, including liquidity and maturity transformation, leverage, interconnectedness with the banking system, and credit intermediation. The assessment of the level of engagement in Table A.1 is influenced by the LIRE.⁷³ Hedge funds, financial vehicle corporations (FVCs), as well as security and derivative dealers (SDDs), all engage significantly in the risky activities considered in the 2020 NBFi Risk Monitor. Bond funds, private debt funds and MMFs, as well as special-purpose entities (SPEs) and financial corporations engaged in lending (FCLs), have a medium level of engagement. Mixed funds, private equity funds and ETFs have a

⁶⁸ ECB Financial Stability Review (November 2020).

⁶⁹ Bundesbank (2019a).

⁷⁰ See also the **Thematic note on leveraged finance**, EBA 2020.

⁷¹ The ECB Macroeprudential Bulletin's article "**Is leverage driving procyclical investor flows? Assessing investor behaviour in UCITS bond funds**" (29 October 2019).

⁷² See ESMA's **Annual Statistical Report EU Alternative Investment Funds 2020**.

⁷³ See the ESRB's **EU Non-bank Financial Intermediation Risk Monitor 2020**.



low level of engagement, on average, at the entity level. The assessment includes a more detailed breakdown for MMFs and bond funds. Bond funds are split between funds which invest mainly in corporate bonds and those which invest mainly in sovereign bonds. The level of engagement in risky activities is similar for the two categories, although corporate bond funds do more liquidity transformation. The assessments differentiate between constant net asset value (CNAV), variable net asset value (VNAV) and low volatility net asset value (LVNAV) funds. The main difference relates to liquidity transformation, where CNAVs and VNAVs have a medium level of engagement, while LVNAVs have a pronounced level of engagement. VNAVs offer subscriptions or redemptions at a price which is equal to the MMF's NAV, although they tend to hold a more diversified portfolio, including corporate debt, which can be less liquid. Finally, LVNAVs have a pronounced level of engagement in liquidity transformation given their higher exposure to assets which are less liquid than CNAVs and the risk that such a fund could "break its collar".

The overall credit quality of the prevailing stock of outstanding corporate bonds has deteriorated over time (Chart A.16). Çelik et al. (2020) found that the current stock of outstanding corporate bonds has lower overall credit quality, higher payback requirements, longer maturities and inferior covenant protection. As the market turmoil in March 2020 revealed, these features of corporate bond markets make them vulnerable to a downturn, creating sell-off pressure and affecting liquidity in these markets, as identified by ESRB (2020).

For the insurance and occupational pension fund sector, profitability and solvency pressures from the LIRE may lead to search-for-yield behaviour. The Solvency II regime introduced market-based valuations of assets and liabilities in 2016. Liabilities rise as discount rates fall⁷⁴, while on the asset side falling discount rates lead to both capital gains on existing bond holdings and lower expected returns on new bond investments.⁷⁵ Because life insurers and pension funds typically have long-dated liabilities while the assets they hold are shorter-dated, the sector has a "negative duration gap". A fall in interest rates, then, typically increases the net present value of liabilities by more than it does for assets – it therefore has a negative impact on solvency. As a result, the combination of legacy life insurance contracts with higher guaranteed rates of return⁷⁶ and the sector's negative duration gap can create an incentive for insurers to search for yield (Chart A.20). This also applies to private pension funds promising guaranteed rates of return. In the decade following the GFC, pension funds around the world doubled their allocations to higher yielding alternative asset classes such as private equity and real estate.⁷⁷ The extent of this shift to alternative asset classes has been more pronounced in countries in which long-term interest rates are particularly low. The COVID-19 market turmoil of March 2020 affected insurers and pension funds, and EIOPA found evidence that insurers, in particular, had sold "fallen angels" to protect the

⁷⁴ As of 30 June 2020, the monthly published risk-free rate used for discounting Solvency II insurers' liabilities was negative for maturities of one, five and ten years (See [EIOPA risk-free interest rate term structure](#)).

⁷⁵ Approximately two-thirds of insurers' assets are invested in bonds.

⁷⁶ As of end-2018, the weighted-average period for which interest rate guarantees are expected to apply exceeds ten years in 20 European countries. (EIOPA (2018), "Report on long-term guarantees measures and measures on equity risk").

⁷⁷ Ivashina and Lerner (2018).



credit quality of their asset portfolios. The term “fallen angels” refers to corporate bonds which were formerly investment grade but have been downgraded to high yield.^{78 79} Of the approximately €8.6 billion held in BBB-rated downgraded corporate bonds insurers sold 7.8% net in Q1 2020. These disinvestments in the initial wake of the COVID-19 outbreak were contained and did not pose any systemic risk. After that, the rapid intervention of central banks helped to normalise the markets. Overall, the aggregate asset allocation of insurers and pension funds in the first half of 2020 was fairly similar to what it was at end-2019, and investments in alternative assets are expected to have dampened their portfolio volatility.

Academic and regulatory studies find little evidence of search-for-yield behaviour by the insurance sector – examples of this would be insurers assuming higher interest rate or credit risk. The share of different credit ratings in the ICPFs’ bond portfolios changed little over 2016-20.⁸⁰ Research does find evidence of search-for-yield behaviour, however, *within* a given credit rating step.⁸¹ Also, insurers in some countries have larger allocations to alternative assets, including up to 25% in mortgages and loans at the end of Q4 2019 in NL (Chart A.18). While life insurers’ portfolio weights for real estate have increased moderately, this may also reflect valuation effects as opposed to a rebalancing towards real estate (Chart A.19). Insurers might choose to assume interest rate risk with the goal of following alternative investment strategies rather than pursuing a strict duration-matching strategy.⁸² But there are significant differences across countries.

The LIRE has not led to an overall increase in households’ indebtedness in the EU. The gross debt-to-income ratio has been declining progressively in the EU since 2010, reflecting the deleveraging process under way in those countries that entered the GFC with higher levels of private debt (Chart A.21). ESRB (2019) found, however, that significant household indebtedness in relation to income along with rising residential real estate market prices could increase systemic risk in several EU countries.⁸³ According to the Household Finance and Consumption Network (2020), between 2014 and 2017 households with lower net wealth at the beginning of the sample period took advantage of low interest rates to reduce their leverage. At the same time, however, households with higher net wealth appear to have increased their leverage, benefiting from an increase in income and asset prices (Chart A.22). Again, there are cross-country differences within these developments, also in view of the uneven distribution of household wealth within countries.

⁷⁸ See “**A system-wide scenario analysis of large-scale corporate bond downgrades**”, ESRB (2020).

⁷⁹ See EIOPA’s **Financial Stability Report**, December 2020.

⁸⁰ Close to a third of all assets managed by insurers (more than €3.6 trillion) are invested via collective investment vehicles. Search-for-yield behaviour within funds is more difficult to assess. Source: EIOPA Insurance Statistics.

⁸¹ Academic studies have shown for the United States (Becker and Ivashina, 2015) and, more recently, Europe (Boermans and Van der Kroft, 2020) that regulated entities tend to search for yield by holding the riskiest bonds within a given credit quality step.

⁸² Möhlmann (2019).

⁸³ Indeed, six countries were found to have high risk (CY, DK, LU, NL, NO, SE) and 13 medium risk (BE, EE, ES, FI, FR, GR, IE, IS, LI, MT, PT, SK, UK) in relation to the household stretch (which combines household indebtedness with factors related to residential real estate, such as home ownership). See **Vulnerabilities in the residential real estate sectors of the EEA countries**, September 2019.



The COVID-19 pandemic has further widened inequality of households' income and wealth.

While for workers in some sectors (e.g. telecommunications, IT and finance) employment has remained fairly stable, other workers have seen their livelihoods threatened and have had to rely on furlough and other support schemes (e.g. workers in the hospitality, tourism and entertainment sectors). Moreover, ample liquidity resulting from public interventions, the LIRE and search for yield have caused most financial asset prices to recover quickly from the sizeable shock witnessed at the early stage of the pandemic, to reach historically high levels. Also, residential real estate prices across most of the EU Member States have continued to rise, benefiting homeowners.

The decline in the differential between government borrowing costs and GDP growth rates has improved public debt sustainability.

At the end of 2019, almost all EU countries presented negative differentials between interest rates and GDP growth rates (Chart A.23) – for a given level of the ratio of public debt to GDP, this improves debt sustainability over the long term.⁸⁴ A higher mean debt level is justified when the equilibrium real rate is lower, but the evolution of primary deficits raises concerns going forward.⁸⁵ Following COVID-19, the large drops in GDP and the need to finance larger primary deficits resulting from support measures may risk turning the interest rate/growth rate differential positive.

Looking forward, we can expect a significant increase in private sector indebtedness beyond the existing high levels in certain segments of the household and NFC sectors.

While in some EU countries deleveraging has occurred, all major world economies have witnessed a continuous increase in NFC indebtedness in the aftermath of the GFC, supported by the LIRE and the debt bias of tax regimes.⁸⁶ Similarly, household indebtedness has been a concern in several EU countries in recent years (see the ESRB's 2016 recommendations and the ESRB's 2019⁸⁷ warnings and recommendations on medium-term residential real estate vulnerabilities). During the first half of 2020, there was a significant increase of lending to NFCs, particularly for loans of a smaller size (below €1 million), typically to SMEs.⁸⁸ Credit to households remained relatively stable, mainly due to government support measures such as loan moratoria, grants to households, and furlough schemes.⁸⁹

Public deficits and debt are also expected to continue to increase significantly following the COVID-19 pandemic.⁹⁰ Government debt has risen further since the GFC⁹¹ and, as a result of the

⁸⁴ Just as for the fall of the real interest rate, the evolution over time of the interest rate-growth differential is also related to both secular factors and cyclical developments.

⁸⁵ Blanchard (2019) and Wyplosz (2019) provide interesting reflections on public debt sustainability.

⁸⁶ See [BIS Statistics on indebtedness of the non-financial corporate sector](#).

⁸⁷ See the ESRB [press release](#) of 28 November 2016 and the [press release](#) of 23 September 2019 respectively.

⁸⁸ According to the Q1 2021 edition of [The Euro Area Bank Lending Survey](#): "Euro area banks reported that COVID-19-related government guarantees were important in supporting banks' credit standards and terms and conditions for loans to firms, both SMEs and large enterprises, in 2020."

⁸⁹ See the ESRB (2021) report: "[Financial stability implications of support measures to protect the real economy from the COVID-19 pandemic](#)".

⁹⁰ See the [IMF Fiscal Monitor Update](#) of January 2021.

⁹¹ See the [Debt Sustainability Monitor](#), which has been published by the European Commission since 2017.



economic contraction suppressing revenues as well as various public support measures, primary deficits reached very high values in 2020 (the EU's government deficit-to-GDP ratio increased from -0.5 % in 2019 to -6.9 % in 2020, the highest in the time series), increasing public debt (the EU government debt-to-GDP ratio increased from 77.5 % at the end of 2019 to 90.7 % at the end of 2020, the highest in the time series).⁹² Looking ahead, the rise of indebtedness during the COVID-19 crisis is likely to remain, at least until pandemic-related uncertainty abates and most economies return to a solid growth path.⁹³ Under these circumstances, borrowers would be quite vulnerable to any negative shocks and could transmit these vulnerabilities to the financial sector through debt instruments on the liability side of their balance sheets (bonds and bank loans).

The dynamics identified in this section can feed off each other to create a “vicious cycle” of increasing asset prices, intense risk-taking behaviour and higher leverage. Intense risk-taking behaviour fuelled by investors searching for yield applies upward pressure to asset prices. Higher prices reduce expected returns and, in turn, contribute to cheaper funding conditions for issuers. Higher portfolio valuations enable investors to increase their leverage, exerting additional upward pressure on asset prices. These dynamics make the system vulnerable the moment “the music stops” (which could come through an income shock or another trigger leading to a reassessment of risk premia). The extent of upward movement in prices differs across asset classes, but the accumulation of debt is widespread and rising, and this creates vulnerabilities.⁹⁴ These developments could reverse abruptly and turn into a disorderly downward spiral of deleveraging, falling asset prices and increasing defaults. Moreover, some researchers maintain that high levels of private and public debt lead ultimately to lower levels of economic growth.⁹⁵

3.2 The sustainability of business models

The LIRE has important implications for the sustainability of some business models in the financial sector.

The LIRE contributes to reducing net interest margins, with consequences for several aspects of banks’ traditional maturity transformation. Net interest income is usually the most important source of income for banks. As lending rates have continued to fall since 2016, the net interest margin has dropped further, with many market rates turning negative. But 48% of the banks responding to the EBA Spring 2020 Risk Assessment Questionnaire reported that there was no legal clarity (including legal restrictions) with regard to the application of negative interest rates on deposits. The inability of banks in some countries to pass on negative rates to their customers

⁹² See the Eurostat [Government finance statistics](#) of 21 April 2021.

⁹³ See Blanchard (2019) for a discussion on the public debt and low interest rates.

⁹⁴ As has been well established by Schularick and Taylor (2018) and others, lagged credit growth and asset prices are highly significant predictors of financial crises.

⁹⁵ See Cecchetti et al. (2011) and references therein for further discussion of the real effects of debt.



contributes to the squeeze on net interest margins.⁹⁶ Over the review period, the overall increase in lending volumes, falling volumes of non-performing loans, and search-for-yield via riskier interest-bearing assets have compensated for the decline in net interest margins, leading to a relatively stable level of net interest income (Chart A.12, Chart A.24 and Chart A.25).⁹⁷ This may not, however, be sustainable in a less favourable environment.

The share of deposits with a stuck-at-zero rate represents a major part of banks' overall deposits. A gradual pass-through of negative rates on NFC deposits has been observed since 2015. By end-2020, the share of negatively remunerated deposits in the euro area (three-month moving average) was around 41% for NFC deposits and 21% for household deposits. One obvious obstacle to charging negative rates on deposits stems from explicit or implicit country-specific legal constraints. Research finds that where there is no legal impediment, the application of negative rates to NFC deposits depends positively on the degree of banks' capitalisation and the size of clients' deposits (see Box 1). These pressures on bank profitability⁹⁸ may contribute to increased risk taking by banks, as described in the preceding section, as well as banks seeking to diversify income sources beyond net interest income (e.g. fee income).

NFCs facing negative deposit rates tend to increase their fixed investment and rebalance their portfolios away from bank deposits. Research on euro area firms finds that companies with high levels of cash holdings linked to banks charging negative rates increase their investment and decrease their cash holdings to avoid the costs associated with negative rates.⁹⁹ Similarly, Danish firms which are more highly exposed to negative deposit rates than other firms increase their fixed investment and employment. They also tend to rebalance their portfolio of liquid assets away from bank deposits and reduce their degree of leverage.¹⁰⁰

There could be some non-linearities and heterogeneous responses to negative deposit rates for households. There is limited evidence, however, with regard to negative deposit rates and household behaviour.¹⁰¹ Economic theory suggests that changes in interest rates have both direct and indirect effects¹⁰² on household consumption. The relative importance of these effects is determined by how strongly household consumption responds to changes in real interest rates given disposable income, and to changes in disposable income given the real interest rate. Moreover, since household wealth is unevenly distributed and there are large differences in the

⁹⁶ See the [EBA Spring 2020 Risk Assessment Questionnaire](#) for more details.

⁹⁷ There is abundant academic evidence regarding the effect of interest rates on net interest margins, including for the euro area (Claessens et al. 2018; Coleman and Stebunovs, 2019; Borio et al., 2017; Altavilla, Boucinha and Peydró, 2018; Bundesbank, 2018; Lopez et al., 2018; Gennay and Podjasek, 2014; Bundesbank, 2015).

⁹⁸ See Kerbl et al. (2019) and Kerbl and Sigmund (2016).

⁹⁹ Altavilla et al. (2020).

¹⁰⁰ Abildgren, K. and Kuchler A. (2020).

¹⁰¹ See a recent speech by Tenreyro (2021), Swoboda (2021) and IMF (2021) for recent reviews of issues related to negative interest rates. According to the IMF (2021): "Empirical studies of the response of household savings and portfolio choices to NIRP are largely absent." But that may be because banks are either constrained not to charge negative rates or prefer not to. "...particularly for households, banks tend to raise fees and commissions rather than impose negative rates."

¹⁰² See Kaplan et al. (2018).



composition of households' portfolios, households may react very differently to negative deposit rates. There may be some non-linearities moving from +0.1 to (say) -0.2%, because of the existence of zero interest-bearing currency, but there is no research on the likely importance of these non-linearities. Households will lack the scale incentives that NFCs have to switch out of deposits into interest-bearing currency. But the differences in households' income and wealth distributions suggest heterogeneous responses. Once again, however, we currently have no evidence on whether deposit rates turning negative might provoke a significant household switch out of deposits.¹⁰³ Overall, the country case studies in IMF (2021) find no untoward effects with regard to households' or firms' behaviour when banks move to charging negative rates on deposits.

Low interest rates may have multiple effects on banks' asset quality. As lower interest rates ease debt servicing pressures for borrowers, they contribute positively to banks' balance sheets by reducing non-performing loans. Low interest rates also induce forbearance, however, allowing banks to "evergreen" past due loans, thereby deferring the recognition of non-performing loans as well as allowing the financing of non-viable borrowers ("zombies").¹⁰⁴ Rapidly deployed public support measures such as loan moratoria, guarantees and grants to households and NFCs as a response to the COVID-19 shock made it possible to avoid a significant increase in defaults and a deterioration of asset quality in 2020. This may reverse once the impact of COVID-19 begins to materialise fully on lenders' balance sheets.

In the LIRE, bank customers may shift towards other institutions providing financial services, creating further excess capacity in the EU banking system. The low returns on bank deposits make them unattractive as saving and investment vehicles for households and NFCs, who may be incentivised to move savings to alternative investments such as MMFs and investment funds. Moves out of deposits into non-currency stores of value will be less likely, however, if non-bank sector financial instruments themselves start paying negative interest rates when economic conditions lead to negative deposit rates. The share of loans granted by insurers and pension funds has been growing in recent years, particularly in certain EU Member States (such as the Netherlands), although it still remains relatively low in the aggregate. New technology and the absence of expensive legacy systems and branch networks provide a comparative advantage for fintechs and, increasingly, big techs to enter the market where banks have traditionally operated, creating further excess capacity in the EU banking system. Consequently, if market forces do not lead to the exit of the least efficient institutions, all banks will eventually have to shrink, including the most efficient. Both the LIRE and the competitive push from new and old non-bank financial intermediaries are challenging banks' business models.

Under these circumstances, the structural vulnerabilities of the EU banking system increase in importance and negatively affect banks' profitability, sustainability and capacity to serve the real economy. In the EU there has long been a strong reliance on banks for the provision of

¹⁰³ See Ulate (2021).

¹⁰⁴ See [ESRB report 'Prevention and management of a large number of corporate insolvencies' \(2021\)](#).



credit to the real economy.¹⁰⁵ Despite the deleveraging and restructuring which took place after the GFC, and even though there has been some progress with the capital markets union, the overall EU banking system is still too big. By way of comparison, the aggregate balance sheet of EU banks represented 200% of GDP at the end of 2018, while the same metric for the United States has consistently produced a figure of around 80% over the last 15 years. The structural vulnerabilities relate, in particular, to overcapacity and high cost structures as well as to the slow progress made in resolving legacy assets and non-performing loans. Large networks of bank branches and the number of institutions also indicate that there is excess capacity in the current EU banking system and may also signal that economies of scale have not always been fully exploited. European banks were slow to resolve the non-performing loans generated in the GFC and have been operating with inefficient cost structures in recent years, as shown by cost-to-income and cost-to-assets ratios.¹⁰⁶ The extent of these structural vulnerabilities varies by country. In the LIRE, which compresses net interest margins, and with increased competition from non-banks, addressing these structural vulnerabilities is essential to ensure the banking system is resilient, sustainable and effective in serving the real economy's financial services requirements.

Due to the insurance and occupational pension fund sectors' negative duration gaps, a "double hit" scenario could severely impair their resilience. The LIRE has hit balance sheets with a negative duration gap.¹⁰⁷ If the aforementioned cycle of increasing leverage and asset prices were to reverse abruptly, the higher net present value of liabilities would coincide with a fall in the value of assets – a "double hit" scenario.¹⁰⁸ The market turmoil of March 2020 brought about such a "double hit", with risk-free interest rates plummeting along with asset prices. Although asset prices recovered quickly, risk-free interest rates have stayed low, putting further pressure on the insurance and pension funds sectors.

The insurance sector faces significant risks related to low interest rates given its high stock of liabilities providing a guaranteed return in the life insurance business.¹⁰⁹ In 89% of EEA¹¹⁰ countries the majority of life insurance products with profit participation featured an interest rate guarantee in 2018 (Table A.2), in particular in the "life insurance with profit participation" business segment. The weighted average of these guaranteed rates lies above 1.5% for most countries (Chart A.26).¹¹¹ This is evidently unsustainable and puts pressure on insurers to find alternative

¹⁰⁵ See the 2014 ESRB ASC Report "Is Europe Overbanked?".

¹⁰⁶ See also the [ESRB Annual Report 2018](#).

¹⁰⁷ EIOPA has recommended reviewing the extrapolation of long-term rates to reflect current market rates more effectively, as current extrapolation methods may underestimate the actual net present value of future liabilities. See [EIOPA Opinion on Solvency II Review](#), EIOPA (2020).

¹⁰⁸ See [Results of the EIOPA 2017 pension fund stress test](#), EIOPA (2017).

¹⁰⁹ In 2019, life insurance accounted for 53% of total Gross Written Premiums (excluding UK and Gibraltar), while non-life accounted for 47%. In terms of total assets, life insurance's share was 77% while non-life's share was 23%.

¹¹⁰ Including the United Kingdom at the time of data collection.

¹¹¹ The weighted average guaranteed rate in Chart A.26 is for life and composite insurers, at country level, and is calculated using the best estimate, by homogeneous risk group, as weights based on the Solvency II reporting (QRT S.14.01). It includes contracts with no guaranteed rates. The medians in Chart A.26 refer to figures of individual undertakings' guaranteed rates from national statutory accounts (See EIOPA (2020), "Impact of Ultra Low Yields on the Insurance Sector, including First Effects of COVID-19 Crisis", p. 28).



sources of return, all the more as between end-2016 and mid-2020 the share of their bond holdings with a negative yield to maturity increased from 21% to 27%.¹¹² Moreover, an analysis by the CGFS (2018) of a “low for long” scenario suggests that life insurers will start to suffer from negative net cash flows by 2023.

For pension funds, the most significant risk in the LIRE stems from defined benefit liabilities.^{113 114}

The 2019 pension fund stress test found that even under the baseline scenario, the Institutions for Occupational Retirement Provision (IORPs) were underfunded by €41 billion on aggregate (4% of their liabilities) when using the EIOPA’s common methodology, although they held sufficient assets over liabilities (€19 billion) when national methodologies were used. The adverse market scenario would have led to aggregate shortfalls of €180 billion according to national methodologies and €216 billion according to the common methodology.¹¹⁵ Since 2013, coupon income under the LIRE has dropped from around 4.0%, reaching about 2.75% in 2019. When these assets reach maturity they will need to be substituted by other assets with still lower returns, putting financial margins under significant pressure.¹¹⁶

The LIRE is positive for asset management businesses generally, although it may have a negative effect on the business models of some investment fund categories.

The LIRE increasingly challenges the business model of MMFs, especially in the case of low volatility net asset value (LVNAV) and constant net asset value (CNAV) funds.¹¹⁷ Since 2016, euro-denominated MMFs have consistently delivered negative returns, though US dollar-denominated MMFs have delivered positive returns (Chart A.28). The LIRE, and in particular negative interest rates, present a potential cliff-effect, especially for the CNAV business model, possibly making it unviable in the long run. The market share of CNAV funds is very small, however, so this is unlikely to affect financial stability. Still, MMF managers operating CNAVs should make sure that they are able to maintain the stable NAV of the funds they offer, including through stress tests and reverse stress tests, as foreseen in the Money Market Funds Regulation. Managers offering CNAVs should also be prepared to liquidate or switch their funds to other types of MMF if they are unable to maintain a stable NAV. To avoid CNAVs breaking the buck, with possible contagion effects on other MMFs, managers should have systems and policies in place which will enable them to

¹¹² The 2018 EIOPA stress test found that in a prolonged low-yield environment, European insurers’ capital positions would be significantly impaired.

¹¹³ As per calculations by the ESRB using EIOPA data, 86% of the stock of pension assets currently pertain to defined benefit pension plans (excluding the United Kingdom), while only 11% belong to defined contribution pension plans and 3% to hybrid or other plans.

¹¹⁴ See, for example, Serrano Sánchez, S. and Peltonen, T. (2020), “**Pension schemes in the European Union: challenges and implications from macroeconomic and financial stability perspectives**”, *Occasional Paper Series*, No 17, ESRB, Frankfurt am Main, July.

¹¹⁵ See “**EIOPA publishes the results of the 2019 Occupational Pensions Stress Test**”, December 2019.

¹¹⁶ Between the end of 2016 and mid-2020 the share of bonds with a negative yield to maturity increased from 27% to 38% for pension funds.

¹¹⁷ In the EU almost the entire EUR MMF market is concentrated in variable net asset value (VNAV) funds, with just a small proportion in low volatility NAV (LVNAV) funds and a negligible proportion in constant NAV (CNAV) funds, which are predominantly USD funds. Using granular data on US MMFs, Di Maggio and Kacperczyk (2017) found that in the context of low interest rates MMFs are more likely to exit the market as a result of increased profitability pressures.



proceed with an orderly liquidation of the fund (or conversion to other MMF regulatory types) if the stable NAV cannot be maintained. Such policies include communicating with investors and supervisors.

Similar business model issues may also arise for bond funds, which will yield low returns unless they increase their share of riskier high-yield bonds or obtain returns by trading their portfolio (valuation rather than cash-flow effects). Investors seeking higher returns on their assets will reduce their investments in these funds, while those using these funds for cash management purposes are likely to remain invested, although they will have to pay for the cash management service going forward whereas they earned a return in the past.

