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Non-bank financial intermediation in the euro area: implications for monetary policy transmission and key vulnerabilities

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Co-leads of the work stream (or expert group)

Lorenzo Capiello
European Central Bank

Fédéric Holm-Hadulla
European Central Bank

Angela Maddaloni
European Central Bank

Sergio Mayordomo
Banco de España

Robert Unger
Deutsche Bundesbank

Coordinators

Lorenzo Capiello (Sections 3 and 4)
European Central Bank

Fédéric Holm-Hadulla (Section 2)
European Central Bank

Angela Maddaloni (Sections 3 and 4)
European Central Bank

Sergio Mayordomo (Sections 2 and 4)
Banco de España

Robert Unger (Section 1)
Deutsche Bundesbank

Additional contributing authors

Laura Arts
De Nederlandsche Bank

Ioannis Asimakopoulos (author of Sections 3 and 4)
Bank of Greece

Caterina Behrens
European Central Bank

Stefano Corradin (author of Section 4)
European Central Bank

Annalisa Ferrando (author of Sections 1 and 2)
European Central Bank

Margherita Giuzio (author of Section 3)
European Central Bank

Brian Golden (author of Section 4)
Central Bank of Ireland

Giovanni Guazzarotti (author of Section 1)
Banca d'Italia

Adam Gulán
Bank of Finland

Andreas Hertkorn
European Central Bank

Christoph Kaufmann (author of Section 3)
European Central Bank

Lucía Kazarian Avakian
European Central Bank

Kimmo Koskinen (author of Section 3)
Bank of Finland

Franck Sédillot
Banque de France

Jani Matilainen
European Central Bank

Falk Mazelis (author of Section 2)
European Central Bank

Barra McCarthy (author of Sections 3 and 4)
Central Bank of Ireland

Nicolas Meme
Banque de France

Petros Migiakis (author of Sections 3 and 4)
European Central Bank

Harun Mirza
European Central Bank

Alban Moura
Central Bank of Luxembourg

Giulio Nicoletti (author of Sections 1, 2 and 4)
European Central Bank

Juha Niemelä (author of Section 3)
Bank of Finland

Annelie Petersen (author of Sections 2 and 4)
De Nederlandsche Bank

Olivier Pierrard
Central Bank of Luxembourg

Lev Ratnovski (author of Section 4)
European Central Bank

Alexandra Schober-Rhomberg
Oesterreichische Nationalbank

Michael Sigmund
Oesterreichische Nationalbank

Carla Soares (author of Section 4)
Banco de Portugal

Patricia Stupariu
Banco de España

Marco Taboga (author of Section 3)
Banca d'Italia

Luis Miguel Tavares
Banque de France

Emme Van den Boom
De Nederlandsche Bank

Andrea Zaghini (author of Section 4)
European Central Bank

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- No 280, "Understanding low inflation in the euro area from 2013 to 2019: cyclical and structural drivers".

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Abstract

The financing structure of the euro area economy has evolved since the global financial crisis with non-bank financial intermediation taking a more prominent role. This shift affects the transmission of monetary policy. Compared with banks, non-bank financial intermediaries are more responsive to monetary policy measures that influence longer-term interest rates, such as asset purchases. The increasing role of debt securities in the financing structure of firms also leads to a stronger transmission of long-rate shocks. At the same time, short-term policy rates remain an effective tool to steer economic outcomes in the euro area, which is still highly reliant on bank loans. Amid a low interest rate environment, the growth of market-based finance has been accompanied by increased credit, liquidity and duration risk in the non-bank sector. Interconnections in the financial system can amplify contagion and impair the smooth transmission of monetary policy in periods of market distress. The growing importance of non-bank financial intermediaries has implications for the functioning of financial market segments relevant for monetary policy transmission, in particular the money markets and the bond markets.

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Executive summary

The financing structure of the euro area economy has changed markedly since the global financial crisis (GFC). This shift is visible in two dimensions. First, non-bank financial intermediaries (NBFIs) have significantly expanded their financial assets relative to banks. At the same time, there has been an increase in the direct provision of financing by NBFIs to euro area non-financial corporations (NFCs) compared with that provided by banks. Second, the importance of bank loans in the financing structure of euro area NFCs has decreased relative to that of debt securities. Despite this reduction, bank loans remain the most important source of debt financing for NFCs in the euro area.

The changes in the financing structure of NFCs differ across euro area countries and firm sizes. While the importance of bank loans has fallen in most countries, the increase in debt securities has been driven, to a significant extent, by developments in some states. Furthermore, the rise in debt security financing has applied mainly to large companies as opposed to small and medium-sized enterprises (SMEs), whereas the importance of bank loans has declined for both SMEs and large firms. Overall, financing structures remain very heterogeneous across euro area countries and firm sizes.

The changes and the persistent heterogeneity in financing structures may affect monetary policy transmission, but there is no consensus as to the direction of this impact. NBFIs, such as investment funds or insurance companies and pension funds (ICPFs), differ from banks in their business models, balance sheet structures, and regulation. Likewise, the underlying economics of direct market finance – for example via corporate bonds – differ from those of bank loans. The theoretical literature has highlighted important channels through which these differences may affect monetary policy transmission. However, there is at present no consensus view as to whether this transmission would strengthen or weaken following a shift from bank to non-bank finance, and whether this shift would affect the relative effectiveness of different types of monetary policy (e.g. policy rate changes versus asset purchases). The empirical evidence on these issues is scarce, especially for the euro area.

Compared with banks, NBFIs are more responsive to monetary policy measures that influence longer-term interest rates, such as asset purchases. Econometric estimates show that bank and investment fund balance sheets both expand in response to monetary policy easing shocks in general. The response of these different types of financial intermediaries is of similar magnitude for shocks influencing short-term interest rates (“short-rate shocks”). By contrast, investment funds respond more strongly and more persistently than banks in the event of monetary policy shocks affecting longer segments of the yield curve (“long-rate shocks”), where central bank asset purchases primarily operate. Similar patterns emerge when analysing the case of the corporate sector purchase programme (CSPP), whose announcement led NBFIs to raise their holdings of eligible bonds

much more elastically than banks. As such, NBFIs are likely to play a particularly active role in transmitting asset purchases to bond markets, which in turn contributes to pushing down yields and encourages issuance.

The increasing role of debt securities in the financing structure of firms also leads to a stronger transmission of long-rate shocks. The differing behaviour of bank and non-bank financial intermediaries (which form the supply side of the credit market), matters in the initial stages of monetary policy transmission. However, financing structures also affect the later stages of transmission, which consist of adjustments to corporate balance sheets and, ultimately, affect economic activity. The econometric evidence indicates that economies in which bank loans represent a high share of corporate debt show a stronger transmission of short-rate changes to financing conditions and real economic activity than economies with a high share of bond finance. By contrast, asset purchases and other monetary policy measures working via longer-term rates become more effective at higher shares of bond financing.

These findings suggest that the effectiveness of different types of monetary policy may vary across euro area countries. The persistent heterogeneity in financing structures implies in turn that a given monetary policy measure exerts differing effects on economic outcomes across countries. As such, cross-country heterogeneity in financial market structures may complicate efforts to ensure a broadly uniform monetary policy stance throughout the euro area. This suggests that a more uniform transmission of monetary policy across the euro area requires further financial convergence, which would also be supported by the broadening of access to direct market finance as envisaged under the capital markets union.

Finally, the structural lack of bond market access for small firms may also lead to heterogeneity in monetary policy transmission. Even though there has been a progressive increase in the percentage of euro area listed corporate groups that issue fixed income securities in recent years, in 2018 more than 63% of euro area non-financial listed groups had not yet resorted to tapping direct debt market financing. Issuer size is by far the most influential factor affecting firms' access to market-based finance. SMEs in particular face obstacles to gaining access to market-based finance and are therefore more reliant on banks than are large firms. By way of analogy with the cross-country heterogeneity in financing structures, this is likely to render the impact of a given monetary policy measure heterogeneous across firm types. The decline in corporate bond yields, which was partly driven by monetary policy measures such as the CSPP, has contributed to alleviating the constraints faced by smaller groups in accessing market-based finance and has led to a shift in bank loan supply to non-issuing firms. Still greater diversification of financing sources would help firms to increase their resilience and would make their investments less sensitive to adverse shocks, while supporting a more even transmission of monetary policy.

The economy benefits in many ways from deep and broad capital markets supported by non-banks. Non-banks provide firms with funding sources other than bank credit, and the empirical evidence shows that this can foster a faster recovery from downturns. Integrated capital markets also help to improve the risk-sharing of

local shocks in a monetary union. As a result, less monetary stimulus may be needed in times of stress to boost inflation.

However, the growth of market-based finance has been accompanied by increased credit, liquidity and duration risk in non-banks' portfolios, in the context of a low interest rate environment. As a result, the liquidity mismatch between open-end investment funds' assets and liabilities has increased, while the creditworthiness of ICPFs' portfolios has decreased. This makes non-banks more prone to selling their assets pro-cyclically in response to valuation losses and outflows, further amplifying adverse market dynamics. Low interest rates also lead investors to increase their allocation to riskier funds, suggesting that there is a risk-taking monetary policy channel for non-banks.

The risk-taking channel operating through non-banks strengthens the transmission of monetary policy, although it can also lead to the accumulation of risks which have a detrimental impact on financial stability. While increased risk taking contributes to easing the financing conditions of households and firms, it can lead to an excessive build-up of risks. This may affect non-banks' capacity to absorb losses and provide credit to the real economy in the event of an economic downturn or market turmoil.

The growing supply of credit from non-banks, coupled with relatively low yields in the corporate bond markets, may contribute to increasing corporate leverage. NFCs issuing bonds are generally larger and more leveraged and receive cheaper funding from the market. Increased levels of corporate indebtedness could exacerbate firms' vulnerabilities, exert downward pressure on investment and employment and increase the likelihood of corporate defaults.

Furthermore, interconnections in the financial system can amplify contagion and impair the smooth transmission of monetary policy in periods of market distress. The coronavirus (COVID-19) shock in spring 2020 showed how vulnerable segments of the non-bank sector can affect other parts of the financial system through large asset sales and reduced short-term funding. For example, the liquidity of money market funds (MMFs) deteriorated rapidly in March. The actions these funds took to meet redemptions contributed to the significant pressure which arose in the markets they invest in. Central bank interventions in key market segments, including the commercial paper (CP) and corporate bond markets, helped to restore market functioning and prevented a procyclical tightening of financial conditions. This helped to alleviate liquidity strains in the MMF sector.

Against this backdrop, the regulatory framework for non-banks should be enhanced – including from a macroprudential perspective – to support financial stability and the smooth transmission of monetary policy. Pre-emptive macroprudential tools aimed at mitigating the build-up of vulnerabilities in the non-bank sector, such as the better alignment of asset liquidity with redemption terms, would help to increase the resilience of the whole financial system. In addition, such tools would support the effective transmission of monetary policy and would limit the need for central bank interventions in times of crisis. These interventions can have costs, including ex post costs such as increased risks to central banks' own balance

sheets, as well as ex ante costs such as incentives for market participants to take on excessive risk (moral hazard).

The growing importance of NBFIs has implications for the functioning of financial markets. In particular, money markets and fixed income markets play a pivotal role in the transmission of monetary policy. As NBFIs take on a greater role, some of the frictions in these markets may gain in importance and may increase fragilities.

Fragmentation in money markets has increased, reflecting safe asset scarcity in particular. This scarcity was caused by the reduction in supply of and the increase in demand for safe assets. The latter increased due to the implementation of new regulatory requirements for banks (e.g. liquidity requirements) and a general increase in official sector holdings (central banks and official foreign holders), which were already high before the inception of the asset purchase programme.

Safe asset scarcity is partly mitigated by activity in securities lending, a market in which non-banks are important counterparties. The European System of Central Banks (ESCB) programme of securities lending helped to mitigate this scarcity to some extent.

The repo market, which has gained considerably in importance since the GFC, is a prime example of a market in which segmentation and rate dispersion have increased. This increase has the potential to increase fragility in these markets – this could materialise rapidly and trigger sudden illiquidity, impairing the intermediation capacity of some financial institutions and, as a consequence, financing conditions in the non-financial sector.

More work should be done to disentangle the effects on money market rates of regulatory requirements (for financial intermediaries) and differentiated access to central bank facilities among financial intermediaries. Differentiated access to central bank facilities between banks and non-banks seems to induce a gap between the rates charged to banks' counterparties compared with those charged to non-banks. Additional analysis is required to evaluate the implications (including the macroeconomic effects) of this development. This would also provide the basis for a broad assessment of the current monetary policy implementation framework in the face of future structural changes in the financial sector.

Money Market Funds (MMFs) play an important role in the functioning of short-term debt markets. These intermediaries can be subject to runs during periods of financial stress, as was seen during the GFC and, most recently, during the first phase of the COVID-19 crisis. MMFs with holdings in private sector debt invest, for example, in CP and certificates of deposit. These markets are generally considered by investors to be liquid, but they are also markets for which secondary trading is relatively thin in normal times and can evaporate easily during a market-wide shock. Central banks responded to a sudden drop in liquidity in some markets (including the CP market) during the first phase of the COVID-19 crisis by taking steps to restore market functioning, thereby preventing a tightening of financing conditions and easing

MMFs' liquidity strains (which would have eventually been transmitted to the real economy).

Bond markets play a critical role in the transmission of monetary policy and in the financing of the corporate sector. The systemic importance of ratings could increase as bond markets deepen – many corporate bond issuers, especially in the euro area, are just above the investment grade threshold. Since investment funds and other institutional investors (such as ICPFs) rely on ratings to guide their portfolio allocation, the downgrading of multiple issuers could have non-linear effects on bond yields and bond market liquidity. In the event of a “wave” of downgrades of corporate bond issuers, policy options might need to be considered in order to prevent forced sales by institutional investors.

1 The increasing importance of non-bank financing

The financing structure of the euro area economy has changed markedly since the GFC. Section 1.1 documents this shift from two perspectives. First, it looks at the evolution of the financing structure from the perspective of financial intermediaries. More specifically, it describes how the bank-based financial system of the euro area has moved towards a state in which there is a greater role for NBFIs. This sector consists of investment funds, ICPFs as well other financial institutions (OFIs).¹ NBFIs are a fairly heterogeneous group of financial institutions with widely differing business models (see Section 2.1.1 for a detailed analysis). Second, it considers the changes in the financing structure from the perspective of financial instruments. In the euro area, bank loans have traditionally played an important role for NFCs and households. In the aftermath of the GFC, bank loans decreased in importance in the financing structure of euro area NFCs relative to debt securities. Given the fact that euro area households continue to rely mostly on bank financing, this report concentrates on NFCs.² The dual-perspective overview is complemented by a short discussion of the drivers of the change in the financing structure and by a comparison of the evolution of external financing flows during the COVID-19 crisis and during the GFC. Finally, Section 1.2 shows that the changes in the financing structure of NFCs have varied across euro area countries, and according to firm size and sector. While the importance of bank loans decreased in most countries, the increase in debt securities was, to a significant extent, driven by developments in some states. Furthermore, debt security financing rose mainly for large NFCs and not for SMEs. By contrast, the importance of bank loans declined for large firms and SMEs. At the sectoral level, the importance of debt security financing increased most strongly in the information and communication; manufacturing; and wholesale, transportation and accommodation sectors. By contrast, the construction and health and arts sectors remained largely financed by banks.

¹ OFIs include, amongst others, security and derivative dealers, financial vehicle corporations (FVCs) engaged in securitisation transactions, financial corporations engaged in lending, specialised financial corporations, holding companies and financing conduits.

² As of the third quarter of 2020, bank loans made up around 86% of the total loan liabilities of euro area households. Major non-bank sources of loan financing are OFIs (7%) as well as ICPFs (3%). The low prominence of non-bank financing of households in the euro area stands in contrast to the US economy, where NBFIs are very important.

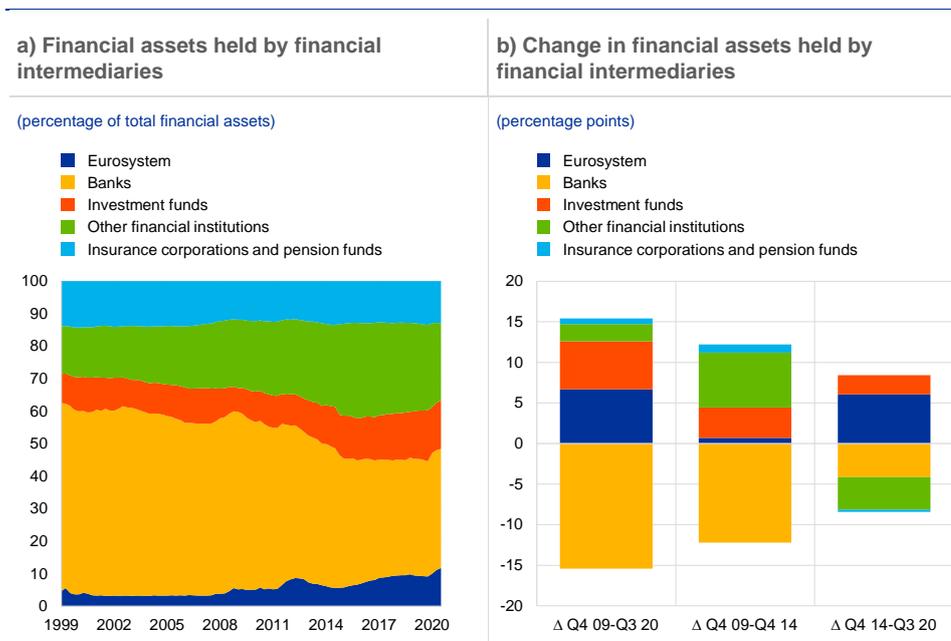
1.1 Provision of external financing to non-financial corporations

1.1.1 Financial intermediary perspective

Since 2009, the importance of banks in euro area financial intermediation has declined. According to financial accounts data, banks³ accounted for 52% of the total financial assets (at market value) of all financial intermediaries at the end of 2009 (see Chart 1, panel (a)). By the third quarter of 2020, this share had fallen by 15 percentage points to 37%. The decline in the importance of banks had already started at the turn of the millennium and accelerated after the GFC. Since the beginning of 2015 the loss in market share has slowed.

Chart 1

Financial assets held by financial intermediaries



Source: ECB (Balance Sheet Items and Quarterly Sector Accounts) and own calculations.

Notes: Calculations based on market values. Financial assets of Eurosystem according to the Balance Sheet Items dataset. MFIs calculated as difference between MFIs (including central bank) and Eurosystem. Data are non-consolidated between sectors.

By contrast, NBFIs have significantly expanded their share of financial assets.

They have thereby replaced financial intermediation capacity lost due to the deleveraging of banks. Investment funds (+5.9 percentage points) and OFIs (+2.1 percentage points) saw larger gains from the end of 2009 (see Chart 1, panel (b)). For investment funds, the rise in importance was relatively steady. The OFI sector grew by a large margin in the years directly after the GFC, although it has

³ In the financial accounts, deposit-taking corporations (i.e. banks) and MMFs combined form the sector "MFIs (other than the central bank)". The currently available statistics do not allow the sector to be split. As the assets of MMFs in the euro area are negligible, the remainder of this report uses the more common term "banks" instead of the technically correct "MFIs".

receded somewhat since 2015.⁴ The share of ICPFs increased only modestly (+0.7 percentage points) after 2009. A non-negligible part of the growth in the market values of the financial assets of NBFIs stems from valuation gains. NBFIs profited more from rising asset prices since their portfolios include more marketable securities than banks' portfolios.⁵ Furthermore, the build-up of intra-sectoral claims also seems to have contributed noticeably to the financial asset growth of NBFIs. Finally, driven mainly by the asset purchase programme (APP), the Eurosystem strongly expanded its balance sheet (+6.7 percentage points) relative to other financial intermediaries.

NBFIs also increased their direct financing provision to euro area NFCs relative to banks. The financial accounts data provide “who-to-whom” information for a selected number of instruments, i.e. loans, debt securities and listed shares, which makes it possible to identify the financing provider.⁶ In order to isolate the changes in the provision of financing that are due to transactions, the analysis relies on notional stocks, which exclude shifts induced by valuation changes. Over the period running from the fourth quarter of 2009 to the third quarter of 2020, only claims in the form of loans measurably lost significance for banks (see Chart 2, panel (a)). Loans provided by (other) NFCs saw the largest increase. In the case of debt securities, the Eurosystem strongly expanded its holding share due to the purchases made in the context of the CSPP. By contrast, economic agents from the rest of the world downsized their portfolio of euro area NFC debt securities. The sectoral holdings of listed shares saw smaller changes, while for all instruments taken together the share of financing provided by banks fell by 3.9 percentage points. By contrast, the provision of financing by (other) NFCs increased by 3.1 percentage points. The shares of ICPFs (+0.4 percentage points), investment funds (+0.5 percentage points) and OFIs (+1.5 percentage points), also rose, although overall much less than total financial assets.⁷

Despite their diminished role, banks continue to be the most important provider of NFC financing. As of the third quarter of 2020, they supplied almost half of the total loan liabilities of euro area NFCs (see Chart 2, panel (b)). Given the high relative weight of loans, banks are also the largest provider of financing across all three instruments (33%). The second biggest suppliers are (other) NFCs, which account for close to 30% of all loans and more than a quarter of overall NFC financing. Investors

⁴ A part of OFI asset growth comes from an extension of the scope of a survey used to compile the instrument “unlisted equity” for the subsector “captives and money lenders (S.127)” in the financial accounts of Luxembourg.

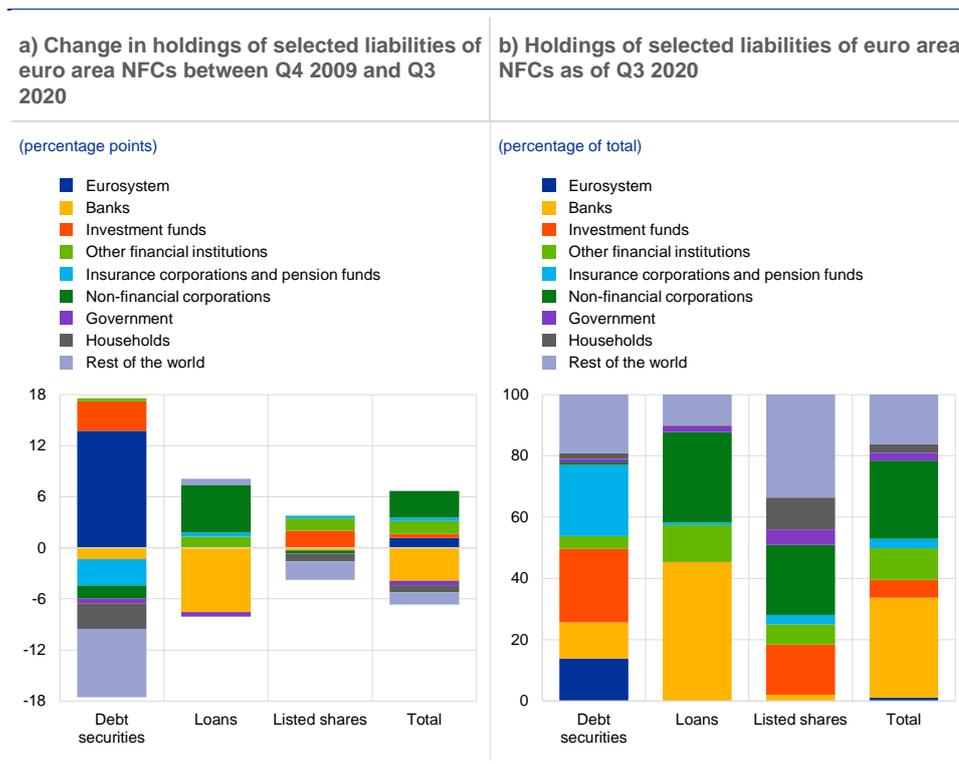
⁵ Calculated based solely on transactions, the share of banks' financial asset holdings declined by only 9.2 percentage points (compared with -15.4 percentage points at market values) between the fourth quarter of 2009 and the third quarter of 2020. In turn, the increase for investment funds (+2.5 percentage points compared with +5.9 percentage points at market values) was considerably smaller. For OFIs, the change even turns negative (-0.4 percentage points compared with +2.1 percentage points at market values).

⁶ As of the third quarter of 2020, these three instruments accounted for 58% of total liabilities at market values. Time series for debt securities and listed shares begin as late as the fourth quarter of 2013. To estimate the change in sectoral financing provision since 2009, we assume that the holding share of a sector in the fourth quarter of 2009 equalled the share in the fourth quarter of 2013 and split the total amount outstanding of the respective instrument in the fourth quarter of 2009 proportionally across sectors.

⁷ Consolidating for intra-sectoral claims, the share of overall financing of banks decreased by only 3.2 percentage points. By contrast, the gains in importance for ICPFs (+0.7 percentage points), investment funds (+0.9 percentage points) and OFIs (+2.5 percentage points) are higher.

from the rest of the world hold around 16% of the three liabilities combined, with a particularly strong prominence in listed shares. In the group of NBFIs, OFIs are the largest provider of financing, with a share of more than 10%. The shares of investment funds and ICPFs amount to around 6% and 3% respectively.⁸

Chart 2
Sectoral provision of financing to euro area NFCs



Source: ECB (Quarterly Sector Accounts) and own calculations.
Notes: Panel (a): calculations based on notional stocks. Total equals the sum of debt securities, loans and listed shares. Due to data limitations, the change in sectoral holdings of debt securities, listed shares and total is calculated under the assumption that the holding share of a sector in the fourth quarter of 2009 equalled the share in the fourth quarter of 2013. Panel (b): calculations based on market values.

