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Research Report

Corporate credit and leverage in the EU: Recent evolution, main drivers and financial stability implications

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Reports of the Advisory Scientific Committee

No 14 / June 2023

Corporate credit and leverage in
the EU: recent evolution, main
drivers and financial stability
implications

by
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ESRB

European Systemic Risk Board

European System of Financial Supervision

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Executive summary

This report seeks to present a long-term view of the evolution of financing of non-financial corporations (NFCs) in Europe in recent decades and to compare this with the contemporaneous evolution of NFCs in other advanced economies. The analysis covers periods of expansion since the euro was first introduced, financial distress after 2008 and the post crisis recovery up to the coronavirus (COVID-19) pandemic. The goal is to offer perspectives that go beyond the conjunctural dimension, identifying structural trends in corporate leverage, assessing potential drivers and their implications for the allocation of credit and financial stability.

The first part of the report documents the aggregate evolution of NFCs' leverage across its main indicators. Private credit as a share of gross domestic product (GDP) expanded for many decades after World War II – a development seen in a positive light until the 2008 financial crisis. A popular perception is that the era of ultralow interest rates may have pushed many NFCs into excess indebtedness. By contrast, our analysis reveals that most measures of NFCs' leverage in the EU have been in decline since at least 2008, and even earlier in core euro area economies. This decline can be observed across most countries, NFC size categories and industries.

The euro area aggregate corporate net leverage ratio (debt minus cash holdings divided by total assets minus cash) fell from around 31% in 2008 to around 24% before the COVID-19 period. In 2021 aggregate gross and net leverage ratios were at their lowest levels since 2001. The decline in corporate leverage is observed both when using data from national accounts (where balance sheet items are valued at market prices) and from accounting (where balance sheet items are valued at book values). This trend was partially matched in the United States, where, in addition to evidence of rising leverage among listed NFCs, there appears to be a steady, if less pronounced, decline in borrowing among unlisted NFCs. A clear distinction is that bond issuance by large US NFCs has been sustained since 2009, while in Europe the rise in bond funding has been more limited and started from a much lower level.

The second part of the report explores potential drivers of the observed evolution. We seek to provide some insight by comparing corporate leverage trends across different types of NFCs and countries, and by assessing their evolution both in phases of credit expansion and tighter supply. From a corporate finance perspective, leverage is the result of NFCs' individual financing choices. Under ideal theoretical conditions NFCs would be able to choose indifferently between debt and equity (Modigliani and Miller, 1958). However, in reality, they choose their leverage by comparing the advantages and disadvantages of debt financing relative to other sources of funding, including self-financing through retained earnings. Variations in leverage over time may then reflect changing investment needs or changes in the relevance of debt tax shields, bankruptcy costs, or any other financial frictions affecting their choice. A steady trend suggests the accommodation to changes in the economic environment such as poorer profitability prospects, greater uncertainty, lower interest rates or tax reforms that reduce the tax advantage of debt financing.

Drivers of leverage trends may include credit supply factors, such as changes in the availability and cost of bank credit, or credit demand factors, such as changes in NFCs' investment needs or the availability of internal funding. Bank credit supply factors might have



affected smaller NFCs following the global financial crisis (GFC) and the European sovereign debt crisis. The regulatory reforms of the past decade might have increased the regulatory capital cost of NFC credit more than that of other lending categories such as mortgages. Supply-side factors related to banks might explain the increasing role of non-bank financing among NFCs in Europe, albeit starting from a very low level. Nonetheless, a general explanation based on increasing financial constraints is not consistent with evidence of a generalised decline in leverage across all categories of NFCs by size or asset composition, including those that are least likely to be constrained (such as dividend paying NFCs). Candidate demand-side explanations for the decline in corporate leverage include a general decline in investment prospects in a phase of secular stagnation, and the technological shift in investment composition towards intangible assets, which need less upfront funding and are less suitable as collateral for debt financing.

A full understanding of these supply and demand factors would require further work based on granular data. A significant effort is currently underway to compile EU-wide databases that offer comparable financial and credit risk data for NFCs and their alternative sources of funding. Those databases will allow econometric identification strategies to be implemented to assess the contribution of the various potential drivers. They may also uncover pockets of vulnerability among individual NFCs which are not clearly visible in less granular data, such as groups of NFCs with excess indebtedness or with no easy access to external funding. Furthermore, the databases can help to identify structural drivers of NFC borrowing trends and hidden vulnerabilities, such as the concentration of excess indebtedness or a lack of access to external funds. Macroprudential authorities may pay more attention to NFC financing in the coming years, assessing, among other issues, their vulnerability in the context of the transition towards a greener economy, which is likely to require significant private investment efforts as well as the large-scale mobilisation of public resources (European Court of Auditors, 2021).

Finally, the report considers potential general equilibrium outcomes and the financial stability implications of the analysis. There are concerns that the decline in the credit needs of NFCs or in the willingness of financial intermediaries to channel credit towards NFCs could lead to a reallocation of credit to other sectors or financial assets. This might generate financial instability if increased credit supply to those sectors (or the concentration of investment in specific assets) were to produce greater systemic risk, as a result of unsustainable valuations or exposure to more highly correlated negative shocks, for instance, especially in adverse aggregate scenarios. In Europe, a major reallocation of credit to governments and, to a lesser extent, to household mortgages can be observed. Finally, the growing role of non-bank financial intermediaries stresses the urgency of developing a comprehensive macroprudential framework that avoids leakages across segments of the financial system and guarantees that similar risks are addressed consistently across the whole system.



1 Introduction

The conduct of macroprudential policy requires a proper assessment of the indebtedness of the private sector. Large increases in credit to households and NFCs often result in a financial crisis, followed by subdued recovery (Dell'Ariccia et al., 2012; Jordà et al., 2013; Verner, 2019). When households and NFCs are highly leveraged, they may be less resilient to shocks, forcing banks to recognise large losses. High leverage is also associated with higher risk of default and bankruptcy (Ohlson, 1980; Campbell et al., 2008; Cathcart et al. 2020). The accumulation of non-performing loans may impair banks' ability to maintain their supply of credit to NFCs, with destabilising effects on the real economy. Over the long term, excess debt in the private sector can impair growth, as debt service absorbs a substantial part of income that could be put to other productive use (Committee of the Global Financial System, 2022).

While attention has focused on financial or household leverage since 2008, this report presents a medium to long-term perspective of the evolution of corporate credit and leverage. The earliest comparable data available to this study suggest a rise in NFC leverage in the EU periphery and a modest decline in core EU countries before 2008. The most striking result, drawn from a broad collection of different data sources, is the suggestion of an unprecedented steady decline in corporate leverage in most EU countries and across NFC characteristics since 2008. The declining trend of corporate leverage is found when using data from accounting and from national accounts, so asset revaluations during the low interest rate environment cannot be the only factor behind the decline of corporate leverage. This report discusses the potential drivers and implications of this decline.

Ultimately, the implications of these findings for macroprudential policy depend on the causes of the decline in NFC credit. Accordingly, the report makes a first attempt to identify and assess a range of possible drivers of this recent trend.¹ More interpretations are, of course, possible,² and a formal quantitative assessment of the statistical and economic significance of each candidate driver would require data and analysis that go beyond the scope of this report, which should therefore be interpreted as a first step towards obtaining a better understanding of financing patterns among EU NFCs and their macroprudential implications.

Prudential analysis typically focuses on the exposures of banks and other financial intermediaries to the private non-financial sector; with complementary optics, this report focuses largely on the indebtedness of NFCs, seeking to understand the drivers of their leverage decisions. All forms of debt financing extended to NFCs are considered, with further breakdowns for bank credit, which is by far the most important funding source for EU NFCs. Flows of bank credit to all sectors, notably NFCs, were severely disrupted in and after 2008 because of the GFC and the sovereign debt crisis (Chart 1). As these crises unfolded, the fall in bank lending flows could have reflected both supply and demand factors and the significant banking dimension of the two crises points to the collapse in banks' lending capacity as the leading driver of the

¹ The report considers developments from a long-term (i.e., structural) perspective and does not stop to analyse developments in corporate leverage directly related to shocks, such as the GFC or the COVID-19 pandemic.

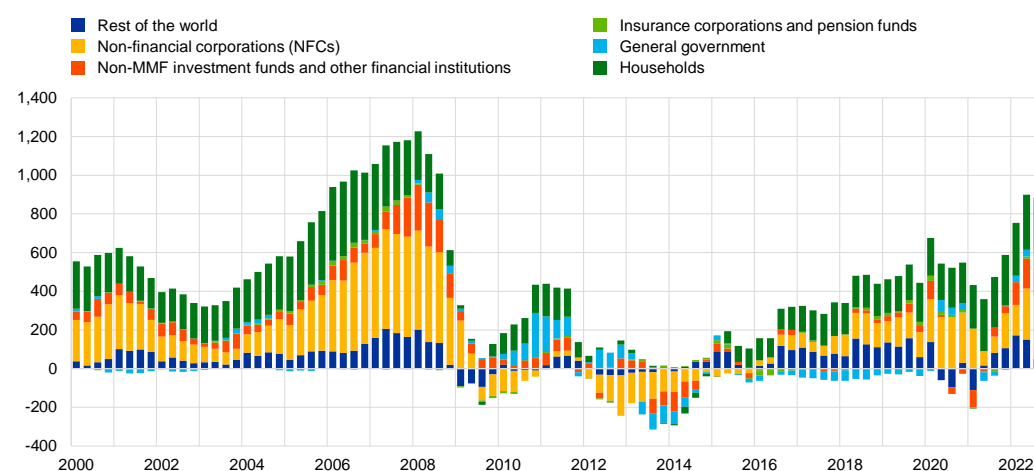
² For example, linked to a process of financial exuberance.



contraction in leverage in other sectors, including NFCs, in the period 2008-2015. The root causes of this contracted supply in bank lending may include not only the diminished lending capacity implied by the capital losses inflicted by the two crises but also the accommodation of the tighter prudential regulations that were gradually enforced after 2009. In this context, a gradual shift by NFCs towards non-bank financing alternatives could be expected. For this reason, in the body of this report we look not only at bank credit to NFCs but all forms of debt financing, including the issuance of debt securities and lending from non-bank financial intermediaries.

Chart 1
Flows of bank loans by borrower sector

(EUR billions)



Sources: ECB (who-to-whom) accounts and ESRB Secretariat calculations.

Notes: Each bar shows the four-period accumulated flows of bank short and long-term loans to different economic sectors, as reported in the euro area quarterly national accounts. The latest observation is for the third quarter of 2022.

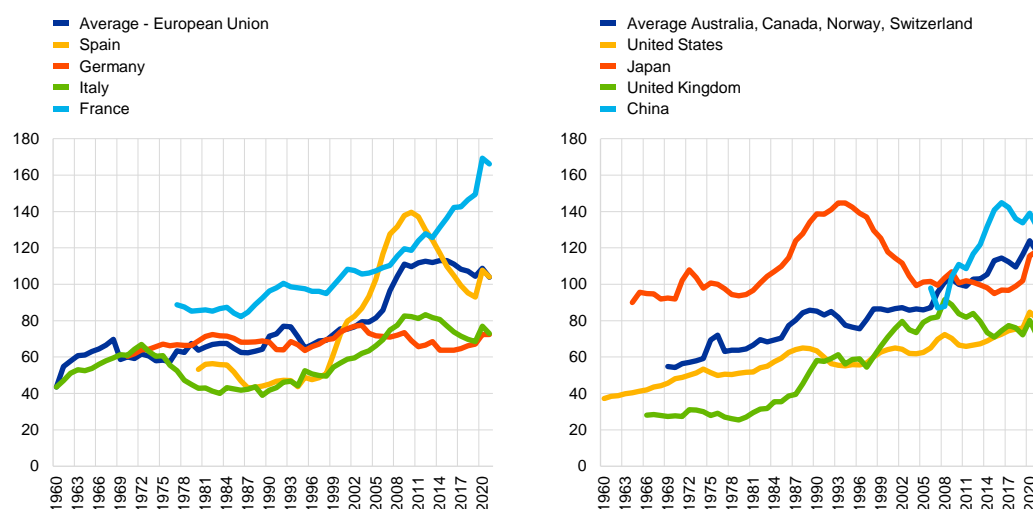
Recent reports have alerted about worrying developments in corporate credit and indebtedness (McKinsey Global Institute, 2021; European Systemic Risk Board, 2021b; International Monetary Fund, 2021; Boone et al., 2022; Committee of the Global Financial System, 2022). This view is largely driven by the focus on gross credit volumes as a share of GDP, which can be especially misleading when there are large volumes of intra-sectoral credit or large fluctuations in GDP, such as during the COVID-19 pandemic. Chart 2 shows the ratio of corporate debt (including loans and debt securities) to GDP for several world economies, as reported by the International Monetary Fund (IMF). For the EU, after a continuous increase in the period between 1999 and 2009, the ratio stabilised or even declined slightly until the outbreak of the COVID-19 pandemic.³ Abstracting from the pandemic period, with some exceptions (e.g. France), corporate debt as a share of GDP stabilises or contracts in most EU countries after 2008 (Chart 2, left-hand panel). This is similar to the experience in Japan and the United Kingdom but is in contrast to the evolution in the United States, several other developed economies and China, which have

³ Recent evidence from the post-COVID-19 period suggests that at the aggregate level NFCs saved their support funding, keeping their net leverage stable (Granja et al., 2022; Pagano and Zechner, 2022).

registered increases in NFC credit as a share of GDP after 2008 (Chart 2, right-hand panel). The observed stabilisation in the ratio corresponding to the EU average could also be interpreted as a return to the historical trend observed up to the mid-1990s, which was disrupted by the credit boom during the 2000s. Looking at individual countries, Chart 2 shows, among others, past boom-bust dynamics in credit to the NFC sector in Spain and Japan as well as more recent large increases in NFC credit as a share of GDP in France and China.

Chart 2
Corporate debt as a share of GDP

(percentage of GDP)



Sources: IMF Global Debt Data Mapper and ESRB Secretariat calculations.

Notes: Total stocks of loans and debt securities of NFCs as a share of GDP. Figures for the EU are the average for the EU27, excluding the United Kingdom, over an unbalanced panel of countries. Data is not consolidated. The latest observation is for 2021.

This report focuses on corporate leverage as the most appropriate measure to assess trends and vulnerabilities in the funding structures of NFCs. The ratio of loans and debt securities divided by total assets (henceforth, gross leverage) relates financial obligations to the assets that can be used to satisfy them, thus offering a proper indication of credit risk exposure. Net debt can be computed by subtracting cash holdings from gross debt, based on the logic that the former could in principle be used to repay the latter without causing a major disturbance to NFC operations. We define net leverage as the ratio of net debt to assets minus cash holdings.⁴ Scaling NFC debt (a stock variable) by assets (another stock variable) is a better measure of NFC exposure to credit risk than scaling it by GDP, a flow variable that is subject to fluctuations that are

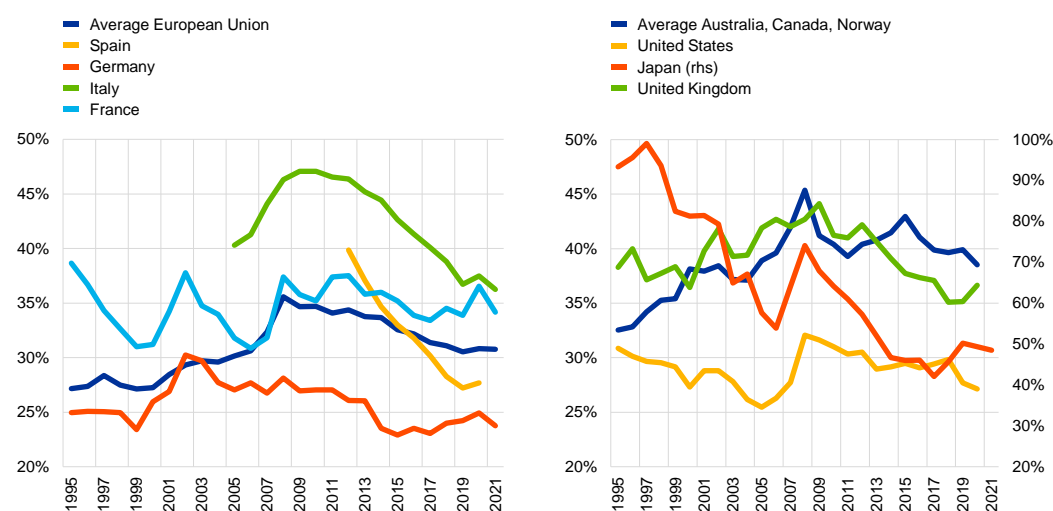
⁴ There is no agreed definition of net leverage in the academic literature. Sharpe (1994) defines net leverage as debt over total assets, subtracting short-term assets (including cash plus receivables minus payables) from the numerator and the denominator. Danis et al. (2014) define net leverage as debt minus cash divided by debt plus equity (which equals total assets). Halling et al. (2016) define net leverage as total debt less cash plus short-term investments divided by total assets. In practice, at a high level of aggregation, whichever of these definitions is used does not qualitatively alter the diagnosis of the direction of the change in NFCs' net leverage.



not directly related to an NFC's repayment capacity.⁵ Chart 3 shows the evolution of corporate debt as a share of total assets. While in some countries the diagnosis would be the same as that depicted in Chart 2 (with Japan or Spain being the clearest examples), different trends can be observed for, among others, the EU average, the United States and France. Using the net leverage ratio generates similar trends, which we discuss in the main body of this report.⁶

Chart 3
Corporate debt as a share of total corporate assets (gross leverage)

(percentage of total assets of NFCs)



Sources: OECD, Haver Analytics and ESRB Secretariat calculations.

Notes: Total stocks of loans and debt securities of NFCs as a share of total assets of NFCs (sum of financial and non-financial assets). Figures for the EU are the average for the EU27, excluding the United Kingdom, over an unbalanced panel of countries. OECD data is consolidated.

Assessing whether the recent evolution of leverage among NFCs produces less financial vulnerability requires an interpretation of its dynamic causes and an assessment of the use of borrowed funds.⁷

NFCs can use borrowing (i) to undertake real or financial investment (including in cash reserves), (ii) to fund dividends or equity withdrawal, or (iii) to cover losses from operating activities. As a first approximation based on national accounts, Chart 4 shows the main sources and uses of funds of euro area and US NFCs since 1999. Sources of funds for NFCs include the profits generated through their activities as well as the (net) issuance of debt (i.e. loans and debt securities) and equity liabilities. The sources and uses of funds after 2009 show a

⁵ Flow variables can be useful to assess liquidity risks, the debt servicing capacity of NFCs or their potential probability of default. They can be seen as of a more cyclical nature, closely linked to the economic and financial cycles. Flow variables are not covered in the report, which focuses on structural factors linked to how NFCs use assets and get resources in the pursue of their long-term objectives.

⁶ Annex 2 considers the evolution of corporate leverage and indebtedness under additional alternative metrics, confirming the diagnosis of predominantly stagnant or declining aggregate leverage of the NFC sector after 2009.

