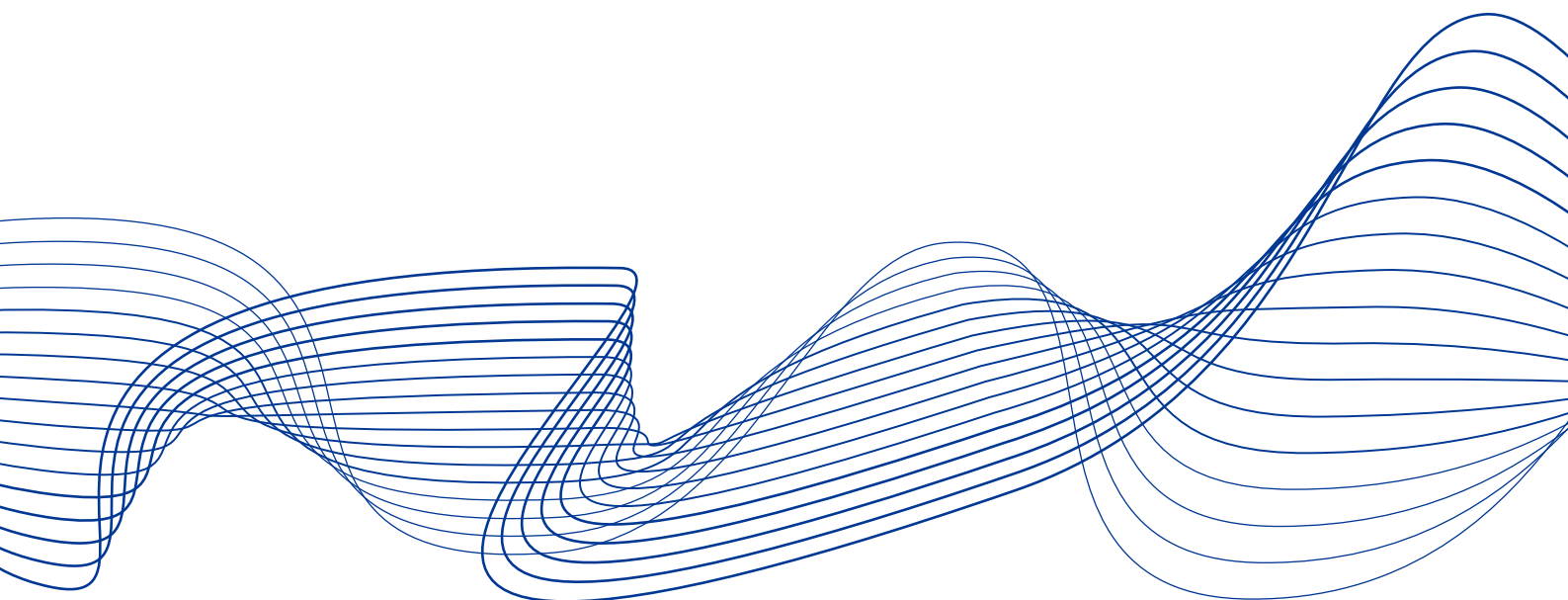


NBFI Monitor

No 5 / October 2020

EU Non-bank Financial
Intermediation Risk Monitor 2020



ESRB
European Systemic Risk Board
European System of Financial Supervision

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Executive summary

The coronavirus (COVID-19) pandemic caused an extreme shock to the economy and financial market, and triggered an unprecedented public sector response to mitigate its effects. European Union (EU) bodies, governments, central banks and supervisory authorities took unprecedented action to support the economy in the face of the pandemic¹ and much of the initial market disruption at the onset of the pandemic in early 2020 was short-lived. As the period under review for this edition of the annual EU Non-bank Financial Intermediation Risk Monitor (NBFIMonitor) is the year 2019, it predates the onset of the pandemic. However, given the disruptions in financial markets observed in early 2020, this edition provides an overview of the initial market impact resulting from the pandemic (see Box 1), including analysis on selected market segments such as money market funds (see Box 3) and exchange-traded funds (see Box 4). In the light of the severe economic disruption and health crisis, further implications for financial markets are likely to materialise with some delay. Next year's edition of the NBFIMonitor will therefore provide a more comprehensive review of developments in 2020.

This report considers a range of systemic risks and vulnerabilities related to non-bank financial intermediation, including those stemming from interconnectedness, liquidity and leverage. The monitoring universe of this report includes all investment funds and so-called other financial institutions (OFIs). The size of this monitoring universe is measured by assets under management in investment funds and OFIs, and thus excludes the assets of banks, insurance corporations and pension funds, as well as central counterparties with a banking licence. In the EU (euro area), this measure stood at €45.5 trillion (€36.3 trillion) at the end of 2019, an increase of 6.7% (5.7%) compared with end-2018. The annual increase largely reflects an increase in the value of assets held by investment funds, which had fallen towards the end of 2018. Over the same period, the overall financial system expanded by 6.3% in the EU (5.4% in the euro area). While the size of the monitoring universe is important for monitoring purposes and might contribute to the degree of systemic risk, it is not, in itself, a sufficient measure of it. Against this background, this report considers a broad range of risks and vulnerabilities.

The assessment of risks and vulnerabilities in the current edition of the NBFIMonitor has been enhanced to consider both structural and cyclical risks. Four key cyclical risks that will require close monitoring include: (i) a global recession and sharp contraction of economic activity in the EU; (ii) rising indebtedness, increased credit risk and the risk of rating downgrades; (iii) high uncertainty and risks associated with a low-for-longer interest rate environment; and (iv) low liquidity and high volatility in some markets. In addition, several structural risks identified in previous editions of the NBFIMonitor require ongoing monitoring. These include: (i) risk-taking, pricing uncertainty, liquidity risk, and risks associated with leverage among some types of investment funds and OFIs; (ii) domestic and cross-border interconnectedness and the risk of contagion across sectors and within the non-bank financial system; (iii) activity-related risks including procyclicality, leverage and liquidity risk created through the use of derivatives and securities financing transactions; and (iv) data gaps including the need to develop new and improved risk metrics as

¹ An overview of the policy measures taken by the ESRB in response to the COVID-19 pandemic is available on [the ESRB's website](#).



new datasets become available. The latter includes big-data analysis projects related to the incorporation and alignment of different datasets stemming from regulatory requirements such as the European Market Infrastructure Regulation, the Alternative Investment Fund Managers Directive, the Securities Financing Transactions Regulation, and the simple, transparent and standardised securitisation framework.

The repricing of risk, with potential spillovers to funding conditions of other financial sectors and the real economy, remained a key vulnerability in 2019 and started to materialise in some market segments in early 2020.

Previously identified vulnerabilities in corporate bond markets, covenant-lite leveraged loans, and parts of the real estate fund sector came to the forefront in the COVID-19 shock. Since the onset of the low interest rate environment following the global financial crisis, the proportion of lower-rated debt securities in the portfolio of bond funds has increased. In more recent years, bond funds' portfolio allocation has remained stable, while the ratings of corporate bonds issued on financial markets continued to deteriorate. This indicates that other entities and investor groups have increased their exposures to lower-rated debt securities. In the light of the adverse economic effects of the COVID-19 pandemic, widespread downgrades of debt securities, including from investment grade to below investment grade (so-called "fallen angels"), are expected to occur.² The increase in covenant-lite leveraged loans was also previously identified as a vulnerability, as it contributes to increased leverage in non-financial companies with debt exposures in a wide range of entities ranging from private debt funds to other investors through the use of securitisation vehicles. Vulnerabilities in real estate funds such as liquidity mismatches in open-ended funds have been noted by regulatory authorities in recent years. Some real estate funds made use of fund suspensions and other liquidity management tools at the onset of the COVID-19 pandemic, often in response to asset valuation uncertainty. During less severe market conditions in 2019, several funds also made use of such tools in response to high redemption requests, none of which caused financial stability concerns at the time (see Box 2).

The use and reuse of financial collateral in derivatives and securities financing transactions can create intermediation chains through which funding liquidity shocks can spread.

In the event of an abrupt fall in the value of securities used as collateral, lenders can be prompted to demand additional collateral, possibly forcing borrowers to sell assets to post the additional collateral. Investment firms and credit institutions dominate the EU derivatives market and large volumes of derivative transactions have created a complex and interdependent network of exposures that ultimately may contribute to a build-up of systemic risk. Derivatives exposures increase liquidity needs for investment funds and the rapid decrease in asset prices and increased volatility in early 2020 following the COVID-19 shock resulted in a sudden increase in initial and variation margins.³

² See "A system-wide scenario analysis of wide-scale corporate bond downgrades", ESRB technical note, July 2020.

³ See "Liquidity risks arising from margin calls", ESRB, June 2020.



1 Overview

1.1 Developments in main aggregates

The NBF Monitor 2020 mainly focuses on developments during 2019, although analyses on some of the initial impacts resulting from the coronavirus (COVID-19) pandemic are incorporated. During 2019, growth of the European investment fund and other financial institution (OFI) sectors contributed to a diversification of the financing sources of non-financial corporations (NFCs). Such diversification can be beneficial as it leads to risk-sharing amongst diverse actors within the financial system. Nevertheless, excessive risk-taking and leverage in non-banks in a low-for-long interest rate environment expose the financial system to vulnerabilities that need to be monitored. This report examines the growth of such vulnerabilities that could arise from non-bank financial intermediation, e.g. liquidity and maturity transformation, leverage and interconnectedness within the financial system.

The COVID-19 pandemic has severely affected global and EU economic activity and caused one of the sharpest economic contractions in recent history. Substantial support from monetary, fiscal and labour market policies is designed to help maintain incomes and reduce some of the economic effects of the health crisis. Such policies have been successful in containing immediate adverse amplifications through the financial system (see Box 1). However, the risk of a further escalation of the outbreak poses a threat to financial stability.

Box 1

Initial developments following the onset of the COVID-19 pandemic

The spread of the pandemic and the lockdown measures imposed to contain COVID-19 triggered an adverse shock to the global economy and large falls in asset prices. Faced with a health crisis, EU governments enforced strict containment measures in late February and March that effectively shut down large segments of their economies. As a result, EU GDP fell by 3.7% and by 11.4% quarter on quarter in the first and second quarter of 2020, according to Eurostat. Similarly, according to the IMF's June 2020 forecasts, the global economy is expected to contract by 4.9% in 2020, down from a projection of a 3% contraction in April 2020 and a projection of 3.3% growth in January 2020. This global disruption of economic activity and the uncertainty over the magnitude and duration of the crisis were reflected in financial markets. While the European investment fund sector remained resilient in early 2020, markets reacted by substantially repricing risk, as investors fled towards safe and highly liquid assets.

Assets in the euro area investment fund and OFI sectors fell by 3.3% quarter on quarter in the first quarter of 2020. This drop in assets under management (AuM) over the quarter amounted to €1.2 trillion and was due to large valuation losses resulting from asset price falls. Moreover, outflows were elevated and also contributed to the fall in AuM across a wide range of fund types, in particular high-yield (HY) and investment-grade (IG) corporate bond funds, certain types of money market funds (MMFs), and exchange-traded funds (ETFs). Redemption flows can



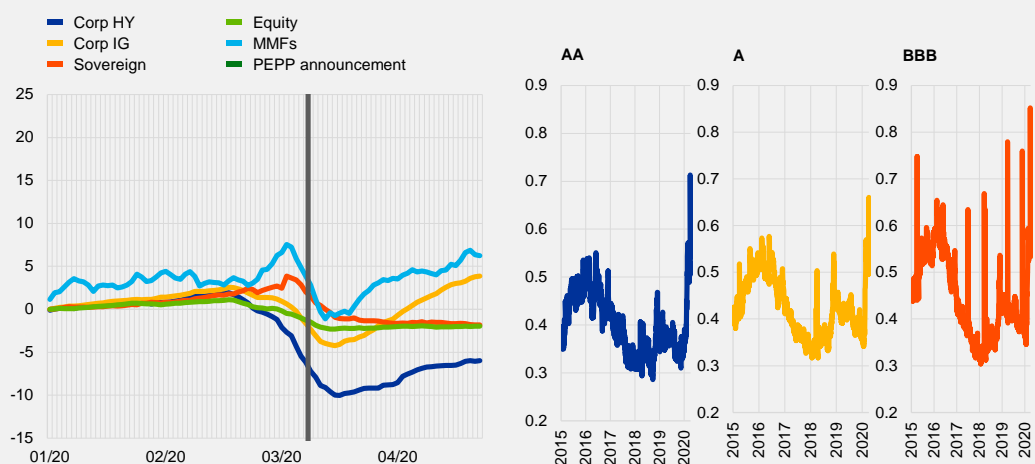
be mostly explained by the increased risk associated with the underlying assets and the heightened demand for cash to meet short-term liquidity needs.

Liquidity mismatches in certain types of open-ended investment funds amplified market volatility in late February and early March. To meet the surge in redemption requests, some open-ended investment funds had to sell securities at prices below market value. The sudden increase in spreads reflected a sharp rise in credit risk, which was particularly pronounced for HY corporate bonds, and worsening liquidity in corporate debt markets impaired the ability of the financial system to provide financing to NFCs. Corporate bond funds and other entity types are closely connected via direct exposures or overlapping portfolios. While the declining issuance of corporate bonds during this period was partially due to the temporary liquidity pressures in these markets, issuance increased strongly again in the second quarter of 2020.

Redemption pressures were particularly acute for HY corporate bond funds, which faced cumulative outflows of more than 10% of AuM during this period (see Chart A, left panel). The additional search for liquidity that these redemption requests triggered may have put further strain on corporate debt markets. Indeed, volatility spiked in corporate bond markets during the weeks of heightened stress in late February and early March. Spreads for both HY and IG corporate bonds widened during this period and credit default swaps (CDSs) saw their spreads widen substantially as well. The reduced liquidity is illustrated by the surge in bid-ask spreads for corporate bonds across various credit rating categories (see Chart A, right panel).

Chart A

Net flows of euro area-domiciled funds (left panel) and euro area investment-grade NFC bond bid-ask spreads (right panel)



Source: EPFR, iBoxx and ECB calculations.

The sudden rise in volatility led to a substantial increase in variation margin calls, putting additional pressure on some investment funds' liquidity positions.⁴ Partial reporting of

⁴ See "Derivatives-related liquidity risk facing investment funds", *Financial Stability Review*, ECB, May 2020.



variation margins in EMIR (European Market Infrastructure Regulation) data shows that daily variation margin calls on euro area funds rose fivefold, from around €2 billion in the first half of February to over €10 billion in the second half of March. For 27% of the funds for which EMIR data are available, daily variation margins exceeded their pre-pandemic cash buffers (i.e. not considering cash raised by engaging in repurchase agreement (repo) transactions or drawing on credit lines) on at least one day during the period of market turmoil. An even higher number of bond funds (30%), hedge funds (31%) and mixed funds (33%) were unable to meet variation margin calls on at least one day by drawing only on their pre-pandemic cash holdings.

In view of the procyclical effects that margin calls may have during periods of market stress, the ESRB's General Board outlined the importance of containing and mitigating the risks to financial stability. In particular, the ESRB's General Board stressed the importance of:

(i) mitigating procyclicality that could be linked to the provision of clearing services and to the exchange of margins in bilaterally cleared markets; (ii) enhancing central counterparty stress-test scenarios for the assessment of liquidity needs; and (iii) limiting excessive liquidity constraints related to margin collection.⁵

A number of EU investment funds, particularly HY corporate bond funds and real estate funds, used liquidity management tools to help address outflows and valuation uncertainties. Some funds imposed quantity-based measures, such as suspensions of redemptions or redemption gates, while other funds used price-based tools, such as swing pricing or redemption fees, which impose the liquidity cost on the redeeming investors. Most suspensions of undertakings for collective investment in transferable securities (UCITS) (mainly bond funds exposed to corporate debt) were short-lived, falling from around €22 billion in March to less than €0.7 billion by mid-May. On the other hand, suspensions of alternative investment funds (AIFs) remained high in early 2020, as several real estate funds faced difficulties in valuing their assets (see Box 2). In order to help contain some of the amplification effect of liquidity mismatches during future periods of market stress, the ESRB issued a public communication in May 2020 emphasising the importance of the availability and timely use of liquidity management tools by fund managers. In addition, the ESRB also adopted a Recommendation to the European Securities and Markets Authority (ESMA) to coordinate with national competent authorities (NCAs) a focused supervisory engagement with investment funds that have significant exposures to corporate debt and real estate assets.

Short-term funding markets also came under strain amid substantial outflows from MMFs. MMFs provide banks and corporates with short-term funding, mainly through the purchase of commercial paper, allowing them to meet liquidity management needs. However, in periods of market stress, MMFs can also play a destabilising role if faced with elevated redemption requests. In such cases, MMFs may be reliant on banks, corporates or central banks to purchase their commercial paper back in order to raise cash and accommodate the heightened redemption flows. This puts further liquidity pressure on the rest of the financial system and the real economy at large. Such risks materialised in the week of 13-20 March, when euro area MMFs experienced outflows amounting to 8% of their AuM. These weekly outflows were the second highest on record,

⁵ See "Liquidity risks arising from margin calls", ESRB, June 2020.



only surpassed in September 2008. Net outflows were concentrated in some types of MMFs, while others experienced net inflows, which may partially reflect a flight to safety (see Box 3).

Central banks took measures that helped improve market liquidity conditions, which also alleviated liquidity strains in the investment fund and money market fund sectors. On 18 March 2020, the ECB announced several monetary policy measures, which had a positive impact on market liquidity: first, a new pandemic emergency purchase programme (PEPP) was announced with an overall envelope of €750 billion, which was increased by €600 billion in June; second, the range of assets eligible under the corporate sector purchase programme (CSPP) was expanded to include non-financial commercial paper; and third, collateral standards were eased by adjusting the main risk parameters in the collateral framework. The Federal Reserve System also introduced extraordinary measures that provided liquidity across various markets, including corporate debt markets and money markets. These interventions played an important role in the improvement of market conditions. Flows into and out of euro area investment funds stabilised from 20 March. Nevertheless, the market stresses experienced in March, together with the scale of central bank intervention required to manage those stresses, have brought to the fore previously identified structural vulnerabilities stemming from leverage and maturity mismatch in some segments of the non-bank sector, as well as broader risks to market functioning from a financial stability perspective. Building on international work in this area, these will need to be considered and, if necessary, addressed over time.

Net finance raised by euro area non-financial corporations increased in 2019. Financing obtained by NFCs in the form of direct bank loans decreased slightly in 2019, after rising in recent years following a collapse during the global financial crisis. Debt securities and unlisted shares remained an important source of funding for NFCs, while net finance raised through the issuance of listed shares decreased for the first time since 2008 (see Chart 1/Chart A-1). Debt securities and listed shares issued by NFCs are mainly held by non-bank financial institutions, with a smaller share held by banks. For EU households, the non-bank financial sector is particularly important to help allocate assets to insurance and pension products, as well as investment fund shares.⁶ In some EU jurisdictions, the non-bank financial sector is also an important source of funding for households. For example, in the Netherlands, 35% of new mortgages are provided by pension funds, insurers and mortgage funds.

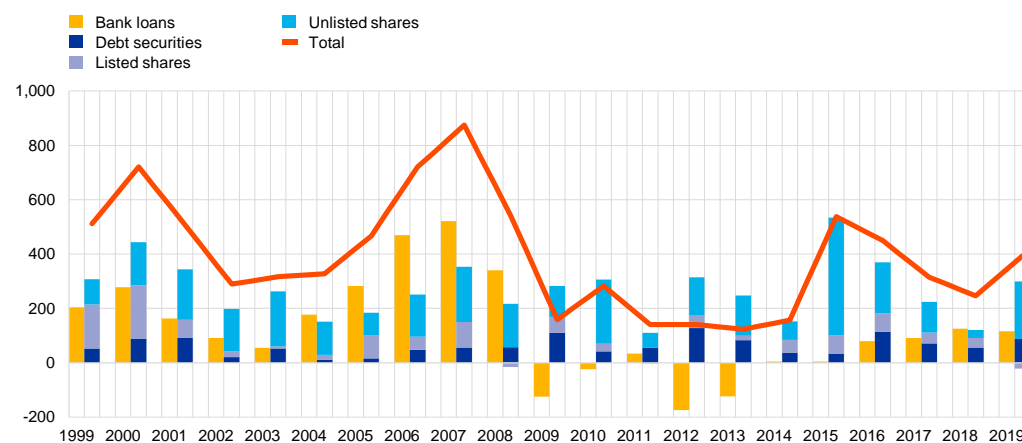
⁶ See “**EU Non-bank Financial Intermediation Monitor 2019**”, ESRB, July 2019, Charts A-1.2 and A-1.3.



Chart 1 (Chart A-1 in the statistical overview)

Net finance raised by euro area non-financial corporations

(EUR billions)



Sources: ECB Quarterly Sector Accounts (QSA) and ESRB calculations.

Note: The latest observation is for the fourth quarter of 2019.

Assets under management in investment funds and other financial institutions increased during 2019.

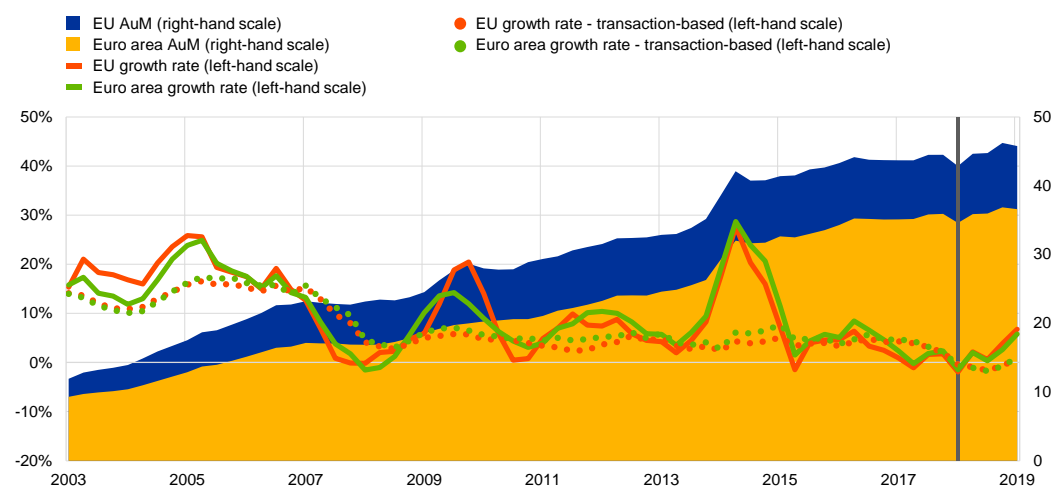
The size of the EU (euro area) investment fund and OFI sectors increased to €45.5 trillion (€36.3 trillion) in 2019, compared with €42.6 trillion (€34.4 trillion) at the end of 2018 (see Chart A-2). The assets included in the monitoring universe make up around 40% of the assets of the overall financial sector. Investment funds (other than MMFs) accounted for a larger share of this during 2019 and represented around 35% of the EU monitoring universe in 2019, compared with 32% in 2018 (see Chart A-3.1 and Chart A-3.2). Total assets of EU (euro area) MMFs, non-MMF investment funds and OFIs stood at €1.3 trillion (€1.3 trillion), €15.6 trillion (€13.1 trillion) and €28 trillion (€21.4 trillion) respectively (see Chart A-5). The countries with the six largest non-bank financial sectors in the EU (by size: Luxembourg, the United Kingdom (UK), the Netherlands, Ireland, Germany and France) make up around 80% of the monitoring universe (see Chart A-7).



Chart 2 (Chart A-2 in the statistical overview)

Assets under management in EU and euro area investment funds and other financial institutions

(EUR trillions and annual growth rates)



Sources: ECB and ECB calculations.

Notes: The continuous lines indicate annual growth rates based on changes in outstanding amounts. The dotted lines indicate annual growth rates based on transactions – i.e. excluding the impact of exchange rate or other revaluations and statistical reclassifications. The latest observation is for the fourth quarter of 2019.

The increase in assets under management in the investment fund and OFI sectors during 2019 reflects increases in asset valuations and investor inflows (see Chart A-4). After a decrease at the end of 2018, AuM increased in 2019. AuM in MMFs and non-MMF investment funds increased throughout the year, supported by continued inflows as well as valuation gains (see Chart A-4.1). Other financial institutions, on the other hand, saw a decrease in AuM over the year (see Chart A-4.2).

Amid declining wholesale funding costs, the share of the total funding of the banking sector provided by non-bank financial entities remained at its long-term average. Wholesale funding provided by non-bank financial entities to the banking sector increased by 5.5% year on year to €2.44 trillion in 2019, up from €2.31 trillion in 2018 and €2.22 trillion in 2017 (see Chart 3). More debt securities issued by banks were bought by investment funds (+10.6%) and MMFs (+23.5%), while banks' funding through securitised assets net of retained securitisations⁷ and MMF deposits decreased by 5.7% and 11.6%, respectively. Data on European securitisation issuance (including placed and retained securitisations) by collateral type showed decreases in 2019 for asset-backed securities (-30.1%), collateralised debt obligations (-23.2%), residential mortgage-backed securities (-11.4%) and loans to small and medium-sized enterprises (-21.8%), while the use of commercial mortgage-backed securities increased by 2.5% (see Chart A-33 and Section 3.3). Overall, while wholesale funding increased in absolute volumes over the past two years, such funding by non-banks as a percentage of total bank funding remained at its long term average of around 8%.

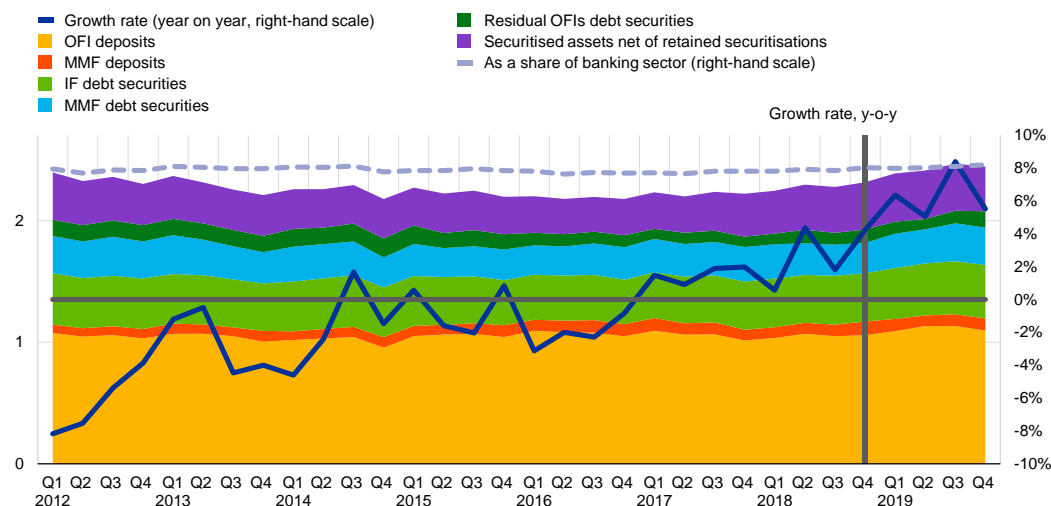
⁷ Retained securitisation refers to the portion of issued securitisation that has been retained on bank balance sheets. This can be used, for example, as collateral to access central bank liquidity facilities.



Chart 3 (Chart A-8 in the statistical overview)

Wholesale funding provided by non-bank financial entities to the banking sector

(EUR trillions and annual growth rates)



Sources: ECB and ESMA calculations.

Notes: The wholesale funding measure is the sum of: MFI (monetary financial institution) funding arising from securitisation; MMF and OFI deposits at euro area MFIs; and investment fund (IF), MMF and OFI holdings of debt securities issued by euro area MFIs. "Residual OFIs" reflects the difference between the total financial sector and the known sub-sectors within the statistical financial accounts (i.e. assets from the banking sector, insurance companies, pension funds, financial vehicle corporations, IFs and MMFs). The latest observation is for the fourth quarter of 2019.

1.2 Overview of risks and vulnerabilities

From a macroprudential perspective, a growing non-bank financial sector brings benefits in terms of increased risk-sharing across the financial system, but it can also result in new risks and vulnerabilities. In particular, the expansion of the non-bank financial sector in recent years has been accompanied by an increase in the riskiness of some asset portfolios, rising liquidity transformation and pockets of increased leverage. Such risk-taking has created vulnerabilities which need to be monitored and assessed, taking into account interconnectedness within the financial system, as well as the role of non-bank financial institutions in funding the real economy more broadly. Figure 1 provides an overview of the potential risks and vulnerabilities arising from non-bank financial intermediation in the EU. The remainder of this section describes the key risk transmission channels in more detail.