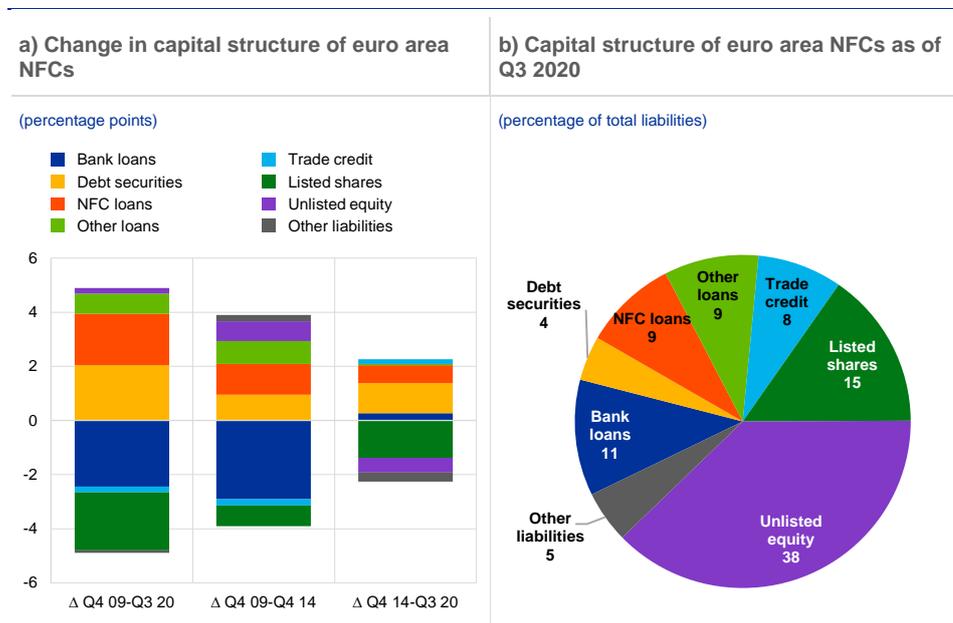
1.1.2 Financial instrument perspective

In the aftermath of the GFC, bank loans decreased in importance in the financing structure of euro area NFCs relative to debt securities. As a percentage of total liabilities measured at notional values, bank loans declined by 2.4 percentage points between the fourth quarter of 2009 and the third quarter of 2020 (see Chart 3, panel (a)). Over the same period, the weight of listed shares fell by 2.1 percentage points. By contrast, debt securities (+2.0 percentage points) increased markedly in importance. Since debt securities are the main alternative to bank loans for (long-term) investment financing, they are closely linked to economic activity and are therefore especially important in the transmission of monetary policy. NFC loans,

⁸ After consolidating the holdings of NFCs for intra-sectoral claims, the continuing dominance of bank financing provision is even more striking. The share of banks of loans and of all three financial liabilities combined rises to 64% and 43% respectively.

which mainly reflect the distribution of liquidity between related enterprises, also rose measurably (+1.9 percentage points). Furthermore, other loans (including loans from NBFIs, +0.7 percentage points) and unlisted equity (+0.2 percentage points) registered smaller gains. The relative importance of trade credit, which serves as the main alternative to bank loans for the short-term financing of working capital needs, remained more or less constant. Measured at market values, the share of bank loans fell by 6.4 percentage points after 2009. This is considerably more than when measured at notional stocks, due to a strong rise in equity valuations. This pushed up the weight of listed shares and unlisted equity at market value by 1.5 and 3.3 percentage points respectively.⁹

Chart 3
Capital structure of euro area NFCs



Source: ECB (Quarterly Sector Accounts) and own calculations.
Notes: Panel (a): calculations based on notional stocks. Panel (b): calculations based on market values.

Despite losing prominence since 2009, bank loans still constitute the largest item in the debt instruments category. As of the third quarter of 2020, they account for 11% of unconsolidated total liabilities at market values (see Chart 3, panel (b)). Debt securities, which increased markedly in importance, now amount to around 4% of total liabilities. However, NFCs also issue debt securities through financing conduits and via holding companies (European Central Bank, 2016). Accordingly, the amount of financing obtained – directly and indirectly – via debt securities is very likely to be

⁹ An ideal measure of the loss-absorbing equity of NFCs would include both subscribed capital at book value and retained earnings. Notional stocks derived from financial accounts data only approximate the change in loss-absorbing equity in the form of subscribed capital at book value and are therefore a lower bound estimate. By contrast, the genuine financial accounts data measure the subscribed capital at market values. On the one hand market valuations should reflect the accumulation of retained earnings, while on the other hand they are sensitive to the discount factor, which is very low in the prevailing low interest rate environment. Accordingly, equity at market value may currently overestimate the loss-absorbing equity of NFCs and is therefore an upper bound estimate.

higher than the headline figures reported above suggest.¹⁰ Loans from (other) NFCs, other loans (including loans from NBFIs) as well as trade credit each account for 8-9%. Around 53% of total liabilities consist of equity instruments. Of this 53%, 15 percentage points are listed shares, while the remaining 38 percentage points are unlisted equity. Consolidating the financial liabilities of NFCs, i.e. removing all claims between NFCs (intra-sectoral claims), would not change the overall picture much. Compared with the unconsolidated data, the share of bank loans and debt securities of total liabilities would rise, although the relative importance of these two financing sources would remain unchanged. The consolidation would also leave the relative weight of equity and debt essentially unaffected.¹¹

1.1.3 Key factors driving the shift in the financing structure

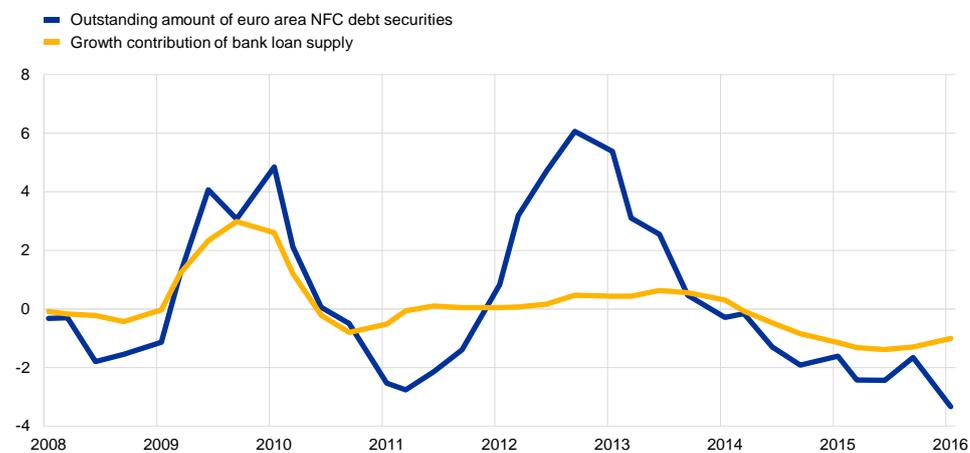
The greater importance of market-based debt financing is in part a long-term consequence of the GFC and the sovereign debt crisis. These crises weakened the balance sheet and asset quality of the euro area banking system. Banks suffering from poor capitalisation and – especially during the GFC – from restricted access to interbank markets, contracted their supply of credit. NFCs used debt security financing as a “spare tyre” to make up for the lack of bank loan supply. Altavilla et al. (2019b), show empirically that the reduction in euro area bank loan supply was an important factor explaining the recourse to bond financing by firms during the GFC (see Chart 4). They also find that the substitution is incomplete, in line with theoretical predictions (Crouzet, 2018).

¹⁰ Anecdotal evidence supports this claim. As of December 2020, OFIs which are holding companies for or subsidiaries of NFCs issued approximately 459 of the 1,600 bonds purchased by the ECB under the CSPP/PEPP.

¹¹ Fully consolidated data from Eurostat show that the share of bank loans and debt securities in total liabilities would rise to 14.9% and 5.3% respectively in the consolidated data, from 10.5% and 3.8% respectively (as of the fourth quarter of 2019) in the unconsolidated capital structure. In the case of equity, only the relative importance of the two categories changes: the weight of listed equity rises (from 16.7% to 20.2%) while the weight of unlisted equity falls (from 39.6% to 36.4%). One reason for this might be that a non-negligible part of the unlisted equity liabilities consists of strategic investments made by other NFCs.

Chart 4**Debt security financing of euro area NFCs**

(year-on-year growth rate, percentages)



Source: Altavilla et al. (2019b).

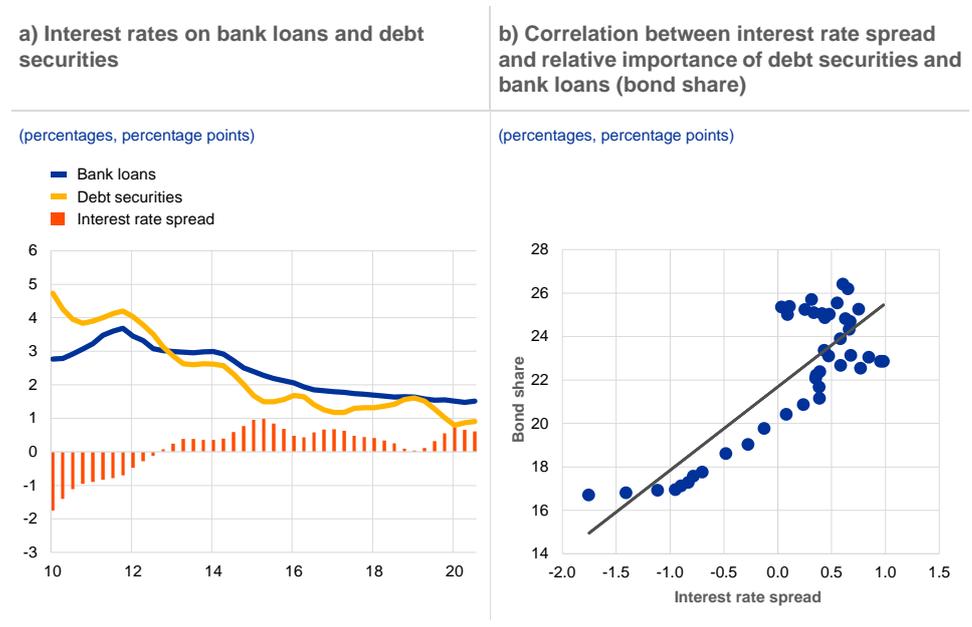
A reduction in the cost of financing via debt securities compared with bank loans also seems to have contributed to the shift in their relative importance in the capital structure.

Two main factors played a role in the strong fall in yields on debt securities. First, the APP low interest rate environment led to a general search for yield among investors and depressed the interest rates on NFC debt securities (European Systemic Risk Board, 2021). Secondly, the lowered yields through two related channels (European Central Bank, 2017, 2018). On the one hand, purchases in the context of the CSPP directly reduced the interest rates on NFC debt securities (see Section 2.2.1 for a detailed analysis). On the other hand, purchasing in the context of the public sector purchase programme (PSPP) reduced the yields on government bonds. Via portfolio rebalancing, this also lowered the interest rates of NFC debt securities (Altavilla et al., 2021). While the interest rates on bank loans also declined, this reduction was more modest.¹² Taking these points together, the financing cost of debt securities fell relative to those of bank loans (see Chart 5, panel (a)). This meant that debt securities became relatively more attractive, while at the same time their relative importance in the capital structure increased (see Chart 5, panel (b)).

¹² One reason for this might be that in most cases banks did not lower their deposit rates below zero, which in turn limited the pass-through to loan rates.

Chart 5

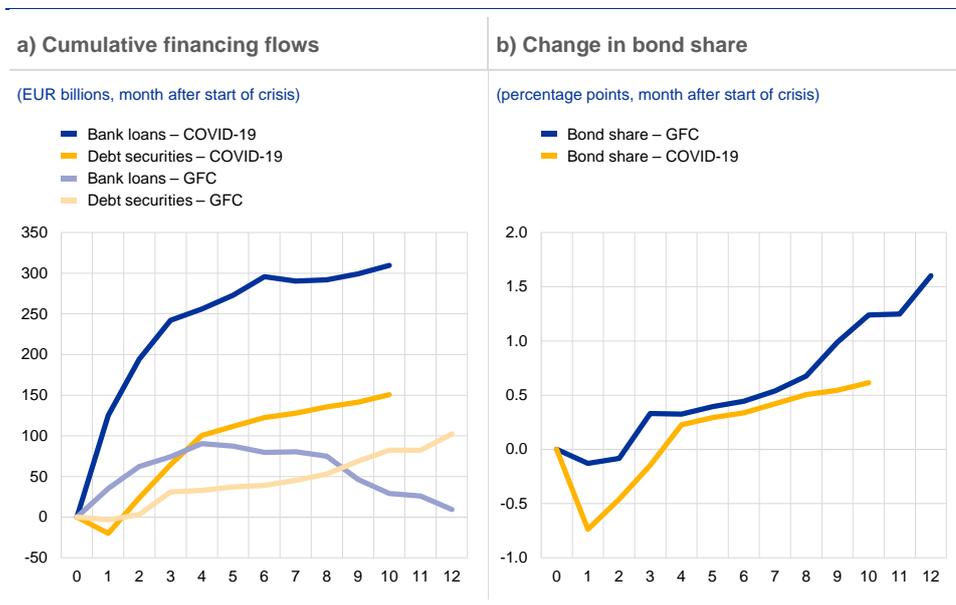
Relative financing cost and importance in the financing structure of bank loans and debt securities



Sources: ECB, Merrill Lynch and own calculations.
 Notes: Panel (a): interest rate spread equals the difference between the interest rates on bank loans and debt securities. Interest rates refer to different average maturities and are thus only approximately comparable. Panel (b): the y-axis displays the bond share, i.e. the share of debt securities in the sum of bank loans and debt securities calculated at notional stocks. The x-axis displays the interest rate spread as defined above. Scatterplot based on data for the first quarter of 2010 to the third quarter of 2020.

1.1.4 Financing flows during the COVID-19 crisis

Financing flows after the outbreak of the COVID-19 crisis differ from those after the GFC. Whereas the GFC originated in the banking sector and spread to the real economy, the COVID-19 crisis is much closer to a truly exogenous shock. Because of the strong reduction in economic activity, NFCs' cash flows collapsed and they expanded their precautionary liquidity buffers, increasing the demand for external financing. In contrast to the GFC, the strong and sustained expansion of bank loans – especially in the form of credit lines and loans with government guarantees – acted as a stabiliser of the financial situation of NFCs after the outbreak of the COVID-19 crisis (see Chart 6, panel (a)). Alongside this development, debt security issuance expanded strongly after a short period of market turmoil, complementing the uptake in loans. By contrast, when bank loan supply restrictions became binding and flows receded in the aftermath of the GFC, debt securities acted increasingly as a substitute. Due to the lower absolute volume of debt security financing, the relative share of bonds has continued to increase during the COVID-19 crisis (see Chart 6, panel (b)).

Chart 6**Financing instruments in times of crises**

Sources: ECB (Balance Sheet Items and Securities Issues Statistics) and own calculations.

Notes: Period 0 refers to the month before the beginning of the respective crisis (GFC: August 2008, COVID-19: February 2020). Bond share is the share of debt securities in the sum of debt securities and bank loans.

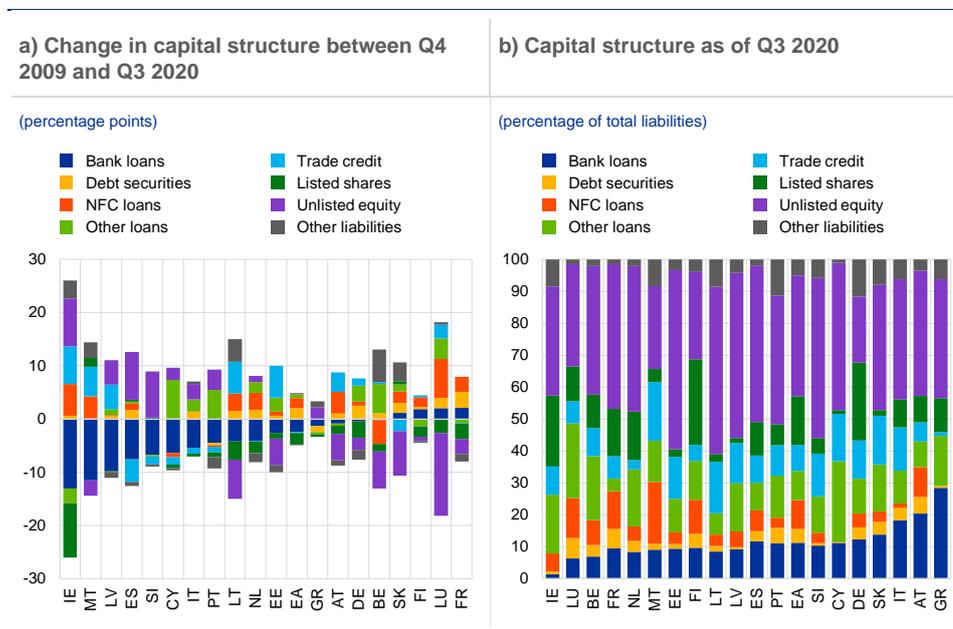
To some extent these developments are also a reflection of the Eurosystem’s different monetary policy measures during the two crises. In response to the GFC, actions focused mainly on banks and came in the form of interest rate cuts, a shift to fixed-rate full allotment tenders, an extended collateral framework and longer-term refinancing operations for banks. By contrast, during the COVID-19 crisis the policy response included support to bond markets in the form of the pandemic emergency purchase programme (PEPP). Policy actions specifically aimed at banks, such as the pandemic emergency longer-term refinancing operation, a recalibration of the targeted longer-term refinancing operation, (TLTRO III) and the temporary easing of collateral standards complemented this measure.

1.2 Persistent heterogeneity in financing structures

The reduced importance of bank loans in the capital structure of NFCs in the euro area as a whole is also observable across the majority of countries. After the end of 2009, the share of bank loans in total liabilities (at notional values) fell in 14 of the euro area countries (see Chart 7, panel (a)). In most places, the decline was larger than it was in the euro area as a whole. By contrast, the weight of bank loans remained more or less constant in Germany and actually increased by two percentage points in France. Given the large economic size of these two countries these developments cushioned the reduction registered for the entire euro area. The share of debt securities rose in almost all individual countries, although in most cases by less than it increased in the euro area as a whole. The increase in the importance of debt securities for NFCs in France contributed strongly to the shift observed for the entire euro area. In general, NFCs in countries that already had a higher share of debt

security financing at the end of 2009 saw larger increases (see Section 2.2.2 for a detailed analysis). Changes varied across the other financing instruments. As of the third quarter of 2020, considerable cross-country heterogeneity continued to characterise the financing mix of NFCs in euro area countries (see Chart 7, panel (b)). The share of bank loans in total liabilities ranges from less than 2% for NFCs in Ireland to 28% for NFCs in Greece. For the remaining countries, the ratio is around 10% and thus close to the share for the euro area as a whole. The relative weight of debt security financing also differs across individual countries and in most cases is lower than it is in the euro area as a whole. Finally, the ratio of equity financing to total liabilities varies considerably across countries as well and ranges in almost all states from 40% to 60%.

Chart 7
Capital structure of NFCs in euro area countries



Sources: ECB (Quarterly Sector Accounts) and own calculations.
Notes: Panel (a): calculations based on notional stocks. Panel (b): calculations based on market values.

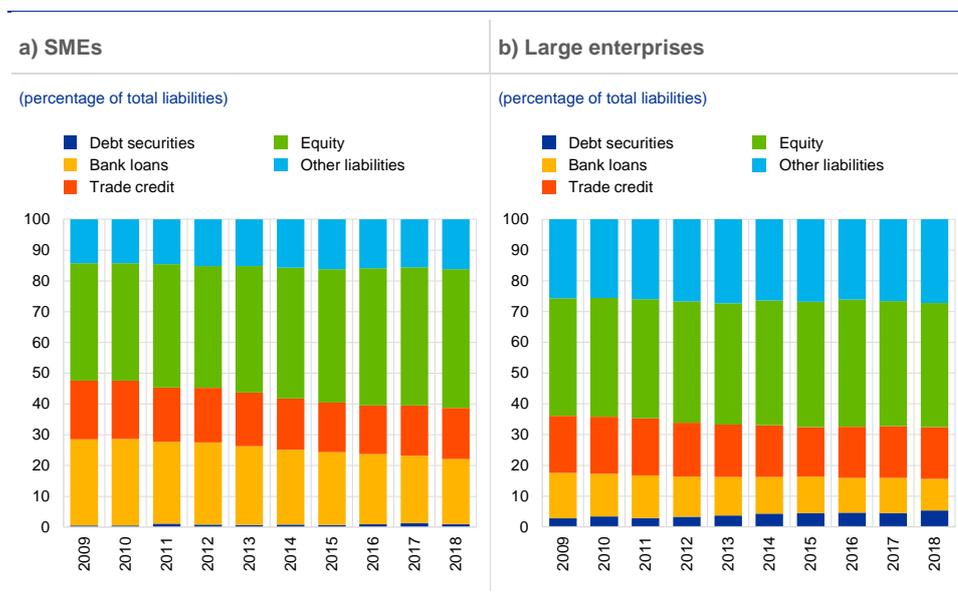
The increase in debt security financing was driven mainly by large NFCs rather than by SMEs. According to BACH data, the share of debt securities in the total liabilities of euro area NFCs increased noticeably only for large firms (see Chart 8).¹³ Various factors seem to hinder access to market-based debt financing for SMEs. These include the relatively low transparency of SMEs, the high fixed costs associated with building a bond market presence, and the underdevelopment of domestic intermediaries specialised in placing and underwriting corporate debt instruments, such as private debt funds. A recent increase in market-based debt financing for SMEs is limited to those countries that benefited from fiscal and regulatory incentives, such as Italy through “Minibonds” (Ongena et al., 2020). By contrast, the importance of bank loans decreased for both SMEs and large firms (see Chart 8). Equity – both listed

¹³ Values for the euro area have been computed from country data for Belgium, Germany, Spain, France, Italy, Luxembourg, Austria, Portugal and Slovakia.

and unlisted – gained in prominence. In the case of SMEs, most of the increase is likely to be due to higher retained earnings.¹⁴ In several countries, tax incentives in favour of recapitalisation fostered an increase in equity financing.¹⁵

Chart 8

Capital structure of euro area NFCs according to firm size



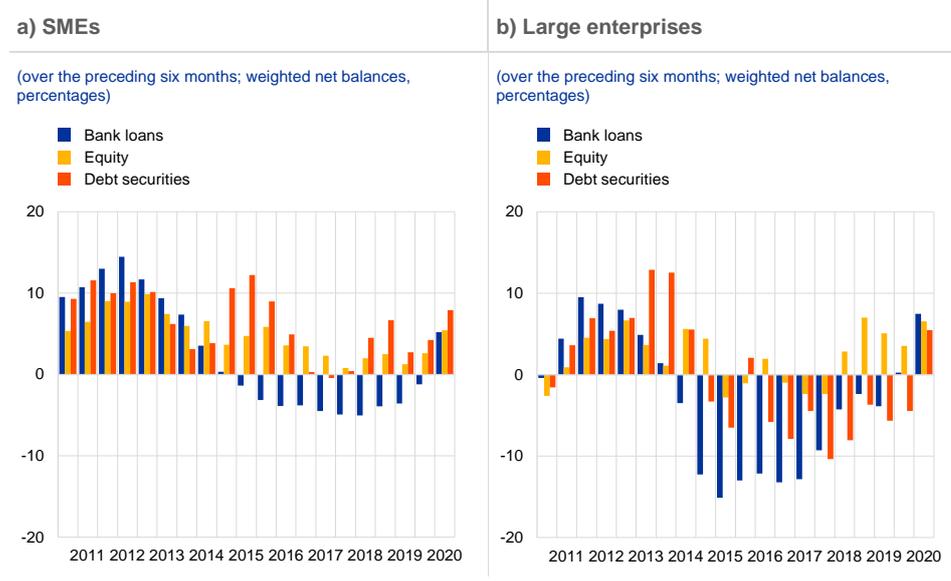
Sources: BACH database and own calculations.

Notes: Equity corresponds to listed and unlisted equity. Other liabilities exclude loans from NFCs (intercompany loans) and include loans from other non-banks. Trade credit includes trade payable and payments. Values are calculated based on country data for Belgium, Germany, Spain, France, Italy, Luxembourg, Austria, Portugal and Slovakia.

Despite showing improvements, SMEs were still unable to obtain as much market-based debt financing as they needed. According to the Survey on the Access to Finance of Enterprises (SAFE), there was still a positive financing gap for specific instruments, i.e. financing needs increased more than financing availability (see Chart 9). Smaller firms reported a positive gap for debt securities and equity since the beginning of the survey in 2009. Looking at the broad recourse to external funds, at least one-third of SMEs in the SAFE state that they have not used this source of funds. Instead they relied exclusively on internal sources of financing (i.e. retained earnings). For large firms, the corresponding share is only 20%.

¹⁴ The increase in the importance of equity financing in the BACH database is in contrast to the reduction in notional stocks derived from financial accounts data as documented above. The discrepancy is likely to be due to the accounting of retained earnings in the BACH database – these are not part of the notional stocks derived from the financial accounts data.

¹⁵ For instance, in Italy the increase in own capital was favoured by the strengthening of tax incentives under the allowance for corporate equity.

Chart 9**External financing gap of euro area NFCs**

Sources: ECB and European Commission SAFE.

Notes: SMEs are firms with fewer than 250 employees while large enterprises have more than 250 employees. A positive value for the indicator suggests an increasing financing gap. Values are multiplied by 100 to obtain weighted net balances in percentages and are one-year moving averages. The latest observation is for the period April-September 2020.

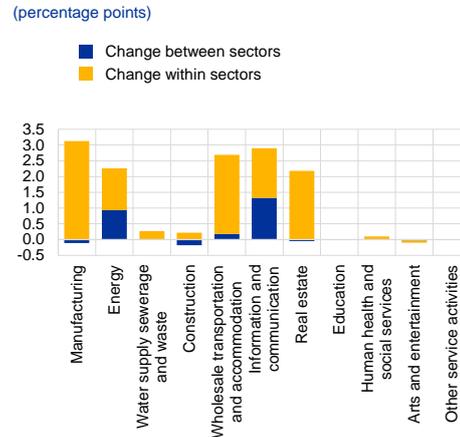
The increase in debt security financing was concentrated in certain sectors, while gains in equity financing were broad-based. The bond share – the ratio of debt securities to the sum of bank loans and debt securities – increased by about 15 percentage points between 2009 and 2018 and was concentrated in certain sectors (see Chart 10, panel (a)).¹⁶ The information and communication; manufacturing; and wholesale, transportation and accommodation sectors saw the largest increase. This development had started already in 2009 for the information and communication sector, while manufacturing caught up between 2014 and 2018. These sectors actively increased their bond share strongly (the yellow bar in panel (a)), while the increased relevance of sectors that were already bond-intensive played a more limited role (the blue bar in panel (a)). By contrast, the construction, health, and arts sectors remained largely financed by banks. A possible explanation for the pattern observed is that sectors that hold mainly tangible assets which can easily be pledged as collateral (e.g. real estate for the construction sector) tend to rely more on bank financing. With regard to equity, the increase was broad-based across sectors (see Chart 10, panel (b)). Notable exceptions were the energy as well as the information and communication sectors, for which the share of equity remained essentially constant. The other services as well as the arts and entertainment sectors showed the strongest relative increase in equity.