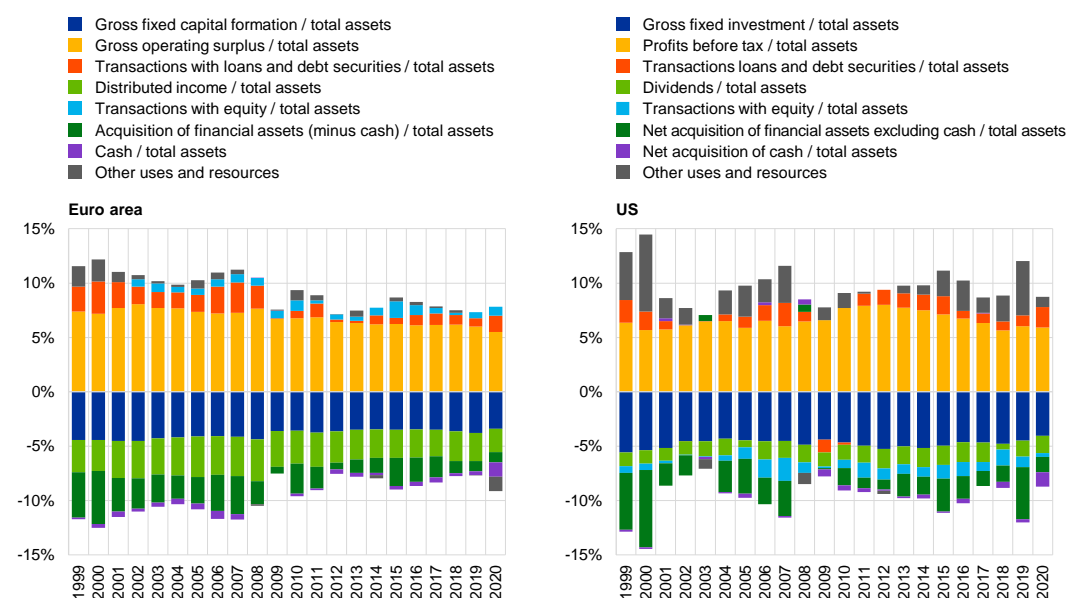
⁷ The report discusses the drivers of the observed evolution of NFC leverage and the implications for financial stability without adopting a normative approach. Such an approach would require either relying on a structural model that directly delivers a welfare metrics or adopting some criteria to quantify and aggregate welfare effects over multiple dimensions. These tasks exceed the exploratory scope of this report.

stronger time series break for euro area NFCs than for their US counterparts. EU NFCs' investment rates and profitability (dark blue and yellow bars respectively) are lower after 2009 than in the previous period (1999-2008). After 2009 they also issue less debt and somewhat more equity (dark red and light blue bars respectively), pay fewer dividends (light green bars) and acquire fewer financial assets (dark green bars) than in the earlier period. Overall, this picture is compatible with an economy that offers fewer investment opportunities or tighter financing conditions for NFCs, a slowdown or reversion in the expansion of the activities of NFCs around the world and more conservative financial policies. The US non-financial corporate sector exhibits altered patterns between 2008 and 2010 (and around the 2002 recession) but seems to recover or even exceed its typical profitability and investment patterns after 2010. These patterns have motivated our analysis of corporate leverage ratios and our discussion of potential supply and demand-side drivers of the observed developments. After this discussion, the report looks at general equilibrium and financial stability implications of the recent trends and offers a tentative list of implications for macroprudential analysis and policy.

Chart 4

Sources and uses of funds of NFCs in the euro area and United States

(% of total assets)



Sources: Eurostat, Federal Reserve Board, Federal Reserve Bank of St. Louis, Haver Analytics and ESRB Secretariat calculations.

Notes: Bars above zero indicate sources of funds and bars below zero indicate uses of funds. As per national accounts, uses and sources of funds must be equal in each year, leaving aside statistical errors and omissions.

This report is structured as follows. Section 2 presents some broad facts on the evolution of credit and leverage in the EU, with a particular focus on NFCs. Section 3 discusses possible drivers of the observed trends, considering both credit supply and credit demand factors. Section 4 focuses on the general equilibrium and macroprudential implications of this evolution and its drivers and Section 5 contains our conclusion. There are several annexes to the report which complement the main sections.



2 Recent evolution of corporate credit and leverage in the EU

This section explores the evolution of credit and leverage among NFCs in the EU in detail, documenting a reduction in corporate leverage since the GFC and a decreasing role of banks as providers of finance to the European non-financial corporate sector. To place the discussion on NFCs under the broader perspective of the funding trends experienced in other sectors of the economy before and after 2008, we start by presenting national account data. The financial accounts provide balance sheets for the main economic sectors (households, NFCs, financial corporations, general government and rest of the world), allowing us to draw a consistent picture of the evolution of leverage ratios across sectors.⁸ This information shows that leverage in the NFC sector moved largely in parallel with that of households and financial intermediaries, all of which peaked around 2008 or 2009. This section then provides a detailed analysis of the evolution of corporate leverage, looking at its variations across EU countries, NFC size categories and sectors of activity, as well as in several non-EU advanced economies. It finishes with an analysis of how the role of banks and non-banks, including market finance, in providing funding to NFCs have evolved in the last 20 years.

2.1 Funding structure of the main economic sectors

The who-to-whom accounts allow for the construction of balance sheets of the EU economy and its main economic sectors. The who-to-whom accounts are based on national accounts methodology and contain a detailed breakdown of financial assets and liabilities held by the different economic sectors. Combined with additional information on non-financial assets, they enable stylised sectoral balance sheets to be created. In this subsection we use those balance sheets to compactly describe the recent evolution of gross leverage ratios across sectors. An important caveat is that intra-sectoral indebtedness is netted out at the level of consolidation used in the charts presented in this section (which can be particularly significant for financial corporations and, to a lesser extent, for NFCs).

The EU household sector appears to have substantially deleveraged since the GFC (Chart 5), although aggregate sectoral measures may hide substantial heterogeneity across households. Around 40% of the assets held by households are non-financial (mainly real estate). Within financial assets, a decrease in the holdings of debt securities can be observed, with other holdings remaining relatively stable since 2001. Household liabilities have a simple structure, with net wealth (assets minus debt liabilities) accounting for a large share, and the remainder made up of loans. Over the depicted period, household gross leverage grows until 2008 to then decreases until 2020, returning to similar levels as in 2001. However, the picture offered by the sectoral leverage ratio is likely to be misleading, especially in the presence of underlying long-term changes in the distribution of income and wealth across households, since households in the lowest gross

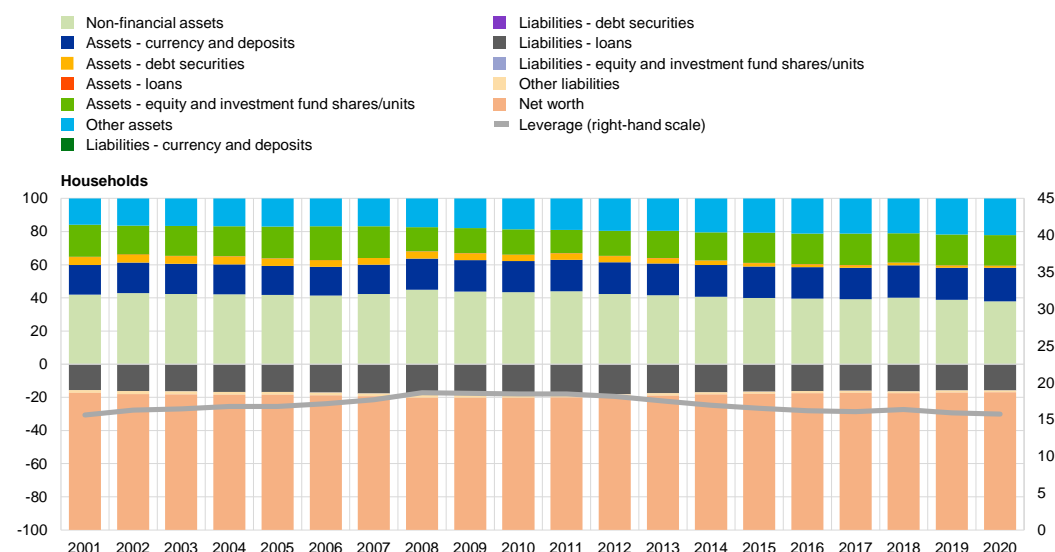
⁸ For further information on the main data sources used in this report, see Annex 1.



wealth quantile typically have the highest leverage ratios (see Bach et al., 2020). Chart 5 also shows an aggregation for the 27 EU Member States, which were going through different business and credit cycles in the period under consideration. Assessing the evolution of credit risk for households would require a more granular approach.

Chart 5
Balance sheet of EU households

(percentages)



Sources: OECD, Eurostat and ESRB Secretariat calculations.

Notes: Data on financial assets and liabilities are from the who-to-whom accounts of the OECD for the European Union. Data on non-financial assets are from Eurostat and have been extrapolated to account for missing observations in the first years of the sample. Leverage is defined as loans and debt securities, divided by total financial and non-financial assets.

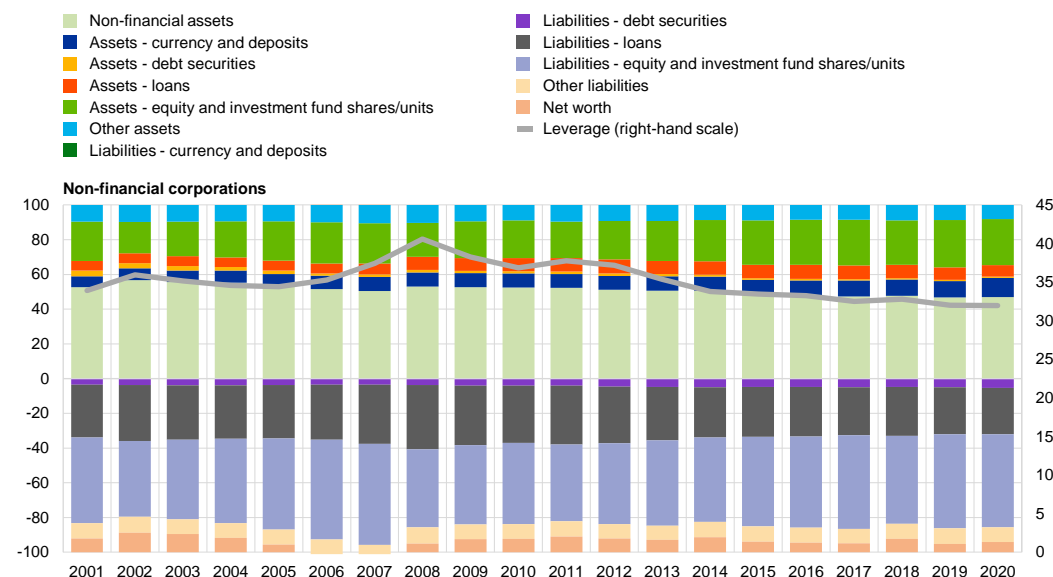
The gross leverage of NFCs also peaked in 2008, marking a strong downward correction since then (Chart 6).

Debt liabilities as a share of total assets stood at about 34% in 2001, rose to 41% in 2008 and declined from then onwards to reach a two-decade low of around 32% in 2020. Non-financial assets as a share of total NFC assets has steadily declined from over 50% in 2001 to around 45% in 2020. Cash and equity and investment fund shares have increased as a fraction of assets. Loans account for the lion's share of debt liabilities compared with debt securities and other liabilities.



Chart 6
Balance sheet of EU NFCs

(percentages)



Sources: OECD, Eurostat and ESRB Secretariat calculations.

Notes: Data on financial assets and liabilities are from the who-to-whom accounts of the OECD for the European Union. Data on non-financial assets are from Eurostat and have been extrapolated to account for missing observations in the first years of the sample. Leverage is defined as loans and debt securities, divided by total financial and non-financial assets.

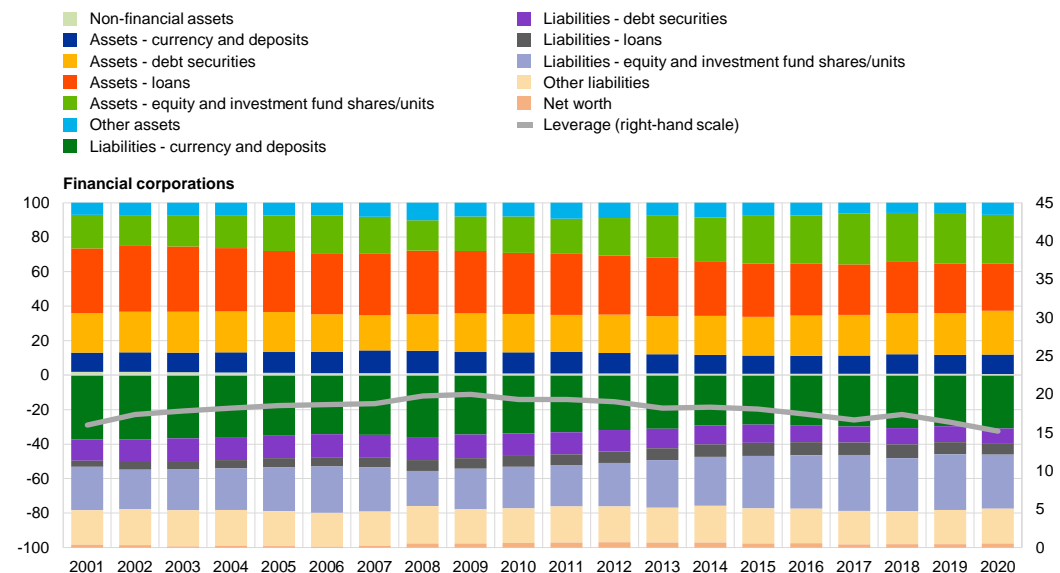
The gross leverage of financial corporations has also decreased in the aggregate after 2008, with large movements in the composition of assets and liabilities (Chart 7). Financial corporations hold a marginal share of real assets – most of their assets are financial claims. Since the peak around the time of the GFC, the data show a decline in the relative importance of loans and an increase in the importance of holdings of equities and investment fund shares, possibly reflecting a shift from bank to non-bank financial intermediation activities within the financial sector. On the liabilities side, currency and deposits have decreased in relative terms while equity and investment fund shares have increased. The higher equity share can be explained by the increase in regulatory capital requirements after the GFC and the increasing weight of intermediaries such as mutual funds (whose liabilities are represented by shares) in the financial sector. In terms of gross leverage, the financial sector as a whole almost matches the evolution of NFCs: increasing steadily to peak around 2008, with a sharp decrease thereafter. Adding liabilities in the form of currency and deposits to the numerator would add between 30 to 40 percentage points to leverage in this sector.



Chart 7

Balance sheet of EU financial corporations

(percentages)



Sources: OECD, Eurostat and ESRB Secretariat calculations.

Notes: Data on financial assets and liabilities are from the who-to-whom accounts of the OECD for the European Union. Data on non-financial assets are from Eurostat and have been extrapolated to account for missing observations in the first years of the sample. Leverage is defined as loans and debt securities, divided by total financial and non-financial assets.

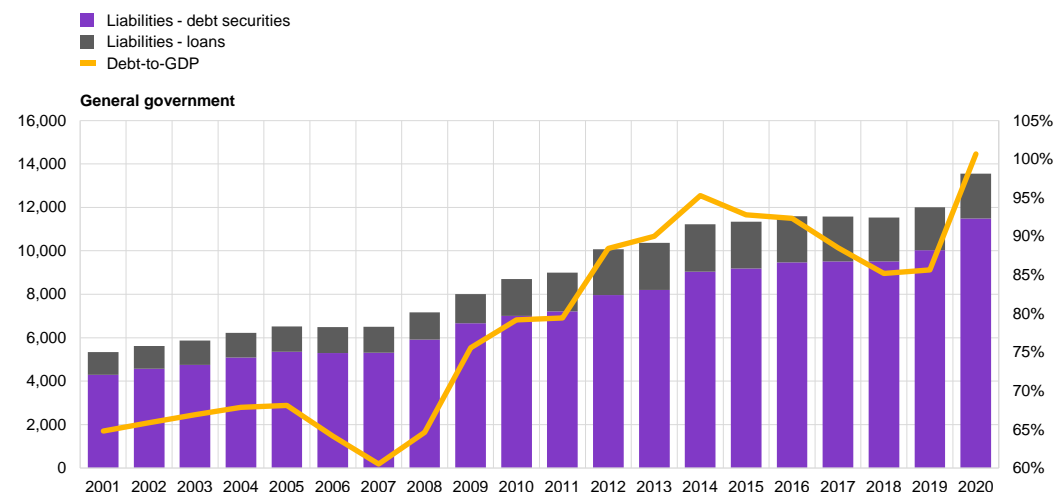
The evolution of leverage in the government sector is very different, largely resembling a mirror image of the other sectors (Chart 8). The general government balance sheet is very different from that of the private sector: taxes are the main source of revenue for the general government, but the government's taxation capacity is not necessarily reflected by the value of its assets. Therefore, drawing a leverage indicator for the government sector exclusively from its balance sheet is methodologically challenging. Looking instead at the level of debt securities and loans of the general government sector as a share of total GDP (the standard metrics for government indebtedness) reveals a strong increase between 2007 and 2014, which only partially corrected between 2015 and 2019 before rising again at the start of the COVID-19 pandemic.



Chart 8

Debt in the general government balance sheet

(left y-axis: EUR billions; right y-axis: percentages)



Sources: OECD, Eurostat, Haver Analytics and ESRB Secretariat calculations.

Notes: Data on financial assets and liabilities are from the who-to-whom accounts of the OECD for the European Union.

In relative terms, the decline in leverage after the GFC appears to be stronger for NFCs than for households. Households' leverage also increased substantially in the years before the GFC and has been retreating since then but at a slower pace than corporate leverage, probably as a result of the longer maturities of household liabilities. NFCs deleveraged fairly strongly between 2008 and 2014, and at a slower pace thereafter. This could point to a structural phenomenon that goes beyond the boom-bust dynamics observed around the time of the GFC.

The evolution of leverage in the non-financial corporate sector must be understood as the result of the financing capacity or needs emerging from NFCs' operations and their choices between various financing alternatives, including, if available, the retention of their own earnings. Box 1 looks more closely at the non-financial corporate sector in the euro area (instead of the EU as a whole), where the available data allow us to examine not just the components of the aggregate sector balance sheet but also items from other financial accounts that describe variables that shape or move in line with NFCs' indebtedness and leverage.

Box 1

A closer look at the corporate sector in the euro area

The evolution of key economic and financial ratios of euro area corporations seems fundamentally altered in several dimensions after the GFC (Chart A). While productivity (gross value added over assets) seems to decline over more than two depicted decades, euro area corporations maintain, on average, a fairly stable level of profitability (gross disposable income over assets) possibly as a result of the overall reduction in the cost of funds. After 2009 corporate investment rates (especially transactions in financial assets) fluctuate around a lower average.