3.3 Structural changes in the financial system

A more market-based financial system provides benefits as it offers diversified sources of funding to the economy, although it can also lead to higher interconnectedness and sensitivity to market risks, as witnessed in March 2020.¹¹⁸ The share of credit provided by non-banks to the private non-financial sector varies from 25% to above 80% across the EU (Chart A 29 and Chart A.30) and has increased in recent years. The trend towards a more market-based financial system is welcome as it provides the real economy with alternative sources of funding (a “spare wheel”). But this may also bring increasing interconnectedness (which is often opaque)¹¹⁹ and greater sensitivity to market shocks, especially where the LIRE has led to a build-up of leverage. Moreover, as described earlier, the search for yield can induce investors to increasingly select lower liquidity assets, potentially making the financial system vulnerable to systemic liquidity risk.

Regulatory reforms implemented after the GFC have increased the safety and resilience of the financial system. At the same time, they have driven banks and other market participants to make adaptations that may affect market-making activities. Binding leverage ratios penalise, in terms of capital requirements, lower-risk activities such as market-making more than higher-risk activities. This may have reduced broker-dealers’ capacity to hold large securities inventories, and therefore their intermediation and absorption capacity, especially during market downturns when investors are looking to sell risky securities.^{120 121} This evolution is, for instance,

¹¹⁸ See FSB (2020) and later discussion.

¹¹⁹ Portes (2018).

¹²⁰ See Duffie (2018). High-frequency trading can follow, and even dominate, market-making strategies (Boehmer et al., 2018; Brogaard et al., 2015; Hoffmann, 2014; Malceniace et al., 2019). But these market-makers, in contrast to banks, tend to become liquidity consumers in times of financial stress (Huh, 2014; Malceniace et al., 2019).



visible in higher spreads in repo markets.¹²² At the same time, an increasing amount of trading takes place on exchanges via central limit order books that directly match buyers and sellers, thus effectively disintermediating brokers and dealer banks. This can contribute to a system that is more vulnerable to liquidity shocks, as the intermediation capacity of natural market-makers has been reduced. The effect is likely to become more prominent going forward in a scenario of increased debt securities in circulation and banks reducing their intermediation and market-making, particularly in times of market turmoil (Chart A.31).

Margin requirements and central clearing have lowered counterparty credit risk, but they have potentially increased liquidity risks. The LIRE can act as an amplifier and can enhance these risks by facilitating higher levels of leverage.¹²³

In response to the LIRE, the insurance and occupational pension fund sectors are beginning to transfer risks to customers by significantly reducing the number of guaranteed products or defined benefit pensions. In response to the pressures on profitability arising from promises of high guaranteed returns, insurers and pension funds have drastically reduced the level of guarantees offered in new contracts while they have incentivised the flow of new products such as unit-linked or multiclass contracts which transfer part of the risk to customers.¹²⁴ European insurers have reduced the level of guaranteed rates for new products considerably compared with existing liabilities (Chart A.32). Similarly, defined benefit schemes have declining coverage ratios, giving rise to new forms of hybrid or defined contribution schemes that transfer risk to households, which behave more procyclically than insurers and pension funds.¹²⁵

¹²¹ See “**Holistic review of the March market turmoil**”, Financial Stability Board, November 2020, which finds that “*Absent central bank intervention, it is highly likely that the stress in the financial system would have worsened significantly. This would have had a major impact on the ability of financial and non-financial firms to raise funds. The need to intervene in such a substantial way has meant that central banks had to take on material financial risk. This could lead to moral hazard issues in the future, to the extent that markets do not fully internalise their own liquidity risk in anticipation of future central bank interventions in times of stress. Moreover, the exceptional measures taken by central banks were not aimed at addressing the underlying vulnerabilities that amplified the stress. The financial system remains vulnerable to another liquidity strain, as the underlying structures and mechanisms that gave rise to the turmoil are still in place.*”

¹²² See Chart 3 in Duffie, D. (2016), “**Financial regulatory reform after the crisis: an assessment**”, contribution to the ECB Forum on Central Banking in Sintra, June.

¹²³ Cont (2017) describes how margin requirements, which effectively reduce credit risk via the collateralisation of exposures, have increased liquidity risk, because margin calls must be met within strict timelines. Central counterparties usually apply conservative collateral requirements, which increases the demand for low-risk, high-liquidity bonds that can be pledged as collateral. As investors prefer to hold higher-yielding assets for returns, but need liquid assets to meet margin requirements, this has led to “collateral upgrade” services being offered whereby dealer banks essentially perform a liquidity and credit risk transformation by swapping higher-quality collateral against lower-quality collateral for a fee. Finally, variation margin calls must usually be met in cash. The result is a system which is more vulnerable to liquidity shocks, especially when the cycle reverses with rapidly dropping prices and the deleveraging of portfolios, because of the confluence of (i) high asset valuations; (ii) cheap funding costs that enable investors to take on more leverage; (iii) the substitution of credit risk for liquidity risk; and (iv) a reduction in the balance sheet space and intermediation capacity of broker-dealers.

¹²⁴ Kojien and Yogo (2020) find that US life insurers have significantly reduced the level of guaranteed returns in their variable annuity products or have even stopped offering guarantees altogether. To foster personal pensions in the LIRE, the new PEPP offers a relatively high level of capital protection, which can be further extended to a guarantee. See Regulation (EU) 2019/1238.

¹²⁵ See Sánchez Serrano and Peltonen (2020) for a more detailed discussion.



The investment fund sector has seen a significant increase in the use of passive investment strategies (ETFs and other similar funds) – most probably because they have thinner cost structures. Active investment strategies provide managers with full discretion to select the securities the fund invests in (the objective being to improve performance relative to a benchmark index), while passive investment strategies replicate an index (or a part of it or a similar benchmark), so the securities the fund invests in are automatically selected. As a result, operating costs are lower for passive investment funds, and costs are also lower for investors. While the gross performance (before deducting the costs to investors) has been similar overall for both active and passive investment funds in recent years, the cost structure of passive investment funds (e.g. ETFs) allows them to show a consistently higher net performance than active investment funds.¹²⁶ This performance differential becomes more important in a LIRE. The rise of ETFs and other forms of passive investment affects market functioning and financial stability¹²⁷, and the co-movement between individual securities and indices increases when the security is included in ETF portfolios. Also, there has been an increase in co-movement across ETFs, probably because of the profile of ETF investors. Gathering evidence of the impact of passive investment on market volatility with the potential to generate episodes of illiquidity focuses on those ETFs with illiquid underlying securities, on times of financial stress, and on ETFs with a more complex investment strategy. During the market turmoil of March 2020, there was a decoupling between ETF share prices and the price of underlying securities which lasted for several days, signalling a lack of liquidity in the underlying assets.¹²⁸ The automatic selection of securities included in an index and the existing concentration in the ETF market are also relevant to the financial stability impact of ETFs and other passive investment vehicles.

3.4 Risk assessment

Risk assessment takes into account enhanced resilience as well as regulatory reforms and mitigating policies. The LIRE threatens the long-term viability of core business models in several sectors of the EU financial system and may result in disorderly adjustments. At the same time, many new regulations and policies which have entered into force in recent years are intended to raise the resilience of the EU financial system and thus also to mitigate financial stability risks related to the LIRE. Moreover, extraordinary monetary and fiscal actions have supported the EU economy in the face of the COVID-19 shock. Asset purchases under the ECB's PEPP and liquidity provision to banks through targeted longer-term refinancing operations have allowed the financial sector to act as a backstop for the euro area economy. These monetary initiatives have been complemented by the fiscal actions of individual governments and by a common fiscal response at the EU level. The support provided by all these measures has been essential to guarantee the stabilisation of financial markets.

¹²⁶ ESMA (2020).

¹²⁷ See Ben-David et al. (2017); Pagano et al. (2019); Kenechukwu et al. (2020).

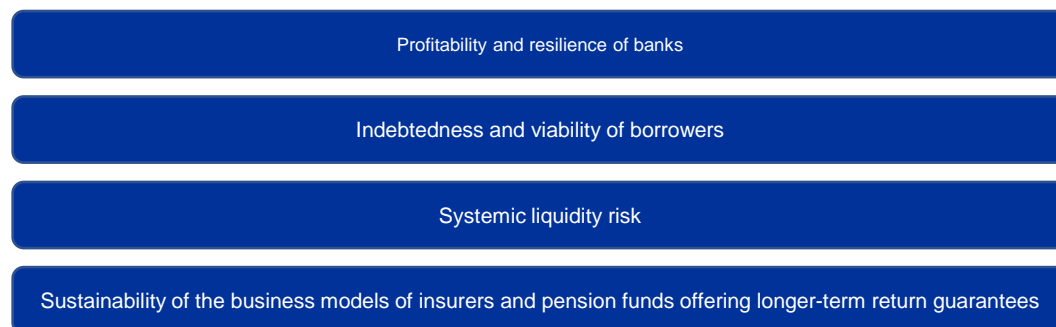
¹²⁸ Financial Stability Board (2020).



The risk analysis in Chapter 3 highlights four areas of concern in the LIRE, as shown in Figure 7.

Figure 7

Key areas of concern in the LIRE



The sustainability of the business models of banks, insurers and pension funds

For the banking sector, continuing pressures stemming from weak profitability in the LIRE, digitalisation, and competition from the non-banking sector, as well as a likely deterioration of asset quality in the medium term due to the COVID-19 shock, pose fundamental challenges. This risk is of particular concern given the central role the banking sector plays in the EU economy. Furthermore, under the LIRE the structural vulnerabilities of the EU banking system take on greater importance and have a further negative effect on banks' profitability, sustainability and capacity to serve the real economy. These structural vulnerabilities relate, in particular, to overcapacity and high cost structures as well as to the slow progress made in resolving legacy assets and non-performing loans. The magnitude of each of these structural vulnerabilities is country-specific. For the EU as a whole, however, addressing weak bank profitability and structural vulnerabilities is essential to ensure that the banking system is resilient, sustainable and effective in serving the real economy's financial services requirements. These concerns persist, even though important regulatory and supervisory action has been taken to improve EU banking sector resilience and resolvability, while counterbalancing increased risks: the implementation of Basel III including intensified micro and macroprudential supervision, the BRRD, IFRS 9, and the establishment of the SRB, as well as an overall improvement of banks' asset quality.

Similarly, the combination of the LIRE and the insurance and pension fund sectors' negative duration gap, as well as the high level of guarantees, presents a medium to long-term viability challenge for these sectors. The insurance sector faces significant risks related to low interest rates given its high stock of liabilities providing a guaranteed return in the life insurance business. A successful transposition of EIOPA's Opinion¹²⁹ into legislation would reduce the risks posed by the LIRE for the insurance sector. Additional mitigating factors are the very low number of

¹²⁹ See EIOPA (2020), Opinion on the 2020 Review of Solvency II.



new contracts issued with return guarantees, the long-term horizon over which the risks are expected to materialise, and the introduction of an EU-wide harmonised recovery and resolution framework to ensure the orderly exit of unviable firms.

For pension funds, the most significant risk in the LIRE stems from defined benefit liabilities. The 2019 EIOPA IORP stress test found that some pension funds were underfunded even in the baseline scenario, when the common methodology was used. The adverse market scenario would have led to substantial aggregate shortfalls.¹³⁰ While many IORPs have reacted to the LIRE by shifting their business model to selling defined contribution funds in which investors bear the risk, they still have existing defined benefit liabilities on their balance sheets. The IORP II Directive puts greater emphasis on risk management through new governance requirements (e.g. a risk management function, an own risk assessment, the consideration of environmental, social and governance risks and cross-border aspects) and was accompanied by new pan-EU pension reporting.

The indebtedness and viability of borrowers

The LIRE facilitates higher leverage and encourages search for yield. The level of indebtedness across the real economy and the financial system has risen considerably and is expected to increase further as a consequence of the COVID-19 shock. This may threaten financial stability in the medium term, although the LIRE has brought down the cost of servicing the debts. Debt levels for the public sector and the NFC sector have risen considerably in recent years, with an additional surge from the response to COVID-19. While household debt has been declining since the GFC (perhaps as a correction of unsustainable levels), it may increase again in response to COVID-19. Although appropriate in response to the unprecedented macroeconomic shock, the sweeping measures taken by governments to stabilise aggregate demand and employment could raise debt sustainability concerns, especially if a reassessment of credit risk were to increase risk premia and increase debt servicing costs. A materialisation of this risk would have significant consequences for financial stability in the EU.¹³¹ Highly indebted entities are vulnerable to shocks, even if their debt is currently manageable. Safeguarding financial stability in this context should therefore include making it easier to monitor private sector indebtedness, and measures to restructure viable businesses promptly should be reinforced. Efficient insolvency procedures should ensure that non-viable firms are swiftly unwound and resources reallocated to productive uses.

¹³⁰ In the baseline scenario, these IORPs were underfunded by €41 billion on aggregate, which translates into 4% of their liabilities, according to the common methodology. The adverse market scenario would have led to substantial aggregate shortfalls of €180 billion according to national methodologies and €216 billion following the stress test's common methodology.

¹³¹ Our maintained hypothesis here, following the analysis in Chapter 2, is that the LIRE will persist for a long time. This does not, however, exclude a short-term shock to risk premia, which could be destabilising.



Systemic liquidity risk

The LIRE and structural changes have given rise to a financial system that is more sensitive to market shocks and systemic liquidity risks through three broad channels of transmission.

First, the LIRE creates incentives to search for yield in assets typically characterised by relatively low or unstable market liquidity. Second, low interest rates and abundant funding liquidity injections can contribute to liquidity illusion, causing investors and issuers to regard their own liquidity risk exposure as low. Third, the need to invest abundant liquidity contributes to the creation of new interlinkages both within the financial system and also with the non-financial sector. This gives rise to a liquidity multiplier that increases systemic liquidity risk across the financial sector and can adversely affect financial stability and the real economy in times of stress.

The sharp fall in asset prices observed at the onset of the COVID-19 pandemic was accompanied by substantial redemptions from certain investment funds and MMFs and a significant deterioration in financial market liquidity. Market shocks, such as sharp drops in asset prices and high levels of market volatility, generate increases in variation margins and may also lead to significant initial margin calls on positions in cash securities, commodities or derivatives. Such market dynamics have major implications for market participants' liquidity management, for their funding needs, and possibly even for their solvency if the liquidity stress leads to systematic fire sales of assets. Only by taking decisive action were central banks, supervisory authorities and governments able to stabilise market conditions in March 2020. Macroprudential and supervisory authorities therefore need to be better prepared to monitor, prevent and address liquidity risks by taking a system-wide perspective.



4 Policy perspectives in the low interest rate environment

This report proposes policy options in three areas to address systemic risks¹³² related to the extended LIRE and structural changes in the EU financial system following the COVID-19 pandemic: 1) the profitability and resilience of banks; 2) the indebtedness and viability of borrowers; and 3) systemic liquidity risk. Moreover, the report emphasises the importance of enhancing the macroprudential policy toolkit for the insurance sector and completing the policy proposals of the ESRB's 2016 LIRE report, particularly with regard to the insurance and pension fund sectors offering longer-term return guarantees. Section 4.1 proposes policies addressing the following concerns.

1. The profitability and resilience of banks. The LIRE accentuates the negative effects of the existing structural problems in the EU banking sector, such as overcapacity and cost inefficiencies. This puts further pressure on already low bank profitability, reduces resilience and threatens the viability of weakly capitalised banks. It is therefore necessary to identify unviable banks and manage problems sufficiently early on, through intervention or orderly exit, to avoid adding to the existing structural problems. The central role of the banking system in the EU economy as well as the prospect of “lower for longer” makes it imperative to implement policies aimed at improving profitability and addressing structural factors related to overbanking.

2. The indebtedness and viability of borrowers. The LIRE facilitates higher leverage and encourages search for yield. The level of indebtedness across the real economy and the financial system has risen considerably and is expected to increase further as a consequence of the COVID-19 shock. This may threaten financial stability in the medium term, although the LIRE brings down the cost of servicing the debts. Highly indebted entities are vulnerable to shocks, even if their debt is currently manageable. Safeguarding financial stability in this context means targeting the most dangerous levels and trends of indebtedness. It should be made easier to monitor debt and other factors that may lead to unsustainable debt. Effective policy also requires strengthening measures used to restructure viable businesses promptly and establishing efficient insolvency procedures to ensure that non-viable firms are swiftly unwound and resources reallocated to productive uses.

3. Systemic liquidity risk. The LIRE and the structural changes give rise to a financial system that is more sensitive to market shocks and systemic liquidity risks through three broad channels of transmission: the endogenous build-up of risk, liquidity illusion, and interconnectedness within the financial system. This was confirmed by the systemic liquidity tensions experienced by financial intermediaries during the March 2020 turmoil. Macroprudential and supervisory authorities must

¹³² While acknowledging that they are also important in determining R*, this report does not discuss structural or labour policies but focuses instead on policies addressing the systemic risks in the financial system which are related to the LIRE.



therefore monitor more effectively, prevent and address liquidity risks by adopting a system-wide perspective.

The ESRB's 2016 report had already presented 17 policy options in a comprehensive macroprudential approach aimed at enhancing financial stability and mitigating systemic risks in the LIRE. These focused on monitoring and analysing risks, containing these risks, increasing the resilience of financial institutions to risk shocks, and promoting failing institutions' orderly exit from the market. Section 4.2 identifies a range of actions that need to be taken to complete the implementation of these policy proposals.

In particular, the 2016 report raised concerns regarding the sustainability of the business models of insurers and pension funds offering longer-term return guarantees, which have since come under increasing pressure in the LIRE, and made several policy proposals. For the insurance sector, the report proposed a wide range of measures to address LIRE-related risks: (i) a new, market-based methodology for deriving the risk-free interest rates used to calculate insurers' technical provisions by discounting future liabilities; (ii) permitting a reduction in the maximum guarantees offered in new contracts and limits on policyholders' discretionary benefits; (iii) empowering supervisors to cancel or defer dividends even before the solvency capital requirement (SCR) has been breached, requiring more capital; (iv) harmonising recovery and resolution across EU countries and, as a last resort, introducing legal options for modifying existing contracts in the interests of policyholders. These measures were expected to inform the implementation of Solvency II, which has since been introduced, and its future review, which is currently ongoing. For the pension fund sector, the 2016 LIRE report proposed a harmonised EU framework for the risk assessment and transparency of pension funds. The proposal was to endorse EIOPA's Opinion¹³³ recommending a common risk assessment and transparency framework. The report also recommended investigating the systemic impact of pension funds by means of stress tests taking cross-country differences into account.

Bearing in mind the progress made, and in line with the views expressed in the ESRB's report on macroprudential policy for the insurance sector,¹³⁴ this report restates the need to consider further the measures proposed in the 2016 report. It also supports EIOPA's Opinion on the review of Solvency II, in particular with regard to the need for macroprudential measures for the insurance sector. Moreover, the forthcoming review of the IORP II Directive should consider the issues and the policy proposals raised in both this and the ESRB's 2016 report.

Finally, Section 4.3. reviews the existing macroprudential instruments that could address systemic risks related to the LIRE and how these instruments could be adjusted and used going forward.

¹³³ EIOPA (2018), **Decision of the Board of Supervisors on EIOPA's regular information requests towards NCAs regarding provision of occupational pensions information**, EIOPA-BoS/18-114, 10 April and EIOPA (2020), **Decision of the Board of Supervisors on EIOPA's regular information requests towards NCAs regarding provision of occupational pensions information**, EIOPA-BoS/20-362, 2 June.

¹³⁴ **Enhancing the macroprudential dimension of Solvency II** (2020).



This report presents several policy options for mitigating systemic risks and improving systemic risk analysis. The Task Force suggests prioritising the policy option areas as shown below. In each of the policy areas, the order is in line with priority.

Policy options for mitigating systemic risks

1. The profitability and resilience of banks:

- address overcapacity by removing potential obstacles to banking sector consolidation and restructuring;
- reconsider the framework for dealing with weak banks;
- re-evaluate incentives for banks' digital transformation and improving cost efficiency;
- assess legal restrictions on the application of negative interest rates to deposits.

2. The indebtedness and viability of borrowers:

- develop measures to prevent and resolve high levels of corporate indebtedness;
- develop a common minimum toolkit of borrower-based measures targeted at households.

3. Systemic liquidity risk:

- move towards macroprudential liquidity requirements.

4. The sustainability of the business models of insurers and pension funds offering longer-term return guarantees:

- include macroprudential measures for the insurance sector in the Solvency II review and in particular, the ESRB should support EIOPA's Opinion issued as part of the review of the Solvency II Directive, in line with the views expressed in the ESRB report on macroprudential policy for the insurance sector;
- establish a recovery and resolution framework for insurance companies;
- consider issues and policy proposals raised in this and the 2016 LIRE reports for pension funds in the IORP II review.

Policy options for improving systemic risk analysis

2. The indebtedness and viability of borrowers:

- build an enhanced credit and debt monitoring capacity.

3. Systemic liquidity risk:

- improve liquidity reporting and a more efficient use of already available data;
- implement system-wide liquidity stress tests.

4. The sustainability of the business models of insurers and pension funds offering longer-term return guarantees:

- create an EU-wide monitoring framework of LIRE-related risks for ICPFs.



These policy options should not be seen as ESRB recommendations but rather as a blueprint for medium-term policy objectives. The ESRB may selectively choose some of these proposals with the aim of refining them and developing them into more concrete ESRB recommendations.

The authorities should use existing macroprudential tools to mitigate the risks stemming from the LIRE and to make progress on the actions needed to complete the implementation of the policy options set out in the 2016 report.

4.1 Policy options

4.1.1 The profitability and resilience of the EU banking system

The LIRE may both add to and reinforce the negative effects of existing structural problems in the EU banking sector (such as overcapacity and cost inefficiencies), putting further pressure on low bank profitability and reducing resilience.

Low profitability reduces banks' ability to accumulate capital organically via retained earnings and to supply credit. Overcapacity, poor cost efficiency and legacy assets have negatively affected profitability in the EU banking sector for many years. The pressure from the LIRE on net interest margins, exacerbated by obstacles to setting negative rates on bank deposits, puts already weak profitability under further stress. This impairs banks' ability to build resilience and supply credit and threatens the viability of weakly capitalised banks. Unviable banks should be identified and problems managed sufficiently early, through interventions or an orderly exit, to avoid adding to the existing structural problems.

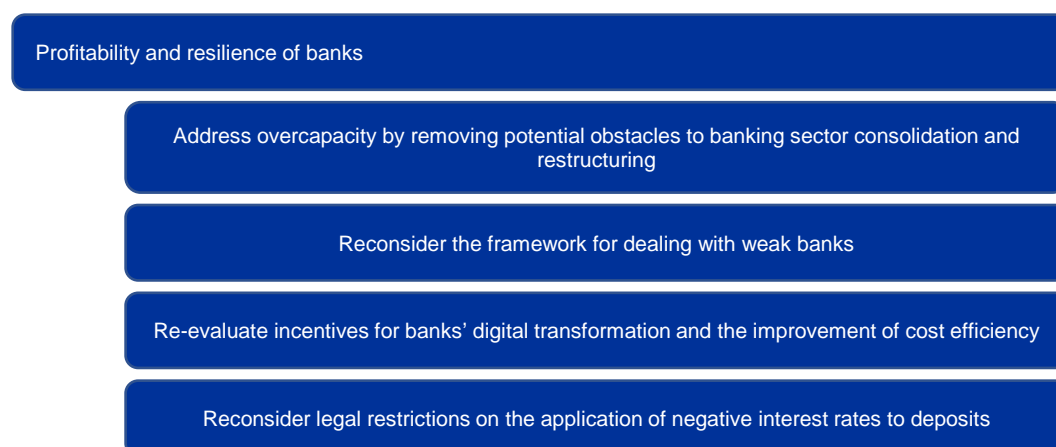
A prospective return on equity below the estimated cost of equity, as is the case for many EU banks, leads to low market valuations of banks' equity. This makes it more difficult for banks to raise new equity if required, with negative consequences for the stability of individual banks and for the financial system overall.

In this regard we propose two sets of policies (Figure 8) that would contribute to an increase in bank profitability. The first set (policies 4.1.1.1 and 4.1.1.2) addresses the structural factors related to overbanking, while the second set (policies 4.1.1.3 and 4.1.1.4) seeks to improve profitability directly. The prospect of "lower for longer" makes it imperative to implement these policies, given the slow progress of private sector solutions in dealing with these issues and the importance of political, institutional and legal barriers, which policy should address.



Figure 8

Policy options for addressing risks related to the profitability and resilience of banks



4.1.1.1 Address overcapacity by removing potential obstacles to banking sector consolidation and restructuring

Some banks might have already exhausted cost-saving opportunities on a standalone basis without having attained sustainable profitability levels. These banks should reconsider their overall business model, including the possibility of merging with another institution.

The consolidation and restructuring of banks, particularly in countries where there are clear signs of overcapacity, would allow for economies of scale and scope, with positive effects on profitability and the functioning of the EU banking sector. The negative effects of the LIRE on bank profitability are particularly significant for small banks operating at inefficient scale and with little opportunity to diversify their business models. Larger banks may be unable to exploit fully the benefit of greater diversification and economies of scale because of limitations imposed on the allocation of internal resources. For these reasons, bank-level restructuring, as well as consolidation or integration, both domestic and cross-border, could improve risk diversification, bring about cost savings and guarantee more stable profits.

Pursuing these objectives should recognise the need to support the smooth functioning of the Internal Market and for the financial sector to provide a sustainable contribution to economic growth in all Member States. Cross-border (consolidated) financial groups, along with the relevant authorities, should monitor financial and real sector developments carefully across all economies and take them into account in their management decisions.



Banking M&As, especially those which are cross-border, have been subdued in the EU in recent years because of the difficulties of exploiting synergies and the high execution risk, partly triggered by low profitability and concerns over the asset quality of the banks, political factors, fragmented regulation and uncertain supervisory outcomes.^{135 136} EU

institutions such as the EBA and the ECB have noted the need for a transparent and predictable approach to M&A processes, including the prudential treatment of accounting bad will. The SSM's guidance on assessing potential M&As within the banking union¹³⁷ (e.g. stating that credible integration plans will not be penalised by higher capital requirements), is a step in the right direction. Finally, agreement over the early introduction of the fiscal backstop to the Single Resolution Fund via the European Stability Mechanism is of great importance on the road to completing the banking union.¹³⁸ Further progress on this path is, however, essential.