¹⁶ The shift share exercise in Chart 10 provides a precise decomposition between the deepening of the use of bonds within sectors, which played the largest role, relative to the increased importance of sectors with high bond intensity (i.e. “between” sectors), which played a smaller role.

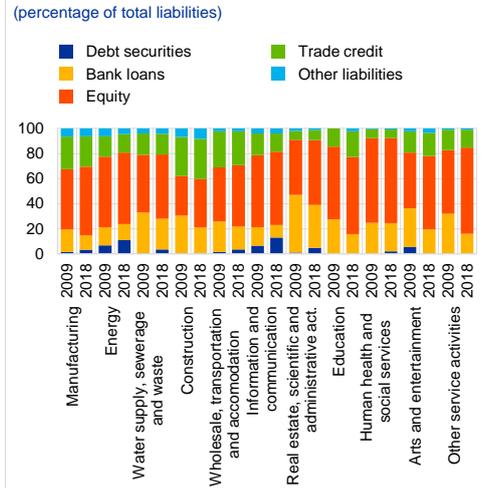
Chart 10

Capital structure of euro area NFCs at the sectoral level

a) Contribution to the change in bond share between 2009 and 2018



b) Capital structure as of Q4 2018



Sources: BACH database and own calculations.

Notes: Panel (a): bond share is the ratio of debt securities to the sum of debt securities and bank loans. Colours highlight the shift share decomposition distinguishing between changes in the use of bonds within sectors (i.e. "within", yellow) and changes in the importance of bonds of sectors with high bond intensity, (i.e. "between", blue). Panel (b): equity corresponds to listed and unlisted equity. Other liabilities exclude loans from NFCs (intercompany loans) and include loans from other non-banks. Trade credit includes trade payable and payments.

2 Financing structures and the transmission of monetary policy

This chapter discusses the transmission of monetary policy in the euro area via non-bank finance and contrasts this with transmission via banks. In recent decades, the monetary economics literature has provided an increasingly detailed account of how financial intermediaries and financial structures shape the transmission of monetary policy to the economy.¹⁷ Drawing on this literature, this chapter starts from a set of conceptual considerations to examine why an economy's financing structure – and specifically the relative role of bank and non-bank sources of finance – can influence the transmission of monetary policy (Section 2.1). It then offers empirical evidence on the interaction between financing structures and monetary policy transmission in the euro area (Section 2.2). In both sections the discussion is organised along three aspects: the role of different intermediaries (e.g. banks vs. investment funds, ICPFs, etc.), the role of different instruments (e.g. bank loans vs. corporate bonds or debt vs. equity finance), and the role of different borrower types (e.g. large corporates vs. SMEs).¹⁸

2.1 Distinctive features of bank and non-bank finance in the transmission of monetary policy

2.1.1 Financial intermediary perspective

Economies are populated by financial intermediaries with fundamentally different business models and balance sheet structures. To illustrate these differences, Figure 1 shows the stylised aggregate sectoral balance sheets of euro area banks, ICPFs and investment funds. Together, these intermediaries make up the bulk of the financial assets held by financial institutions in the euro area (see Chapter 1),¹⁹ and they exhibit striking differences on both the assets and the liabilities

¹⁷ While financial frictions were an active field of study in the 1990s (Blanchard, 2000), they were not considered a core feature in the models of the neoclassical synthesis that combined new classical and new Keynesian macroeconomics (Goodfriend and King, 1997; Woodford, 2009). Even the seminal financial accelerator model (Bernanke et al., 1999) only incorporated a financial sector in a reduced-form manner. Following the breakdown of bank-based monetary policy transmission during the GFC, a rapidly growing body of literature moved the financial intermediation process and related frictions to the centre of attention. Seminal works included those by Gerali et al. (2010), Cúrdia and Woodford (2010; 2011) and Gertler and Karadi (2011). Furthermore, more recent strands of the literature have extended the focus from bank to NBFIs, given the increasing role of the latter. See, for instance Verona et al. (2013), Gertler et al. (2016), Mazelis (2016), Meeks et al. (2017) and Gebauer and Mazelis (2020).

¹⁸ In practice, some of these distinctions are fluid, but this structure helps to organise the diverse field of non-bank financial intermediation and distil some key economic mechanisms and empirical relationships that dominate in each of these three aspects.

¹⁹ As described in Chapter 1, there are further types of intermediary beyond those discussed here. In particular, the OFI sector is quantitatively relevant (see Chart 1). In this chapter, we abstract from the OFI sector since it combines a very heterogeneous set of intermediary types and thus risks concealing rather than clarifying the key mechanisms in play.

sides. On the assets side, loans constitute the main instrument by which banks supply credit to the economy, whereas the assets side of ICPFs and investment funds is dominated by debt securities and equity. On the liabilities side, a defining feature of banks is their access to deposit funding, whereas ICPFs' liabilities consist mainly of technical reserves for their clients and investment funds' liabilities consist mainly of their issued fund shares.

Figure 1
Balance sheet structures by financial intermediary sector

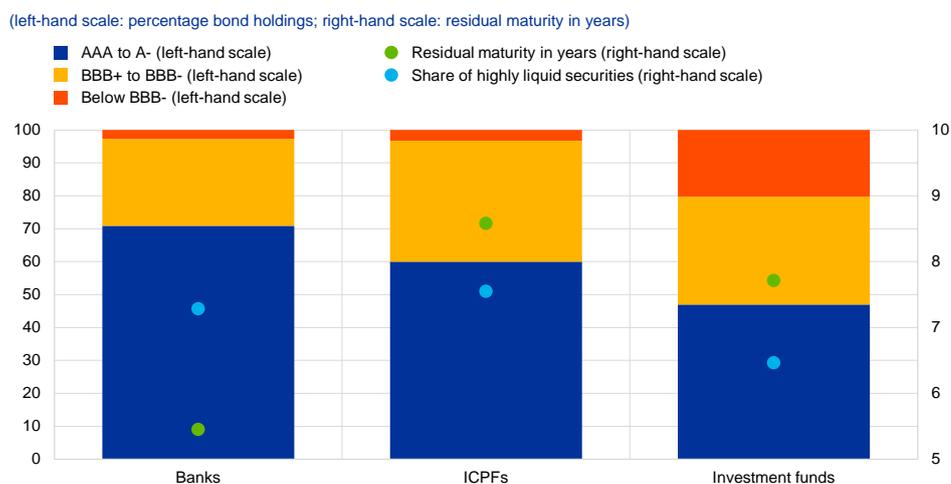
Banks		ICPFs		IFs	
	DS	L	L	L	L
L	BD	DS	TR	DS	FS
DS	E	E	E	E	E
E	E	O	E	O	O
O	O	O	O	O	O

Sources: ECB Statistical Data Warehouse (databases: MFI Balance Sheet Items, Insurance Corporations Assets and Liabilities, Pension Funds Regulation, Investment Funds Balance Sheet Statistics) and own calculations.
Notes: Schematic aggregate balance sheet sizes are based on the outstanding amounts at the end of the second quarter of 2020. For each intermediary type, the left column denotes assets and the right column liabilities. L = Loans, DS = Debt securities, O = Other, BD = Bank deposits, E = Equity, TR = Technical reserves, FS = Fund shares.

The above differences in the weight of specific asset and liability classes are accompanied by further important sources of heterogeneity across intermediaries. For instance, bond portfolios show marked differences in the tendency for intermediary types to assume (i) credit risk (approximated by the relative shares of lower-rated bond holdings), which is much higher in investment funds than in banks and ICPFs; (ii) duration risk (approximated by the residual maturity of bond holdings), which is higher for ICPFs than for banks and investment funds; and (iii) liquidity risk (approximated by the share of highly liquid securities), which is lower for banks and ICPFs than for investment funds (see Chart 11). These differences are in turn accompanied, and in some cases may be compounded, by similarly pronounced differences in other asset classes (such as loans), as well as in the liability structure of different types of intermediaries.

Chart 11

Bond holdings of euro area financial institutions



Sources: ECB (Securities Holdings Statistics by Sector) and ECB calculations.
 Notes: Securities are mapped into liquidity classes in accordance with Commission Delegated Regulation (EU) 2015/61, which defines liquidity requirements for banks. Highly liquid securities correspond to Level 1. The latest observation is for the second quarter of 2020.

This heterogeneity in balance sheet structures may in turn impact key channels of monetary policy transmission. For instance, the gap between the duration of assets and liabilities on an intermediary’s balance sheet determines whether their net worth is increased or reduced by declining interest rates.²⁰ These differences in the duration channel of monetary policy may, in turn, alter the respective incentives to adjust the volume and pricing of credit supplied to the economy. Likewise, differential credit risk exposures imply that the risk-taking and balance-sheet channels of transmission differ across intermediary type, and the differences relating to the liquidity mismatch between assets and liabilities, as well as the specific sources from which intermediaries raise funding, constitute a further factor giving rise to heterogeneity in transmission.²¹ Moreover, these differences may affect the relative transmission patterns of different types of monetary policy measures. For instance, asset purchases exert stronger effects on duration-risk and credit-risk premia than policy rate cuts, thereby reinforcing or mitigating existing differences across intermediaries (Altavilla et al., 2021). Finally, adding to the heterogeneity in balance sheet structures, differences in the regulatory environments in which different intermediary types operate may affect their scope and incentives to adjust to monetary policy, hence pointing to a further potential source of heterogeneity in transmission (Gebauer and Mazelis, 2020).

²⁰ Banks, for example, tend to have assets with a higher duration than liabilities because of their maturity transformation business. This, ceteris paribus, implies that their net worth benefits from falling discount rates. By contrast ICPFs, and especially life insurers, have liabilities with a higher duration than assets, so their net worth comes under pressure when discount rates fall.

²¹ Banks, for example, source a large portion of their liabilities from depositors, who tend to exhibit a sluggish response to changing risk-return constellations, whereas investment funds are largely financed by attentive investors, who respond more elastically. As such, investment funds may be more prone to abrupt reversals in liquidity conditions than banks. At the same time, the pricing of bank liabilities tends to be particularly responsive to monetary policy, which may work in the opposite direction (see below).

Overall, the increasingly relevant role of NBFIs calls for an extended reassessment of the monetary policy transmission process. While the shift towards a greater role for non-bank intermediaries is likely to impact monetary policy transmission in a significant manner, the direction and patterns of this impact are, from a theoretical perspective, ambiguous. Moreover, there has been scarce empirical evidence so far, especially for the euro area, and previous findings for other economies, such as the US economy, may not apply here due to differences in economic structures and institutional environments. Against this backdrop, Section 2.2 presents a quantitative analysis which zooms in on key aspects of the interaction between non-bank financial intermediation and monetary policy transmission.

2.1.2 Financial instrument perspective

Firms may obtain funds through a diverse set of financing instruments. For instance, they may raise external finance via debt or equity instruments and, within debt finance, via bank loans or direct market financing instruments such as corporate bonds. Moreover, within these categories there are further significant parameters which shape the composition of external finance (e.g. with regard to its maturity structure or collateralisation). These differences may impinge on the transmission of monetary policy to the costs and volumes of financing and, ultimately, to key economic outcome variables.

The transmission of monetary policy via different debt financing instruments involves countervailing mechanisms. According to the bank lending view of monetary policy transmission, bank loan supply tends to be particularly responsive to monetary policy shocks (Kashyap and Stein, 1994; Gambacorta, 2005). The reason for this is that a large portion of banks' liabilities is tied to policy-controlled interest rates, while frictions on borrowers' balance sheets prevent them from fully arbitraging away differences in financing conditions across debt instruments.²² However, this bank lending channel is accompanied by a second mechanism related to demand substitution on the borrower side. The underlying terms of bank loans tend to be easier to adjust in response to changing economic circumstances and the value of this flexibility is likely to rise (fall) under tighter (looser) monetary conditions (Crouzet, 2021).²³ This mechanism may therefore (partly) offset the stronger loan supply shifts arising from the bank lending channel.

²² For instance, the financial positions of small firms often permit only a limited degree of transparency, manifested, for example, in the absence of independent credit ratings, which prevents them from accessing direct market finance. For this reason, they cannot easily compensate for a contraction in loan supply by issuing bonds and, instead, have to bear the higher financing costs that accompany inward shifts in loan supply.

²³ For instance, loan contracts are easier to renegotiate or restructure if borrowers fall on hard times than are bonds. This is because: (i) loan contracts typically involve one (or a few) creditors, whereas bonds can, in principle, be spread over an infinite number of anonymous investors, so the transaction costs of changing the terms of a credit contract are lower in the former than in the latter case; (ii) banks specialise in the screening and monitoring of borrowers and are therefore particularly well placed to conduct credit renegotiations and restructurings on informed terms.

As a consequence, the interaction between monetary policy and debt financing structures is, from a theoretical perspective, ambiguous. For instance, monetary policy tightening may induce a greater credit supply contraction in bank loan markets than in corporate bond markets.²⁴ However, the resultant clouding of firm business prospects may also raise the value firms attach to the flexibility of loans and may therefore induce a demand shift towards the latter instrument. As such, the shock may either raise or lower the share of bonds relative to loans, and the relative strength of the impact may in turn depend on the financing structure prevailing prior to the shock. This is because it will be easier for firms to substitute bonds for loans in economies with well-developed bond markets than in economies in which the corporate sector (almost) exclusively relies on lending from banks. Therefore, the relative role of bank finance vs. bond finance may affect the overall response of credit to monetary policy shocks and may thereby shape their ultimate transmission to the economy. In view of the rising importance of bond finance in the euro area and the persistent heterogeneity in financing structures across countries, these questions are of first-order policy relevance and will be analysed empirically in Section 2.2.

The interaction between monetary policy and the choice between debt and equity finance is also subject to several countervailing mechanisms. For instance, monetary policy tightening (easing) renders borrowing constraints in the corporate sector more (less) binding. This may give rise to a positive relationship between leverage – or financial constraints more broadly defined – and the strength of transmission to firm investment and the real economy (Cloyne et al., 2018). On the other hand, highly leveraged firms face a steeper marginal cost-of-capital curve because an increase in borrowing triggers a greater rise in risk premia at high levels of leverage, which may lead to weaker real transmission of policy (Ottonello and Winberry, 2020). Accordingly, the implications of leverage for the transmission of monetary policy are ambiguous and leave scope for important empirical analysis.

The mix between debt and equity in the corporate sector may also be endogenous to monetary policy. In times of rising leverage – such as the period of the COVID-19 crisis – it is important to understand whether the policy response may reinforce or mitigate that trend. Once again, the theory does not offer any clear-cut answers. For instance, the pecking order theory of corporate finance postulates that firms only issue equity when specific events occur (such as their founding, IPOs, or around M&A transactions) and instead use debt as the marginal tool of external finance (Myers, 1984). This would generally speak in favour of monetary policy easing (tightening) leading to higher (lower) leverage as equity issuance remains unaffected while debt issuance expands (contracts). However, opposite patterns may also materialise, at least temporarily, for example if policy easing raises firms' profitability, allowing them to build up capital or shed credit. There is therefore also a need for an in-depth empirical analysis of this issue and Section 2.2 will seek to make a contribution.

²⁴ Throughout this report we refer to tightening (easing) as an exogenous change in monetary policy that places upward (downward) pressure on interest rates.

2.1.3 Borrower perspective

Finally, aggregate financing structures interact with the institutional and economic structures of the economy. Euro area countries differ in their legal and institutional traditions and these differences may influence firms' access to and composition of external finance (De Fiore and Uhlig, 2011). For instance, a greater emphasis on borrower rights in insolvency laws may favour bank lending over direct market finance, because the former is typically collateralised and relies on better technologies to screen and monitor borrowers. Perhaps most importantly, the comparative advantages across industries, as well as economic and institutional traditions, have given rise to very different firm size structures across euro area countries (see Section 1.2). While the euro area economy is dominated by SMEs overall, in some countries the emphasis is on small-sized firms while in others it is on medium-sized firms, in some cases accompanied by the significant presence of major corporations. Smaller firms are largely restricted to bank credit because of asymmetric information and agency problems (Jaffee and Russell, 1976; Stiglitz and Weiss, 1981; Berger and Udell, 2006), implying that cross-country differences in aggregate firm size structures also translate into corresponding differences in financing structures.

This has important implications for the impact of monetary policy on credit markets and the economy. In particular, the bank lending channel remains important in large parts of the euro area, albeit to different degrees across countries. If transmission via banks differs from that via direct market finance the uneven financing structures may constitute an important source of intra-euro area heterogeneity. Accordingly, it is important to understand not only the impact of monetary policy on the intensive margin of debt financing choices (firms with access to loans and direct market finance issuing more or less of the latter), but also the extensive margin (whether a given type of firm is able to tap direct market finance or not). The empirical analysis in Section 2.2 will shed light on both aspects.

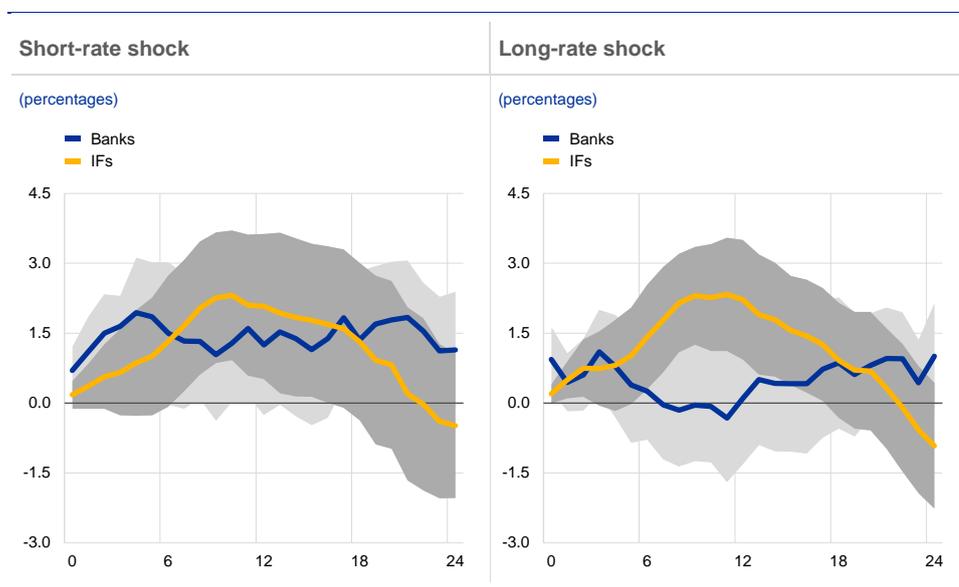
2.2 Empirical evidence

2.2.1 Transmission of monetary policy across different types of financial intermediaries

Bank and non-bank balance sheets respond differently to monetary policy shocks. As non-bank intermediaries' importance has increased among the suppliers of credit to the euro area economy, the question naturally arises as to whether their typical adjustments to changes in monetary policy differ from those of banks. To gauge the response of these different intermediary sectors, the analysis underlying Chart 12 augments a standard empirical macro model with measures of the balance sheet size of the euro area bank and investment fund sectors and estimates their

response to two types of monetary policy shock.²⁵ The first of these is a shock influencing the short end of the yield curve (a short-rate shock), which is tightly linked to standard monetary policy rates; the second is a shock affecting the longer segment of the yield curve (a long-rate shock), which is where the initial transmission of central bank asset purchases tends to concentrate. In response to short-rate easing shocks, both types of intermediary exhibit a statistically significant and economically relevant expansion of their financial assets, albeit in a somewhat swifter and more persistent manner for banks than for investment funds. By contrast, the bank response to long-rate shocks, while initially significant, fades after a few months, whereas the investment fund response is much more pronounced and persistent. This provides a first indication that the relative importance of different types of financial intermediary may also affect the relative effectiveness of different types of monetary policy.

Chart 12
Impulse responses to expansionary monetary policy shocks



Source: Holm-Hadulla et al. (2021).

Notes: The chart shows responses to a monetary policy easing shock that leads to a decline of 25 basis points in interest rates. Shocks are identified via high-frequency surprises (Altavilla et al., 2019a). Short-rate (long-rate) shocks refer to surprises in three-month OIS rates (ten-year Bund yields). Impulse response functions (IRFs) are from local projections modelled on monthly euro area data from January 2003 to January 2020. Dependent variables are notional stocks of bank assets and investment fund shares respectively. Balance sheet size is measured by the notional value of bank assets and the notional value of shares issued by investment funds. The latter is used as proxy for total notional assets by investment funds because of data availability issues (notional value of investment fund assets is only available from 2009). The investment fund data is linearly interpolated from quarterly to monthly frequency before 2009. Surprises are cleaned in respect of information effects based on high-frequency movements in stock prices around policy announcements. Control variables include six lags of the monetary policy shock, the one-year OIS rate, a corporate bond spread, a bank lending spread, real GDP, the GDP deflator and the two balance sheet size measures. Ranges are 90% confidence intervals.

The different responses of bank and non-bank intermediaries to monetary policy also emerge from a case study conducted around the time when the CSPP was introduced. The aggregate patterns shown in Chart 12 appear to be consistent with the differences observed in the balance sheet structures of different intermediary types: bank assets are dominated by loans, whereas investment funds mainly extend credit to the non-financial private sector by purchasing debt securities

²⁵ The choice of singling out investment funds from the different types of non-bank intermediaries is motivated by the particularly dynamic growth in their relative importance in the euro area financial system since the GFC (see Chapter 1).

(see Figure 1 and Chapter 1).²⁶ Combining this with the fact that the typical maturity or rate-fixation period of loans tends to be shorter than that of bonds, it appears plausible that investment funds are more responsive to long-rate shocks, as the latter are more directly relevant to the maturity segment in which corporate bonds tend to concentrate. However, in order to derive more granular and concrete insights, the CSPP can be used as a testbed to ascertain the differences between banks and non-banks in their response to a specific monetary policy measure. The CSPP was announced on 10 March 2016 and purchases started three months later (8 June 2016). In contrast to other asset purchase programmes, for which the date of the announcement and the beginning of the purchases are close to each other, the timing of the CSPP helps to isolate the reaction of intermediaries to both events.

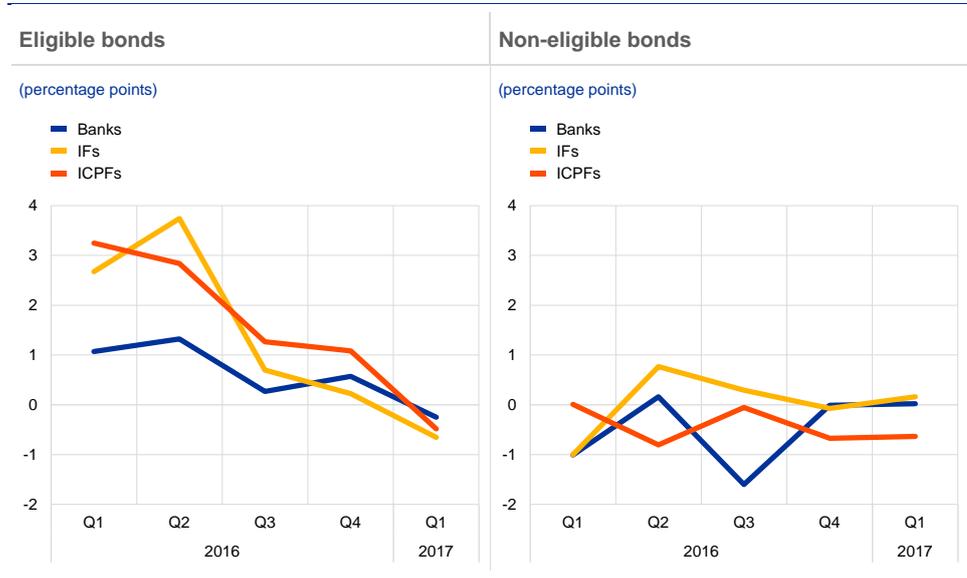
Non-bank intermediaries appear to have been more active in transmitting the CSPP to corporate bond markets. Around the time of the CSPP announcement, all intermediaries purchased a substantial amount of CSPP-eligible bonds (see Chart 13). Purchases were, however, markedly greater for investment funds and ICPFs (i.e. NBFIs) than for banks. Accordingly, NBFIs' holdings of eligible bonds responded much more elastically to the CSPP announcement than bank holdings. Moreover, purchases of CSPP-eligible bonds continued to grow during the second quarter of 2016 for all intermediaries, although once again more so for the non-banks, and especially for investment funds. Finally, the increase in the holdings of eligible bonds in the third quarter of 2016, coinciding with the beginning of the purchases,²⁷ was much lower than had been observed during the second quarter and had even turned negative by the first quarter of 2017, especially for NBFIs.

²⁶ For instance, loans make up more than 60% of bank assets and less than 10% of investment fund assets, while debt securities make up almost 40% of investment fund assets and around 10% of bank assets in the euro area. By contrast, non-banks are particularly important for the corporate bond market. For instance, the holdings of euro area corporate bonds of ICPFs and investment funds amounted to almost 50% of the total amount outstanding as of the third quarter of 2020. Besides differences in business models and balance sheet structures, regulation may also drive a wedge between the responses of different types of intermediaries (see, for example, Gebauer and Mazelis, 2020).

²⁷ The amount of bonds purchased on the days in June 2016 when the programme was active was relatively low (€6.4 billion) compared with the trend for purchases observed in the subsequent months (in September 2016 purchases amounted to almost €10 billion).

Chart 13

Change in bond holdings issued by NFC relative to total amount outstanding



Sources: ECB (Securities Holdings Statistics by Sector and Centralised Securities Database), Refinitiv Datastream and authors' calculations.

Notes: Chart depicts quarterly change in the face value of holdings of bonds issued by NFCs relative to the face value of the total amount outstanding. Holders are euro area banks (blue), investment funds (yellow) and ICPFs (orange). Chart considers bonds denominated in euros, grouped according to their eligibility in the relevant Eurosystem purchase programmes.

The early purchases of CSPP-eligible bonds by NBFIs probably led to a greater decline in their yields than was the case for non-eligible bonds (see Chart 14).

These results illustrate the fact that NBFIs responded strongly to monetary policy measures and this might ultimately have had an effect on the prices of financial assets. Thus, part of the decrease in bond yields (especially in the case of eligible bonds²⁸) observed immediately after the announcement of the CSPP is likely to have been driven by the investment decisions of NBFIs, which might have anticipated the strong demand arising from the Eurosystem's purchases and the capital gains associated with it. The yields of eligible bonds showed a gradual decrease until the third quarter of 2016, alongside the increase in NBFIs' holdings, which was much greater than the decrease observed for the yields of non-eligible bonds.²⁹ However, financial intermediaries with higher demand elasticity started selling their securities to the central bank when the prices were high enough to record gains.³⁰ The change to their holdings therefore slowed their growth in the fourth quarter and even turned

²⁸ See Abidi and Miquel-Flores (2018).