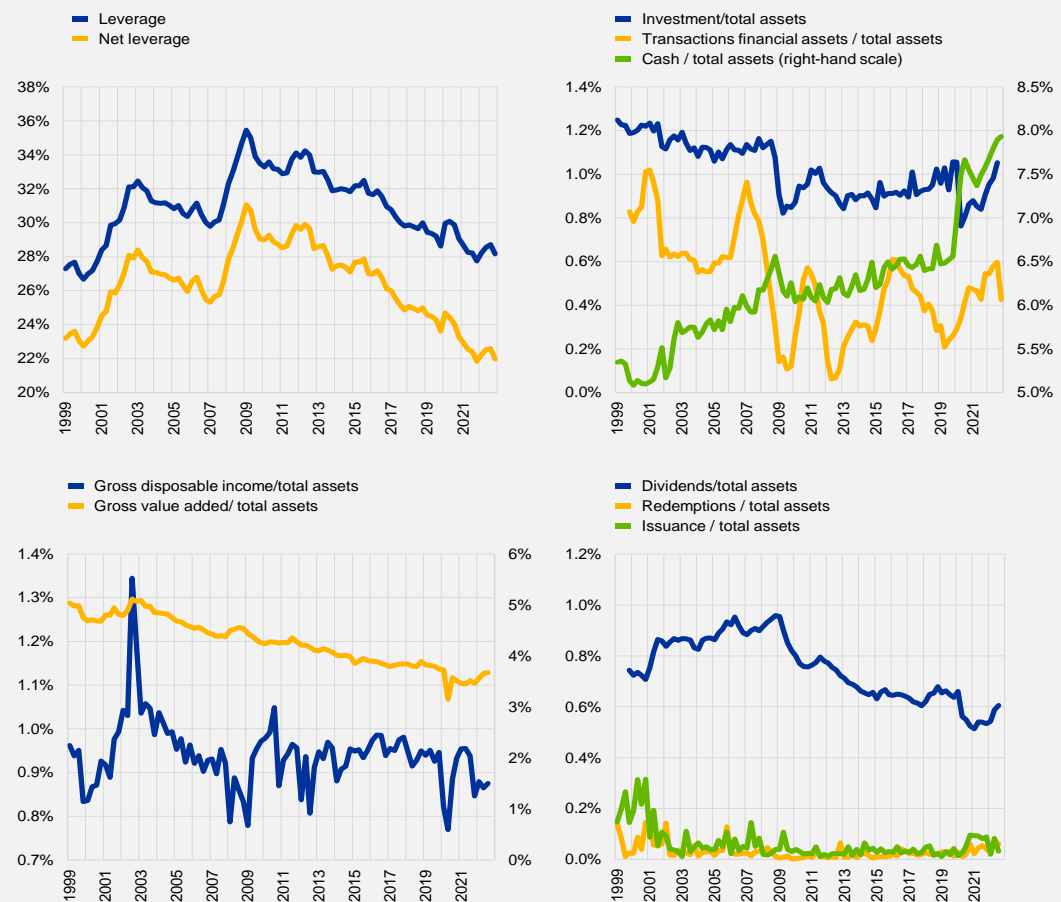


Dividends (both as a share of assets or as a percentage of gross disposable income) gradually fall from their 2008 peaks. Cash as a share of assets grows throughout the period (and particularly during the COVID-19 pandemic, as a result, partly, of the public measures to support NFCs), while the (fairly volatile) importance of transactions involving financial assets seems to decline after 2008.

Chart A

Key aggregate financial ratios of euro area NFCs

(%)



Sources: Eurostat, ECB, Haver Analytics and ESRB Secretariat calculations.

Note: Total assets are approximated as the sum of net fixed assets and financial assets. Last observation is the fourth quarter of 2022, except for investments / total assets, gross disposable income / total assets and gross value added / total assets (third quarter of 2022).

This evolution is compatible with different drivers. First, it is consistent with a correction in leverage relative to a previous period of exuberance during the pre-2008 credit boom. Second, it is consistent with the adoption of more conservative funding strategies amid lower profitability and growth prospects. Third, and last, it is consistent with a decline in investment financing needs. While these three explanations are not mutually exclusive, only the second and third drivers point to



structural changes, rather than the corporate sector's reflection of aggregate boom-bust dynamics around the time of the 2008 crisis. We will return to these different possible drivers in the next section.

2.2 Corporate leverage at country and industry level

The evolution of corporate leverage across EU countries exhibits a large degree of heterogeneity (Chart 9). Most countries show stable or declining corporate net leverage after 2008. For some countries, such as Austria, Germany or Netherlands, the decrease in net leverage is part of a mild downward trend that has been observable since the early 2000s. For others, such as Italy, Slovenia or Hungary, corporate leverage decreases after having increased substantially before 2008-2009. In countries like France or Sweden, recent declines seem to form part of mild cyclical fluctuations around a stable level. Exceptions to the recent downward trend include Belgium, Czech Republic, Denmark, Luxembourg and Slovakia, which all show fairly different patterns. At the end of 2019 net corporate leverage exceeded the peak reached in 2007-09 only in Cyprus, Luxembourg and Slovakia.⁹ Heterogeneity at country level suggests more than one cause for the dynamics in all countries, rather than the patterns observed at the aggregate EU level reflect the interaction of multiple forces whose net impact on each country's aggregate corporate leverage need not be the same.¹⁰

⁹ Data for Cyprus refer to 2018. There are no data for Greece, Spain and Poland for the period 2007-2009.

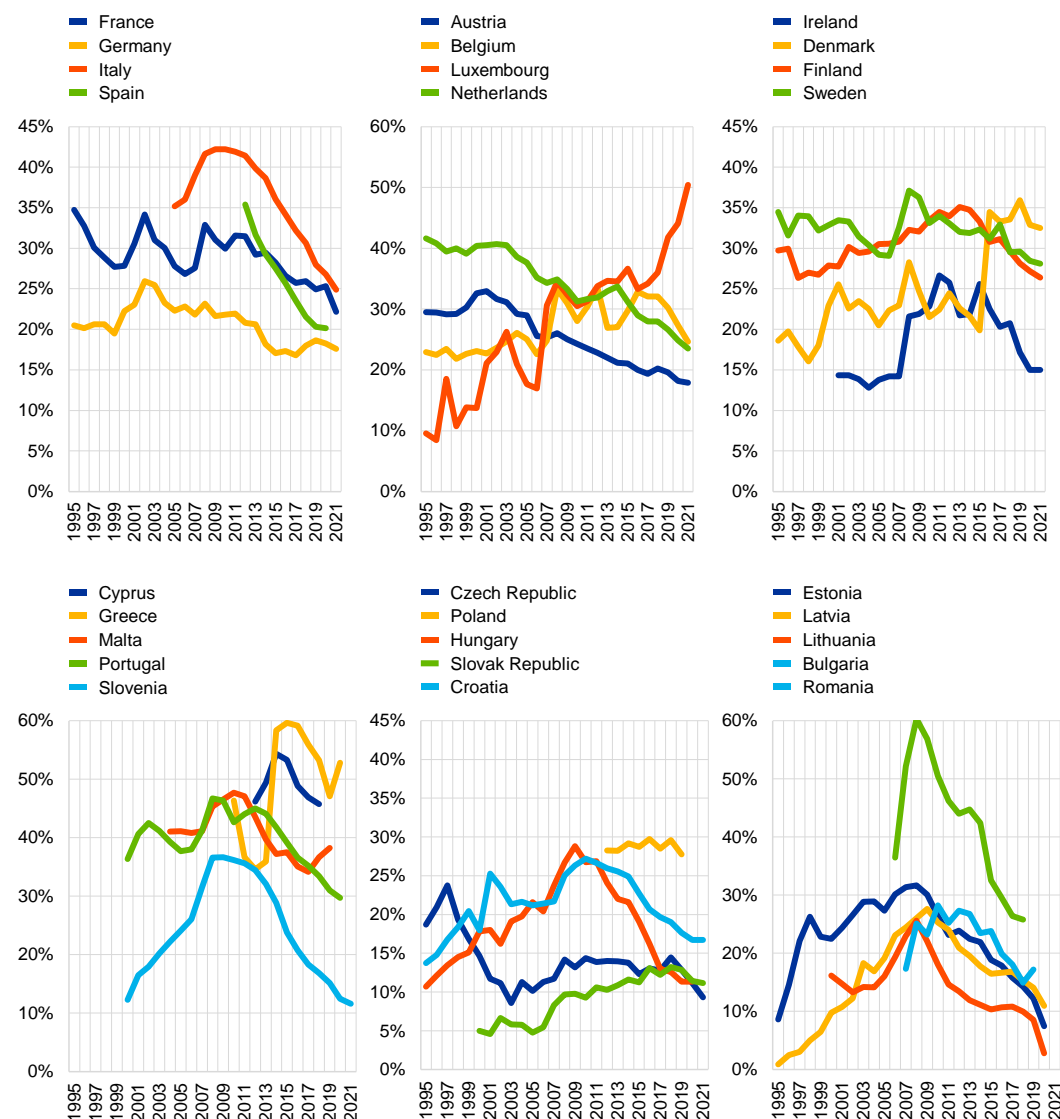
¹⁰ A closer look at the evolution of corporate leverage in each country is better left to future analysis.



Chart 9

Net leverage of NFCs across EU countries

(%)



Sources: OECD, ECB, Haver Analytics and ESRB Secretariat calculations.

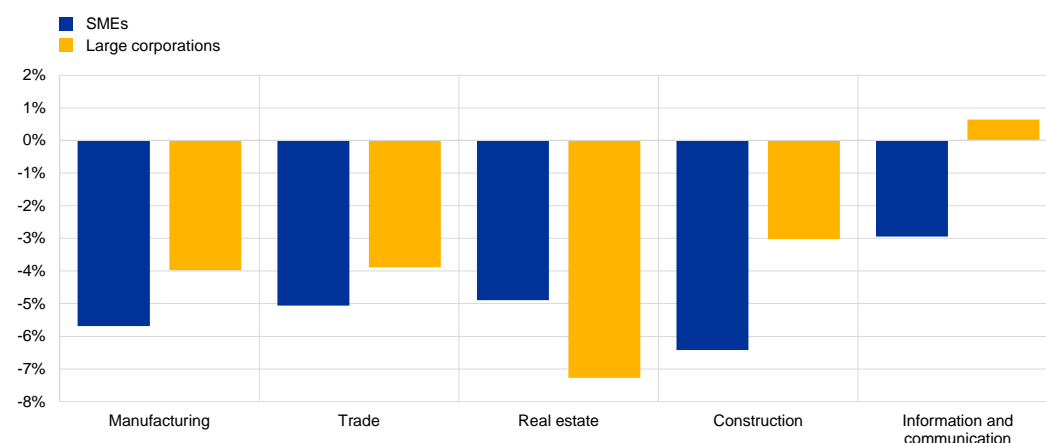
Notes: Data from the OECD dataset are from who-to-whom accounts, on a consolidated basis. Data for Bulgaria, Cyprus, Malta and Romania are from the quarterly sectoral accounts, as reported by the ECB and in accordance with European System of Accounts (ESA) 2010. Data for Ireland are from the Central Statistical Office of Ireland and data for Croatia are from Hrvatska Narodna Banka. Net leverage is defined as loans and debt securities minus cash (currency and deposits), divided by total assets (financial and net fixed assets) minus cash.



Based on granular balance sheet data from the Bank for the Accounts of Companies Harmonized (BACH) database,¹¹ corporate leverage does not fall uniformly across industries, and is most marked for small and medium-sized enterprises (SMEs). Chart 10 focuses on the main sectors according to their contribution to gross value added (see Chart A4 in Annex 3 for a full sectoral breakdown of the underlying time series). With the exception of SMEs operating in the Information and communication and Real estate sectors, SMEs in Europe are typically more leveraged than the large corporations in their own industries (Chart A4). It should be noted that both SMEs and large NFCs have been deleveraging steadily over the past 20 years, with few exceptions (such as large corporations in the Information and communication sector, or the Administrative services sector, or the Electricity and gas sector for SMEs). Box 2 presents the results of a granular exploration of corporate leverage across NFCs in the Netherlands. This closer examination of data collected by the tax authorities shows a generalised decline across multiple NFC categories, including those that are typically associated with financially unconstrained NFCs.

Chart 10
Changes in gross leverage in the main corporate sectors, 2019 – 1999

(percentage points)



Sources: BACH database of the European Committee of Central Balance Sheet Data Offices and ESRB Secretariat calculations.

Notes: Each bar represents the change in gross leverage for SMEs and large corporations between 2019 and 1999. The Mining and quarrying and Professional activities sectors are excluded. The five sectors shown in the chart account for the largest share of EU gross value added in 2019, excluding sectors O – Public administration and defence; compulsory social security, P – Education and Q – Human health and social work activities. The five sectors in the chart represent 49% of the total gross value added of the NFC sector. SMEs are defined as having annual turnover of less than €50 million while large corporations have an annual turnover of over €50 million. Data are from the accounting financial statements of over 2,000,000 NFCs domiciled in Austria, Belgium, France, Germany, Italy, Poland, Portugal, Slovakia and Spain.

¹¹ The BACH database contains accounting information and provides country aggregates a large sample of NFCs from nine EU countries (Austria, Belgium, France, Germany, Italy, Poland, Portugal, Slovakia and Spain). Average coverage ratios of BACH, either based on number of employees, turnover or number of NFCs, are 3% in Poland, 18% in Belgium, 50% in Austria, 54% in Spain, 58% in Slovakia, 60% in Germany, 89% in France, and 100% in Italy and Portugal. The gross value added of NFCs in these nine countries represented 81% of the total gross value added of EU NFCs in 2021. While these series cannot be directly compared to series based on aggregate balance sheet or national account data, their main value is that they offer detail at an industry level. For further details see Annex 1 and [BACH brochure](#).



Box 2

A granular exploration of corporate leverage in the Netherlands

A tightening credit supply explanation has clear predictive implications as to which NFCs could be most affected. According to standard corporate finance arguments, SMEs with limited collateral should suffer the largest (involuntary) contraction in credit, while NFCs that are able to pay (and, if needed, cut) dividends should be less constrained. In addition, the exit over time of more indebted NFCs may contribute to falling average leverage. Testing these predictions requires us to examine granular data across relevant categories of NFCs and to account for the evolving composition of the population of NFCs.

This box reports the results from the population of tax-filing NFCs in the Netherlands, a country where financial and credit conditions have been fairly favourable in recent years (Ladika et al., 2022). The data show a consistent decline in both gross and net leverage for all size classes, using both balanced and unbalanced data panels (Chart A). This rules out a decline that is entirely caused by either changes in the composition of NFCs due to entry and exit, or the focus on surviving NFCs. Having said that, leverage in the balanced panel falls steadily between 2000 and 2020, while in the unbalanced panel the decline is only apparent after 2009. The first point is compatible with a financing pattern over NFCs' life cycles whereby leverage tends to decline as NFCs mature and their earnings allow them to both sustain investment and repay debt. The second point is compatible with less dynamic NFC entry after 2009 (which would make the unbalanced panel look more like the balanced panel) and lower starting leverage for NFCs entering the unbalanced panel after 2009.

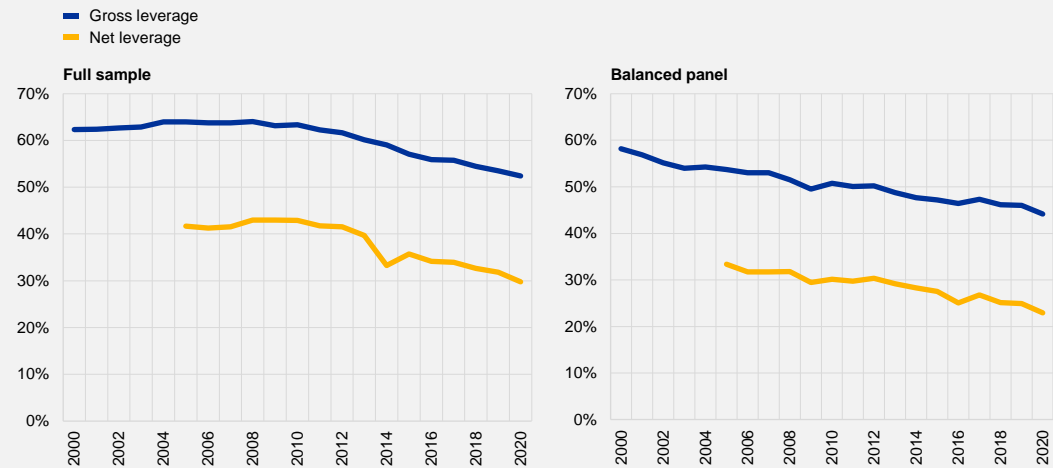
The decline is only partly the result of rising cash holdings and appears to be fairly comparable across NFCs in all relevant categories. More profitable NFCs and dividend paying NFCs reduce their leverage at a comparable rate to non-dividend-paying NFCs (Chart B). Leverage declines in parallel across the three upper quartiles of asset tangibility and only remains stable at a very low level in the lowest quantile (Chart C). Strikingly, the share of NFCs with negative cash flow, which must rely on some form of external financing to operate, has declined dramatically in recent years (Chart D). These results suggest a generalised leverage decline across NFC characteristics, including those that signal easy access to credit. In terms of our discussion about drivers included later in the report, this suggests that the decline in leverage cannot be simply due to rising financial constraints.



Chart A

Gross and net leverage for NFCs with at least ten employees

(percentages)



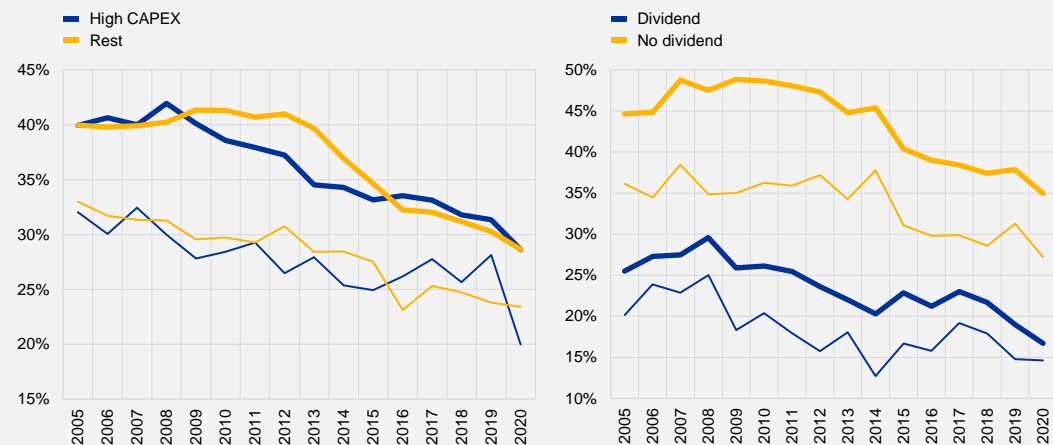
Source: Ladika et al. (2022).

Notes: Includes all tax-filing Dutch NFCs with more than ten employees. Gross leverage is total debt over total assets; net leverage is debt minus cash holdings and net trade credit over total assets minus cash.

Chart B

Net leverage of Dutch NFCs by capital expenditure and profit distribution

(%)



Source: Ladika et al. (2022).

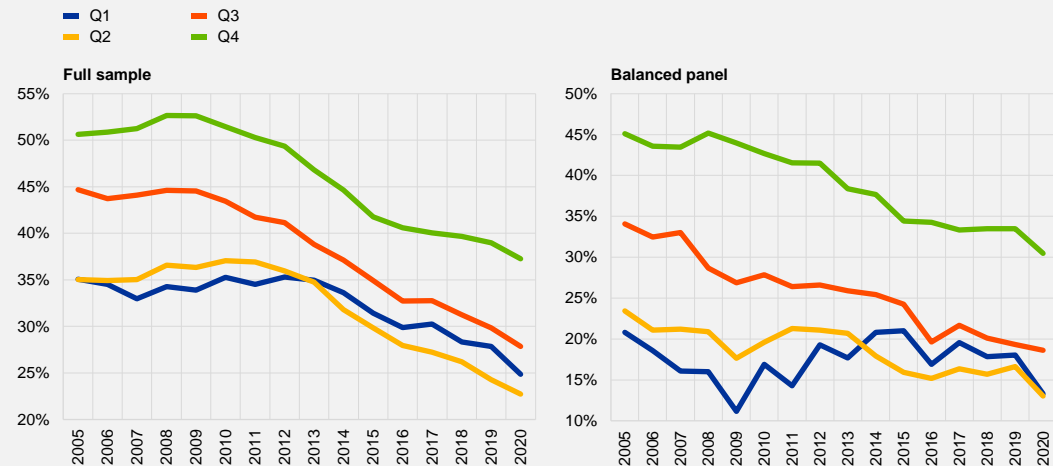
Notes: Includes all tax-filing Dutch NFCs with more than ten employees. Net leverage is debt minus cash holdings and net trade credit over total assets minus cash. Capex is defined as the change in value of physical assets net of depreciation, all divided by initial stock of physical assets. The thin lines refer to the balanced sample, while the thick lines refer to the full sample. The blue lines in the chart on the left refer to the top 25% of the capex distribution each year.