The ESRB has previously discussed some of the risk transmission mechanisms which materialised to some extent at the onset of the COVID-19 pandemic. In particular, previous editions of this report highlighted liquidity risk in the investment fund sector and the procyclical effect of margin and haircut practices as key vulnerabilities in the non-bank financial sector. Further vulnerabilities became evident following the COVID-19-related market stress, which had not been anticipated to the same extent. For instance, the difficulty of investment funds to price certain assets following the market shock and liquidity strains in certain money market funds became

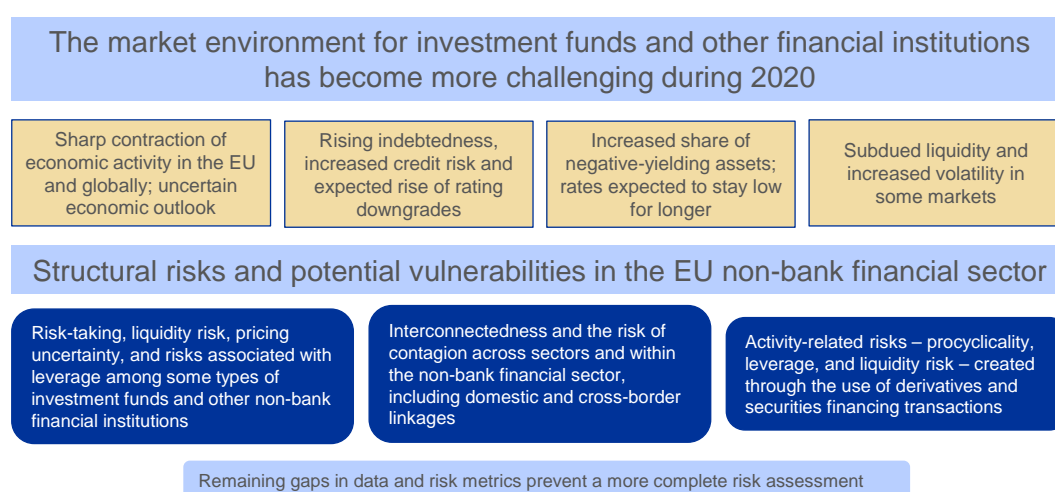


pressing issues during the episode. Box 1 provides a summary of developments following the onset of the COVID-19 pandemic.

The market environment for investment funds and other financial institutions in the EU has become more challenging as a result of the coronavirus pandemic and its adverse effects on economic activity. Downside risks to economic activity in Europe and globally have increased substantially in 2020 and uncertainty about the future path of the pandemic continues to weigh on financial markets. While fiscal and monetary policy measures have significantly reduced the likelihood of adverse tail events, the market liquidity situation remains subdued and uncertainties concerning future growth prospects remain high.

Figure 1

Risks and potential vulnerabilities in the EU non-bank financial sector



Source: ESRB.

Riskier corporate borrowers are in a more vulnerable state and at higher risk of being downgraded, which could amplify existing vulnerabilities in the financial system. The share of high-yield and lower-rated investment-grade issuances – many involving highly leveraged firms – has risen in recent years prior to the coronavirus crisis. Following the coronavirus shock, corporate downgrades are expected to increase in view of a deteriorating economic outlook, along with higher funding costs and possible rollover risks going forward. Investment funds and insurers (including via their unit-linked products) hold more than half of the estimated outstanding stock of NFC bonds in the euro area and would therefore be directly affected by a possible further deterioration in credit quality and corporate downgrades. Downgrades would also force some funds to sell the bonds of issuers losing their IG status, possibly adding to liquidity strains in corporate bond markets.⁸

Moreover, the market for leveraged loans and collateralised loan obligations (CLOs) has expanded in recent years, alongside a growing role of non-bank financial institutions as

⁸ See “Issues note on liquidity in the corporate bond and commercial paper markets, the procyclical impact of downgrades and implications for asset managers and insurers”, ESRB, May 2020.



investors and originators.⁹ Insurers' direct holdings of CLOs and collateralised mortgage obligations (CMOs) stood at €5.11 billion in the second quarter of 2019, a 17% increase compared with end-2018 volumes.¹⁰ These figures might underestimate the overall exposure of the insurance sector since they do not account for indirect investments via funds.

At the same time, interest rates are expected to remain low for longer, and a continued search for yield could lead to exuberance in financial markets. Before the coronavirus shock, the share of low or negative-yielding assets had increased rapidly in 2019, triggering an intensified search-for-yield behaviour. About 20% of outstanding amounts of bonds across the globe are negative yielding and more than 80% offer yields of less than 2% (as at July 2020).¹¹ As yields have fallen, non-bank financial intermediaries hold a growing share of low-yielding bonds, which decreases their investment income in the medium term and encourages risk-taking. Investor flows and higher demand for risky assets can have a procyclical effect on asset prices and fuel the renewed build-up of vulnerabilities in the non-bank financial sector.

Portfolio flows of investment funds actively searching for yield worldwide have increased the potential for cross-border financial contagion. Investment funds account for an important share of cross-border portfolio investments, with considerable variation across countries.¹² Such cross-border portfolio flows bring the benefits of increased risk-sharing, but they are also a channel for inward and outward financial contagion. Recent work by the Bank of England has found that the shift to market-based finance has increased global capital flows to emerging market economies and, at the same time, amplified the responsiveness of these flows to global shocks.¹³ Further evidence suggests that asset reallocations by international investment funds can play an important role in transmitting global financial conditions across regions.¹⁴

1.2.1 Risk taking, liquidity risk and risks associated with leverage

Liquidity and duration risks have increased over recent years in some parts of the European non-bank financial sector, including investment funds. With interest rates expected to stay low for longer, investment funds increased the residual maturities of their portfolios in 2019. A notable increase in average residual maturities could be observed for both EU bond funds (see Chart A-21) and for money market funds over this period (see Chart A-24). Likewise, liquidity transformation in EU bond funds increased further during 2019 (see Chart A-14), while the average cash positions declined.¹⁵ Low liquid asset holdings and low cash positions, in particular in corporate bond funds,

⁹ See "**Vulnerabilities associated with leveraged loans and collateralised loan obligations**", Financial Stability Board (FSB), December 2019.

¹⁰ See "**Financial Stability Report**", European Insurance and Occupational Pensions Authority (EIOPA), December 2019, p. 59.

¹¹ See "**Financial Stability Review**", ECB, November 2019, p. 7 (figures updated as at July 2020).

¹² See "The role of investment funds in cross-border capital flows", **Global Monitoring Report on Non-Bank Financial Intermediation 2019**, FSB, January 2020, pp. 79-83.

¹³ See Eguren-Martin, F., O'Neill, C., Sokol, A. and von dem Berge, L., "**Capital flows-at-risk: push, pull and the role of policy**", Staff Working Paper No. 881, Bank of England, August 2020.

¹⁴ See "**Financial Stability Review**", ECB, November 2019, Box 6.

¹⁵ See "**Financial Stability Review**", ECB, May 2020, p. 83.



reduced the capacity of the investment fund sector to absorb the large outflows observed at the onset of the coronavirus crisis (see Box 1).

The financial leverage of investment funds increased slightly during 2019, most notably for hedge funds. The increase in hedge funds' financial leverage has been notable both in AIFMD (Alternative Investment Fund Managers Directive) data¹⁶ and aggregate statistics on funds' financial leverage (see Chart A-16). By contrast, leverage in bond and mixed funds increased only moderately. Financial leverage is generally low in the fund sector, except for hedge funds. But leverage can also be generated through the use of derivatives, which is usually not captured by traditional measures of leverage and is therefore difficult to quantify. Such synthetic leverage can add to leverage and amplify procyclical behaviour of asset managers and fund investors alike.¹⁷

Despite a general deterioration in corporate bond ratings already prior to the onset of the COVID-19 pandemic, the rating profiles of EU bond funds' portfolios have changed little. On aggregate, bond funds have maintained a stable portfolio composition over the past two years, with no substantial change in the ratings of assets (see Chart A-21). This suggests that bond funds have not significantly increased credit risk in their portfolios in search of higher yields in recent years. It also indicates that the increasing issuance of lower-rated corporate debt is largely purchased by other investors, which may include some types of pension funds,¹⁸ other fund types that are not classed as bond funds or other institutional investors. However, an increase in credit risk and associated rating downgrades due to the COVID-19-induced economic contraction could have an impact on the rating profiles of fund portfolios and prompt asset managers to sell the downgraded bonds.¹⁹

In 2019, several UCITS funds with a high share of less liquid assets faced acute liquidity strains following large outflows. In June 2019, the UK asset manager Woodford suspended redemptions of its UCITS equity fund, when the manager could no longer meet redemption requests after most of its liquid assets had been depleted. Similarly, bond funds managed by the UK-based asset management firm H2O LLP²⁰ experienced substantial outflows in June and July 2019 triggered by a loss in confidence and uncertainty surrounding the liquidity of the underlying portfolios. Moreover, some non-UCITS property funds in the UK suspended redemptions following large outflows. These events were idiosyncratic in nature and did not have wider systemic repercussions, also because they happened in a benign market environment without substantial spillovers to other funds.

By contrast, the outflows and liquidity stress observed at the onset of the COVID-19 pandemic were more widespread and affected a broader range of funds. As the market sell-off

¹⁶ See "ESMA Annual Statistical Report: EU Alternative Investment Funds 2020", European Securities and Markets Authority (ESMA), January 2020, p. 20.

¹⁷ See Molestina Vivar, L., Wedow, M. and Weistroffer, C., "Is leverage driving procyclical investor flows? Assessing investor behaviour in UCITS bond funds", *Macprudential Bulletin*, ECB, October 2019, and Molestina Vivar, L., Wedow, M. and Weistroffer, C., "Burned by leverage? Flows and fragility in bond mutual funds", *Working Paper Series*, No 2413, ECB, May 2020.

¹⁸ According to the **December 2019 EIOPA Financial Stability Report**, bond portfolios of European insurers consist primarily of investment-grade bonds, with percentage holdings remaining stable in recent years.

¹⁹ See "Issues note on liquidity in the corporate bond and commercial paper markets, the procyclical impact of downgrades and implications for asset managers and insurers", ESRB, May 2020.

²⁰ H2O LLP is majority-owned by the French bank Natixis.



intensified in late February and early March, corporate bond funds and some types of money market funds experienced large outflows, and liquidity stresses threatened to become systemic during this period (see Box 1). Money market funds faced difficulties in offloading commercial paper, while liquidity strains were particularly pronounced in low-volatility net asset value (LVNAV) and standard variable net asset value (VNAV) funds (see Box 2).

1.2.2 Interconnectedness and the risk of contagion

Non-bank financial institutions are closely connected with each other and with the banking sector through direct exposures. Investment funds, MMFs and OFIs represent an important source of wholesale funding for the banking sector. Wholesale funding provided by these non-bank financial institutions accounts for about 8% of total bank funding (see Chart A-8). This share has remained stable over many years, although there has been an increase in absolute amounts. Bank-issued deposits account for about half of the wholesale funding provided by these institutions. The other half consists of bank-issued debt securities held by these institutions, including securitised assets. On the other hand, financing provided to non-bank financial institutions through loans, debt securities and equities issued by non-bank financials also account for about 8% of banks' total assets (see Chart A-9). Deposits with euro area credit institutions from euro area non-bank financials accounted for less than 6% of bank liabilities for the first time in more than a decade (see Chart A-10).

Indirect exposures can arise through ownership structures in financial conglomerates, involving banks, insurers and asset management companies. Banks and insurance companies in the EU are often connected with large asset management companies within financial conglomerates. These links can help to optimise liquidity between the parent company and affiliated institutions and provide long-term benefits in terms of revenue and risk diversification. However, the interlinkage, e.g. through credit lines and contingency arrangements between the holding company and the affiliated institutions, creates potential channels for contagion between the affiliated institutions and to the holding company, especially during stress periods. Interdependencies also exist with respect to revenue streams and confidence effects.

Liquidity stress in unit-linked products offered by insurers illustrates the interdependencies and parallels between the insurance and asset management sectors. Earlier in 2020, before the COVID-19 shock hit, large net outflows from unit-linked products invested directly in commercial real estate prompted two Irish-authorized insurers to temporarily suspend redemptions.²¹ At around the same time, others changed their pricing from an acquisition basis to a disposal basis. Later in the year, these property-related unit-linked funds were closed to withdrawals. This happened mainly as a result of challenges triggered by the coronavirus pandemic in determining the value of the underlying assets and the suspension of the authorised property funds used as an investment vehicle by some of the unit-linked funds.²² Liquidity risks in these unit-linked products are generally

²¹ Property-related assets account for €6 billion of the unit-linked funds, which includes €4 billion invested in Irish properties, mostly commercial property. Actions were taken to protect the interests of all policyholders, while at the same time they reduced the risk of forced asset sales.

²² See “**Financial Stability Review 2020: I**”, Central Bank of Ireland, June 2020, p. 63.



more pronounced compared with traditional open-ended property funds in Ireland, as investors are, in the main, allowed to redeem at a higher frequency, although the insurance companies have the contractual right to defer such redemptions to protect the interests of all policyholders. While liquidity risks in unit-linked products are generally borne by end-investors,²³ reputational damage or liquidity spillovers to the insurance sector remains a tail risk in a possible future downturn of commercial real estate (CRE) markets.

Indirect interlinkages between banks, insurance corporations and non-bank financial institutions result furthermore from common asset exposures. For example, euro area banks and bond funds tend to invest in the same securities. Large common exposures between banks, investment funds and insurers domiciled in the euro area increase the risk of amplifying market stress, if they have to liquidate a large or illiquid part of their portfolios simultaneously. Investors holding the same assets may then suffer mark-to-market losses in their balance sheet, which can prompt further outflows and fire sales, affecting market liquidity more broadly.²⁴

The interconnectedness between non-bank financial institutions and the rest of the financial system potentially increases the likelihood of spillovers in a period of financial market stress. At the onset of the COVID-19 pandemic, non-bank financial institutions were drawing on credit lines and borrowing from banks, which mitigated acute liquidity strains in the non-bank financial sector, but at the same time raised banks' exposure to these institutions. Dislocations in non-bank financial intermediation furthermore amplified liquidity stress in financial markets, ultimately affecting the financing conditions of the corporate sector more broadly, if only temporarily, through reduced issuance and increased funding costs (see Box 1).

1.2.3 Activity-related risks in derivatives and securities financing transactions

Haircut and margining practices in bilaterally and centrally cleared trades can increase liquidity risk, especially during periods of high market volatility. Recent regulatory reforms in the derivatives market have introduced the daily exchange of margin for the vast majority of derivatives exposures. The exchange of margin in the form of cash or high-quality cash-like collateral reduces counterparty credit risk. However, the requirements also increase liquidity risk, especially during periods of high market volatility, as counterparties need to meet margin calls with high-quality collateral at short notice. In addition to liquidity risk, securities financing transactions (SFTs) and derivatives can be used to build up leverage, exposing market participants to counterparty risk and forcing them to deleverage if the value of collateral deteriorates.²⁵

During the COVID-19 market turmoil, the sudden rise in volatility led to an increase in variation margin calls, putting additional pressure on some investment funds' liquidity positions (see Box 1). Partial reporting of variation margins in EMIR data shows that daily

²³ During the moratorium, retirees were generally still able to access their retirement benefits and make regular withdrawals.

²⁴ See "**The role of bank and non-bank interconnections in amplifying recent financial contagion**", *Financial Stability Review*, ECB, May 2020.

²⁵ See "**Liquidity risks arising from margin calls**", ESRB, June 2020.



variation margin calls on euro area funds rose fivefold, from around €2 billion in the first half of February to over €10 billion in the second half of March. The highest increase – by around 6.5 times – was reported for portfolios composed of equity derivatives, followed by interest rate (fivefold increase) and currency (fourfold increase) portfolios.²⁶

Repo markets were used to raise cash at short notice, while at the same time banks were constrained in their capacity to intermediate increased volumes. Already before the coronavirus shock hit, activity in the euro money markets and repo trading grew steadily during 2019, with intermittent spikes in repo rates (see Chart A-36). On 16-17 September 2019, the Federal Reserve System injected funds into US repo markets in response to an unusual spike in repo rates, although no collateral pressures were witnessed in European repo rates at the time. During the COVID-19-related market stress, repo market activity increased, driven partly by safe-haven flows into short-term secured markets, the need to cover fund outflows, as well as collateral transformation to meet margin requirements. As the demand for repo increased, banks' capacity to intermediate remained constrained. Meanwhile, the market had to deal with the disruption of operating remotely, with implications for operational efficiency.²⁷

1.2.4 Remaining gaps in data and risk metrics

Data gaps still prevent an effective risk assessment in some parts of the non-bank financial sector. Vulnerabilities can build up unnoticed among entities where statistical information is not readily available or not sufficiently granular. Such gaps need to be closed, existing data reporting frameworks improved and consistent metrics developed.

Especially in a crisis, authorities require up-to-date and high-frequency data to monitor risks in the non-bank financial sector and to inform policy decisions. At the onset of the COVID-19 pandemic, authorities relied heavily on commercial data and market intelligence to gain insights into evolving risks, e.g. in the money market and investment fund sectors. While these commercial data are a valuable source of information, they are usually sourced from market participants who report on a voluntary basis. Such data can be patchy and quality standards are difficult to verify compared with regulatory data. A harmonised and consistent set of indicators, available to European authorities at a high frequency, is therefore key in facilitating a timely monitoring of stability risks in stressed market conditions.

A globally consistent measure of leverage for investment funds is still lacking, which prevents effective monitoring of stability risks from a system-wide perspective. Such consistent measures should comprise metrics based on a gross and a net notional exposure and should be supplemented by risk measures to capture potential losses and liquidity demands arising from derivatives exposures. The International Organization of Securities Commissions (IOSCO) concluded its work on globally consistent measures of fund leverage in December 2019, as requested by the FSB recommendations to address structural vulnerabilities stemming from asset management activities. These proposed a two-step analysis where the first step focuses on

²⁶ See “**Derivatives-related liquidity risk facing investment funds**”, *Financial Stability Review*, ECB, May 2020.

²⁷ See “**The European repo market and the COVID-19 crisis**”, International Capital Market Association (ICMA), April 2020.



identifying a sub-set of investment funds that can be taken forward for further risk-based analysis. In the second step, a set of risk-based metrics is applied to the sub-set of funds.²⁸

With respect to the euro area accounts, the statistical standard-setting bodies are reviewing existing classifications to develop a more granular understanding of the OFI residual. In this context, it is important that captive financial institutions (CFIs), which are sometimes consolidated in the balance sheets of other companies, can be distinguished from non-consolidated entities.

Important work is ongoing to help close some data gaps and improve data quality. The ESRB and ESMA are working on data quality improvements in the AIFMD reporting, for instance, by enriching the database with other data sources to help break down the “Other AIFs” category. The AIFMD Review will play an important role in improving the reporting framework. The ESRB has previously outlined some of the shortcomings identified in the AIFMD framework.²⁹

European and national authorities should continue working towards a better understanding of interconnectedness and contagion risk from a system-wide perspective. This includes developing measures of direct exposures, including across countries and types of entities, but also indirect exposures through common asset holdings and ownership links. To improve entity-based and activity-based risk assessments, the ESRB and its member institutions are working towards combining various EU-wide datasets, such as those collected under EMIR, the Securities Financing Transactions Regulation (SFTR), the AIFMD and the Securities Holdings Statistics (SHS) Regulation. The FSB is taking a leading role in integrating datasets at a global level.

1.3 Engagement in certain risky activities

The monitoring framework considers how non-bank financial entities are involved in certain risky activities and how these activities might have an impact on financial stability. Table 1 provides an overview of such risky activities carried out by the entities considered in this report, including liquidity and maturity transformation, leverage, interconnectedness with the banking system and credit intermediation. The level of engagement in these activities does not necessarily translate into a measure of risk. The assessment of the level of engagement in Table 1 is informed by descriptive statistics and market intelligence, but is ultimately judgement-based. It is reviewed and updated on an annual basis and incorporates improved data availability (e.g. under the AIFMD and the SFTR) and regulatory developments. A more detailed entity-based analysis is presented in Section 2, while activity-based monitoring is covered in Section 3.

Hedge funds, financial vehicle corporations (FVCs), as well as security and derivative dealers (SDDs), are found to have a pronounced engagement in the risky activities considered in this report. The engagement of equity funds is low on average, and hence equity funds are not further discussed in Section 2. Bond funds, private debt funds and MMFs, as well as special-purpose entities (SPEs) and financial corporations engaged in lending (FCLs), are found to

²⁸ “Recommendations for a Framework Assessing Leverage in Investment Funds”, IOSCO, December 2019.

²⁹ “Letter from the ESRB to the European Commission on shortcomings of the AIFMD framework”, ESRB, February 2020.



have a medium engagement. Mixed funds, private equity funds and exchange-traded funds (ETFs) have a low engagement, on average, at the entity level.

This year's assessment includes a more detailed breakdown for MMFs and bond funds.

Bond funds are split between funds investing mainly in corporate bonds and those that invest mainly in sovereign bonds. The engagement in risky activities between the two categories is similar, though corporate bond funds are deemed to have a stronger engagement in liquidity transformation. The different types of MMFs were also incorporated to show the assessments for constant NAV (CNAV), variable NAV (VNAV) and low-volatility NAV (LVNAV) funds. The main difference relates to liquidity transformation where CNAVs and VNAVs are considered to have a medium engagement, while LVNAVs are deemed to have a pronounced engagement. CNAVs invest largely in liquid sovereign markets, but the risk of “breaking the buck” remains. VNAVs offer subscriptions or redemptions at a price equal to the MMF's NAV, but tend to hold a more diversified portfolio, including corporate debt, which can be less liquid. Finally, LVNAVs are judged to have a pronounced engagement in liquidity transformation given their higher exposure to less liquid assets than CNAVs and the risk that such a fund can “break its collar”.



Table 1
Mapping of activities to entity types

	Investment funds											Other financial institutions				
	MMFs			Bond funds		Mixed funds	Equity funds	Hedge funds	Real estate funds	ETFs	Private equity funds ⁴	Private debt funds	FVCs	SPES	SDDs	FCLs
	CNAV	VNAV	LVNAV	Corpo-rate	Sove-reign											
Market size																
Euro area 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	
Summary assessment																
Engagement	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●
Risk transformation activities																
Credit intermediation	●	●	●	●	●	●	○	●	○	○	●	●	●	○	●	
Maturity transformation	●	●	●	●	●	●	○	●	●	●	○	○	●	●	●	
Liquidity transformation	●	●	●	●	●	●	○	●	●	○	○	●	●	●	●	
Leverage²	○	○	○	●	●	●	○	●	●	○	●	●	●	●	●	
Market activities ¹																
SFTs	●	●	●	●	●	●	●	○	●	○	○	○	○	●	○	
Derivatives	●	●	●	●	●	●	●	●	●	○	●	●	●	●	○	
Reuse of collateral	●	●	●	●	●	●	●	●	●	○	●	●	●	●	○	
Interconnectedness																
Interconnectedness³	●	●	●	○	○	○	○	●	●	●	○	○	●	●	○	●

Notes: 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 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 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



Regulatory update

Recent developments in the EU policy framework

There were a number of policy developments in 2019 related to non-bank financial intermediation. This box provides a brief summary of some of the main developments.

The next phase of a public consultation for the AIFMD Review progressed in 2019 after the publication of a report commissioned by the European Commission.³⁰ During 2019, the ESRB prepared a letter to the European Commission which was published on 3 February 2020. It outlined the key shortcomings of the current AIFMD framework from a financial stability perspective. The identified drawbacks relate to three different aspects where the framework could be improved. First, the letter provides considerations on the suitability of the reporting framework and access to data for monitoring systemic risk. Second, it covers the need to operationalise existing macroprudential policy instruments. Finally, it stresses the ongoing development of the macroprudential policy framework “beyond banking”, and for investment funds in particular, and therefore the need to review the adequacy of the AIFMD macroprudential framework again in a subsequent review process. The report from the Commission to the European Parliament and the Council assessing the application and scope of the AIFMD was adopted on 10 June 2020.³¹ A public consultation on the AIFMD is expected during the second half of 2020.

In September 2019, ESMA published a report outlining a stress simulation framework for investment funds.³² The report discusses the calibration of redemption shocks for investment funds, methods to assess the resilience of funds to shocks and ways to measure the impact of fund managers' liquidation strategies on financial markets, including second-round effects. In addition to the methodological aspects of the framework, the report also provides a simulation of a redemption shock and its effects on a sample of 6,000 UCITS bond funds. ESMA intends to use this stress simulation framework as part of its regular risk monitoring of investment funds.

ESMA published a report in September 2019 providing guidance on liquidity stress testing for UCITS and AIF asset managers. The report is part of ESMA's response to the 2017 ESRB Recommendation on liquidity and leverage risks in investment funds.³³ The common requirements set out in this report, which will become applicable on 30 September 2020, will allow for convergence in the way NCAs supervise liquidity stress testing across the EU. Moreover, work related to other parts of the ESRB Recommendation continues, such as the development of guidance on the implementation of Article 25 of the AIFMD.

In December 2019, IOSCO published its recommendations for the assessment of leverage in investment funds.³⁴ The proposed framework consists of two steps. Step 1 focuses on identifying

³⁰ See “**Report on the Operation of the Alternative Investment Fund Managers Directive (AIFMD)**”, European Commission and KPMG, December 2018.

³¹ See “Report to the European Parliament and the Council assessing the application and the scope of Directive 2011/61/EU of the European Parliament and of the Council on Alternative Investment Fund Managers”, European Commission, COM(2020) 232 final, June 2020.

³² See “**Stress simulation for investment funds**”, ESMA, September 2019.

³³ **Recommendation of the European Systemic Risk Board of 7 December 2017 on liquidity and leverage risks in investment funds (ESRB/2017/6)** (OJ C 151, 30.4.2018, p. 1).

³⁴ See “**Recommendations for a Framework Assessing Leverage in Investment Funds**”, IOSCO, December 2019.



those funds that are more likely to pose risks to the financial system. For this purpose, it is recommended that leverage is measured as gross notional exposure (GNE) or adjusted GNE. Under step 2, it is proposed that risk-based metrics, such as value at risk, are used to assess the level of risk posed by leverage used in investment funds.

The European Commission presented the European Green Deal, which is a growth strategy aiming to make Europe a climate-neutral continent by 2050.³⁵ This included the European Green Deal Investment Plan, which aims to mobilise at least €1 trillion of sustainable investments over the next decade. Three key pieces of legislation aim to incentivise and channel private sector investments into green and sustainable development. This includes a unified EU green classification system, sustainability-related disclosure requirements, and two new categories of climate benchmarks to orient the choice of investors who wish to adopt a climate-conscious investment strategy. Investment funds and OFIs will play a crucial role in raising and channelling private sector funds.

1.4 Financial innovation

Financial innovation has the potential to transform existing business models, applications, processes or products, having a material effect on financial markets, institutions and service provision. Some prominent examples of financial innovations include distributed ledger technologies (DLTs), crypto-assets, budgeting tools, mobile payments, and the use of artificial intelligence (AI) in the form of algorithm-based decision-making (e.g. for mortgage granting or portfolio management) and cloud-based decision-making. These innovations have the potential to rapidly transform the financial sector in general and the non-banking sector in particular, including risk transmission channels. Material financial stress and systemic risk implications may become more pertinent as the provision of fintech-based financial services increases and new forms of interconnectedness emerge. This sub-section provides an overview of recent regulatory and supervisory developments regarding the facilitation of these new financial innovations, as well as the improvement of our knowledge of the risks they may pose to financial stability.

Regulators and supervisors are working on addressing the second generation of crypto-assets amid the emergence of proposals for so-called global stablecoins. Global stablecoins can leverage a large customer base, can address the high volatility common to many crypto-assets and could gain a global footprint.³⁶ Given their potential reach, stablecoins could create opportunities but also new risks. In line with the report of the G7 Working Group on Stablecoins,³⁷ the FSB outlines³⁸ the steps forward for its work on the regulatory issues of such an asset. The FSB underlines the need for a clear understanding of the whole ecosystem of a stablecoin arrangement and the interactions within the context of the applicable regulatory and supervisory

³⁵ See “**The European Green Deal**”, European Commission, December 2019.

³⁶ See “**Addressing the regulatory, supervisory and oversight challenges raised by ‘global stablecoin’ arrangements**”, FSB consultative document, April 2020.

³⁷ See “**Investigating the impact of global stablecoins**”, G7 Working Group on Stablecoins, October 2019.