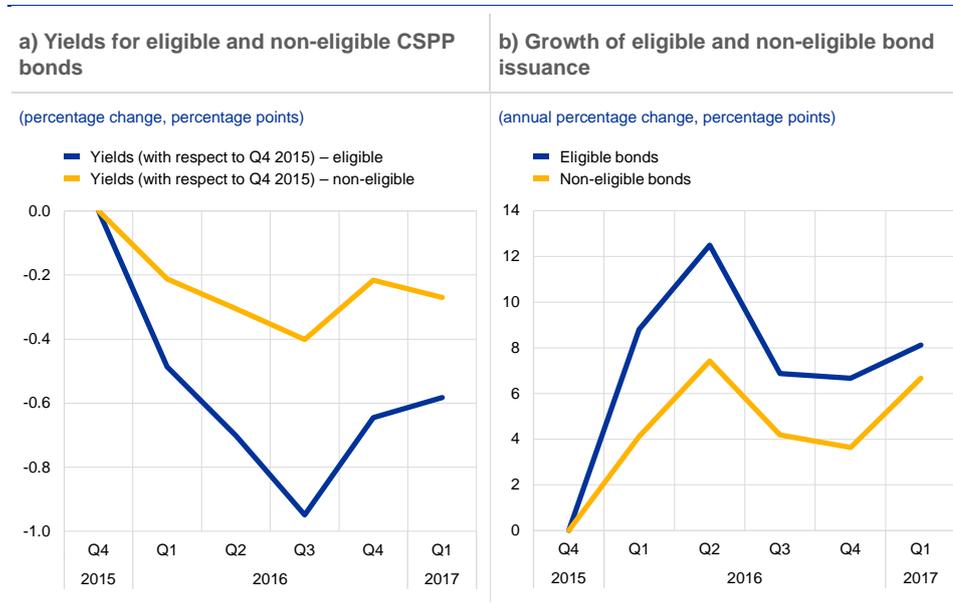
²⁹ The degree to which financial institutions substitute their investments across asset classes or characteristics (such as maturity) affects the actual impact on risk premia. Thus, besides the usual signalling effects, the transmission of asset purchases to yields operates via portfolio rebalancing undertaken by financial institutions. Central bank purchases of bonds reduce the amount of duration risk and credit risk in investor portfolios, thus lowering yields by contracting risk premia (Vayanos and Vila, 2009; Greenwood and Vayanos, 2014). In response to lower risk premia, investors rebalance their portfolios in respect of other risky assets, lowering their risk premia as well. In this way purchases can spill over across assets of potentially different maturity or risk, or even across different asset classes. The intensity of these spillovers depends on the substitutability of those assets in the balance sheets of financial intermediaries.

³⁰ Kojien et al. (2017) show that when asset purchases started foreign investors sold most of the PSPP-eligible government bonds. This is consistent with the idea that these investors have a more elastic demand for euro area bonds than do euro area investors.

negative in the first quarter of 2017. This evolution was coupled with an increase in the yields of eligible bonds (see Chart 14, panel (a)).

Chart 14

Yields and issuance developments for NFC bonds by eligibility



Sources: ECB (Securities Holdings Statistics by Sector and Centralised Securities Database), Refinitiv Datastream and authors' calculations.

Increased purchases by the private sector after the CSPP announcement date were matched by increased issuance.

In the first two quarters of 2016, bonds outstanding increased strongly – especially eligible bonds – thus helping firms to meet their financing needs. In particular, the issuance growth rate peaked in the second quarter of 2016 – for eligible bonds it was about twice that observed for ineligible bonds (see Chart 14, panel (b)).³¹ The announcement of the CSPP in March 2016 contributed towards lowering the cost of firms' financing through the issuance of fixed income securities relative to the cost of bank funding, thus encouraging companies to switch from bank to bond financing (see also Section 2.2.2).³² Interestingly, while this switch specifically regarded large bond issuers, smaller companies also benefited from the programme. This was because their credit supply via bank loans increased as banks found it optimal to reallocate the credit previously granted to bond issuers to smaller firms that did not have access to financial markets. This reallocation process was led by banks with weaker liquidity positions receiving credit repayments from bond issuers, and which extended credit to the same firms they had been rationing it to prior to the CSPP. This positive credit supply shock also raised the real investment of

³¹ This evidence is confirmed by Abidi and Miquel-Flores (2018) and De Santis and Zaghini (2021). Moreover, Pegoraro and Montagna (2021) show that after the announcement of the CSPP eligible issuers timed the market by substituting eligible for ineligible bonds.

³² See Arce et al. (2021), Bats (2020), Betz and De Santis (2021), De Santis and Zaghini (2021), Grosse-Rueschkamp et al. (2019) or Lhuissier and Szczerbowicz (2018), among others.

non-issuing firms.³³ Given the significant effect of the CSPP on the financing structure of NFCs we now look at how this structure affects the transmission of monetary policy.

2.2.2 Firm financing structures and monetary policy

2.2.2.1 Interaction of monetary policy with debt financing structures

One key question is whether monetary policy transmission depends on the relative roles played by bonds and loans in corporate debt financing. Both of these are important instruments used by firms to finance investment spending and, as such, are of direct relevance to transmission. However, the literature has not yet arrived at a consensus view on how the behaviour of these different instruments adjusts in response to monetary policy shocks (Section 2.1) and, for the euro area in particular, empirical evidence is scarce. This gap has in turn become increasingly important in view of the rising share of bonds in corporate debt as well as the persistent heterogeneity in debt financing structures across euro area countries (see Chapter 1). If debt financing structures do indeed matter for transmission, these developments may have changed the way monetary policy affects the economy at the euro area level and may be a source of heterogeneity in transmission across euro area countries.

The following analysis exploits the heterogeneity in debt financing structures across euro area countries to shed light on their relevance to monetary policy transmission. The analysis is based on a monthly panel of euro area countries over the period 2002-19. It starts from a standard empirical macro model, including indicators of economic activity and inflation as well as a policy-controlled short-term interest rate, and extends this with variables capturing the volume and cost of credit to firms. Monetary policy shocks are identified via high-frequency surprises in interest rates around ECB Governing Council meetings and these shocks then interact with the prevailing financing structure in each country.³⁴ Based on this set-up, the analysis addresses three aspects: first, whether financing conditions in bank loan markets vs. corporate bond markets respond differently to monetary policy shocks; second, whether any such differences are more or less accentuated depending on the financing structure prevailing in the economy prior to the shock; and, third, whether these differences alter the ultimate impact of monetary policy on the economy.

The results point to a stronger impact of short-term interest rate shocks on the cost of loan finance than on the cost of bond finance. Chart 15 plots the dynamic response of key variables to a 25 basis point short-rate easing shock at the euro area

³³ For further details, see Arce et al. (2021). These authors also document that the ECB's concomitant targeted longer-term refinancing operation (TLTRO II) contributed to amplifying the credit reallocation effect triggered by the CSPP.

³⁴ The analysis is based on Holm-Hadulla and Thürwächter (2021). The estimations rely on the local projections framework proposed by Jordà (2005) and the high-frequency shocks are based on Altavilla et al. (2019a). The financing structure is approximated by the bond share, computed as the volume of bond finance relative to the sum of bank loan and bond finance volumes.

average.³⁵ The responses for economic activity and prices are well behaved: both expand after the shock, with a size and timing that is in line with typical patterns found in the related literature.³⁶ The cost of bank lending falls relative to the cost of bond finance in response to the shock (see “Intermediation wedge” in Chart 15). This pattern is consistent with the bank lending view of transmission, which posits a stronger responsiveness to standard monetary policy shocks in the supply, and hence the cost, of loan finance than in the supply of bond finance. The volumes of bonds and loans both expand in response to the shock and they do this in roughly equal percentages, as shown by the insignificant response of the bond share in Chart 15.³⁷

³⁵ Short-rate shocks are measured by the high-frequency changes in one-month OIS rates.

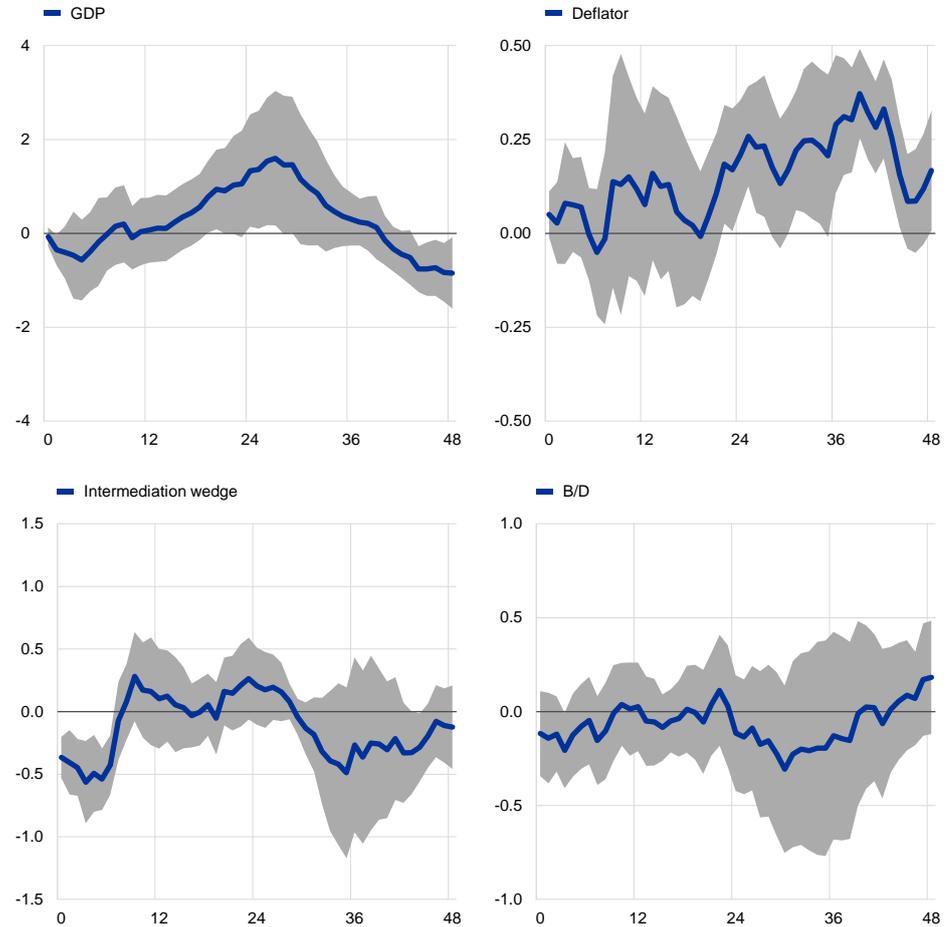
³⁶ For instance, scaling the responses to a shock leading to a 100-basis point peak decline in the OIS rate, the peak effect on GDP is 3.8%, which falls within the upper part of the range of estimates for real activity in a US context, as reviewed by Ramey (2016).

³⁷ The differential cost and uniform quantity responses across financing instruments are interesting in their own right and indicate that the stronger supply response in bank loans (which in isolation should also lead to a greater quantity adjustment in loans than in bonds) is accompanied by a countervailing shift in the structure of demand towards loans. Such a shift would be consistent with the flexibility advantages of intermediated credit whose value rises (falls) under tighter (looser) monetary conditions (see Section 2.1). This demand substitution effect buffers the impact of the shock on loan volumes (where the supply and demand channels work in opposite directions), while reinforcing the impact on the relative costs (where they reinforce each other). For additional detail, see Holm-Hadulla and Thürewächter (2021).

Chart 15

Impulse responses to expansionary short-rate shocks for average bond share

(y-axis: percentages, except for B/D which is in basis points; x-axis: months)



Source: Holm-Hadulla and Thürwächter (2021).

Notes: Panels show IRFs to a monetary policy easing shock, identified via high-frequency surprises in a panel local projections model using monthly data for euro area countries, leading to a 25 basis point fall in interest rates. Shocks refer to surprises in the one-month OIS rate. Intermediation wedge is the difference between a spread for loan financing and a spread for bond financing. B/D is the ratio of bond volume to the sum of bond and loan volumes in the NFC sector of each country. Blue lines are point estimates, ranges are 90% confidence intervals.

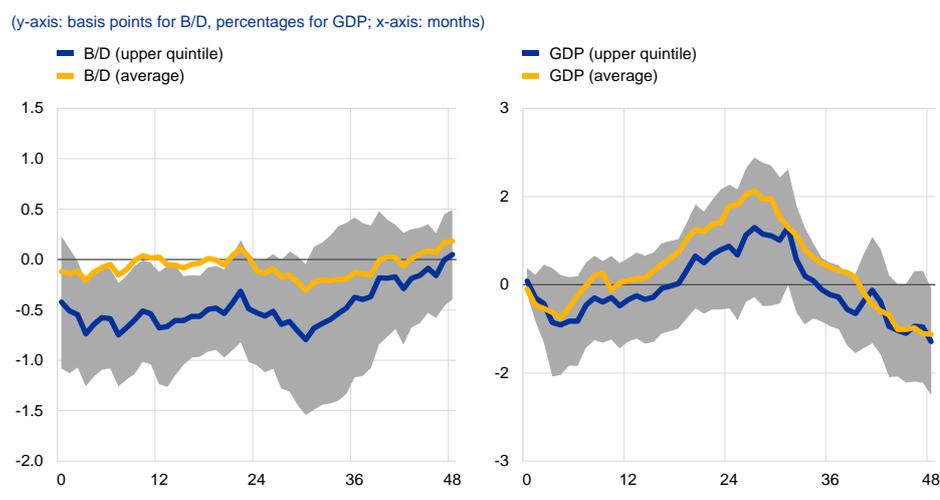
The greater impact of standard policy rate shocks on loan finance than on bond finance gives rise to heterogeneous transmission across economies. Chart 16

compares the impact of a short-rate shock on economies with a high share of corporate bond finance with the impact for the euro area average. In economies with a high bond share, the corporate sector uses this instrument as a “spare tyre” by expanding its relative use when bank lending contracts in response to tightening shocks and by curbing its relative use when bank lending conditions become more favourable in response to easing shocks (left panel). By contrast, for firms in economies which do not have a high bond financing share the replacement of bank loans by this alternative financing instrument does not arise.³⁸ As a consequence, economies with a lower bond share exhibit stronger transmission of short-rate shocks

³⁸ For instance, this is visible from the roughly equal response relative to base levels in bond and loan finance at the average, which is reflected in the fact that the IRFs for the bond share hover at around zero.

to firm financing conditions because a higher share of firm credit is remunerated at the loan rate and bond finance is too scarce to buffer shifts in loan supply. Hence, the overall cost of finance in these economies is more sensitive to policy-controlled short-term interest rates and this in turn translates into a stronger transmission of monetary policy to economic activity at lower rather than at higher bond shares. The peak impact of a short-rate shock on GDP in an economy with an average bond share is substantially greater than it is in economies with a high bond share (see Chart 16, right panel).³⁹

Chart 16
Impulse responses to expansionary short-rate shocks at different bond shares



Source: Holm-Hadulla and Thürwächter (2021).
Notes: Panels show IRFs to a monetary policy easing shock, identified via high-frequency surprises in a panel local projections model using monthly data for euro area countries, leading to a 25 basis point fall in interest rates. Shocks refer to surprises in the one-month OIS rate. B/D is the ratio of bond volume to the sum of bond and loan volumes in the NFC sector of each country. Upper quintile (average) refers to IRFs evaluated at the respective moments of the bond share distribution in the sample, using the coefficients on the shock and its interaction with the bond share. Blue lines are point estimates, ranges are 90% confidence intervals.

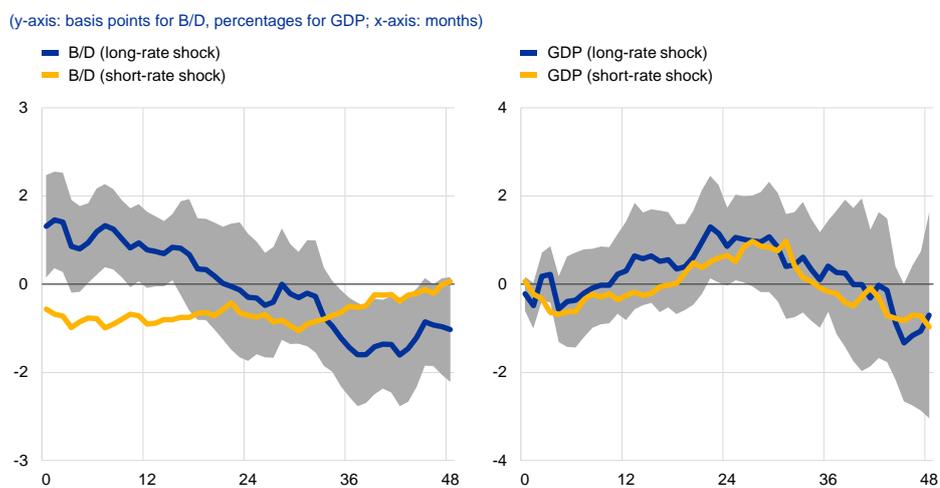
By contrast, policy shocks intervening at longer segments of the yield curve exhibit stronger transmission in economies with a high bond share. The analysis has so far focused on the transmission of policy shocks at the short end of the yield curve. However, in the presence of non-standard monetary policy measures and in the vicinity of the lower bound on policy-controlled interest rates, it is important to test whether the conclusions change when considering shocks at longer maturities, at which the impact of central bank asset purchases, in particular, is likely to concentrate. To this end, Chart 17 repeats the previous exercise for the upper part of the bond share distribution, but considers a monetary policy shock intervening at a longer-term segment of the yield curve.⁴⁰ The results show that this distinction between different types of policy shock is highly consequential: instead of contracting, bonds expand relative to loans in response to the long-rate shock. Moreover, the expansion in GDP also becomes stronger and, in contrast to its response to the short-rate shock, is statistically different from zero at later horizons.

³⁹ These findings are robust when accounting for cross-country differences in firm size structures and the maturity of debt across countries (see Holm-Hadulla and Thürwächter, 2021).

⁴⁰ Long-rate shocks are measured by the high-frequency changes in five-year Bund rates.

Chart 17

Impulse responses for expansionary short-rate and long-rate shocks



Source: Holm-Hadulla and Thürwächter (2021).

Notes: Panels show IRFs to a monetary policy easing shock, identified via high-frequency surprises in a panel local projections model using monthly data for euro area countries, leading to a 25 basis point fall in interest rates. Short-rate (long-rate) shocks refer to surprises in the one-month OIS rate (five-year Bund yields). B/D is the ratio of bond volume to the sum of bond and loan volumes in the NFC sector of each country and the estimates refer to the upper quintile of the B/D distribution for both types of shock. Blue lines are point estimates, ranges are 90% confidence intervals.

These results echo similar findings based on different methods and for different economies.

Using firm level data for the United States, Crouzet (2021) also finds that the secular trend towards a greater share of bond finance in the United States has led to a weaker transmission of standard monetary policy shocks to real activity (here measured by firm investment). Gulan and Silvo (2021) developed a DSGE model with endogenous determination of direct market finance and intermediated credit and also find that: (i) monetary policy tightening shocks lead to a rebalancing of bank loans towards bonds; (ii) a higher bond share leads to a weaker transmission of policy rate shocks to the economy; and (iii) these mechanisms should also lead to a weaker transmission of monetary policy in the United States than in the euro area, given the higher share of bond finance in the former economy than in the latter. Lhuissier and Szczerbowicz (2018), Arce et al. (2021) and Grosse-Rueschkamp et al. (2019), distinguish between conventional and unconventional monetary policy and find differences in the response patterns across financing instruments. Adalid et al. (2021) find that loan and bond finance act as substitutes in response to monetary policy shocks, as manifested by opposite adjustments to such shocks.

The findings have important implications for monetary policy transmission, both at the euro area level and across countries.

First, they imply that the secular rise in the relative role of bond finance is likely to have strengthened the impact of policy measures that work primarily via longer-term interest rates, such as asset purchases. At the same time, the findings also confirm the continued effectiveness of short-term policy rate changes in steering the euro area economy, which remains highly reliant on bank loans. Second, they imply that not only do financing structures shape the transmission of monetary policy, but the impact also arises in the opposite direction: policy easing measures intervening at longer yield curve segments, such as asset purchases, may stimulate bond finance relative to bank loan finance and therefore also alter the financing structure in the economy. Third, the findings imply

that cross-country heterogeneity in financing structures leads to an uneven impact of these different types of policy measure across the euro area economies. This uneven impact may be opportune in some cases, as economic conditions differ across countries due to asymmetric shocks and structures. Under normal conditions, however, it is likely to complicate efforts to ensure a broadly uniform monetary policy stance throughout the euro area.

The findings also confirm the direct monetary policy relevance of the EU's capital markets union. The importance of financing structures to monetary policy transmission shocks highlights the fact that cross-country convergence in both economic and financial structures are complementary goals. Financial convergence in turn may benefit from a broadening of firm access to direct market finance, as envisaged in the context of the EU's capital markets union. This conclusion is reinforced by a growing literature which goes beyond the current focus on monetary policy and shows that access to direct market finance reduces the susceptibility of economies to adverse shocks (see, for example, Grjebine et al., 2018).

2.2.2.2 Interaction of monetary policy with firm leverage and financing constraints

In view of the recent rise in corporate vulnerability, the interaction of monetary policy with firm leverage and financing constraints has acquired renewed relevance. Corporate leverage ratios had been declining since 2015, but the pandemic-induced crisis abruptly reversed this trend at the beginning of 2020.⁴¹ Corporate leverage plays an important role in the transmission of macroeconomic shocks to real activity and inflation – an insight that dates back to Fisher (1933), who identifies it as a key driver of debt cycles and debt deflations, and which has been formalised, for instance, in Bernanke et al. (1999). Given these propagation mechanisms, corporate leverage – and corporate balance sheet resilience more broadly – may also shape the transmission of monetary policy and, conversely, monetary policy may change corporate leverage dynamics if it exerts different effects on the incentives for firms to contract debt rather than equity financing. Given the pandemic crisis-induced rise in corporate vulnerability and the strong monetary policy response to this crisis, these issues are of first-order relevance – both from a transmission perspective, as discussed in the current section, and from a financial stability perspective, as discussed in Chapter 3. At the same time, empirical evidence on the link between monetary and corporate leverage is sparse, especially for the euro area.⁴²

At the euro area level, the ratio of debt to equity financing appears to rise in response to monetary policy easing shocks. Evidence of this link is provided in Chart 18, based on a similar empirical framework as the analysis in Section 2.2.2, but

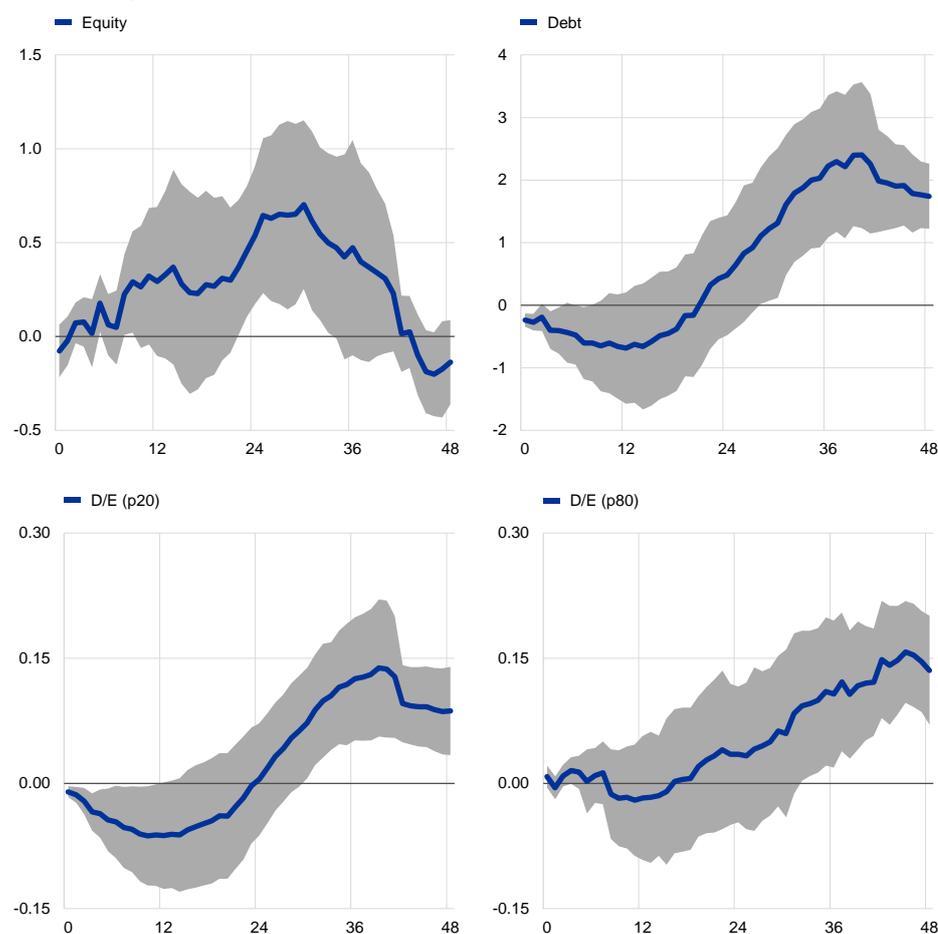
⁴¹ These patterns hold, for instance, for leverage defined as a ratio of NFC non-equity liabilities to assets at market value.

⁴² Recent contributions on this issue using US or UK data include those from Ottonello and Winberry (2020), Jeevas (2019) and Cloyne et al. (2018). The few papers on the euro area include Auer et al. (2019) and Durante et al. (2020).

focusing on the structure of debt vs. equity financing rather than bank loan vs. bond financing.⁴³ The results point to a stronger response by debt financing than equity financing – while both expand after the short-rate shock, the rise in debt is more pronounced and protracted (see Chart 18, upper panels). As a consequence, the results point to a durable rise in the leverage ratio, defined as the ratio of notional stocks for debt to equity, which peaks at around half a percentage point after three years.

Chart 18
Impulse responses to an expansionary short-rate shock for debt and equity

(y-axis: percentages, except for D/E which is in basis points; x-axis: months)



Notes: IRFs based on same model as Chart 15 to Chart 17, replacing bond share with ratio of bank loans and corporate bonds over equity (D/E); p20 denotes the lower and p80 the upper quintile of the D/E distribution in the country panel described in Section 2.2.2. Blue lines are point estimates, ranges are 90% confidence intervals.