M&As might increase costs if they were to add new management levels (especially for cross-border M&As) and increase the complexity of the institution. They could also result in lower competition and less diversity, negatively affecting the resilience of the financial system. These considerations, along with the risk of creating too-big-to-fail institutions, should not outweigh the benefits of the synergies.

To remove obstacles to consolidation and restructuring in order to help banks improve profitability in the LIRE, we propose the following.

- The EBA and the ECB, as well as NCAs, continue their efforts to achieve more transparent and predictable approaches to both domestic and cross-border M&A processes – the latter should include replacing the fragmented regulatory framework by more harmonised practices.
- The European Commission, the EBA as well as NCAs continue efforts to evaluate and address the circumstances under which legal and regulatory practices that may pose obstacles to cross-border banking consolidation are not duly justified from a prudential perspective. This should be carried out while recognising the need to support the smooth functioning of the Internal Market and financial stability at both the EU and the national levels.

4.1.1.2 Reconsider the framework for dealing with weak banks

Some weak banks might fail to find a suitable partner for a merger or might not attain sustainable profitability levels even after an M&A deal. In such cases the orderly exit of non-viable banks is essential to guarantee the efficient functioning of the market. This is even more important in the LIRE in order to ensure that the weakness of some individual banks does not

¹³⁵ Gardella et al. (2020).

¹³⁶ Jokivuolle, E. and Virén, M. (2019).

¹³⁷ See the [ECB guide on the supervisory approach to consolidation in the banking sector \(2020\)](#).

¹³⁸ See the [statement](#) of the Eurogroup on 30 November 2020.



jeopardise the already low profitability of healthier ones. It is also important to ensure that banks' balance sheets are cleaned up quickly following any intervention.

The current framework for dealing with distressed banks in Europe should be improved, in particular for small and medium-sized banks that rely mainly on deposit funding and remain subject to ordinary liquidation procedures under diverse national regimes and authorities.¹³⁹ The current framework has not been tested in a financial crisis, where several systemically important institutions might be distressed or likely to fail simultaneously. A number of important issues regarding the Single Resolution Mechanism require attention,¹⁴⁰ and it is also essential to take decisive steps towards completing the banking union. In some countries mutual insurance arrangements have been used to recapitalise banks, although there are no clear EU rules for using these arrangements.

The exit of non-viable banks should be evaluated carefully, especially in terms of its implications for the profitability of remaining banks and for overall financial stability. An efficient framework must take into account the potential need for support via the use of mutual insurance arrangements, while avoiding – insofar as possible – the use of public resources where there is no public interest.

To facilitate and ensure the proper and orderly exit of non-viable banks, thus reinforcing the system overall, the relevant authorities should continue their efforts to:

- simplify the use of the early intervention framework as foreseen in the BRRD to ensure the effective management of banks with deteriorating fundamentals;
- improve the current framework for dealing with distressed banks in Europe to facilitate and ensure the orderly exit of non-viable institutions, in particular small and medium-sized banks, in view also of the need to reduce overbanking and foster system profitability in the LIRE.

4.1.1.3 Re-evaluate incentives for banks' digital transformation and the improvement of cost efficiency

Rationalising the network of physical branches and increasing digital capabilities are essential for banks to improve cost efficiency and attain sustainable profitability levels in the face of LIRE pressures. On the revenue side, banks face multiple headwinds, i.e. low margins, strong competition and uncertain prospects for lending growth following the current economic contraction. Banks with low profitability levels therefore need to reduce their operating expenses. Although such a strategy might entail substantial short-term costs (restructuring costs, digital investments, etc.), it is essential to guarantee long-term viability. While improved cost

¹³⁹ See Martinez et al. (2019).

¹⁴⁰ See European Court of Auditors (2021), "Resolution planning in the Single Resolution Mechanism", **ECA Special Report 01** (2021).



efficiency involves trying to optimise many factors such as process automation, staff, products and infrastructures, and may be facilitated by consolidation and bank-level restructuring, investment in digital technologies is a keystone.

Digitalisation typically decreases the need for physical branch networks and allows for staff rationalisation, thereby providing opportunities for long-term cost savings. Digital solutions are also conducive to boosting revenues through better customer services. They can also improve a bank's ability to meet the demands which follow from technological innovation in financial services, customer requirements and competition from non-banks. Digitalisation may, however, involve high initial costs.

In November 2020 the European Commission adopted the regulatory technical standard on the prudential amortisation of software assets¹⁴¹, which sets a maximum period of three years. The positive difference between the prudential and the accounting accumulated amortisation is fully deducted from CET1 capital, while the residual portion is risk-weighted. According to EBA estimates, the new prudential approach would lead to a maximum increase in EU institutions' CET1 capital of approximately €20 billion in 2021. The prudential amortisation approach might encourage the banking sector to invest in software, in line with the spirit of the EU legislation.

With the majority of listed banks trading at price-to-book multiples below one, M&A deals are likely to generate negative goodwill (or badwill) which could be used to streamline operating expenses. The ECB Banking Supervision Guide¹⁴² specifies that, given the uncertainties over the determination of badwill, banks are not expected to distribute this accounting profit to shareholders. Nonetheless, ECB Banking Supervision expects the acquirer bank to use the badwill to increase the sustainability of the business model of the combined entity by, for example, covering the integration costs or increasing the coverage of non-performing loans.

To facilitate banks' digital transformation and improve their cost efficiency in the LIRE, we propose that:

- the European Commission should re-evaluate the incentives for banks' digital transformation, given the experiences of recent initiatives and taking into account the implications of the LIRE and the need for banks to improve cost efficiency;
- supervisory authorities should encourage banks involved in M&A deals to use the potential badwill generated in such transactions to streamline their branch network and to progress their digital transformation.

¹⁴¹ Commission Delegated Regulation (EU) 2020/2176 of 12 November 2020 amending Delegated Regulation (EU) No 241/2014 as regards the deduction of software assets from Common Equity Tier 1 items.

¹⁴² European Central Bank – Banking Supervision, Guide on the supervisory approach to consolidation in the banking sector, 12 January 2021.



4.1.1.4 Assess legal restrictions on the application of negative interest rates to deposits

The LIRE has resulted in a smaller decrease in deposit rates than in loan rates, with a significant impact on net interest margins. The share of negatively remunerated deposits in the euro area in the last quarter of 2020 (three-month moving average) was around 40% for NFC deposits and 21% for household deposits. Of 19 euro area countries, in nine countries some share of households' deposits are remunerated with negative rates. In fact, the share of overnight deposits with negative rates exceeds 30% in BE, CY, DE, FI, LU, and NL (See Box A in the Annex for more information).¹⁴³ In many cases, the relatively low share of household deposits with negative rates is a consequence of restrictions on the application of negative deposit rates. Whereas some of these restrictions are due to reputational or competition concerns, there are also legal barriers (implicit or explicit) in several EU countries.¹⁴⁴

Although average EU loan rates are still in positive territory, in some countries banks already apply negative rates to certain loan categories. By contrast, a number of other countries apply explicit or implicit legal floors for lending rates. Such restrictions might help to protect lending margins, although they might also impair the adequate transmission of monetary policy and, more importantly, they might result in the incomplete transmission of the benefits of lower interest rates to borrowers.

Charging effective negative deposit rates via higher fees raises issues. Since fees are not usually related to the volume of deposits in a current account¹⁴⁵, depositors have few incentives to reduce their cash balances, thus also impairing the transmission of monetary policy. Moreover, the imposition of fees tends to penalise smaller depositors more than bigger depositors and therefore raises inequality concerns.

We note, however, that the application of negative deposit rates might also entail risks related to the behaviour of depositors and to the level of overall systemic liquidity. Considering how difficult it is to find close substitutes for deposits offering a positive yield in the LIRE, depositors (especially households) might be induced to opt for higher-risk investment products. Deeply negative rates might affect the stability of the deposit base, leading to a draining of overall system liquidity and the potential build-up of vulnerabilities in other parts of the financial sector. Application of negative rates to household deposits may be controversial, however, because of the perceived distributional consequences and could encounter political resistance.

¹⁴³ In Denmark the average deposit rate on ordinary Danish household deposits first turned negative in May 2020, and has declined further since then, reaching -0.07% by October 2020. In January 2021, several Danish banks lowered their thresholds for deposits bearing negative rates, so the average rate is likely to decline further (see Danmarks National Bank [statistics](#) for further information).

¹⁴⁴ As mentioned in Chapter 3, in the [EBA Spring 2020 Risk Assessment Questionnaire](#) 48% of the responding banks reported that there was no legal clarity (including legal restrictions) with regard to the application of negative interest rates on deposits.

¹⁴⁵ Fees could easily be proportional rather than fixed.



In view of the pressure on net interest margins in the LIRE, relevant authorities such as national legislatures should:

- consider eliminating legal obstacles to charging negative rates in their jurisdictions (with no requirement for banks to apply negative rates to deposits or loans). The European Commission might play a role aimed at adopting a unified approach that would guarantee a level playing field.

4.1.2 The indebtedness and viability of private sector borrowers

The private sector will emerge from the COVID-19 crisis with an increased burden of debt.

Households and NFCs entered 2021 with high debt levels in several EU Member States, reflecting pre-crisis factors (including low interest rates and tax systems favouring debt over equity), the effects of the epidemic on many businesses, as well as public support measures that enabled businesses to survive by allowing them to borrow or suspend debt service.

A prolonged LIRE will make the recovery from the COVID-19 crisis easier, ceteris paribus. It will make it easier to service government, business and household debt and, in the short run, will reduce the need for debt restructuring. In the long run, a prolonged LIRE will encourage the accumulation of debt and leverage and may sustain or add to existing vulnerabilities. There will also be a risk to economic growth if economic agents attempt to reduce their debt burden too quickly, which might create financial stability problems. Thus, high debt levels are here to stay for a long time to come.

Highly indebted entities are vulnerable to shocks, even if their debt is currently manageable.

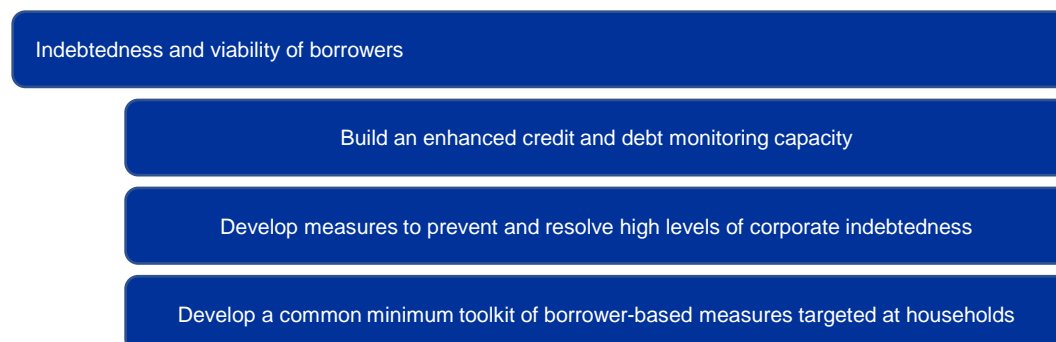
No entity – in the public sector, the financial sector, NFCs or households – is safe from shocks that could suddenly transform affordable debt into an unsustainable burden, even in a prolonged LIRE. Maintaining functioning credit markets is essential for economic recovery, long-term growth and employment. In a high-debt environment, this requires careful monitoring, an ability to address the most worrying debt levels and trends in a very targeted manner while avoiding stifling economic activity overall and, finally, the capacity to restructure debt and deal with insolvencies of households and NFCs efficiently to minimise long-term damage to the economy.

The policy proposals summarised in Figure 9 complement those presented in ESRB's 2016 report and summarised in Section 4.2.2.



Figure 9

Policy options for addressing risks related to the indebtedness and viability of borrowers



4.1.2.1 Building an enhanced credit and debt monitoring capacity

The LIRE facilitates higher leverage and encourages search for yield. Close monitoring of many aspects of leverage – levels and flows, maturities, allocation across sectors, industries and geographies – is a critical tool for understanding vulnerabilities and risks and for designing policy.

It is therefore essential to build an enhanced credit/debt monitoring capacity. In line with the proposals in Section 4.2.2 of the ESRB's 2016 report, an enhanced credit/debt monitoring capacity could be built on the basis of existing credit registers. These registers should ideally comprise not only bank lending but also non-bank lending as well as other forms of debt. They should cover NFCs, general government, supranational institutions and financial institutions (as is currently the case for AnaCredit), as well as households and non-profit organisations serving households (as envisaged as part of further development stages of AnaCredit). Credit registries have been used successfully in many countries to monitor both domestic currency and foreign currency borrowing by NFCs, underpinning macroprudential measures with solid evidence.¹⁴⁶

Using comprehensive credit/debt registers to monitor financial stability risks would be even more valuable if credit data were linked to the relevant data from representative surveys.

Household surveys include the ECB's Household Finance and Consumption Survey, Eurostat's Labour Force Survey, Household Budget Survey and Statistics on Income and Living Conditions. Clustered credit register data in conjunction with survey data could make it possible to identify household types that are particularly vulnerable and might become a financial stability concern. In several Member States national statistical offices already rely on register data from tax and social

¹⁴⁶ We acknowledge privacy concerns with regard to collecting household-level data. Any data collection must respect Regulation (EU) 2016/679 (General Data Protection Regulation).



security offices to complement questionnaire responses. Similar efforts could be possible for company surveys.

The following actions are necessary to enhance credit and debt monitoring capacity.

- The ESRB and its members should develop a policy on the use of existing credit/debt registers to monitor financial stability risks. They should also develop a set of specific common minimum requirements for such registers for financial stability monitoring purposes.
- The ECB should consider extending AnaCredit, as already envisaged as part of further development stages, to include aggregated statistical information on households and non-profit organisations serving households. Future data collection should ideally include not only bank lending but also non-bank lending and other forms of debt.

4.1.2.2 Develop measures to prevent and resolve high levels of corporate indebtedness

The LIRE has encouraged the build-up of corporate debt. Understanding the aggregate patterns of corporate credit could help to prevent a build-up of pockets of instability and excessive leverage which could lead to systemic crises. This is a much more complex task for NFCs than for households. The monitoring of corporate credit through credit registries should cover not just volumes but also prices as well as non-financial terms (such as covenants). Since NFCs can access a wider range of financing sources, exposures of other parts of the financial system (beyond banks) to highly leveraged NFCs should be monitored. High leverage is a critical factor if there are significant exposures in institutions with guaranteed deposits (the banking sector) and if systemically relevant institutions or segments of the financial system are heavily exposed.

A policy strategy aimed at tackling the financial stability risks stemming from highly indebted NFCs should be based on a comprehensive assessment of incentives facing borrowers and lenders and the policy options available to change these incentives. Areas to consider could include taxation (e.g. the tax deductibility of interest payments), micro and macroprudential requirements for financial firms exposed to highly leveraged corporates¹⁴⁷ and, possibly, even the rights of workers' representatives (social dialogue).¹⁴⁸ Special attention could also be given to the role of investment funds (private equity and credit funds) in either increasing leverage or strengthening equity in the NFCs they own. The upcoming review of the Alternative Investment Fund Managers Directive offers an opportunity to consider how to boost equity

¹⁴⁷ Identifying highly leveraged companies is difficult. It differs, for instance, across sectors and firms' size classes, due to the sensitivity of NFCs' indebtedness to their assets (availability of collateral) and size. And synthetic leverage is difficult to identify and measure.

¹⁴⁸ For instance, Directive 2001/23/EC of 12 March 2001 on the safeguarding of employees' rights in the event of transfers of undertakings stipulates that employee representatives should be given prior information and consulted on the legal, economic and social implications of the transfer for employees. This could help raise awareness of the implications of debt-financed transfers.



investments by funds in NFCs.¹⁴⁹ Corporate governance arrangements should be reviewed insofar as they reward performance based on earnings per share or share price targets, which could encourage a bias in favour of share buy-backs and M&A activity to the detriment of focusing on business fundamentals. There is significant cross-country heterogeneity in NFC indebtedness, its sources and the drivers of leverage. Efforts to monitor NFC indebtedness and leverage should be proportionate to the relevant issues.

Few Member States have developed borrower-based measures which target lending to corporates. Borrower-based measures, where they exist, target commercial real estate.¹⁵⁰

They are easier to implement for households as the latter typically borrow from domestic banks against collateral (usually residential real estate) whose liquidation value can be relatively well assessed. Moreover, it is easier to assess the debt service and income situation of households than it is for NFCs. SMEs also often lack collateral and, hence, generally promise future earnings/cash flow under blanket lien to serve as collateral. Larger corporates can tap a wider range of domestic or foreign non-bank financing sources, making it more complicated to enforce borrower-based measures. In this respect, given the objectives of the capital markets union, we advocate taking a more activity-based approach to assessing the systemic risks arising in the NFC sector, in order to incorporate the increasing role of non-bank financial intermediation and borrowing from capital markets.

The likelihood of corporate distress and insolvency rises in the LIRE with high growth in credit and leverage. The resilience of the financial system depends on how insolvencies are handled and to what extent this preserves viable business operations. It is important to develop a mechanism which allows the markets to distinguish between viable and non-viable firms (e.g. by enhancing transparency), so that where necessary they can place the former in insolvency procedures that preserve their existence, while dismantling non-viable firms efficiently.

A system for managing distress and insolvency should protect viable business operations from inefficient liquidation. This should respect the priority of creditors and other claimants and resolve distress quickly. The efficient resolution of insolvency reduces losses for credit institutions, thereby supporting financial stability. Avoiding unnecessary liquidation helps to maintain economic activity and enhances economic resilience. The EU's reform efforts in this direction¹⁵¹ are therefore essential to improve credit market performance.

The COVID-19 pandemic has increased the urgency for action. The issues above are particularly relevant in preparing for the surge in insolvencies that could follow the COVID-19 pandemic.¹⁵² Beyond the emergency liquidity and more targeted solvency support that has been

¹⁴⁹ See the European Commission's recent [consultation](#) on banking and financial services.

¹⁵⁰ See ESRB (2019), [Macroprudential approaches to non-performing loans](#), p. 27.

¹⁵¹ In particular, see Directive (EU) 2019/1023 on restructuring frameworks, the discharge of debt and disqualifications, and measures to increase the efficiency of procedures concerning restructuring, insolvency and the discharge of debt.

¹⁵² See the ESRB's risk assessment in the ESRB's 2019 [Annual Report](#) and the [speech](#) by the ESRB Chair to the European Parliament on 19 November 2020.



provided to NFCs so far, efficient debt restructuring procedures and banks' ability to handle bad debt internally will be key.¹⁵³ In the medium term, in line with the European Commission's CMU Action Plan, improving and harmonising national insolvency procedures should facilitate greater legal certainty for cross-border investors and could therefore encourage more cross-border activity in the EU.¹⁵⁴ Detailed and accurate credit registers could also help to support efficient restructuring regimes, especially for cross-border insolvencies and business groups.

A shift from debt to equity is highly desirable. This could be achieved, for instance, through tax reforms and improved insolvency and debt restructuring procedures which encourage hybrid forms of equity instruments (such as preferred shares and convertible bonds), as well as novel financing instruments such as state-contingent debt. This would make the financial structure more resilient.

The European Commission, together with the ESRB and relevant authorities, should carry out a comprehensive review of policy options (including borrower-based measures, which would remain the sole responsibility of national authorities) to prevent and resolve those high levels of corporate indebtedness which could pose financial stability risks. Given the wide range of issues, this endeavour would have to draw on expertise from a number of different areas beyond the financial sector.

The following actions are needed to prevent and resolve high levels of corporate indebtedness which could threaten financial stability.

- The European Commission, together with the ESRB and the relevant authorities, should carry out a comprehensive review of policy options (including considering borrower-based measures, **which would remain the sole responsibility of national authorities**) to prevent and resolve high levels of corporate indebtedness which could pose financial stability risks. Given the wide range of issues and the complex impact of the COVID-19 pandemic, this work would have to draw on expertise from a number of different areas beyond the financial sector.
- The European Commission should consider, together with Member States, ways to incentivise a shift from debt to equity both for issuers and investors through taxation and novel financing instruments, as well as insolvency and debt restructuring procedures.
- The relevant authorities in charge of investor protection and financial stability should cooperate to define minimum requirements for lending covenants.

¹⁵³ See Becker, B. and Oehmke, M. (2021), "Preparing for the post-pandemic rise in corporate insolvencies", ESRB **ASC Insight** No 2., January. See also ESRB (2021), **Prevention and management of a large number of corporate insolvencies**.

¹⁵⁴ See ECA (2020), "Capital Markets Union – Slow start towards an ambitious goal", **Special Report**, No 25.



4.1.2.3 Develop a common minimum toolkit of borrower-based measures targeted at households

Not all Member States have a comprehensive set of borrower-based instruments. Most Member States currently have some borrower-based measures that can be targeted at households. Such measures are widely used to mitigate risks and enhance resilience related to residential real estate and household mortgage developments. Not all Member States have these instruments available, however, and their national applicability varies. The upcoming reviews of the Consumer Credit Directive and the Mortgage Credit Directive, as well as the 2022 review of the macroprudential tools (as required by Article 513 CRR), are opportunities to define a common minimum toolkit of borrower-based measures for households. The activation and calibration of these tools would have to remain the responsibility of national macroprudential authorities, given the national or even regional specificities of financial stability risks linked to household borrowing and the need to take into account other (notably social) policy objectives.

Comprehensive credit/debt registers could also support the implementation of borrower-based measures. Such measures encompass requirements to conduct thorough creditworthiness checks as well as quantitative limits (e.g. loan-to-value and debt-service-to-income ratios). They aim to prevent a build-up of leverage (often in the household sector) that could create stability risks. Access to credit/debt registers could help lenders to comply with a broader set of borrower-based measures (beyond loan-to-value ratios), if implemented in accordance with the applicable data protection rules.

In order to develop a common minimum toolkit of borrower-based measures.

- The ESRB and its members should develop a common minimum toolkit of borrower-based measures for households, which would remain the responsibility of national macroprudential authorities. This could also be considered by the European Commission in its upcoming legislative reviews. The ESRB should also examine appropriate reciprocation rules and any measures that may be required to guarantee the effectiveness of national borrower-based measures, limiting circumvention through cross-border lending or non-bank lending.

4.1.3 Systemic liquidity risks

Systemic liquidity risks arise when multiple financial institutions experience simultaneous liquidity shortages, with adverse consequences for financial stability and the real economy.

Financial intermediaries are then subject to inward risks (their sensitivity to systemic liquidity shortage) and outward risks (their ability to withdraw liquidity from the system). Here macroprudential oversight and instruments should complement microprudential supervision and instruments.



The LIRE contributes to the rise in systemic liquidity risk through three broad transmission channels – these are characterised by search for yield, liquidity illusion, and increased interconnectedness and correlations within the financial system.¹⁵⁵ First, the LIRE creates incentives which encourage search for yield in assets that are typically characterised by relatively low or unstable market liquidity. Second, low interest rates and abundant liquidity injections can contribute to a liquidity illusion which leads individual investors and issuers to regard their own liquidity risk exposure as low. Third, the need to invest abundant liquidity contributes to the creation of new interlinkages both within the financial system and also with the non-financial sector. This gives rise to a liquidity multiplier that increases systemic liquidity risk across the financial sector and could adversely affect financial stability and the real economy in times of stress¹⁵⁶.

The March 2020 turmoil revealed that these channels contributed to the systemic liquidity tensions experienced by financial intermediaries. As underlined by ESRB Recommendations **ESRB/2020/4** and **ESRB/2020/6**, the sharp fall in asset prices observed at the onset of the COVID-19 pandemic was accompanied by significant redemptions from certain investment funds and MMFs and a significant deterioration in financial market liquidity. Market shocks, such as sharp drops in asset prices and high levels of market volatility, generate increases in variation margins and may also lead to significant initial margin calls on positions in cash securities, commodities or derivatives. Such market dynamics have major implications for the liquidity management of market participants, for their funding needs and, possibly, even for their solvency if the liquidity stress leads to extensive fire sales of assets. Despite the lessons offered by the GFC and subsequent new regulation, in March 2020 decisive action had to be taken by central banks, supervisory authorities and governments to stabilise market conditions.

Macroprudential and supervisory authorities need to be better prepared to monitor, prevent and address liquidity risks by taking a system-wide perspective (Figure 10). First, liquidity reporting on an entity-based level and datasets at a transaction level should be better aligned and harmonised, in order to monitor liquidity flows at the scale of the EU financial system. Second, liquidity risks should be analysed using system-wide liquidity stress tests. Third, a range of tools could be considered which could mitigate identified risks while avoiding unintended consequences. In particular, regulation is needed throughout the financial system to ensure that liquidity is managed system-wide in a sustainable manner. Sector-specific (both banking and non-banking) microprudential liquidity constraints might increase the probability of system-wide liquidity runs. It will be important to assess the impact of potential regulatory changes on the sustainability of the business models of the financial entities to which these requirements will be applied. Finally, given the global dimension of the issue, international coordination and cooperation is essential, as occurred in the work initiated by the Financial Stability Board to address financial stability issues identified during the 2020 market turmoil.¹⁵⁷

¹⁵⁵ Houben (2015) and ECB (2018).

¹⁵⁶ Kashyap (2020).

¹⁵⁷ See the **FSB 2021 work programme**.



Figure 10

Policy options for addressing systemic liquidity risk



4.1.3.1 Improve liquidity reporting and use already available data more effectively

Individual financial intermediaries are already subject to liquidity reporting related to liquidity requirements. The post-GFC reforms for banks, for example, provide comprehensive reporting and disclosure frameworks, which are useful for monitoring systemic liquidity in this part of the financial system. Liquidity reporting has also improved in the investment fund (see Section 2.1, Annex) and central counterparty (CCP) sectors. For insurance companies, although Solvency II reporting already includes detailed information on assets and liabilities, there are gaps that should be filled from a macroprudential point of view (see Section 2.1, Annex).