³⁸ See “**Regulatory issues of stablecoins**”, FSB, October 2019.



frameworks and practices that could apply. The components of the ecosystem include entities involved in issuing stablecoins, those managing the underlying assets, the transfer infrastructure, gatekeepers, the stabilisation mechanism and the governance arrangement. An important aspect of the regulatory and supervisory frameworks covers the cross-border and cross-authority context. In the context of gaining insights into developments in stablecoins, several papers were prepared, for example by ECB staff on a taxonomy and a stabilisation mechanism³⁹ or by the International Monetary Fund (IMF)⁴⁰.

The European Commission carried out an assessment of the applicability and suitability of current EU law to address the evolution of crypto-assets, building on European Banking Authority (EBA) and ESMA assessments.⁴¹

These European Supervisory Authorities (ESAs) reported under their respective remits in early 2019, stating that crypto-assets typically fall outside the scope of current EU financial services regulation.⁴² The European Commission therefore published its consultation on a regulatory framework for crypto-assets in December 2019.⁴³ In the meantime, the EBA and ESMA are continuing to monitor market developments and promote knowledge-sharing between competent authorities on regulatory and supervisory issues relating to crypto-assets.

An FSB note⁴⁴ published in May 2019 provides an overview of the work on crypto-assets by several international organisations.

Areas of focus of the Basel Committee on Banking Supervision (BCBS), the Committee on Payments and Market Infrastructures (CPMI), IOSCO, the Financial Action Task Force (FATF), the Organisation for Economic Co-operation and Development (OECD) and the FSB include investor protection, market integrity, anti-money laundering, bank exposures and financial stability monitoring. Developments in these areas continue to be monitored, convergence in supervisory expectations for firms is being promoted, and work continues to clarify how international standards apply to crypto-assets. Crypto-asset trading platforms, as well as initial coin offerings (ICOs), are also being assessed in international fora. An IOSCO consultation report⁴⁵ considers risks related to crypto-asset trading platforms and provides a toolkit intended to assist regulatory authorities in addressing challenges related to safeguarding participants' access, conflicts of interest, operations, market integrity, price discovery and technology. Key risks of ICOs⁴⁶ relate to both issuers and investors subscribing to token offerings. The risks are mainly linked to the uncertainty of the applicable regulatory framework for ICOs and crypto-asset markets, together with the lack of financial consumer protection safeguards, limitations in the structuring of ICOs and operational risks related to DLTs.

³⁹ See **"In search for stability in crypto-assets: are stablecoins the solution?"**, *Occasional Paper Series*, No 230, ECB, August 2019.

⁴⁰ See **"The Rise of Digital Money"**, *Fintech Notes*, IMF, July 2019.

⁴¹ See **"ESMA Advice: Initial Coin Offerings and Crypto-Assets"** and **"EBA reports on crypto-assets"**, January 2019.

⁴² Some crypto-assets do fall within the scope of EU law, namely those that qualify as financial instruments within the meaning of the Markets in Financial Instruments Directive (MiFID) or as electronic money pursuant to the second Electronic Money Directive.

⁴³ See **"Financial services – EU regulatory framework for crypto-assets"**, European Commission, December 2019.

⁴⁴ See **"Crypto-assets – work underway, regulatory approaches and potential gaps"**, FSB, May 2019.

⁴⁵ See **"Issues, Risks and Regulatory Considerations Relating to Crypto-Asset Trading Platforms"**, Consultation Report, IOSCO, May 2019.

⁴⁶ See **"Initial Coin Offerings (ICOs) for SME Financing"**, OECD, January 2019.



Innovative financial technology and technology-enabled structural changes in the financial sector bring new elements in the risk-benefit analysis and warrant vigilance by supervisors and regulators.^{47,48}

The relationship between financial institutions and technology firms is considered to be largely complementary.⁴⁹ However, technology-enabled structural changes to the financial sector bring new opportunities and risks through new bundlings of products and services using platforms and can result in concentration risk.⁵⁰ Some innovations, such as the increasing use of robo-advisors, can result in structural changes in investor behaviour. Although still at an early stage, emerging financial technologies can materially alter the universe of financial services. In this context, an FSB report⁵¹ explores the financial stability, regulatory and governance implications of decentralised financial technologies, such as DLT and peer-to-peer platforms.

Faced with the rapid and global digitalisation and technological advances, policymakers and regulators will have to continue to monitor and coordinate closely.

In order to promote coordination and cooperation among national innovation facilitators, the European Forum for Innovation Facilitators (EFIF)⁵² was launched in April 2019 with the objective to foster the scaling-up of innovation in the EU financial sector, following up on the findings in the report by the ESAs.⁵³ Innovation facilitators typically take the form of innovation hubs and regulatory sandboxes. Members of the EFIF include one representative of each competent authority represented on the boards of the ESAs, the ESAs and, as an observer, the European Commission.

⁴⁷ See “**FinTech and market structure in financial services: Market developments and potential financial stability implications**”, FSB, February 2019.

⁴⁸ See “**Big tech in finance: opportunities and risks**”, *Annual Economic Report*, Bank for International Settlements (BIS), June 2019.

⁴⁹ See “**EBA assessment of risks and opportunities from Fintech and its impact on incumbents business models**”, July 2018, and “**EBA assessment of impact of FinTech on payment institutions' and e-money institutions' business models**”, July 2019.

⁵⁰ See “**Final report of the Expert Group on Regulatory Obstacles to Financial Innovation**”, European Commission, December 2019.

⁵¹ See “**Decentralised financial technologies: Report on financial stability, regulatory and governance implications**”, FSB, June 2019.

⁵² See “**Joint Report on Regulatory Sandboxes and Innovation Hubs**”, European Supervisory Authorities Joint Committee, January 2019.

⁵³ See “**FinTech: Regulatory sandboxes and innovation hubs**”, ESMA/EIOPA/EBA, 2018.



2 Entity-based monitoring

The ESRB's entity-based monitoring approach to non-bank financial intermediation covers a broad array of non-bank financial institutions. The monitoring universe for the entity-based monitoring comprises investment funds and so-called other financial institutions, thus excluding, for example, banks, insurance corporations and pension funds, as well as central counterparties (CCPs) with a banking licence.⁵⁴ In Section 1, Table 1 provides an overview of key entities included in the monitoring universe and summarises their engagement in certain activities that pose or potentially propagate structural financial stability risk. The subsequent section explores these assessments in more detail. In the statistical overview of the Monitor, Table 2 also provides a more detailed overview of OFIs according to the European System of National and Regional Accounts (ESA).⁵⁵

2.1 Developments in the EU investment fund sector

Assets under management in the EU investment fund sector increased in 2019 as a result of an increase in asset valuations and continued fund inflows. After a sharp decrease at the end of 2018, which mainly reflected a substantial drop in asset prices, AuM in the EU investment fund sector grew across all fund types in 2019 (see Chart A-5). This increase was particularly pronounced for bond funds and equity funds. However, while the increase in AuM in the former mostly reflected investor inflows, valuation effects accounted for most of the growth of AuM in equity funds. Mixed funds, other funds and real estate funds saw steady inflows over the year, whereas hedge funds saw investor withdrawals, but valuation effects offset these outflows. The strong geographical concentration in the EU investment fund sector was broadly unchanged in 2019 (see Chart A-13).

The investment fund sector is linked to the rest of the financial system and the non-financial system through a number of channels. This includes linkages with the real economy, as investors' funds are channelled to households and non-financial corporations. Linkages with the rest of the financial sector are created through numerous channels, including wholesale funding of banks provided through non-bank financial entities, funding provided by banks to investment funds, or connections created through the repo and securities lending markets. In addition, ownership linkages between asset managers and other financial firms can result in contagion channels.

Many asset management companies have ownership linkages to EU banks and, to a lesser extent, insurance corporations. Among the largest 25 asset management companies operating in the EU, 15 are owned by banks and four by insurance companies (see Chart A-18). The remaining six asset managers are independent, mainly from the United States (US), and include the largest asset manager in the EU. In the case of ownership ties with other financial firms, additional channels of contagion result from reputational spillovers, credit lines and contingency

⁵⁴ Assets under management by CCPs are partially included in the monitoring universe as OFIs unless the CCPs have a banking licence, in which case they are included within MFI statistics.

⁵⁵ For more information, see the [ESA 2010](#).



arrangements between financial firms, their asset management arms and the investment funds that they manage.

Euro area investment funds' holdings of debt securities, investment fund shares and other equity issued by euro area non-financial corporations and other investment funds increased in 2019 (see Chart A-19). Exposures of euro area investment funds to other euro area non-MMF investment funds and OFIs grew from €2.2 trillion in 2018 to €2.6 trillion in 2019. Exposures to non-financial corporations also increased strongly from €1.3 trillion in 2018 to €1.6 trillion in 2019. On the other hand, exposures to euro area banks⁵⁶ (€0.7 trillion), governments (€0.9 trillion) and insurers and pension funds (€0.07 trillion) remained relatively stable throughout the year.

Box 2

Use of liquidity management tools in EU investment funds

Some fund managers made use of liquidity management tools in 2019 which allowed them to manage unexpectedly high redemption requests in their funds. Throughout the year, Woodford Equity Income Fund, H2O Asset Management's funds and M&G's property fund experienced large withdrawals. The activation of liquidity management tools such as swing pricing and fund suspensions reduced the need to engage in forced asset sales and helped contain the stress. The underlying reasons for the high redemptions were unique in each case and none of them caused financial stability concerns. However, they illustrate a range of vulnerabilities also identified in this Monitor such as large liquidity mismatches and interconnectedness between the bank and non-bank sector. This box provides a short overview of these three cases.

Following an unanticipated amount of redemption requests, the Woodford Equity Income Fund (WEIF) was suspended in June 2019 and wound up in October.⁵⁷ UCITS funds are required to limit the amount of unlisted securities to 10% of a fund's portfolio. In February and March 2018, WEIF first breached these limits, resulting in closer monitoring by supervisors. In March 2019, the UK Financial Conduct Authority became aware that three securities held in the WEIF were suspended on the International Stock Exchange based in Guernsey. These suspensions were reported in the media in April, resulting in news headlines highlighting some of the more illiquid investments of the fund. During May 2019, net outflows averaged 1% of the fund's net asset value per week. The amount of redemption requests subsequently increased and reached GBP 296 million, representing 8.2% of the fund's net asset value on Friday 31 May and Monday 3 June. Unable to meet these unanticipated redemption requests without selling assets at large discounts, which could have harmed the interests of all investors, the fund was suspended on 3 June. After several reviews of the suspension, WEIF's authorised fund manager decided to wind up the WEIF on 15 October.

The French bank Natixis' UK-based subsidiary H2O Asset Management faced large outflows from some of its French-registered UCITS funds, resulting in the use of some liquidity

⁵⁶ "Banks" refers to EU monetary financial institutions (MFIs), which comprise national central banks and the ECB, credit institutions as defined in Article 4(1)(1) of Regulation (EU) No 575/2013, and certain OFIs that receive deposits and/or close substitutes for deposits from the public and, for their own account, grant credit and/or make investments in securities.

⁵⁷ See "Global Monitoring Report on Non-Bank Financial Intermediation 2019", FSB, January 2020, Box 2-1.



management tools. On 18 June 2019, the Financial Times published an article showing that, according to H2O's latest filings, six of its funds collectively held investments of more than €1.4 billion in illiquid bonds, accounting for 3.7% of the NAV of these funds. In addition, the research firm Morningstar Inc. decided to suspend its rating of one of H2O's funds, Allegro Fund, citing liquidity concerns. H2O faced a large increase in net outflows over the following weeks and activated some liquidity management tools which allowed it to meet all redemption requests over this period. First, entry fees, which had been previously introduced at a time of high inflows, were removed. Second, the asset manager activated swing pricing, whereby transaction costs are passed on to redeeming investors. In addition to these measures, H2O sold €300 million of the funds' exposures to these illiquid bonds and revaluated the remaining positions. None of the funds were suspended over this period.

The fund manager M&G suspended its flagship open-ended property fund in December, as Brexit-related uncertainty and a downturn in the retail sector led to a surge in withdrawals.

Brexit-related concerns had already prompted many UK property funds to suspend dealings in 2016. A large increase in withdrawals for M&G's GBP 2.5 billion property fund over 2019 generated a similar outcome. Faced with an increase in redemption requests that the intrinsically illiquid nature of its investments did not allow it to meet, M&G suspended dealings on its property fund in early December. In late February 2020, the fund manager told investors that the share of cash would amount to 16% of investments once all current sales were confirmed, up from less than 5% in December. At the cut-off date of this report, as of 15 September 2020, the fund remained suspended.

While none of these idiosyncratic events in 2019 led to the materialisation of systemic risk, they occurred during stable market conditions and illustrate key vulnerabilities.

In all cases, an unanticipated increase in redemption requests led to a liquidity squeeze. The WEIF and M&G's property fund suspended dealings, because they could not meet the surge in withdrawals without selling assets at a discount price. The WEIF case also illustrates some of the vulnerabilities that can arise when investors are unfamiliar with a fund's underlying investments. This can lead to sudden risk reassessments, which may lead to substantial outflows. While H2O did not suspend any of its six funds, the case illustrated the importance of interconnections and possible spillover risks between sectors as Natixis' share price dropped by 15% in a single trading day following negative news headlines regarding the use of liquidity management tools by its subsidiary. While these events occurred against a backdrop of stable market conditions, they might have triggered more adverse spillover effects during a time when systemic risks were materialising.

The onset of the COVID-19 pandemic saw a more widespread use of liquidity management tools, which helped to manage redemption requests.

While the current edition of the NBF1 Monitor focuses on developments in 2019, the severe market shock as a result of the COVID-19 pandemic in early 2020 illustrated the importance of liquidity management tools during a crisis. The increased risk environment resulted in valuation uncertainty for some assets and high investor redemptions at the onset of the crisis. This led fund managers to make use of liquidity management tools including redemption gates, swing pricing and fund suspensions. Most suspensions of UCITS (mainly bond funds exposed to corporate debt) were short-lived, falling from around €22 billion in



March to less than €0.7 billion by mid-May. On the other hand, suspensions of AIFs remained high in early 2020 as several real estate funds faced difficulties in valuing their assets.⁵⁸ The timely use of such tools by investment funds remains a key element of prudent liquidity risk management. It can reduce the risk of forced sales of less liquid assets in periods of stress and help to guard against the adverse system-wide effects stemming from fire-sale dynamics.⁵⁹ This also underlines the importance of such tools being consistently available across jurisdictions.⁶⁰ Overall, despite the more widespread use of liquidity management tools at the onset of the COVID-19 pandemic, liquidity mismatches in certain types of open-ended investment funds amplified market volatility in late February and early March (see Box 1). Going forward, an area that merits further consideration is whether, and if so how, the efficacy of using such tools to guard against wider financial stability implications of liquidity management by the investment fund sector can be enhanced.

2.1.1 Bond funds

Bond funds provide credit through the purchase of debt securities and can hold debt of different maturity and liquidity. Through holdings of debt securities, they are exposed to firms across different sectors, which can result in interconnections with the banking sector. Bond funds engage in credit intermediation and, depending on their redemption policy, typically perform maturity and liquidity transformation (see Charts A-14, A-15 and A-17). Investment strategies used in bond funds are diverse and range from a focus on investment-grade bonds to a focus on non-investment-grade bonds.

After a decrease in net asset values at the end of 2018, assets in EU bond funds grew strongly in 2019, reaching €3.7 trillion (see Chart A-11). The increase in assets was reflected by both inflows and positive valuation effects over the year, although growth slowed during the final quarter as continued inflows were offset by falls in asset values. The growth in assets coincided with falling yields in global bond markets as negative yields are becoming more common for longer maturities.⁶¹

As the low interest rate environment persists, search-for-yield behaviour can manifest itself in different forms, with investors taking on increased credit risk, interest rate risk or liquidity risk. The continued increase in the issuance of BBB-rated debt in corporate bond markets is a reflection of a general rise in credit risk in financial markets.⁶² Alternative ways for corporate bond funds and other investors to increase yields include increasing investments in bonds that have longer maturities, or investing in less liquid assets, thereby increasing liquidity risk in portfolios.

The general deterioration in ratings of issued corporate bonds is not reflected in average EU bond fund portfolio holdings. On aggregate, bond funds have maintained a stable portfolio

⁵⁸ See “[ESMA Report on Trends, Risks and Vulnerabilities](#)”, No. 2 2020, September 2020.

⁵⁹ See “[ESRB statement on the use of liquidity management tools](#)”, May 2020.

⁶⁰ [Recommendation of the European Systemic Risk Board of 7 December 2017 on liquidity and leverage risks in investment funds \(ESRB/2017/6\)](#) (OJ C 151, 30.4.2018, p. 1).

⁶¹ See “[Financial Stability Review](#)”, ECB, November 2019, Overview.

⁶² See “[ESMA Report on Trends, Risks and Vulnerabilities](#)”, No. 1 2020, February 2020, Chart T.14.



composition over the past two years, with no substantial change in the ratings of assets (see Chart A-21). This suggests that bond funds have not significantly increased credit risk in their portfolios in search of higher yields in recent years. It also indicates that the increasing issuance of lower-rated corporate debt is largely being purchased by other investors, which may include some types of pension funds⁶³, other fund types that are not classed as bond funds or other institutional investors.

Residual maturities in corporate bond fund portfolios increased sharply over the year. The average maturity of assets in EU bond funds rose to its highest level since 2009, reaching 9.23 years amid decreasing yields, compared with 8.43 years at the end of 2018 (see Chart A-22). This reflects the increasing duration of bond fund portfolios, while issuers benefit from falling interest rates, which are widely expected to remain low for longer. The general increase in residual maturities suggests that investors faced increased interest rate risk in a scenario of a sudden repricing of risk premia.⁶⁴

The degree of liquidity transformation performed by EU bond funds increased in 2019.

Liquidity transformation by open-ended bond funds, measured by the share of less liquid assets in total assets, increased from 37% at the end of 2018 to 40% at the end of 2019. This reflects an increase in the share of less liquid assets, such as debt securities issued by non-financial corporations and OFIs. At the same time, the share of liquid assets, such as bank deposits and government debt, gradually decreased. The increase over the past year is in line with a longer-term trend where the measure of liquidity transformation continues to rise from around 25% in 2009.

The overall risk environment for EU bond funds worsened in 2019 and high-yield funds remained particularly vulnerable to external shocks.

While the rating profile of bond fund portfolios remained stable, residual maturities and the degree of liquidity transformation have increased. The vulnerability of bond funds varies depending on the fund's strategy. A simulation exercise of an external shock resulting in widespread BBB-rated bond downgrades⁶⁵ demonstrates that high-yield bond funds may experience a liquidity shortfall. While other bond funds are less vulnerable to such a shock, the impact could be more significant for other institutional investors with exposures to bond markets.

Net asset values of EU bond funds dropped by 8.7% in the first quarter of 2020, amid the market turmoil triggered by the onset of the COVID-19 crisis.

Falling assets in bond funds reflected both negative valuation effects, with spreads increasing substantially, and elevated outflows in late February and early March. Funds with exposures to corporate bonds and, as previously identified, especially HY corporate bond funds, were particularly affected with cumulated outflows for 2020 reaching 10% of assets in March. Bond funds exposed to investment-grade corporate bonds also faced substantial redemptions, with outflows amounting to almost 5% of assets. Early evidence indicates that the lower the holdings of high-quality liquid assets (HQLA) were at the end of February, the higher the outflows were during March 2020, thereby supporting

⁶³ According to the **December 2019 EIOPA Financial Stability Report**, bond portfolios of European insurers consist primarily of investment-grade bonds, with percentage holdings remaining stable in recent years.

⁶⁴ See "**ESRB Annual Report 2018**", July 2019.

⁶⁵ See "**Stress simulation for investment funds**", ESMA Economic Report, September 2019.



the view that a higher engagement in liquidity transformation can make funds more susceptible to investor runs as it may create a first-mover advantage.⁶⁶

2.1.2 Money market funds

Money market funds buy short-term money market instruments issued by financial institutions, governments and corporations. Therefore, they play a key role in providing short-term funding to financial institutions (especially banks) and corporates. MMFs are also important for the liquidity management of non-banks. Their shares can be redeemed on a daily basis and, depending on the type of MMF, investors are typically offered redemptions at either a constant price (CNAV and LVNAV) or a variable price (VNAV). The promise of instantaneous liquidity and stable value means that investors consider them an attractive alternative to bank deposits. MMFs engage in some maturity and liquidity transformation (see Charts A-14 and A-15), and a large portion of MMFs' assets consists of bank debt securities and deposits, thereby resulting in close interconnectedness with the banking sector (see Chart A-20). Stress in the MMF sector could trigger liquidity issues for (i) banks through the reduction in short-term funding, and (ii) institutional investors if they are not able to redeem their shares quickly.

The European Money Market Fund Regulation was fully implemented on 21 March 2019.

There are three types of MMF funds under the new regulation: (i) public debt constant NAV (CNAV), which must invest 99.5% in government assets; (ii) low-volatility NAV (LVNAV), which primarily invest in money market instruments, deposits and other short-term assets; and (iii) short-term variable NAV as well as standard MMFs (both VNAV), which are subject to looser liquidity rules than CNAV and LVNAV funds. LVNAVs offer more price stability than VNAVs and are less constrained than CNAVs in their investment policy.⁶⁷

In the euro area, AuM of MMFs increased by almost 7% in 2019, rising to the highest level since 2009 (see Chart A-23).

Euro area MMFs held €1,261 billion of assets at the end of 2019. While this figure remains below the March 2009 peak (€1,326 billion), it reflects a 52% increase from the trough at the end of 2013 (€832 billion). The increase largely reflects inflows in the third quarter of 2019, in particular into low-volatility net asset value MMFs (LVNAVs).⁶⁸ Growth rates in 2019 across major fund domiciles varied, decreasing in France (-4%) but increasing in Ireland (+15%) and Luxembourg (+12%).

Euro area MMFs' interconnectedness with the banking sector remains high. Corporate investors tend to use MMFs both for investment purposes and to manage their liquidity. In the euro area, MMFs are invested mainly in debt securities issued by banks (see Chart A-20). Since LVNAVs are less constrained than CNAVs in their investment policy, most CNAV prime MMFs in the euro area have transformed into LVNAV MMFs. This allows them to continue investing in securities issued by banks. At the end of 2019, most assets held in MMFs were in funds that are

⁶⁶ See Gehrend, M. and Weber, F., "**Monitoring risks in the Luxembourg non-bank financial sector**", *Revue de Stabilité financière 2020*, Banque centrale du Luxembourg, July 2020, pp. 135-163.

⁶⁷ See "**ESMA Report on Trends, Risks and Vulnerabilities**", No. 1 2020, February 2020.

⁶⁸ See "**ESMA Report on Trends, Risks and Vulnerabilities**", No. 1 2020, February 2020.



registered as VNAV (47.5%) or LVNAV (44.8%) funds, with the remainder being CNAV funds (7.7%).⁶⁹

Liquidity mismatches between MMF assets and liabilities remained stable in 2019, while the weighted average maturity of assets increased. In 2019, the percentage of assets with weekly liquidity and daily liquidity remained stable (see Chart A-25). MMFs in the EU are constrained in their risk-taking by the regulatory limits placed on the residual maturity and the residual life of the securities held. After falling in 2018, the weighted average maturity (WAM) and weighted average life (WAL)⁷⁰ of MMFs' portfolios increased sharply (see Chart A-24), reflecting a rise in credit risk.

MMF assets in the euro area increased by 1.5% in the first quarter of 2020, despite the stress in short-term funding markets triggered by the COVID-19 crisis. Some euro area MMFs faced substantial outflows at the peak of the market turmoil in mid-March. In the week of 13-20 March, outflows reached 8% of their assets, the highest weekly amount since the 2008 global financial crisis. These net outflows were concentrated in LVNAV and VNAV funds. CNAV funds, on the other hand, experienced net inflows during the same period (see Box 3).

Box 3

Money market funds during the COVID-19 shock

As the coronavirus crisis deepened, some segments of the MMF sector experienced significant stress during March 2020. In Europe, LVNAV USD MMFs, which are non-government debt MMFs providing a constant net asset value, faced outflows of almost 30% during this period (see Chart A, right panel).⁷¹ Other types of MMFs investing in private sector securities, such as VNAVs, also saw significant redemptions, albeit less pronounced, with redemptions of around 10%. CNAV MMFs, which invest almost exclusively in public debt, saw very high inflows.

LVNAV MMFs account for a large share of the EU MMF sector (see Chart A, left panel). They invest mainly in securities issued by the private sector, while providing a constant net asset value to investors as long as their mark-to-market NAV is within 20 basis points (bps) of the constant net asset value. When the deviation is larger than 20bps, LVNAVs have to convert to variable net asset value (meaning mark-to-market valuation). Some LVNAV funds, mostly denominated in US dollars, were close to breaching this threshold at the end of March.⁷² Overall, redemption activity put pressures on funds' liquidity levels, with a few funds seeing their weekly liquidity fall below their regulatory threshold to a limited extent and for a maximum period of a few days (see Chart B).⁷³

⁶⁹ See the [IMMFA website](#).

⁷⁰ WAM is a measure of the average length of time to maturity of all of the underlying securities in the fund weighted to reflect the relative holdings of each instrument, assuming that the maturity of a floating rate instrument is the time remaining until the next interest rate reset to the money market rate, rather than the time remaining before the principal value of the security must be repaid. WAL is the weighted average of the remaining life (maturity) of each security held in a fund, meaning the time until the principal is repaid in full.

⁷¹ Within the LVNAV categories, MMFs denominated in US dollars account for a large share, as their investment strategies mirror US prime institutional MMFs, which are used by corporates and institutional investors to park their cash in US dollars.

⁷² See "Recent stress in money market funds has exposed potential risks for the wider financial system", [Financial Stability Review](#), ECB, May 2020.

⁷³ See "[What Investors Want to Know: European Money Market Fund Sensitivity to Coronavirus](#)", FitchRatings, April 2020.

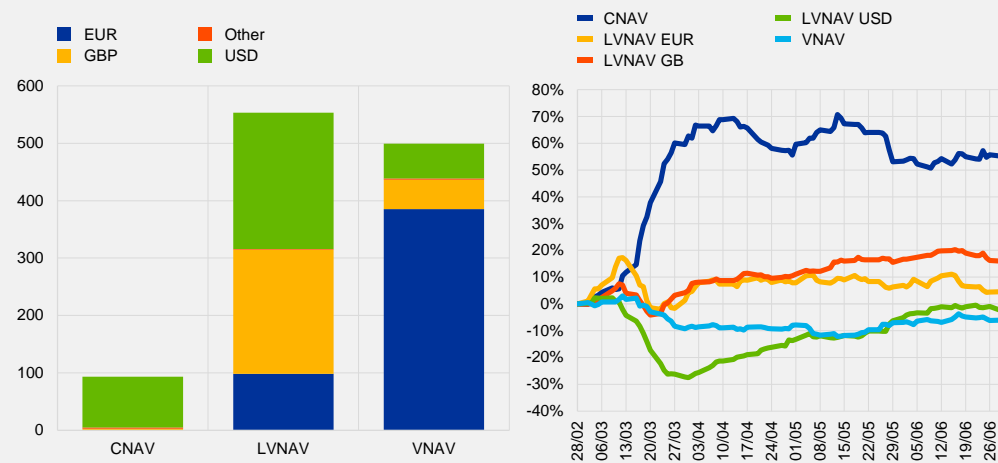


The liquidity challenges MMFs faced were related to a combination of factors. On the liabilities side, a “dash for cash” was reflected in large investor redemptions. On the assets side, liquidity deteriorated quickly in money markets, particularly in the commercial paper market in the EU and in the US. Many bank issuers, which usually buy back their paper from MMFs when needed, were unwilling to make markets, increasing liquidity pressures on MMFs. As a result, LVNAVs had to either sell their most liquid assets to raise cash, resulting in a decline in weekly liquid assets, or sell less liquid assets at a discount, which would lead to a decline of the mark-to-market NAV and a deviation from the constant NAV. The prospect of a decline in the mark-to-market NAV may have increased incentives for investors to redeem during the recent stress episode.⁷⁴ Finally, USD MMFs domiciled in the EU were not eligible for Federal Reserve support, which may have decreased the attractiveness of EU-domiciled USD MMFs for investors, relative to US-domiciled USD-denominated MMFs that were eligible for Federal Reserve support. Nonetheless, the improvement of market conditions for EU-domiciled USD LVNAV MMFs coincided roughly with the opening of the Federal Reserve’s Money Market Mutual Fund Liquidity Facility (MMLF), thereby suggesting that EU-domiciled USD MMFs may also have benefited indirectly through better liquidity conditions in US markets.