Chart C

Net leverage of Dutch NFCs by holdings of tangible assets

(%)



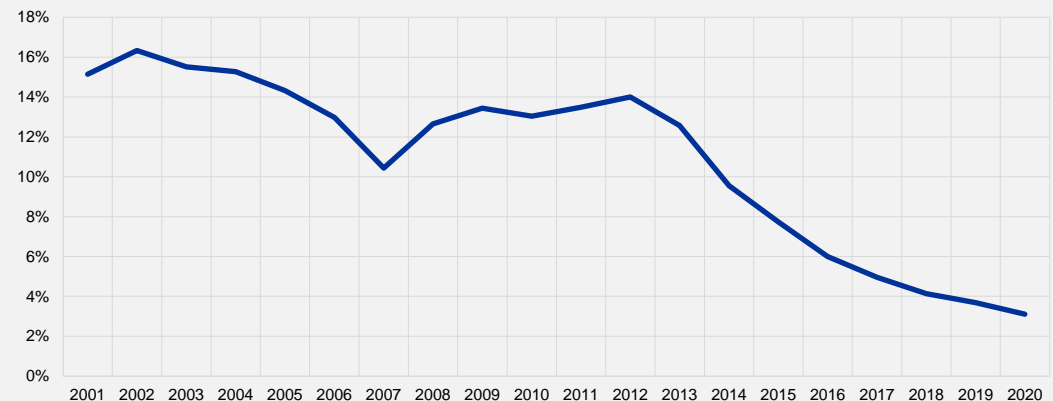
Source: Ladika et al. (2022).

Notes: Includes all tax-filing Dutch NFCs with more than ten employees. Net leverage is debt minus cash holdings and net trade credit over total assets minus cash. Each line represents net leverage by quartile of the physical asset distribution. Physical assets include all forms of tangible capital; the main components of this asset class are machinery & equipment, buildings, vehicles and land.

Chart D

Share of Dutch NFCs with negative free cash flows

(%)



Sources: Ladika et al. (2022).

Notes: Includes all tax-filing Dutch NFCs with more than ten employees. Free cash flow is defined as earnings minus taxes plus third parties share minus interest expenses, minus Capex expenditures.

For SMEs and large corporations alike, loans are by far the main source of debt financing in all industries, although their relevance as an overall source of funding is declining. The breakdown of funding sources between equity, bank loans and debt securities for the different

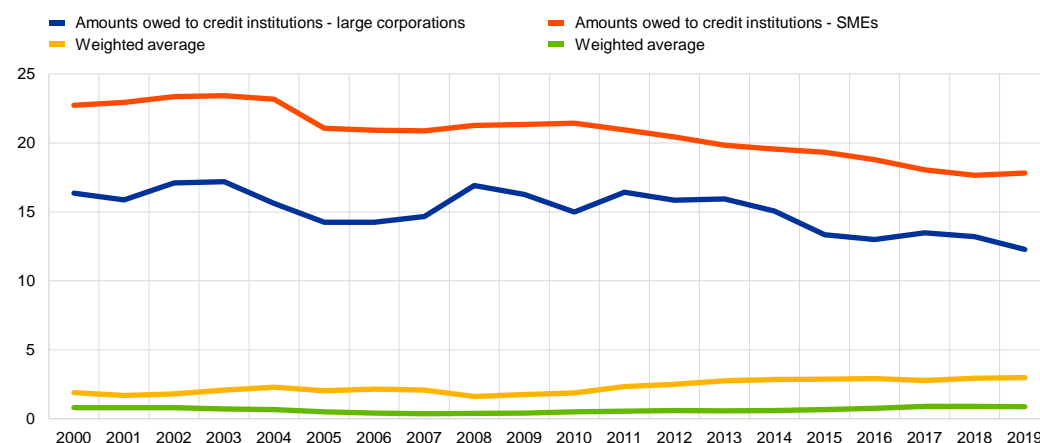


industries and size categories confirms the importance of bank loans as a source of debt funding for EU corporations but also their declining weight (as a share of assets) in a number of industries and across NFCs of all sizes (Chart A4 in Annex 3). While the weighted average across sectors of the median ratio of bank loans as a share of total assets was 22% for SMEs and close to 14% for large corporations in 2000, it was 18% and 9% for each of these groups respectively in 2019 (Chart 11). This suggests that the decline in gross corporate leverage has mainly taken the form of a decline in funding from banks. Bond and debt securities are a minor source of funding for the EU NFC sector as a whole and especially for SMEs, although their relevance is increasing, especially for large corporations in several industries (Chart A5 in Annex 3). This seems to be consistent with evidence that even in economies with a well-developed corporate bond market bonds are only used as a source of funding by a very small number of NFCs (Caglio et al., 2021).

Chart 11

Amounts owed to credit institutions and bonds as a share of total assets, weighted average across sectors

(percentages)



Sources: BACH database of the European Committee of Central Balance Sheet Data Offices and ESRB Secretariat calculations.

Notes: Sectors B (Mining and quarrying), E (Water supply), K (Financial and insurance activities), M (Professional, scientific and technical activities), O (Public administration), P (Education), Q (Human health), T (Activities of households as employers), and U (Activities of extraterritorial organisations) are excluded. Weights are computed from the gross value added of the underlying sectors in 2019. SMEs are defined as having annual turnover less than €50 million while large corporations have an annual turnover of over €50 million. Data are from the accounting financial statements of over 2,000,000 NFCs domiciled in Austria, Belgium, France, Germany, Italy, Poland, Portugal, Slovakia and Spain.

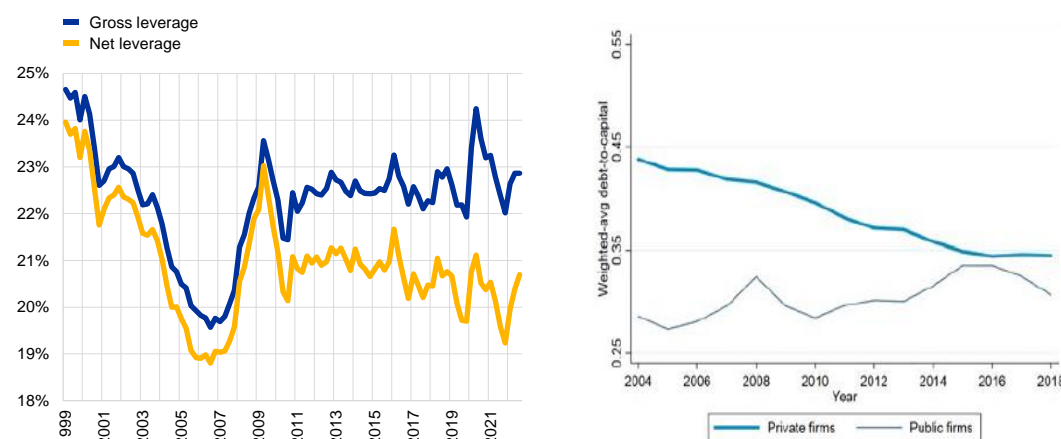
The decline in corporate leverage observed in Europe after 2008 is only partially matched in the United States (Chart 12). After the peak in corporate leverage observed during the GFC, the gross and net leverage of NFCs in the United States remained broadly stable until 2019, while net leverage shows a decline compatible with the increase in cash holdings during the COVID-19 pandemic. Although large corporations in the United States have increased their net leverage in recent years, new data shown by Dolbridge et al. (2022) suggest that the declining leverage seen in Europe in recent years is matched among unlisted US NFCs and even among smaller listed NFCs (particularly those operating in the IT and health sectors). Dolbridge et al. (2022) report a steady



decline in leverage among unlisted NFCs from 2004 to 2015 and a simultaneous gradual rise among listed NFCs (right-hand panel of Chart 12).¹²

Chart 12
Leverage of US NFCs

(left-hand panel: %; right-hand panel: percentages)



Sources: Board of Governors of the Federal Reserve System, Federal Reserve Bank of St. Louis, ESRB Secretariat calculations and Dolbridge et al. (2022).

Notes: The left-hand panel, based on the US Financial Accounts for the US non-financial corporate business sector (Table B.103 from Z.1), shows gross leverage (defined as loans and debt securities, divided by total assets) and net leverage (defined as loans and debt securities minus checkable deposits and currency, divided by total assets minus checkable deposits and currency). The last observation is the third quarter of 2022. The right-hand panel, using more granular data for the United States and a somewhat different ratio (debt/capital), distinguishes between listed (public) and non-listed (private) NFCs.

Several other advanced economies have registered declines in net corporate leverage in the last decade (Chart 13). Based on data from the OECD, the aggregate net leverage of NFCs in Australia, Japan, the United Kingdom and Israel has decreased after peaking around the time of the GFC. In other advanced economies such as Norway and Canada, NFCs maintain levels of leverage similar to those reached in 2008-09.

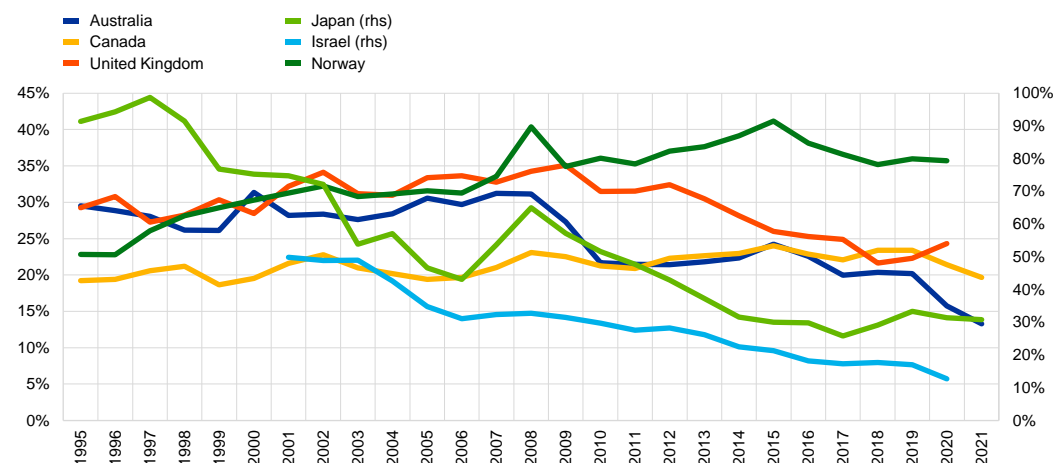
¹² Further details are needed to better understand the rise in leverage among the largest US NFCs seen recently, including the impact of quantitative easing (QE) on the issuance and pricing of corporate bonds. The latter is a broader topic that goes beyond the purpose of this report, but which has been the focus of recent research activity (Lo Duca et al., 2016; Todorov, 2020; Pegoraro and Montagna, 2021; Acharya et al., 2022 Holm-Hadulla and Leombroni, 2023).



Chart 13

Net leverage of NFCs in other advanced economies

(%)



Sources: OECD, Statistics Canada, Bank of Japan, Haver Analytics and ESRB Secretariat calculations.

Notes: Data for Australia, Israel, Norway and the United Kingdom are from the OECD dataset on who-to-whom accounts. Net leverage is defined as loans and debt securities minus currency and deposits, divided by financial and net fixed assets minus currency and deposits.

These results suggest that after 2008 there were common and possibly structural drivers that led to a steady decline in corporate leverage which were marked in the EU but also visible in other developed economies. This generalised trend suggests that the evolution of NFC leverage identified in the EU cannot be a simple reflection of the comparatively lower dynamism of the European corporate sector (Decker et al., 2016) but is owing, at least in part, to structural global drivers. The reduction in corporate leverage among smaller NFCs and the difference between large corporations in Europe and the United States call for a deeper discussion of the potential drivers (Section 3 of this report). Before moving on to that topic, the final part of this section considers the evolution of the role of banks and non-banks in the provision of funding to European NFCs.

2.3 Bank and non-bank funding of European NFCs

The importance of market finance seems to be increasing in the EU, even in the context of a declining trend in corporate leverage. In 2014 a report published by the ESRB Advisory Scientific Committee concluded that the EU was overbanked in the following senses, among others: (i) EU banks had a size which implied that their marginal contribution to real economic growth was likely to be nil or negative; and (ii) the EU financial structure was biased towards banks (rather than securities markets), which resulted in excessively volatile credit creation and lower economic growth (Pagano et al., 2014).¹³ Soon afterwards, the European Commission launched an

¹³ As a third conclusion, the report also noted that large universal banks were particularly common in Europe and contributed more to systemic risk than small and narrowly focused banks, a point that does not directly relate to this discussion.



action plan for a capital markets union in Europe, to develop capital markets in the EU and to offer sources of finance as alternatives to bank loans to a broader set of NFCs. The following paragraphs consider the recent evolution of the share of banks and non-banks, including market finance, in the provision of finance to EU NFCs.

Despite the predominance of banks as suppliers of debt funding to EU NFCs, the relative importance of bank lending in the period 2000-2019 shows a slightly declining trend in most industries. Based on country-level averages provided by the BACH database, Chart 14 aims to gauge the recent evolution across industries of different sources of debt financing for EU corporations. Average debt funding by banks as a fraction of NFC total assets ranges between about 10% in Professional activities to around 30% in Real estate activities, with a pattern that typically reproduces the variation in corporate leverage across industries. In fact, debt funding by banks is the main source of debt funding for most industries; the main exceptions being Electricity and gas and, to a lesser extent, Information and communication and Professional activities, where intragroup debt and other non-bank debt are the leading source of debt funding. Aside from this source, which is either the first or second most important for all industries, NFCs also receive debt funding from the issuance of debt securities and from non-financial lenders (e.g. in the form of trade payables) to a smaller extent (in terms of simple averages).

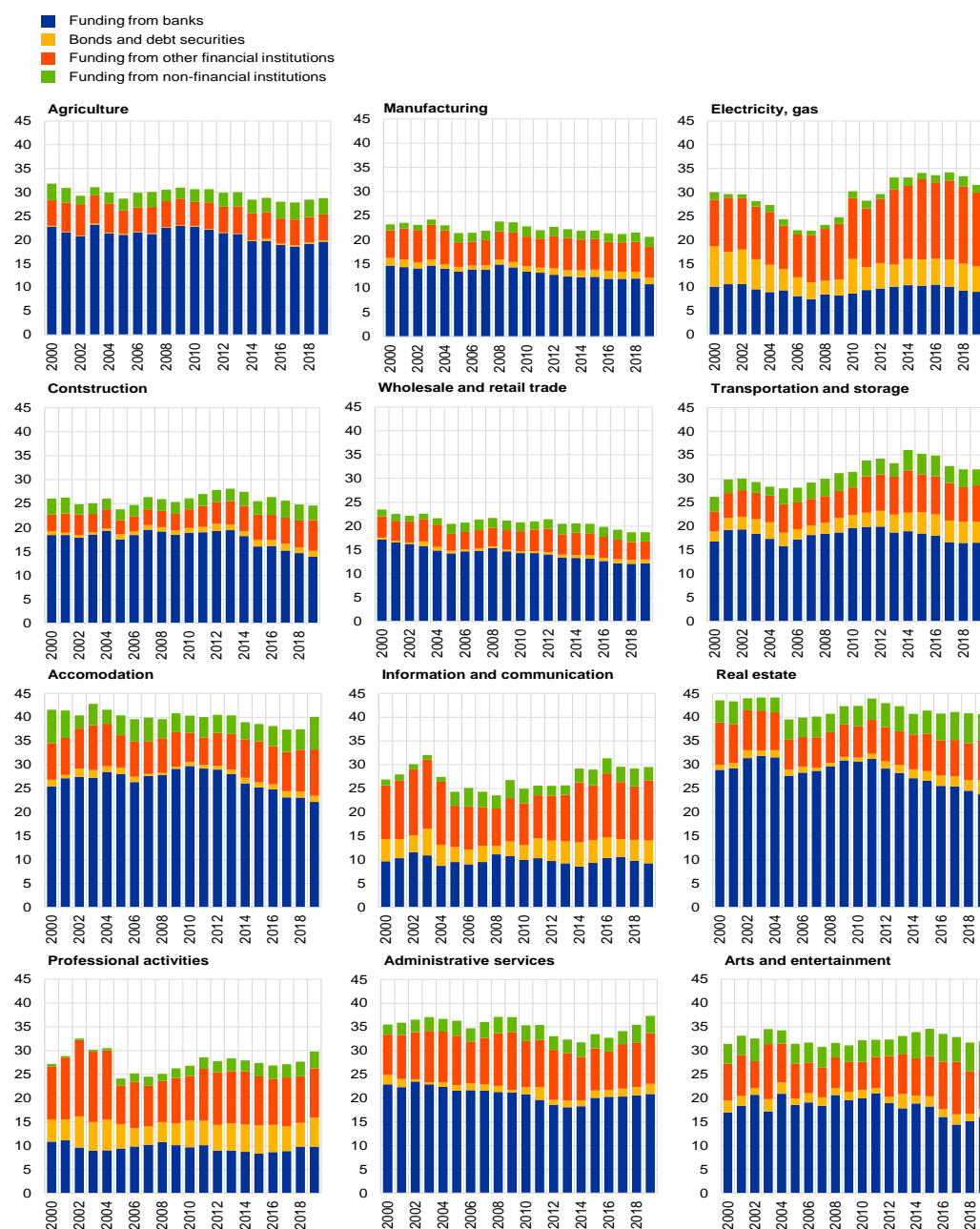
The declines in bank funding shown in Chart 14 become more apparent after 2009. This occurs in industries such as Agriculture, Manufacturing, Construction, Wholesale and retail trade, Accommodation, Real estate and Arts and entertainment (the last three after 2011). In the other industries bank debt as a share of assets remains roughly stable. The fall in debt funding provided by banks is only partly offset by the increase in other sources of debt funding in some industries, thus producing an overall picture that is consistent with the decline in corporate leverage documented in earlier sections of this report. The increase in intragroup lending and lending from non-banks as a share of total assets more than offsets the fall in bank lending in the Electricity and gas, and Information and communication sectors, while it provides a partial (or almost full) offset of the retrenchment of bank lending in Construction (partial), Transportation and storage (full), Accommodation (partial), and Arts and entertainment (full). Industries that are not experiencing any apparent substitution at this level of aggregation include Agriculture, Manufacturing, Wholesale and retail trade, Real estate activities and Administrative services. The growth in bond and other debt security funding is nil or small in most industries. At this level of aggregation, it is only visible in Transportation and storage and in Real estate activities.



Chart 14

Non-current liabilities as a share of total assets by industry and funding source

(percentages)



Sources: BACH database of the European Committee of Central Balance Sheet Data Offices and ESRB Secretariat calculations.