The analysis also provides indicative evidence that corporate leverage is initially more responsive to monetary policy in economies with higher leverage levels, although the difference fades after a few months. Distinguishing between the upper and lower quintiles of the leverage distribution, some patterns emerge (see

⁴³ Debt and equity are both measured as notional stocks. Equity includes listed and unlisted shares. Debt volumes are defined as the sum of loan and bond financing by NFCs. The volumes of debt and listed equity shares are available on a monthly basis. For the unlisted shares, the quarterly volumes from the financial accounts are linearly interpolated to a monthly frequency.

Chart 18, lower panels). Economies with high leverage exhibit a monotonous increase (decline) in leverage in response to monetary policy easing (tightening). This is consistent with the presence of financing and balance sheet constraints that tighten or loosen according to the direction of the monetary policy shocks and force the corporate sector to adjust its financing structure to preserve its solvency position. In economies with low leverage, debt instead initially contracts (expands) relative to equity after a policy easing (tightening). This pattern is consistent with the corporate sector using the leeway afforded by reduced financing and balance sheet constraints to buffer the shock. At the same time, the difference in response across high and low-leverage economies is transitory and becomes insignificant a few months after the shock.

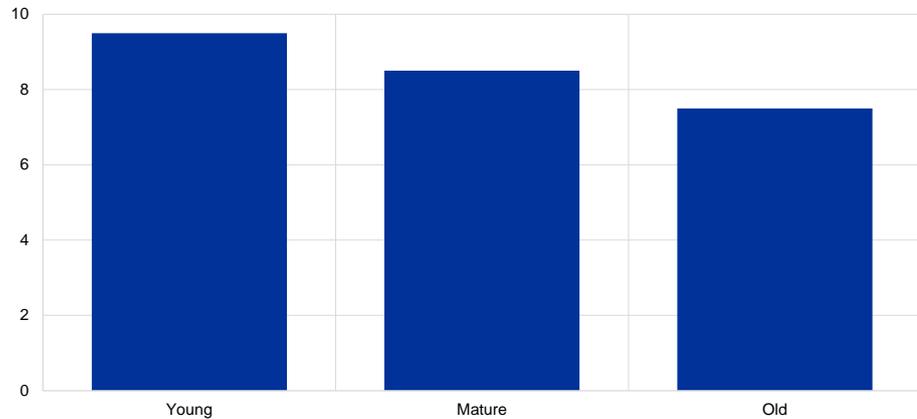
Conversely, firm financial constraints emerge as an important factor shaping monetary policy transmission. As discussed in Section 2.1, the theory is ambiguous as to whether financially constrained firms are more or less responsive to monetary policy shocks than unconstrained firms. Here the empirical macro model underlying the previous results does not offer clear-cut evidence, suggesting that a more granular micro-level analysis is needed to shed light on the issue. Chart 19 provides such an analysis, based on a yearly panel of more than one million firms in Germany, Spain, France and Italy over the period 2000 to 2016 (Durante et al., 2020). Financial constraints are proxied by firm age, which has emerged as a common approach in the related literature (Cloyne et al., 2018). This choice captures the notion that young firms face greater obstacles when seeking to obtain external finance due to their short track record in capital markets, and this proxy may be more robust to endogeneity issues than other financial constraint proxies.⁴⁴ In line with this notion, the response of firm investment to a monetary policy shock does indeed appear to be greater in the group of young firms compared with that in more mature and older firms. In the year after an easing shock, the expansion in the investment of young firms is approximately 10% greater than it is in average firms, whereas the reaction of old firms is around 10% less. The difference between young and old firms is significant at the 5% level. Accordingly, the evidence points to a strengthening of transmission in the context of tighter financing constraints, although this difference fades out over later horizons.

⁴⁴ For instance, higher leverage at the firm level may lead to tighter financing constraints since, all else being equal, it is accompanied by higher solvency risks. Conversely, however, it may also reflect looser financing constraints since only firms that are able to borrow reasonably freely can accumulate high levels of leverage. Also, from an econometric perspective, Cloyne et al. (2018) show that firm age has greater explanatory power than other common proxies for financing constraints, such as firm leverage and liquidity positions.

Chart 19

Financing constraints and investment response to monetary policy

(percentage points)



Source: Durante et al. (2020).

Note: Effect of a 25 basis point easing shock on the net investment in the first year after the shock.

2.2.3 Firms' access to market-based finance

2.2.3.1 Large firms' access to market-based finance

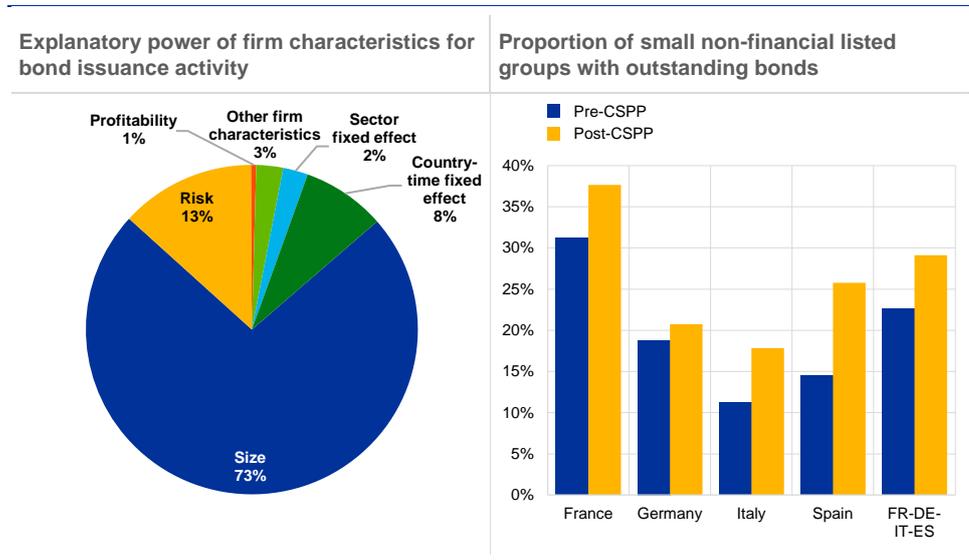
Most euro area listed groups do not tap direct debt market financing. Despite the progressive increase in recent years in the percentage of non-financial listed groups in the euro area that issue fixed income securities, more than 63% of groups did not tap direct debt market financing, according to data obtained in 2018.⁴⁵ Differences in external funding structures reflect firm, sector and country-specific factors. The results obtained from a panel regression analysis illustrate the contribution of these factors to decisions taken by firms to issue bonds and their reliance on bond financing relative to bank loans. The left panel of Chart 20 summarises the explanatory power of each set of regressors and illustrates that issuer size is the most influential factor influencing firms' access to market-based finance. Large issuers tap financing to a much greater extent in fixed income markets and this type of financing plays a more prominent role in their financing structure. This could be explained by the existence of economies of scale which reduce the cost of issuance as the size of an operation increases. Country-specific factors are also of great importance, in line with the consensus that a country's legal system affects access to external finance (Section 2.1). Another driving force behind the more prominent role of bond markets in the euro area as a source of

⁴⁵ The analysis in this subsection is based on the ERICA (European Records of IFRS Consolidated Accounts) database, which contains information on the consolidated annual accounts of about 1,000 listed non-financial groups from eight European countries: Belgium, Germany, Greece, Spain, France, Italy, Austria and Portugal. ERICA data are compiled by the ERICA Working Group of the ECCBSO (European Committee of Central Balance Sheet Data Offices). The data are fully harmonised and are subject to quality controls to guarantee the reliability of the information. Most issuers of fixed income securities are part of the sample.

funding is the decline in their cost compared with bank loans, which is due in part to the implementation of monetary policies such as the CSPP (see Section 2.2.2).

Importantly, the CSPP has not only contributed to lower financing costs through bond markets but has also alleviated the constraints faced by smaller groups in accessing market-based finance. Chart 20 shows the significant increase in the percentage of small groups with access to market-based financing since 2016, coinciding with the implementation of the Eurosystem’s corporate bond purchase programme. This programme made bond issuance attractive not only to traditional issuers, but also to other companies with no prior history of issuing activity in the market. According to the information contained in the ERICA database, almost 10% of the listed corporate groups with outstanding fixed income securities were first-time issuers from 2016 onwards. Generally, these groups are smaller than those with a history of active issuance (the mean of total assets of active issuers is almost nine times larger than that of previously inactive issuers). Beyond the positive effect of this monetary policy measure, further measures are necessary to facilitate access to direct market finance – this will also allow smaller firms to diversify their debt financing structure beyond bank loans. In this regard, the development of the capital markets union is heading in the right direction.

Chart 20
Firm size and bond issuance activity



Source: ERICA database and own calculations.
Notes: Explanatory power (as a percentage) is based on the breakdown of R-squared from regressing a dummy that is equal to one if a firm has bonds outstanding in a given year and otherwise zero on a set of explanatory variables (log of total assets, riskiness proxies (Altman z-score and leverage ratio), cash to total assets, fixed tangible assets to total assets, ROA and industry and country-time fixed effects). The estimation is based on consolidated information for non-financial listed groups in the ERICA database for groups with headquarters in Germany, Spain, France and Italy and for the period 2013-18. In the right panel, the chart shows the proportion of small non-financial listed groups with headquarters in each country that have outstanding bonds. The last two bars correspond to the aggregate for the four countries. The pre- (post-) CSPP period is 2013-15 (2015-18). The sample is restricted to groups with information for both periods.

There is extensive heterogeneity in the degree of equity market development across Europe and in its dynamics. Since 2005 the number of listed NFCs has risen

significantly in Italy and Spain, while it has declined in Germany and France.⁴⁶ In fact, in many countries (including Germany and France), the number of IPOs has not returned to its pre-GFC levels. The number of listed companies in Italy and Spain as of 2018 (270 and 142 respectively) is much lower than it is in France and Germany (626 and 561 respectively) and the United Kingdom (975). The main driver of these differences is the lower number of listed SMEs in France, Germany, Italy and Spain (318, 200, 104 and 52 respectively as of 2018) than in the United Kingdom (471). This is due to the more advanced development of financial markets in the United Kingdom and, in particular, the alternative investment market which attracts small, young and fast-growing UK and overseas companies seeking to raise more capital.

2.2.3.2 SME access to market-based finance

SMEs use different combinations of financial instruments, but non-bank finance is seldom used. The Survey on the Access to Finance of Enterprises (SAFE) shows that only a small proportion of SMEs report that they use market-based finance – i.e. debt securities and equity capital. In the period 2010-20 the proportion was around 4%. At the same time, 25% of SMEs use bank loans, 20% use trade credit and 20% use internal funds to finance their business activities.

SMEs that rely on market-based finance perform better. According to the taxonomy presented in Table A in Box 1, the cluster of SMEs using market-based finance has a higher percentage of innovative firms (26%), exporters (27%) and firms with high expected future growth (23%) than SMEs in the clusters using external finance. However, one-third of these firms also indicated that they faced obstacles to obtaining bank loans, which is a higher proportion than for SMEs in other clusters. Additional research shows that firms in the cluster using market-based finance tend to diversify when they do not receive the full amount of the funds they have requested from banks.⁴⁷

Access to a variety of sources of financing helps firms to increase their resilience to disruptions of different origins and makes their investments less sensitive to adverse scenarios. Chart A in Box 1 reports the effects of the diversification of external funds on the purposes for which firms used financing.⁴⁸ Overall, the empirical analysis confirms that the composition of firms' financing structure may condition their investment decisions and adds to the empirical evidence showing that diversification of firms' funding leads to more investment⁴⁹ and to a lower vulnerability to financial shocks.⁵⁰

⁴⁶ For further details on the evolution of firms' listing in Europe and the specific comparison of Italy with the largest European countries, see Finaldi Russo et al. (2020).

⁴⁷ In SAFE, it is possible to disentangle various reasons why firms are reported to be financially constrained. Firms in the first cluster are also signalling either that they feel discouraged from applying for bank loans for fear of rejection or that the amount they received is only a part of what they had requested.

⁴⁸ The empirical analysis is based on a logistic regression model. See Box 1 and Chart A for details.

⁴⁹ See Tengulov (2016).

⁵⁰ See De Fiore and Uhlig (2015).

Box 1

Taxonomy of financing patterns of euro area SMEs and real effects

A cluster analysis focusing on the SAFE survey round for the period April-September 2020 provides a snapshot of the financing patterns of euro area SMEs.⁵¹ Similarly to Bańkowska et al. (2020), the cluster analysis groups firms according to their use of several financing instruments⁵², in such a way that the groups are both homogenous (small within-cluster variance) and very distinct from each other (large between-cluster variance).

The taxonomy highlights the main characteristics of SMEs along six clusters, starting from those that include several financing instruments, and moving on to clusters that use fewer financing options.⁵³ Only one cluster – Mixed (market) – includes firms that have access to market-based finance, in combination with all the other types of finance. In the remaining clusters, SMEs rely mainly on single specific sources of finance.⁵⁴ According to the taxonomy, the cluster of SMEs using market-based finance are in better financial condition. Thus, firms in this cluster exhibit the highest percentages of innovative firms (25%), exporters (27%) and firms with high expected future growth (23%) compared with the other clusters using external finance (Table A).

Table A

Financing patterns according to firm characteristics

(percentages)

		Mixed (market)	Mixed (trade credit)	Mixed (leasing / factoring)	Mainly bank loans	Mainly subsidised loans	Short-term loans only	No external financing
Financially constrained	No	22.1	11.6	9.8	10.0	20.6	6.4	19.5
	Yes	32.7	9.2	6.0	10.0	18.5	8.7	14.9
Profitable firms	No	20.7	11.1	6.2	8.4	13.3	6.4	34.0
	Yes	25.8	10.4	1.4	5.9	3.5	5.2	47.7
Age	<10 year	21.8	11.6	5.2	6.3	15.4	4.5	35.2
	≥ 10 years	20.6	11.0	6.2	8.6	12.8	6.7	34.3
Innovative firms	No	16.3	10.7	5.7	6.8	12.4	6.4	41.8
	Yes	24.9	11.4	6.4	9.8	13.7	6.4	27.5
Exporters	No	17.1	10.0	6.1	7.1	14.6	6.5	38.7
	Yes	26.5	12.8	6.0	10.3	10.9	6.4	27.2
Expected future growth	No growth/ stay the same	18.9	10.0	6.0	7.2	13.6	6.0	38.4
	Growth	22.6	12.0	6.2	9.5	12.5	6.8	30.3

Sources: ECB and European Commission SAFE and ECB calculations.

Notes: The cluster analysis refers to the period April-September 2020. The percentages presented are weighted.

⁵¹ For previous survey rounds see Moritz et al. (2016) and Masiak et al. (2017).

⁵² The sources of finance considered in the cluster analysis are bank loans, credit lines, subsidised loans, trade credit, debt securities and equity, leasing/factoring, other loans and retained earnings.

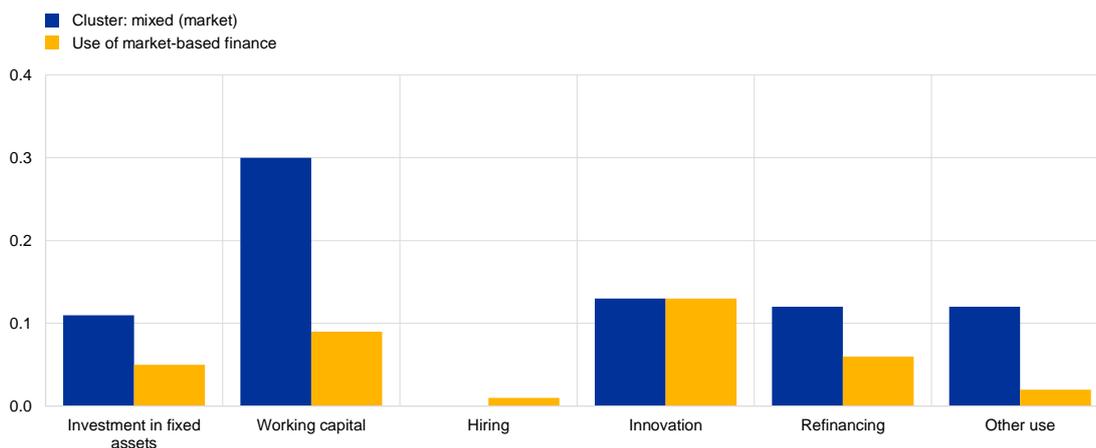
⁵³ There is also an additional cluster that groups SMEs reporting that they have not used external finance. This is the largest group in the sample (representing around 34%).

⁵⁴ For instance, in the second cluster (Mixed (trade credit)), all firms use trade credit for their business activities, which they then combine with short-term bank financing and, to a lesser extent, with long-term bank loans.

The diversification of external sources of finance can be linked to the decisions of companies to invest, innovate and build up inventories, based on a logistic regression model.⁵⁵ Focusing on whether firms belong to the first cluster or not (the first, blue, set of bars of Chart A), the results show that SMEs making use of market-based finance are more likely to invest in fixed asset activities – and even more so in working capital – than SMEs not in the cluster, all other characteristics being equal.⁵⁶ By contrast, the third blue bar in Chart A appears to indicate that the diversification towards market-based finance is not accompanied by a higher likelihood (than for other types of financing diversification) of firms hiring and training their employees. Furthermore, the probability of refinancing is higher for firms using market-based finance, as is the probability of using the finance for other purposes. As the cluster analysis focuses only on the most recent survey period, an alternative specification is based on firms' use of market-based financing since 2010 (reported in the second, yellow, set of bars of Chart A). The overall results are confirmed, although the marginal effects are slightly lower.

Chart A
Importance of market-based finance for SMEs' business decisions

(marginal effects)



Sources: ECB and European Commission SAFE and ECB calculations.

Notes: Logit regressions. The blue bars report marginal effects based on the cluster analysis for the period April-September 2020 and the explanatory variable is equal to 1 if a firm belongs to the first cluster, otherwise 0. The yellow bars report marginal effects where the explanatory variable is a dummy equal to 1 if a firm is considering using or has used market-based financing, otherwise 0. The analysis covers the period 2010-20. Other reference categories in the regression analyses are large and mature companies in the German manufacturing sector. All specifications use weights based on the number of employees to restore the proportions of the economic weight of each size class, economic activity and country.

⁵⁵ In the logistic regressions, the set of dependent variables are dummies set to 1 if firms are using finance for one of six specific purposes: (1) investment in fixed assets (property, plant or equipment), (2) inventory and other working capital, (3) hiring and training employees, (4) developing and launching new products or services, (5) refinancing or paying off obligations, and (6) expenditure for other purposes. The dependent variables are regressed on a dummy equal to 1 if firms belong to the cluster Mixed (market), otherwise 0, and a set of variables that control for differences in firm size, age, industry and country. A second specification is based on a dependent variable which is a dummy equal to 1 if a firm is considering using or has used market-based financing, otherwise 0. The former analysis covers the most recent period (April-September 2020) and the latter analysis covers the period 2010-20.

⁵⁶ The regularities could be subject to simultaneity concerns. For example, innovative firms are more reliant on multiple sources, but firms with more diversified funding can also be more innovative. Hence, there is no intention to provide any causal link in the stylised facts.

3 Potential side effects on financial stability with relevance for monetary policy transmission

Non-bank financial intermediation has positive effects on economic growth as it facilitates an efficient allocation of capital and provides an alternative source of finance instead of banks. It may, however, also introduce new sources of volatility across the economic cycles. Structural vulnerabilities and financial distress impairing non-banks' ability to provide credit can negatively affect the transmission of monetary policy and can also increase NFCs' funding costs. Whether non-bank financial intermediation results in stabilizing the financial cycle and in a more efficient allocation of resources or whether it leads to macroeconomic volatility and adverse side effects on financial stability depends on several factors, including whether or not a well-developed macroprudential policy framework is in place for non-banks.

3.1 Changes in financial intermediation can affect systemic risk

3.1.1 Potential effect of increased non-bank credit supply on corporate leverage

The empirical evidence shows that euro area NFCs issuing bonds are on average larger, more leveraged and have a lending relationship with a higher number of banks (see Chart 21). Large firms with higher amounts of total assets, capital and cash are more likely to issue bonds. Also, the availability of cheaper funding from the market, a lending relationship with a higher number of banks and the firm having issued bonds in the past all increase the probability of bond issuance. Similar evidence is gathered by using information derived from survey data on SME access to market-based finance (see Section 2.2).⁵⁷ Firms which are issuing bonds for the first time usually have a positive financing gap (the difference between firms' demand for and the availability of financing) and higher financial leverage, although they also face greater difficulties in servicing their existing debt.

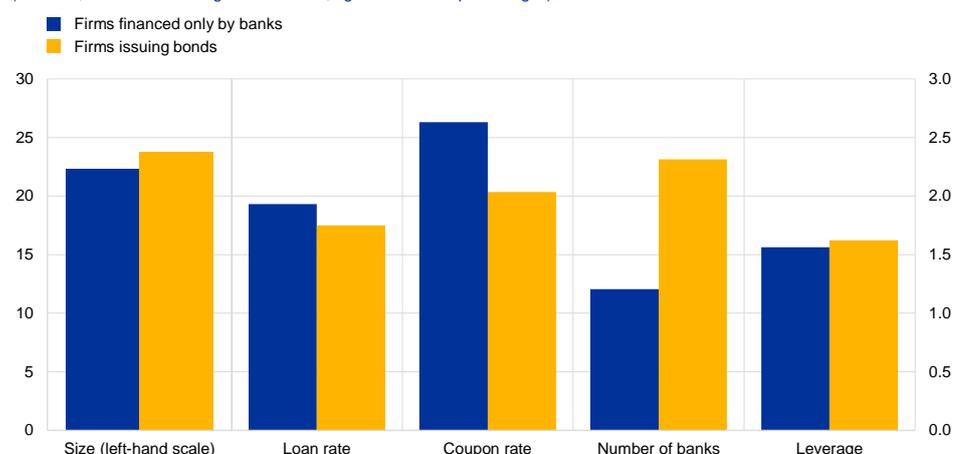
The growth of non-banks and the lower cost of market-based finance have supported the increase in NFCs' debt issuance relative to bank lending in

⁵⁷ See Boccaletti et al. (2021). The study includes a combination of first-time issuers of corporate bonds and new equity as collected in the SAFE survey rounds. See Accornero et al. (2015).

recent years.⁵⁸ A comparison between firms with a similar probability of issuing bonds suggests that the amount of bond issuance increases if market supply is greater and bank supply is lower. Greater market supply – as measured by the average share of issuance guaranteed by underwriters – stimulates issuance, especially from firms with a low probability of issuing bonds ex ante. On the other hand when bank lending is constrained firms with a high probability of issuing bonds tend to replace bank credit with market-based finance.⁵⁹

Chart 21
Financing indicators of NFCs issuing bonds vs NFCs financed only by banks

(Q2 2019, left-hand scale: log of total assets; right-hand scale: percentages)



Sources: Large Exposure dataset, IMIR, Dealogic, Orbis and authors' calculation. See Cappiello et al. (2021).
Notes: The chart shows the differences in loan rates, coupon rates, leverage, the number of connected banks and size between (comparable) firms which issue bonds and firms which do not. The loan rate is the average bank-level rate for loans with a given maturity and amount. For issuer firms, the coupon rate is the annualised coupon rate, while for non-issuers it is the average coupon rate of firms domiciled in the same country and with the same rating. The number of banks corresponds to the average number of banks that have a lending relationship with the firm. Leverage is the ratio between firm debt and equity, divided by 100. Size is the log of total assets.

The growing supply of credit from non-banks, coupled with relatively low yields in corporate bond markets, may lead to increased corporate leverage. High levels of corporate indebtedness during expansionary periods can generate a debt overhang problem, which can depress investments, employment and GDP when the economic cycle turns (Kalemli-Ozcan et al., 2018; Brunnermeier and Krishnamurthy, 2020; Popov et al., 2018) (see Chapter 2).⁶⁰ Banking regulation seeks to limit any excessive credit supply. Non-banks' credit lacks such a shock absorption mechanism, which may have long-term implications for firms' vulnerabilities (Gebauer and Mazelis, 2020; Gertler et al., 2020).

However, there is also structural evidence that the adverse macroeconomic dynamics associated with excessive corporate debt are less severe when debt

⁵⁸ Bond yields have declined faster than bank loan rates, which also tend to be bounded to zero. An increasing share of corporate bonds yield negative rates. According to iBoxx data, 11% of outstanding euro area NFC bonds with maturity longer than five years yield negative rates, as of November 2020. The figure increases to 20% when outstanding bonds with maturities shorter than five years are considered.

⁵⁹ See Cappiello et al. (2021).

⁶⁰ Empirical evidence shows that high levels of credit are associated with a high probability of financial crises (Krishnamurthy and Muir, 2020). When a crisis erupts, the pricing of risks escalates above a level consistent with the fundamentals, leading to an intensification of the economic downturn and potentially to broader contagion within the financial system.

is financed via capital markets rather than by banks. Having a balanced financial structure in which bank loans and marketable instruments complement each other offers clear diversification gains, particularly when the (domestic) banking system is a source of instability (De Fiore and Uhlig, 2011). Taking the leverage of NFCs into account, recent evidence shows that the replacement of bonds by loans occurs regularly after crises, and economies with high bond shares recover faster (Grjebine et al., 2018).

The coronavirus outbreak has increased the liquidity needs of NFCs and a significant share of the new financing is provided by the market. Newly issued bonds represented 35% of NFC debt financing in 2020. However, the increase in market-based finance is associated with higher leverage, at least for large firms. This raises some concerns with regard to debt overhang.