Chart A

Composition of euro area MMF assets (left panel) and cumulative net flows of euro area MMFs by regulatory fund type (right panel)

(Left panel: end-February 2020, EUR billions; Right panel: 28 February 2020, percentage of total assets)



Sources: Crane data, Refinitiv Lipper IM and ECB calculations.

As investors redeemed from LVNAV funds, MMFs that invest only in government securities (CNAV) recorded inflows of up to 70%, as part of investor rebalancing. Similar developments were observed in the US, with a large rebalancing between prime MMFs, which principally invest in non-government securities, and Treasury and government MMFs. Some US prime MMFs received

⁷⁴ In addition, more than 95% of USD LVNAVs receive MMF ratings from credit rating agencies (MMF ratings assess the ability of funds to preserve capital and maintain liquidity to investors), and the move to VNAV would have resulted in downgrades from these agencies.

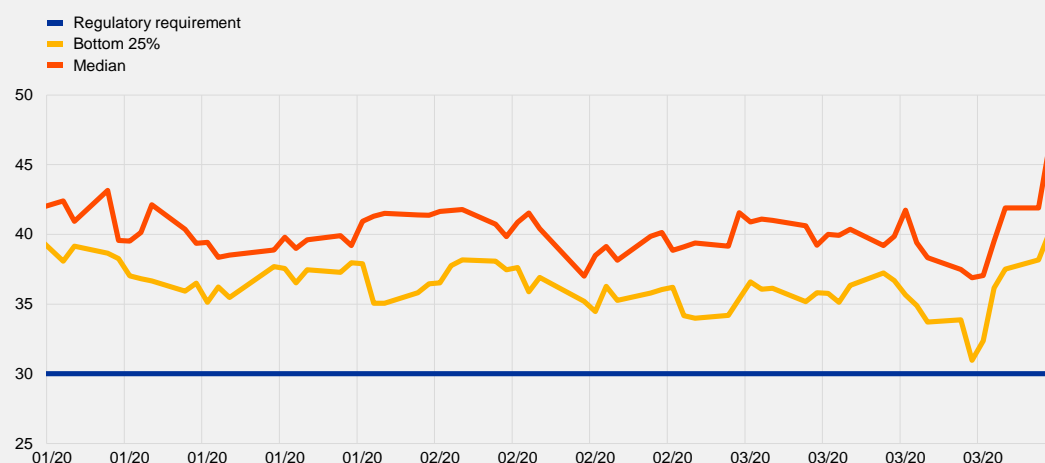


direct support from their sponsor to address their liquidity challenges. In contrast, external support from the sponsor is not allowed in the EU.

Since mid-April, LVNAVs have increased their liquidity buffers and have seen large inflows as year-to-date cumulated net flows turned positive in May. For other types of MMFs, flows have been low since April (see Chart A, right panel). During the height of the liquidity crisis, EU MMFs were able to avoid imposing fees or gates and did not have to suspend redemptions, since liquidity conditions improved quickly enough following the actions of central banks globally. Still, this episode raises a broader question about the potential structural mismatch between the liquidity of some of the instruments that MMFs hold and investors' expectations about the liquidity of MMF units. A full assessment of the disruption faced by MMFs at the onset of the COVID-19 pandemic will also need to consider the effectiveness of the post-crisis financial reforms.

Chart B
EU US dollar LVNAV weekly liquid assets

(percentage of assets in weekly liquid assets)



Sources: Crane Data and ESMA.

Note: Weekly liquid assets for USD LVNAV funds, based on a sample of 20 MMFs with NAV of USD 350 billion.

2.1.3 Real estate funds

Real estate funds invest in real estate both directly, through holdings of physical assets, and indirectly, through holdings of real estate-related financial instruments (e.g. shares in real estate investment trusts or REITs). Real estate is a highly illiquid asset class, often requiring several months for a transaction to be completed. Open-ended real estate funds may offer redemptions at higher frequencies which can expose them to liquidity transformation risks. Notice periods or minimum holding periods usually mitigate liquidity transformation risks in most open-ended funds. Closed-ended investment funds typically do not carry liquidity transformation risk as issued shares are not redeemable from the fund. There are significant differences in the share of



open-ended and closed-ended real estate funds and in regulatory frameworks across jurisdictions.⁷⁵

AuM in euro area real estate funds grew in 2019, while their share of the total investment fund sector fell slightly to 6%. Assets have increased continuously for the past six years, driven by new fund inflows and supported by increasing real estate prices. Total assets of euro area real estate funds amounted to €921 billion at the end of 2019, an increase of 14% over the year (see Chart A-26). Holdings of non-financial assets increased by 10% (€434.4 billion in the fourth quarter of 2019) and equity investments rose by 29% (€158.7 billion in the fourth quarter of 2019), accounting for most of the rise in real estate funds' AuM. Other assets held by real estate funds also grew in 2019: debt securities increased by 13% (€15.3 billion in the fourth quarter of 2019), deposits and loan claims rose by 10% (€14.6 billion in the fourth quarter of 2019), and shares held in other investment funds increased by 3% (€79.6 billion in the fourth quarter of 2019). Growth in equity investments and debt securities was driven by exposures where the issuers were financial corporations other than banks or insurance companies and pension funds.

Open-ended real estate funds' engagement in liquidity transformation fell slightly in 2019 (see Chart A-14). The degree of liquidity transformation, which depends on the redeemability of fund shares and redemption frequencies, varies across countries. Some euro area-domiciled real estate funds are mainly open-ended, while others have long redemption notice periods in place. Redemption gates and other liquidity management tools available to fund managers may further mitigate the risk of large and abrupt outflows or risks stemming from valuation uncertainties.

There have been several recent occasions when investment vehicles which focus on real estate investments made use of liquidity management tools. As a result of Brexit-related uncertainties, the fund manager M&G suspended its flagship open-ended property fund in early December 2019. Several UK property funds also suspended trading at the onset of the COVID-19 pandemic (see Box 2). The illiquid nature of real estate, combined with asset valuation uncertainty and periods of net outflows, has seen several large Irish insurers impose temporary suspensions on redemptions out of property funds. Irish insurers held approximately €4 billion in Irish commercial real estate (CRE), which includes any holdings via these unit-linked funds. In contrast, more traditional investment funds (i.e. authorised AIFs) hold approximately €18 billion in Irish CRE, which amounts to around 35% of the investable CRE market in Ireland.⁷⁶ Real estate funds registered as AIFs are generally open-ended, but offer redemptions on a less than quarterly basis. Liquidity risks in real estate investment funds (REIFs) are therefore considered to be low. The liquidity risks in the unit-linked funds are more pronounced as they allow investors to redeem at a higher frequency, although insurers have the contractual right to defer such redemptions to protect the interests of all policyholders.

Financial leverage in real estate funds decreased in 2019, but remains considerably higher than in other types of investment funds (see Chart A-16). In 2019, the financial leverage of real estate funds continued its long-term downward trend and fell to 13%, compared with around 20% in

⁷⁵ See "The role of investment funds and investment trusts in EU CRE markets", **EU Non-bank Financial Intermediation Risk Monitor 2019**, ESRB, July 2019.

⁷⁶ See "Who invests in the Irish commercial real estate market?: An overview of non-bank institutional ownership of Irish CRE", Central Bank of Ireland, 2019.



2009. Liabilities of real estate funds primarily consist of shares issued, which amounted to €753 billion, as well as borrowings, which amounted to €120 billion in 2019. Most of the growth in liabilities was due to shares issued, which increased by 14%, while loans and deposits grew by 8%.

The real estate fund sector is highly concentrated in terms of domicile, with most funds being registered in a small number of countries (see Chart A-26). Real estate funds registered in five countries (France, Germany, Italy, Luxembourg and the Netherlands) account for approximately 90% of all real estate fund assets in the euro area. This concentration of the market has not significantly changed over the past decade. The importance of REIFs relative to the domestic investment fund sector varies across countries. For example, in Luxembourg this share represents 3%, while in Italy it is 20% of total assets under management. While the real estate fund sector is concentrated in a small number of countries in terms of fund domicile, funds conduct cross-border investments within the EU as well as in other countries such as the US and Japan.

Compared with 2018, the risk indicators for real estate funds have largely remained unchanged, with risks in some parts of the wider real estate sector still elevated. In September 2019, the ESRB published an assessment of residential real estate markets in European Economic Area (EEA) countries which showed continued increases in house prices and mortgage lending in most jurisdictions.⁷⁷ The assessment concluded that vulnerabilities exist in eleven countries and that these vulnerabilities may be a source of systemic risk to financial stability in the medium term. At the same time, for real estate funds, there were no significant changes in liquidity transformation, maturity transformation and credit intermediation risk metrics (see Charts A-14, A-15 and A-17). Leverage in real estate funds fell, continuing a longer-term downward trend in recent years (see Chart A-16).

While most other fund types saw a reduction in AuM amid the market stress triggered by the onset of the COVID-19 outbreak, AuM in euro area real estate funds rose by 1.8% in the first quarter of 2020. The increase in AuM was mainly driven by net inflows amounting to €14.4 billion, while outflows were limited by redemption notice periods and the use of liquidity management tools. Faced with valuation uncertainties during the market stress, a number of real estate funds suspended in the first quarter of 2020. Many euro area jurisdictions also impose notice periods on redemptions or minimum holding periods which help to mitigate possible fire-sale dynamics.

2.1.4 Exchange-traded funds

Exchange-traded products (ETPs) are generally designed to track the performance of an underlying index or basket of assets which can include a broad range of investments such as shares, bonds and commodities. Most exchange-traded funds (ETFs) are managed passively and tend to focus on tracking equity or fixed income market indices. Like other ETPs, ETFs can be traded intraday on secondary markets. Similar to equities, ETFs can be bought on margin and sold short. These features make them popular with market participants who consider them efficient and flexible instruments for trading and hedging purposes.

⁷⁷ Based on this assessment, the ESRB issued a set of country-specific warnings and recommendations on medium-term vulnerabilities in the residential real estate sector. For more details, see the [press release](#) on the ESRB's website.



The dual market structure of ETFs allows liquidity transformation between the primary and secondary market, particularly in less liquid or fixed income markets. ETFs combine many of the operational aspects of an open-ended investment fund with those of equities traded on an exchange. Their dealing arrangements have a creation and redemption mechanism in primary markets like in open-ended investment funds, with arrangements which allow trading in secondary markets. The primary market includes authorised participants (APs), such as banks and proprietary trading firms, which are designated by the ETF issuer to be part of the creation and redemption mechanism. APs may trade in ETFs, but they have no legal obligation to create or redeem shares. They regulate the supply of ETF shares in the secondary market when there is an imbalance of orders to buy or sell ETF shares that cannot be met through the secondary market. Secondary markets consist of the trading activity of buyers and sellers taking place on an exchange. Trading activity and market depth on stock exchanges contribute to an ETF's secondary market liquidity (see Box 4).

At the end of 2019, total assets held by ETFs in the euro area reached a record of €932 billion, increasing by 35% compared with the previous year (see Chart A-27). The growth in AuM was driven by increases in asset values and continued investor inflows, particularly during the second half of 2019 (see Chart A-27.1). The share of ETFs as a percentage of total euro area investment fund assets increased to an all-time high of 6.6%. The strong growth was widespread across all ETF asset classes with assets under management in equity ETFs increasing by 37% and in bond ETFs by 40%, while derivatives and remaining assets grew at a slower rate of 7%. Equity ETFs still account for the largest share of assets under management (64%), followed by bond ETFs (26%). In bond markets, institutional investors tend to rely on ETFs as they can be bought and sold more quickly and at a lower liquidity cost (narrower bid-ask spread) than the bonds themselves (see Chart A-27).

The strong growth of the European ETF market is supported by the continued transition towards automated, digital operations. Trading is increasingly being undertaken through algorithms that determine where, when and how to trade. Technological progress has also enabled the automation of transactions tailored to customer preferences. The implementation of MiFID II has accelerated some of these market changes. Whenever a trade occurs on an electronic marketplace, reporting of the trade becomes a responsibility of the trading venue. As a result, a growing number of institutions are willing to trade in exchange-traded products.⁷⁸

The ETF market structure has shown some resilience, with vulnerabilities concentrated in less liquid market segments (see Box 4). In times of stress, ETFs can trade at significant discounts in the secondary market, and there may be frictions in the AP mechanism. However, past volatility events in ETF shares have generally been short-lived, as APs and other liquidity providers have stepped in during periods when the price of the underlying assets and the ETF price diverge. The risk of market dysfunction may be higher for some ETFs such as those with corporate fixed income assets as the underlying, where those assets are traded in less structured markets.

The exceptional growth of the sector requires careful monitoring from a financial stability point of view. In the current prolonged low-yield environment, the increased availability of ETFs

⁷⁸ See “Europe’s Mifid rules on ETFs help to pump up the volume”, Financial Times, 29 July 2019.



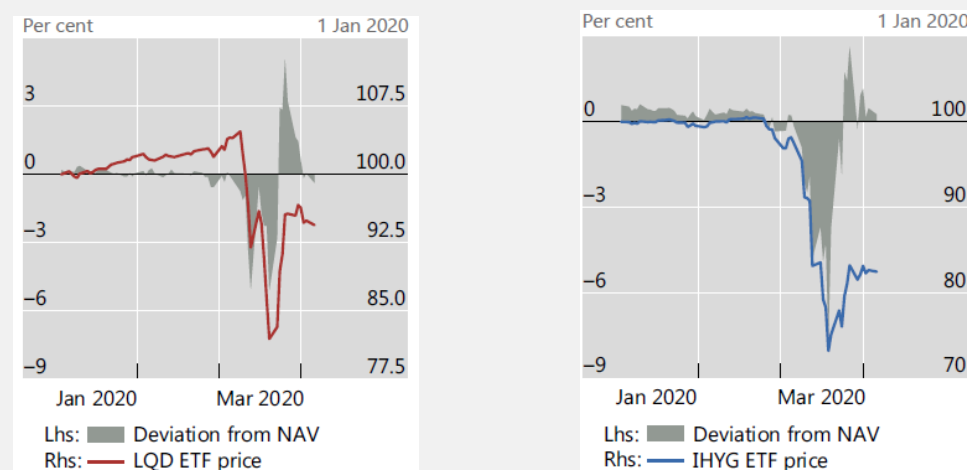
may shift investors' preferences towards search-for-yield strategies in less liquid markets. Being perceived as highly liquid instruments, ETFs may be used by other funds as an additional means to manage exposures and portfolio liquidity, notwithstanding the risk that ETF liquidity may deteriorate in certain periods of severe stress.⁷⁹

During the initial market disruption following the onset of the COVID-19 pandemic, some ETFs saw unusually large discounts to their net asset value. As liquidity in some parts of the bond market decreased rapidly, trading of ETFs on the secondary market continued, with some market participants arguing that ETFs performed a price-discovery function⁸⁰ (see Box 4). Overall, assets held in euro area ETFs decreased by 15% in the first quarter of 2020, driven by falls in asset values and investor outflows.

Box 4 Discounts to net asset values on corporate bond exchange-traded funds induced by COVID-19

A noteworthy phenomenon during the peak of the market turbulence in March was the emergence of unusually large deviations between the prices of shares in fixed income ETFs and the value of their portfolios. These discounts to NAV, which were especially pronounced for corporate bond ETFs, were greater, the less liquid the underlying bonds. Chart A shows the NAV discrepancies for the largest US investment-grade corporate bond ETF, BlackRock's LQD, while Chart B depicts the price gap for BlackRock's IHYG ETF, which tracks the performance of an index of euro-denominated high-yield corporate bonds.

Charts A and B
LQD discount to NAV (left panel) and IHYG discount to NAV (right panel)



Source: *BIS Bulletin No 6, April 2020, p. 3.*

⁷⁹ See “**Financial Stability Review**”, ECB, May 2019.

⁸⁰ See “**Lessons from COVID-19: ETFs as a Source of Stability**”, BlackRock, July 2020.



The operations of authorised participants (APs) normally ensure that the shares in ETFs trade at values very close to the value of the underlying portfolio. APs are large banks or proprietary traders which, by virtue of their sole access to the primary market, control the creation and redemption mechanism and thereby provide liquidity to the market.⁸¹ APs are also often market-makers in the secondary market. In case of differences between the price of ETF shares on the secondary market and the value of the underlying portfolio, APs have an incentive to initiate creations or redemptions, since they can capture the spread as (gross) profit.⁸² Should an ETF's shares start to trade at a discount, for instance, an AP could purchase the ETF's shares on the secondary market and redeem them at NAV to the ETF issuer, keeping the difference.⁸³ Other APs will soon have also spotted this arbitrage opportunity, and the increased demand for the ETF's shares on the secondary market will eventually result in the (near) disappearance of the discount.⁸⁴ Should a discount nevertheless persist, this can in principle be the result of a failure of the arbitrage mechanism or issues relating to the market for the underlying assets.

The exceptionally high discounts for corporate bond ETFs observed in March may reflect a lack of liquidity in the underlying market, although disruptions in the arbitrage mechanism constitute a possible second factor. Following the COVID-19 shock, liquidity in the market for less liquid corporate bonds underlying certain fixed income ETFs dried up, as a result of which their NAVs and any corresponding discounts reflected information that was no longer current.⁸⁵ At the same time, APs' internal pricing information indicated market values of the underlying bonds that were lower than the NAV seemed to suggest. Since de facto discounts were thus smaller, the incentives for APs to initiate redemptions, which would have raised ETF share prices and decreased the "nominal" discount, were reduced. APs therefore focused their operations largely on market-making in secondary markets, with their regular hedges now being composed of offsetting positions in proxy assets that had demonstrated a high correlation with the underlying bonds held by the ETF during normal times. Because of the imperfect nature of such hedges as well as the elevated levels of volatility on secondary markets, the APs acting as market-makers did increase

⁸¹ There are two ways in which APs can alter the number of outstanding ETF shares. The first is a scenario in which the AP initiates a creation or redemption, as will be mentioned shortly in the main body of the text. The number of outstanding ETF shares can also change as a result of APs acting as an intermediary between certain secondary market participants, such as large institutional investors or market-makers, and the ETF. For instance, as part of a buy-and-hold strategy, a large pension fund may want to purchase ETF shares at a quantity that exceeds current secondary market supply. The pension fund would then provide cash (or underlying securities) to an AP, who would pass this on to the ETF (possibly after adjusting the mix of securities in the case of an in-kind transaction), which would then issue ETF shares to the AP, who would deliver those to the pension fund. Market-makers may also enlist APs in a similar manner if they would have identified an imbalance between supply and demand in the secondary market.

⁸² In reality, transaction costs and fees will be deducted from gross profits, but these costs are relatively small. See Sushko, V. and Turner, G., "The implications of passive investing for securities markets", *BIS Quarterly Review*, March 2018, p. 118, as well as "Exchange-traded funds: Clarity amid the clutter", Vanguard Commentary, February 2019, p. 4.

⁸³ In practice, the AP would lock in the difference between the price of ETF shares and their NAV per share by means of an intraday short sale of the securities included in the ETF's portfolio or assets that are highly correlated with those underlying assets. At the end of the trading day, the AP would then deliver the ETF shares to the ETF provider and obtain the underlying securities (or their cash equivalent) in return, which would unwind its positions and realise the locked-in profit. Oftentimes the short sale is also performed through the selling of futures contracts, which have the advantage that the seller cannot be asked to cover its position prior to their expiration date.

⁸⁴ In some cases, deviations from NAV are justified. Examples include underlying assets being traded on exchanges in a different time zone, or being traded infrequently. See Lettau, M. and Madhavan, A., "Exchange-traded funds 101 for economists", *Journal of Economic Perspectives*, Vol. 32, 2018, pp. 138-139.

⁸⁵ Sources for this and the following paragraphs include Aramonte, S. and Avalos, F., "The recent distress in corporate bond markets: Cues from ETFs", BIS Bulletin No 6, April 2020, as well as market intelligence.



the spread between their bid and ask quotes. Moreover, several large asset managers reportedly increased the cost of cash redemptions.⁸⁶ Where APs nevertheless engaged in redemptions or creations, and those occurred in kind, ETF issuers generally provided or accepted proxy assets in place of the underlying bonds that were difficult to trade. As soon as liquidity in the underlying bonds started improving, their prices adjusted downwards and NAV spreads gradually came down to pre-crisis levels.

The relative liquidity of the shares in corporate bond ETFs trading on secondary markets may be an indication that the price discovery pertaining to the underlying assets might have shifted to the ETF. By virtue of continued market-making in secondary markets, the shares in these corporate bond ETFs continued to trade. Corporate bond ETFs thereby allowed investors to have sustained exposure to these particular fixed income assets. They also enabled investors to leave the market at, on the whole, a lower cost of illiquidity than they would have had to incur had they invested directly in the underlying securities.

The large NAV discounts in corporate bond ETF markets in March might be explained to a large extent by stress in the underlying markets, although disruptions in the arbitrage mechanism may have also played a role. In this light, a closer examination of the sources of stress in the underlying market for corporate bonds, including the opacity of fixed income trading, and the role of trading flows generated by ETFs, seems warranted. At the same time, possible defects in the arbitrage mechanism should also be further assessed. Furthermore, it is important that investors correctly interpret NAV spreads and not engage in widespread panic selling of their ETF shares, which would bring about unnecessary volatility and losses. A re-evaluation of the effectiveness of current rules on investor disclosure might therefore be worthwhile.

2.1.5 Hedge funds

Hedge funds aim to generate returns not correlated with market trends by using a wide range of investment strategies. The investment styles of hedge funds vary widely, using different techniques and instruments. Although hedge funds can have a directional bias (long or short) or try to take advantage of corporate events (e.g. takeovers), many strategies seek to exploit arbitrage opportunities or price differentials between closely correlated assets or asset classes that differ from those observed in the past. EU hedge funds are regulated entities, which are mostly subject to AIFMD rules.⁸⁷ They usually make greater use of leverage compared with other fund types, and are typically restricted to professional investors.

⁸⁶ See “**BlackRock, Vanguard Raise Price of Cash Redemption for Some ETFs**”, The Wall Street Journal, 20 March 2020.

⁸⁷ For statistical purposes, the ECB defines hedge funds as funds “which apply relatively unconstrained investment strategies to achieve positive absolute returns and whose managers, in addition to management fees, are remunerated in relation to the fund’s performance” (Guideline ECB/2014/15).

⁸⁷ UCITS funds that qualify themselves as “hedge funds” manage €183 billion in the euro area. However, the strict limitation of leverage permitted under the UCITS framework mostly prevents funds from putting in place strategies that could achieve absolute returns in all market conditions (strategies that imply holding long/short positions need to be heavily leveraged to generate reasonable returns).



Assets under management of EU hedge funds increased to €38 billion in 2019 (see Chart A-28). The EU hedge fund market is small, with assets under management accounting for around 3% of the overall European fund industry. In terms of volumes, assets under management have increased by 3% compared with 2018 and 10% compared with 2017. Over the past years, growth in assets held in hedge funds has been slower than in other fund types such as equity or bond funds (see Chart A-11).

AIFMD data show that AIFs following a hedge fund strategy represent €33 billion in terms of NAV, but are highly leveraged (see Chart A-12.1). This figure refers to 2018 due to a significant time lag in processing AIFMD data. While the gross leverage of hedge funds is high but stable, adjusted gross leverage (which is adjusted for interest rate derivatives) significantly increased, up to 10.5 times their NAV (+43%). This also reflects improved AIFMD data coverage of the industry, with newly added funds reporting particularly high leverage values.

The high levels of leverage used by hedge funds may contribute to the build-up of financial stability risks. Since leverage involves the use of borrowed money and derivatives, which require a smaller initial investment than buying cash equities or bonds, the exposure of funds to market movements is amplified. In times of stress, funds that are strongly engaged in liquidity transformation and have high levels of leverage may be forced to sell their assets at fire-sale prices in order to meet redemption requests. Under the AIFMD, funds are therefore required to align their liquidity profile and redemption policy with their investment strategy.

The liquidity profile of hedge funds subject to AIFMD rules indicates little liquidity mismatch at the aggregate level compared with other fund types. Within one week, investors can only redeem up to 16% of the NAV, while 35% of the assets can be liquidated within this time frame (see Chart A-12.2). This is similar across all hedge fund strategies, despite different levels of portfolio and investor liquidity. However, compared with the previous year, the overall asset liquidity in hedge funds deteriorated. For instance, only 39% of hedge funds' portfolios could be liquidated within one month in 2018, compared with 83% in 2017. Similarly, over the same period, the share of the portfolio that could be redeemed by investors decreased from 43% to 28%.

Hedge funds are exposed to financing risk, as one-third of their financing is overnight, but also tend to maintain large cash buffers which help to meet future margin calls relating to derivative positions.⁸⁸ Hedge funds have high levels of unencumbered cash compared with other AIFs (38% for hedge funds versus 8% for all AIFs). The highest levels of cash are for strategies that have the highest exposures to interest rate derivatives, such as relative value, macro, credit and commodity trading advisors (CTA). This suggests that part of the cash buffers is used to cover future margin calls.

The NAV of EU hedge funds decreased by 11% in the first quarter of 2020, driven by investor outflows and falls in asset prices. Net outflows amounted to around €25 billion in the first quarter as hedge funds faced substantial losses in March. Most hedge fund strategies faced large losses, in particular event-driven funds and distressed debt funds.

⁸⁸ See "ESMA Annual Statistical Report: EU Alternative Investment Funds", January 2020.



2.1.6 Private equity funds

Private equity funds are collective investment schemes making use of a wide range of investment strategies. The funds tend to invest in equity and debt issued by non-listed firms. Funding is often raised from institutional investors and financial institutions in the form of unfunded capital commitments when the fund is set up. The capital raised is then levied over the fund's lifetime. Private equity (PE) funds encompass a broad range of fund structures among AIFs and legal structures vary widely across EU jurisdictions. Typically, PE funds are closed-ended funds with five-to-ten-year terms, which may include annual extension options. A broad definition of private equity encompasses: (i) venture capital, which provides financing for firms' early-stage development; (ii) growth capital, which provides funding for mature firms in need of capital to restructure operations, expand into new markets or finance an acquisition; and (iii) mezzanine capital, which provides debt financing with an embedded option to convert the stakes into equity instruments. The universe of private equity funds also includes leveraged buyouts, whereby a company is purchased using a combination of equity and debt to finance the transaction.

The NAV of PE funds increased from €204 billion in 2017 to €352 billion in 2018.⁸⁹ Available data for PE funds are less up to date than those for other fund types and therefore this sub-section outlines developments over 2018 rather than 2019. PE funds reached 6% of the total NAV of AIFs in 2018, up from 4% in the previous year. This rise was common across PE funds with different strategy types, but investments in growth capital increased at a faster pace. As a result, such investments accounted for 39% of the NAV of PE funds in 2018, compared with a share of 30% in 2017. The share of venture capital investments, on the other hand, declined from 14% to 12% over the same period, while the share of investments in mezzanine capital funds remained stable at 4%. The residual category encompasses leveraged buyout and private debt strategies and therefore retains a large proportion of the NAV of PE funds (45%).

Retail investors are not significantly exposed to PE funds and their share of the total NAV further decreased from 8% in 2017 to 5% in 2018. PE funds have the lowest share of retail investors among AIFs. Across the different types of PE funds, venture capital funds have the largest percentage of retail investors (17% of NAV in 2018, down from 20% in 2017). The geographical focus of PE funds has become more diversified, as the share of investments in EEA firms fell from 77% of NAV in 2017 to 68% in 2018. In contrast, the share of investments in North American and Asian firms increased from 9% to 19% and from 2% to 7%, respectively, over the same period.

PE funds tend to incur little liquidity or maturity transformation risk as their redemption risk is limited by their long-term funding and closed-ended structures. Most PE funds remain closed-ended (94% of NAV in 2018) and the redemption frequency for open-ended PE funds is usually longer than for other types of AIFs. Given the low financing liquidity risk and very low liquidity mismatch, PE funds also tend to have relatively high levels of unencumbered cash compared with other AIFs. These cash reserves, which have not yet been invested by PE funds, accounted for 26% of NAV in 2018, up from 4.9% in 2017, further implying a strengthening of these funds' liquidity position.

⁸⁹ See "ESMA Annual Statistical Report: EU Alternative Investment Funds", January 2020.



The use of longer-term leverage remains low compared with other fund types, although current reporting does not necessarily capture the full usage of leverage. Private equity funds do not directly hold significant levels of financial leverage and are not heavy users of derivatives. The AuM-to-NAV ratio, which stood at 113% on aggregate in 2018, is the lowest among AIFs. Moreover, outright borrowing further decreased from approximately 4% of NAV in 2017 to less than 3% in 2018 and there is no significant dispersion across different fund types. Mezzanine funds are an exception, as they rely on a hybrid of equity and debt financing, but outright borrowing for this type still amounts to around 10% of NAV. However, the low level of leverage for PE funds must be interpreted with caution, as leverage may be incurred through special-purpose vehicles (SPVs) or by the firm the fund invests in. This is particularly the case for leveraged buyout funds.⁹⁰ In addition, temporary leverage may be used where PE funds borrow until they can call on the capital commitments from members.