Existing reporting requirements do not take the system-wide dimension¹⁵⁸ into account. The ECB (2017) attempted to design a set of indicators for monitoring systemic liquidity risks. 20 indicators were developed. Four criteria were used to analyse them: (1) ability to capture systemic liquidity; (2) scope; (3) crisis signalling; and (4) data availability. But the indicators focus only on developments in systemic liquidity risk in the bank and non-bank financial sectors at the country level. Future work should also include indicators measuring the cross-border dimension of liquidity risk. For example, the ECB (2016a) showed that bank intragroup transactions represent the majority of cross-border lending and thus merit particular attention.

¹⁵⁸ Some of these liquidity gaps can be analysed using datasets which are already available at the transaction level or which are dedicated to specific activities within the financial system. For example, granular Securities Holdings Statistics are available for euro area banks; Solvency 2 requires insurance companies to inform their supervisors of their asset-by-asset holdings; fund holdings are (only very partially) reported to ESMA. Moreover, granular data on short-term funding should now be available in Anacredit (ECB) for unsecured bank loans, the Securities Financing Transactions Regulation for securities financing transactions, and money market statistical reporting (MMSR) for transactions in the secured, unsecured, foreign exchange swap and overnight index swap euro money market segments. Finally, granular derivative positions are available in European Market Infrastructure Regulation (EMIR) data.



One major remaining difficulty is how to combine all the information available to assess liquidity risk at the scale of the financial system and across borders. Beyond the need for high-quality, granular data, work is required to develop international standards for measuring liquidity chains in the financial system. Moreover, the relevant authorities should be granted appropriate access rights for existing databases, while investments in IT solutions (big data techniques) should be undertaken so that these datasets can be merged and analysed.

The LIRE underlines how important it is for the ESRB, the ECB and the ESAs to continue their joint work on developing ways to measure global liquidity risk, as well as gathering granular data and analysing relevant indicators for measuring the cross-border and cross-sectoral dimensions of liquidity risk. Various datasets need to be aligned, with common concepts and harmonised identifiers. Further progress on international standards such as the LEI (legal entity identifier), the UTI (unique transaction identifier) and the UPI (unique product identifier), is essential. Data quality, under the responsibility of the ESAs, should also be of primary concern. Finally, a data hub dedicated to interconnections of the EU financial system should be established, especially in the context of system-wide stress tests. To improve the assessment of risks in non-bank financial activities, the ESRB also believes that the granular portfolio data of investment funds, alternative investment funds and UCITS should all be made available. This kind of granular portfolio data would also enhance the assessment of LIRE-related risks.¹⁵⁹

To improve liquidity reporting and to foster the more efficient use of already available data:

- the ESRB, the ECB and the ESAs should continue their joint work in developing ways of measuring global liquidity risk, gathering granular data, and analysing the relevant indicators for measuring the cross-border and cross-sectoral dimensions of liquidity risk.
- the European Commission, the ESRB and the ESAs should jointly identify the remaining obstacles to sharing information and should remove any related barriers if these restrict systemic risk assessment.
- the relevant authorities should support further progress on international standards such as the LEI, the UTI and the UPI.
- the ESAs and the relevant supervisors should continue to emphasise the importance of data quality in supervisory reporting.

4.1.3.2 Implement system-wide liquidity stress tests

Recently, supervisors have taken liquidity stress-testing exercises into broad consideration.

With regard to banks, the **ECB (2019)** conducted dedicated top-down liquidity stress tests focusing

¹⁵⁹ See the **ESRB's response** to the European Commission consultation on the review of the Alternative Investment Fund managers Directive (AIFMD).



on bank cash outflow scenarios affecting the net liquidity position of individual banks. In 2019, ESMA published a stress simulation assessing liquidity risk for funds (ESMA, 2019). In 2020, ESMA published guidelines on liquidity stress-testing for investment funds (ESMA 2020, bottom-up stress tests) along with the guidelines for the MMF stress test (ESMA, 2020a).¹⁶⁰ In January 2021 EIOPA published a paper setting out the methodological principles that can be used to run stress test exercises to assess the vulnerability of insurers to liquidity shocks. Even if all supervisors were to implement guidelines for liquidity management, however, some financial intermediaries would still not be subject to regular liquidity stress-testing exercises.

Few stress tests follow a system-wide approach to introducing interlinkages between the different parts of the financial sector. The existing exercises focus on the individual capacity of each financial intermediary without considering the disruption to liquidity chains and the amplification effects associated with interconnections. One exception is CCP stress tests, which capture the systemic dimension related to the interdependencies of CCPs by considering two scenarios – one at the CCP level, another at the EU level including all CCPs. By construction, the CCP stress test models the impact of a failure in one entity (the default of the clearing member) on another entity (the CCP) and may be used to assess the knock-on impact on a third entity (losses in the default fund to which non-defaulting clearing members are exposed). Even if these advances do not yet fully model the system-wide cross-sectoral interdependencies in times of stress, the EU CCP stress tests already provide unique insights into counterparty interdependencies.

Liquidity stress tests should take into account potential disruption in liquidity chains (e.g. the chain linking insurers – reinsurers – CCPs – banks – repo market) or those related to off-balance sheet exposures such as derivative positions. While derivatives can help insurers to mitigate some of the risks in their balance sheets, they also expose them to higher liquidity risk. Both centrally cleared and bilateral derivative trades require the posting/exchange of collateral, typically in the form of cash margins. Moreover, collateral needs could also emerge from reinsurance arrangements and any other obligations or guarantees provided to other parties. Under normal circumstances repo markets are able to secure the liquidity needs of insurers. But banks' ability or willingness to provide liquidity may be limited under certain circumstances. It is therefore essential to model behavioural interactions.

Systemic liquidity stress tests should ideally be conducted as top-down analyses following a system-wide approach. In bottom-up liquidity stress testing, individual institutions are unable to internalise their negative externalities on the liquidity of the system. While sectoral liquidity stress tests are a step in the right direction, a systemic liquidity stress test should encompass all relevant parts of the financial system so it can account for important interactions and interlinkages. The liquidity-based scenarios in existing (but not system-wide) liquidity stress tests display common features at the short-term horizon of stress but differ significantly in terms of stress triggers. Finally,

¹⁶⁰ EU MMFs are subject to annual stress tests covering a range of risk factors (liquidity, credit risk etc.). The stress tests also include the use of an adverse scenario developed by the ESRB. MMFs have to report the stress test results to NCAs and to ESMA.



a successful systemic liquidity stress test may require detailed information from individual institutions.

In order to analyse liquidity risks through system-wide liquidity stress tests.

- The ESRB, in close cooperation with the ESAs, the ECB and the macroprudential authorities, should work towards conducting coordinated system-wide liquidity stress tests. Such a workplan is very ambitious and should be implemented gradually following clear intermediate objectives and steps including IT infrastructures, data requirements, analytical developments and institutional cooperation to conduct coordinated system-wide liquidity stress tests on a regular basis and on a needs basis if that is justified by a crisis situation. The ESRB should be explicitly mandated with such a task as the EU's macroprudential oversight body.

4.1.3.3 Moving towards macroprudential liquidity requirements

So far, addressing liquidity risks has relied mainly on sectoral, entity-based regulation. In the case of banks, the post-GFC regulatory framework has led to the design of two new liquidity requirements for the banking system (the liquidity coverage ratio and the net stable funding ratio) and the substantial enhancement of the reporting and disclosure of liquidity-related information by banks. MMFs are also subject to liquidity requirements consisting of minimum levels of daily maturing assets and weekly maturing assets, with levels varying according to the MMF regulatory type. In the context of the Review of Solvency II, EIOPA advises that liquidity risk management plans and data on liquidity for insurers should be required, and supervisors should have the power to act where vulnerabilities are identified. For investment funds, both the AIFMD and the UCITS Directive include requirements with regard to the liquidity management of funds (ESMA has published guidelines on liquidity stress testing and is conducting stress test exercises), but the toolkit is incomplete as managers' liquidity management tools have not been harmonised across Europe. Moreover, since fund managers are bound by the prospectus of the funds they manage, they should be required to include the potential use of liquidity management tools in their prospectus.

The COVID-19 turmoil has shown that liquidity shocks can propagate quickly through the financial system. Acute volatility led to an increase in variation margins, requiring clearing members to post additional cash as collateral. At the same time, investors redeemed their holdings in MMFs and bond funds to build cash buffers or reduce risks in those vehicles (including the suspension of redemptions). Investor redemptions required bond funds and MMFs to dispose of assets in highly illiquid markets, increasing the risk of fire sales and further price declines.

In order to address systemic liquidity risks that could threaten financial stability.

- The ESRB, in cooperation with the ESAs and the ECB, should assess sectoral liquidity requirements and their systemic implications and should propose ways to improve their macroprudential design and supervision, recognising the different business models involved. Potential avenues could consist of making existing liquidity buffers usable or releasable (i) in a reactive manner to deal with the speed of liquidity stress and (ii) in a coordinated manner across sectors and jurisdictions.



- Liquidity requirements should be considered for all parts of the financial system, not only as a microprudential requirement but also as a macroprudential measure, taking into account the significant level of interconnections in the financial system and the underlying market structures of financial activities.
- The March 2020 market turmoil suggests there is a need to review the definitions of liquid assets in the current regulations, as some of the assets the regulations had considered to be liquid were found to be illiquid, and the markets exhibited structural vulnerabilities.
- Finally, there is a need to enhance the supervision of liquidity risk across the financial system, and particularly for non-banks, across different financial entities.

4.2 Key actions to complete the implementation of ESRB 2016 report measures

The ESRB's 2016 report presented 17 policy options in a comprehensive macroprudential approach aimed at enhancing financial stability and mitigating systemic risks in the LIRE.

These focused on monitoring and analysing risks, containing their build-up, increasing the resilience of financial institutions to the materialisation of these risks, and promoting an orderly exit from the market by failing institutions. All 17 policy actions formulated by the 2016 LIRE report are presented in the Annex.

This section focuses on the actions required to complete the implementation of the 2016 LIRE report for those policy proposals which have not been fully implemented but are still necessary to address the present LIRE-related risks. These additional policy actions are identified through an assessment of (i) the progress made in respect of the implementation of the 2016 proposals and (ii) the sufficiency of the actions taken so far.

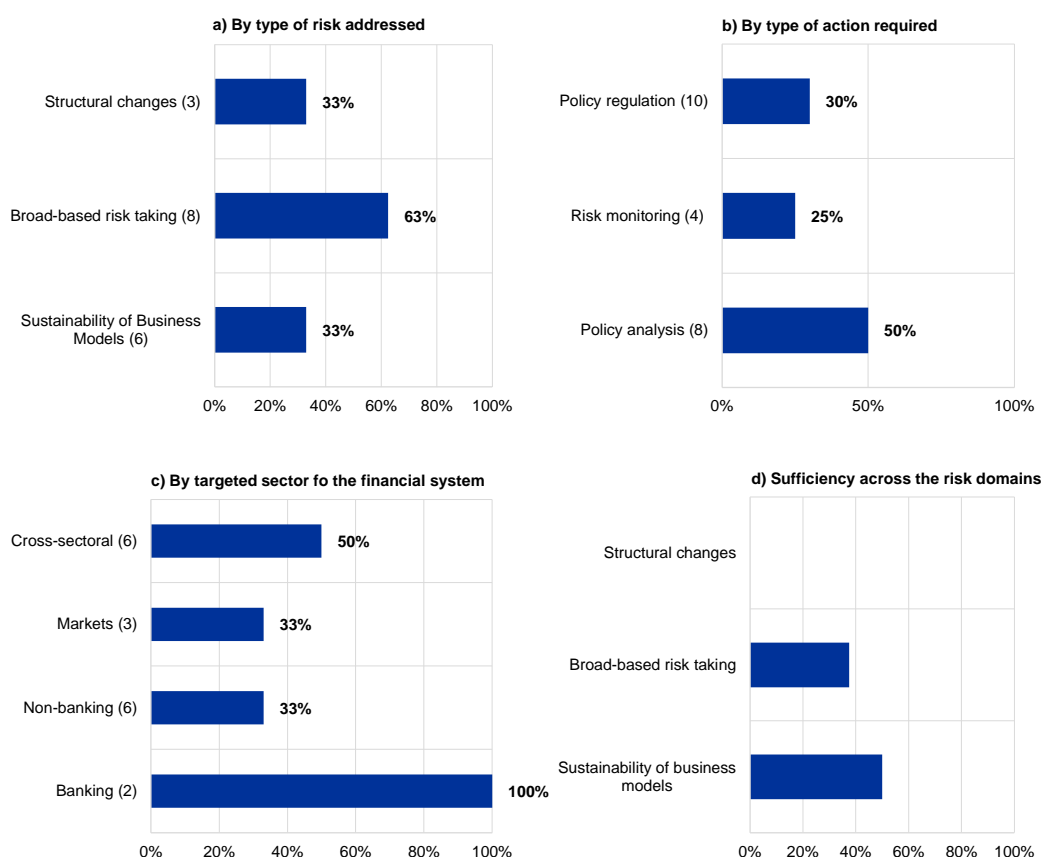
The 2016 policy proposals did not have the status of ESRB recommendations, so their implementation was not enforced. The proposals differ from ESRB recommendations¹⁶¹ in terms of structure and legal status, so when we assess the progress made on implementation we consider all actions taken by a variety of EU and national authorities with regard to the 2016 proposals. A detailed description of our conclusions on the implementation of the 2016 measures is provided in the Annex. Chart 6 summarises the assessment, illustrating the progress made along three dimensions: (i) type of risk addressed (Chart 6 a), (ii) type of action required (Chart 6 b) and (iii) targeted sector (Chart 6 c). It also shows the sufficiency of the actions taken across these three risk domains (Chart 6 d).

¹⁶¹ Regulation (EU) No 1092/2010 of the European Parliament and of the Council on European Union macroprudential oversight of the financial system and establishing a European Systemic Risk Board. One characteristic of a recommendation is that it specifies an addressee (Article 16) and should be followed by a formal compliance assessment attesting whether the addressee acted on its recommended actions (Article 17).



Chart 6

Progress of policy implementation



Note: Panels a, b and c present the share of implemented or partly implemented policies as illustrated in Annex I; a complete mapping of the policy proposals formulated in 2016 onto the categories in panels a, b and c is also available in Annex I. Panel d illustrates the share of policies whose implementation is considered sufficient, as illustrated in Annex I. We do not weight proposals according to their relevance.

4.2.1 The sustainability of business models

The 2016 report raised concerns as to the sustainability of the business models of life insurers and defined benefit pension funds given their long-term guarantees (see Chapter 3). Addressing the LIRE-related risks of the insurance sector, the 2016 LIRE report proposed a wide range of measures: (i) a new, market-based methodology for deriving the risk-free interest rates used to calculate insurers' technical provisions by discounting future liabilities; (ii) a reduction in the maximum guarantees offered in new contracts and limits on policyholders' discretionary benefits; (iii) empowering supervisors to cancel or defer dividends even before the SCR has been breached, requiring more capital; (iv) harmonising recovery and resolution across EU countries and, as a last resort, introducing legal options for modifying existing contracts in the interests of policyholders.

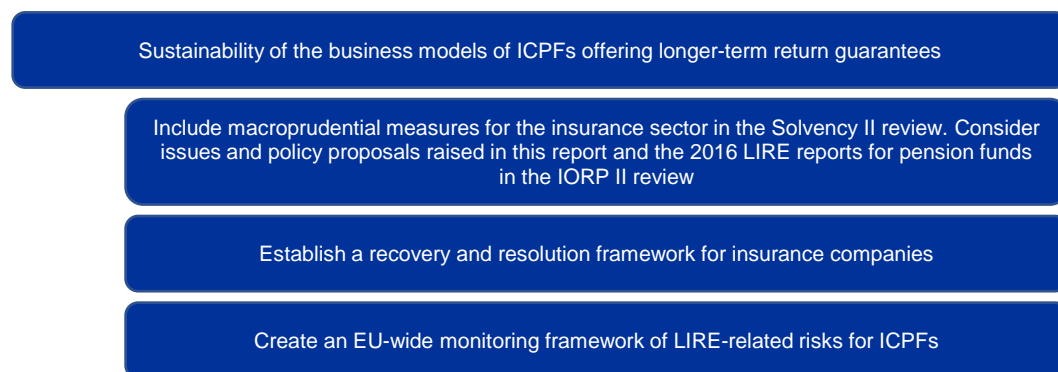
These policy proposals were expected to inform the implementation of Solvency II in 2016 as well as its future review, which is ongoing. One important element of the 2016 policy proposals has already been considered and partially implemented in 2017, i.e. the review of the



ultimate forward rate for the determination of the risk-free interest rate term structure. Moreover, the opinion published by EIOPA on the review of Solvency II contains many other elements of the proposals formulated in the 2016 LIRE report.¹⁶² The legislative process is ongoing and agreement with co-legislators is expected to be reached in 2022.

Figure 11

Policy options for addressing risks related to the sustainability of the business models of ICPFs offering longer-term return guarantees



Further consideration should be given to macroprudential policies for the insurance sector, however, and the ESRB broadly supports EIOPA’s Opinion on the 2020 Review of Solvency II with regard to prudential and monitoring tools. These tools aim to measure the interest rate risk more prudently in the standard formula, to value liabilities more realistically by adopting the method for discount rates, and to guarantee sound capital by introducing a surcharge for systemic risk. Furthermore, a liquidity risk management framework should ensure that policymakers suffer no payment shortfalls, while a harmonised recovery and resolution framework should ensure they are treated equally across EU countries. In the absence of an EU-wide monitoring framework, NCAs in EU countries with guaranteed returns on insurance products should enhance their local monitoring framework using all the existing Solvency II reporting data.

The 2016 LIRE report proposed a harmonised EU risk assessment and transparency framework for pension funds, although this has not been fully implemented. The proposal was to endorse EIOPA’s Opinion¹⁶³ recommending a common risk assessment and transparency framework. The report also recommended investigating the systemic impact of pension funds by means of stress tests considering cross-country differences. Since 2016, EIOPA has employed some elements of

¹⁶² [Opinion on the 2020 Review of Solvency II](#) (EIOPA, December 2020).

¹⁶³ EIOPA (2018), [Decision of the Board of Supervisors on EIOPA’s regular information requests towards NCAs regarding provision of occupational pensions information](#), EIOPA-BoS/18-114, 10 April and EIOPA (2020), [Decision of the Board of Supervisors on EIOPA’s regular information requests towards NCAs regarding provision of occupational pensions information](#), EIOPA-BoS/20-362, 2 June.



the framework in the case of defined benefit pension funds, through its regular stress testing exercise. It is also planning to review and enhance its stress testing framework. Going forward, a harmonised standard for prudent person rule investments (e.g. for non-regulated markets) would underpin the stability of pensions from defined contribution pension funds. Also, the new European reporting should be fully used to monitor LIRE risks so that early supervisory action can be taken with regard to vulnerable entities, particularly in EU countries with many defined benefit pension funds.

Considering the progress made, and in line with the views expressed in the ESRB's report on macroprudential policy for the insurance sector¹⁶⁴, this report restates the need to give further consideration to the measures proposed in 2016 and supports EIOPA's Opinion on the review of Solvency II, in particular with regard to the insurance sector's need for macroprudential measures. Moreover, the forthcoming review of the IORP II Directive should consider the issues and policy proposals raised both in this report and in the ESRB's 2016 report. See also Figure 11.

Key actions proposed to address the sustainability of the business model of ICPFs vulnerable to LIRE.¹⁶⁵

- With regard to the need for macroprudential measures for the insurance sector, the ESRB should support EIOPA's Opinion which was issued as a part of the review of the Solvency II Directive,¹⁶⁶ in line with the views expressed in the ESRB's report on macroprudential policy for the insurance sector. Moreover, the forthcoming review of the IORP II Directive should consider the issues and policy proposals raised both in this report and in the ESRB's 2016 report.
- With regard to the policy options proposed in the ESRB's 2016 LIRE report, if it is not possible to establish an EU-wide framework for monitoring LIRE-related risks and a recovery and resolution framework for insurance, the relevant authorities and NCAs in EU countries with a guaranteed return on insurance products and defined benefit IORPs should, through a supervisory exercise coordinated by EIOPA:
 - enhance the local framework for monitoring LIRE-related risks;
 - take early supervisory action with regard to vulnerable entities;
 - develop recovery and resolution frameworks for insurance at the national level.

¹⁶⁴ ESRB (2020), **Enhancing the macroprudential dimension of Solvency II**, February.

¹⁶⁵ The key missing actions proposed here refer to policies A.1.1.1, A.1.1.2 and A.1.2.2 of the 2016 LIRE report.

¹⁶⁶ EIOPA, (2020), **Opinion on the 2020 Review of Solvency II**, December.



4.2.2 Broad-based risk taking

The LIRE 2016 report advanced a set of proposals relating to LIRE-induced broad-based risk taking which exceeds the capacity of financial institutions and the financial system as a whole. Since then, broad-based risk taking has remained elevated across the financial system. Macroprudential policies should address the build-up of risks in a forward-looking and comprehensive manner and should prevent the lowering of lending standards and the creation of pockets of illiquidity and excessive leverage, wherever they originate in the financial system. Given the greater interconnectedness of financial institutions induced by the LIRE, the disorderly materialisation of such risks could pose a significant challenge to financial stability.

Key missing actions proposed to address the risk of a lowering of lending standards across the financial system.¹⁶⁷

- The ESRB should foster the implementation of a minimum harmonised set of borrower-based measures (i.e. LTV/DSTI/DTI) and lending standards (i.e. affordability tests, amortisation rules, maturity limits and collateral valuation principles) for households at the EU level. These measures could be part of the Mortgage Credit Directive and the Consumer Credit Directive as well as the 2022 review of the macroprudential tools (as required by Article 513 CRR) and would remain the responsibility of national macroprudential authorities.
- All national macroprudential authorities should be legally empowered to activate a minimum harmonised set of tools to limit the extent of systemic risks arising from the relaxation of lending conditions, especially in the context of mortgage lending. In the absence of an EU-wide framework NCAs should implement national frameworks.
- The ESRB and the NCAs should monitor the risks posed by lending beyond banking. Enhanced credit/debt monitoring capacity could be created on the basis of existing credit registers and could be improved by linking it to relevant survey data. The ESRB should support the implementation of monitoring and lending standards beyond banking at the national level and should advise NCAs to guarantee data availability.

Key missing actions proposed to address the risk of excessive leverage in the financial system.¹⁶⁸

- Make further progress on work to define leverage (including off-balance sheet) across the financial system and the economy to facilitate the monitoring of contagion risks.
- Ensure data availability and analyse the systemic risks induced by excessive leverage.

¹⁶⁷ The key missing actions refer to policies A.2.2.1, A.2.2.2 and B.1.2.1 in the 2016 LIRE report.

¹⁶⁸ The key missing actions refer to policy B.1.2.3 in the 2016 LIRE report.



- Review implicit subsidies to debt relative to equity, especially in the tax system and with regard to bail-out guarantees, to assess their role in the creation of excessive leverage in the LIRE.
- Review the use of leverage requirements across different entities and parts of the financial sector, including investment funds, and analyse the interactions among the requirements. Identify policy measures for limiting the procyclicality of leverage in the financial system and across the economy.
- Assess the need for the ESRB to issue recommendation(s) in this area.

Key missing actions proposed to address the risks resulting from interconnectedness.¹⁶⁹

- Identify critical data gaps (legal, institutional and political) hindering the in-depth analysis of risks related to interconnectedness and system-wide stress testing. Recommend that the European Commission, the ESAs and the country authorities remove these barriers effectively.
- Make further progress on the development of a comprehensive framework to analyse interconnectedness in the EU financial system allowing for an effective analysis of contagion risk across the system.
- Make further progress on system-wide stress tests.
- Recommend that the ESAs and the ESRB collaborate on the analysis of the possible transmission of shocks between banks, insurers and CCPs in the process of resolution.

4.2.3 Changes in the structure of the financial system

The risks relating to the changes fostered by the LIRE to the structure of the financial system have increased since 2016. An accelerated transition to a more market-based structure could pose risks to financial stability as the financial system may, for example, become more sensitive to market shocks because of the higher degree of interconnectedness across sectors.

The ongoing and expected changes in the business models of non-banking institutions and in the structure of the financial system bring benefits, but they could also pose challenges to financial stability. The development of market-based finance accompanied by the growing role played by the non-banking sector is part of the Action Plan on Building a Capital Markets Union and offers the benefit of an alternative source of finance for the real economy. Nonetheless, risks beyond the banking sector should be properly monitored and tools to mitigate them should be implemented while ensuring there is a level playing field for institutions across the financial system.

¹⁶⁹ Key missing actions refer to policies B1.1.1, B.2.1.1 and A.1.2.3 of the 2016 LIRE Report.



Key missing actions proposed to address risks related to regulatory arbitrage.¹⁷⁰

- Identify cases of regulatory arbitrage and assess the related risks, focusing on regulatory approaches to credit, liquidity and leverage risks. Ensure regulations are consistent across the financial system while taking a macroprudential perspective.
- Review the areas and risks where, in view of the ongoing structural changes, an activity-based approach may be most needed.
- Review the possible consequences of a broader use of activity-based regulations and their interaction with entity-based regulations.
- Ensure that data are available for the development of activity-based regulations.

Key missing action proposed to implement macroprudential policy beyond banking.¹⁷¹

- Review the implementation of the ESRB's macroprudential policy beyond banking strategy to comprehensively assess any persisting policy gaps and identify the actions needed to close them, incorporating the findings from the follow-up work on risks and policies in the LIRE, as well as other related work.

4.3 Existing macroprudential tools for addressing systemic risks related to the LIRE

The existing macroprudential tools for addressing financial stability risks stemming from the LIRE are limited to the banking sector and borrower-based measures for households, based on national legislation.¹⁷² In the absence of an explicit and comprehensive macroprudential framework for the non-banking sector in the EU, **macroprudential measures are limited to enhancing the resilience of national banking systems and borrowers.** Moreover, borrower-based instruments are currently available only for lending to households but not for lending to NFCs. As borrower-based instruments are defined in national legislation, their availability varies across EU Member States.

So far no EU Member State has explicitly used macroprudential instruments motivated by systemic risks related to the LIRE. This report argues that the LIRE is mainly driven by structural factors, although it can also amplify cyclical developments. As Chapter 3 explains, one of the key financial stability risks related to the LIRE is that it induces broad-based risk taking that could lead to excessive credit growth and asset price inflation, as well as a rise in indebtedness and leverage. It is, however, difficult to assess the extent to which these developments are due to cyclical rather

¹⁷⁰ Key missing actions refer to policy B.2.2.1 of the 2016 LIRE Report.