3.1.2 Vulnerabilities in non-banks can amplify market dynamics

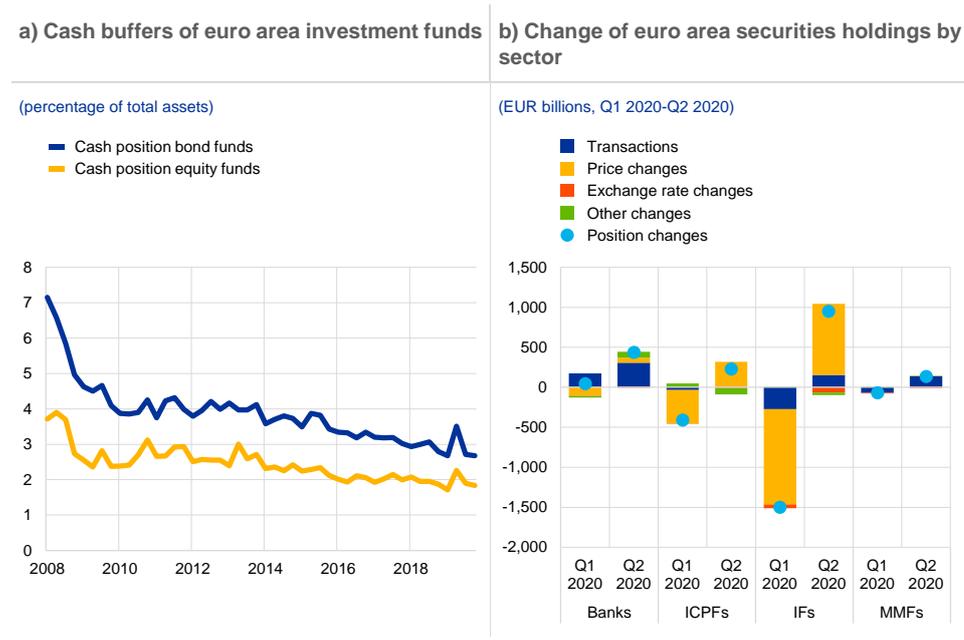
NBFIs can be a source of systemic risk. Greater diversification between bank and market-based financing can be associated with lower systemic risk, as debt and equity markets can partly substitute for a decline in lending if the banking sector is under stress (Bats and Houben, 2020). In addition, leverage in the investment fund sector is on average lower than in banks, although there can be pockets of high leverage in the non-bank financial sector.⁶¹ At the same time, there can be substantial liquidity mismatches in non-bank financial intermediation. And in the event of an economic downturn or a sudden correction of risk premia, higher credit risk and liquidity risk may force non-banks to sell a large part of their assets, thereby becoming more sensitive to large outflows from investors. Furthermore, even though risk sharing is improving, a larger share of non-bank financial intermediation also potentially increases interconnectedness across the financial system (see Section 3.1.4). This could amplify the effects of any downturn, leading to a reduction in funding flows to the real economy more broadly.

Investment funds can amplify adverse market dynamics by selling assets procyclically. There is evidence of a procyclical flow-performance relationship between investor flows and past returns (Goldstein et al., 2017). This relationship implies that investment funds experience outflows after a drop in their returns during a market downturn. Another consequence of the low interest rate environment is that investment funds tend to have structurally low liquidity buffers (see Chart 22, panel (a)). This can imply that in the event of larger outflows, relatively illiquid assets need to be sold in a falling market. Large sales of illiquid assets can have financial stability implications because they exacerbate market price movements, particularly in times of low market liquidity. This can result in balance sheet losses in the fund sector and spillovers to other financial institutions directly holding investment fund shares or

⁶¹ For example, the main liability type of investment funds are equity-like fund shares. For funds – at least for those regulated under the UCITS directive – leverage is restricted. Although debt to equity ratios for insurance corporations tend to be high, policyholders cannot usually withdraw from their contracts at short notice, in contrast to depositors at banks.

holding similar assets.⁶² Empirical evidence suggests that these additional losses deriving from funds' asset sales can be substantial (Fricke and Wilke, 2020). Moreover, investment funds behave procyclically in respect of rating changes, due to their specific investment mandates. This may amplify any repricing in the event of widespread downgrades coinciding with large outflows. In turn, this may aggravate the effects of any downturn on the real economy through higher borrowing costs.

Chart 22
Investment fund cash buffers and procyclical selling behaviour



Sources: ECB (investment fund statistics and Securities Holdings Statistics by Sector) and ECB calculations.

The evidence is mixed as to whether other NBFIs, such as ICPFs, are less prone to procyclical trading behaviour. As their liabilities are mostly long term, they are less vulnerable to liquidity shocks and can take advantage of market conditions, buying under-priced securities in times of stress and contributing to stabilising the system (Timmer, 2018). However, this benign view has been challenged by financial stress episodes in the last years, during which insurers' solvency requirements and internal risk limits became binding relatively quickly (Fache Rousová and Giuzio, 2019; Boneva et al., 2019; Bank of England, 2014; Papaioannou et al., 2013).

The coronavirus shock in the first half of 2020 provides a recent example of non-banks amplifying adverse market dynamics. The sudden and broad-based tightening of market conditions implied significant valuation losses for the financial sector. Investment funds, which were the sector being affected the most, experienced outflows of a magnitude last seen during the GFC. As a result, investment funds procyclically shed large amounts of assets in the first quarter of the year before

⁶² Giuzio et al. (2019) show that in response to outflows investment funds tend to reduce their cash and illiquid asset holdings while they hoard more liquid assets, possibly in expectation of additional future outflows. Using data for Italian equity funds, Branzoli and Guazzarotti (2017) find that funds can exacerbate episodes of market stress by hoarding cash.

becoming a net buyer again once market valuations have started to recover (see Chart 22, panel (b)). Although total transactions were relatively smaller, ICPFs exhibited a similar pattern in the aggregate, while only the banking sector stabilised the market by countercyclically buying assets during the market turmoil.

An adequate macroprudential framework for non-banks is warranted to address the vulnerabilities spreading from the sector to the wider financial system. The elements of such a framework should support the mitigation of systemic risk build-up over the financial cycle as well as contain regulatory arbitrage. Macroprudential regulation should also increase the shock absorption capacity of non-banks. This could be achieved, for example, by requiring investment funds to hold a sufficiently large share of cash and highly liquid assets to manage increased liquidity needs stemming from outflows during stress episodes.⁶³

3.1.3 Risk taking and liquidity of non-bank financial intermediaries

Prolonged periods of asset price growth, compressed risk premia and reduced income also contributed to fund managers' search for yield. Fund managers compete against each other to attract inflows as their fee income is linked to the volume of their assets under management. This competition is based on fund performance, as investors tend to allocate to investment funds which offer relatively higher returns. As a consequence, fund managers tend to search for yield and may behave procyclically during periods of prolonged and broad-based asset price growth. In addition, the fund-level flow-performance relationship seems to be stronger during periods of price growth than it is in times of crisis: when investment funds' returns decline the outflows tend to be smaller than the inflows which occur when investment funds' returns increase. This incentivises risk taking as fund managers are relatively more concerned with generating returns and attracting investors in good times than they are with managing risks ex ante in order to avoid large losses and investor outflows during market downturns.⁶⁴ Risk premia compression also incentivises investment funds to reallocate to riskier assets to beat the benchmark.⁶⁵

Euro area non-banks have increased their credit risk, liquidity risk and duration risk in the low yield environment over the last seven years. The exposures of insurers and funds to BBB-rated and high-yield bonds has increased by 49% and 62% respectively, and the residual maturity of their bond holdings has risen by 3% and 26% respectively (see Chart 23, panel (a)). At the same time they have reduced their holdings of highly liquid securities and also ventured into alternative assets such as infrastructure, private equity funds and real estate (see Box 2).⁶⁶ Finally, recent evidence shows that there are pockets of high leverage in the (alternative) investment

⁶³ See Recommendation of the European Systemic Risk Board of 6 May 2020 on liquidity risks in investment funds (OJ C 200, 15.6.2020, p.1).

⁶⁴ See Rajan (2005) and Ryan (2020).

⁶⁵ See Carbone and Giuzio (2020).

⁶⁶ See Fache Rousová and Giuzio (2019).

fund sector, which could contribute to exacerbating stress in down markets and fund outflows.⁶⁷

ICPFs offering guaranteed returns have incentives to take on more risk in a low interest rate environment (see Box 2). The low yield environment dampens the profitability of ICPFs and progressively erodes solvency ratios, as 37% of their assets are invested in the bond market. The long end of the yield curve is particularly important in this respect. Life insurers try to shift from traditional saving policies with guaranteed rates to unit-linked products for which the investment risk is borne by the policyholder. As unit-linked products are typically invested in funds, this shift increases the interconnectedness between non-banks when funds are external and can create liquidity mismatches and run-risk for insurers when funds are internal (i.e. they do not exist independently of insurers' balance sheets).

The increased illiquidity of ICPFs' portfolios can amplify market movements in liquid assets.⁶⁸ The risk taking is accompanied by increasing contingent claims (such as collateral demand for margin calls on derivative positions) and capital commitments on illiquid alternative assets (such as real estate). This limits ICPFs' ability to invest countercyclically and play a stabilising role during periods of stress.

⁶⁷ See van der Veer et al. (2017) and Vivar et al (2020) who show that leveraged funds are more prone to outflows in periods of declining fund returns and behave more pro-cyclically.

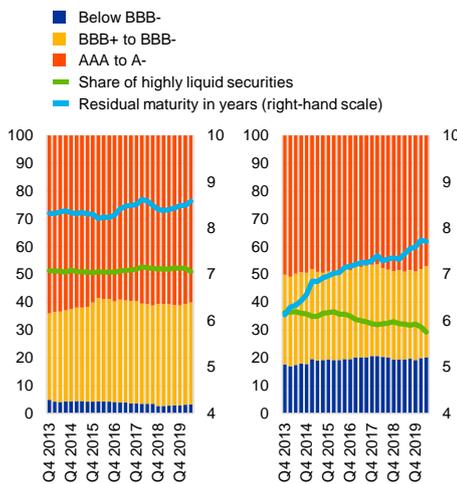
⁶⁸ IMF Global Financial Stability Report "Lower for longer", October 2019.

Chart 23

Non-bank risk taking amid the low yield environment

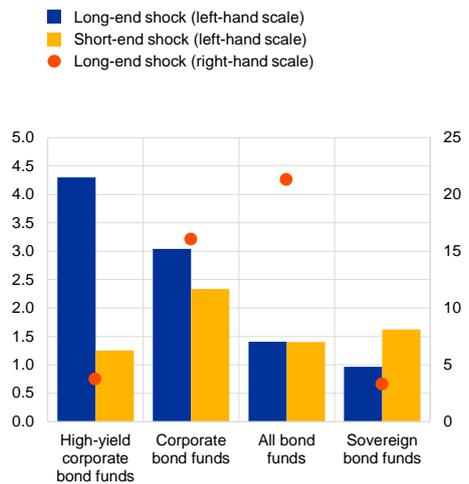
a) Bond holdings of euro area ICPFs and investment funds

(percentage of total bond holdings; years; Q4 2013-Q2 2020)



b) Inflows into euro area funds following a long-end and a short-end monetary policy shock of -25 basis points

(percentage of assets under management; EUR billions)



Sources: ECB (Securities Holdings Statistics by Sector and Investment Funds Balance Sheet Statistics), EPFR Global and ECB calculations.

Notes: Panel (a): securities are mapped into liquidity classes in accordance with Commission Delegated Regulation (EU) 2015/61, which defines liquidity requirements for banks. Highly liquid securities correspond to Level 1. Panel (b): the analysis is based on BVAR models using monthly data between April 2007 and June 2019. The included variables are cumulative investment fund flows as a percentage of past NAV, the VIX, the five-year Bund yield, a five-year NFC spread measure, as well as two high-frequency variables for a term structure and an NFC spread shock. Monetary policy shocks are identified using the method proposed by Jarocinski and Karadi (2020). Each fund flow category is added to the model separately. The monetary policy shock is equivalent to 25 basis point reductions of the five-year euro area risk-free rate for long-end shocks and the three-month OIS for short-end shocks. See Giuzio et al. (2021) for details.

Low interest rates led retail and institutional investors to increase their allocation to riskier funds. Empirical estimates show that a 25 basis point surprise decrease in the euro area risk-free yield curve drives inflows into all euro area bond funds of 1.4% of their net asset value (see Chart 23, panel (b)).⁶⁹ These inflows are particularly concentrated in high-yield corporate bond funds. The findings hint at a risk-taking channel of monetary policy for non-banks.

At the same time asset managers increased the liquidity risk of their funds by decreasing their holdings of cash and liquid assets (see Chart 23, panel (a)). The bulk of risk exposure for most fixed income funds is driven by their investment mandate and the benchmark market index. As a result of this, and given their significant exposures to BBB-rated debt (see Chart 23, panel (a)), funds might be particularly vulnerable to large-scale downgrades of corporate debt, which directly affects the composition of bond indices.

⁶⁹ See Giuzio et al. (2021). Kaufmann (2020) shows that investment funds both globally and in the euro area also achieved higher inflows into riskier asset classes after a loosening in US monetary policy.

3.1.4 Linkages between banks and non-banks

The increased interconnectedness between banks and non-banks causes shocks to propagate quickly across the financial system and to be amplified, generating negative externalities.⁷⁰ Linkages across financial entities can arise through market price channels, ownership links and exposures to common risk factors (such as overlaps in securities holdings). The shift in NFC financing structure from bank loans to debt securities tends to increase interconnectedness across non-banks through common exposures to similar securities (see Box 2).

Non-banks and banks represent important sources of funding for each other.

Wholesale funding by non-banks accounts for about 8% of total bank funding.⁷¹ Euro area ICPFs hold around 15% of euro area bank bonds, while investment funds, MMFs and other financial institutions together hold around 24% of the market (see Chart 24). Within this amount, MMFs play a particularly important role in short-term funding. Banks also provide financing to euro area non-banks through loans, debt securities and equities, which amount to about 8% of total banks' assets.⁷² Deposits with euro area credit institutions from euro area non-bank financials account for less than 6% of bank liabilities. Direct links between different types of non-banks are also sizeable. Insurance corporations, for example, hold over 25% of their assets in investment fund shares and rely heavily on MMFs for their liquidity management. This makes them vulnerable to liquidity risk from large fund outflows, as happened in March.

Banks and insurers also have major stakes in asset management companies and financial conglomerates.

Of the 25 largest asset management companies operating in the EU, 14 are owned by banks and five by insurance companies.⁷³ Also, around 40% of mutual funds around the world are run by commercial banks,⁷⁴ while about 38% of the hedge fund industry's assets are managed by funds affiliated with a financial conglomerate.⁷⁵ The ownership links between banks, insurers, asset management companies and funds provide long-term benefits in terms of risk and revenue diversification, exploit economies of scope, and can help to optimise liquidity between the parent company and affiliated institutions. As an example, in the event of idiosyncratic shocks affecting funds, headquarter banks may intervene to support them (see, for example, Bagattini et al., 2021). Conversely, affiliated funds may provide funding support to their parent company, e.g. via purchases of bonds (Gil-Bazo et al., 2020), while continuing to comply with their clients' fiduciary duty. In times of stress, however, ownership structures may also be a source of contagion if there are credit lines and contingency arrangements between the holding company

⁷⁰ Abad et al. (2017) was the first study to examine the linkages of EU banks to shadow banking entities at both the country and the individual exposure level.

⁷¹ See European Systemic Risk Board (2020).

⁷² See European Central Bank (2020c).

⁷³ See European Systemic Risk Board (2020).

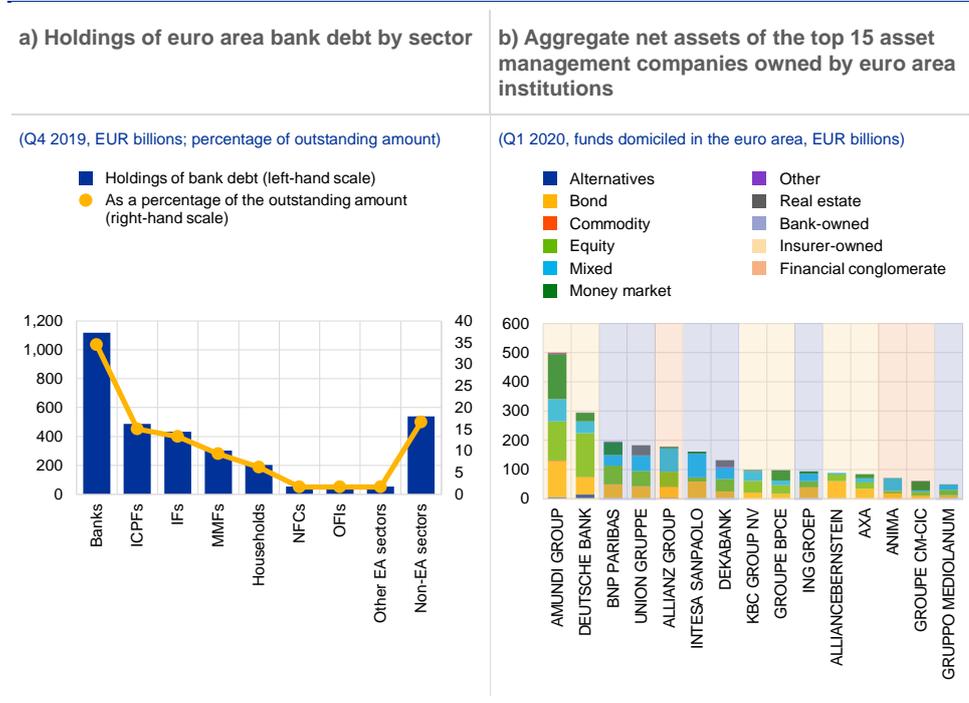
⁷⁴ See Ferreira et al. (2018).

⁷⁵ See Franzoni and Giannetti (2019).

and the affiliated institutions or via step-in and reputational risks related to confidence effects or revenue losses (see, for example, Franzoni and Giannetti, 2019).⁷⁶

Chart 24

Cross-sectoral holdings of financial sector assets in the euro area



Sources: ECB (large exposure data and securities holdings statistics), Refinitiv and ECB calculations.

Notes: The right panel includes assets of mutual funds and exchange-traded funds. Asset managers are classified as owned by banks/insurers when the asset manager is a subsidiary of the bank/insurer (this excludes cases in which 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 latest observation is for March 2020.

Banks and NBFIs are also connected to systemically important financial market infrastructures (FMIs) such as central counterparties (CCPs), central securities depositories and payment systems. FMIs play a key role in the smooth functioning of the financial system and differ considerably from other types of non-banks, which is why they are subject to dedicated regulatory and supervisory frameworks. In addition, central clearing is a highly concentrated business, in terms of both the post-trading infrastructure providers (i.e. the CCPs) and their direct users, which are primarily systemically important banks that clear not only proprietary but also client trades. Central clearing has reduced risks in the financial system via central risk management and collateralisation. At the same time, however, CCPs, the clearing member banks and their clients are tightly interconnected in ways that might lead to a destabilising feedback loop in the presence of liquidity risk.⁷⁷ The systemic importance of FMIs raises the question of whether, and under what conditions, they could have access to the central banks' monetary policy framework, with regard to both holding balances (i.e. deposit facility) and liquidity provision (i.e. credit operations).

⁷⁶ Please also note that a conglomerate affiliation may negatively affect the performance of an investment fund due to a double agency problem, whereby fund managers set aside the interests of the fund investor to benefit the parent bank (see, for example, Ferreira et al., 2018).

⁷⁷ See Faruqui et al. (2018).

Interconnections in the financial system can amplify contagion and impair the smooth transmission of monetary policy in periods of market distress. Large asset sales in illiquid markets can propagate stress across the financial system via mark-to-market losses on common exposures.⁷⁸ The portfolio holdings of euro area banks, ICPFs and investment funds share significant common exposures of relatively higher risk.⁷⁹ These exposures increase the risk of amplifying market stress if financial institutions have to liquidate a large or illiquid part of their portfolios simultaneously.⁸⁰ Investors holding the same assets may then suffer mark-to-market losses in their balance sheets, potentially leading to fire sales that affect the financing conditions of other financial intermediaries (i.e. by reducing collateral values) or of NFCs (i.e. by increasing the cost of market financing).

Recent events have shown that stress in non-banks can affect other parts of the financial system through asset sales and reduced short-term funding, thereby affecting the transmission of monetary policy (see Chart 22). As the coronavirus crisis deepened, euro area MMFs experienced outflows of nearly 8% of their assets under management, largely in relation to funds' and institutional investors' liquidity needs. Many MMFs experienced difficulty in raising enough cash as liquidity deteriorated rapidly, particularly in the CP market. Unconventional measures involving the CP market were needed, both in the United States and in the euro area, to improve financial market conditions and alleviate liquidity strains in the MMF sector, which was the main holder of short-term bank and NFC bonds.⁸¹

3.2 Financial stability risks can influence monetary policy and its transmission

The larger role of the risk-taking channel operating through non-banks could strengthen the transmission of monetary policy but also lead to side effects which could ultimately impair it. In comparison with the traditional bank lending channel, the relative importance of the risk-taking channel increases with a growing non-bank sector. There is evidence that a loosening of monetary policy conditions increases investors' risk appetite (Bekaert et al., 2013). For investment funds, this can imply additional inflows and a rebalancing of investors' portfolios towards riskier assets (Giuzio et al., 2021). Therefore, non-banks could strengthen monetary policy

⁷⁸ See, for example, Chrétien et al. (2020).

⁷⁹ See, for example, Section 3.1.3 regarding the rating of bonds held by non-banks.

⁸⁰ Note that leveraged funds are more exposed as they need to sell more than unleveraged funds to cover margin calls and account for higher haircuts on leveraged positions. Also, in stress periods leveraged funds face significantly higher outflows compared with unleveraged funds (see, for example, Molestina Vivar et al., 2020). The use of derivatives can also amplify procyclical behaviour on the part of asset managers and fund investors. However, it is difficult to capture a derivative's effect using traditional measures of financial leverage, which makes it difficult to quantify their exact effect on market dynamics (see, for example, Molestina Vivar et al., 2020).

⁸¹ See also ["The ECB's commercial paper purchases: A targeted response to the economic disturbances caused by COVID-19"](#), ["Improving funding conditions for the real economy during the COVID-19 crisis: the ECB's collateral easing measures"](#) and ["ECB announces new pandemic emergency longer-term refinancing operations"](#) on the ECB's website.

transmission to the extent that their risk appetite is more sensitive to monetary policy changes than that of banks (International Monetary Fund, 2016).

Structural vulnerabilities and financial distress impairing non-banks' ability to provide credit can negatively affect the transmission of monetary policy and NFCs' funding costs. While the increased risk taking of non-banks is an intended consequence of monetary policy aimed at easing the financing conditions of households and firms, it can also lead to an excessive build-up of risks and vulnerabilities (see also Section 3.1). As the relative importance of the risk-taking channel for non-banks grows, financial stability risks that impair the capacity of non-banks to provide credit can have a significant negative impact on the real economy.

Changes in monetary policy may trigger the sudden repricing of risk premia when non-banks behave procyclically. A surprising tightening of monetary policy can depress asset valuations and, therefore, lead to momentum in investment fund returns (Feroli et al., 2014). When fund investors react to these changing returns procyclically, rapid outflows may occur (see Section 3.1.2). Consequently, risk premia can change abruptly, thus affecting financing conditions for households and firms. In this way non-bank financial investors can impair the orderly transmission of monetary policy.

Liquidity transformation by NBFIs is often tightly linked with the supply of credit to firms and households (see, for example, Financial Stability Board, 2020). However, such liquidity transformations increase the vulnerability of NBFIs and when risks materialise the transmission of monetary policy may be impaired. By the same token asset prices are playing an increasing role in the provision of credit. However, when premia increase and prices decline significantly, credit provision can go down.

In the absence of a well-developed macroprudential framework for NBFIs, central bank interventions may be needed to stabilise the markets in times of stress, although such monetary policy measures may increase moral hazard. During the COVID-19 outbreak, large fund outflows and widespread asset sales from non-banks have amplified downward movements in prices, especially in less liquid markets.⁸² The sudden increase in margin requirements amplified liquidity stress in MMFs, ultimately hampering the short-term funding of banks and NFCs. Central bank interventions stopped any further spreading of systemic risk and ensured the smooth transmission of monetary policy.⁸³ However, these interventions can create incentives for market participants to take on excessive risk.

Against this backdrop, the enhancement of the regulatory framework – also from a macroprudential perspective – for non-banks would complement

⁸² As was the case in previous outflow episodes, funds sold illiquid securities and hoarded liquid securities. See Giuzio et al. (2019).

⁸³ See “The ECB’s commercial paper purchases: A targeted response to the economic disturbances caused by COVID-19”, “Improving funding conditions for the real economy during the COVID-19 crisis: the ECB’s collateral easing measures” and “ECB announces new pandemic emergency longer-term refinancing operations” on the ECB’s website.

monetary policy. Pre-emptive macroprudential tools aimed at mitigating the build-up of vulnerabilities in the non-bank sector and taking system-wide effects into account would help to increase the resilience of the whole financial system. In addition, they would support the effective transmission of monetary policy and could limit central bank interventions in times of crisis. However, such interventions can have costs. These include ex post costs such as increased risks to central banks' own balance sheets as well as ex ante costs such as incentives for market participants to take on excessive risk (moral hazard).

Box 2

The search for yield and the demand for illiquid assets through non-bank financial intermediaries

The prolonged low interest rate environment has challenged institutional investors, particularly those investing in traditional fixed income instruments. Many institutional investors such as pension funds need more lucrative investments to cover the high nominal returns promised on future liabilities. This has pushed them to look for other higher-yielding investment opportunities in the market. There is a demand for both relatively high-risk assets, such as corporate bonds, leveraged loans or certain tranches of asset-backed securities, and assets that provide attractive long-term returns and which have limited risk and a relatively low capital requirement.

The demand for illiquid investment assets (in liquid form) directs funds towards the non-banking sector. Liquidity transformation – the creation of liquid claims that are backed by less liquid assets – is one of the key functions of many financial intermediaries. For example, an alternative fund may offer an investor a more liquid way to invest in certain asset classes compared with direct investment in the same market. Some investors may also prefer illiquidity since it offers a liquidity premium. For example, although they may be difficult to sell at short notice, illiquid assets come with a higher yield for those investors who can buy and hold with certainty. Closed-end fund structures may be employed – they can use more leverage than open-end funds since they can do this without having to face short-term risk to meet investor redemptions.

Banks' increasing use of the originate-to-distribute model to fund syndicated corporate loans has both led and been driven by the growth of collateralised loan obligations (CLOs).⁸⁴ Euro area CLOs have grown to €132 billion as of the second quarter of 2020 from €49 billion in 2014, while outstanding issuance of invested syndicated loans rose to €230 billion in the second quarter of 2020 from €140 billion in 2009 – rising over this period from 2.1% to 2.9% of total euro area loans to corporates.⁸⁵ Comparable figures for leveraged loans held by banks are unavailable for 2020, but an estimate for the second quarter of 2019 put this amount at €382 billion (EBA, 2020). While they remain a small portion of NFC funding, these loans are used by borrowers who are heavily indebted or intending to become heavily indebted, and thus tie into concerns around debt overhang for the business cycle (see Section 3.1.1).