As the COVID-19 crisis took shape in early 2020, private equity funds continued to raise significant capital. While the number of deals fell, private equity funds increased their levels of “dry powder” in view of potential investment opportunities. The total amount of capital raised by private equity funds globally during the first quarter of 2020 increased by almost 12% to USD 133 billion compared with the same period in 2019.⁹¹ At the same time, M&A activity slowed significantly with venture capital deals dropping by 23% and buyouts falling by 12% as a global recession became widely expected. The slowdown in activity was partially due to difficulties in valuing businesses resulting in smaller financing rounds, as well as delays in the investment process.

2.1.7 Private debt funds

Private debt funds invest in debt or debt-like instruments that are not traded and have no quoted price. Through private debt funds, investors can lend to corporations where private debt investments are typically used to support business growth, provide working capital, or fund real estate or other infrastructure projects. Private debt funds aim for equity-like returns and low volatility by focusing on borrowers that may not have access to bank financing, while offering low levels of liquidity to investors. Typical investors in private debt funds are institutional investors, with pension funds and insurers accounting for around two-thirds of total assets under management. Other investors include sovereign wealth funds (5%), family offices (5%), private banks (4%) and high net worth individuals (3%).⁹² Most of the investors in private debt are located in the US (55%), followed by Europe (25%) and Asia (11%).⁹³

Total assets under management of private debt funds at the global level increased to USD 854 billion at the end of 2019, from USD 753 billion at the end of 2018.⁹⁴ North America-focused private debt assets, where the debt is issued by North American corporates, constituted around 60% (USD 491 billion) in mid-2019, followed by Europe-focused assets (USD 241 billion)

⁹⁰ See “**Financial stability implications of private equity**”, *Financial Stability Review*, ECB, May 2020.

⁹¹ See “**Preqin’s House View: COVID-19’s Impact on Alternative Assets**”, 29 April 2020.

⁹² See “**Financing the Economy 2018**”, Alternative Credit Council.

⁹³ See “**2020 Preqin Global Private Debt Report**”, February 2020.

⁹⁴ Source: Preqin.



and Asia-focused assets (USD 57 billion), with the remainder focused on other regions. Direct lending strategies remained the most popular and accounted for 36% of total assets. Most direct lending funds closed in 2019 invested at the senior level of the capital structure, which indicates that investors were seeking protection on the downside in the event of a market correction. Assets allocated to distressed debt, which is a strategy that can offer profitable opportunities in a downturn, also increased by 7%.

The growth in private debt finance reflects a diversification of funding sources for the real economy, but also contributes to new vulnerabilities. In particular, it can increase rollover risk for borrowers who are not able to access more traditional sources of bank finance or bond markets at the time of debt refinancing. Over the past few years, “covenant-lite” leveraged loans have become the new standard for private debt funds. The continued strong growth in assets means that large amounts of capital are available for a small number of deals. This encourages some fund managers to continue to turn to covenant-lite leveraged loans, where certain investor protections are no longer available.

Leverage in some private debt funds has been modestly increasing in recent years, while liquidity transformation remains low.⁹⁵ Private debt funds can make use of leverage or financing which can include borrowing against portfolio assets, short-term cash flow management facilities, or subscription line finance, which tends to have terms of less than 12 months. Private debt funds tend to be closed-ended and are mainly held by institutional investors with long-term investment horizons, suggesting that they do not engage in significant liquidity transformation.

The increase in credit risk as a result of the COVID-19 pandemic was reflected in private debt fund markets. Fundraising by private debt funds initially fell by 41% in the first quarter of 2020 as valuation uncertainties increased. Direct lending continued to be the most popular strategy, with special situation funds, which could offer profitable opportunities during a recession, accounting for 20% of total private debt fundraising.⁹⁶ There was also a sharp increase in the number of distressed debt funds in anticipation of potential defaults.⁹⁷ The expected surge in defaults will be the first major test for the sector, which has been particularly active in the issuance of leveraged loans in recent years.

2.2 Other financial institutions

2.2.1 Financial vehicle corporations engaged in securitisation

Financial vehicle corporations are special-purpose vehicles engaged in securitisation activity. Securitisation is the transformation of non-tradable, illiquid assets such as loan portfolios into tradable, and more liquid, debt securities. It can be achieved through the issuance of securitisation fund units or with the use of financial derivatives. Through securitisation, FVCs

⁹⁵ See “**Financing the Economy 2018**”, Alternative Credit Council.

⁹⁶ See “**Preqin’s House View: COVID-19’s Impact on Alternative Assets**”, 29 April 2020.

⁹⁷ See “**Record Number of Distressed Debt Funds in Market amid Downturn**”, Preqin, 17 June 2020.



facilitate the transfer of credit risk from financial institutions, such as banks, that originate the credit to the buyers of the securities issued by the FVC. Other types of assets held by FVCs include deposits and loan claims, debt securities as well as equity and investment fund shares.

Assets of euro area FVCs increased by 6% in 2019, reaching €2.08 trillion (see Chart A-29).

Since the trough in the third quarter of 2016, assets have increased by 16.7%, but are still 12.3% lower than they were at the end of 2009. The main contribution to this growth came from a 28.3% increase in the holdings of debt securities, while securitised loans increased moderately. Euro area FVC assets are concentrated in a few jurisdictions, with Ireland and Italy having the largest sectors, at over €400 billion each in terms of assets (see Chart A-30). While securitised loans (mostly originated within the euro area) represent the majority of FVC assets in most jurisdictions, assets other than securitised loans constitute more than half of the holdings of FVCs domiciled in Ireland and Luxembourg. Net issuance of securitised loans by euro area FVCs remained positive in 2019, but fell to €4 billion compared with €8 billion in 2018 (see Chart A-31). This was driven by a positive contribution from non-euro area originators amounting to €5 billion.

The main risks posed by FVCs stem from their interconnectedness with other parts of the financial system.

Banks often use securitisations by FVCs to transfer assets, along with their related risks, from their balance sheets to the investors in the FVC securities. However, in the past years they bought back a substantial portion of FVC securities, thus retaining the risks associated with the securitised loans underlying these securities. Banks and other financial institutions are also faced with potential “step-in” risk if they sponsor an FVC. The decision to provide support by the sponsor may be due to reputational reasons. During the global financial crisis, there was evidence of banks that provided liquidity support and assumed the losses of a defaulting securitisation vehicle that they sponsored. Maturity mismatches generated by FVC securities remain low. Given the way these vehicles are structured, they only hold a small amount of equity and therefore their business model is characterised by high leverage.

Collateralised loan obligation vehicles are emerging as a potential source of risk.

These FVCs are engaged in the securitisation of leveraged loans (i.e. loans extended to highly leveraged corporations). Given the complexity of their linkages across the financial system, these entities can contribute to the amplification of stress across the financial system in times of stress. While the size of CLOs issued in the euro area is small compared with the US, European vehicles, a large share of which are located in Ireland,⁹⁸ experienced growth of more than 10% over the past two years and reached around €138 billion at the end of 2019.⁹⁹ Increased demand for CLOs due to their higher returns compared with other assets and increased risk-taking by investors may lower credit standards in the leveraged loan market, incentivising borrowers to assume excessive amounts of debt and exposing investors to credit risk. Such increases in risk-taking are exemplified by a rise in the proportion of leveraged loans with weak covenant protection (covenant-lite loans) in the portfolios of CLOs, which hold around a third of the outstanding leveraged loans in Europe.

⁹⁸ See, for example, McCarthy, B., Elbay, T., Daly, P. and Cima, S., “**The Who’s Who of Irish Collateralised Loan Obligations**”, Central Bank of Ireland, November 2019, and Cima, S., Killeen, N. and Madouros, V., “**Mapping Market-Based Finance in Ireland**”, *Financial Stability Notes*, Central Bank of Ireland, December 2019.

⁹⁹ See “**AFME Securitisation Data Report Q1 2020**”, June 2020.



Vulnerabilities arising from the FVC sector have remained broadly stable over the course of the last year, although there are pockets of risk, which warrant attention. As shown in Chart A-32, maturity transformation remained unchanged, while interconnectedness and credit intermediation slightly declined, mostly due to a fall in the share of securitised loans in the FVCs' assets. Despite the gradual decline in recent years, interconnectedness with the financial system, particularly with banks, remains elevated and a potential source of vulnerability. Moreover, the rapid growth of some segments of the market – notably CLOs – deserves continued close monitoring to identify risks arising in this part of the sector.

2.2.2 Special-purpose entities

Special-purpose entities are legal entities created to fulfil narrow, specific and temporary objectives other than securitisation. SPEs are usually part of complex ownership networks within multinational groups and are linked to a range of sponsoring entities at an international level. Often, they engage in transactions on behalf of their parent companies or are set up as an instrument of intragroup financing. Like FVCs, these entities can issue debt securities and may engage in liquidity transformation.

SPEs engage in a broad range of activities and the cross-border nature of many of their transactions make them an important contributor to international financial flows. These entities have little or no connection to the domestic economy of their country of domicile and their general purpose is to channel financial flows from one country or corporation to another, usually within a corporate group structure. The main activities of non-securitisation special financial institutions (SFIs), which are a type of SPE domiciled in the Netherlands, can be broadly divided into financing companies and holding companies set up to provide debt or equity funding to foreign subsidiaries, or royalty and licencing companies set up for the payment of fees related to intellectual property rights.¹⁰⁰ These vehicles had assets of about €3.49 trillion at the end of 2019, down from €3.59 trillion a year earlier. Meanwhile, Irish-domiciled non-securitisation SPVs' assets stood at €401 billion at the end of 2019, up from €325 billion at the end of 2018.¹⁰¹ Irish-domiciled SPEs' activities include a number of different business models, such as investment fund-linked activities, external and intragroup financing, and operational leasing, among others. Almost three-quarters of these vehicles were set up (sponsored) by financial auxiliaries or non-financial corporations, mainly from the US, the UK, Ireland and Russia.

The main financial stability-related vulnerabilities posed by SPEs relate to their complex cross-border linkages. The lack of data on SPEs at an EU level inhibits systemic risk monitoring of the activities of SPEs and their linkages. As experienced during the financial crisis, the lack of detailed knowledge of the activities of a sector reduces the ability of regulators to properly identify sources of contagion within the financial system. For instance, in times of stress, the complexity of

¹⁰⁰ See “**What shall we do with pass-through? DNB's experiences with special financial institutions**”, Bank for International Settlements, September 2016.

¹⁰¹ This increase was partially driven by the reclassification of FVCs to non-securitisation SPEs in the fourth quarter of 2019. The FVC saw a decrease of 47 entities in its reporting population in this quarter as a result.



SPEs' cross-border linkages might lead to an amplification and spread of shocks through the financial system.

2.2.3 Security and derivative dealers

Security and derivative dealers are investment firms specialising in securities trading, which are authorised to provide investment services to third parties. These investment firms play an important role in facilitating saving and investment flows across the EU. They provide a range of services which give investors access to securities and derivatives markets. SDDs tend to trade in financial instruments on their own account and at their own risk, for the exclusive purpose of benefiting from the margin between the purchase and the sale price. This type of trading also forms part of their market-making activities. In doing so, they give investors access to securities and derivatives markets through investment advice, portfolio management, brokerage, the execution of orders, proprietary trading, underwriting, and the placing of financial instruments on behalf of an issuer on a firm commitment or on a standby commitment basis. Their services concern financial instruments, which unlike deposits are not payable but fluctuate according to market movements. Up to now, SDDs do not form part of the regular banking system, but are an important part of the non-bank sector from a systemic risk perspective as they may undertake liquidity and maturity transformation.¹⁰²

Country-level data show that total assets held by security and derivative dealers remained stable in 2019. Non-public data collections for the euro area suggest that SDDs' leverage increased before the financial crises, but has fallen over the past decade. These also indicated that total assets have remained stable over the past year. Continued monitoring of the sector remains important as recent changes in EU regulation may result in changes in the business models of and total assets held by SDDs.

One of the key regulatory changes that will have an impact on the SDD sector will be the final revision of the CRR.¹⁰³ The European Commission has proposed a new regulation concerning the prudential requirements of investment firms and a new directive regarding the prudential supervision of investment firms. This includes the introduction of a new categorisation of investment firms, i.e. (i) systemic and "bank-like" investment firms to which the full CRR/CRD IV requirements should be applied, (ii) other ("non-systemic") investment firms with a more limited set of prudential requirements and (iii) smaller firms with "non-interconnected" services. This proposal was approved by European Parliament and Council in November 2019.

Previous regulatory regimes for investment firms have been fragmented and were applied inconsistently across member jurisdictions. All SDDs in the EU are licensed and supervised by a supervisory authority, although the exact features of the applicable regimes vary across countries. The new regulatory framework, which aligns capital requirements for investment firms

¹⁰² SDDs do not fall under the definition of "credit institution" as set out in the Capital Requirements Regulation (CRR). Where SDDs are in a group with a credit institution, they must be consolidated pursuant to Article 18(1) of the CRR.

¹⁰³ **Regulation (EU) 2019/2033 of the European Parliament and of the Council of 27 November 2019 on the prudential requirements of investment firms** (OJ L 314, 5.12.2019, p. 1).



with the size and nature of their activity, as well as with the risk they are exposed to, may affect the future risk assessment of these entities.¹⁰⁴

The degree of maturity transformation, liquidity and leverage risk depends on the specific business model of the SDD. SDDs engage with a variety of lenders, including banks, and can hold a wide range of asset types with different maturities. They tend to hold liquid securities which can be converted into cash through repos and securities lending or can be posted as collateral to support various trading strategies. This can result in some maturity and liquidity transformation.

SDDs may rely on banks as a funding source, especially when they are consolidated into banking groups. As part of a financial institution, the consolidated banking group is then required to hold capital against the risks related to the group's SDDs. This incentivises banks to exert a degree of control over the risks borne by SDDs, which implies that risks stemming from interconnections with the banking sector may be considered to be low. However, this may not be the case across all jurisdictions as SDDs may not always be consolidated into banking groups.

Overall, risks in SDDs appear to have remained largely unchanged in 2019 compared with the previous year. The planned revisions to the CRR may result in structural shifts in the SDD market, which will have to be monitored.

In response to the COVID-19 crisis, banking supervisors across Europe announced measures to ensure that directly supervised banks can continue to perform vital services.

Banks have been provided with considerable capital, liquidity and operational relief since the onset of the pandemic.¹⁰⁵ Supervisors have underlined that banks are expected to use the positive effects of these measures to support the economy, for example through the continued provision of loans or market-making services. For example, the Banca d'Italia¹⁰⁶ decided to grant extensions on some compliance requirements for banks and SDDs.

2.2.4 Financial corporations engaged in lending

Financial corporations engaged in lending principally specialise in asset financing for households and non-financial corporations. The entities in this sub-sector include financial leasing, factoring, mortgage lending and consumer lending companies. When carrying out lending activities, FCLs can engage in credit intermediation outside the banking regulatory perimeter.¹⁰⁷

Assets of FCLs increased in 2019 by 5% compared with lower increases of around 2% per annum in the previous three years. Annual data published by the ECB show that total assets of FCLs were around €476 billion at the end of 2019, up from €453 billion at the end of 2018. This represented about 2% of OFI total assets. Having declined steadily since 2010, the sector's assets

¹⁰⁴ **Proposal for a Regulation of the European Parliament and of the Council on the prudential requirements of investment firms** (COM(2017) 790 final).

¹⁰⁵ See the **press release** of 12 March 2020 on the ECB Banking Supervision website.

¹⁰⁶ See the **press release** of 20 March 2020 on the Banca d'Italia's website.

¹⁰⁷ In November 2017, the EBA published an Opinion on regulatory perimeter issues relating to the Capital Requirements Directive IV (CRD IV). This Opinion explains that those FCLs which are in the same group as a credit institution must be consolidated pursuant to Article 18(1) of the CRR, as they are regarded as "financial institutions".



and liabilities have slightly increased every year since 2015 (see Chart A-34). The balance sheet composition has remained broadly stable in recent years and loans to non-MFIs continued to represent around 93% of total loans provided by FCLs. The liabilities side of the balance sheet shows a gradual increase in FCLs' capital and reserves over the last five years and a sharp reduction of securities issued compared with the beginning of the decade (see Chart A-35).

The extent of regulation for FCLs varies significantly across Member States. Some jurisdictions have prudential regulation in place to address liquidity and leverage risk, although the features of such regimes vary substantially.¹⁰⁸ In some countries the assets of FCLs are partly consolidated into banking groups and, therefore, fall within the banking regulatory perimeter, while in other jurisdictions FCLs are not subject to any prudential requirements.

Systemic risks emanating from the sector appear to be low when leverage, liquidity and interconnectedness channels are considered. A simple FCL leverage measure suggests that leverage has been decreasing over the past six years and it is below the median value for the banking sector.¹⁰⁹ Although there is large variation across countries, the liquidity risks facing FCLs are broadly similar to those for the banking sector and the liquidity conditions of the sectors have been increasing over the years. Finally, interconnectedness with the banking system appears to be low, as only 5% of FCL assets in 2019 had direct counterparty exposure to the banking sector. In conclusion, risks appear to have remained unchanged compared with the previous year.

National and EU authorities have swiftly taken decisive measures to support the liquidity and solvency of firms and protect households' income during the COVID-19 pandemic. This has included various economic support measures for entrepreneurs, sole traders, other small, medium-sized and large companies, as well as credit institutions. However, the severe economic shock has been reflected in escalating loan loss provisions¹¹⁰ and a reduction in business investments is likely to subdue growth in 2020.

2.2.5 Captives and OFI residual

The OFI residual refers to sub-sectors of other financial institutions for which primary statistics are not currently available at the EU level. It continues to pose important challenges from both a statistical perspective and when conducting assessments of vulnerabilities. While some new data collection has been undertaken in recent years, data for captive financial institutions (CFIs) – the largest OFI sub-sector in many jurisdictions – are not available at the EU level. There remains a strong interest at the EU and global levels in better understanding the activities undertaken by captive financial institutions. Ongoing efforts will help to assess vulnerabilities in the sector and whether additional policy actions should be considered.

¹⁰⁸ The EBA has undertaken a **comprehensive analysis** of issues relating to the regulatory perimeter further to the 2014 EBA Opinion and Report on the perimeter of credit institutions. Similar results have been obtained in an ECB survey.

¹⁰⁹ The leverage indicator is computed as the ratio of total assets to equity. This is in line with the method used to compute the leverage indicator for the EU banking sector, which uses consolidated banking data (CBD), and therefore allows for comparison.

¹¹⁰ See "**Leaseurope Index Q2 2020**", September 2020.



Captive financial institutions and money lenders consist of institutional units, often as part of a larger company structure, providing financial services to the corporate group. This includes a wide range of entities that undertake different activities with different business models. In Luxembourg, for example, more than three-quarters of the total assets of captive financial institutions over the period 2014-19 were held by holding corporations and by intragroup lending companies.¹¹¹ In addition, these entities are not subject to a uniform European legal framework, but are subject to different national legal systems (i.e. in terms of authorisation, regulation and tax systems). It is therefore important to define the perimeter of the sector that is relevant for systemic risk analysis.

Recent ECB data collections allow the classification of captive financial institutions into five broad types. These are: (i) units which are legal entities such as trusts, estates, agency accounts or “brass plate” companies; (ii) holding companies that hold controlling levels of equity of a group of subsidiary corporations and whose principal activity is owning the group without providing any other service to the businesses in which the equity is held; (iii) SPEs that qualify as institutional units and raise funds in open markets to be used by their parent corporation; (iv) units which provide financial services exclusively with own funds, or funds provided by a sponsor, to a range of clients and incur the financial risk of the debtor defaulting (e.g. money lenders, corporations engaged in lending to students or for foreign trade from funds received from a sponsor such as a government unit or a non-profit institution, and pawnshops that predominantly engage in lending); and (v) sovereign wealth funds classified as financial corporations.

Entities included in the OFI residual do not necessarily engage in activities that give rise to risks from a financial stability perspective, but may be interconnected with other parts of the financial system. Entities such as CFIs do not necessarily engage in credit intermediation or in the issuance of debt instruments. They tend not to be regulated, however, and can form part of a complex financial intermediation chain where they may engage in securities and financing transactions or maintain high levels of leverage through the use of derivatives. Due to a lack of harmonised data on CFIs and the importance of these entities in some jurisdictions, additional analysis and data collection will need to be undertaken to better understand the business models of these entities and their legal frameworks.

It is therefore not yet possible to make a clear assessment of the risks of these entities. However, work is ongoing to better understand the detailed characteristics of CFIs. A recent survey conducted by the ECB found that most CFIs can be categorised as holding companies of larger groups or as SPEs. The interconnectedness with banking groups does not appear to be a significant source of risk, although credit intermediation undertaken by some entities will require further assessment.

¹¹¹ Di Filippo, G. and Pierret, F., “**A Typology of Captive Financial Institutions and Money Lenders (Sector S127) in Luxembourg**”, Banque centrale du Luxembourg Working Paper No°146, July 2020.



3 Activity-based monitoring

Activity-based monitoring complements entity-based monitoring, thereby ensuring a more holistic understanding of financial stability risks related to non-bank financial intermediation. Entity-based monitoring may not capture all aspects of systemic risks, in particular those that may arise in specific markets that cut across entities. Complementing entity-based monitoring with activity-based monitoring sheds further light on the use of certain financial instruments and the type of markets in which different kinds of financial institutions, including banks and entities within and outside the monitoring framework, interact.

3.1 Derivatives

Derivatives can be used for hedging or speculating and their use increases interconnectedness within the financial system.¹¹² Derivatives can be used as a risk-reduction tool, as they allow market participants to transfer unwanted risks, including market risk (e.g. movements in market variables such as exchange rates, interest rates, equity prices and commodity prices), credit risk (e.g. the risk of late payment by a borrower) and counterparty risk (i.e. the failure of a counterparty to fulfil its obligations), to market participants willing to take these risks. This can contribute to risks being borne by those market participants that are best placed to manage or bear them. However, as a risk-transfer tool, derivatives can create complex financial intermediation chains that increase interconnectedness between entities and across different markets. Counterparty risk, credit risk and procyclical behaviour, in addition to risks and vulnerabilities arising from interconnectedness, can act as additional risk transmission channels in which non-bank financial institutions might play a relevant role. As many types of non-bank financial institutions are involved in derivatives trading, it is important to understand why and how these institutions use derivatives.

The trading and execution of derivatives contracts play a central role in market integrity, efficiency and transparency. Derivatives executed in a regulated market and on an over-the-counter (OTC) basis have very different characteristics in terms of levels of standardisation, liquidity and post-trading processes such as central clearing. Exchange-traded derivatives (ETDs) are traded on regulated markets and have become more widely used in response to regulatory requirements, as the standardisation of contracts, liquidity, the reduction of default risk and transparency have become determining factors in investment strategies. However, ETDs are still less common than OTC derivatives.

¹¹² Derivatives are usually defined as instruments with a predefined maturity, entailing an obligation or option to acquire or sell underlying assets or to effect a cash settlement determined with reference to transferable securities, currencies, interest rates or yields, commodities, or other indices or measures. Different derivative classes are used by different counterparties to address different needs. In general, interest rate swaps (IRSs) are widely used as hedging instruments among banks and other intermediaries, although they may leave individual entities sensitive to interest rate changes. Credit derivatives markets, in particular the market for credit default swaps (CDSs), transfer counterparty and underlying asset credit risk at the same time. On the other hand, the market for foreign exchange (FX) derivatives allows financial and non-financial counterparties to hedge against unwanted FX risk, and constitutes a closer link between the financial system and the real economy than other forms of derivatives. See Abad, J. et al., “**Shedding light on dark markets: First insights from the new EU-wide OTC derivatives dataset**”, *Occasional Paper Series*, No 11, ESRB, September 2016, for more details and an in-depth analysis.



EMIR data show that the EU derivatives market had a total notional outstanding amount of €08 trillion and 57 million open trades at the end of 2019. The market continued to be dominated by interest rate derivatives (IRDs), with 82% of the total notional amount. About 12% of the total notional amount was in currency derivatives, with another 7% in equity, credit and commodity derivatives (see Chart A-39). OTC contracts accounted for 92% of the total notional amount in the fourth quarter of 2019, with the remainder in ETDs. However, 7% of the total notional amount was in OTC contracts executed on trading venues with characteristics comparable to ETDs. The UK remained at the centre of derivative trading in Europe and with third countries.

Commodities and equities account for a large proportion of ETDs since instruments in these asset classes are mostly traded on regulated markets. In the fourth quarter of 2019, the share of ETDs in the gross notional amount outstanding was the largest for commodities (62%) and equities (42%) (see Chart A-40), compared with 54% and 56% in the fourth quarter of 2018. In other classes, OTC derivatives accounted for most of the gross notional amount outstanding and showed little change from a year earlier, even for OTC derivatives traded on venues included in 2019. OTC trades accounted for 93% of the gross notional amount outstanding for IRDs, 99% for currency and 96% for credit derivatives in the fourth quarter of 2019, compared with 92%, 99% and 97% respectively in the fourth quarter of 2018.

Investment firms and banks dominate the EU derivatives market. Investment firms have large notional exposures across all derivative classes, ranging from 31% of IRDs to 58% of equity derivatives. They also account for a large share of the notional amount in currency derivatives (49%), commodity derivatives (47%) and credit derivatives (44%). For banks, the main exposures are in IRDs (19% of the notional), currency derivatives (27%), equity derivatives (23%) and credit derivatives (20%) (see Chart A-41). However, such exposure measures for investment firms and credit institutions overstate these firms' exposures to some extent because these firms can conduct trading on behalf of end-clients that are not captured under EMIR reporting. Further distortions occur as notional amounts can be a poor proxy when assessing exposures as derivatives with underlyings having a low volatility can have large notional amounts, while derivatives with highly volatile underlyings can have a small notional amount.

The large volumes of derivative transactions have created a complex and interdependent network of exposures that ultimately may contribute to a build-up of vulnerabilities. Systemic vulnerabilities may also exist when some institutions are exposed to common shocks due to overlapping asset holdings, giving rise to a network of indirect exposures.¹¹³ Gaining outright exposure to an asset underlying a derivative requires the payment of the purchase price in full, which could be financed through borrowing, resulting in financial leverage. By contrast, gaining the same exposure through derivatives typically incurs comparatively small upfront costs (e.g. in the form of an initial margin and – for some derivatives such as options – a premium). The use of derivatives can therefore create synthetic leverage. Furthermore, the interplay between market risk, counterparty risk and liquidity risk, and the distribution of these risks across market participants,

¹¹³ "Systemic risk in derivatives markets: a pilot study using CDS data", Financial Stability Paper No. 38, Bank of England, July 2016.



can also be a source of systemic risk. Procyclicality in collateral requirements can lead to sudden deleveraging during the downswing phase of asset price cycles.¹¹⁴

Derivatives exposures increase liquidity needs for investment funds. In particular, the implementation of stricter margining requirements for cleared and uncleared derivatives implies that investment funds need to have more cash available to cope with variation margin calls. Variation margins posted by funds on their derivative portfolios have almost doubled since mid-2018, mainly on account of a structural shift towards full collateralisation of funds' derivative portfolios. The BCBS and IOSCO have agreed to extend by one year the final implementation of the margin requirements. With this extension, the final implementation phase will commence on 1 September 2021, at which point covered entities with an aggregate average notional amount (AANA) of non-centrally cleared derivatives greater than €8 billion will be subject to the requirements.¹¹⁵

The rapid decrease in asset prices and increased volatility in early 2020 following the COVID-19 shock resulted in a sharp rise in initial and variation margins.¹¹⁶ Heightened volatility caused sharp increases in variation margin collections by CCPs, while initial margins gradually increased to take into account extraordinary levels of volatility, which depleted excess margins. While some margin breaches occurred, clearing members were largely able to meet heightened liquidity demands. Some leveraged investors were also forced to sell their assets in order to raise cash to meet margin calls on their repo and derivative positions, exerting downward pressure on prices, including those of investment-grade bonds.¹¹⁷

3.2 Securities financing transactions

Securities financing transactions allow investors and firms to use assets, such as the shares or bonds they own, to secure funding for their activities. SFTs include four types of instrument: securities lending, repurchase agreements, buy-sell back transactions and margin lending transactions. They can enhance the efficiency of the financial sector by facilitating credit growth, maturity transformation and liquidity transformation outside the banking system.