¹⁷¹ Key missing actions refer to policy B.2.2.2 of the 2016 LIRE Report.

¹⁷² Aspects related to the need to extend macroprudential policy beyond banking as well as the improvements related to the availability of borrower-based measures are discussed in Sections 4.1. and 4.2.



than structural factors. Notwithstanding the important cross-country differences in risk developments, several macroprudential authorities in the EU have so far mainly addressed these risks using the countercyclical capital buffer (CCyB), insofar as they have judged these risks to be the result of cyclical forces, potentially amplified by the LIRE. While several countries have used systemic risk buffers to address various structural risks,¹⁷³ no EU Member State has justified their usage on the basis of systemic risks related to the LIRE. Moreover, borrower-based measures have been widely used by Member States in ensuring sound lending standards, preventing borrowers from taking on excessive leverage, thereby increasing the resilience of borrowers and, indirectly, lenders.

Table 2
Existing macroprudential tools for addressing LIRE-related risks

LIRE impact	Macroprudential objectives	Macroprudential tools
Increases vulnerabilities arising from negative impact on traditional bank business model and net interest rate margin	Raise resilience of banks	SyRB
Encourages risk-taking behaviours by altering banks' portfolios towards high-risk, high-return products	Raise resilience of banks in context of specific sectoral risks	SSyRB BBM
Encourages risk-taking behaviours reflected in weakening of credit risk policies by banks	Ensure sound lending standards	BBM
Amplifies credit/financial cycles due to increased search for yield and leverage	Raise resilience of banks, smooth credit cycle and prevent procyclical de-leveraging of banks	CCyB BBM

Notes: SyRB stands for systemic risk buffer, SSyRB for sectoral systemic risk buffer, BBM for borrower-based measures, and CCyB for countercyclical capital buffer.

The macroprudential authorities may consider implementing either system-wide or targeted capital buffers, as the LIRE could also result in a build-up of non-synchronised imbalances in specific market segments that could contribute to increasing systemic risk in the banking sector. The CCyB is the primary tool aimed at addressing excessive credit growth and leverage related to cyclical developments in the economy that could be amplified by the LIRE. In the CRD V¹⁷⁴, the SyRB can also be applied in a sectoral manner (SSyRB), making it a suitable instrument for addressing sectoral structural risks related to the LIRE.¹⁷⁵ Finally, while the full impact of the COVID-19 pandemic on the real economy and the financial system is still unfolding,

¹⁷³ The harmonised use of macroprudential instruments within the EU would minimise the risk of fragmentation.

¹⁷⁴ See EBA (2020), **Final Guidelines** on the appropriate subsets of sectoral exposures to which competent or designated authorities may apply a systemic risk buffer in accordance with Article 133(5)(f) of Directive 2013/36/EU.

¹⁷⁵ The introduction of such a measure should be approached with care, and calibration should take full account of the targeted risks and should consider the proportionality of the measure.



so the functioning of the EU macroprudential framework has not yet been fully tested, there have been some important early observations. First, the COVID-19 shock has demonstrated the importance of building an adequate level of resilience in the banking system, such that it is able to withstand unexpected shocks. Second, it is important to maintain an adequate balance between structural and releasable buffers, as well to create a macroprudential space which is able to respond effectively to potential shocks. In the current situation, however, any potential macroprudential measures regarding the LIRE risks should avoid procyclicality and should take into account the prevailing macro-financial environment.

The design and calibration of national borrower-based measures might require adjustments in the LIRE. For example, the standard debt service-to-income (DSTI) ratios in the LIRE may mask underlying increasing risky indebtedness, especially when loan maturities are extended and interest rates decline¹⁷⁶. Therefore, affordability tests at loan origination combined with limits to the debt-to-income (DTI), DSTI and loan maturity would be particularly useful to ensure households' (and in turn banks') resilience. To the extent that the LIRE is associated with the risk of housing overvaluation, a combination of BBMs involving both the loan-to-value (LTV) and DTI/DSTI limits may also be warranted, ultimately enhancing banks' resilience to house price reversals¹⁷⁷. More broadly, the design and calibration of the borrower-based instruments should reflect the debt servicing capacity of households as well as the expected increase in household indebtedness. The instruments should also consider the potential implications for households' market access and the impact on inequality, where applicable. The completion of the legal framework for the borrower-based measures where they are not yet available is desirable, but in the meantime implementation in the form of non-legally binding supervisory recommendations may also be effective. Sections 4.1. and 4.2 discuss the ways further borrower-based measures could be made available to the national macroprudential authorities in all EU Member States and consider how they could be expanded to cover NFC borrowers as well as all lenders including non-bank financial institutions.

The current macroprudential framework and the available macroprudential instruments do not facilitate the comprehensive and efficient mitigation of systemic risks related to the LIRE. The LIRE and the accompanying transition to a more market-based financial structure in the EU require the development of a macroprudential policy framework beyond the banking sector. To the extent that structural change involves the displacement of traditional banking activities and related risks from the banking sector, where macroprudential policy instruments are readily available, to non-bank financial intermediation, it should be accompanied by the development of a macroprudential policy beyond banking and more activity-based regulation to complement the

¹⁷⁶ This is because the DSTI ratio reflects the ability to repay debt obligations (i.e. the periodic instalment with principal and interest) based on one's current income and interest rate (for adjustable rate mortgages). As both parameters are subject to uncertainty looking forward, such a test might not capture the overall risk of the loan, particularly over an extended maturity.

¹⁷⁷ The combination of BBMs is often related to reaping synergies from the joint impact of individual instruments operating via complementary transmission channels. In terms of supporting the resilience of borrowers and banks, income-based instruments such as DSTI and DTI are more likely to affect household default probabilities since they directly limit the overall indebtedness of borrowers and ensure the sustainability of household debt servicing. Collateral-based instruments (e.g. LTV) operate through a different incentive mechanism by requiring borrowers to put more "skin in the game" (i.e. equity) and, hence, limiting strategic default (where the legal framework allows it).



current entity-based regulation (see Section 4.2). This would mitigate cross-sectoral and cross-country leakages and potential regulatory arbitrage and would also guarantee a level playing field.



5 Conclusions

This report analyses the macroprudential policy implications related to the LIRE and the related structural changes in the EU financial system and proposes possible policies to mitigate them. The analysis identifies three main financial stability risks associated with a prolonged LIRE. The risks relate to profitability pressures and weakening resilience in some sectors of the financial system, excessive risk taking affecting financial markets, as well as risks associated with the accelerated transition to a more market-based structure, implying a possible risk of higher sensitivity to market shocks. In particular, **the report highlights four areas of concern: 1) the profitability and resilience of banks; 2) the indebtedness and viability of borrowers; 3) systemic liquidity risk; and 4) the sustainability of the business models of insurers and pension funds offering longer-term return guarantees.**

Addressing risks related to the LIRE requires broad-ranging policy responses. There are limits to the ability of existing macroprudential instruments to address risks related to the LIRE, in terms of both scope and coverage, so some policy proposals in this report go beyond traditional macroprudential instruments. Moreover, the current macroprudential toolkit does not provide instruments to deal directly with risks related to structural changes in the financial system. To the extent that structural change involves the moving of traditional banking activities and related risks to non-bank financial intermediation, **it requires the development of a macroprudential policy beyond banking and more activity-based regulation to complement the current entity-based regulation.** This would mitigate potential regulatory arbitrage and ensure there is a level playing field.



This report presents several policy options for mitigating systemic risks and improving systemic risk analysis. The Task Force suggests prioritising the policy option areas as shown below. In each of the policy areas, the order is in line with priority.

Policy options for mitigating systemic risks

1. The profitability and resilience of banks:

- address overcapacity by removing potential obstacles to banking sector consolidation and restructuring;
- reconsider the framework for dealing with weak banks;
- re-evaluate incentives for banks' digital transformation and improving cost efficiency;
- assess legal restrictions on the application of negative interest rates to deposits.

2. The indebtedness and viability of borrowers:

- develop measures to prevent and resolve high levels of corporate indebtedness;
- develop a common minimum toolkit of borrower-based measures targeted at households.

3. Systemic liquidity risk:

- move towards macroprudential liquidity requirements.

4. The sustainability of the business models of insurers and pension funds offering longer-term return guarantees:

- include macroprudential measures for the insurance sector in the Solvency II review and in particular, the ESRB should support EIOPA's Opinion issued as part of the review of the Solvency II Directive, in line with the views expressed in the ESRB report on macroprudential policy for the insurance sector;
- establish a recovery and resolution framework for insurance companies;
- consider issues and policy proposals raised in this and the 2016 LIRE reports for pension funds in the IORP II review.

Policy options for improving systemic risk analysis

2. The indebtedness and viability of borrowers:

- build an enhanced credit and debt monitoring capacity.

3. Systemic liquidity risk:

- improve liquidity reporting and a more efficient use of already available data;
- implement system-wide liquidity stress tests.

4. The sustainability of the business models of insurers and pension funds offering longer-term return guarantees:

- create an EU-wide monitoring framework of LIRE-related risks for ICPFs.



These policy options should be seen not as ESRB recommendations but rather as a blueprint for medium-term policy objectives. The ESRB may selectively choose some of these proposals to be refined and further developed into more concrete ESRB recommendations.

The authorities should use existing macroprudential tools to mitigate risks stemming from the LIRE and to make progress on the actions required to complete the policy options in the 2016 report.



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Appendix

A.1 Analytical boxes

Box 1

The negative interest rate environment

For banks, the factors underlying the distortions associated with the prolonged LIRE partly relate to banks' inability to charge negative rates on client's deposits. In the LIRE, although lending rates continue to follow market rates deposit rates, which are normally set at market rates net of a "mark-down", tend to hit the zero-lower bound (ZLB) relatively soon. This leads to a compression of loan-deposit margins, with adverse consequences for banks' net interest income. As Chart A shows, the share of deposits with a "stuck-at-zero" rate has been increasing since 2010, and has become the predominant part of bank's overall deposits. At the same time, since 2015 we have seen a gradual pass-through of some deposit rates into negative territory. We now seek to quantify just how sticky the ZLB actually is.

The last six years of negative rates have underlined the persistent nature of the constraints imposed on deposit rates by the ZLB. The amount of negatively remunerated NFC deposits has been steadily increasing (although it still represents only about one-third of overall corporate deposits), while households have only been moderately affected by negative deposit rates (Chart A). For corporate sector deposits, there is a visible compression of the mass at zero (Chart B). The overall share of retail deposits with a rate of between 0% and 0.05% has been hovering at around two-thirds since 2017.

One obvious obstacle to charging negative rates on deposits stems from explicit or implicit country-specific legal constraints. National regulatory frameworks constitute a primary source of heterogeneity that could explain at least a part of the observed differences in the degree of pass-through (Table A). The laws affecting deposit rates vary not only by country but also by specific contract: for instance, some jurisdictions only consider regulated contracts, while others distinguish between new business and existing contracts. Even when there is no clear legal obstacle to negative deposit rates there are still some blurred situations with regard to risks for a bank moving to charge negative rates. This leads to overall uncertainty, particularly for small retail depositors.

The persistence of the ZLB on deposit rates has structural roots in the characteristics of both banks and clients. Empirical evidence on euro area deposits highlights a core difference between households and NFCs in terms of their willingness to accept negative deposit rates. Corporates face higher transaction costs related to the size of the deposits and the complexity of available payment services if they turn to cash. With regard to credit institutions, research

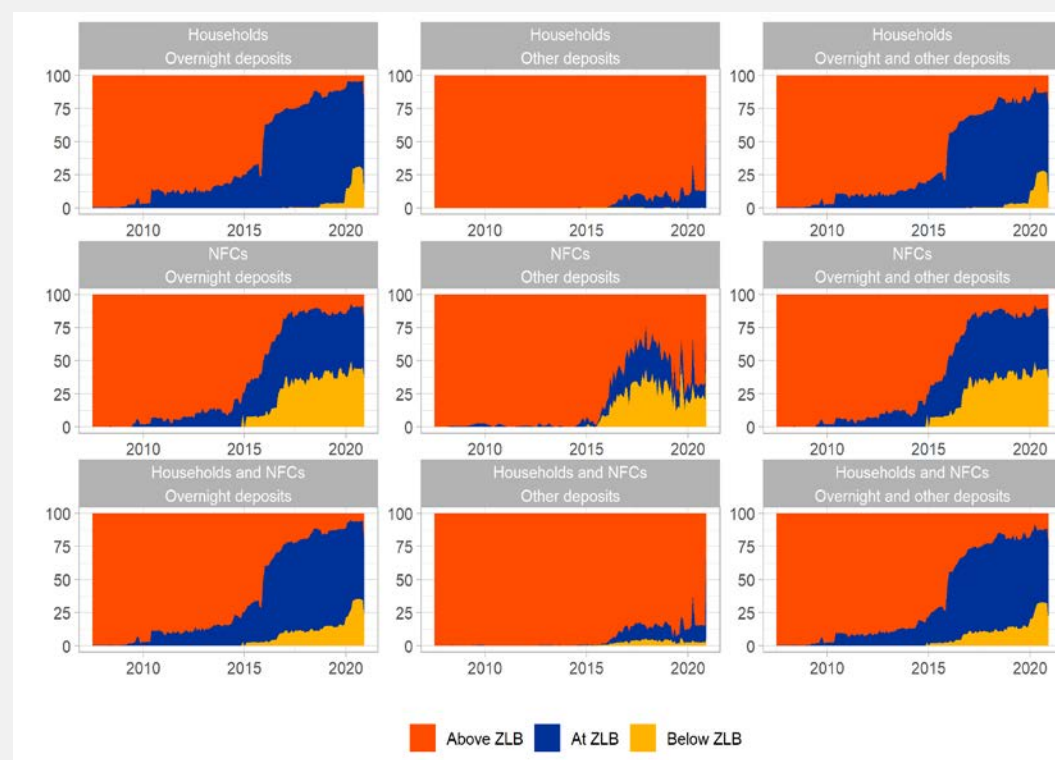


suggests¹⁷⁸ that the more capitalised the banks are, the more likely it is that negative rates will be applied to NFC deposits. Moreover, as Chart C shows, the increase over time of negatively remunerated NFC deposits is more visible for banks dealing with large clients, reflecting the larger and more complex payment services they require.

Chart A

The share of deposits priced above, at and below the zero lower bound (ZLB)

Shares of deposits by type and sector (percentage points)



Sources: ECB (individual balance sheet item and MFI interest rate statistics) and ECB calculations.

Notes: Last data point is December 2020. We consider a deposit rate to be equal to zero if it belongs to the set [0%, 0.05%], distinguishing overnight deposits from other deposits and disentangling deposits by client sector (households and NFCs).

Empirical estimates confirm the importance of the role structural factors play in determining the ZLB on deposit rates and the sluggishness of the pass-through into negative territory.¹⁷⁹

¹⁷⁸ See Altavilla, C., Burlon, L., Giannetti, M. and Holton, S. (2019), "Is there a zero lower bound? The effects of negative policy rates on banks and firms", *Working Paper Series*, No 2289, ECB, June.

¹⁷⁹ In order to quantify the inertia of banks in charging negative rates a Cox Proportional Hazard model is estimated taking into account, to the extent possible, all the above factors. Time-varying country characteristics are controlled via shared "frailty" controls. They are equivalent to time-specific (random) effects absorbing all time-varying country-specific confounding factors, including country-level regulatory constraints or macroeconomic conditions.



¹⁸⁰ ¹⁸¹ As expected, the two main characteristics of a deposit (i.e. it is an overnight – ON – deposit from an NFC) are of primary importance and present strongly significant, positive coefficients, while the likelihood of negatively pricing a stuck-at-zero deposit increases with the size of the bank and its clients. Based on these estimates, and depending on the current level of explanatory variables, the only segment that could be expected to show a material increase in the probability of observing a negative rate for stuck-at-zero deposits is, unsurprisingly, the NFC overnight deposits segment. Even in that case, though, the pass-through at the ZLB seems rather sticky, with the probability of observing a negative rate reaching about one-fifth over a five-year projection horizon.

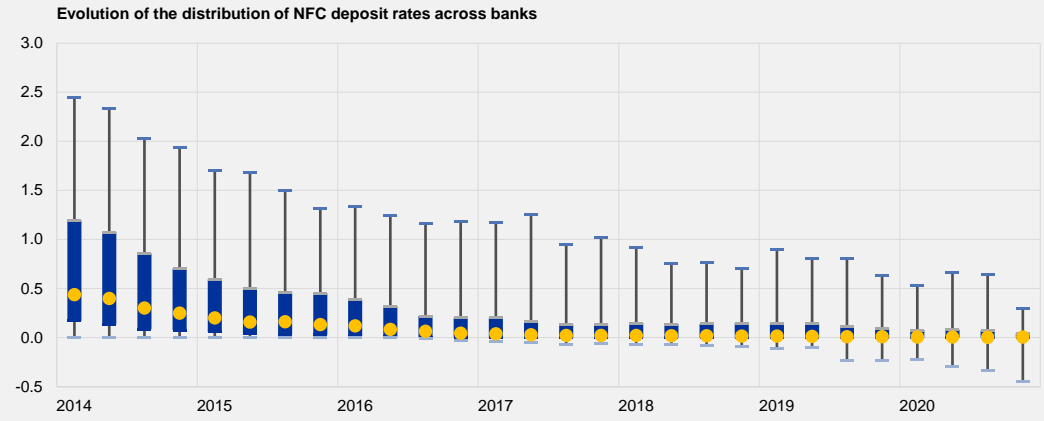
¹⁸⁰ We employ covariates to control for the type of deposit (overnight or term deposit), the sector of the depositor (NFC or household), the size of the bank (log(assets)), the share of large clients (computed as the share of NFC loans above 1€ million over total NFC loans) and the current DFR compared with that observed while stuck at zero (this is a time-varying variable that reflects the level of the point-in-time DFR compared with that observed when the deposit rate was stuck at zero). The capital ratio covariate has been excluded from the final formula as the associated estimated coefficient was not significant.

¹⁸¹ The specification allows us to model the presence of censored data related to those deposits which do not carry a negative rate but may do so in the future. We thereby account for the large share of deposits still stuck at the ZLB. Not considering this source of censoring would lead to highly (downwardly) biased estimates of how fast the transition occurs. Among the controls, the model also embeds time-varying country-specific random effects (distinguishing periods based on the level of the DFR), via the inclusion of “frailty” controls. Under the reasonable assumption that the policy rate is set taking into account (even) country-level conditions, including in relation to the stacking at the ZLB, this control is useful for addressing a potential source of endogeneity.

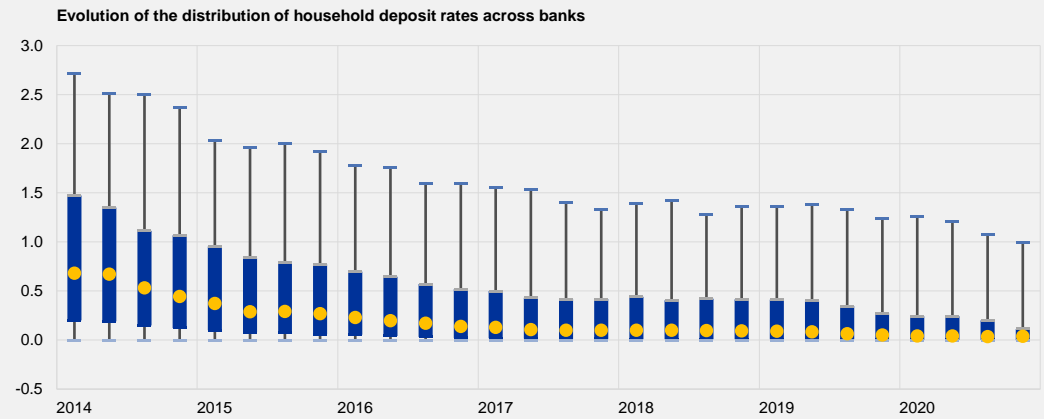


Chart B
The distribution of deposit rates

(percentage points)



(percentage points)



Sources: ECB (individual balance sheet item and MFI interest rate statistics) and ECB calculations.

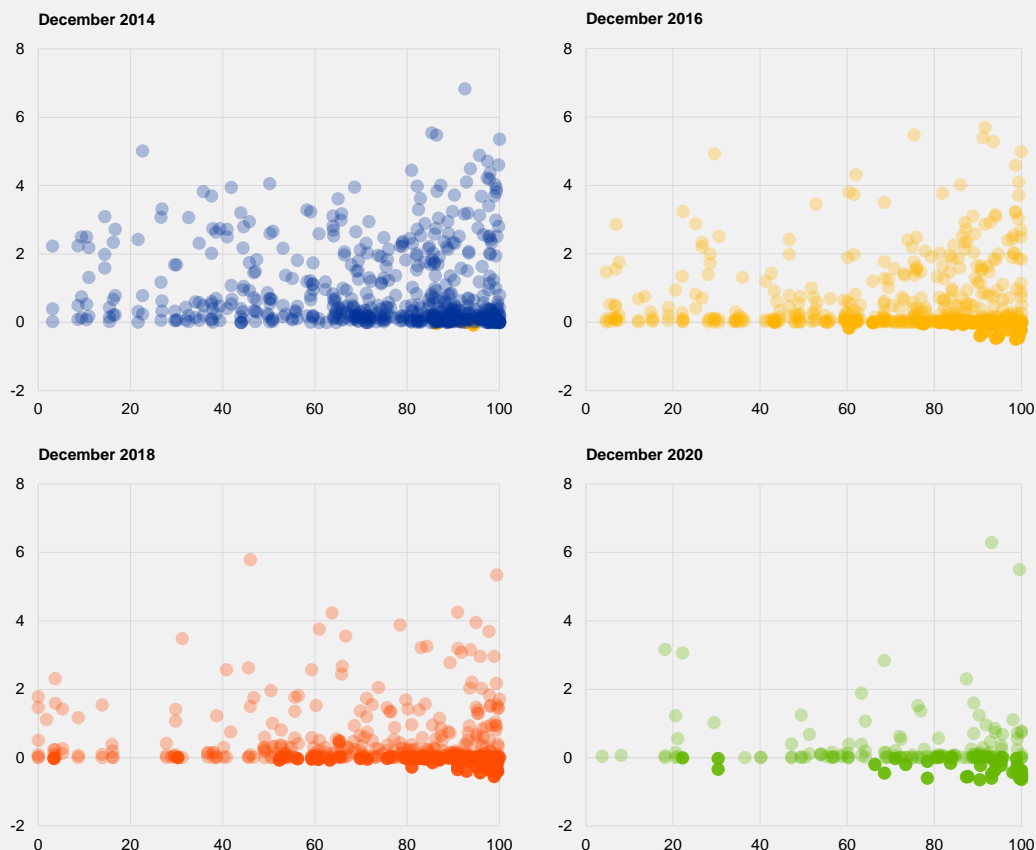
Notes: Time series of box plots representing the distribution of deposit rates across banks in euro area countries for NFCs and households respectively. For each period, the box plots represent the 5th, 25th, 50th, 75th and 95th percentile of the distribution. Frequency is quarterly, based on the distribution in the last month of each quarter considered. Last observation December 2020.



Chart C

Deposit rates versus share of large loans to NFCs

(y-axis: percentage points; x-axis percentage of total NFC loans)



Sources: ECB (individual balance sheet item and MFI interest rate statistics) and ECB calculations.

Notes: Bank-level scatter plots of rates on new business deposits (y-axis), average across all categories weighted by the corresponding outstanding amounts, and share of new loans to NFCs above €1 million (x-axis). The x-axis is a proxy that indicates whether the banks deal with large clients. Observations with negative rates are highlighted by darker shaded points. Each panel reports data for the corresponding month only. Last observation December 2020.

Table A

Share of deposits with a negative deposit rate, by type

(percentage points)

	AT	BE	CY	DE	EE	ES	FI	FR	GR	IE	IT	LT	LU	LV	MT	NL	PT	SI	SK
Overnight HH	11.1	44.4	40.0	43.1	0.0	0.0	33.3	6.9	0.0	0.0	3.3	0.0	36.4	0.0	0.0	30.0	0.0	0.0	0.0
Overnight NFC	66.7	55.6	40.0	69.4	0.0	20.0	70.0	29.0	0.0	62.5	3.2	0.0	72.7	0.0	0.0	81.8	0.0	0.0	60.0
Term HH	0.0	0.0	0.0	10.8	0.0	0.0	0.0	18.2	0.0	0.0	7.7	0.0	37.5	0.0	NA	0.0	0.0	0.0	0.0
Term NFC	10.0	0.0	0.0	46.8	0.0	4.5	0.0	6.7	100	16.7	7.1	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0

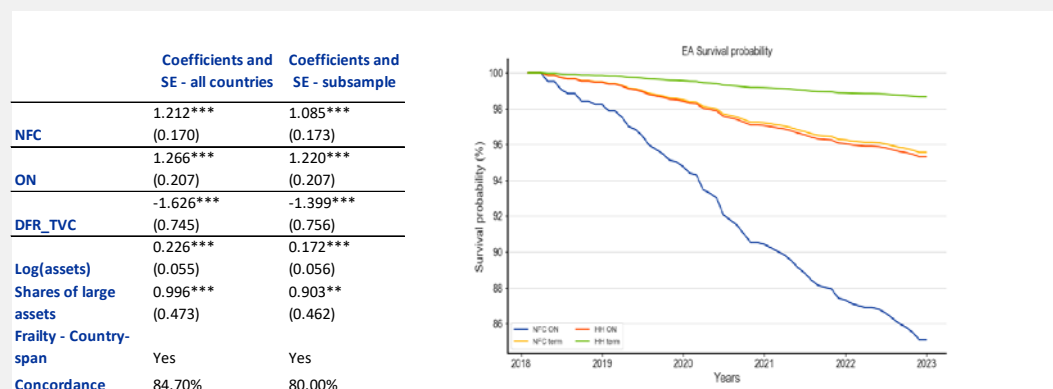
Source: ECB (individual balance sheet item and MFI interest rate statistics) and ECB calculations.