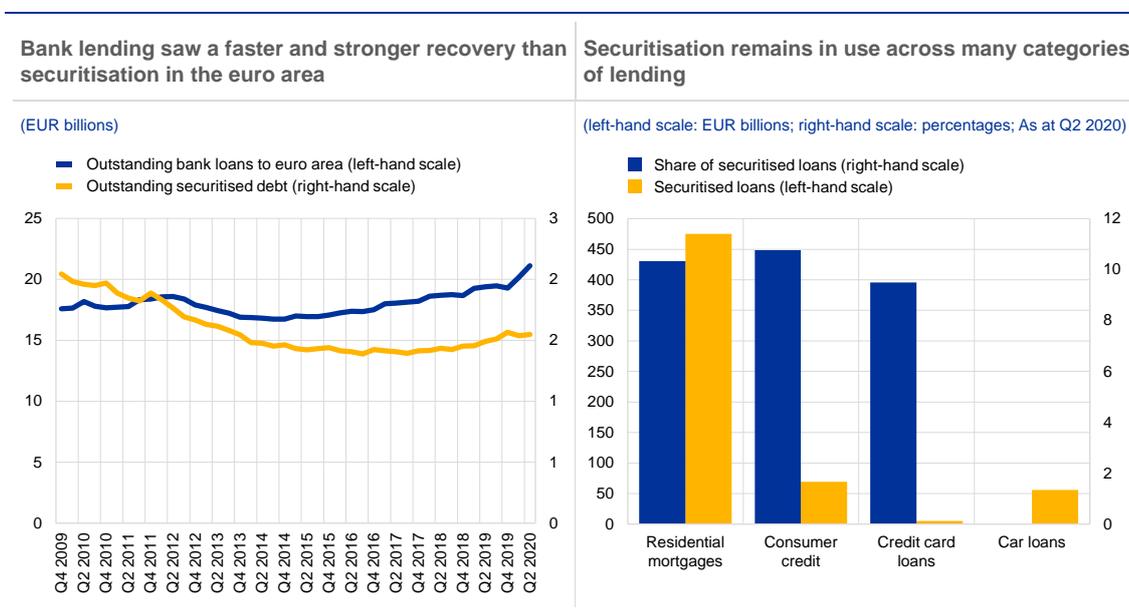
⁸⁴ See Bord and Santos (2012).

⁸⁵ A breakdown of outstanding amounts between financial and non-financial corporate borrowers is unavailable, but data on initial issuance suggest that financial companies accounted for only 5% of the total for outstanding syndicated loans at end-2019.

However, outside of syndicated corporate loans the importance of the originate-to-distribute model has declined since 2009. The euro area's outstanding securitised debt has yet to return to its pre-crisis highs – if CLOs are excluded, it grew by only €1 billion between the fourth quarter of 2014 and the second quarter of 2020. By contrast, bank loans have been growing at a faster rate from an earlier trough following the euro area debt crisis (see Chart A). Despite its decline, securitisation remains a commonly used business model beyond corporate loans in various categories of lending such as mortgages, consumer credit, auto finance and credit card loans (see Chart A). Furthermore, it is a much more established feature of the euro area's financial system than it was when the euro was introduced – in the first quarter of 1999 outstanding securitised debt amounted to less than 5% of its current level. This is relevant for policy as securitisation can weaken the bank lending channel of monetary policy by reducing banks' funding needs and improving their liquidity in the event of monetary tightening (Altunbas et al., 2009).

Chart A

Bank loans and securitised debt



Sources: ECB Statistical Data Warehouse, AFME Securitisation Data Report and authors' calculations.

Notes: Car loans are not distinguishable in bank lending statistics as they form a part of consumer and business lending. Therefore, a percentage figure is not included.

The growth of the non-bank financial sector will lead to a greater number of entities involved in credit intermediation, relative to bank-based intermediation. Financial intermediaries outside the banking sector are typically highly specialised – unlike banks, which offer a wide range of products, several non-banks are often set up for only one type of precisely specified purpose. Due to balance sheet constraints and specialisation, individual institutions in the non-bank sector are generally not very large, although collectively they may amount to substantial assets under management for certain asset managers. Market-based financing is therefore often performed along a chain of specialised and interconnected intermediaries.

There are strong interlinkages both within the non-bank sector and between banks and non-banks. Non-bank credit intermediation is highly dependent on retail or institutional investors – institutional investors are able to make the large ticket investments needed to support credit intermediation processes conducted by other non-bank entities. Due to their increasing preference for allocating their capital to other financial intermediaries, the financial system is becoming more

complex, with layers of interconnections and participants. While this adds complexity it also spreads risk across the financial sector rather than leaving it concentrated. Non-banks can also finance their operations by obtaining debt financing, although the use of portfolio leverage is typically somewhat restricted by mandate or by regulation.

Even though the amount of structured credit and leveraged finance may be modest compared with total financing for corporates and households, these methods of finance still deserve the attention of policymakers. The current monetary policy stance is contributing to the growth of the methods, and they both still have the potential to impact monetary policy transmission. This symbiotic relationship with monetary policy means they should be included in any suite of non-bank financial indicators considered by policymakers.

4 Implications of a shift in the financing structure for the functioning of specific market segments

This section analyses how the increase in non-bank financial intermediation, coupled with recent developments in the use of non-conventional monetary policy and in regulation, is affecting the functioning of fixed income markets. In particular, it considers developments in money markets and in bond markets which are of particular relevance for the conduct of monetary policy.

Fixed income markets are important for monetary policy transmission, support investment in the economy and are key to financial stability. Money markets are directly affected by the transmission of conventional monetary policy – changes in policy rates are generally immediately reflected in the rates on short-term transactions in money markets. On the other hand, bond markets are affected by expectations with regard to conventional monetary policy and are directly affected by the implementation of some unconventional monetary policies, in particular central bank asset purchases, which affect term and credit-risk premia. Both markets are important for the financing of banks and NFCs and, as such, their smooth functioning and effectiveness may have macroeconomic and systemic risk implications, which monetary policy may have to take into account.

This chapter identifies a number of frictions in the above markets. While they may only be minor so far, such frictions could gain in economic importance as the role of NBFIs and fixed income markets increases. This could induce central banks to consider policies aimed at reducing frictions, and to carry out contingency planning for market interventions during future crises.

4.1 Euro area money markets and the scarcity of safe assets

Money markets represent the early stage of monetary policy transmission, since policy rates are immediately reflected in the rates at which intermediaries transact in the money markets. Counterparties in the money markets borrow and lend liquidity in the (very) short term and the rates tend to be very close to the policy rates implemented by the central bank. Only a subset of financial intermediaries operating in money markets (e.g. banks) have access to central bank facilities.

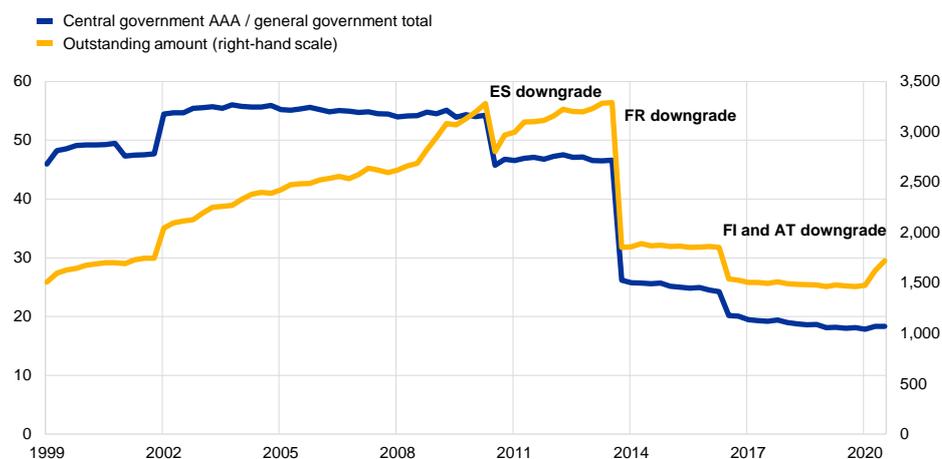
Since the GFC most money market transactions have been backed by securities used as collateral (secured lending). After the GFC euro area banks significantly reduced their unsecured interbank lending activities and switched to secured lending (European Central Bank, 2020a). Secured markets are also an important source of financing for non-bank financial institutions such as hedge funds, investment funds and insurance companies. The distinctive characteristic of secured

markets is that lending is provided against single-name securities or pools of securities which are used as a guarantee. In the event of counterparty insolvency, the guarantee can be sold immediately without any need for judiciary proceedings. Clearly, not all securities are good collateral. Collateral should be information insensitive (Gorton and Pennacchi, 1990) and should remain safe and liquid in most instances, even in crisis conditions.

Collateral used in the euro area is mostly government debt, for which the safest debt commands a premium. In the euro area the supply of benchmark government bonds⁸⁶ as safe assets to be used as collateral has generally decreased, while the demand for safe assets has increased, partly because of new regulatory requirements.⁸⁷ Several factors have affected supply and demand for these assets. The supply of top-rated euro denominated sovereign bonds has declined in recent years, due to sovereign rating downgrades and reduced issuance from top-rated issuers (see Chart 25). The recent COVID-19 crisis – in particular enhanced government funding needs due to the ongoing pandemic – has altered this trend, at least as far as the issuance of more sovereign debt is concerned.

Chart 25
AAA-rated euro area sovereign debt securities

(left-hand scale: share of euro area total, percentages; right-hand scale: amount, EUR billions)



Sources: ECB and Bloomberg.

Note: Includes sovereigns with AAA rating from at least one of the three main credit rating agencies (S&P, Fitch and Moody's) at each quarter end.

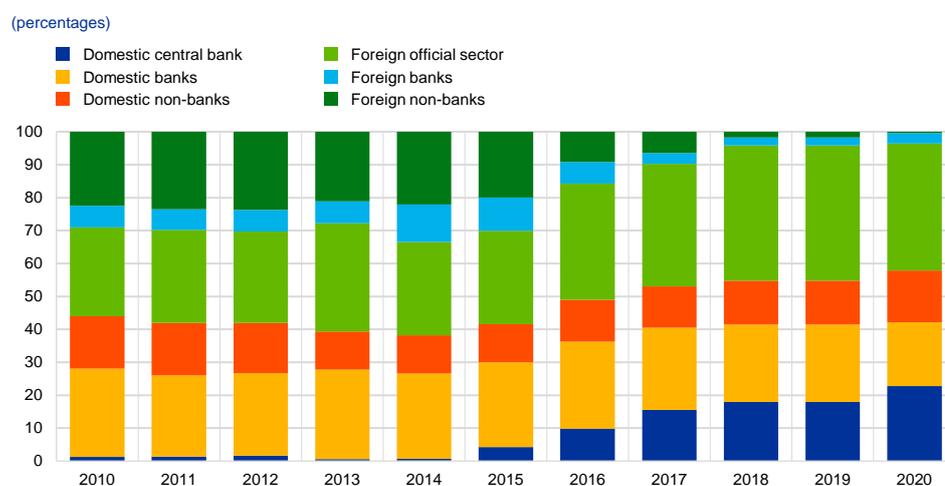
On the demand side, in recent years the official sector has been an increasingly significant holder of safe assets. In 2019, for example, 59% of AAA euro area sovereign debt securities were held by the official sector (domestic central banks and

⁸⁶ Bonds used as benchmarks are highly liquid and have a high credit rating (AAA or AA/Aa). In this section, sovereign credit ratings are used for illustrative purposes, in line with market practice, as an indicator of the safety status of sovereign bonds.

⁸⁷ The demand for safe assets has also increased due to a general increase in risk aversion. During downturns and periods of financial turmoil, investors tend to temporarily pile into safe and liquid assets. However, the GFC and the sovereign debt crises may have altered the way agents structurally form their expectations and may have longer-lasting effects than in the past. This may have resulted in a general increase in risk premiums (see Farhi and Gourio, 2018) and a strong preference on the investor side for safe assets.

foreign official sector), compared with 29% in 2014 (see Chart 26). This was a result of the renewed and enhanced asset purchases programmes implemented by the central banks in the face of the crisis and the significant reserves held by the foreign official sector in euros. Central bank portfolios are typically buy-and-hold – central banks do not typically engage in the frequent trading of such assets, often keeping them in their portfolios until maturity. Central banks’ holdings therefore contribute to reducing the *effective* supply of safe assets, i.e. the supply that is available for trading (see Malliaropulos and Migiakis, 2018). Securities lending schemes implemented by central banks can mitigate this scarcity.

Chart 26
Holdings of AAA-rated euro area sovereign debt by sector



Sources: IMF and Bloomberg.
Note: Includes sovereigns with AAA rating from at least one of the three main credit rating agencies (S&P, Fitch and Moody's) at each quarter end.

The demand for safe assets has also increased in recent years due to developments in prudential regulation. In the years following the GFC, the prudential authorities stepped up their efforts to regulate financial intermediaries in order to increase the resilience of the financial sector and lower the probability of another financial crisis. Although these developments primarily affected banks they were also present in markets in which non-banks are important counterparties, due to regulations such as the European Market Infrastructure Regulation. The new requirements often indicated that financial intermediaries had to increase their holdings of safe assets, most notably liquid assets.

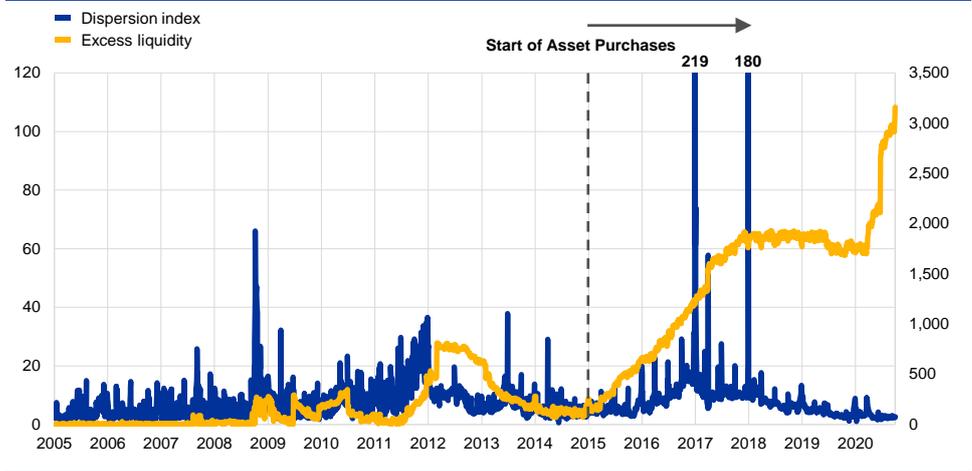
The above developments have affected liquidity in money markets resulting, in particular, in an increase in the observed dispersion of rates (see Chart 27).⁸⁸ Prior to 2015, financial stress indicators such as market volatility (i.e. VSTOXX), exhibited strong co-movement with the dispersion index, as observed specifically

⁸⁸ The chart shows the volume-weighted cross-sectional dispersion of money market overnight rates for the euro area over the period 2005-19 (Corradin et al., 2020). The metric, proposed by Duffie and Krishnamurthy (2016), combines information on money market rates and volumes. The dispersion index is low in relatively frictionless markets. Increases in dispersion indicate that money market rates do not move in tandem, which can signal impairments in the pass-through of the monetary policy stance to private market rates.

during the GFC and the euro area sovereign debt crisis. However, this relationship has become less pronounced in recent years (see Corradin et al., 2020).

Chart 27

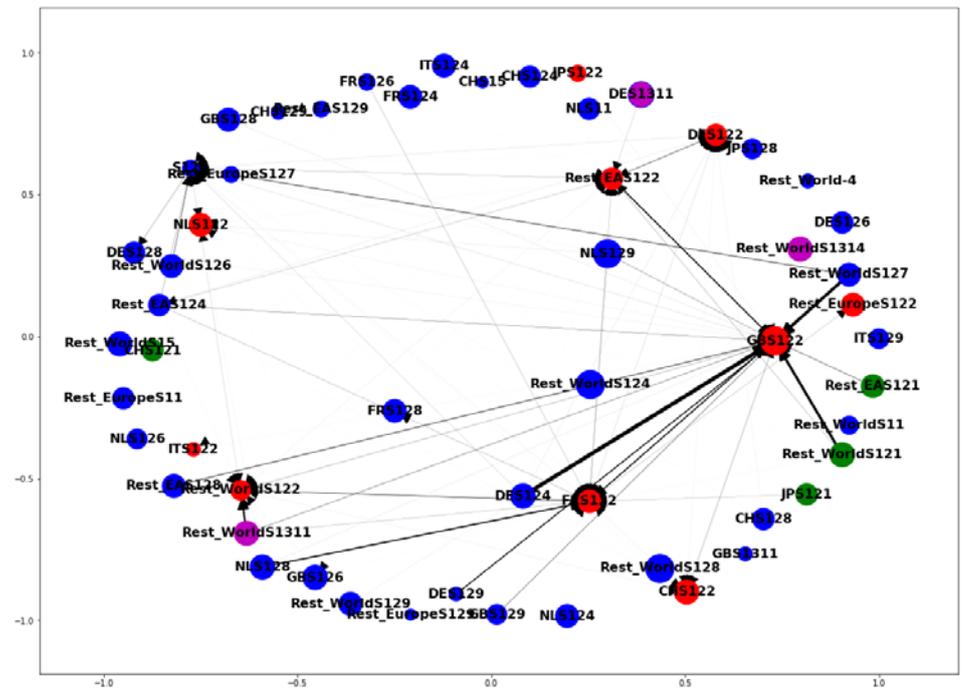
Dispersion index for euro area money market rates



Source: Authors' calculations, following Duffie and Krishnamurthy (2016).
 Note: Index constructed using the euro overnight index average (EONIA), Germany, Spain, France and Italy general collateral and special repo rates, volume weighted.

Figure 2

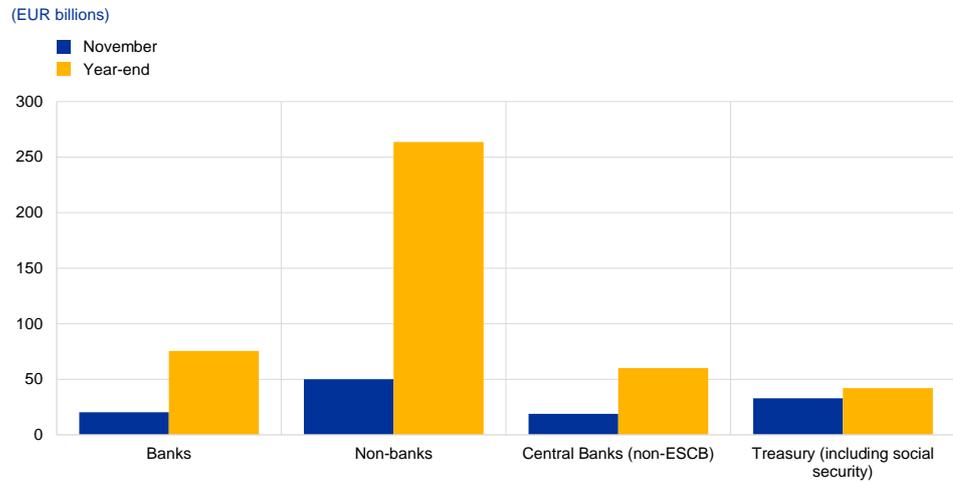
Network of Bund lending by country sector (ESA definitions), 28/12/2020



Source: Securities Financing Transactions Data Store.
 Notes: Each arrow points to the receiver of Bunds, node size is proportional to the number of links, edge widths are proportional to the value of Bunds lent. Blue denotes non-banks; red, banks; magenta, foreign official sector (government sector non-central banks); green, non-ESCB central banks.

Chart 28

Change of Bund lending over time by giver sector



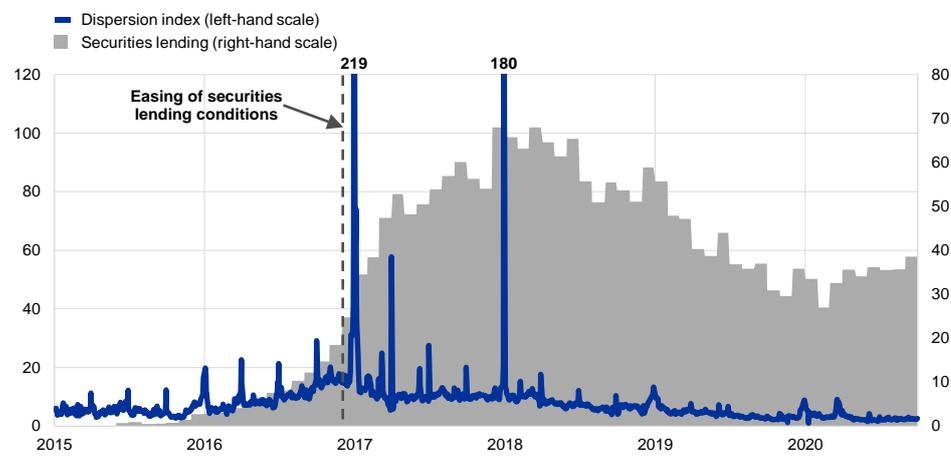
Source: Securities Financing Transactions Data Store.

The scarcity of securities in high demand is mitigated by securities lending, a market in which NBFIs are important counterparties. Securities lending is particularly strong at year-end (see Figure 2 and Chart 28), with non-banks being the most elastic and foreign official holders the least elastic providers of securities. The newly released Securities Financing Transactions Data Store (SFTDS) provides daily, transaction-level information on the European securities lending market. SFTDS data make it possible to build a network for Bund lending, as an example of a security which commands a particularly high premium in repo transactions. This network appears to be largely unidirectional, with NBFIs lending their holdings to banks, except for CCPs (S125) which also seem to be receivers of these securities. Bund lending may ease scarcity problems by allowing institutions to gain access to specific securities, thereby reducing market segmentation (Corradin and Maddaloni, 2020). The total volume of Bunds lent increases by a factor of about four close to year-end, when banks are compelled to fulfil specific regulatory liquidity requirements, in comparison with mid-November (see Chart 28). The expansion of such lending is mostly led by non-banks, especially investment funds. Central banks (non-ESCB) are as elastic as banks in providing securities at year-end, while other foreign official holders are the least elastic. Finally, the ECB securities lending programme contributes to reducing dispersion in money market rates and increasing overall liquidity in the market (see Chart 29)

Chart 29

Dispersion index for euro area money market rates and securities lending

(left-hand scale: dispersion index, basis points; right-hand scale: securities lending, EUR billions)



Source: Authors' calculations, following Duffie and Krishnamurthy (2016).

Note: Index constructed using the euro overnight index average (EONIA), Germany, Spain, France and Italy general collateral and special repo rates, volume weighted.

The observed dispersion of rates may also reflect market segmentation between banks and non-banks.

Non-banks are significant counterparties in the money markets and they do not have access to central bank deposit and liquidity facilities. This implies that similar transactions between banks are priced at rates that are different from those for transactions in which one of the counterparties is a non-bank. Banks may borrow liquidity at a lower rate from a non-bank (a fund) that does not have access to the central bank deposit facility (see Section 1.1.2.).

Since 2015 repo rates for almost the entire European repo market have fallen below the deposit facility rate (DFR), which implies that the deposit facility provides attractive remuneration for funds not otherwise invested.

It is therefore to be expected that banks will increasingly deposit funds at the central bank deposit facility when repo rates fall below the DFR, while other financial institutions will continue to use the lending side in general collateral repo transactions to deposit their liquidity. Recent evidence (see Ballensiefen et al., 2020) documents a drop in general collateral trading volume to about a third of its original size and sees this reduction as being mainly driven by banks that had access to the ECB's deposit facility. Finally, this segmentation between access and non-access banks induced by the central bank framework increases dispersion across repo rates.

More work is needed to disentangle the effects on money markets rates of regulatory requirements (for financial intermediaries) and differentiated access to central bank facilities among financial intermediaries.

Differentiated access to central bank facilities between banks and non-banks seems to induce a gap between rates applied to banks compared with those applied to non-banks. Further analysis is required to evaluate the implications (including the macroeconomic effects) of this development. Access to central bank facilities may induce differences in the transmission of monetary policy across financial intermediaries (see also Boot et al., 2020). A broad assessment of the current monetary policy implementation framework

would also provide a basis for addressing structural changes in the financial sector that could be implemented in the future.

As the COVID-19 crisis has unfolded it has brought fragilities in the mutual fund sector to the surface. Mutual funds faced unprecedented investor outflows when the COVID-19 shock hit. Central bank interventions implemented in March 2020 to alleviate liquidity strains in the financial system helped to stave off runs on funds and alleviated fire sale pressures. Central bank asset purchases were particularly effective. Funds with higher shares of assets eligible for central bank purchases in their portfolio before the COVID-19 crisis saw their performance improve by 3.7% and outflows decrease by 66% relative to otherwise similar funds. In addition, following the announcement and the implementation of additional asset purchases, banks increased the maturity of their lending to funds in the repo market (see Breckenfelder et al., 2020).

4.1.1 Repo markets and monetary policy

Repo markets, in which loans are secured by collateral, represent the largest proportion of money market transactions. The implementation of non-conventional monetary policy – primarily asset purchases – and the phasing in of new regulatory requirements have affected prices and volumes exchanged in the market, with a further impact on the transmission of monetary policy.

Central bank asset purchases induce scarcity in the repo markets, especially for securities that are needed in other related markets (e.g. the cash bond and futures markets). Different financial intermediaries holding securities exchanged in the repo markets also affect scarcity in the market, as measured by level of specialness.⁸⁹ In particular, the specialness of securities that are held in the portfolios of ICPFs is higher than that of securities held in the portfolios of banks and other financial intermediaries (see Maddaloni and Roh, 2021). Central bank portfolios, which are typically buy-and-hold, also induce higher levels of specialness.

Regulations affecting counterparties in the repo markets also have an impact on the rates prevailing in the markets. Compliance with regulatory ratios, in particular the liquidity coverage ratio, may have increased demand for high-quality liquid assets (HQLA) in repo markets. An analysis of overnight repo transactions using money market statistical reporting (MMSR) data reveals that repos with sovereign bonds as collateral trade at a premium relative to non-HQLA collateral at the end of periods. This effect is stronger for bonds from high-rated sovereigns even though such bonds are subject to the same regulatory treatment.⁹⁰

Non-banks engage in secured transactions with banks in order to manage their liquidity. Investment funds and ICPFs are funded by clients - in the form of equity in

⁸⁹ Specialness is the premium paid to borrow a “scarce” security in the repo market. It can be calculated as the difference between the general repo rate and the special repo rate on a specific security and day of trading in the repo market.