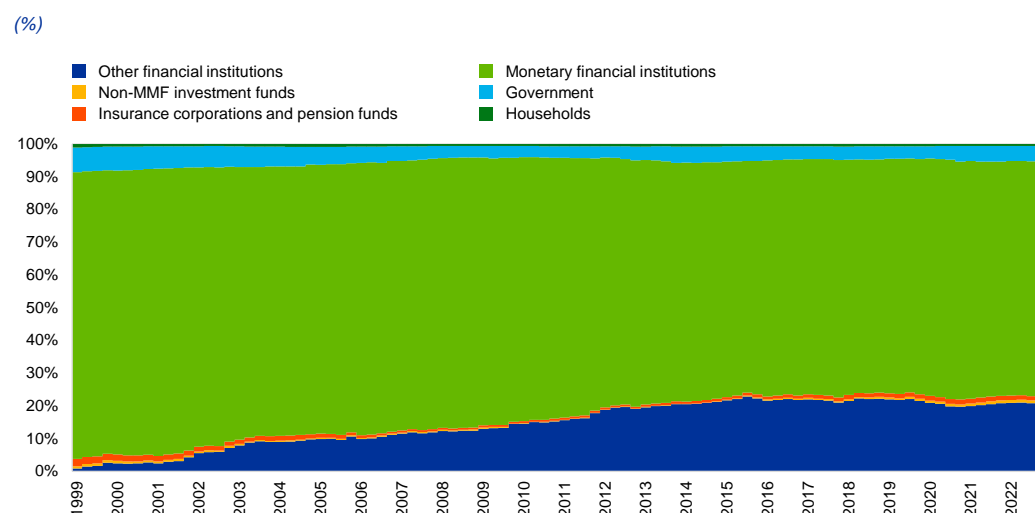
Notes: Data are from the accounting financial statements of over 2,000,000 NFCs domiciled in Austria, Belgium, France, Germany, Italy, Poland, Portugal, Slovakia and Spain. Funding from banks corresponds to the item "Amounts owed to credit institutions". Funding from other financial institutions (financial creditors in BACH) includes intragroup debt and other debt from non-banks. Funding from non-financial institutions (non-financial creditors in BACH) refers to undistributed dividends, tax and social security payables and payables other than trade payables. Each line represents the simple mean across countries of the weighted mean of each country. The Mining and quarrying and Other services sectors are excluded.



One possible driver of the striking differences in leverage and the importance of bank funding observed across industries may be the typical size or ownership structure of the relevant NFCs. NFC's size or, for smaller ones, being part of a group with greater funding capacity, largely dictates its access to non-bank sources of debt funding, including debt security markets. According to financial intermediation theory, other relevant drivers, aside from size and ownership structure, are the importance of the information and incentive problems that the monitoring and relationship aspects of traditional bank lending help to mitigate (Diamond, 1984; Rajan, 1994).

The significant but shrinking role of banks and the growing importance of non-bank financial intermediaries in the EU has been confirmed by supply-side data (Chart 15). The relevance of non-bank financial institutions as providers of debt financing to euro area NFCs steadily increased between 2000 and 2013, with their contribution stabilising thereafter to account for around 25% of all loans. While there is a high level of heterogeneity in the institutions included under the “Other financial institutions” aggregate (European Systemic Risk Board, 2017), a recent analysis by the ECB suggests that captive financial institutions (comprising holding companies and intragroup entities, such as financing conduits or special purpose entities that raise funds in open markets to be used by their parent corporation and that are domiciled in a country other than that of their parent corporation) represent more than 75% of the aggregate.¹⁴ This implies that cross-border intragroup loans between NFCs and these special purpose entities appear in Chart 16 as loans from other financial institutions. Simultaneously, the contribution of banks, which provided around 85% of all loans in 1999, has stabilised at around 70% since 2013. Box 3 presents further analysis of recent developments in European corporate bond markets.

Chart 15
Counterparts of loans to NFCs (excluding intragroup loans between NFCs), euro area



Sources: ECB (who-to-whom accounts) and ESRB Secretariat calculations.

Notes: Other financial institutions comprise financial vehicle corporations (engaged in securitisation), security and derivative dealers, financial corporations engaged in lending and specialised financial corporations. The Monetary financial institutions sector comprises deposit-taking financial institutions, central banks and money market funds; lending by the central bank to non-financial corporations can be seen as negligible. The latest observation is for the last quarters of 2022.

¹⁴ See ECB Statistics note “Financial accounts for other financial institutions by subsector.”



Box 3

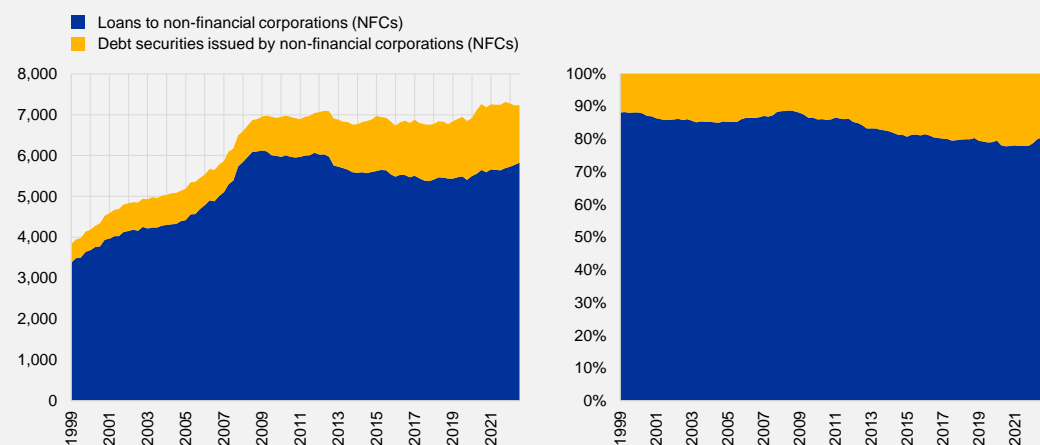
Dynamics of European corporate bond markets

National accounts data show an increased use of bond funding by euro area corporates, both in absolute terms and relative to bank loans (Chart A). The total amount of bonds on the liabilities side of the corporate sector balance sheet in the euro area has grown continuously since 1999, exceeding €1 trillion in size in recent years. As a share of total funding from loans and bonds received by NFCs in the EU, bond financing represented about 20% in 2021, up from around 12% in 2008 (right-hand panel of Chart A).

Chart A

Loans to NFCs (excluding intragroup loans) and debt securities issued by NFCs, euro area, deflated (base = 2015)

(left-hand panel: EUR billions; right-hand panel: %)



Sources: ECB (who-to-whom accounts), OECD, Haver Analytics and ESRB Secretariat calculations.

Notes: Loans to NFCs are as reported to who-to-whom accounts, excluding intragroup lending. Debt securities are as reported to the OECD in the quarterly sectoral accounts, in accordance with ESA 2010. Euro amounts shown in the left-hand panel are deflated using the quarterly GDP deflator for the euro area, seasonally adjusted (2015 = 100). The latest observation is for the third quarter of 2022.

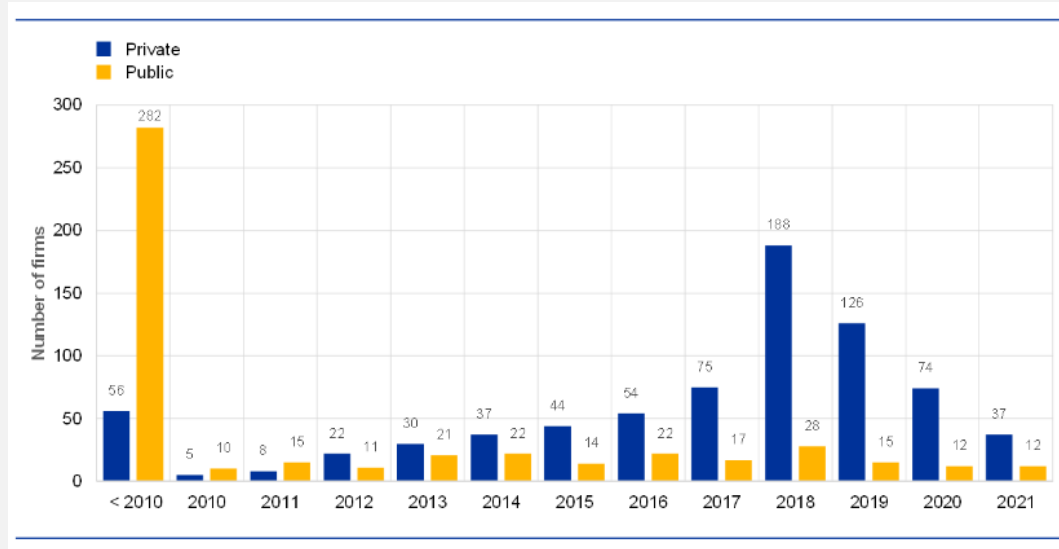
New evidence using a database containing all securities issued in the euro area (Darmouni and Papoutsis, 2022) documents rising bond issuance especially among unlisted European NFCs, although bond issues do not appear to be associated with rises in corporate investment. Chart B plots the number of NFCs issuing bonds for the first time by the year that they enter the corporate bond market. Entry among unlisted NFCs has been growing from a low base and rose sharply in 2018 when the ECB introduced its corporate sector purchase programme.



Chart B

Number of NFCs entering the euro area corporate bond market per year

(number)



Sources: Figure 1 – Darmouni and Papoutsis (2022).

Notes: The sample includes all European NFCs with bonds outstanding in the period between 2018 and 2021. In each year, new issuers are defined as NFCs that issue bonds for the first time ever in that year. The first year of issuance was obtained by combining data from Capital IQ and the Centralised Securities Database.

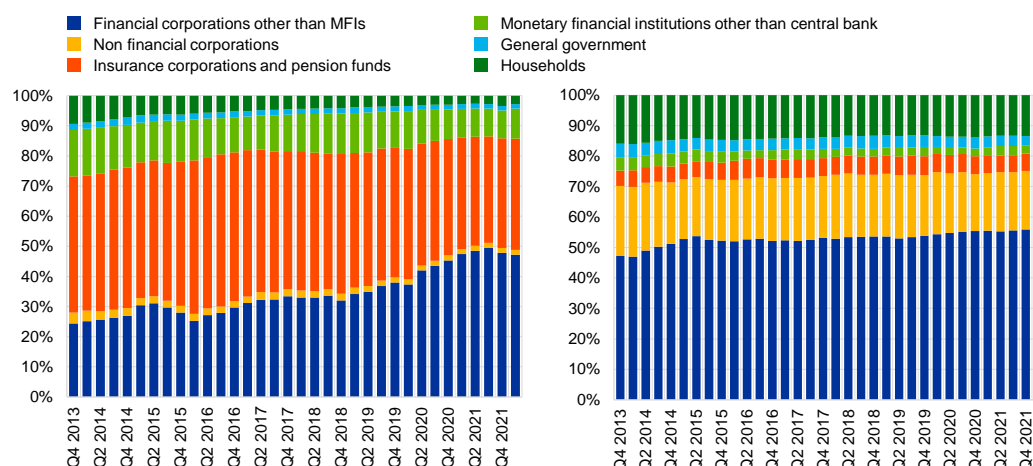
The larger role of non-bank financial institutions in financing the real economy is indirectly reflected in the increase in their holdings of corporate debt securities and shares. The left-hand panel of Chart 16 shows the holdings of debt securities issued by euro area NFCs since 2013. While insurance corporations and pension funds were the main holders of debt instruments at that time, they have been losing relative weight in favour of non-bank financial institutions, which now hold more than half of the debt securities issued by euro area NFCs. Similarly, non-bank financial institutions remain the main holders of shares issued by euro area NFCs (right-hand panel of Chart 16).



Chart 16

Holders of debt securities (left-hand panel) and of listed shares (right-hand panel) issued by euro area NFCs excluding central banks, market values

(%)



Source: ECB (Securities Holdings Statistics) and ESRB Secretariat calculations.

Notes: Holdings of the central bank are excluded. The last observation is the first quarter of 2022.

Recent developments point to the partial replacement (mainly by some large corporations) of traditional bank loans with newer forms of bank and non-bank debt financing such as those associated with syndicated loans and collateralised debt obligations (CLOs). Aldasoro et al. (2022) document a twentyfold increase between 1990 and 2019 in the origination by non-banks of syndicated loans to NFCs around the world, reaching USD 410 billion in 2019.¹⁵ They also note that, relative to those borrowing from banks in the syndicated loan market, NFCs borrowing from non-banks in the syndicated loan market tend to have lower returns and higher leverage, leading to higher credit spreads and to more volatility in the provision of such lending. Similarly, Bouveret et al. (2019) show an increase in the size of leveraged loans markets and of CLOs, with declining spreads as a result of investors' greater risk appetite and the growing role of alternative investment funds (i.e. hedge funds). Additionally, both the financial soundness of the borrowers in these markets and the credit standards applied to them seem to have declined, as covenants accept weaker interest coverage ratios or interest-to-earnings ratios (International Monetary Fund, 2019). In the United States, several studies point to abundant excess liquidity among lending institutions as a force behind the steady decline in syndicated loan standards (Griffin et al., 2021).

¹⁵ This is still only around 10% of global syndicated loan origination in 2019, which amounted USD 4,750 billion.

3 Potential drivers of the observed trends

The implications for financial stability and macroprudential policy of the decline in corporate leverage and the decreasing role of banks in the provision of credit to NFCs clearly depend on the underlying drivers. A reduction in corporate leverage may reflect a healthy rebalancing from above-optimal levels or a response to deeper structural changes in credit demand or supply.¹⁶ Ceteris paribus, a reduction in corporate leverage implies a strengthening of NFC balance sheets, a lower probability of default and a greater recovery rate for lenders. The overall effect on financial stability should, in principle, be positive. Similarly, reducing the role of banks in the provision of credit to NFCs should be positive for financial stability, as it would reduce overbanking in the EU. However, once the causes of the shift in leverage and credit are taken into account, the diagnosis of the implications for financial stability may change in sign and size. For example, banks in the EU may not be able to meet the credit demands of NFCs as a result of their own vulnerabilities, leaving some credit demand unmet or met by less regulated institutions. In this case, the implications for financial stability would not be so clear. The decrease in corporate leverage may be the result of the financial sector being unable to fund investment, hampering productivity and growth over the long term. This section looks at the main drivers of the observed trends and seeks to provide an initial assessment of these.

Lower leverage might be the result of tighter lending conditions, driven by reduced credit supply, or the lack of availability or unsuitability of debt financing for funding certain investments. Credit supply, especially from banks, may be affected by transitory profitability and capitalisation problems related to the long-lasting impact of a financial crisis, or to more permanent factors such as the enforcement of tighter prudential regulations. Developments that tighten the supply of bank credit relative to other forms of credit may alter the composition of bank versus non-bank sources of funding and generate asymmetric effects across NFCs with and without access to alternative debt funding sources.

An NFC's choice to reduce leverage may also respond to demand forces, including declining investment and profitability prospects. Choosing to have lower net leverage may reflect lower funding needs because of reduced investment opportunities or low profitability prospects. It may reflect a desire to contain financial risk or a rebalancing of its capital structure following other changes in the advantages and disadvantages of debt financing (see Box 4). For instance, holding higher cash reserves (which reduces net leverage) may reflect an aim to self-insure against negative cash flow shocks in uncertain times. In these cases, the credit risk behind an apparently more conservative leverage choice is obviously lower than if higher leverage were chosen in different circumstances, but not necessarily lower than in the circumstances that would lead NFCs to choose higher leverage during an expansion.

¹⁶ The revaluation of balance sheet items at market prices may influence measures of corporate leverage beyond an active choice to issue debt or expand the balance sheet, but does not change the overall picture. Annex 4 shows corporate leverage excluding revaluations of financial assets and liabilities.



Box 4

Corporate leverage from the point of view of capital structure theories

In their well-known capital structure irrelevance propositions, Modigliani and Miller (1958) established that under ideal conditions (including well-operating financial markets and the absence of bankruptcy costs, taxes or informational and incentive problems) corporations would be indifferent to alternative funding sources. In such circumstances, from an individual NFC's value maximisation perspective, any leverage ratio would be optimal.

This proposition proved to be a critical benchmark for the development of corporate finance as a field in economics. Early academic work in this field emphasised the role of bankruptcy costs and corporate taxes, establishing a static trade-off theory of capital structure, balancing the tax advantages of debt financing with potential financial distress costs incurred by NFCs or their financiers (De Angelo and Masulis, 1980; Opler and Titman, 1994). In particular, high leverage can exacerbate conflicts of interest and cause value losses due to risk taking (Jensen and Meckling, 1976) or investment-detering debt overhang problems (Myers, 1977). Debt financing may have advantages in that it provides incentives for manager/owners (Innes, 1990), reduces state verification costs (Gale and Hellwig, 1989) or, in the case of public firms, disciplines self-interested managers (Bolton and Scharfestein, 1990; Stulz, 1990; Aghion and Bolton, 1992; Hart and Moore, 1994).

These approaches reflect a static trade-off view of capital structure decisions and cannot easily explain their time series evolution. More recent research considers a more dynamic set-up, focusing on adjustment costs (Fischer et al., 1989; Hennessy and Whited, 2005; Leary and Roberts, 2005; Strebulaev, 2007), such as issuance costs or the restructuring of long-term debt. As a complementary approach, the pecking order theory (Myers and Majluf, 1984) views leverage ratios as the result of cumulative marginal financing decisions where the preferred funding source depends on changing circumstances. Other contributions highlight the role of inertia (Welch, 2004) and market timing (Baker and Wurgler, 2002), predicting a negative correlation between leverage and market-to-book ratios.

A more contemporary strand considers the goal of preserving financial flexibility (DeAngelo et al., 2011; Denis and McKeon, 2012) in anticipation of difficult times. Profitable NFCs with no imminent investment opportunities may opt for conservative funding (low net leverage) to preserve their future capacity to expand or absorb negative cash flows.

Interpreting the recent evolution of leverage in EU NFCs in terms of the theories briefly summarised in this box is beyond the scope of this report. While the lion's share of academic work has focused on explaining the cross-sectional variation in NFCs' leverage within a given country or economic area, our goal is to emphasise a puzzling generalised decline, listing possible causes without seeking to formally validate any specific theories.¹⁷

¹⁷ Exceptions to the focus on cross-sectional variation within a country include Rajan and Zingales (1995), who study the determinants of corporate capital structures across countries, and Halling et al. (2016), who document cyclical patterns in capital structures.



Falling leverage over many years among EU NFCs could be the result of a gradual adjustment to lower target leverage, related to lower tax benefits associated with lower rates, greater concerns over financial distress costs following the GFC and declining investment prospects. Under this perspective, the current phase of declining borrowing may in part be seen as a response to a changing environment and a correction after the excessive borrowing witnessed before 2008.

A recent view of the evolution of leverage, even for NFCs with good prospects, highlights the changing composition of NFC assets. The increasing reliance of NFCs on intangible rather than physical capital may reduce credit supply, as intangible investment represents poor collateral for lenders (Rampini and Viswanathan, 2013). Furthermore, intangible investment requires less external funding, as intangibles are usually expended over time rather than acquired outright as is the case for physical capital, which has historically been dominant.

Technological change may also make debt funding less suitable for certain investment activities. Rapid changes in business models, driven by progress in IT technology, have led to a reduced role for physical capital – the traditional collateral securing bank loans – and a shift towards intangible capital creation. Intangible capital includes investment in intellectual property and organisational design, product development, automation, capacity to develop and manage data, internal software, web-based logistics and internet presence, among other items, all of which imply a larger role for highly skilled human capital.¹⁸ As intangible assets are poor collateral for loans, their expansion may require low or even negative net leverage. At the same time, the creation of intangible capital requires lower investment spending ex ante, as human capital and NFC capabilities cannot be acquired upfront but need to be developed over time. As a result, a greater reliance by NFCs on intangible assets compared with tangible assets may reduce both credit demand and access to credit. In parallel, several aspects of the digital transformation of the economy (such as the access to financial services provided through digital platforms by either traditional intermediaries or new players) may facilitate NFCs' access to funding, applying a force in the opposite direction.