Notes: The sample includes deposits with rates which were either negative or stuck-at-zero for at least one month between June 2014 and December 2020. The green cells indicate the share of deposits in the sample bearing negative rates as of December 2020. Data for NFC deposits in Greece refer to one single observation.



Chart D

Cox proportional hazard model on deposit rates



Source: ECB (individual balance sheet item and MFI interest rate statistics), ECB calculations. Notes: Left panel – coefficients and standard errors (SE) for the covariates included in the Cox Proportional Hazard regression. The event under investigation is one bank charging negative rates on clients' deposits. NFC is a Boolean indicating whether a deposit is an NFC or a household (HH) deposit. ON is a Boolean indicating whether a deposit is overnight or with a longer term. DFR_TVC is a time-varying covariate computed, for each time span (where each span refers to the months with a given DFR), as the difference between the current DFR and the DFR observed when a given deposit has a stuck-at-zero rate (we consider a rate to equal zero when it is in the closed set [0%, 0.05%]). Log(assets) covariates indicate the natural logarithm of the bank's assets. The share of large loans indicates the share of total NFC loans with a value above €1 million. The frailty makes it possible to include a random effect for each country and time span, where the time span is defined as above. The concordance assesses that there is a high correlation between the covariates and the dependent variable. The upper * stands for the level of significance (*, **, *** for 10%, 5% and 1% significance levels respectively). The first column refers to the regression considering a sample of banks from throughout the euro area. The second column refers to a smaller sample, removing the deposits by country sector if they have been negative in that specific country sector. Right panel – the chart shows the five-years-ahead monthly projections of survival probabilities for each deposit type (NFC overnight - blue, NFC term - yellow, HH overnight - red, HH term - green). The survival probabilities are defined as 1 minus the likelihood of observing the phenomenon estimated with the Cox Proportional Hazard model (one bank charging a negative rate on a certain deposit).



Box 2

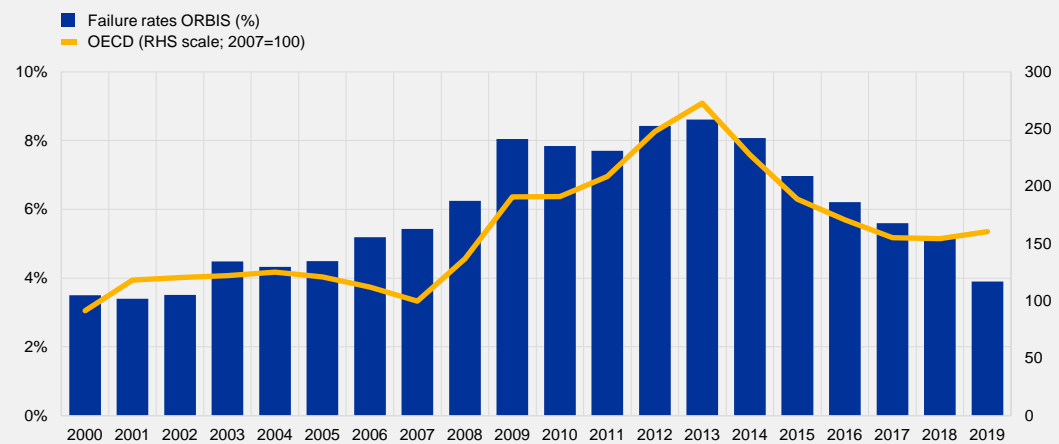
COVID-19 and the credit risk of euro area SMEs

The spread of the COVID-19 pandemic in 2020 and the lockdown measures adopted to tackle the various waves of infections have severely affected the corporate sector. Companies have raised additional external financing since the outbreak of the COVID-19 crisis, partly facilitated by public guarantee programmes, loans, grants or moratoria aimed at alleviating possible liquidity constraints. The increased indebtedness further exacerbated the already high levels of leverage prevailing in the pre-pandemic period (favoured by the LIRE), making the corporate sector more vulnerable to large economic shocks.¹⁸² A recovery is expected in 2021, although uncertainty remains high, especially in relation to the rollout of the vaccination campaign.

Chart A

Corporate failure rates in the euro area

(left-hand scale: percentages; right-hand scale index: 2007=100)



Notes: ECB calculations based on the BvD ORBIS database and OECD data (SDBS dataset). The figure depicts: a) the number of firms' failures as a share of the beginning-of-period number of performing firms, based on BvD ORBIS. Failure is defined as the occurrence of two consecutive years for which cash and cash flow do not cover financial expenses (blue bar), b) OECD data (SDBS dataset) on bankruptcy of enterprises (yellow line). Data for 2019 are partly estimated.

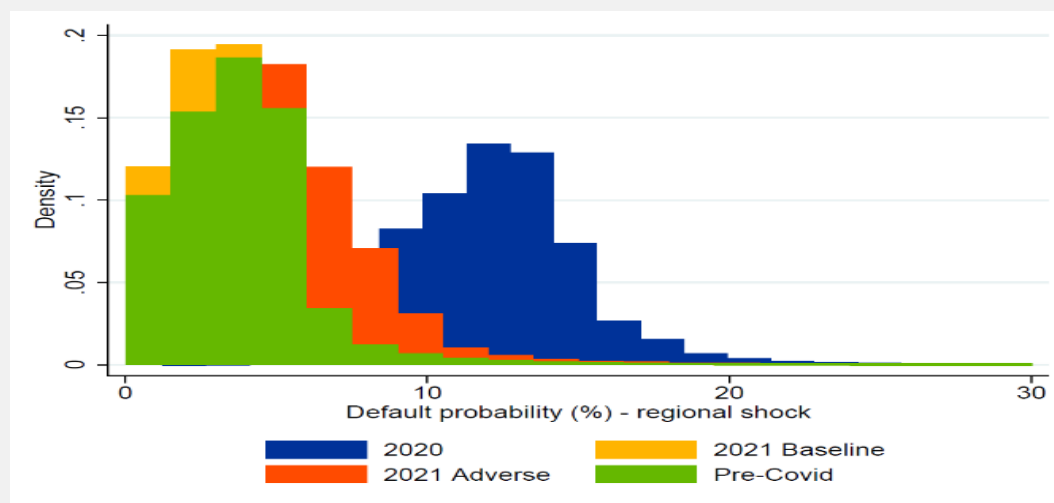
The impact of COVID-19 on individual firms' probability of default (PD) can be estimated from a model considering the standard determinants of credit risk and accounting for heterogeneity in the tightness of local lockdown measures. The model is an adaptation of those models available in the literature on SME credit risk (Cathcart et al., 2020) and is run on a large sample of euro area firms

¹⁸² ECB (2019), *Financial Stability Review*, November.



included in the BvD ORBIS yearly dataset.¹⁸³ The model explains individual firms' failures, defined as companies having cash and cash flow that is not sufficient to cover their financial expenses for two consecutive years. Chart A shows that this definition, following Gourinchas et al. (2020), provides default rates that are consistent with the aggregate statistics available from the OECD. The model is first used to produce December 2019 firm-level

Chart B
Distribution of the firm-level PDs



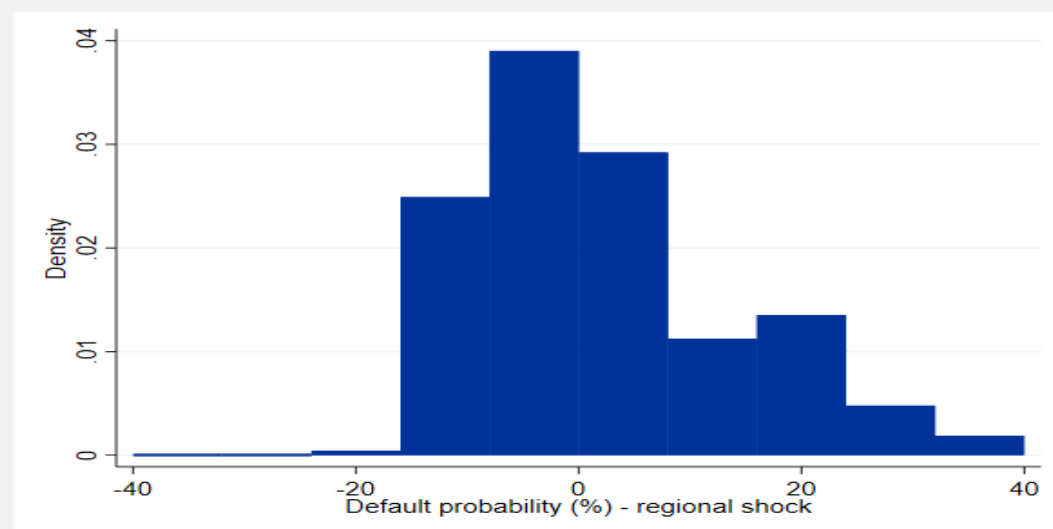
Note: ECB calculations based on BvD ORBIS

¹⁸³ The underlying dataset comprises around 36 million observations, pertaining to about 4.7 million firms – largely SMEs (those with total assets below €43 million, in line with Eurostat’s definition of an SME and representing around 95% of the overall sample). The baseline specification includes GDP growth rate, leverage, profitability, liquidity and age. The model allows for non-linearity in the relationship between the deterioration in the macroeconomic outlook and credit risk. Other aggregate macroeconomic indicators are controlled for by the inclusion of a set of time dummies. Robustness has been tested along several dimensions, including the definition of the dependent variable, the selection of the regressors, and the model adopted.



Chart C

Distribution of the firm-level difference between PDs based on regional and country GDP



Note: ECB calculations based on BvD ORBIS database. The chart shows the distribution across firms, for the year 2020, of the difference between the PD computed based on GDP growth adjusted for the severity of lockdown measures at the regional level, and the PD computed based on (unadjusted) country-level GDP figures, as a percentage of the latter

PDs. The PDs for 2020 are based on observed GDP growth rates while for 2021 they are projected on two different scenarios (baseline and adverse).¹⁸⁴ For both years, the projected PDs take into account the geographical heterogeneity in firms' exposures to COVID-19. This is done by adjusting country GDP figures based on the severity of lockdown measures implemented in the region where the corresponding firm is located.¹⁸⁵

Model-based PDs in line with the observed and expected economic outlook would entail a sharp deterioration of credit risk in 2020 and a material improvement in the following year. According to the model, the severe contraction in economic activity in 2020 would take the average firm-level PD in the euro area to 12%, three times higher than its pre-COVID-19 level and higher than the 9% peak recorded during the sovereign debt crisis (Chart B). The rebound expected for 2021, under both scenarios, would instead take PDs close to pre-pandemic levels, namely 3.6% and 5.8% for the baseline and adverse scenarios respectively. These estimates rely on historical regularities and cannot capture the direct effects on default rates of the different extraordinary mitigating measures implemented following the COVID-19 outbreak. By helping viable firms to withstand a systemic but transitory shock such as the pandemic, these measures will eventually exert a (material) downward

¹⁸⁴ The scenarios adopted are those constructed for the forthcoming **EBA stress tests**.

¹⁸⁵ The severity of lockdowns is captured by (yearly averages of) indicators of change in mobility obtained from the Community Mobility Report (Google) and available at the regional level for all countries considered. The adjustment is computed based on an ancillary regression linking the country-level figures for quarterly GDP-growth rates in 2020 and corresponding mobility indicators, available for 133 countries worldwide. For 2021 it is assumed that the difference in the mobility reduction from the country average remains as it was in 2020.



impact on actual default rates for 2020 (not yet available in this dataset), compared with the estimated figures. However, to the extent that such measures do not prevent defaults but instead just postpone them, either because the COVID-19 shock turns out to be more persistent than originally thought or because the measures have partially benefitted companies that already were in a weak condition, they may lead to 2021 default rates which are significantly higher than estimated.

Uncertainty remains high over the credit risk outlook – this is also due to increased heterogeneity across firms, partly reflecting a geographically diverse exposure to lockdown measures. The cross-sectional dispersion of estimated PDs in 2020 has increased considerably, as tends to be the case when the average PD also increases. Another factor causing an increase in cross-sectional dispersion is heterogeneous exposure to COVID-19. This is visible from the firm-level distribution of the difference between the PDs considered so far and the corresponding figures calculated based on country-level GDP growth: adjusting for the severity of lockdown measures implemented locally leads to a materially different assessment for a considerable mass of firms (Chart C).



Box 3

Luxembourg investment funds in the LIRE

Given the persistent LIRE, investment funds in Luxembourg have extended the maturity of their bond portfolios and have increased their exposure to interest rate risk. Since the end of 2008, the average residual maturity of the debt securities held by Luxembourg non-MMF investment funds has increased by 2.5 years to 9.2 years (Chart A). In parallel, the modified duration rose by 1.8 years to reach 5.7 years. Hence a one percentage point parallel upward shift of all relevant yield curves would, all else equal, lead to an approximate 5.7% decrease in the market value of the debt securities held by Luxembourg investment funds.

The relationship between Luxembourg funds' portfolio maturity and yields has become stronger over time. Up to the beginning of 2013, the relationship between the 10-year German Bund yield and the residual maturity of the debt securities held by Luxembourg funds was weak and statistically insignificant.¹⁸⁶ Since Q4 2013, however, the relationship has changed as movements in the 10-year German yield have been mirrored by opposite moves in the residual maturity (Chart A). Over the period Q4 2013-2Q 2020, a one percentage point decrease in the 10-year German Bund yield has been accompanied by an increase in the residual maturity of +0.66 years and an increase in the modified duration of +0.44 years of funds' aggregate bond portfolio.

An important factor driving the change in this relationship was the move of long-term interest rates towards zero. Interest rates close to zero hamper investment funds' ability to maintain positive yields and may incentivise them to shift towards assets with longer maturities. Indeed, as the 10-year Bund rate started to approach zero from end-2013 onwards, Luxembourg investment funds started shifting towards assets with longer maturities. The increase in maturities was most pronounced for sovereign bond holdings (+3.3 years). The increase in the residual maturity for private sector bond portfolios, which typically earn a risk premium over sovereign bond yields, was less significant (+2.2 years).

Luxembourg investment funds also hold debt securities with a lower credit quality than a decade ago, likely reflecting further search-for-yield behaviour. In 2010, the share of debt securities held by Luxembourg funds that had a AAA credit rating amounted to 30%, compared with 14% in Q2 2020 (Chart B).¹⁸⁷ At the same time, the share of debt securities rated BBB+ to BBB- more than doubled and the share of high-yield bonds increased from 15% to 19%. This deterioration in credit quality was driven by rating downgrades, as well as active shifts towards lower-rated debt securities.¹⁸⁸

¹⁸⁶ The relationship was estimated by regressing the change in the residual maturity/modified duration on the change in the 10-year German Bund yield.

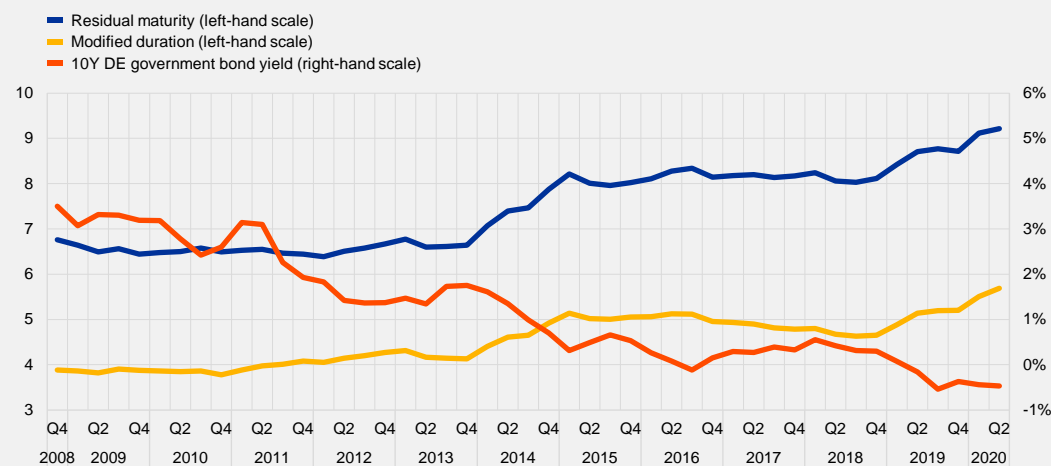
¹⁸⁷ Data for the years 2011-17 are currently being compiled and should be considered to be work-in-progress.

¹⁸⁸ All these phenomena are also observed for German institutional funds: "Yet using unique granular data on the bond holdings of institutional funds, we show that their trading behavior is strongly procyclical: they actively move into higher yielding, longer duration and lower rated securities in response to lower interest rates...Institutional funds' risk taking increases when interest rates turn negative, and this effect is particularly pronounced for funds with explicit minimum return guarantees." (Barbu et al. 2020).



Chart A Residual maturity and modified duration

(left-hand scale: years, right-hand scale: percentages)

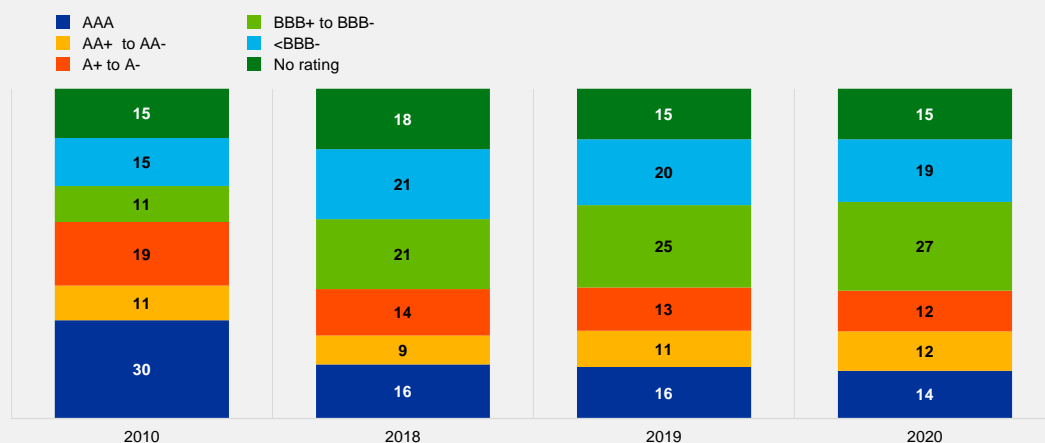


Sources: BCL, ECB Centralised Securities Database (CSDB), Bloomberg.

Notes: the calculation considers all debt securities held by non-MMF investment funds and caps the maturity at 100 years (e.g. for perpetual bonds).

Chart B Credit ratings

(percentages)



Sources: BCL, ECB Centralised Securities Database (CSDB), Bloomberg.

Notes: end-of-year data, except for 2020 (Q2 data). Data for the years 2011-2017 are currently being compiled and should be considered as work-in-progress.

The shift towards longer-term and lower-rated securities helped to preserve the average yield on Luxembourg investment funds' bond portfolios. Over the period 2008-20, the weighted average yield on fixed-rate debt securities held by Luxembourg funds decreased by 130 basis points to



2.9%. By way of comparison, the decrease in the German 10-year Bund yield was much greater over this period (approximately 400 basis points).

The rebalancing towards riskier assets in Luxembourg funds' bond portfolios has also brought greater liquidity transformation. Securities with lower credit ratings and/or longer maturities tend to display a lower level of market liquidity.¹⁸⁹ In combination with the fact that most investment fund shares/units can be redeemed at a high (usually daily) frequency, the shift towards less liquid assets may therefore have created a liquidity mismatch between the asset and the liability sides of investment funds' balance sheets. Under adverse market conditions, investors may perceive a first-mover advantage that could potentially trigger a run. In line with this, Luxembourg high-yield bond funds, which invest in the most illiquid debt securities, experienced net investor outflows of -8.5% in March 2020, compared with -1.1% for government bond funds. Heavy outflows due to a potential first-mover advantage might in turn amplify existing negative price dynamics, resulting in a negative impact on overall financial stability in Europe (e.g. through common asset holdings with banks).

¹⁸⁹ See, for example, Chen, L., Lesmond, D. A., and Wei, J. (2007), "Corporate yield spreads and bond liquidity", *The Journal of Finance*, 62(1), pp. 119-149 or EBA (2013), *Report on appropriate uniform definitions of extremely high quality liquid assets (extremely HQLA) and high quality liquid assets (HQLA) and on operational requirements for liquid assets under article 509(3) and (5) CRR*, 20 December.



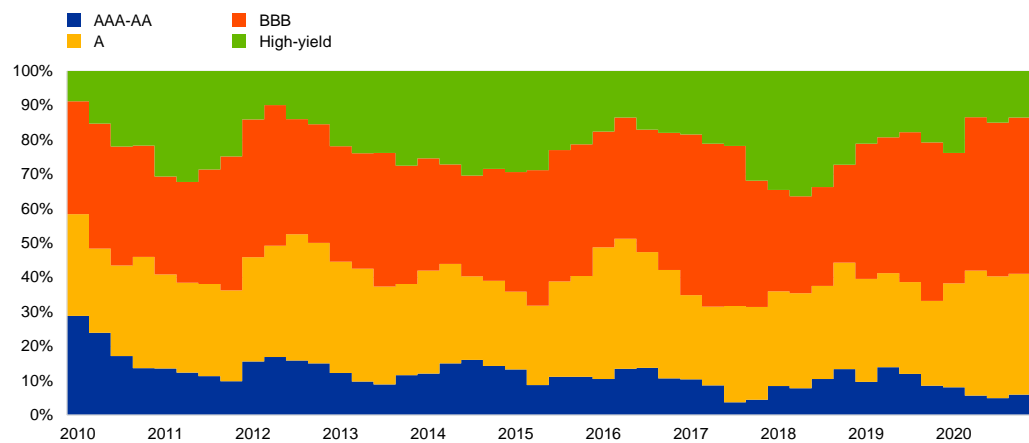
A.2 Chart pack complementing the risk analysis

A.2.1 Broad-based risk taking

Chart A.1

Corporate debt issuance by rating category

(Q1 2010-Q3 2020; percentage shares)



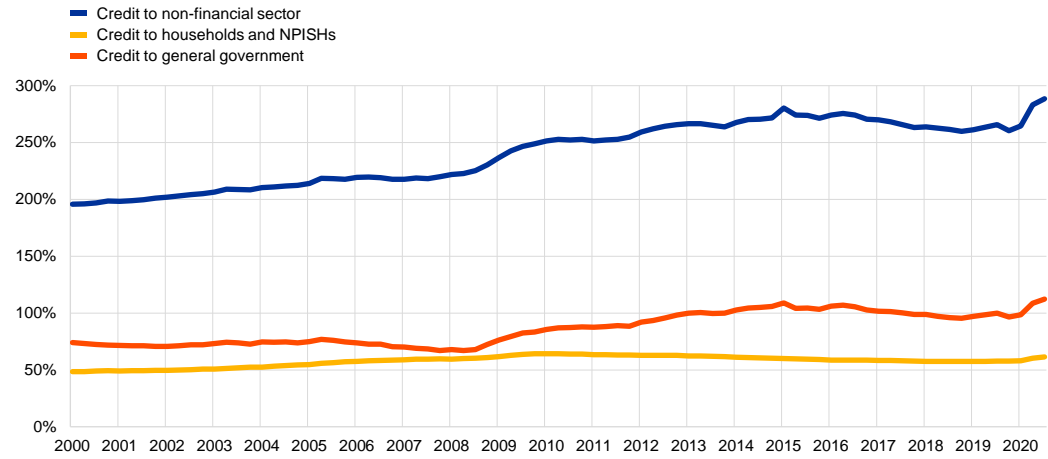
Source: ECB (Centralised Securities Database), Dealogic and ECB Calculations. Issuance of euro-denominated debt securities.



Chart A.2

Total credit to economic sectors

(Q1 2010-Q3 2020; percentage shares)



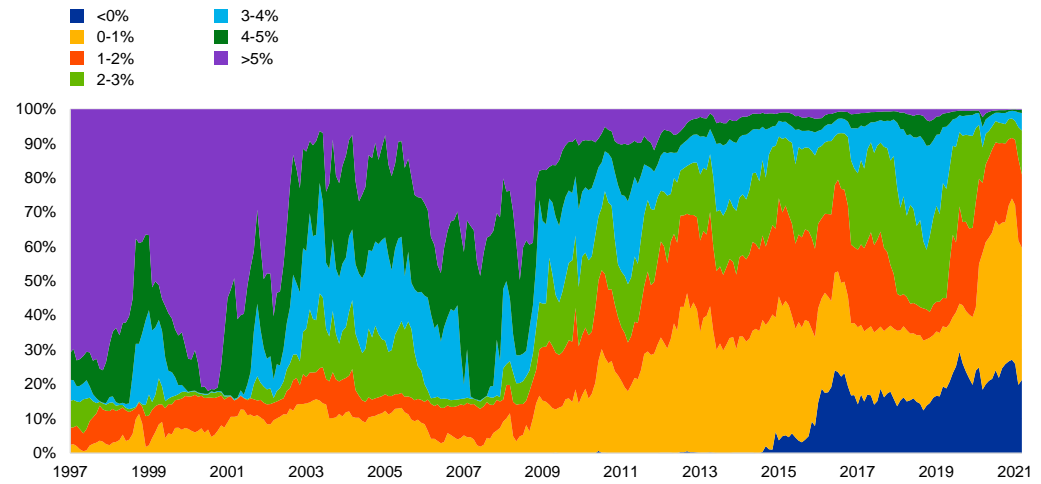
Source: BIS, Haver and ESRB Secretariat calculations.

Note: Total credit as percentage of GDP. NPISH stands for non-profit institutions serving households.