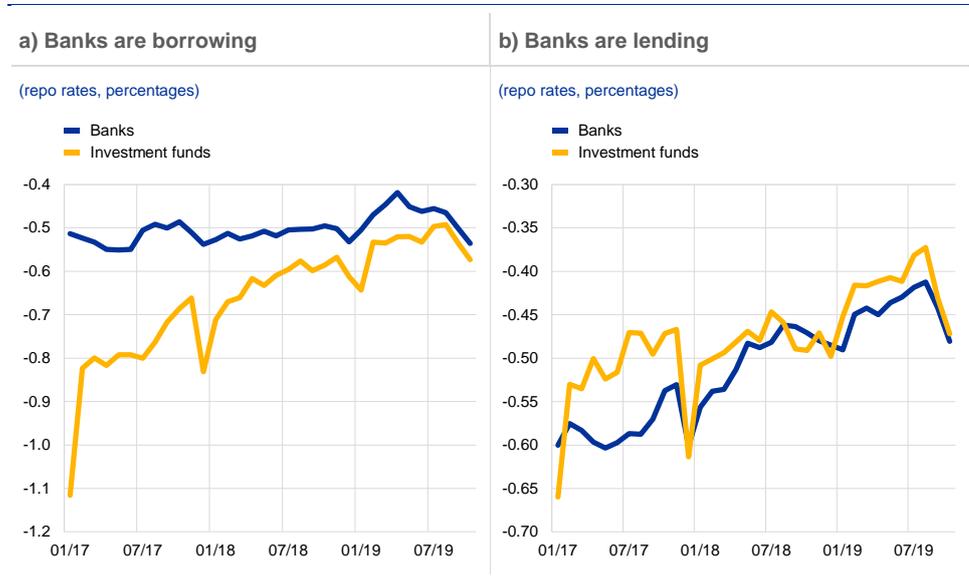
⁹⁰ See Gomes et al. (2018).

the case of investment funds (i.e. shares) and policy premia in the case of ICPFs. When a non-bank has additional (temporary) funding needs or wishes to increase financial leverage, it needs to do so via money markets, in which banks are counterparties. Non-banks with an excess of liquidity have no access to central bank deposit facilities, although they can lend into money markets. Among the non-bank intermediaries, investment funds play a more dominant role in these markets. ICPFs engage in these markets mainly to borrow liquidity – by lending securities from their portfolios – and are important counterparties only in some specific jurisdictions such as France.

Differentiated access to central bank facilities may induce partial segmentation in secured money markets, creating a repo rate gap (see Chart 30). Money markets are characterised by informational frictions and it is costly to find a counterparty with which to transact. Banks have a natural advantage in this process compared with other intermediaries because of their access to central bank facilities: they will not be willing to accept terms that are less favourable than those which could be obtained from the central bank (e.g. the deposit facility if the bank is lending cash). Research in this area is expanding rapidly, in order to quantify the extent of this gap and its response to monetary policy action. The gap can be noticeable if no control is introduced: in panel (a) of Chart 30, euro area funds lending to banks do this at higher rates than those which apply when banks are lending to other banks. The reverse is also true: when funds borrow from banks, they pay a premium (panel (b)). However, the large differences shown in the chart are unconditional, i.e. they do not take into account several well-justified reasons – besides access to central banks' facilities – which explain why repo rates differ. For example, funds might systematically use collateral of lower quality than banks in their transactions, or the repo rate might reflect the higher credit risk attached to a hedge fund. Once all these elements (“confounding factors”) have been taken into account and controlled for, a more plausible estimate of a gap of around 8-10 basis points for the period 2017-19 is obtained (Alogoskoufis and Nicoletti, 2021).

Chart 30

Secured money market rates applied by banks to other banks versus investment funds when banks are borrowing (panel (a)) or lending (panel (b))



Source: MMSR, from Alogoskoufis and Nicoletti (2021).

The repo rate gap between banks and non-banks seems to interact with collateral scarcity more than with changes in policy rates. Preliminary estimates (Alogoskoufis and Nicoletti, 2021) suggest a reduction of transmission to investment funds of only 1-2 basis points in the week following a DFR cut of 10 basis points, so that rates to investment funds might initially go down by only 8-9 basis points in the week after the cut. Ballensiefen et al. (2020) point to slightly higher results when banks without access to central bank facilities are considered rather than investment funds. These studies point also to an interplay between collateral scarcity and repo gap (Alogoskoufis and Nicoletti, 2021, Ballensiefen et al., 2020), which may merit further investigation. In particular, the left panel of Chart 30 suggests that the gap was considerably larger in 2017 when collateral scarcity was not mitigated by securities lending and the flow of asset purchases by the ESCB was relatively intense.

4.2 MMFs and money markets during the COVID-19 pandemic

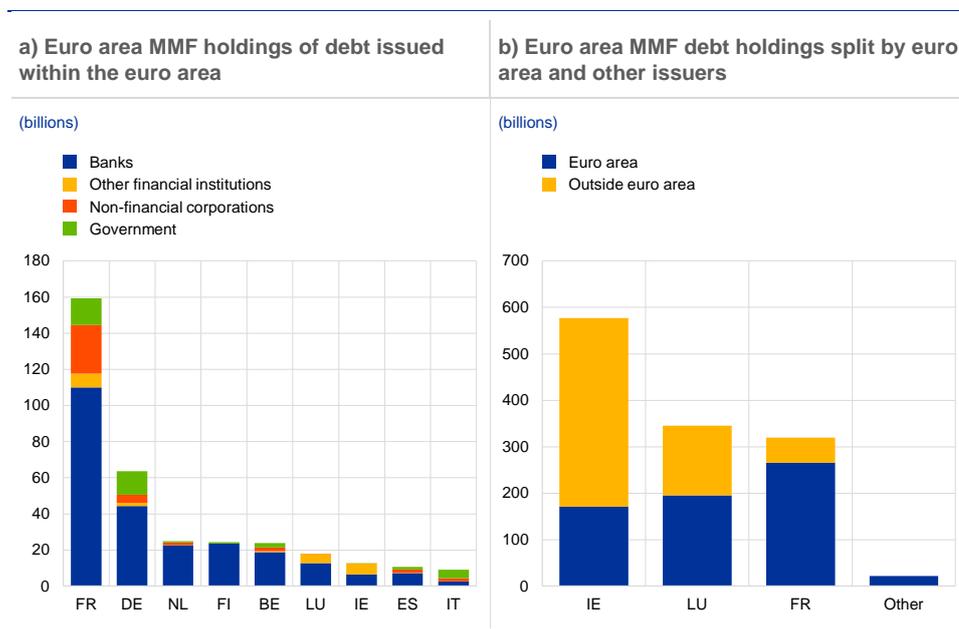
4.2.1 How systemically important are MMFs and money markets?

MMFs are traditionally an important source of short-term funding for financial institutions, mostly through their investment in CP. Before the COVID-19 crisis the most short-term debt in the euro area was issued by banks (€550 billion), followed by other financials (€170 billion) and NFCs (€85 billion). As MMFs based in the United States and the euro area hold 20% and 50% of this short-term debt respectively, these non-bank financial institutions play a crucial role in liquidity allocation in money

markets. Although euro area MMFs are predominantly based in France, Ireland and Luxembourg, Securities Holdings Statistics by Sector data confirm that they invest throughout the whole currency area (see Chart 31). The total assets of euro area MMFs amounted to €1.26 trillion in December 2019, although a substantial part of these debt securities are issued by credit institutions domiciled outside the euro area (see Chart 31). The corollary of this is also true – for example, cross-currency debt issuance by euro area entities accounts for 23% and 30% of US dollar and pound sterling MMF holdings respectively.

Chart 31

MMF holdings of debt securities and the split between euro area and other debt – end-2019



Source: ECB (Securities Holdings Statistics by Sector).
Note: The latest observation is for end-2019.

MMFs play an important role in the cash and liquidity management of both banks and non-banks, thereby affecting the stability of these financial intermediaries and the related effectiveness of the transmission of monetary policy.⁹¹ MMFs offer relatively attractive terms for storing and managing cash,

including the possibility of redeeming at short notice. However, they are subject to liquidity mismatches between their assets and liabilities and are therefore prone to investor runs in times of stress. Their investors are primarily institutional investors and NFCs without direct access to central bank (deposit) facilities.

For banks, the interlinkage with the MMF sector is through the funds' investment, since they are heavily invested in the CP issued by banks. Although CPs are a minor source of bank funding in aggregate, covering less than 3% of total funding needs, they provide a meaningful source of wholesale unsecured short-term

⁹¹ See Box 7 in the ECB's Financial Stability Review of May 2020 – investment funds' and insurers' holdings of MMF shares equal 28% and 21% of their total MMF and cash holdings respectively. Please refer to Box 8 in the ECB's Financial Stability Review of November 2020.

funding. Market intelligence suggests that banks usually use the CP market to manage their liquidity coverage ratio, but it may also be an important source of funding for banks with a smaller depositor base. Because of the prominent role played by MMFs in the CP market, fund managers' reaction to unexpected and high redemptions can also contribute to significant episodes of CP market stress, with direct consequences for the transmission of policy rates. Following the benchmark reform, bank CP rates were immediately included in the euro interbank offered rate (EURIBOR) – which serves as an important benchmark. The drying-up of CP markets in March 2020 resulted in large spikes in bank CP rates – these were immediately transmitted to the EURIBOR, which rose to levels last seen in 2016.

4.2.2 March 2020 turmoil and central bank actions

From 10 March 2020, as the COVID-19 pandemic gathered pace, MMFs experienced large investor withdrawals, which resulted in a negative feedback loop with money market stress. The large withdrawals from MMFs were part of a wider dash-for-cash, driven e.g. by rising margin calls in derivatives and repo markets. Meanwhile, corporate clients were drawing down cash from multiple sources, including MMFs, fearful of their earnings outlook and with debt issuance no longer practical. In addition, there was a surge in demand for cash-like investments in US dollar markets, reflected in large intra-MMF flows from private to public debt. The outflows put pressure on MMF liquidity ratios, with some MMFs coming close to breaching regulatory thresholds that could have triggered gates/fees and curtailed the cash-like nature of MMF shares/units. When private debt MMFs tried to raise liquidity by selling commercial paper and other assets, activity in these markets slowed to a trickle with almost no buyers.⁹² Nevertheless, a systemic run on MMFs could be avoided as central banks took action to ease liquidity strains and restore market confidence more broadly.

The asset purchase programmes implemented by the central banks stemmed outflows from euro and pound sterling MMFs but not those from US dollar private debt (prime) MMFs. First, following the announcement, spreads in debt markets narrowed significantly, easing margin call pressures within repo and other markets. Second, as asset purchases got underway, companies were able to issue record amounts of debt, with some of the proceeds channelled into MMFs, alongside previously withdrawn funds. Flows from private to public debt within US dollar MMFs continued, however, up to end-March. At that point, improved liquidity levels in US dollar money markets encouraged inflows similar to their onshore counterparts following the introduction by the Federal Reserve System of a liquidity facility for MMFs based on repos – the Money Market Mutual Fund Liquidity Facility (MMLF).

Asset purchase programmes had a muted direct, but an important indirect, effect on MMFs in the months that followed. All offshore sterling and dollar MMFs were ineligible for any central bank programme while 3% of MMF debt securities and

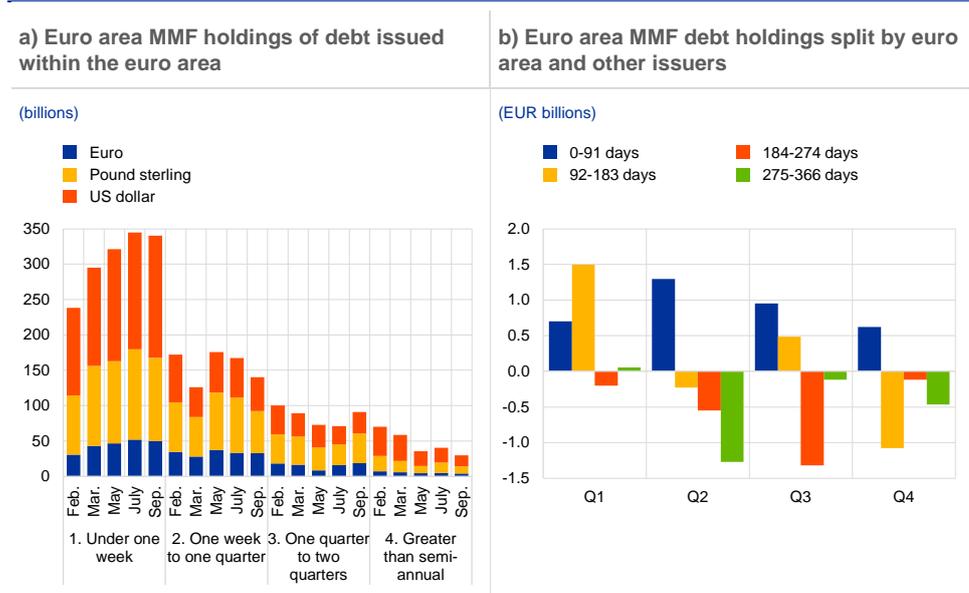
⁹² See Section 4.2 in Financial Stability Board (2020) for a more holistic global view of these developments and Golden (2020) for more details from an Irish perspective.

2% of all holdings were eligible for Eurosystem purchases. Investor inflows recovered sharply, however, due to record amounts of corporate debt issuance – some of the proceeds of this were invested in MMFs.

Money markets in Europe recovered more slowly than those in the United States. Money market liquidity took until June to recover in Europe, while investment in securities beyond three months remained well below pre-pandemic levels and contributed to a sharp decline in volumes in European money markets (see Chart 32). This took place alongside the effect of TLTRO on bank issuance needs, which allowed yield curves to flatten. There was little evidence of an effect from increased concentration limits for bank-issued unsecured debt in the Eurosystem’s collateral framework. In the United States, the MMLF provided a shortcut to this process as prices and traded volumes benefited from the support provided, even if actual repo volumes passing through the MMLF were modest, implying commensurately lower risks for the central bank.

Chart 32

MMF assets by residual maturity and European CP by amounts outstanding – February to September 2020 and quarterly changes in 2020 compared with 2019



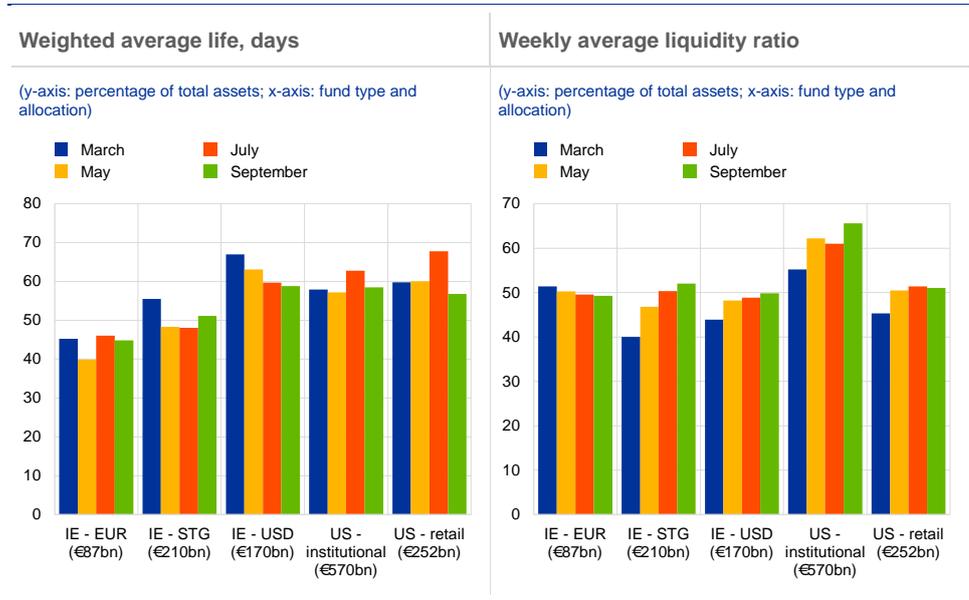
Sources: Central Bank of Ireland and ECB.

The MMLF allowed US-resident MMFs to invest further out on the money market curve than their euro area counterparts despite structurally higher liquidity ratios. In Europe, the fragility of secondary market liquidity and fear of testing regulatory liquidity ratios were the key drivers of very conservative investment strategies. In the United States, this fear of fees/gates is greater because they are triggered for prime funds when the weekly liquidity ratio falls below 30%, whereas in Europe a 20 basis point collar must also be breached. In addition, investors require 20-30 basis points as compensation for investing in prime MMFs (Cipriani and la Spada, 2021), which disappeared at very low interest rates. These factors drove liquidity ratios higher in the United States yet average maturities of asset holdings of US-resident MMFs were at or above Irish-resident MMFs, despite the former

depressing the latter (see Chart 33). Similarly, Irish-resident US dollar MMFs benefited from the impact of the MMLF in US dollar markets.

Chart 33

Weighted average life and weekly average liquidity ratios by fund type, split by Irish and US-resident MMFs types in selected months of 2020

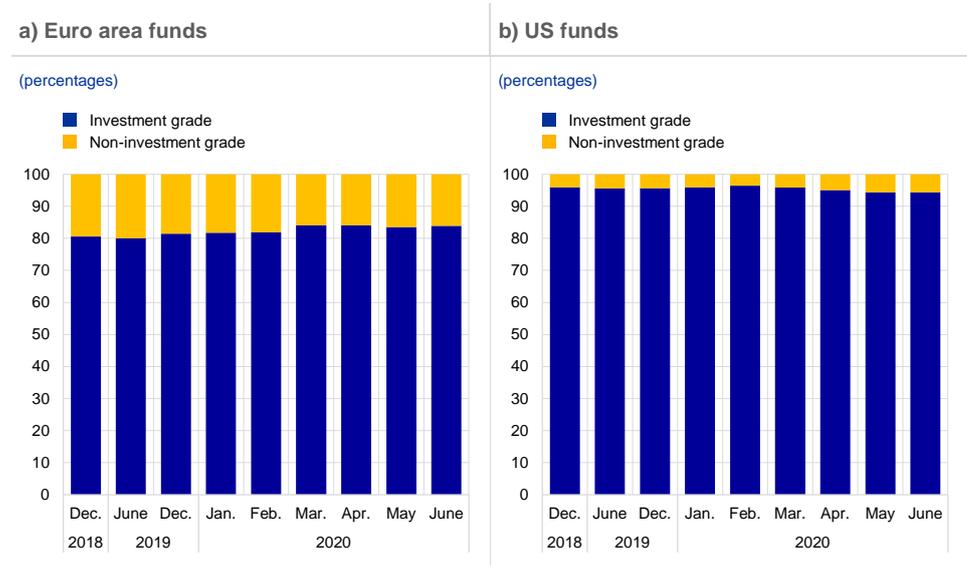


Sources: Central Bank of Ireland and US Securities and Exchange Commission.

The implementation of an MMLF style repo facility in Europe faces significant institutional and implementation barriers. First, there is the issue of support for non-euro denominated MMFs. Currency swap facilities operating between central banks could play a role as there is an alignment of interests. Second, the US MMLF is backed by a US Treasury guarantee. Credit risk may be lower in Europe, however, as municipal debt represents a key risk within collateral provided under the US MMLF. Thirdly, the specifics of US money markets, i.e. flows from private to public debt and the importance of US dollar markets in general, reduce the scope for a direct translation of the Federal Reserve System’s reasoning to Europe. Finally, significant operational preparations would be required during non-crisis times were such a facility to become an option as part of a crisis toolkit.

4.3 The bond markets

NBFIs rely, to a large extent, on credit ratings as a tool for risk assessment in their portfolio allocation. This often results in investment funds facing statutory obligations which bind them in relation to the level of risk and the ensuing rating categories that can be incorporated into their portfolios. This is the main reason why the distribution of their portfolios is skewed towards investment grade bonds; as shown in Chart 34 below, funds investing mainly in bonds allocate 85% or 95% of their portfolios to investment grade bonds, depending on whether their domicile is in the euro area or the United States, (see also Chart 11 in Section 2.1).

Chart 34**Distribution of bond funds' portfolios by rating category**

Source: Lipper (from Refinitiv).

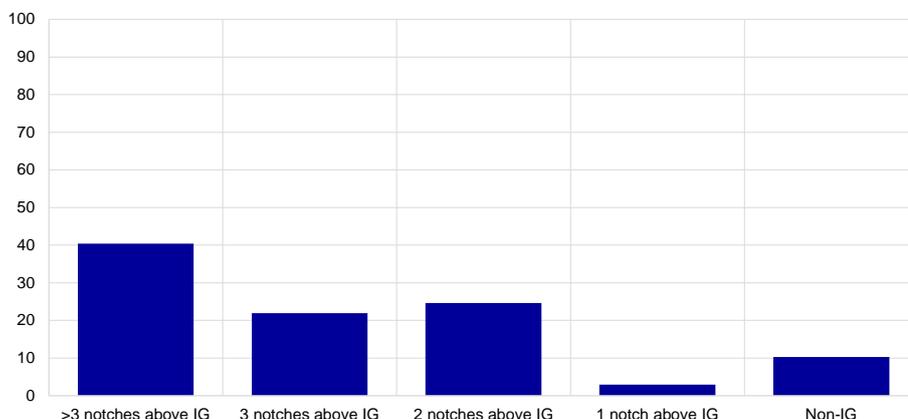
In addition, most corporate bonds issued by euro area entities are rated close to BBB-/Baa3 – below this threshold they would be demoted to the non-investment grade category (see Chart 35). This implies that if a wave of systematic rating downgrades occurs, for example due to a serious deterioration of macroeconomic prospects, a cliff effect will occur in corporate bond markets.⁹³ In particular, companies that lose their investment grade ratings may face substantial hurdles in tapping the market for new funding, or they may face increased borrowing costs after the downgrade. In particular, after the downgrade, investors willing to make placements in the non-investment grade debt will be fewer. This could result not only in increased borrowing costs, but also in an inadequate capacity to absorb new bond issues, and could even lead to a default on maturing debt.

⁹³ Credit rating agencies take into account company-level and macroeconomic, as well as sector-wide, parameters in the process of assigning credit ratings to corporates.

Chart 35

Euro area NFC bonds: distance from investment grade threshold

(percentage of total)



Source: Refinitiv.

Notes: The chart illustrates the distribution of outstanding amounts of bonds issued by NFCs residing in euro area countries, based on the distance of the ratings from the investment grade threshold. Issuer default, foreign currency, ratings assigned by DBRS, Fitch, Moody's and Standard and Poor's are used on a first-best basis. Only bonds issued by NFCs, with a remaining maturity of more than one year, are considered. Ratings equal to or above BBB-/Baa3/BBBL are classed as investment grade (IG), while bonds below this threshold are classed as non-investment grade (Non-IG).

The use of credit ratings is an important factor in the investment strategies of investment funds. The result is that the financing of economic agents, in particular NFCs, is reliant on “rating cycles”. For example, credit ratings exhibit strong covariance with the economic cycle, either preceding or following its shifts. The recent financial shock caused by the COVID-19 pandemic was reflected in both a surge of volatility and a wave of downgrades observed in March and April 2020, specifically because of the deterioration of economic prospects worldwide. Although market volatility conditions eased, the deterioration of the creditworthiness of companies is expected to have longer-lasting effects.

Given the importance of non-bank intermediaries as holders of financial assets and their reliance on ratings, the procyclical patterns shown by ratings may have serious consequences for the economy and the transmission of monetary policy. In particular, systematic rating upgrades in “good times” (e.g. expansions) lead to a widening of the range of entities that may tap the market for funding as well as to easier financial conditions (i.e. a lower cost of borrowing). The opposite of this is observed in “bad times” (e.g. contractions). To the extent this procyclicality is related to macroeconomic factors, companies of adequate credit quality, ceteris paribus, may find it difficult to tap the market for funding, in bad times, or funding may be provided in excess (i.e. to entities of insufficient quality), in good times.⁹⁴

Since the COVID-19 shock the euro area the economy has entered a phase of weaker activity. At this juncture the risk is therefore skewed towards a lack of funding. At present the PEPP supports corporate bond valuations for entities that

⁹⁴ There might be other factors driving rating cycles, apart from the macroeconomy. For example, Blume et al. (1998) argue that there is a stringency factor driving the judgmental component. Other authors (e.g. Lennkh and Moshhammer, 2018) link this factor to market sentiment.

could otherwise be materially affected by a repricing of risk. Bond purchases, in the context of the PEPP, directly support the valuations of low-rated investment grade bonds, which are eligible for the programme. In this regard, the PEPP provides a backstop to what might otherwise be an abrupt rise in the cost of funding for these bond issuers. At the onset of the COVID-19 crisis, bond market volumes froze and costs spiked. With regard to non-eligible bonds, the non-investment grade bond market experienced a significant reduction in March and April 2020, shrinking to a mere 4% of total issuance from a share of over 20% before the COVID-19 shock. This is partly due to the fact that, in contrast to the actions taken by central banks in other jurisdictions, the programmes implemented in the euro area (CSPP and PEPP) did not allow the exemption of bonds which had been rated investment grade before the crisis (“fallen angels”). In other jurisdictions, exemptions were granted with central banks enjoying indemnification – this could be particularly challenging in the euro area context.

Volumes recovered and costs declined after the PEPP was launched; however, the intention is to terminate the programme once the pandemic is over. At the same time, this support also provides an opportunity to work towards making market financing more resilient to future abrupt changes in market conditions. Looking forward, a more structural solution, which would address the issue of a mechanistic reliance on credit ratings with procyclical features, could enhance the resilience of market financing for euro area bond issuers.

Shocks like those stemming from the COVID-19 pandemic may also lead to self-reinforcing mechanisms between flows to NBFIs and their holdings. For example, in March 2020, heightened demand for liquidity on the part of funds’ shareholders was transmitted to both the government and the corporate bond markets. In the face of outflows from bond funds, sales of safe and liquid assets (such as US Treasury bonds) spiked, leading to a rapid rise of US Treasury yields.⁹⁵ Similarly, due to the redemption of fund shares by investors, funds sold off corporate bonds, which led to their yields soaring. In the corporate bond markets transaction costs also rose abruptly and block trades of both investment grade and non-investment grade bonds became difficult.⁹⁶ Stress in the US Treasury market receded after the Federal Reserve System intervened with large asset purchases and provision of liquidity.

The functioning of the bond market is related to the liquidity conditions faced by bond funds. Moreover, the interventions of central banks during the COVID-19 shock provided a backstop for what could have become a broader repricing of risk, similar to that witnessed during the GFC. If a disruptive event had not been avoided, the wave of investment grade corporate bond issuances observed in the aftermath of the policy interventions might have encountered greater difficulty and proven costlier. Consequently, the backstop provided by central banks’ interventions in the aftermath of the COVID-19 shock also facilitated the proper functioning of the market-based financing channel to the economy.

⁹⁵ See Vissing-Jorgensen (2020).

⁹⁶ See O’Hara and Zhou (2020).

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

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