SFTs contribute to the efficient functioning of the financial sector, but can also be the source of systemic risks. During stressed market conditions, liquidity risks can emerge as SFTs have short maturities, while collateral values, haircuts and eligibility can behave in a procyclical manner. At the same time, SFTs contribute to the reliance on overnight or short-term leverage. Additionally, the reinvestment of cash collateral in securities creates maturity and liquidity transformation, while the reuse of non-cash collateral creates opaque interconnectedness across sectors.

¹¹⁴ See “**Mitigating the procyclicality of margins and haircuts in derivatives markets and securities financing transactions**”, ESRB, January 2020.

¹¹⁵ See the **press release** of 23 July 2019 on the BIS website.

¹¹⁶ See “**ESMA Report on Trends, Risks and Vulnerabilities**”, No. 2 2020, September 2020.

¹¹⁷ See “**Leverage and margin spirals in fixed income markets during the Covid-19 crisis**”, BIS Bulletin No 2, April 2020.



Securities lending activity declined in 2019.¹¹⁸ EU securities on loan include government bonds, corporate bonds and equities. Securities lending transactions involving European government bonds declined by 13% in 2019 to USD 315 billion, despite an increase in the amount of lendable assets (up 12% to USD 1.05 trillion). This decline may be linked to the ending of the ECB's quantitative easing programme in December 2018.¹¹⁹ During the period 2017-18, the ECB injected cash into the financial system through the purchase of securities. Due to the reduced availability of government bonds, some market participants turned to securities lending markets, also as a source for HQLA. Securities purchased under the programme were made available for securities lending to support market liquidity and collateral availability in the market, causing loan balances to increase in the period 2017-18. Since the quantitative easing programme ended, borrowers have gone elsewhere. Securities lending activity involving European equities also declined by 13% year on year to USD 178 billion, with some heterogeneity across countries, e.g. German equities on loan increased by 13% to USD 27 billion, while French shares on loan decreased by 20% to USD 31 billion.

The total value of the European repo market amounted to approximately €8.3 trillion in December 2019 (see Chart A-36). This compares with €7.9 trillion in December 2018, representing a 5.9% year-on-year increase, reflecting a rise in supranational agency securities, corporate bonds, covered bonds and, to a lesser extent, government securities being used as collateral.¹²⁰ Regarding EU CCPs, there were signs of over-collateralisation in the last quarter of 2019 as clearing members held collateral in excess of requirements by the CCP.¹²¹ Clearing members tend to post more margins than required by the CCP in order to avoid having to respond to margin calls too often or within very short time frames. Activity in the euro money markets and repo trading grew steadily despite a short-term disturbance in the US repo markets. On 16-17 September 2019, the Federal Reserve System injected funds into US repo markets in response to a spike in repo rates.¹²² While the volatility episode was caused by the changing dynamics in both supply and demand in US markets, no collateral pressures have been witnessed in European repo rates. In the EU, volatility spikes reflect an increase in the deleveraging by EU banks around quarterly reporting periods. This is compounded by typically low trading volumes around the end of each year (see Chart A-37).

Liquidity risks in SFTs may increase in the event of a sudden repricing of the securities used as collateral. In the event of an abrupt fall in the value of securities used as collateral, lenders may be prompted to demand additional collateral, possibly forcing borrowers to sell assets to post the additional collateral. While market-based funding allows corporates to mitigate the consequences of a stress episode originating from the banking system, this source of funding could at the same time increase liquidity risks if there is no over-collateralisation. To the extent that such funding strains result in a more widespread spillover to unsecured funding markets, institutional investors may react to shocks in ways that amplify the impact on markets and on the broader

¹¹⁸ See IHS Markit's Securities Finance Quarterly Reviews for Q4 2018, Q1 2019, Q2 2019, Q3 2019 and Q4 2019.

¹¹⁹ See "**Asset purchase programmes**" on the ECB's website.

¹²⁰ Data from the International Capital Market Association (ICMA) based on a survey sent to 58 financial institutions in December 2019.

¹²¹ See "ESMA Report on Trends, Risks and Vulnerabilities", **No. 2 2019**, September 2019, and **No. 1 2020**, February 2020.

¹²² See Erber, G., "**The Repo-Crisis of September 2019**", European Productivity Research Centre, October 2019.



economy. During 2019, according to a survey on credit terms and conditions for euro-denominated SFTs,¹²³ overall credit terms remained broadly unchanged in the securities financing market.

Interconnectedness between banks and non-banks through the use of repo transactions remained stable in 2019. According to balance sheet data of euro area banks, banks' repo liabilities to non-banks amounted to €248 billion at the end of 2019, compared with €254 billion at the end of 2018 (see Chart A-38). Banks' repo liabilities to CCPs, being the largest bank counterparty, decreased to €179 billion at the end of 2019, compared with €186 billion at the end of 2018. Their share as counterparties of bank repo liabilities remained stable and amounted to 72% at the end of 2019. However, banks' repo liabilities to non-MMFs and other OFIs increased and amounted to €44 billion at the end of 2019, compared with €40 billion at the end of 2018. Although the general structure of repo liabilities remained stable throughout 2019, non-MMFs became somewhat more interconnected with banks during this period.

While repo rates remained stable during the COVID-19-related market volatility in early 2020, continued Eurosystem bond purchases may contribute to collateral shortages. Repo rates in the euro area remained largely unaffected¹²⁴ during the first quarter of 2020, whereby euro area investment funds engaged in repo transactions with the aim to raise cash, through the selling of assets or drawing on credit lines. The additional flexibility with respect to sovereign issuer limits under the PEPP contributed to restoring market liquidity, while the policy to support liquidity conditions in the euro area financial system and an easing of the collateral framework resulted in low volatility spikes in repo rates. However, price terms offered to non-financial corporations, insurance companies and hedge funds tightened somewhat in the first quarter of 2020, reflecting pressures affecting liquidity conditions and the financial strength of counterparties. While monetary policy action through the PEPP helped alleviate liquidity strains, certain shortages of liquid collateral may emerge in the context of expanding Eurosystem bond purchases.

3.3 Securitisation

Securitisation allows non-tradable, illiquid assets such as individual loans to be pooled and tranced into tradable securities. In this process, financial institutions which originated the loans transfer credit risk to the buyers of the securities. This is usually done through an issuer, such as a financial vehicle corporation, which buys the portfolio of loans, repackages it into tradable securities and sells them to investors. The majority of securitisations are structured such that investors buy claims to the cash flows of the assets underlying the securities. These assets can be, for instance, residential mortgage loans, commercial mortgage loans, auto loans, credit card receivables or loans to non-financial corporations. In some cases, securitisation is also achieved via the issuance of securitisation fund units or with the use of financial derivatives to create so-called synthetic securitisations, which are based on the cash flows generated from the derivatives.

¹²³ See the ECB's **December 2019** and **March 2020** "Survey on credit terms and conditions in euro-denominated securities financing and over-the-counter derivatives markets (SESFOD)".

¹²⁴ See "**The European repo market and the COVID-19 crisis: ICMA European Repo and Collateral Council (ERCC) market report**", April 2020.



Data on European issuance of securitisations¹²⁵ show a decrease of 19.5% in 2019, spread across most types of underlying loans (see Chart A-33). In particular, the placed and retained issued volumes of asset-backed securities (ABSs) decreased by 30.1% over the year, while the issuance of collateralised debt obligations (CDOs) and the securitisation of loans to small and medium-sized enterprises dropped by 23.2% and 21.8%, respectively. The issuance of residential mortgage-backed securities (RMBSs) also fell, by 11.4%, whereas the issuance of commercial mortgage-backed securities (CMBSs) increased by 2.5% over the same period. Despite its decrease in 2019, the issuance of CDOs remains almost double the amount that was issued in 2016. After the global financial crisis, which was triggered by large losses on securitised sub-prime residential mortgages in the US, the EU securitisation market also experienced a contraction. In response to this decline and to improve the functioning of the EU securitisation market, the EU developed the simple, transparent and standardised (STS) securitisation framework, which came into effect in January 2019 and continues to be implemented.¹²⁶

Under the STS Regulation, the ESRB has a mandate to opine on the financial stability implications of the securitisation market.¹²⁷ In line with this mandate, the ESRB continuously monitors developments in the securitisation market and uses granular data available through the European Data Warehouse (EDW)¹²⁸ to support this assessment. Box 5 provides a brief outline of initial findings from this analysis, focusing on RMBSs, which continue to make up more than half of the total outstanding amount in the European securitisation market.

Box 5 Initial findings on the European securitisation market: residential mortgage-backed securities¹²⁹

For residential mortgage-backed securities, granular data from the EDW help illustrate how some of the features of the underlying loans have evolved over the last two decades. Chart A depicts the weighted average of the loan-to-value (LTV) and debt-to-income (DTI) ratios by origination year of the loan (irrespective of when it was securitised). This preliminary analysis shows that the LTV and DTI ratios have been increasing in recent years, with the DTI ratio being on a steep upward trend since 2014. Part of this increase may be due to a diminishing sample size towards the end of the time series as there are fewer recently originated loans that have already been securitised. However, it is likely that a substantial part of the increase is due to households

¹²⁵ See “**AFME Securitisation Data Report Q1 2020**”, June 2020.

¹²⁶ See “**The case for a better functioning securitisation market in the European Union**”, Bank of England/ECB Discussion Paper, May 2014, and **Regulation (EU) 2017/2402 of the European Parliament and of the Council of 12 December 2017 laying down a general framework for securitisation and creating a specific framework for simple, transparent and standardised securitisation** (OJ L 347, 28.12.2017, p. 35).

¹²⁷ See Article 31 of Regulation (EU) 2017/2402.

¹²⁸ The European Data Warehouse is a securitisation repository which provides granular loan-level data for securitisations in the EU. This dataset covers more than two-thirds of the EU securitisation market and, in the fourth quarter of 2019, it contained more than 800 ABS deals containing over 75 million loans. Of these, roughly 20% are RMBS transactions, 20% are auto loans, 30% are consumer loans and 25% are credit card loans. Each asset class is broken down into between 100 and 200 loan-level variables and 30 to 50 bond-level variables per asset class. This includes information on the lender, borrower or collateral and allows for the monitoring of trends and developments in the securitisation market both at the EU and the national level. From a financial stability perspective, this dataset can be used to shed light on the role securitisations play in the build-up and propagation of risks in the financial system.

¹²⁹ Data from the EDW is currently being integrated into the ECBs main datahub. The preliminary results shown here are based on a subset, representing approximately 30% of the total RMBS data covered by the EDW.

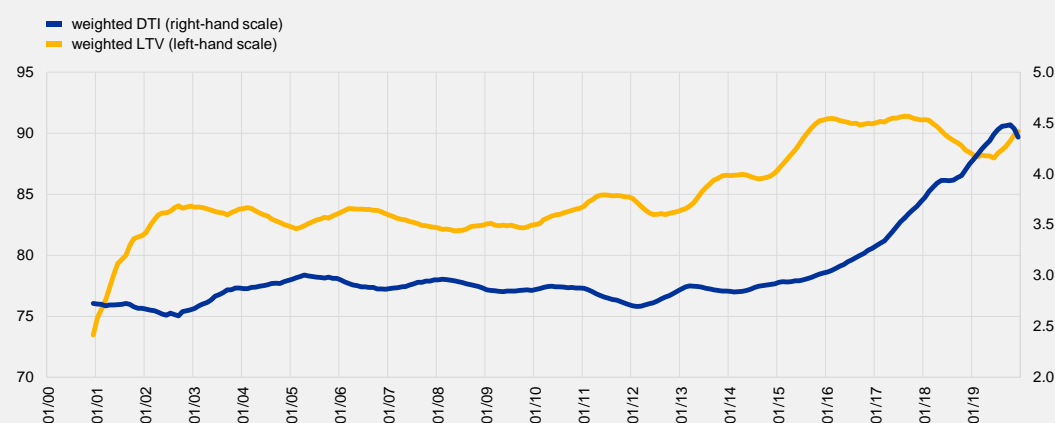


increasing their DTI ratios for mortgages. Households will have been able to increase the DTI ratios because the decrease in interest rates has improved debt serviceability, while house prices have increased in recent years. LTV ratios have been less volatile over the past two decades, rising steadily from a low of around 82.5 in 2010 to a high of around 90 in 2019. Overall, since only residential mortgage loans which have been securitised are accounted for, this increase in LTVs may not necessarily suggest lower credit standards in the residential mortgage market overall, but could also point to lenders increasingly securitising the riskiest residential mortgage loans and keeping the less risky loans on their balance sheets. At any rate, this trend of rising LTVs implies an increasing transfer of credit risk towards investors buying these types of securities.

Chart A

Euro area LTV and DTI ratios of residential mortgage-backed securities

(LTV ratio (left-hand scale) and DTI ratio (right-hand scale))



Sources: European Data Warehouse and ESRB calculations. The latest observation is for December 2019.

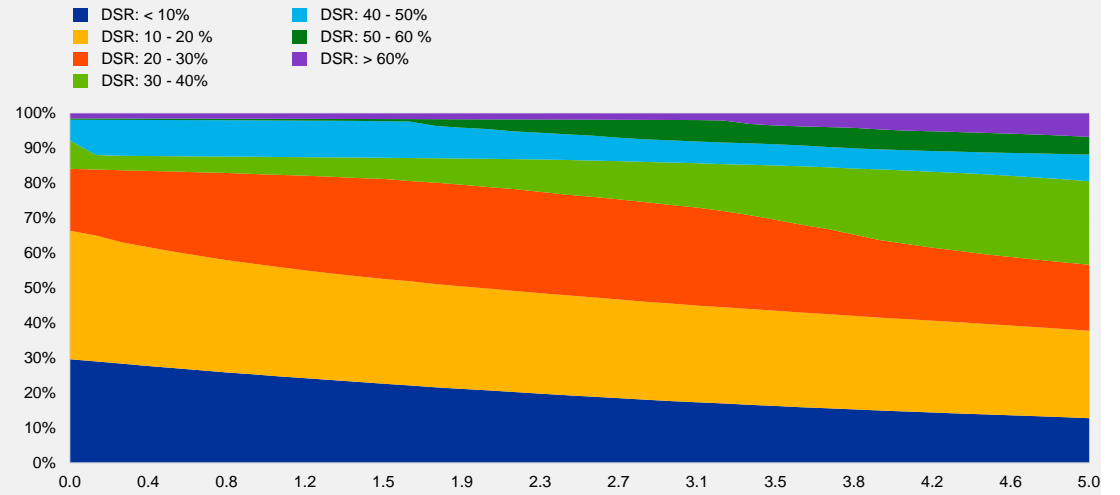
Sensitivity analysis can provide useful insights into how well borrowers that form part of residential mortgage-backed securities would be able to absorb rising interest rates on their loans. Chart B illustrates the total amount outstanding (of floating rate debt) broken down by debt service ratio for different interest rate increases. It shows that with interest rates unchanged, about 30% of the households spend up to 10% of their income on servicing their debt, while 15% of the households spend more than 30% of their income to service their debt. If, for instance, interest rates were to rise by 3 percentage points, households would then need to spend a higher percentage of their income to service their debt. In such a scenario, around 20% of households would spend up to 10% of their income, while around 30% of households would spend more than 30% of their income to service their debt. The loans that are serviced by households spending a large fraction of their income on debt service are at a higher risk of default. This analysis can also be conducted at the country level to improve policymakers' understanding of the household sector's exposure to interest rate risk. By linking securitisation data with the ECB's Securities Holdings Statistics, it is for instance possible to simulate the propagation of losses and the potential for contagion via securitisations in the European financial network.



Chart B

Overall amount of loans in euro area residential mortgage-backed securities outstanding, split into debt service ratio buckets

(percentages (left-hand scale); simulated increase in interest rates (horizontal axis))



Sources: European Data Warehouse and ESRB calculations.



4 Statistical overview

4.1 Statistical classification for investment funds and other financial institutions

Table 2

Entities: Sectors and sub-sectors		Description
Investment funds (IFs)	Money market funds (ESA S.123)	Part of the monetary financial institution (MFI) sector
	Non-MMF investment funds (ESA S.124)	Allocated to investment policy according to assets in which they primarily invest
	Bond funds Equity funds Mixed funds Real estate funds Hedge funds Other funds	
	Exchange-traded funds (ETFs) Private equity funds	ETFs and private equity funds are included in the above fund types, depending on the strategy of the fund
Other financial institutions (OFIs)	Other financial intermediaries (ESA S.125)	i.e. special-purpose vehicles engaged in securitisation e.g. financial leasing, factoring, hire purchase i.e. dealers on own account e.g. venture capital, export/import financing, central counterparties (CCPs)
	Financial auxiliaries (ESA S.126) Captive financial institutions and money lenders (ESA S.127)	e.g. insurance or loan brokers, fund managers, head offices of financial groups, financial guarantors e.g. special-purpose entities not engaged in securitisation, "brass plate" companies, holding companies

Source: ECB

Note: Some CCPs are classified as specialised financial corporations in the ESA 2010, while others have bank licences and are included in the MFI statistics.

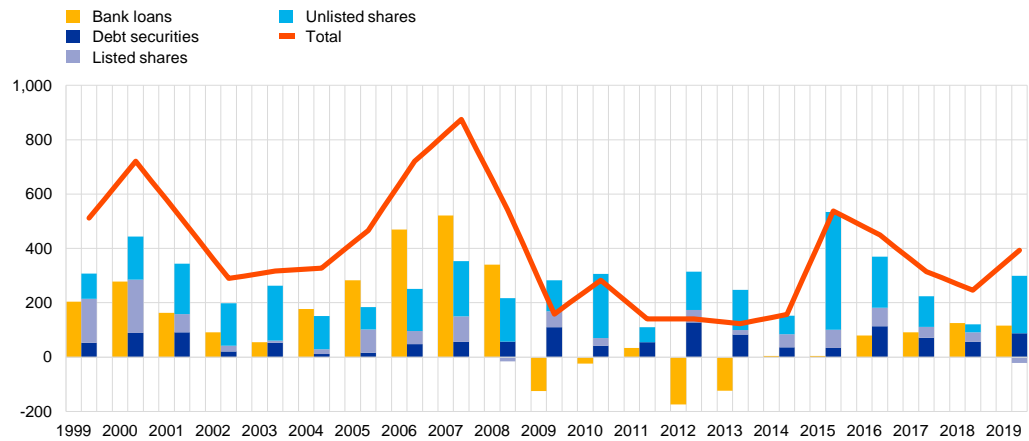


4.2 Developments in main aggregates

Chart A-1

Net finance raised by euro area non-financial corporations

(EUR billions)



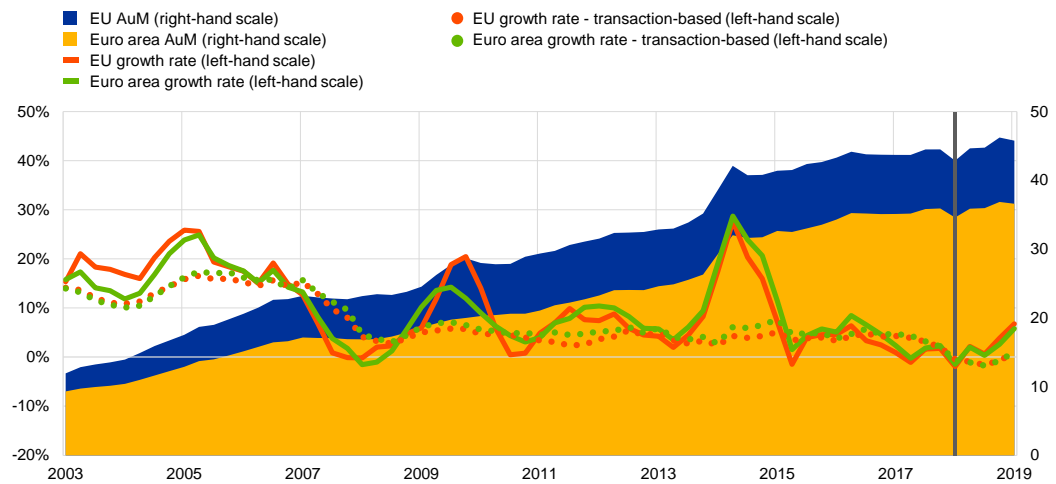
Sources: ECB Quarterly Sector Accounts (QSA) and ESRB calculations.

Note: The latest observation is for the fourth quarter of 2019.

Chart A-2

Assets under management in EU and EA investment funds and other financial institutions

(EUR trillions and annual growth rates)



Sources: ECB and ECB calculations.

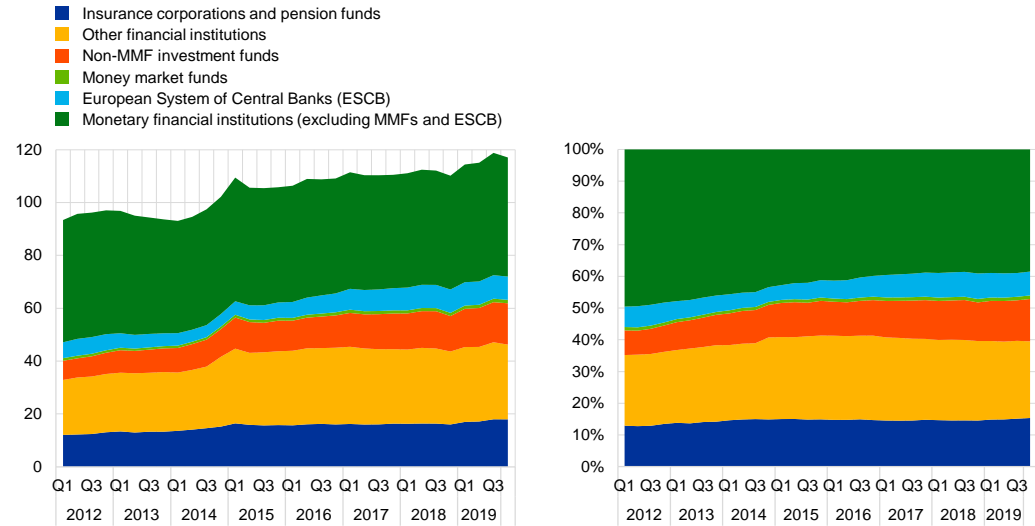
Notes: The continuous lines indicate annual growth rates based on changes in outstanding amounts. The dotted lines indicate annual growth rates based on transactions – i.e. excluding the impact of exchange rate variations or other revaluations and statistical reclassifications. The latest observation is for the fourth quarter of 2019.



Charts A-3.1 and A-3.2

EU financial sector

(Chart A-3.1: EUR trillions; Chart A-3.2: percentages)



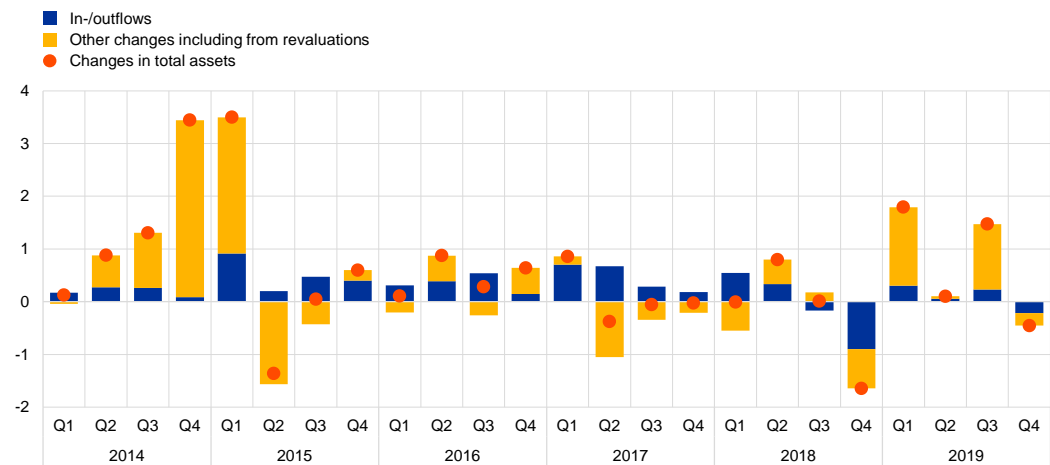
Sources: ECB and ESRB calculations.

Notes: Based on financial accounts data for the total financial assets of the financial sector of EA plus non-euro area EU Member States. To exclude central banks from the MFI time series, ESCB is estimated based on BSI data for the Eurosystem and national central bank data for the non-euro area EU central banks. The latest observation is for the fourth quarter of 2019.

Chart A-4

EU investment funds and other financial institutions: financial transactions and other changes

(EUR trillions)



Sources: ECB and ESRB calculations.

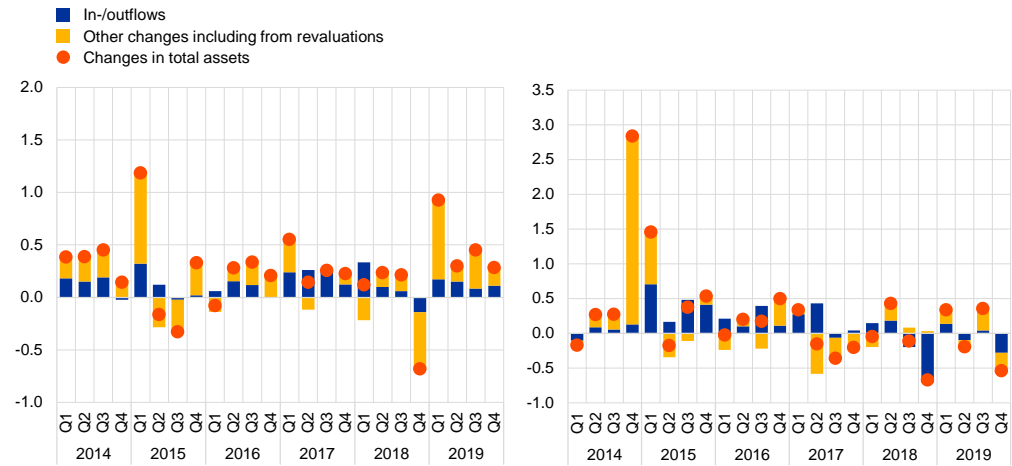
Notes: Based on financial accounts data for the total financial assets of the financial sector of the euro area plus the non-euro area EU Member States. In-/outflows are calculated from differences in outstanding amounts adjusted for revaluations, exchange rate variations, statistical reclassifications and any other changes which do not arise from transactions. The latest observation is for the fourth quarter of 2019.



Charts A-4.1 and A-4.2

Euro area investment funds (left panel) and euro area other financial institutions (right panel): transactions and other changes

(EUR trillions)



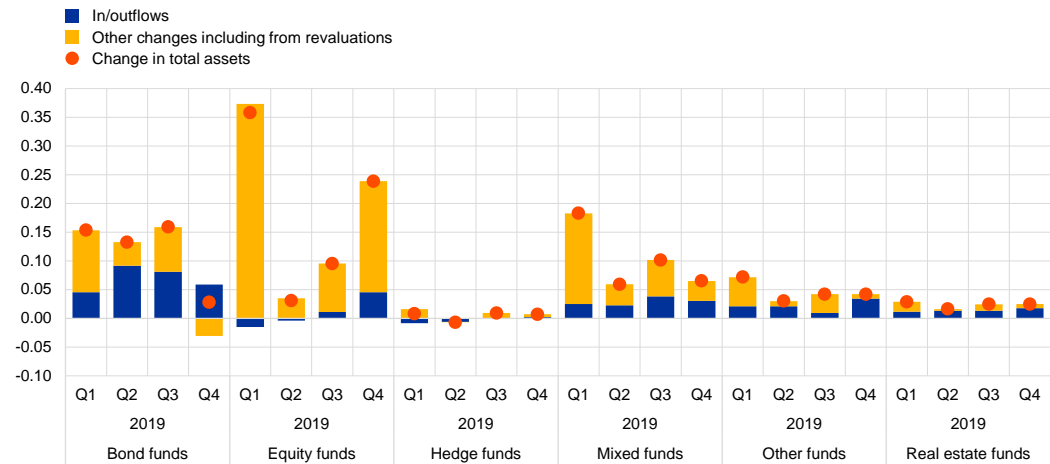
Sources: ECB and ESRB calculations.

Notes: Based on financial accounts data for the total financial assets of the financial sector of the euro area. In-/outflows are calculated from differences in outstanding amounts adjusted for revaluations, exchange rate variations, statistical reclassifications and any other changes not arising from transactions. The latest observation is for the fourth quarter of 2019.