Shrinking lending opportunities to the corporate sector could lead financial intermediaries to redirect their funding towards other sectors (e.g. households, governments or the rest of the world) or asset classes (e.g. real estate) with potentially higher systemic vulnerability.

These and other general equilibrium considerations are discussed further in Section 4.

¹⁸ Current accounting standards and national accounts do not recognise all intangibles of an NFC as assets, treating some of them as expenses. This is the case for data purchases, employee training and reorganisation expenses, among others. As a result, in a world in which intangible assets are increasingly present the size of the balance sheet and the investment of NFCs may be increasingly understated.



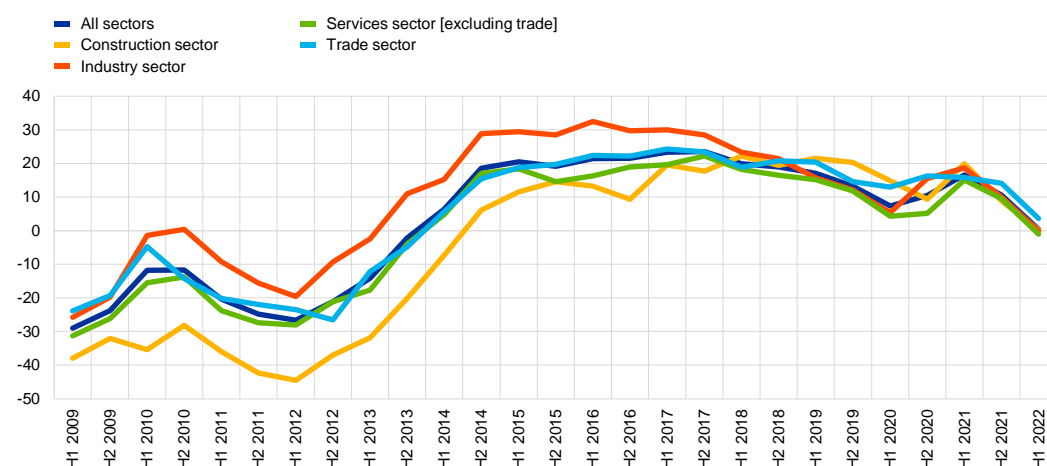
3.1 Supply-side factors

3.1.1 Bank lending conditions

During the GFC and the euro debt crisis, many NFCs across the EU appeared to be constrained as banks reduced their lending. Banks are the main providers of corporate loans in the EU and are especially important for SMEs with no alternative access to capital markets. In 2011 and 2012, there were widespread concerns that EU banks' impaired access to wholesale funding markets, their weak profitability prospects and capital positions, and the entry into force of a new prudential regulation (i.e. Basel III) would lead to a process of deleverage, in some cases involving a reduction of their loan portfolios (Bank for International Settlements, 2012; European Central Bank, 2012; Feyen et al., 2012; European Systemic Risk Board, 2013). Kalemli-Ozcan et al. (2022) find that having lost access to bank funding, facing weaker demand and showing symptoms of debt overhang, many EU NFCs embarked on a process of gradual deleveraging, in part by reducing investment and in part by reducing equity pay-outs. In the countries most affected by the two crises, economic recovery was delayed and non-performing loans started to increase and pile up in banks' balance sheets, creating both demand and supply conditions that resulted in limited recourse to bank credit. The Survey on the Access to Finance of Enterprises (SAFE), run by the ECB among European NFCs, shows that NFCs across all sectors of activity reported a reduced willingness of banks to provide credit up to 2014 (Chart 17). This is consistent with the results of the Bank Lending Survey (BLS) run among euro area credit institutions which shows that banks were tightening their credit standards for both NFCs and households over the same period (Chart 18).

Chart 17
Net change in the willingness of banks to provide credit

(weighted % of responses)



Source: ECB SAFE.

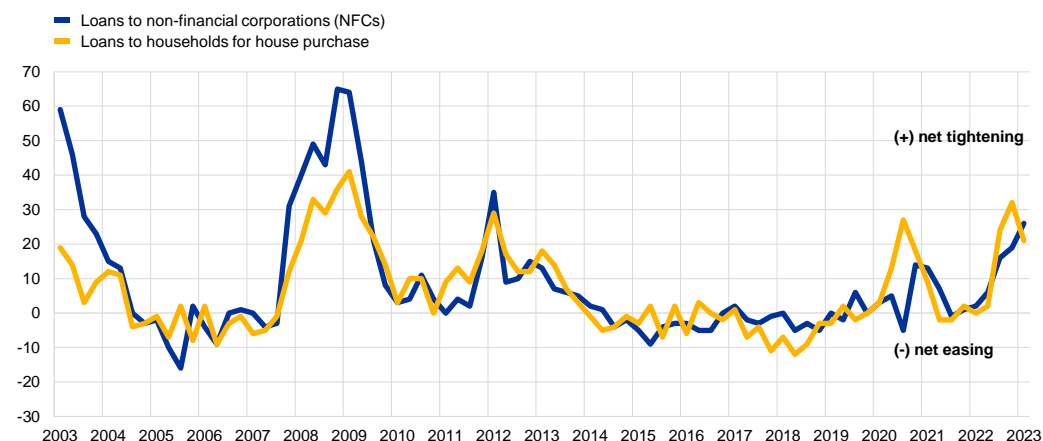
Notes: The y-axis shows the weighted difference in the percentage of responses reporting an increase in the willingness of banks to provide credit (positive values) and those reporting a decrease (negative values).



Chart 18

Changes in credit standards for loans to NFCs and households in the euro area

(%)



Sources: ECB BLS and ESRB Risk Dashboard.

Notes: Positive values represent a tightening of lending conditions and negative values represent an easing of lending conditions.

After around 2014, financial conditions for corporates and households eased considerably, however, corporate leverage continued its downward trend. The SAFE and BLS survey results point to a significant easing of credit conditions after 2014. This suggests an improvement in NFC funding conditions, with restored access to bank credit and narrowing spreads, driven, among other factors, by decisive policy interventions. Thus, the sustained fall in corporate leverage, even after 2014, cannot be easily explained by tightening financial conditions.

3.1.2 Prudential regulation

The regulatory reform initiated in 2009 may have impacted the supply of bank funding to NFCs. Tighter capital requirements might have affected the supply of bank lending to NFCs more than other activities.¹⁹ New liquidity standards may have also disincentivised the maturity transformation implied by bank lending. The impact of regulatory burdens on banks' pricing and willingness to hold loans on their balance sheets could partly explain the growing reliance of European NFCs on non-bank financing, including the expansion of securitisations based on CLOs.²⁰ However, bond financing is almost exclusively available to large corporations, so a

¹⁹ For example, Gropp et al. (2019) and De Jonghe et al. (2020) find that banks shrink their corporate portfolios relatively more than other asset categories as they adjust their risk-weighted assets to comply with tighter capital regulation.

²⁰ Serena Garralda and Tsoukas (2020) document that following the contraction in the supply of credit by European banks after the 2011 EBA capital exercise, US NFCs began relying more heavily on market debt instruments.



contraction in the supply of bank credit may induce a larger reduction in the leverage of SMEs or, more generally, NFCs without access to alternative sources of debt financing.²¹

Risk-based capital requirements tend to impose higher risk weights on bank loans to NFCs than on mortgages to households, implying a potential reallocation of lending towards the latter when capital regulations become tighter. The risk weights associated with unsecured corporate loans to unrated corporations under prevailing capital regulations are significantly higher than those for most mortgages, implying higher requirements of bank capital per unit of lending. Under the internal ratings-based approach (IRB), risk weights are increasing in the probability of default (PD) and the loss given default (LGD) attributed to each loan. Chart 19 shows the average PDs and LGDs of bank exposures to SMEs and to mortgage lending in a sample of 190 EU banks in early 2021. The differences in these credit risk parameters largely explain the average differences in risk weights under the IRB approach shown in Chart 20. Chart 20 also shows very significant differences in the average risk weights applicable to corporate versus mortgage exposures under the standardised approach (SA). Roughly speaking, the differences in risk weights imply that from the same amount of own funds a bank can generate twice as much lending in the form of average mortgages than in the form of average corporate loans. In times of bank capital scarcity or tightening capital regulations, these asymmetries can generate, other things equal, a strong incentive to reallocate lending away from corporate loans.²²

²¹ As shown in Box 3, the EU bond market for unlisted NFCs has grown considerably in recent years, but still represents a very small fraction of their debt financing.

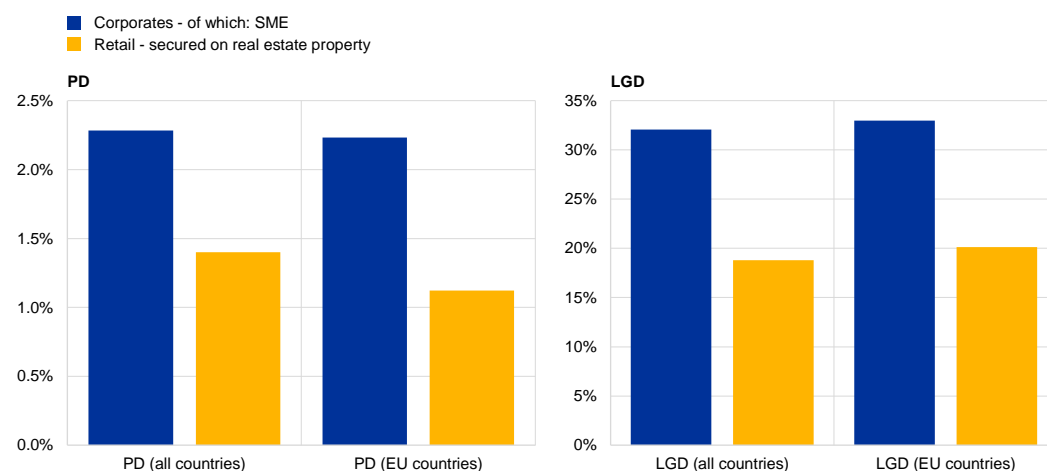
²² In this sense, Juelsrud and Wold (2020) find that, after the adoption of Basel III reforms, Norwegian banks rebalance their portfolios away from the corporate sector, favouring instead household credit. The relevance of loan portfolio adjustments following changes in capital regulation is also documented in Auer et al. (2022), who find that a tightening of capital requirements on mortgage lending induces Swiss banks to shift credit towards the corporate sector. San Millan (2023) considers an analytical setup in which banking crises are characterized by episodes of reallocation of bank credit portfolios towards mortgage lending and shows that sectoral countercyclical capital buffers that increase the capital charges on mortgage loans but not necessarily on corporate loans can be effective in mitigating such a reallocation and, consequently, the frequency and severity of banking crises.



Chart 19

Probabilities of default (PD) and loss given default (LGD) of exposures secured with real estate and exposures to SMEs

(%)



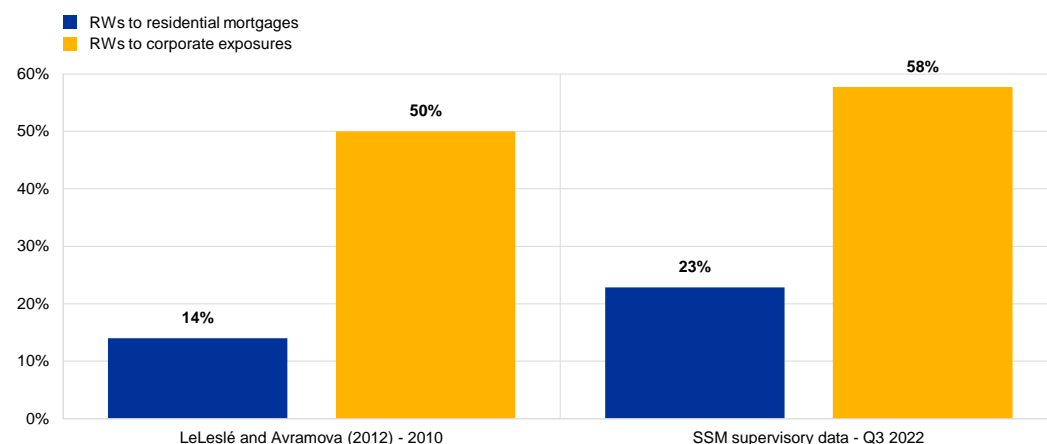
Sources: EBA Risk Dashboard and ESRB Secretariat calculations.

Notes: Data refer to the second quarter of 2021, as reported by a sample of around 190 EU banks.

Chart 20

Average risk weights (RWs) across exposure classes, Q3 2022 and 2010

(%)



Sources: SSM Supervisory Data, LeLeslé and Avramova (2012) and ESRB Secretariat calculations.

Notes: Data for the third quarter of 2022 aggregate all the banks subject to microprudential supervision by the European banking supervision. Risk weights are the weighted average by risk-weighted amounts of exposures under the SA and IRB approaches. Data for 2010 are taken from Figure 12 of LeLeslé and Avramova (2012) and based on Pillar III disclosures of a sample of European banks.

Thus, the tightening of bank capital regulations might have contributed to the reduction of leverage among bank-dependent NFCs. However, the evidence presented in Section 2 (Chart 11



and Box 2, as well as in Chart A4 in Annex 3) points to a fairly homogeneous decline in leverage across all size categories, even among dividend paying NFCs, suggesting that regulatory pressure is probably not the sole cause of the observed fall in corporate leverage.

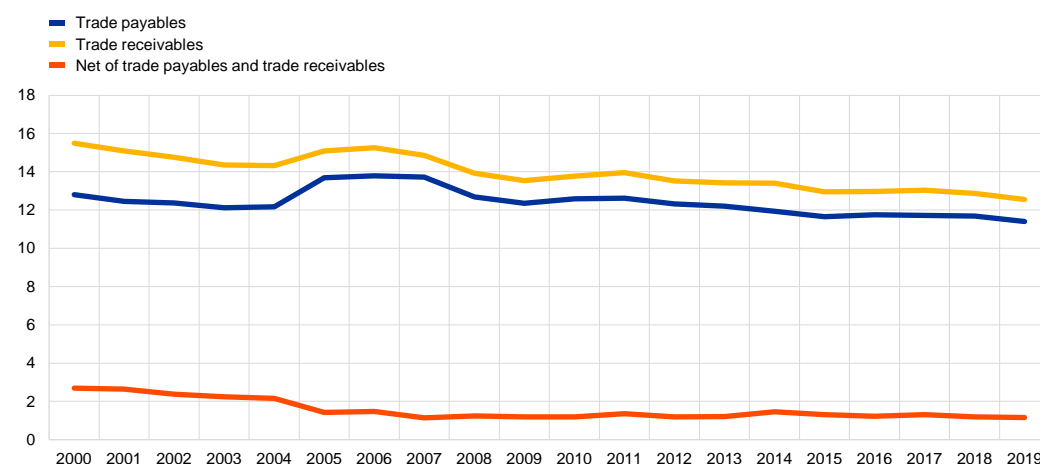
The COVID-19 pandemic is an interesting experiment in the response of bank lending and NFC leverage choices to an exogenous relaxation of prudential requirements and to support measures impacting credit demand like loan guarantees and moratoria. Following the widespread public support measures taken at the start of the pandemic, EU banks significantly expanded their corporate loan books between 2020 and 2021. As government guarantees ensured a minimal capital charge, banks were willing to expand lending to corporates. However, most aggregate evidence indicates that NFCs' net leverage did not change a great deal, as the amounts borrowed were largely retained, possibly on precautionary grounds, as cash reserves.

Trade credit does not appear to have risen to compensate for the decline in bank lending to NFCs. In principle, trade credit may allow NFCs with better access to funding (including internal funds and non-bank sources of external financing) to re-channel funding towards smaller and otherwise more bank-dependent NFCs. Tighter funding conditions in markets or financial intermediaries may therefore encourage NFCs to increase inter-corporate lending (Rajan and Petersen, 1997; Biais and Gollier, 1997). However, the scale of trade credit among European NFCs has remained stable over time both at the aggregate level (Chart 21) and across most sectors of activity (Chart A6 in Annex 3). No obvious interaction appears to exist between trade credit and the trend of corporate leverage and bank lending documented elsewhere in this report.

Chart 21

Trade payables and receivables as a share of total assets, weighted average across sectors

(percentages)



Sources: BACH database of the European Committee of Central Balance Sheet Data Offices and ESRB Secretariat calculations.

Notes: Data are from the accounting financial statements of over 2,000,000 NFCs domiciled in Austria, Belgium, France, Germany, Italy, Poland, Portugal, Slovakia and Spain. Sectors B (Mining and quarrying), E (Water supply), K (Financial and insurance activities), M (Professional, scientific and technical activities), O (Public administration), P (Education), Q (Human health), T (Activities of households as employers) and U (Activities of extraterritorial organisations) are excluded. Weights are computed from the gross value added of the underlying sectors in 2019.



3.2 Credit demand factors

Demand-side factors relate to the willingness of NFCs to borrow. Reduced leverage suggests that NFCs have experienced a reduction in external funding needs. This could be due to a higher reliance on internal sources of funding or lower funding needs. This subsection focuses on investment as a key driver of funding needs. We first consider the macroeconomic environment (i.e. investment and savings for the whole economy) and then the evolution and composition of corporate investment. The technological transformation seen in recent decades and the associated move towards intangible assets may be an important factor in the decline of corporate leverage.

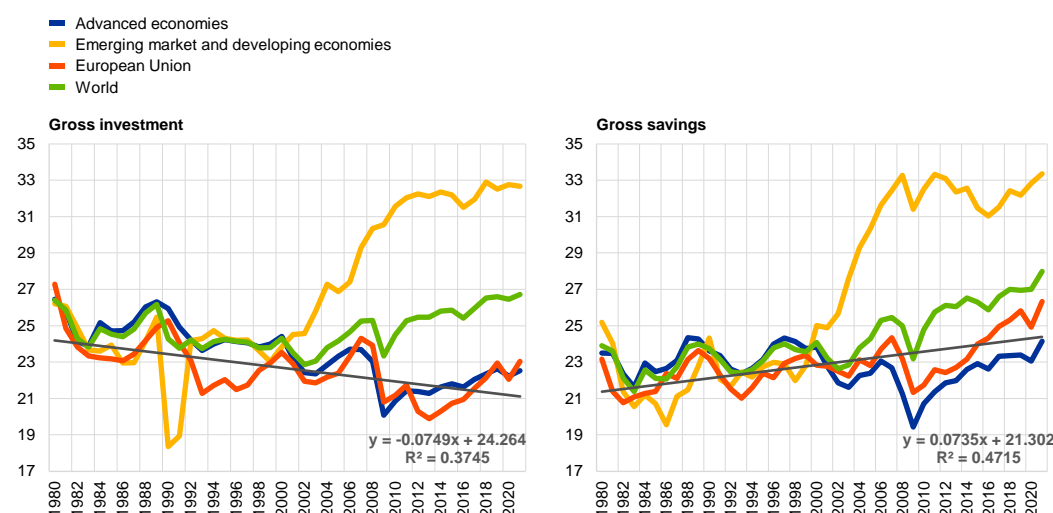
3.2.1 Investment and savings flows

Investment in advanced economies has weakened over the last 40 years. The left-hand panel of Chart 22, based on the April 2022 IMF World Economic Outlook, shows the evolution of investment in advanced economies (with a separate line for the EU, and a dark line showing the trend), and in emerging and developing economies. For advanced economies, there is a clear decreasing trend from 1980, which seems to have partially reversed since the GFC (since 2013 for the EU). By contrast, investment in emerging and developing economies increased substantially between 2000 and 2008, stabilising at a rate that is significantly higher than the rate seen in advanced economies since then.