Chart A.3

Global corporate and government bonds outstanding by yield buckets

(Jan 2019 – Jan 2021; percentages)



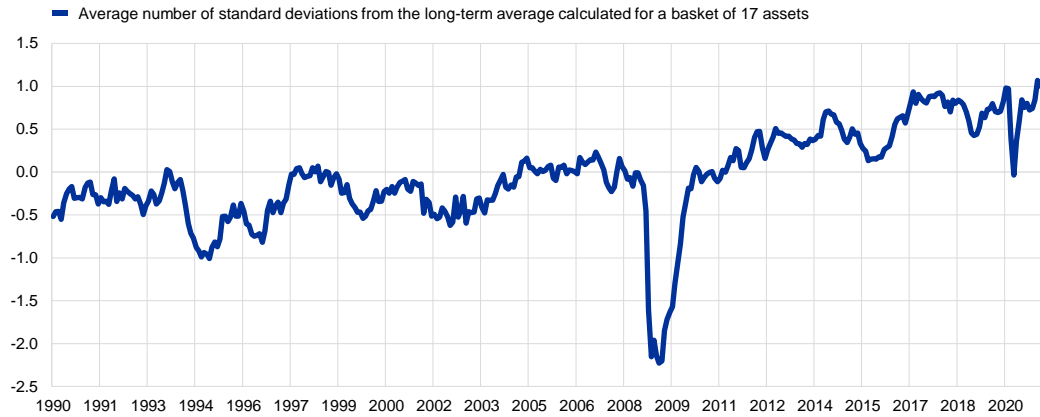
Source: Bloomberg and Deutsche Bank.



Chart A.4

Average deviation of real yields from long-term average

(Jan 1990 – Oct 2020, Z-score)



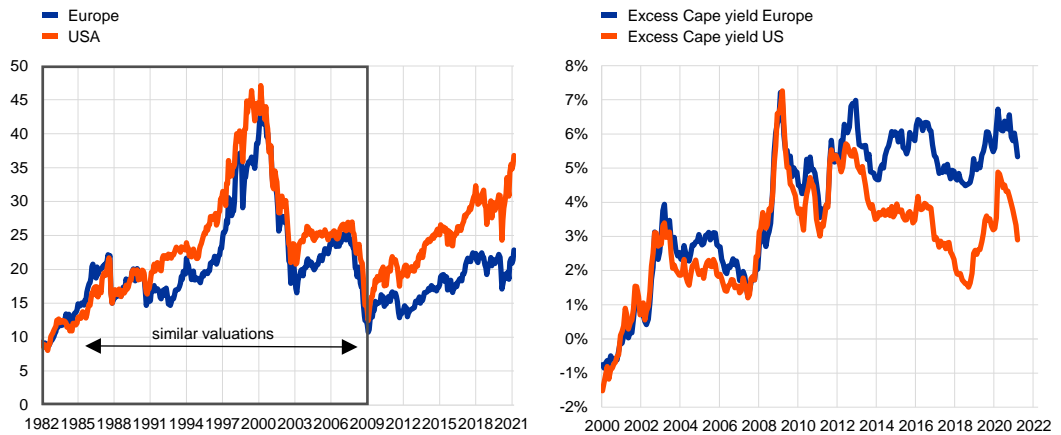
Source: ECB, November 2020 FSR, Bloomberg, Wilshire, Bureau of Economic Analysis and R. Shiller database, Princeton University.

Notes: The chart shows the average deviation of the real yield from the long-term average calculated for a basket of 17 global financial assets, including developed market equities (earnings yield), developed market sovereign yields, euro area and US corporate bond yields, US mortgage-backed securities yields, emerging market equities (earnings yield) and USD-denominated sovereign yields. A lower basket real yield than average is denoted by a positive score.

Chart A.5

Cyclically adjusted price/earnings (CAPE) ratio and excess CAPE yield

(left-hand panel: Jan 1982 – Jan 2021, ratio; right-hand panel: Jan 2000 – Jan 2021, percentages)



Source: Barclays indices, Robert Shiller's website, Refinitiv.

Notes: The cyclically adjusted price-to-earnings ratio (CAPE) is a valuation measure, defined as price divided by the average of ten years of earnings, adjusted for inflation. To calculate the excess CAPE yield, the CAPE ratio is inverted and a ten-year real interest rate is subtracted from it.



Chart A.6

Cyclically adjusted price/earnings (CAPE) ratios for the US stock market

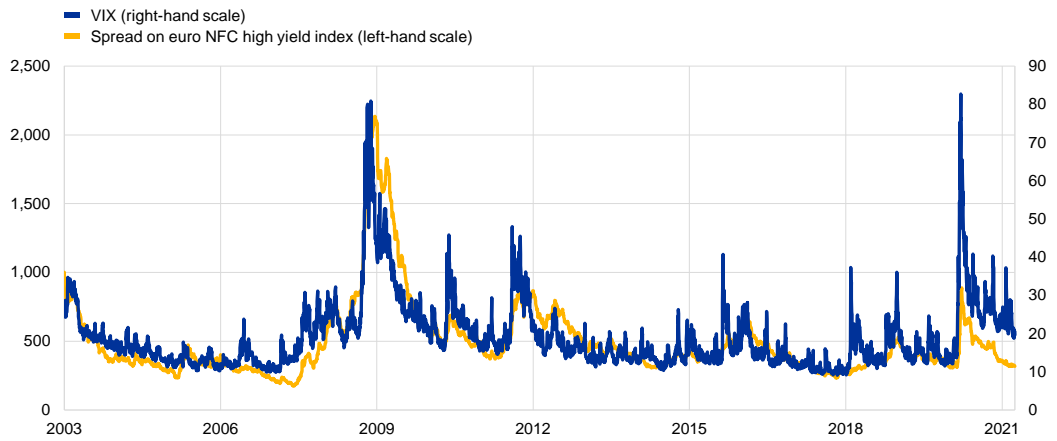
(Jan 1881 – Mar 2021; ratio)



Source: [Online data Robert Shiller](#). Chart A.7

Spreads on euro area high yield bonds and the VIX

(Jan 2003 – Feb 2021; left-hand scale, basis points; right-hand scale, percentages)

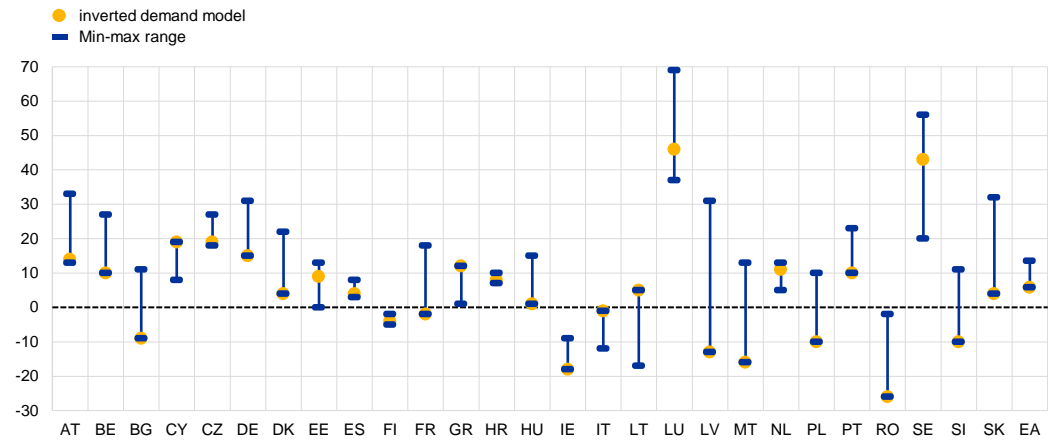


Sources: Bloomberg and ECB calculations.



Chart A.8 Housing price overvaluation

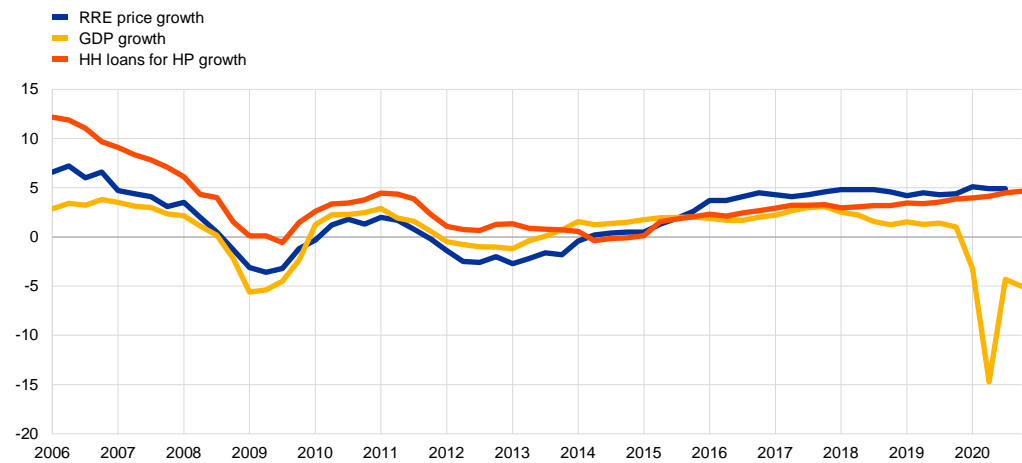
(Q3 2020, percentages)



Source: ECB. Notes: Last observations refer to Q3 2020, with the exception of Cyprus (Q2 2020). For methodological details of the house-price-to-rent and the house-price-to-income ratio, as well as the asset pricing approach, see Box 3 in the ECB's Financial Stability Review, June 2011. For methodological details on the Econometric Model, see Box 3 in the ECB's Financial Stability Review, November 2015.

Chart A.9 House price, credit and economic output developments

(Q1 2006-Q4 2020, annual growth rate, percentages)



Source: ECB, Eurostat. Note: Nominal values.



Chart A.10
Bitcoin price

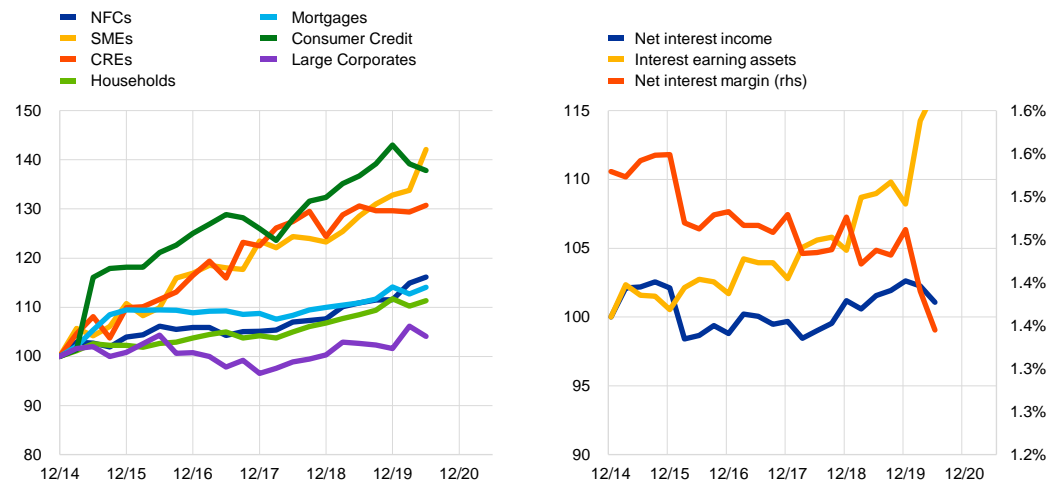
(1 Jan 2017 – 4 March 2021, USD)



Source: Yahoo Finance.

Chart A.11
Banks' credit allocation and net interest income

(Dec 2014 – June 2020, portfolio shifts to riskier market segments (left-hand panel) and evolution of net interest margins and net interest income (right-hand panel))



Source: EBA.

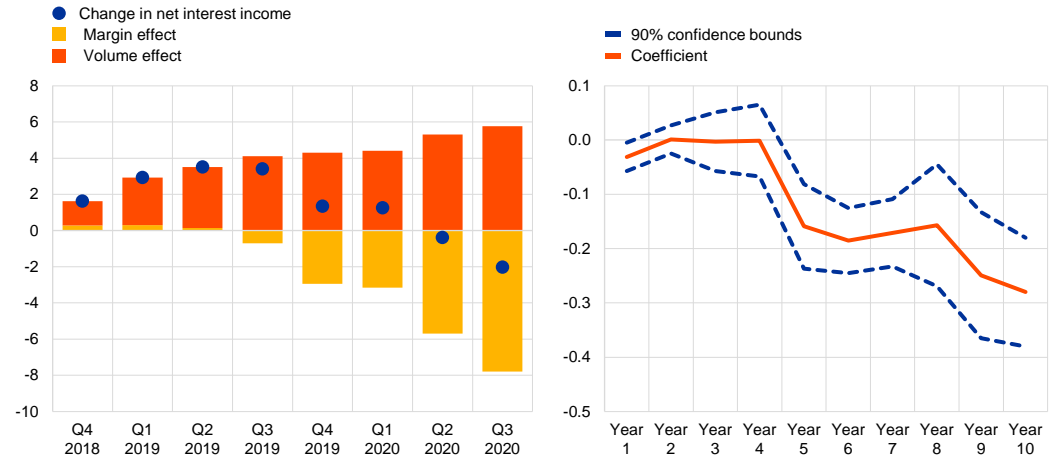
Note: Dec 2014=100 for the left-hand panel and for net interest income and interest earning assets in the right-hand panel.



Chart A.12

Euro area banks' net interest income and margin

(left-hand panel: Q4 2018-Q2 2020, percentage changes, percentage point contributions; right-hand panel: regressions coefficients)

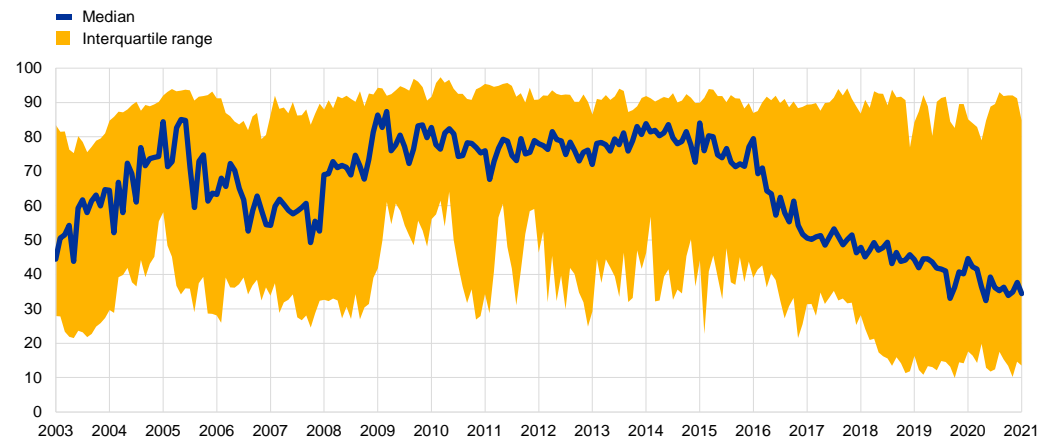


Source: Refinitiv, EuroMTS, Fitch Ratings and ECB calculations.

Chart A.13

Share of floating rate mortgages

(Share of new loans with a floating rate or an initial rate fixation period of up to one year of total new loans from MFIs to households for house purchases ; Jan 2003 – July 2020; percentages)



Source: SDW, ESRB calculations.

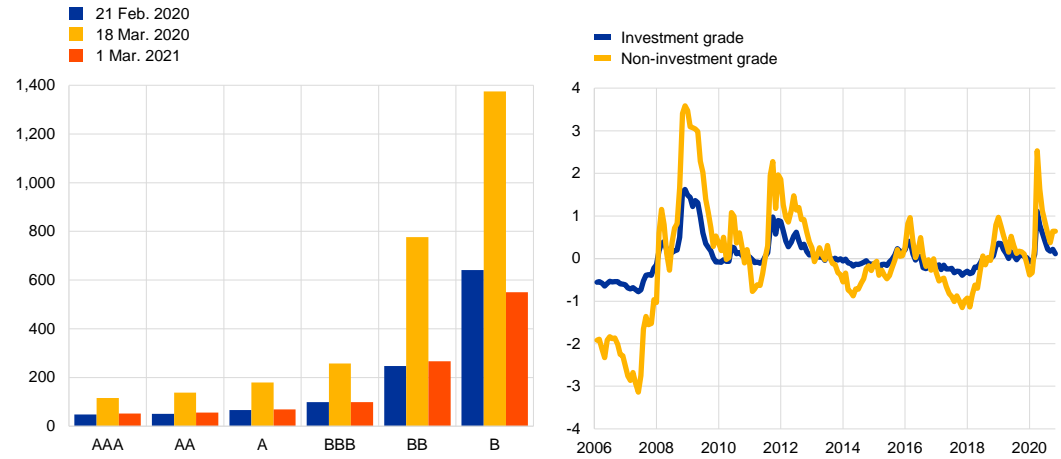
Notes: The shaded area represents the interquartile range and the blue line the median. Last observation July 2020.



Chart A.14

Corporate bond spreads and excess bond premiums

(left-hand panel: y-axis: Oct 2020 basis points; x-axis: ratings; right-hand panel: Jan 2006 – Oct 2020, percentages)



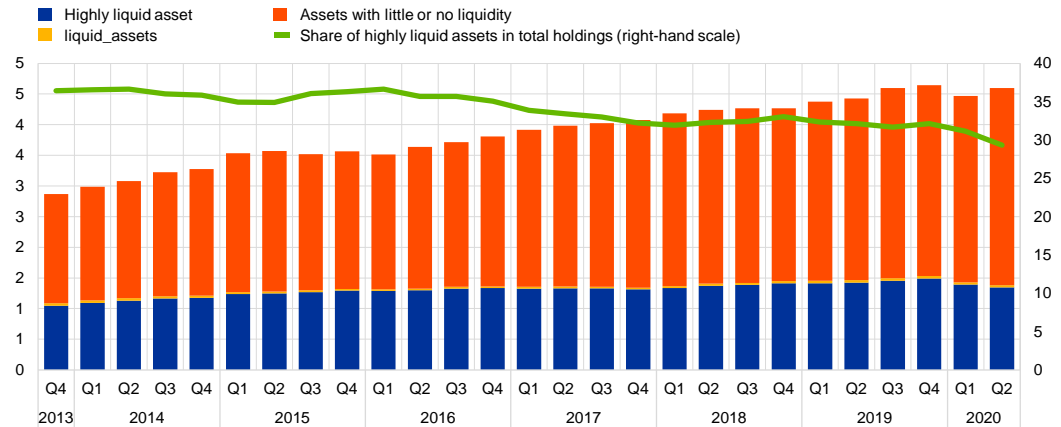
Source: IHS Markit, Bloomberg Finance L.P. and ECB calculations.

Notes: Left-hand panel: iBoxx EUR Non-Financials Z-spread (i.e. the constant spread that makes the price of a security equal to the present value of its cash flows when added to the yield at each point on the spot rate Treasury curve); three-to-five-year maturity and ratings.

Chart A.15

Size and profitability of MMF types

(Q4 2013-Q2 2020; left-hand scale: EUR trillions; right-hand scale: percentages)



Source: EPFR Global, Refinitiv, ECB securities holdings statistics; ECB calculations.

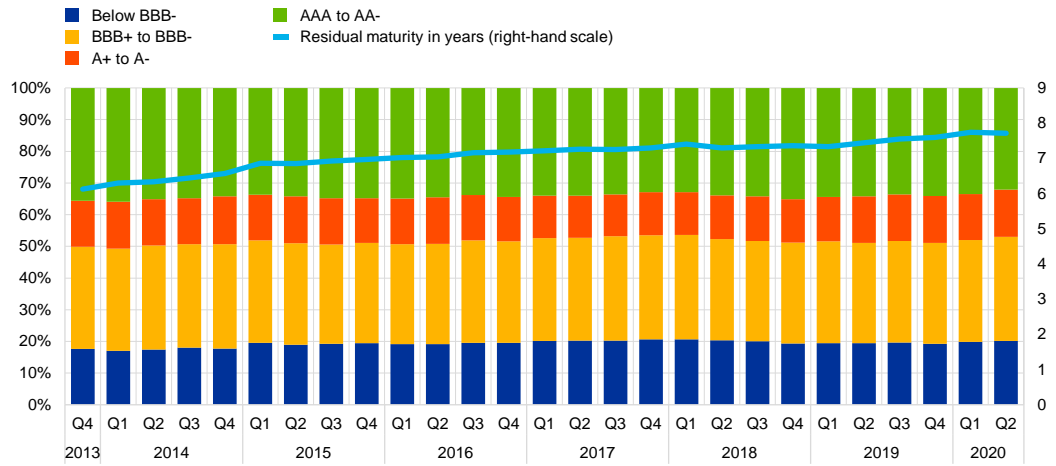
Note: Highly liquid assets correspond to Level 1, liquid assets to Levels 2A and 2B, and assets with little or no liquidity to non-HQLA.



Chart A.16

Residual maturity and ratings of bonds held by bond funds

(Q4 2013 – Q2 2020; left-hand scale: percentages; right-hand scale: years)

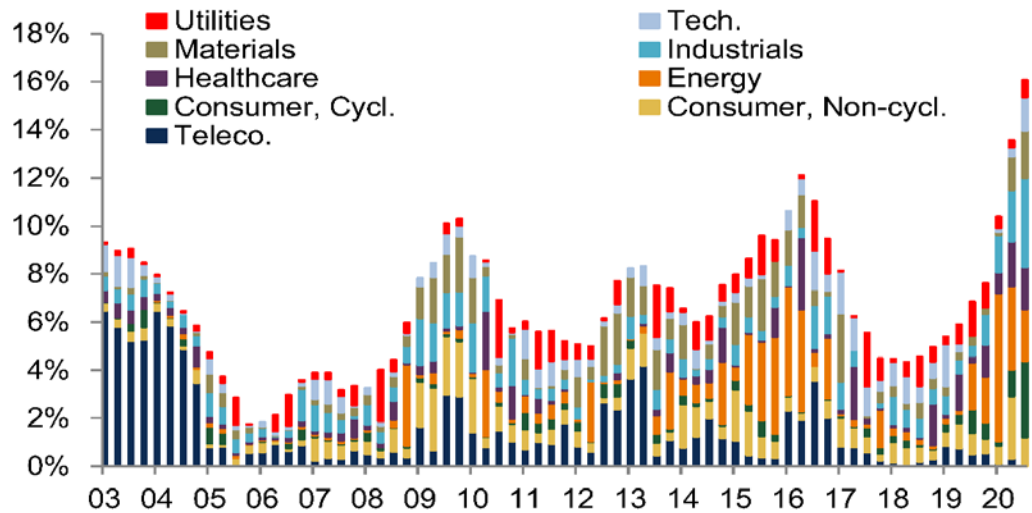


Source: EPFR Global, Refinitiv, ECB securities holdings statistics and ECB calculations.

Chart A.17

Share of euro area firms with interest expenses higher than earnings

(Q1 2003-Q3 2020, percentages)



Source: Bank of America.

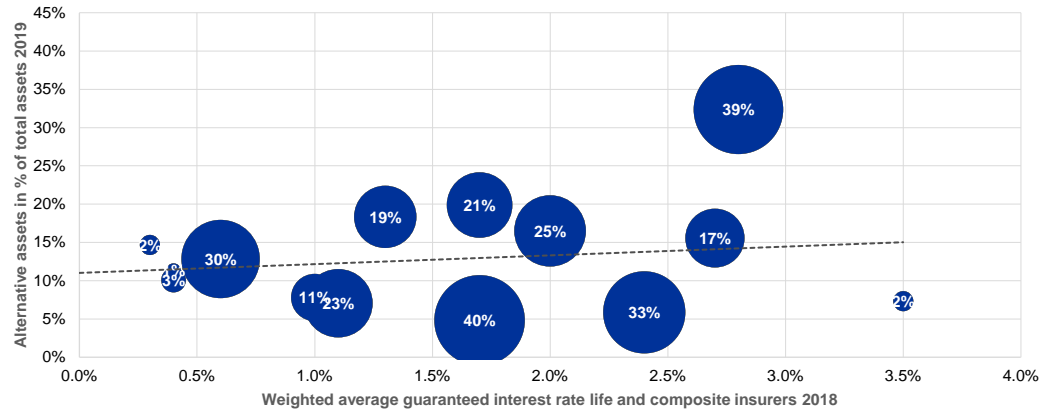
Note: Market-cap weighted, non-financial firms in Euro STOXX 600. Earnings refer to EBITDA.



Chart A.18

Insurers' weighted average interest rate, allocation to alternative assets and increase in solvency capital requirement (SCR) due to long-term guarantee (LTG) measures

(percentages)



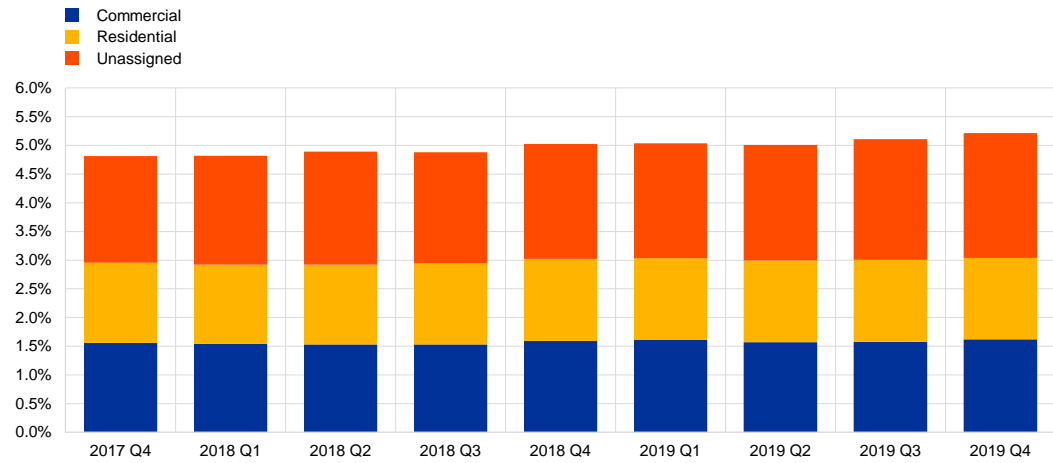
Source: EIOPA.

Notes: The weighted average guaranteed rate for life and composite insurers, at the country level, is calculated using the best estimate by homogeneous risk group as weights. The average guaranteed rate is calculated for all the Life Best Estimate technical provisions – not only for those with positive guaranteed rates; this means that technical provisions with no guaranteed rates enter the calculation, and affect the weighting, with a zero guaranteed rate. Alternative Investments include investment funds (real estate, alternative, private equity, infrastructure, other; CIC 45-49), structured notes (CIC 5), collateralised securities (CIC 6), mortgages and loans (CIC 8), property (CIC 9) and other investments (CIC 0). LTG measures refer to the matching adjustment, to the volatility adjustment, to the transitional measure on risk-free interest rate and transitional measures on technical provisions. The sample comprises the following countries: Austria, Belgium, Bulgaria, Czech Republic, Denmark, France, Germany, Greece, Hungary, Italy, Ireland, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Slovenia, Spain.