Chart A-5

Euro area investment fund types: in/outflows and other changes (EUR trillions)

(EUR trillions)



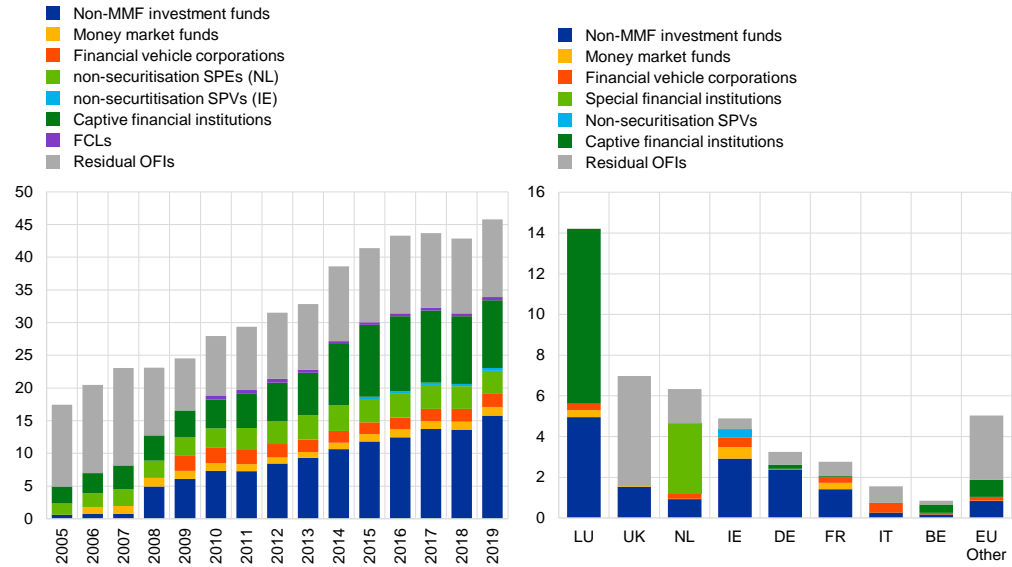
Sources: ECB and ESRB calculations.

Notes: Based on financial accounts data for the total financial assets of the financial sector of the euro area. "In/outflows" are given by the net issuance of fund shares. The latest observation is for the fourth quarter of 2019.



Charts A-6 and A-7

Breakdown of investment funds and other financial institutions by type in the EU (left panel) and by domicile (right panel)

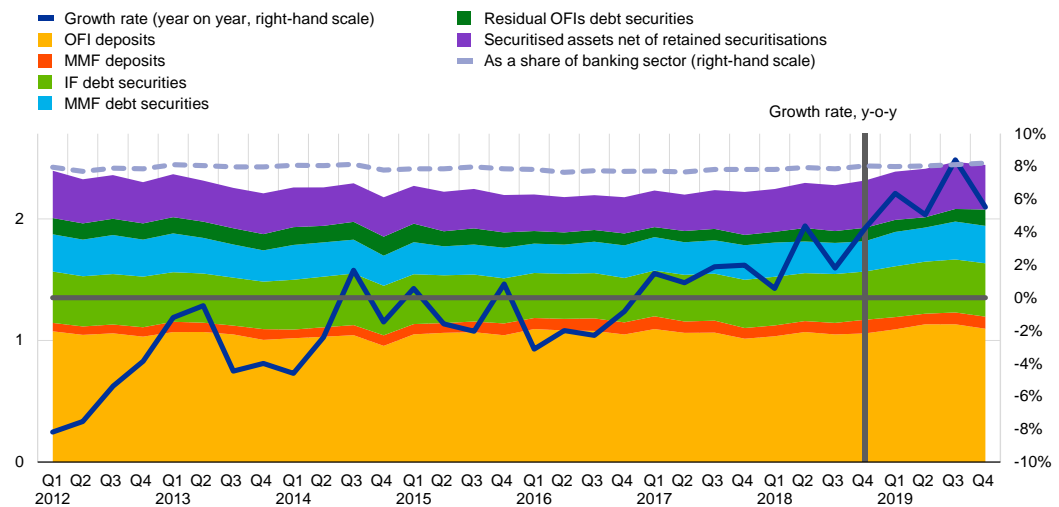


Sources: ECB, Eurostat, Central Bank of Ireland, De Nederlandsche Bank, Nationale Bank of Belgium and ECB calculations.
 Notes: Data for the total OFI sector are sourced from financial account statistics; data on IFs, MMFs and FVCs are based on ECB monetary statistics. Data on FCLs are based on OFI BSI statistics. Data on SFIs, non-securitisation SPVs and captive financial institutions cover only particular countries. Captive financial institutions are sourced from Eurostat financial account statistics. In the financial accounts, SFIs, non-securitisation SPVs and captive financial institutions are included in the sector "captive financial institutions and money lenders (ESA S.127)". The latest observation is for the fourth quarter of 2019. Figures for Dutch SFIs relate to the fourth quarter of 2019.

Chart A-8

Wholesale funding provided by non-bank financial entities to the banking sector

(EUR trillions and annual growth rates)



Sources: ECB and ESMA calculations.
 Notes: The wholesale funding measure is the sum of: MFI funding arising from securitisation; IF, MMF and OFI deposits at euro

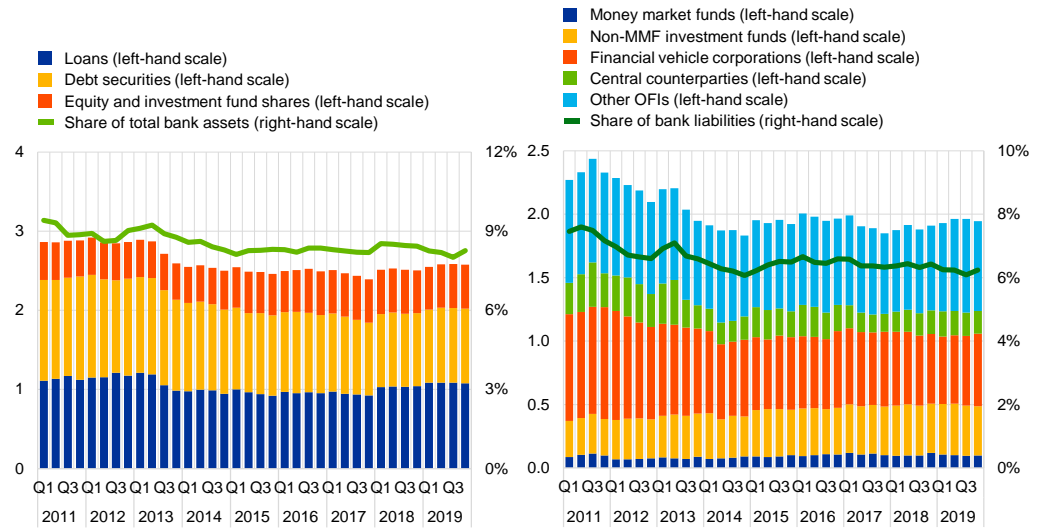


area MFIs; and IF, MMF and OFI holdings of debt securities issued by euro area MFIs. "Residual OFIs" reflects the difference between the total financial sector and the known sub-sectors in the statistical financial accounts (i.e. assets from the banking sector, insurance companies, pension funds, FVCs, IFs and MMFs). The latest observation is for the fourth quarter of 2019.

Charts A-9 and A-10

Euro area credit institutions' assets vis-à-vis (left panel) and deposits from (right panel) euro area investment funds and other financial institutions

(EUR trillions and share of credit institutions' total assets)



Source: ECB.

Note: The latest observation is for the fourth quarter of 2019.

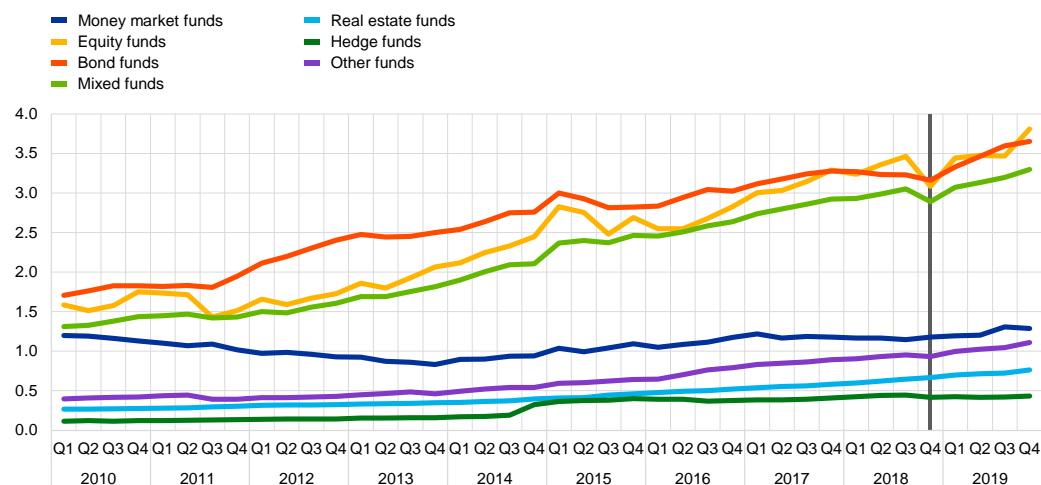


4.3 Entity-based monitoring

Chart A-11

EU investment funds: net asset values

(EUR trillions)



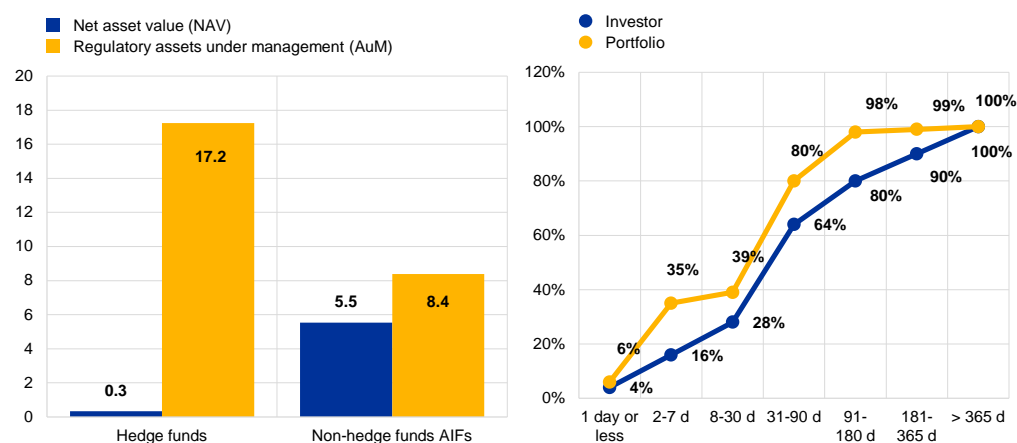
Source: ECB.

Notes: Based on data for the EU; Bulgaria, Croatia, Denmark, Sweden and the UK are not included. In 2016, some hedge funds were reclassified as "other funds", affecting the series for these funds. The latest observation is for the fourth quarter of 2019.

Charts A-12.1 and A-12.2

Hedge funds subject to AIFMD rules: net asset value and regulatory assets under management under the AIFMD (left panel) and liquidity profile (right panel)

(EUR trillions)



Sources: AIFMD database, NCAs and ESMA.

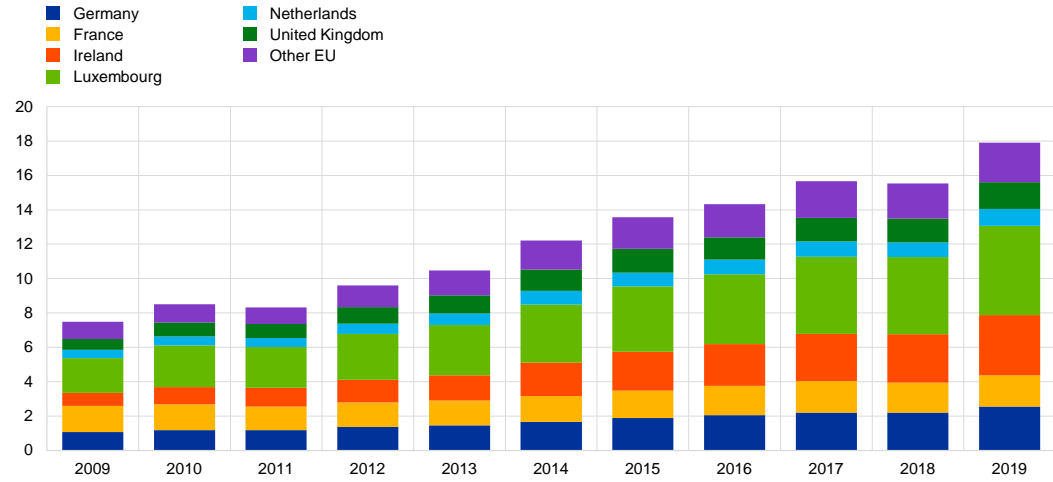
Notes: Chart A-12.1: NAV and AUM by AIF type. "Regulatory AUM" refers to the value of all portfolio assets, including all assets acquired through the use of leverage (borrowing of cash or securities and leverage embedded in derivative positions). Chart A-12.2: portfolio and investor liquidity profiles of hedge funds managed and/or marketed by authorised EU AIFMs. Portfolio profile determined by percentage of the portfolios capable of being liquidated within each specified period; investor profiles depend on the shortest period within which redemption payments could be received. The latest observation is for the fourth quarter of 2018.



Chart A-13

EU investment funds: total assets by country of domicile

(EUR trillions)



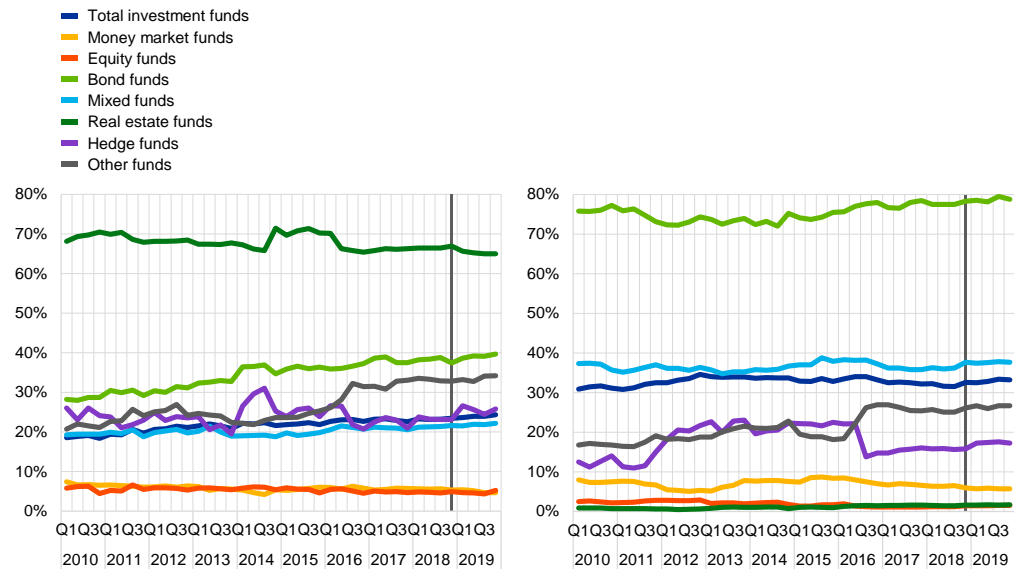
Source: ECB.

Notes: Data for non-MMF IFs are based on investment fund statistics for the euro area countries and QSA for non-euro area countries. The latest observation is for the fourth quarter of 2019.

Charts A-14 and A-15

EU investment funds: liquidity transformation (left panel) and maturity transformation (right panel)

(percentages)



Source: ECB.

Notes: Data for the EU; Bulgaria, Croatia, Denmark, Sweden and the UK are not included. During 2016, some hedge funds were reclassified as "other funds". In Chart A-14, the proxy for liquidity transformation is expressed as total assets minus liquid assets (deposits, sovereign bonds, debt securities issued by MFIs and equity and open-ended investment fund shares), as a share of total assets. Estimates are made for non-MMF funds' holdings of non-euro area securities and deposits. In Chart A-15,

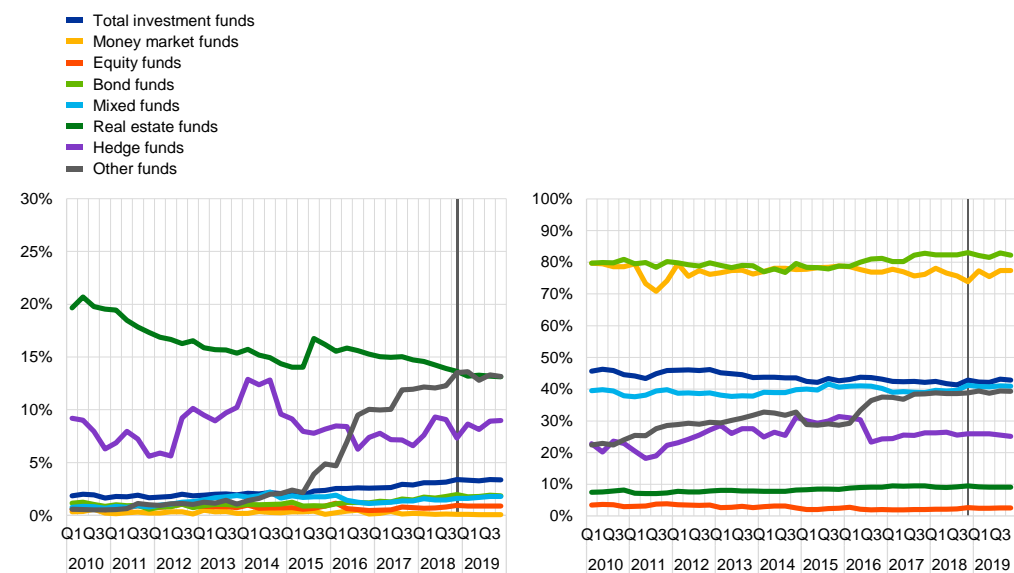


maturity transformation is shown as the ratio of all long-term assets (original maturities of over one year) to total assets. By this measure, maturity transformation is low for equity funds and real estate funds (which invest in non-financial assets). For MMFs, long-term assets vis-à-vis the government sector are not included. The latest observation is for the fourth quarter of 2019.

Charts A-16 and A-17

EU investment funds: financial leverage (left panel) and credit intermediation (right panel)

(percentages)



Source: ECB.

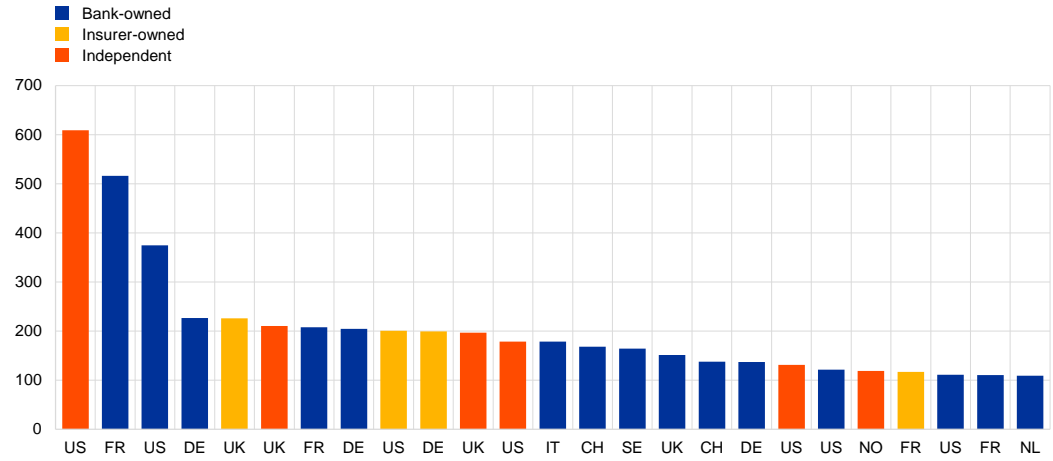
Notes: Data for the EU; Bulgaria, Croatia, Denmark, Sweden and the UK are not included. During 2016, some hedge funds were reclassified as "other funds". In Chart A-16, financial leverage is calculated as the ratio of loans received to total liabilities. In Chart A-17, credit intermediation is calculated as the ratio of holdings of loans and debt securities vis-à-vis non-MFIs to total assets. An estimate is made for non-MMF funds' loans to non-euro area counterparties. The latest observation is for the fourth quarter of 2019.



Chart A-18

Aggregate net assets of the top 25 asset management companies in the EU

(EUR billions)



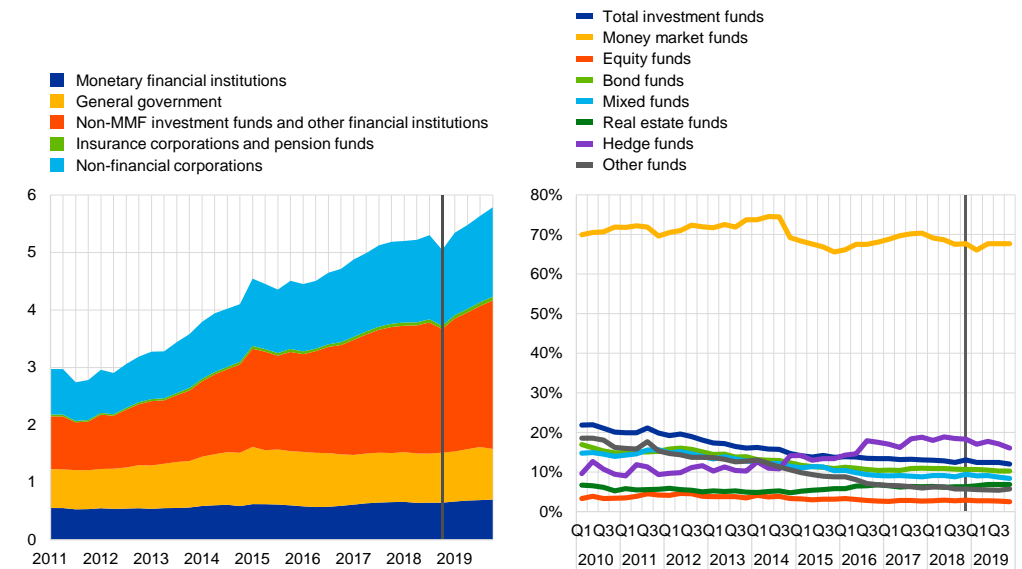
Sources: Thomson Reuters Lipper and ECB calculations.

Notes: Asset managers are classified as held by banks/insurers when the asset manager is a subsidiary of the bank/insurer (this excludes cases where bank/insurance activities are a subordinate business of the group or where the holding company also holds banks/insurers) or has a bank/insurer as a majority shareholder. The horizontal axis shows the domicile of the asset manager. The latest observation is for December 2019.

Charts A-19 and A-20

Euro area investment funds: exposures to other financial and non-financial sectors in the euro area (left panel) and holdings of MFI assets as a share of total assets (right panel)

(Chart A-19: EUR trillions; Chart A-20: percentages)



Source: ECB.

Notes: Chart A-19: euro area IF holdings of debt securities, IF shares and other equity issued by euro area entities. Chart A-20: based on data for the EU; Bulgaria, Croatia, Denmark, Sweden and the UK are not included. Interconnectedness is proxied by

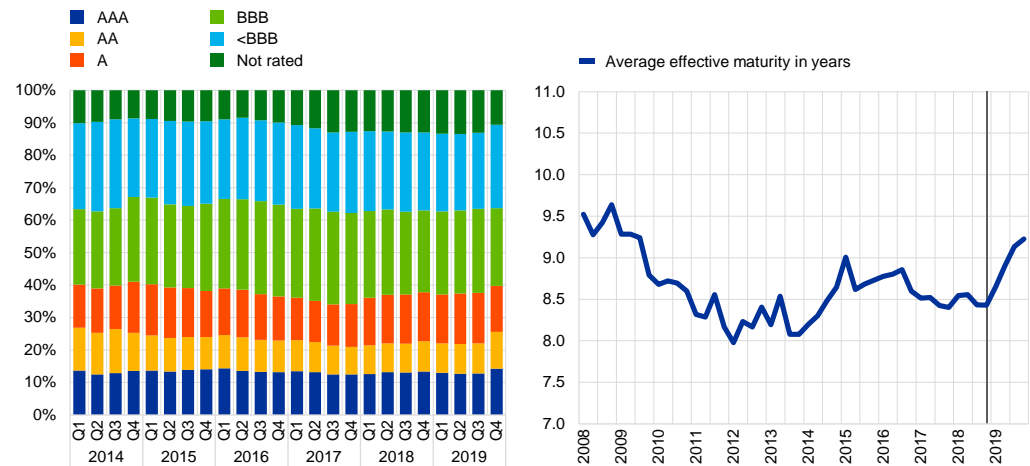


holdings of debt securities and loans with an MFI as a counterparty as a share of total assets. Estimates made for non-MMFs' loans to non-euro area counterparties. MMF data in the fourth quarter of 2014 are affected by reclassifications. The latest observation is for the fourth quarter of 2019.

Charts A-21 and A-22

EU bond funds: average rating of fund holdings (left panel) and weighted average maturity of assets (right panel)

(Chart A-21: share of total assets)

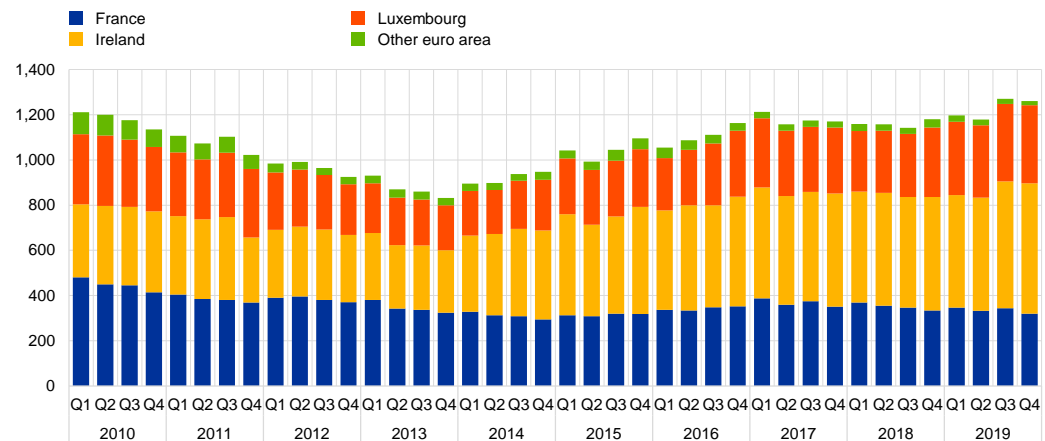


Sources: Thomson Reuters Lipper, ESMA and Standard & Poor's.
 Note: The latest observation is for the fourth quarter of 2019.

Chart A-23

Euro area MMFs: total assets by country of domicile

(EUR billions)



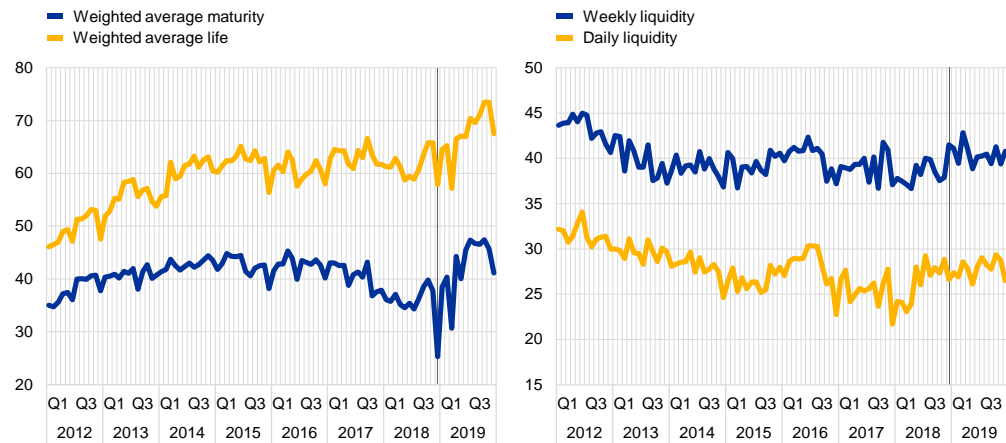
Sources: ECB and ECB calculations.
 Note: The latest observation is for the fourth quarter of 2019.