Chart 22

Gross investment and gross savings as a share of GDP

(percentage of GDP)



Sources: IMF World Economic Outlook, April 2022.

Notes: Advanced economies also include the EU. The thin grey line represents the linear trend of the time series for the EU.

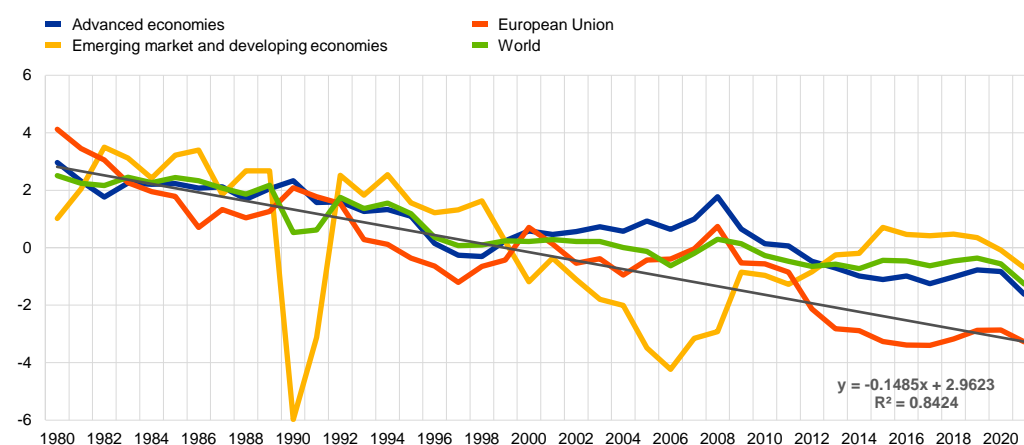
Gross investment refers to gross fixed capital formation plus changes in inventories and acquisitions less disposal of valuables, excluding the acquisition of financial assets.



While savings have fluctuated cyclically, they have increased since the GFC in the EU and other advanced economies, even though interest rates have been at historically unprecedented low levels. As shown in the right-hand panel of Chart 22, minimum values in savings in the EU were reached in 1981, 1993 and 2009, immediately after severe contractions in economic activity. Since 2009 a steady increase in saving rates can be observed across advanced economies. Saving rates in emerging economies have grown significantly since 2000, stabilising at a much higher level than in developed economies after 2008. Comparing investment with saving rates (Chart 23),²³ there seems to be an excess of savings over investment in the EU and, to a lesser extent, advanced economies during the last ten years, while investment and savings appear to be fairly balanced in emerging economies from 2011.

Chart 23
Investment minus savings as a share of GDP

(percentage of GDP)



Sources: IMF World Economic Outlook, April 2022 and ESRB Secretariat calculations.

Notes: Advanced economies also include the EU. The lines depict the difference between gross fixed capital formation and gross savings for each group of countries. The thin grey line represents the linear trend of the time series for the EU.

Weak investment is regarded a major driver of the global savings glut (Bernanke, 2005; Taylor, 2009), fitting well with the hypothesis of secular stagnation, defined as a prolonged period of low or no growth in which savings exceed investment (Summers, 2014; Barsky and Easton, 2021). Weak economic growth in the aftermath of the GFC was initially explained as a lack of demand, driven by the need to absorb credit and confidence losses (Lo and Rogoff, 2015). However, its persistence suggests that structural transformation and supply-side factors could also have played a role. Eichengreen (2015) and Justiniano et al. (2015) review the evidence and conclude that technological explanations appear to be more plausible than temporary demand factors. The increasing importance of intangible and digital capital (which are not always properly measured as investment in NFCs' financial statements), for which debt financing is both less

²³ This comparison needs to consider that the acquisition of financial assets is not taken as gross investment, and that savings and investment can flow from the domestic economy to the rest of the world.

needed and less suitable, may partly explain the decline in the share of credit directed to the NFC sector. In the next two subsections we look more closely at these demand-side factors.

3.2.2 Lower need for external financing among NFCs in advanced economies

The steady decline in corporate borrowing at a time of falling interest rates and normalised access to bank lending (from 2013 onwards) suggests an evolution in business needs. The documented decline in aggregate investment rates in developed economies in recent decades (Chart 22), partly as a result of the global relocation of manufacturing activities to emerging countries, is a likely cause of the reduction in credit demand. This shift has not been offset by an expansion of capital spending by innovative NFCs and emerging sectors.

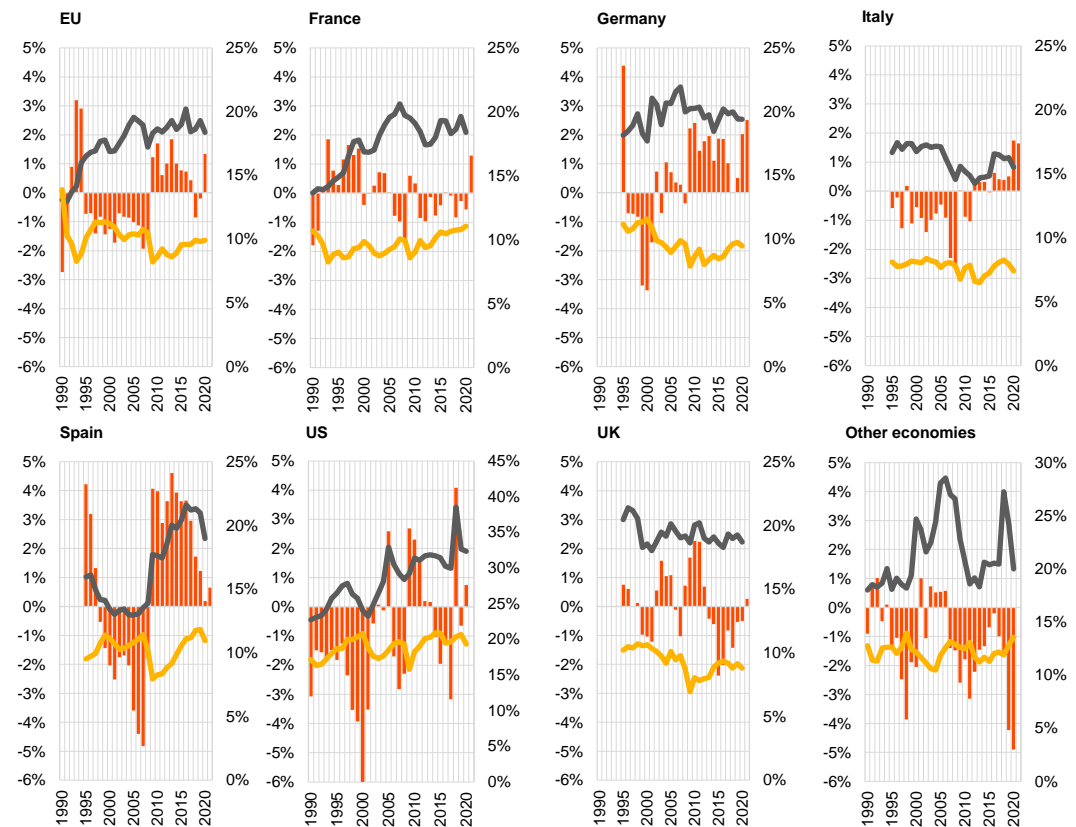
Strikingly, the corporate sectors of most advanced economies have become net lenders to other sectors in recent years. On a flow basis, in several advanced economies the NFC sector has become a net lender in the aggregate, implying that in net terms it does not need to seek new borrowing from the financial sector to fund its activities (Chart 24). At the same time, net entrepreneurial income as a share of the value of production generally shows a positive trend across advanced economies, so the gradual move of the corporate sector from net borrower to net lender could be explained by a rise in savings, via retained earnings, and in some cases sluggish gross capital formation (as a share of production value) in several advanced economies (e.g. Germany since 2010; Spain, the United States and the United Kingdom from around the time of the GFC). The existence of a financial surplus for the NFC sector is unprecedented since World War II (Bates et al., 2009; Gruber and Kamen, 2015). While an aggregate surplus conceals significant variations across NFCs, the NFC sector as a whole has clearly become less dependent on external financing in the last fifteen years compared with the preceding years.



Chart 24

Income, investment and net lending/borrowing of NFCs

(% of the value of production)



Sources: OECD and ESRB Secretariat calculations.

Notes: The red bars represent the ratio of net lending (positive) or borrowing (negative) divided by production value for NFCs. The grey lines represent the ratio of net entrepreneurial income divided by production value and are linked to the right-hand scale. The yellow lines, which are also linked to the right-hand scale, represent the ratio of gross capital formation divided by production value. Data on production are not available for the United States, so gross value added is used instead in the denominator. Other economies include South Korea, New Zealand, Norway and Switzerland.

Several academic papers document abnormally weak investment activity among US NFCs since the early 2000s and analyse a number of candidate explanations that might also help explain the evolution seen in Europe.

According to Gutierrez and Philippon (2017), investment by US NFCs after the 2001-2002 recession was systematically below the level that the neoclassical Q theory of investment would have predicted. The fall in investment persisted well after corporate profits recovered. They document that this pattern of declining investment coincides with a period of reduced entry and exit of new establishments in the US manufacturing sector and an increasing concentration of activity in the largest NFCs. Barriers to competition and the stronger market power of big NFCs might discourage investment by both big NFCs and their potential competitors. In fact, Gutierrez and Philippon (2017) provide evidence that “the investment gap is primarily driven by industry leaders”.



The rise in market concentration and the emergence of the digital economy are other possible, if not related, drivers of the decline in corporate investment. While the increase in concentration is well documented for the United States, it is less evident in Europe (Doettling et al., 2017). This makes it more relevant to consider other possible non-mutually exclusive explanations for the weakness of investment activity in recent years. One major global trend is the emergence of an IT-driven growth process (the digital economy). NFCs have been expanding their IT-related activities since the 1980s and product development has increasingly centred on human-capital-intensive innovation. This has led to a transition from traditional items of capital expenditure such as plant and equipment towards investment in intangible assets which may not be fully reflected as investment in the financial statements of the NFCs. The following paragraphs describe this driving force in further detail.

3.2.3 Intangible assets

Investment in intangible assets differs from tangible investment in a number of dimensions.

Tangible investment requires the upfront building of physical facilities and the acquisition of capital assets. By contrast, intangible capital is built primarily over time by investing skilled human capital in research and development. Unlike physical assets, the intangible assets embedded in human capital (e.g. the know-how of a team of scientists) cannot be bought upfront since employees are free to leave with some of it. The investment may therefore have to be sustained by properly rewarding human capital over time rather than through upfront payment for the assets. This implies lower financing needs and, quite likely, a lower demand for credit.

There is growing consensus that traditional accounting measures fail to account for much intangible investment outside assets on which the NFC can claim intellectual property (such as patents and brand names).

Less visible intangible investment includes data collection and analysis, internal software, staff training, brand development, product development and customer targeting (Haskel and Westlake, 2018). Academic research has sought to estimate intangible capital stock by capitalising R&D and related expenses (Corrado and Hulten, 2010). Corrado et al. (2022) show that accounting for intangible assets in a broad sense, including those not recognised as assets by accounting standards, would lead to an increase in investment as a share of GDP in the United States since 1985. In the EU, Corrado et al. (2018) find that after the GFC investment in tangible assets has fallen disproportionately compared with investment in intangible assets. Accounting for these measures helps improve recent estimates on the relation between Tobin's Q and corporate investment (Peters and Taylor, 2017).

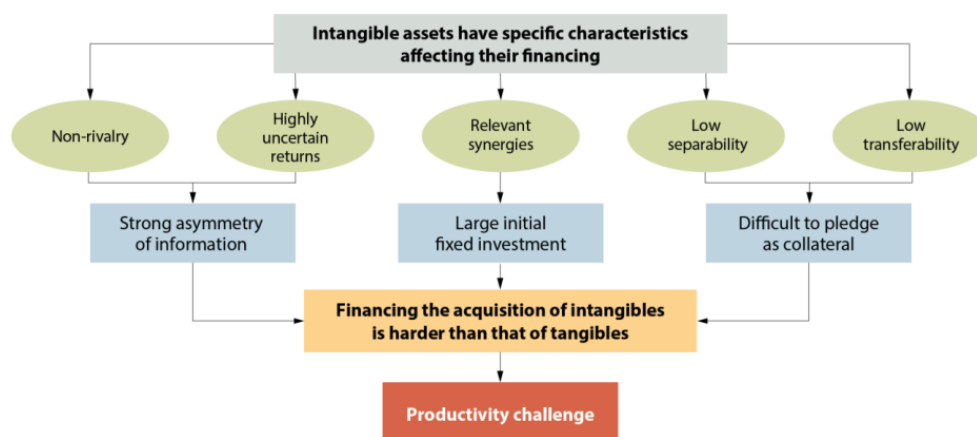
By their very nature, intangible assets are poor collateral for credit since the human capital behind the intangibles may simply “walk out of the door” when the NFC experiences financial distress.

Thus, intangible investment offers little debt capacity to NFCs, posing financing challenges that have been recognised by academics (Rampini and Viswanathan, 2010) and the official sector (see Figure 1 taken from OECD, 2021 and Manigart et al., 2020). There is clear evidence that NFCs with a high ratio of intangible to tangible capital have lower leverage and tend to accumulate larger cash reserves (Falato et al., 2022). They tend to fund growth from retained earnings and (limited) equity issuance than on the classic credit investment funding source. The most detailed evidence involves US listed NFCs (see Box 5).



Figure 1

The challenge of financing intangibles



Source: OECD (2021).

Box 5

Investment in intangible capital in the United States

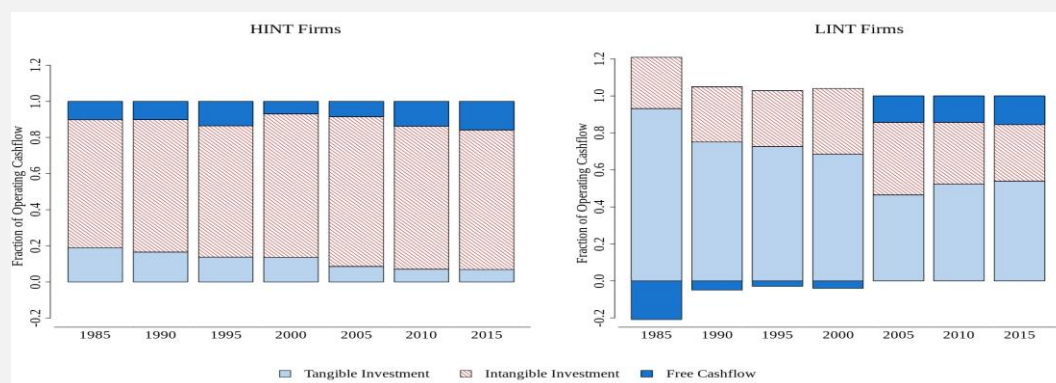
Evidence from the United States suggests that NFCs with a larger share of intangible capital have lower financing needs. Doettling et al. (2018) find that US listed NFCs with high intangible assets (HINT NFCs) generate positive free cash flow (the dark blue areas in Chart A); that is, an excess of operating cash flow over the sum of the estimated flows of investment in tangible and intangible assets. These NFCs would then contribute positively to the previously documented financial surplus of the NFC sector in recent years. Those with low intangible capital (LINT NFCs) present negative free cash flow up to the early 2000s, but also contribute positively to the financial surplus of the NFC sector afterwards. Chart B shows a larger contribution of retained earnings and deferred equity (equity granted internally to employees) to the financing of investment for HINT NFCs than for LINT NFCs, and a corresponding lower contribution of debt financing.



Chart A

Investment spending and free cash flows among US listed NFCs with high and low intangible assets

(shares)



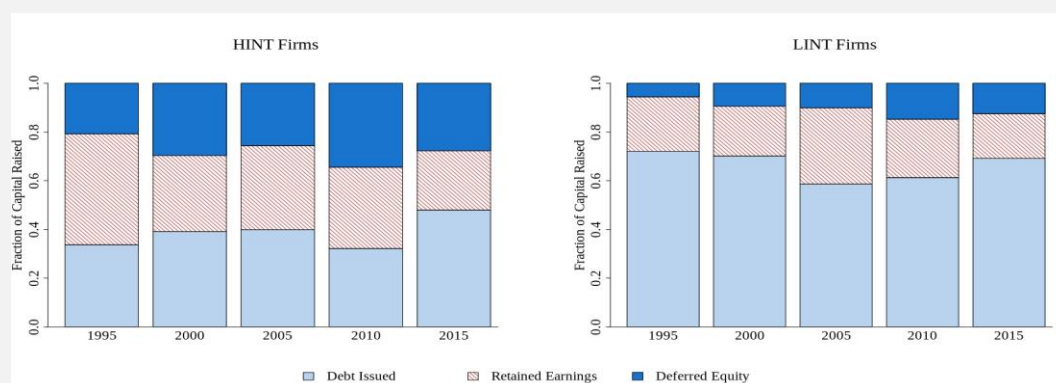
Source: Figure 2 of Doettling et al. (2018).

Notes: The sample contains all listed US NFCs. HINT NFCs are those with a ratio of intangible-to-total capital in the top tercile in the year, while LINT NFCs are those with a ratio of intangible-to-total capital in the bottom tercile in the year. Intangible capital is measured following Peters and Taylor (2017) by capitalising R&D spending and 30% of selling, general and administrative expenses. These capitalised amounts are then added to the intangible assets reported on the balance sheet. Tangible investment is capital expenditures, while intangible investment is R&D, spending on balance sheet intangibles and 30% of selling, general and administrative expenses. Operating cash flow is cash flows after taxes and interest payments on debt, but prior to investment spending. Free cash flow is operating cash flow minus tangible and intangible investment. The figures plot median values over five-year intervals that end with the year listed below each bar.

Chart B

Composition of capital raised among US listed NFCs with high and low intangible assets

(shares)



Source: Figure 3 of Doettling et al. (2018).

Notes: The sample contains all listed US NFCs. HINT NFCs are those with a ratio of intangible-to-total capital in the top tercile in the year, while LINT NFCs are those with a ratio of intangible-to-total capital in the bottom tercile in the year. Intangible capital is measured following Peters and Taylor (2017) by capitalising R&D spending and 30% of selling, general and administrative expenses. These capitalised amounts are then added to the intangible assets reported on the balance sheet. Tangible investment is capital expenditures, while intangible investment is R&D, spending on balance sheet intangibles, and 30% of selling, general, and administrative expenses. Debt Issued is the sum of long-term debt issued plus debt in current liabilities issued during the year. Retained earnings is free cash flow minus net stock repurchases and minus dividend payments. Deferred equity is the annual grant-date fair value of restricted stock and stock option compensation to non-executive employees.



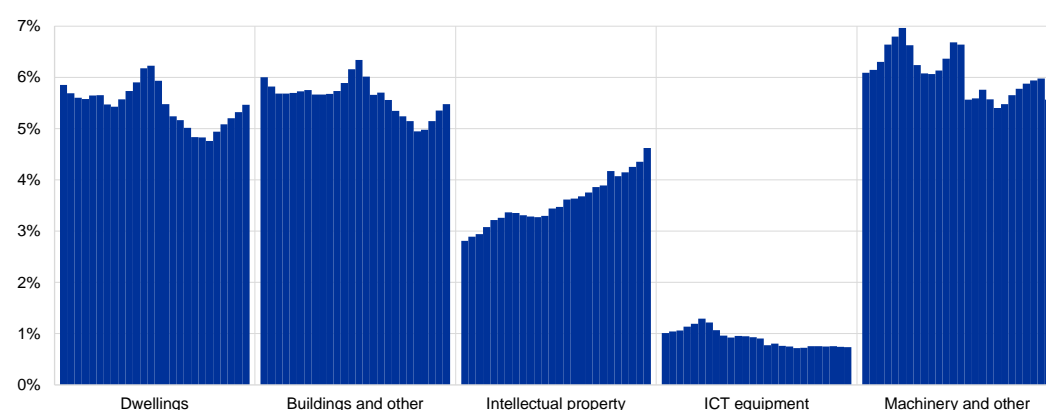
Evidence points to an increase in the importance of intangible assets among European

NFCs. Based on Eurostat data, Chart 25 shows the evolution over the past 25 years of the importance (as a share of GDP) of investment in five different categories of fixed assets by European corporations. With the exception of intellectual property (an intangible asset), investment in all other categories of fixed assets considered in Chart 25 (tangible assets) have shrunk relative to GDP.