Chart A.19
Portfolio weights of real estate for life insurers

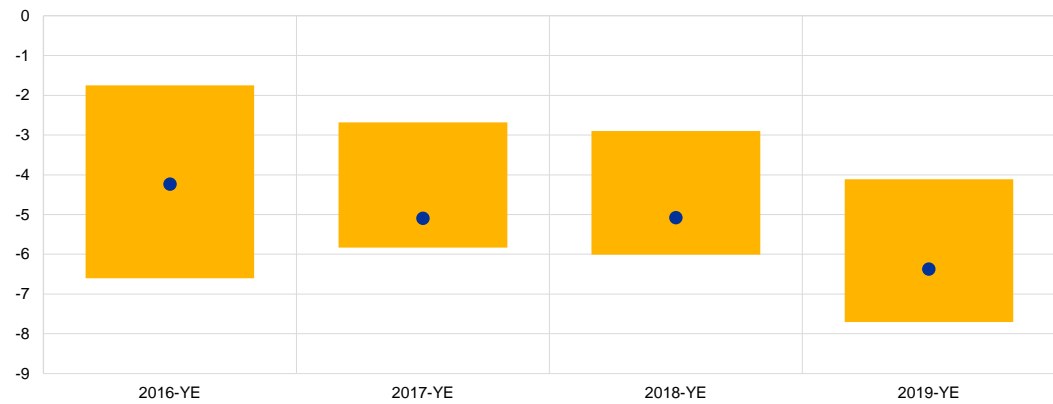
(percentages)



Source: EIOPA EEA life insurance undertakings.

Chart A.20
Duration mismatch of insurers

(2016-2019; years)



Sources: EIOPA Risk Dashboard January 2021.

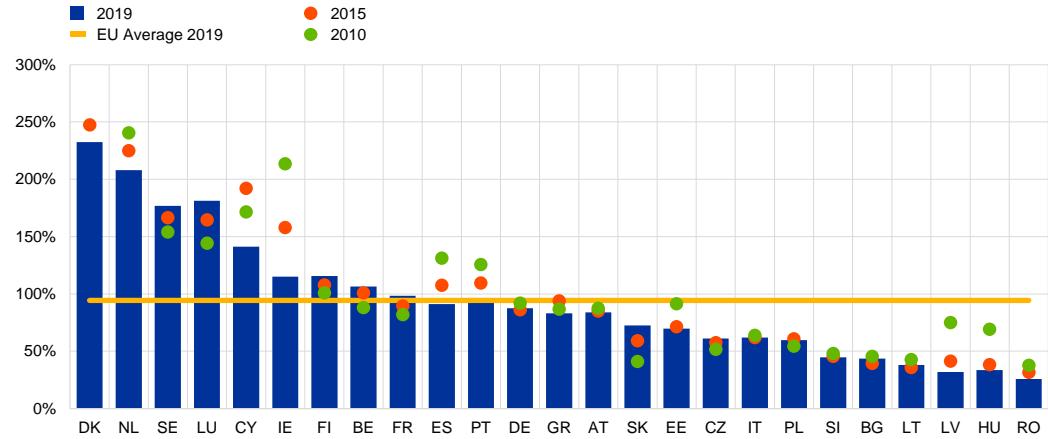
Note: Distribution of indicator (interquartile range, median). Assets QFG (N2019 Q4=92); Liabilities AFG (N2019=92).



Chart A.21

Households' gross debt-to-income ratio

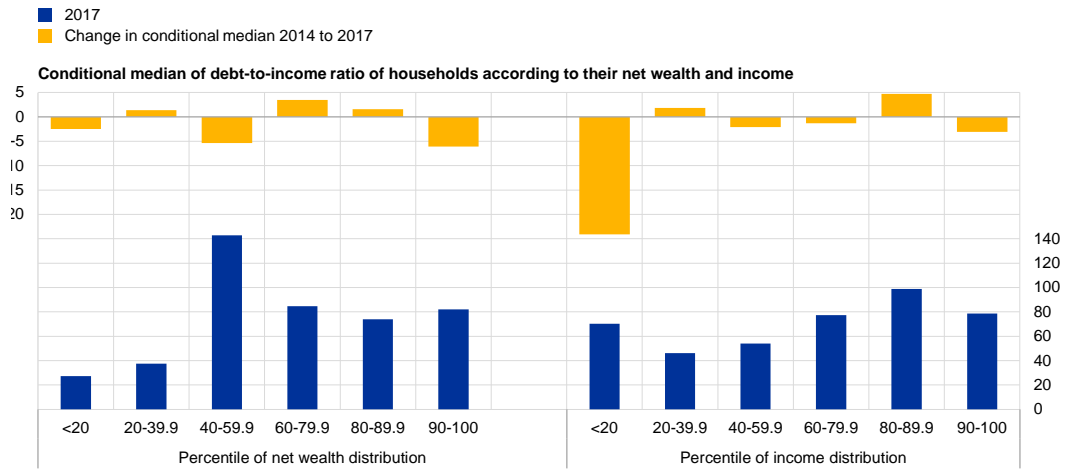
(2010, 2015, 2019; percentages)



Sources: Eurostat and ESRB Secretariat calculations.

Chart A.22

Households' wealth and income distribution



Sources: Household Finance and Consumption Network (2020) and ESRB Secretariat calculations.

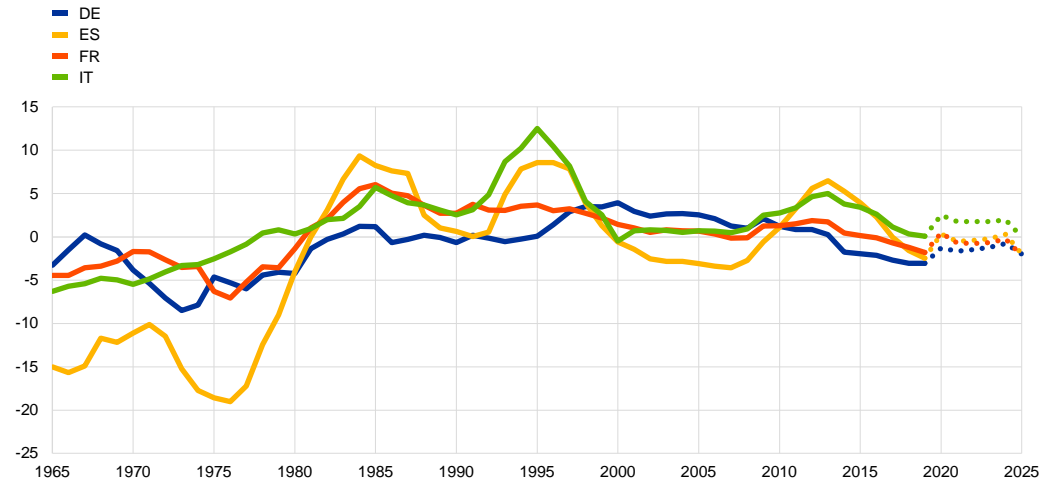
Notes: The blue bars denote the conditional median debt-to-income ratio per household group in 2017. The yellow bars denote the growth rate in conditional median debt-to-income ratio between 2014 and 2017. Debt-to-income ratio is calculated as the ratio between total liabilities and household annual gross income for indebted households. Breakdown of households according to percentile of the household net wealth within the euro area (left-hand panel) and percentile of the household income within the euro area (right-hand panel).



Chart A.23

Interest-growth differentials in the largest euro area countries

(1965-2025, percentage point differences)



Source: AMECO, Consensus Economics and ESRB Secretariat calculations.

Note: five-year moving average. Dotted lines mark years (2020-2025) including Consensus Economics long-term forecasts of GDP growth and long-term interest rates.



Table A.1

Level of engagement in risky activities: mapping of activities to entity types

	Investment funds												Other financial institutions						
	CNAV	MMFs			Bond funds						Private equity funds ⁴			Private debt funds	FVCs	SPEs	SDDs	FCLs	
	VNAV	LVNAV	Corporate	Sovereign	Mixed funds	Equity funds	Hedge funds	Real estate funds	ETFs										
EA AuM (EUR trillion)	0.1	0.6	0.6	3.6	3.3	3.8	0.4	0.8	0.9	0.8	n.a.					2.1	n.a.	n.a.	0.5
Engagement	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●
	Market size																		
	Summary assessment																		
	Risk transformation activities																		
Credit intermediation	●	●	●	●	●	●	○	●	○	○	●	●	●	●	●	●	●	○	●
Maturity transformation	●	●	●	●	●	●	○	●	●	●	○	○	○	○	○	○	○	○	○
Liquidity transformation	●	●	●	●	●	●	○	●	●	○	○	○	○	○	○	○	○	○	○
Leverage ²	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Market activities ¹																		
SFTs	●	●	●	●	●	●	○	●	○	○	○	○	○	○	○	○	○	○	○
Derivatives	●	●	●	●	●	●	○	●	○	○	○	○	○	○	○	○	○	○	○
Reuse of collateral	●	●	●	●	●	●	○	●	○	○	○	○	○	○	○	○	○	○	○
	Interconnectedness ³																		
Interconnectedness ³	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Source: ESRB NBFi Monitor 2021. The table summarises the assessment of engagement, where the colours of the circles reflect the intensity of the possible institutional engagement in the relevant areas of activity, according to the coding specified in the notes below.

The colouring is judgement-based and is informed by market intelligence and quantitative evidence. 1) Market activities through which risk transformation can be undertaken by investment funds and OFIs can take various forms. The list focuses on those market activities deemed to be most susceptible to risks. 2) Leverage refers to financial leverage and not to leverage that is created synthetically through the use of derivatives. 3) Direct and indirect interconnectedness with the banking system is based on asset and liability data and staff assessment. 4) While credit intermediation and leverage at the fund level may be low, private equity funds can facilitate credit and leverage in the financial system by engaging in leveraged buy-out transactions. Market size data come from the Invest Europe report on 2019 European Private Equity Activity. FVCs stands for financial vehicle corporations (non-retained securitisations), FCLs for financial corporations engaged in lending, SDDs for security and derivative dealers, CNAV for constant net asset value, VNAV for variable net asset value and LVNAV for low volatility net asset value. The geographical coverage of the table refers to entities domiciled in the EU. Owing to data limitations and a lack of consistent data, the assessment does not distinguish between consolidated and non-consolidated entities. Colour coding: ●=pronounced engagement; ●=medium engagement; ●=low engagement; ○=unlikely or insignificant engagement.

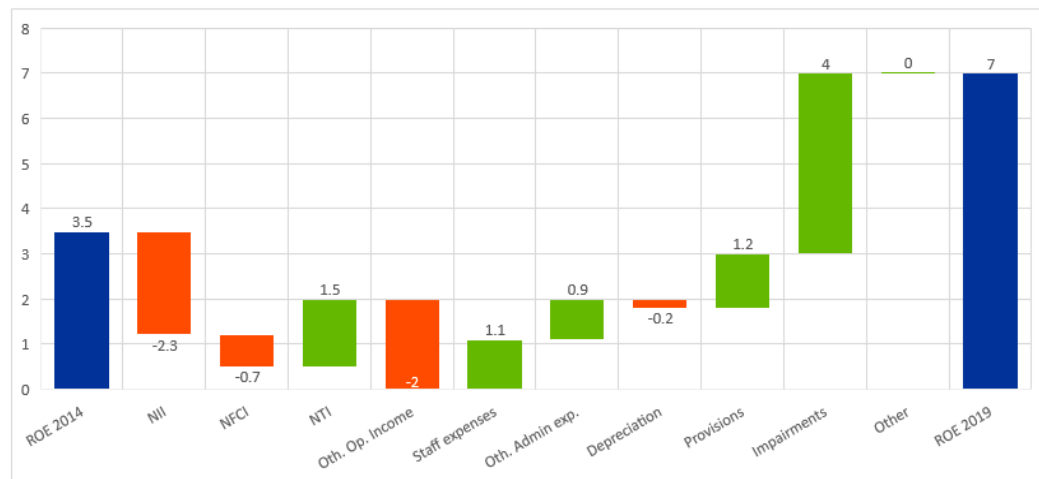


A.2.2 The sustainability of business models

Chart A.24

Evolution of banks' net interest income

(2014-2019, percentages)



Sources: ECB and EBA.

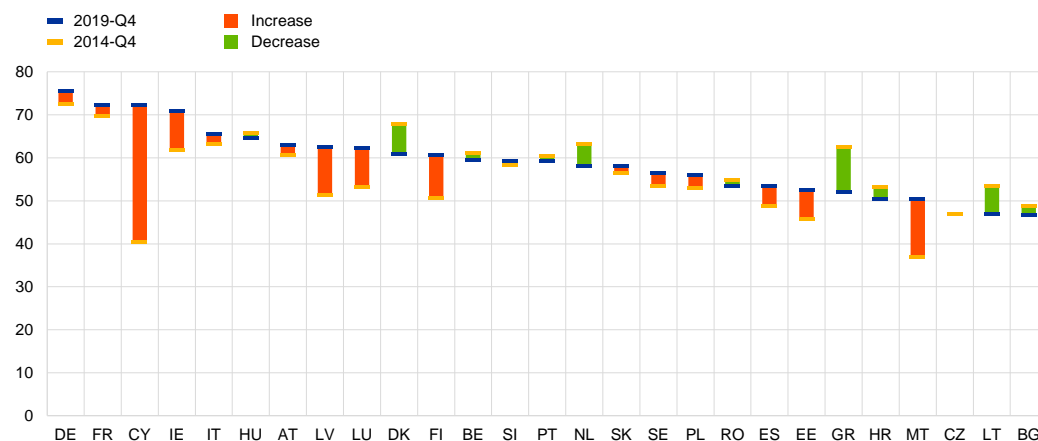
Notes: The sample covers the same 182 EU/EEA institutions as the EBA Risk Dashboard. Change between Q4 2014 and Q4 2019.



Chart A.25

Changes to banks' cost-to-income ratio

(Q4 2014 and Q4 2019, percentages)



Source: European Central Bank (Consolidated Banking Data).

Note: Changes in the cost-to-income ratio of EU banks as reported to the Consolidated Banking Data, including domestic and foreign branches and subsidiaries. The blue line represents the value of the ratio in Q4 2019 and the yellow line represents the value of the ratio in Q4 2014. Red (green) bars denote an increase (decrease) in the ratio over the corresponding period. Change between Q4 2014 and Q4 2019.

Table A.2

Overview of guarantees in the EEA insurance sector

(Percentage of EEA countries, including the United Kingdom, in which more than 50% of the premiums underwritten by various business lines in insurance benefit from one or more guarantees)

Type of guarantee	Life insurance with profit participation	Index-linked and unit-linked insurance	Other life insurance
Any guarantee	100%	57%	99%
Interest rate guarantee	89%	15%	49%
Guaranteed sum assured on death	54%	36%	70%
Guaranteed sum assured on other	33%	20%	28%
Guaranteed surrender value	49%	18%	30%
Guaranteed annuity benefit	26%	13%	36%
Guaranteed return of premium	22%	18%	13%

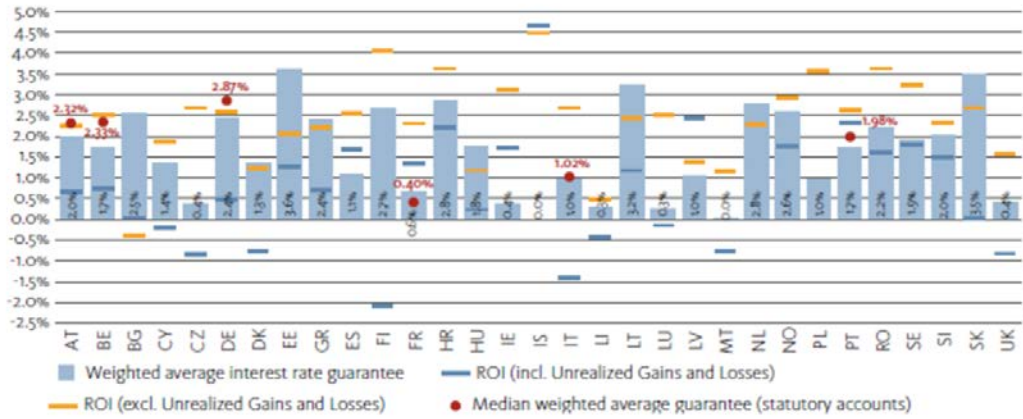
Source: EIOPA's third annual analysis on the use and impact of long-term guarantees measures and measures on equity risk, December 2018 (page 66).



Chart A.26

Weighted average interest rate guarantees and return on investment

(2018, percentages)

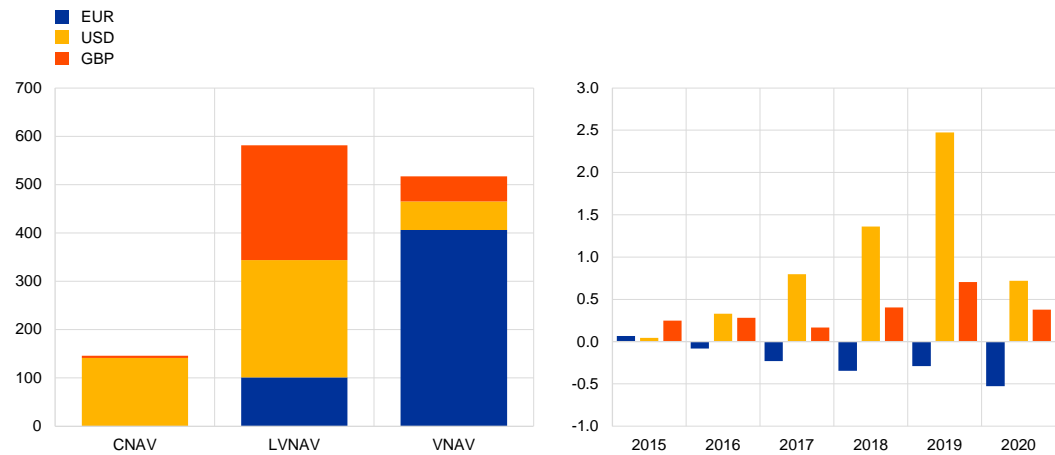


Source: EIOPA (2020), *Impact of ultra-low yields on the insurance sector, including first effects of Covid-19 crisis*, July, p. 28.

Chart A.28

Size and profitability of various MMF types

(June 2020; left-hand panel: EUR billions; right-hand panel: percentages)



Source: Lipper, ESMA.

Note: Left-hand panel shows net asset value of EU MMF by type and currency in EUR billions, as of June 2020. Right-hand panel shows weighted-average returns on EU MMFs as a percentage.

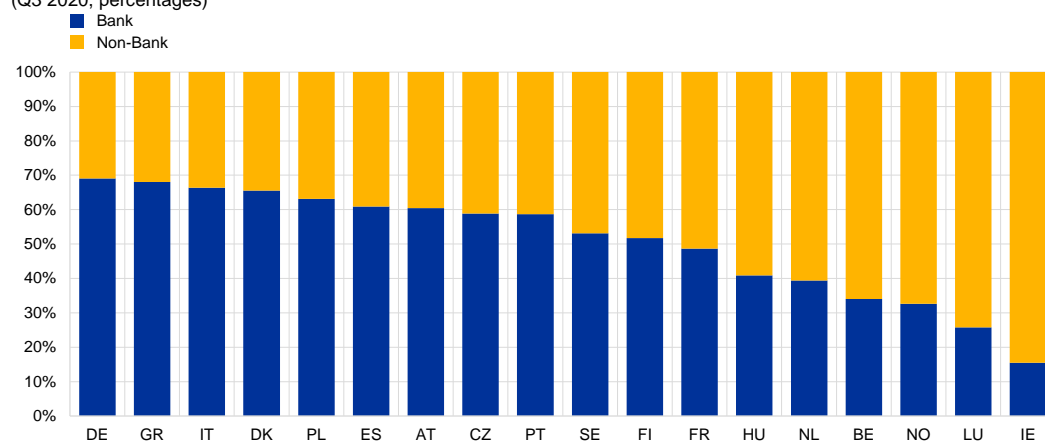


A.2.3 Changes in the structure of the financial system

Chart A.29

Bank vs non-bank credit to the EU NFC sector

(Q3 2020, percentages)



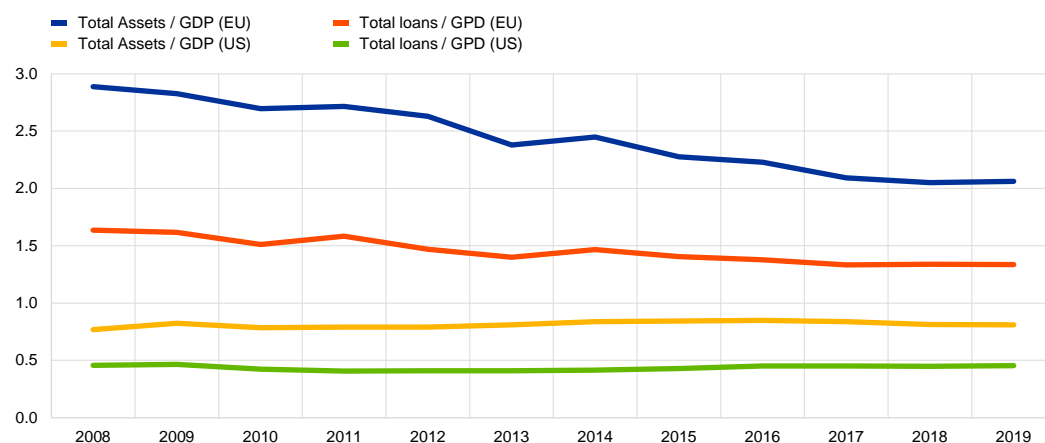
Sources: Bank of International Settlements and ESRB Secretariat calculations; Statistics on total credit to the non-financial sector.

Note: Data refer to Q3 2020.

Chart A.30

Total assets and total loans of EU and US banks as a share of GDP

(2008-2019, ratio to GDP)



Sources: European Central Bank (Consolidated Banking Data), Federal Deposit Insurance Corporation, Eurostat, US Bureau of Economic Analysis, Federal Reserve Bank of St. Louis (Fred database), and ESRB Secretariat calculations.

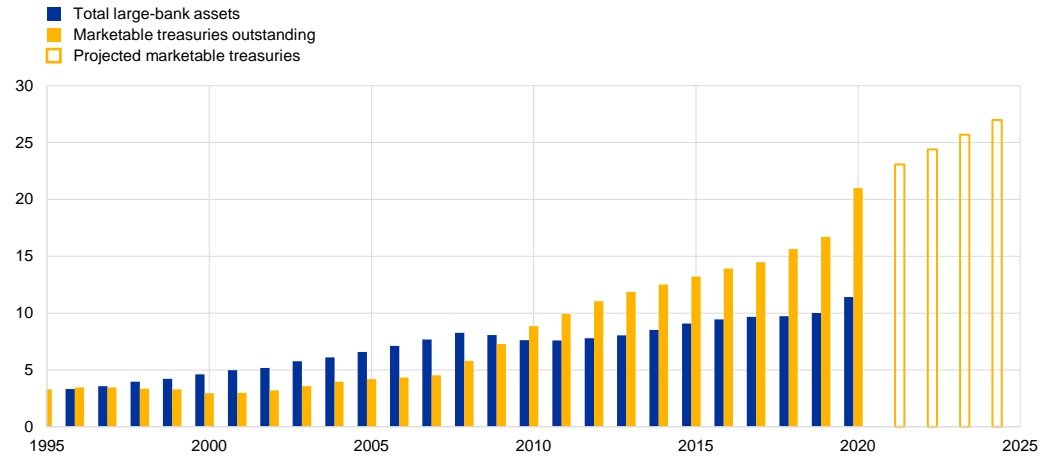
Notes: Data on total loans and total assets for the EU refer to domestic and standalone banks. EU and US GDP at market prices. Total loans in the US are gross loans and leases minus allowances for losses.



Chart A.31

Marketable US treasury bonds in relation to large US dealer banks' total assets

(USD trillions)



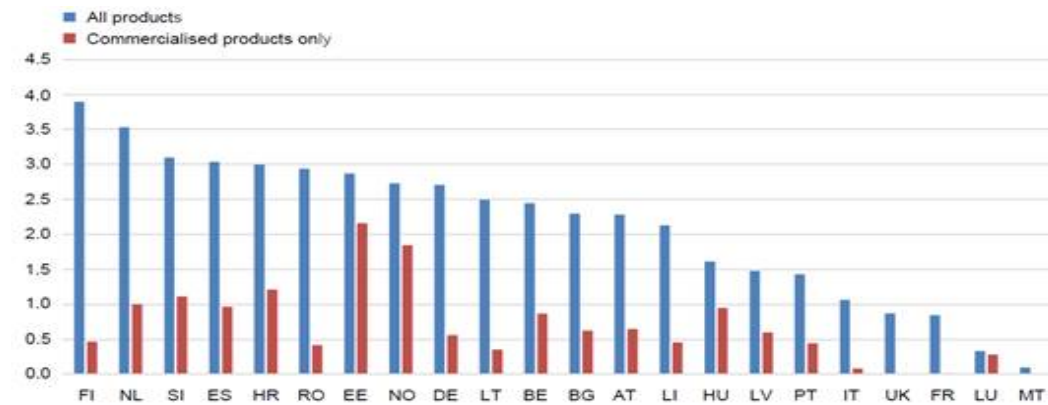
Source: Haver.

Note: Data from the Federal Reserve Board and the Treasury, with projections for 2020-25 based on federal deficit projections made on April 13, 2020 by the Committee for a Responsible Federal Budget.

Chart A.32

Weighted average rates for products with interest rate guarantees

(2018, percentages)



Source: EIOPA's third annual analysis on the use and impact of long-term guarantee measures and measures on equity risk, December 2018.

Note: Average Guaranteed rate for LoB 30.



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