Charts A-24 and A-25

EU MMFs: weighted average maturity and life (left panel) and weekly and daily liquidity (right panel)

(Chart A-24: days; Chart A-25: percentages)



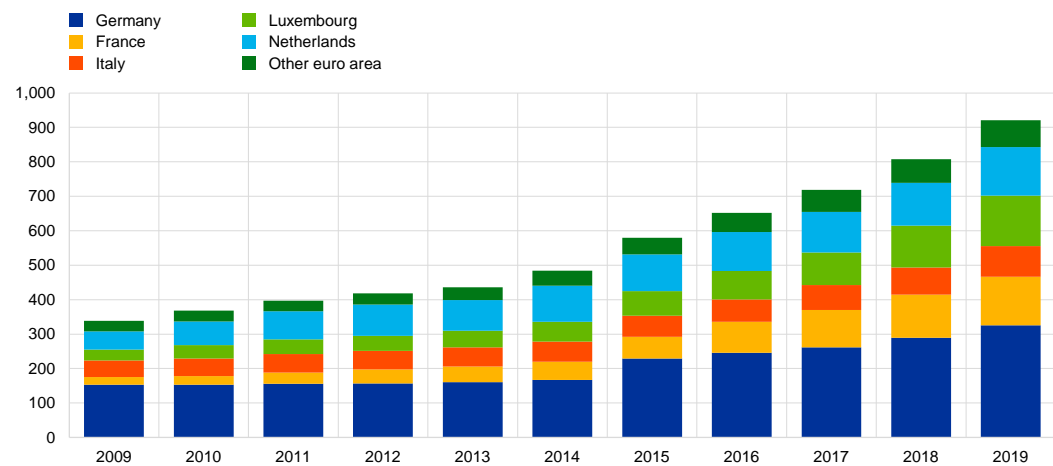
Sources: Fitch Ratings and ESMA.

Notes: Chart A-24: weighted average maturity (WAM) and weighted average life (WAL) of EU prime MMFs. Aggregation carried out by weighting individual MMFs' WAM and WAL by AUM. Chart A-25: daily liquidity includes all assets maturing overnight and weekly liquidity includes shares issued by AAA-rated MMFs and securities issued by highly rated sovereigns with a maturity of less than one year. Aggregation carried out using individual MMF data weighted by AUM. The latest observation is for December 2019.

Chart A-26

Euro area real estate funds: total assets by country of domicile

(EUR billions)



Source: ECB.

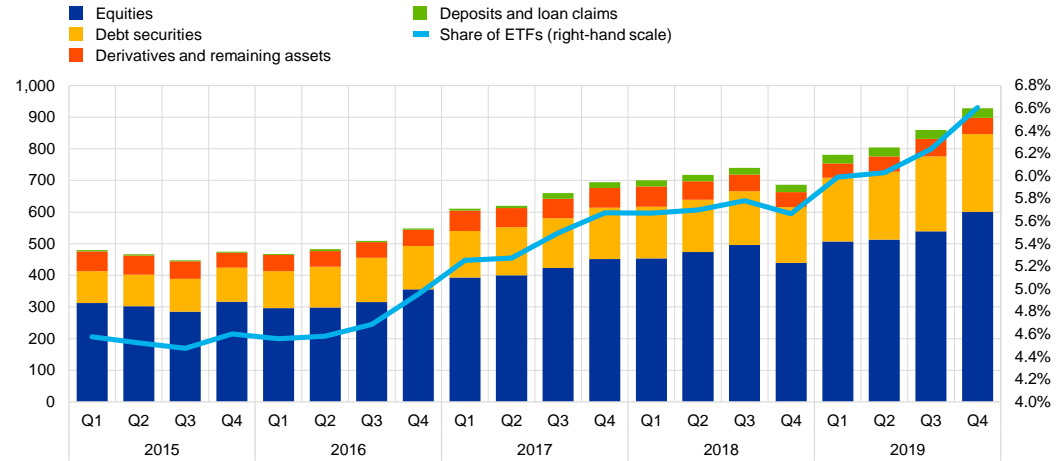
Notes: The data of German closed-ended funds have been included in the calculation of total assets since 2015. The latest observation is for 2019.



Chart A-27

Euro area ETFs: assets by type and share of total

(EUR billions (left-hand scale) and share (right-hand scale))



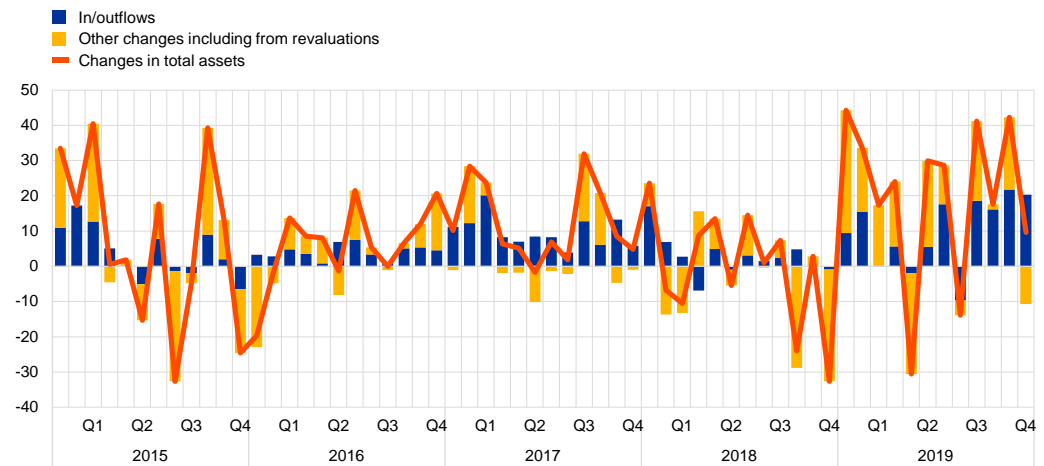
Source: ECB.

Notes: "Share of ETFs" is calculated relative to assets held by the euro area investment fund sector. The latest observation is for the fourth quarter of 2019.

Chart A-27.1

Euro area ETFs: flows and changes in valuation

(EUR billions)



Sources: ECB and ESRB calculations.

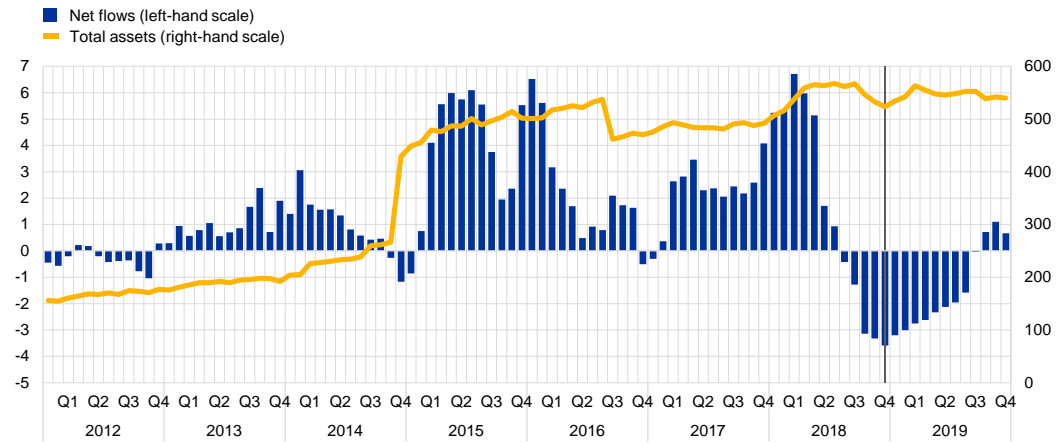
Notes: Based on ECB investment fund balance sheet statistics for exchange-traded funds in the euro area. Transactions are calculated from differences in outstanding amounts adjusted for revaluations, exchange rate variations, statistical reclassifications and any other changes which do not arise from transactions. The latest observation is for December 2019.



Chart A-28

EU hedge funds: net flows and total assets

(EUR billions)



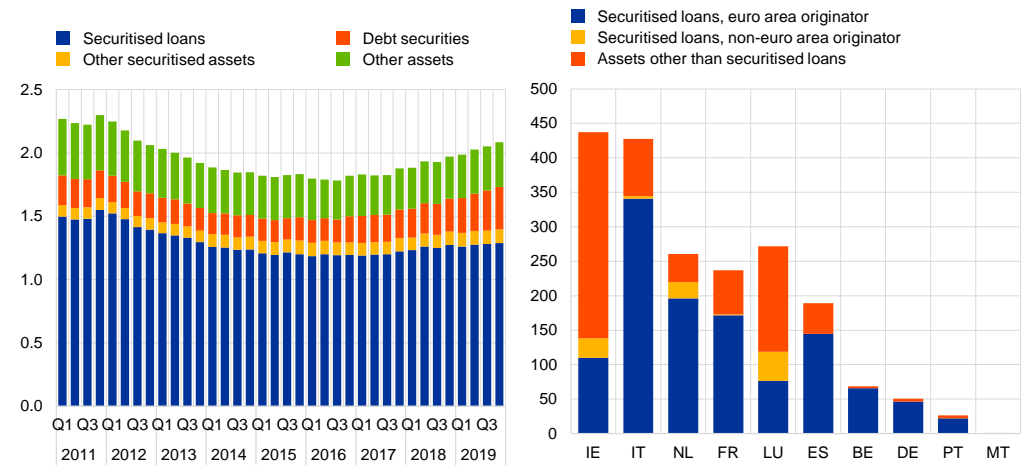
Source: ECB.

Notes: Based on available data for the EU; Bulgaria, Croatia, Denmark, Sweden and the UK are not included. Three-month moving average for net issuance of shares. Reclassifications and revisions affect the series for total assets. The latest observation is for December 2019.

Charts A-29 and A-30

Euro area FVCs' total assets (left panel) and total assets by domicile (right panel)

(Chart A-29: EUR trillions; Chart A-30: EUR billions)



Source: ECB.

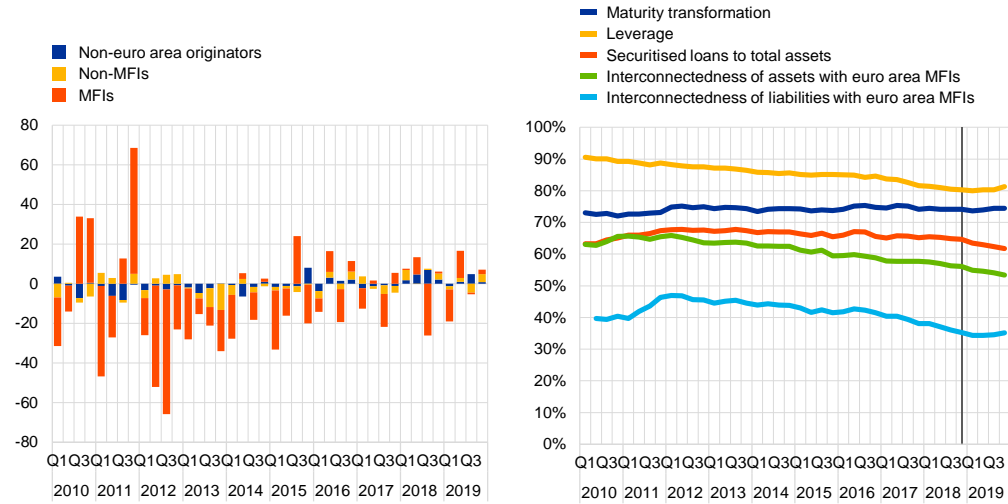
Notes: Chart A-29: "Other assets" includes shares and other equity, financial derivatives and remaining assets. The latest observation is for the fourth quarter of 2019.



Charts A-31 and A-32

Euro area FVCs' net issuance of securitised loans by originator (left panel) and maturity transformation, leverage, credit intermediation and interconnectedness (right panel)

(Chart A-31: EUR billions; Chart A-32: percentages)



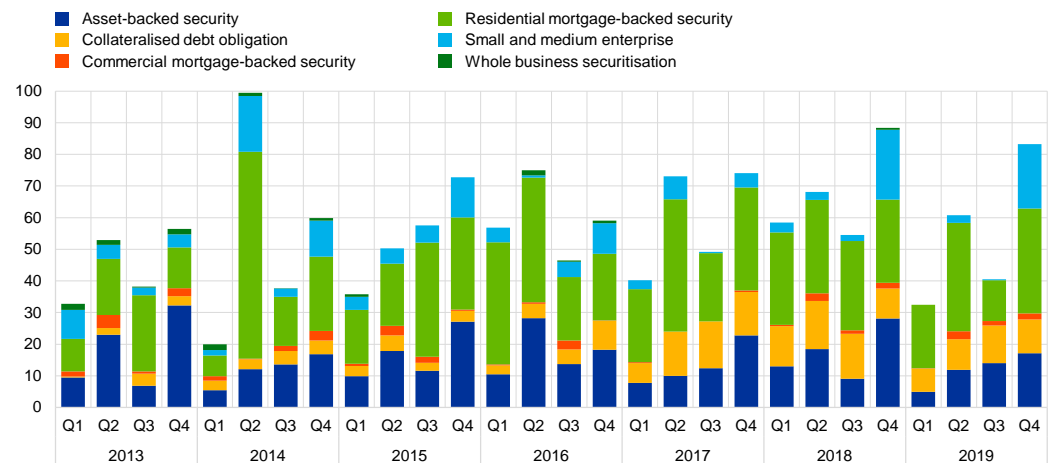
Source: ECB.

Notes: Chart A-31: euro area FVCs' securitised loans by originator. Chart A-32: the proxy for maturity transformation is calculated by summing long-term securitised loans and debt securities (both with an initial maturity of more than one year) divided by total assets. Leverage is computed as the sum of loans received and debt securities issued divided by total assets. FVC assets with a euro area MFI counterparty are computed as the sum of loans and debt securities where the counterparty is a EA MFI, and securitised loans originated by a EA MFI. FVC liabilities are computed as debt securities held by EA MFIs, excluding the ESCB reporting sector, using BSI statistics for MFIs. The latest observation is for the fourth quarter of 2019.

Chart A-33

European securitisation issuance by collateral type

(EUR billions)



Source: Association for Financial Markets in Europe (AFME).

Notes: "Asset-backed security" includes auto loans, credit card receivables, leases, loans and other receivables; certain public finance initiative securitisations are included within the category "whole business securitisation" as of the fourth quarter of 2013.

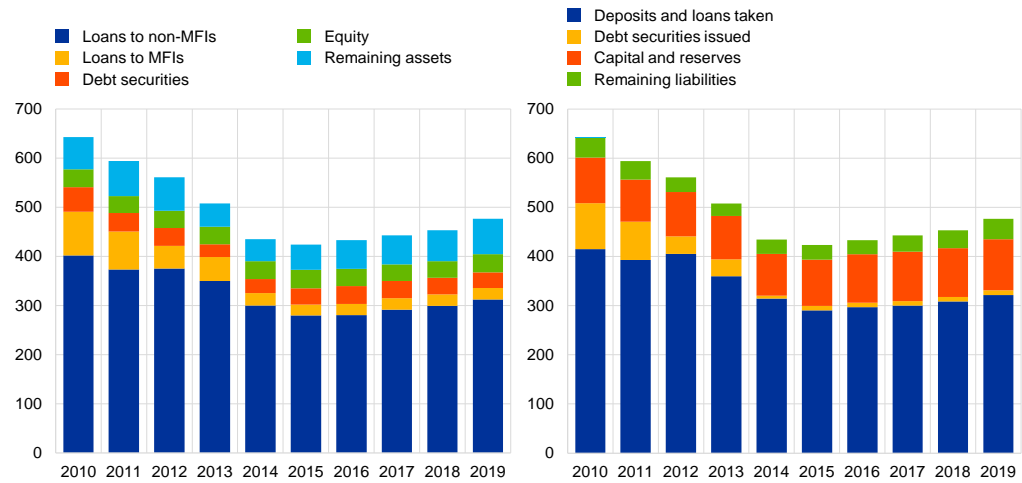


"European" covers all EEA countries and certain non-EEA countries located on the geographical European continent. The latest observation is for the fourth quarter of 2019.

Charts A-34 and A-35

Euro area FCLs' assets (left panel) and liabilities (right panel)

(EUR billions)



Source: ECB.

Note: The latest observation is for the fourth quarter of 2019.

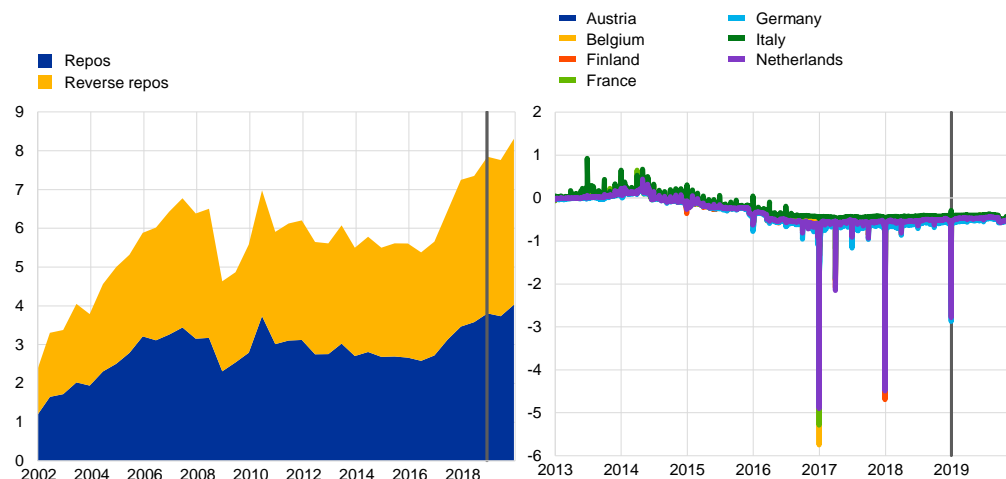


4.4 Activity-based monitoring

Charts A-36 and A-37

Size of EU repo market (left panel) and repo rate for selected sovereigns (right panel)

(Chart A-36: EUR trillions; Chart A-37: percentages)



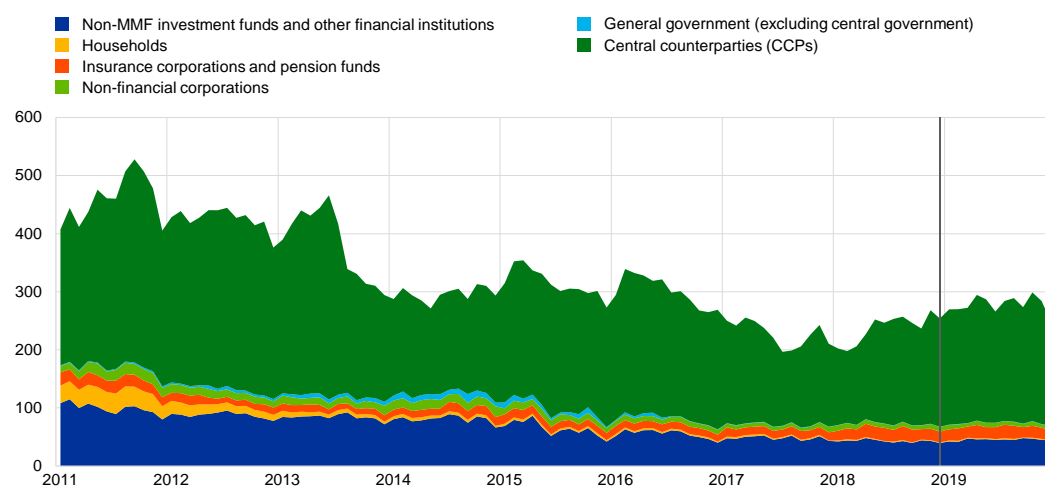
Sources: ICMA, RepoFunds Rate and ESMA.

Notes: Chart A-36: total value of repos and reverse repos outstanding on the books of the institutions which participated in the ICMA repo surveys. Chart A-37: volume-weighted average of fixed rate index value, by origin of the collateral. Centrally cleared sovereign repos only. The latest observation is for December 2019.

Chart A-38

Euro area MFIs' repo liabilities with non-MFIs, by sector

(EUR billions)



Source: ECB.

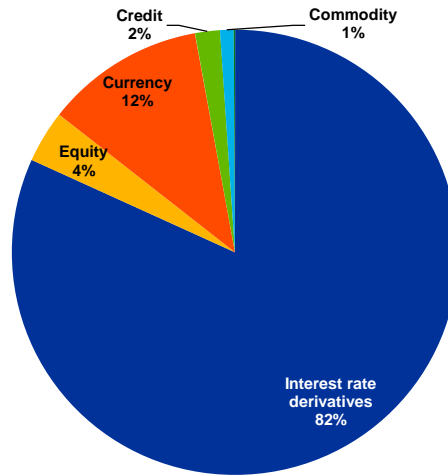
Notes: Euro area MFIs' repo liabilities with euro area non-MFI counterparties. The latest observation is for December 2019.



Chart A-39

Gross notional amount outstanding by asset class

(percentages)



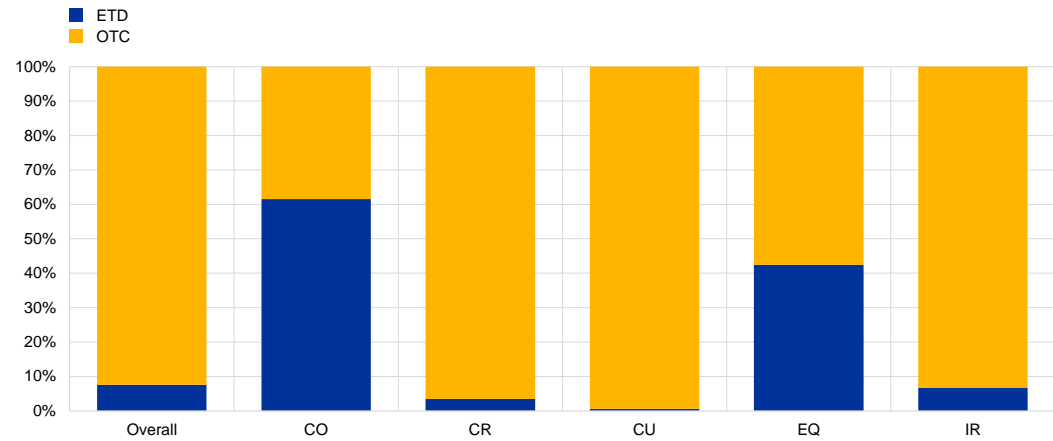
Sources: Trade repositories and ESMA.

Notes: Gross notional amount outstanding by asset class as a percentage of gross notional amount outstanding. The latest observation is for end-2019.

Chart A-40

ETD versus OTC notional amount

(percentages)



Sources: Trade repositories and ESMA.

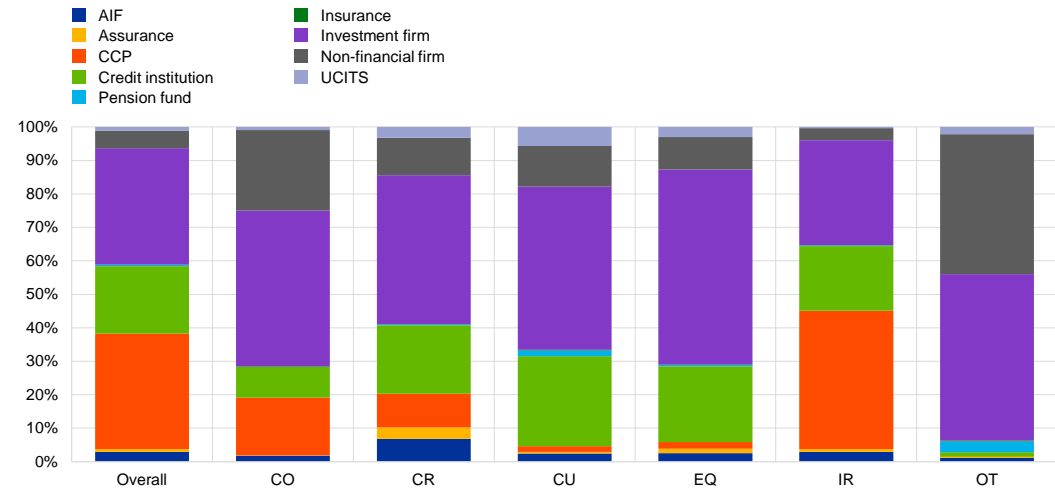
Notes: Percentage share of gross notional amount outstanding by asset class. The latest observation is for end-2019.



Chart A-41

Gross notional amount by sector of counterparty

(percentages)



Sources: Trade repositories and ESMA.

Notes: Gross notional amount outstanding (not reconciled) by counterparty as a percentage of gross notional amount outstanding by asset class. The latest observation is for end-2019.



5 Abbreviations

ABS	asset-backed security	GBP	pound sterling
AI	artificial intelligence	GDP	gross domestic product
AIF	alternative investment fund	GNE	gross notional exposure
AIFMD	Alternative Investment Fund Managers Directive	HQLA	high-quality liquid assets
AP	authorised participant	HY	high-yield
AuM	assets under management	ICMA	International Capital Market Association
BCBS	Basel Committee on Banking Supervision	ICO	initial coin offering
BIS	Bank for International Settlements	IF	investment fund
BSI	balance sheet item	IG	Investment-grade
CBD	consolidated banking data	IMF	International Monetary Fund
CCP	central counterparty	IRD	interest rate derivative
CDO	collateralised debt obligation	IRS	interest rate swap
CDS	credit default swap	IOSCO	International Organization of Securities Commissions
CFI	captive financial institution	LTV	loan-to-value
CLO	collateralised loan obligation	LVNAV	low-volatility net asset value



CMBS	commercial mortgage-backed security	M&A	mergers and acquisitions
CMO	collateralised mortgage obligation	MIFID	Markets in Financial Instruments Directive
CNAV	constant net asset value	MFI	monetary financial institution
CPMI	Committee on Payments and Market Infrastructures	MMF	money market fund
CRD	Capital Requirements Directive	NAV	net asset value
CRE	commercial real estate	NCA	national competent authority
CRR	Capital Requirements Regulation	NCB	national central bank
DLT	distributed ledger technology	NFC	non-financial corporation
DTI	debt-to-income	OECD	Organisation for Economic Co-operation and Development
EA	euro area	OFI	other financial institutions
EBA	European Banking Authority	OTC	over-the-counter
ECB	European Central Bank	PE	private equity
EDW	European Data Warehouse	PEPP	pandemic emergency purchase programme
EEA	European Economic Area	REIF	real estate investment fund
EFIF	European Forum for Innovation Facilitators	REIT	real estate investment trust
EIOPA	European Insurance and Occupational Pensions Authority	repo	repurchase agreement



EMIR	European Market Infrastructure Regulation	RMBS	residential mortgage-backed security
ESA	European Supervisory Authority, European System of Accounts	SDD	security and derivative dealer
ESCB	European System of Central Banks	SFI	special financial institution
ESMA	European Securities and Markets Authority	SFTR	Securities Financing Transactions Regulation
ESRB	European Systemic Risk Board	SHS	Securities Holdings Statistics
ETD	exchange-traded derivative	SPE	special-purpose entity
ETF	exchange-traded fund	SPV	special-purpose vehicle
ETP	exchange-traded product	STS	simple, transparent and standardised
EU	European Union	UCITS	undertakings for collective investment in transferable securities
EUR	euro	UK	United Kingdom
FCL	financial corporations engaged in lending	US	United States
FSB	Financial Stability Board	USD	US dollar
FATF	Financial Action Task Force	VNAV	variable net asset value
FVC	financial vehicle corporation	WAL	weighted average life
FX	foreign exchange	WAM	weighted average maturity



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Anna Maria Agresti
ECB

Antoine Bouveret
ESMA

Simone Cima
Central Bank of Ireland

Manuel Cruz
ESRB Secretariat

Ad-Willem Dashorst
Dutch Authority for the Financial Markets (AFM)

Jean-Baptiste Haquin
ESMA

Neill Killeen
Central Bank of Ireland

Konstantinos Kanellopoulos
Bank of Greece

Steffen Kern
ESMA and co-chair of the NBEG

Urszula Kochanska
ECB

Luis Christian Molestina Vivar
ECB

Mark Pooters
Dutch Authority for the Financial Markets (AFM)

Richard Portes
Advisory Scientific Committee and co-chair of the NBEG

Eric Schaanning
ESRB Secretariat

Eiko Sievert
ESRB Secretariat and Secretary to the NBEG

Olaf Weeken
ESRB Secretariat

Christian Weistroffer
ECB and Chair of the NBEG Risk Metrics Taskforce

In addition, useful input and comments were also received from members of the ESRB Expert Group on Non-bank Financial Intermediation.

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Postal address 60640 Frankfurt am Main, Germany
Telephone +49 69 1344 0
Website www.esrb.europa.eu

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For specific terminology please refer to the [ESRB glossary](#) (available in English only).

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