Chart 25

Components of fixed capital formation as a share of GDP, sum of European countries (1995-2020)

(% of GDP)



Sources: Eurostat and ESRB Secretariat calculations.

Notes: Data are from the quarterly sectoral accounts, in accordance with ESA 2010, covering EU 27 countries (with the exception of Ireland and Croatia), Norway and Switzerland. For each component of fixed capital formation, the bars depict the yearly shares (percentage of GDP) between 1995 and 2020, the latest still showing provisional data.

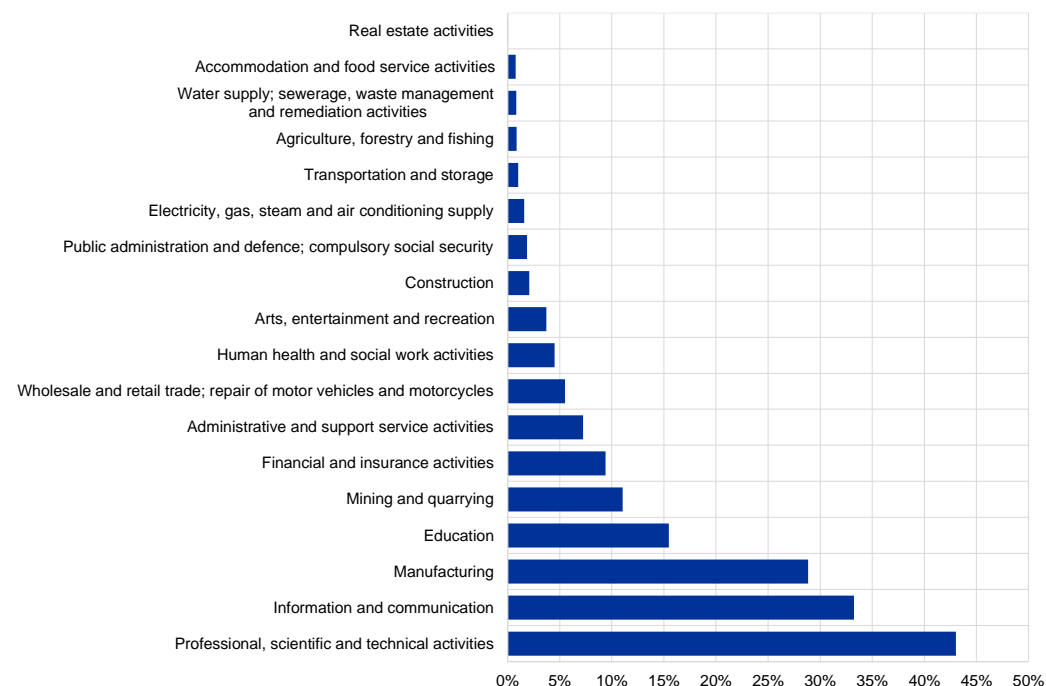
Intellectual property assets are concentrated in a handful of sectors and the growth in investment in these assets accounts for most of the growth in intellectual property observed for the aggregate NFC sector. Manufacturing, Information and communication, Professional activities and Education feature the highest shares of these assets as a fraction of total assets (Chart 26 and Chart A7 in Annex 3). The Financial and insurance services sector, among others, exhibits a growing share, while in other sectors the share is very small (and does not show a clear trend). However, the share of intellectual property as a fraction of fixed assets is just the tip of the iceberg when identifying the growing importance of intangibles for NFCs. More recently, aspects such as digital presence seem to be key to the success of many NFCs and it is unclear whether the investment in promoting this presence is measured or even proxied by the investment in traditional intangible asset categories such as intellectual property.



Chart 26

Intellectual property products by sector of activity, 2019 EU

(% of total fixed assets)



Sources: Eurostat and ESRB calculations.

Notes: Data have a reference date of 2019 and are from the annual sectoral accounts, in accordance with ESA 2010, covering EU 27 countries (with the exception of Croatia).

The outsourcing of business services such as cloud computing and storage, that reduces the need to rely on in-house capital and the funding that the acquisition of such capital would require, is a related development. Outsourcing to large platforms reduces most NFCs' needs to own the assets (mainly in the form of ICT equipment, Chart 25) and hence the need to finance expensive equipment or intangibles upfront. In the case of cloud-based services, some of the providers are highly profitable big tech companies with the ability to self-finance their investments in intangible assets. These technological leaders tend to retain profits as reserves, becoming net providers of funding to other companies and the rest of the economy.

3.3 Supply or demand?

Assessing the relative importance of the factors identified in the discussion above is an objective that goes beyond the scope of this report. Quantifying the contribution of the various possible drivers to the decline in the leverage of NFCs and the increasing role of non-banks would require an explicit econometric approach or the formalisation associated with a quantifiable structural model. Rather than providing definitive conclusions on this issue, one objective of this report is to encourage further research on the determinants of capital structure decisions by EU



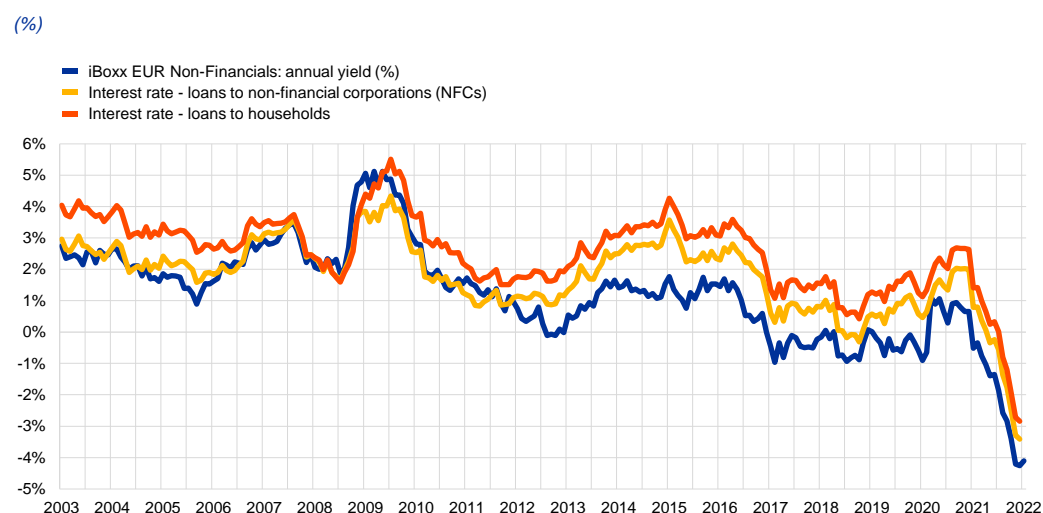
NFCs, especially those that can explain aggregate trends and outcomes of relevance for financial stability.

A typical partial equilibrium approach to assessing whether demand or supply shifts are dominant in a given market is to consider the co-movements between quantities and prices.

Assuming that demand and supply curves have normal slopes with respect to the price of the corresponding good, observing that quantity and price fall at the same time would suggest a downward shift of the demand curve (and lead us to interpret equilibrium before and after the shift as two intersections on a stable supply curve). By contrast, observing that the equilibrium quantity falls while the equilibrium price increases would suggest an inward shift of the supply curve (and lead to interpret equilibrium as two intersections on a stable demand curve). In a direct application of this logic to the credit market (or, more specifically, to the market for corporate loans), observing the documented decline in corporate leverage during a period of declining loan real interest rates would point to the relevance of a downward shift in demand and reinforce the case for the candidate explanations discussed in subsection 3.2. Box 6 discusses potential reasons for the decline in aggregate corporate leverage in an environment of falling nominal interest rates in further detail. However, on second reading, bank loan financing has as close substitutes, at least for some NFCs, their own internally generated funds or even bond financing, in which case the relevant price is not the loan rate but the difference between the cost of loans and the cost of the alternative funding sources. From that perspective, Chart 27 also reveals a smaller cost of bond financing for NFCs and a wider spread between the cost of bank loans and the cost of bonds after 2012. That change in the relative cost of bank loans would point to the relevance of supply-side explanations such as those sketched out in subsection 3.1 and would be consistent with the growing importance of market financing and non-bank financial intermediaries for NFC financing in the EU.

Chart 27

Annual yield of European corporate bonds and interest rates of outstanding loans to NFCs and households, in real terms



Sources: ECB, IHS Markit (S&P Global), Haver Analytics and ESRB Secretariat calculations.

Notes: Interest rates refer to the outstanding amount of loans granted by banks in the euro area. The annual yield is for iBoxx non-financials in euros. The **iBoxx EUR Non-Financial** comprises 2,142 bonds with an average duration of 4.98 years. They are all shown in real terms by subtracting inflation in the euro area (year-on-year change in the consumer price index) from the corresponding nominal rates. The latest observation is for January 2022.



Additional insight can be obtained by considering the evolution of average spreads across loans to NFCs, loans to households and corporate bonds. Computed by subtracting the German ten-year government bond yield as a proxy for the risk-free rate from the same average nominal rates behind Chart 27, the loan spreads shown in Chart 28 show a significant upward shift after 2011, suggesting an enduring repricing of credit risk after the European sovereign debt crisis. This is in contrast to the average spreads on corporate bonds that appear to display a more moderate level shift (abstracting from the turbulent 2008-2009 period) since the start of the GFC (Gilchrist and Mojon, 2018).²⁴ While the differential shift in loan spreads can be interpreted as a genuine reassessment of the underlying credit, such an interpretation does not match with a realised rise in defaults and LGDs in the corresponding loan categories in recent years (although it may reflect a reassessment based on the sizeable credit losses experienced during the financial crisis).²⁵ The higher spreads might also reflect a genuine repricing of a given level of credit risk by lending institutions that become more aware of the importance of the systematic component of this risk and/or that internalise the implications of this risk to a larger extent, thanks to tighter prudential regulations and lower bailout expectations (Farhi and Tirole, 2009). One way or another, the repricing observed in Chart 28 significantly increases the distance between the spread of NFC loans and corporate bonds, while it does not alter the distance between the spreads of loans to households and loans to NFCs, supporting the importance of supply-side factors in the explanation for the trends documented in this report.²⁶ Chart A8 in Annex 3 is constructed with data for Germany only and leads to similar conclusions as Chart 28 in relation to the spreads of corporate bonds and loans to NFCs.

²⁴ When comparing corporate loan and corporate bond spreads in Chart 27, it is important to consider that there are relatively few NFCs that issue corporate bonds in the European Union and that the distribution of issuers is very unevenly distributed across countries (see European Commission, 2017, Figure 3). This composition issue may have been exacerbated after the European sovereign debt crisis, contributing to widening the difference between the depicted corporate loan and bond spreads.

²⁵ Other possible and complementary explanations are that NFCs with market access tend to be larger and might have a better credit rating than those that do not have access.

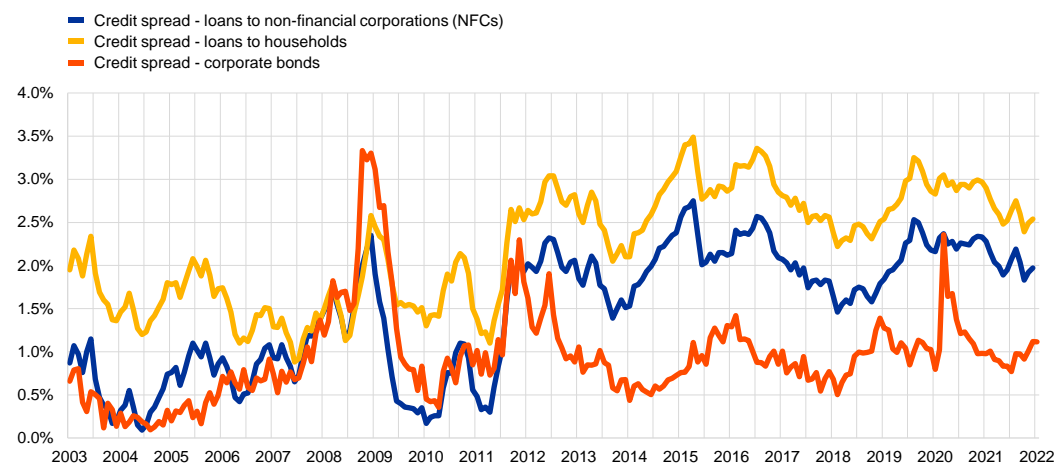
²⁶ The information displayed in Chart 28 does not refer to exactly the same products, as issuers of corporate bonds could have better ratings than NFCs taking loans, the maturity of loans and bonds may not be the same, etc. These caveats, although not invalidating our conclusions, need to be taken into account when interpreting Chart 28.



Chart 28

Credit spreads of loans and corporate bonds

(%)



Sources: ECB, Deutsche Bundesbank, IHS Markit (S&P Global), Haver Analytics and ESRB Secretariat calculations.

Notes: Spreads are calculated as the difference between the nominal interest rates on loans and the yield of corporate bonds, and the yield of the German ten-year government bond. The latest observation is for January 2022.

Box 6

Leverage responses to lower interest rates and their implications for credit risk

The EU has spent almost 20 years with first low and then ultralow nominal and real interest rates. While a lot has been discussed about the potential impact of low interest rates on risk taking (see European Systemic Risk Board, 2021b), the evidence about the sign and importance of such an impact is somewhat mixed. Incentives to search for yield in the low interest rate environment may be partly or even totally offset by the lighter financial burdens (on a flow basis) faced by the indebted agents. As a result, the final impact of falling interest rates on risk taking can be expected to be heterogeneous across agents. In a corporate finance context, leverage is a key determinant of credit risk and it is tempting to interpret a positive (negative) response of leverage to a decline in interest rates as an instance of higher (lower) risk taking.

Evidence on the impact of interest rate declines on leverage choices confirms the heterogeneity of the responses across NFC types. For instance, effects are asymmetric across US leverage buyout targets and matched public companies in Axelson et al. (2007). Caglio et al. (2021) find that US SMEs respond to lower interest rates by raising their leverage, while large public corporations move



in the opposite direction. Darmouni and Papoutsis (2021) show that in the EU bond market NFCs with lower ratings increase their borrowing the most during times of monetary expansion.²⁷

The connection between interest rates, leverage and risk taking is further complicated in the context of NFCs belonging to a corporate group or simply having a bankruptcy remote financial sponsor of some type. Some of the riskier NFCs (e.g. those that are highly leveraged or with low ratings) often enjoy the backing of a bankruptcy remote sponsor that has the option but not the obligation to support them in the case of need (e.g. if they have difficulties to meet the service of debt but are perceived as profitable in the longer run). These sponsors range from funds backing leveraged buyout targets to the parent companies of multinational subsidiaries. Keeping the sponsors as legal entities that are different from the backed NFCs may allow the tax advantages of debt to be better exploited (Leland, 2007).

Based on the logic of the trade-off theory of capital structure (see Box 4), when interest rates fall, non-backed NFCs reduce their leverage (and thus their PD) because the tax benefits of debt fall by more than the expected bankruptcy costs. By contrast, for the riskier NFCs within a conglomerate or under the umbrella of a sponsor, the tax advantage of debt falls proportionately less due to the higher spread component of their cost of debt. In this case, the default probability and expected bankruptcy costs of the affected NFCs increase. In a dimension relevant for prudential surveillance, such an increased default risk is not detectable through standard market-value-based measures of leverage applied at the level of the sponsor-plus-NFC group, which does not increase. Indeed, the market value of debt, which is concentrated in the highly indebted NFC, increases by less than the equity value concentrated in the sponsor, due to the discounting effect of lower interest rates (Nicodano and Regis, 2022). This finding calls for caution in mechanically associating declines in a consolidated market-based measure of leverage with declines in the underlying credit risk.

²⁷ Lower interest rates can increase further loan demand by riskier (i.e. highly leveraged) NFCs when they generate the expectation of bailouts. The benefits of such bailouts accrue not only to NFCs with lower ratings but to all entities with high exposure to interest rate risk. Among these, Fahri and Tirole (2009) include broker dealer and mortgage banks that increasingly fund themselves through securitisation and money markets, and shadow banks (conduits, hedge funds, investment banks, etc.) that engage in maturity transformation without having stable insured deposits.



4 General equilibrium outcomes and macroprudential implications

This section looks more closely at the macroprudential implications of the decline in net leverage and the changes in the allocation of credit across sectors that it may have induced.

In Section 2 we documented a decrease in corporate leverage in the aftermath of the GFC and an increasing role of non-banks in the provision of funding to NFCs. There are reasons to think that these changes are of a structural nature and go beyond cyclical developments. In Section 3 we analysed potential supply and demand factors behind these trends in an environment of low interest rates. If the decline in NFC leverage after 2012 reflects a fall in NFCs' demand for credit, a general equilibrium question arises: where does the surplus funding go? Financial stability may be affected (albeit not necessarily negatively) if funds that would have otherwise gone to the debt-based financing of NFCs' activities are re-channelled into the financing of other activities, including consumption and home purchases by households, government activities funded by government debt, or activities undertaken by the rest of the world. Alternatively, the funds otherwise used in the debt-based funding of NFCs might simply continue to be used for NFC funding but in the form of (mostly internally generated) equity, which also implies a reduction in NFC leverage ratios.

In a standard closed-economy model, a decline in aggregate funding needs would be offset by falling interest rates through an adjustment in savings behaviour.²⁸ However, in recent years savings have proven to be inelastic to interest rates, leading to the "savings glut". In particular, demand for safe assets has remained strong and may even have risen as interest rates fell.²⁹ This is theoretically possible when income effects dominate substitution effects across savers (for example, when savers target retirement income). As a result, a decline in credit demand by one sector driven by reduced investment (i.e. gross fixed capital formation) may not be necessarily offset by a reduction in aggregate credit supply even in a context of falling interest rates. In an open economy, excess savings can also be absorbed by changes in the capital account (i.e. domestic ownership of foreign assets and foreign ownership of domestic assets) or by changes in the net lending/borrowing position of the economy vis-à-vis the rest of the world. The reallocation of funds across sectors may be accompanied by changes in asset prices. Equity prices may respond positively to the flow of savings into equity and house prices may increase in response to the increasing availability of funding for house purchases.

Looking at the evolution of financial liabilities over the last 20 years, the categories that have grown the most are equity across the whole economy, and government debt, along with household loans. As shown in Chart 29, based on data from who-to-whom financial accounts, the main sectors incurring net financial liabilities after the GFC are equities and government debt, the rest of the world and households. In 2008, 2009 and 2020, governments

²⁸ As the nominal amounts of corporate debt and bank loans to NFCs have not declined (or have not declined very significantly), the discussion can be interpreted in terms of an adjustment in the share of available savings or loanable funds allocated to each possible use.

²⁹ This assessment is consistent with a structural and segmented demand for safe assets in historical time series (Krishnamurthy and Vissing-Jorgensen, 2012 and 2015).

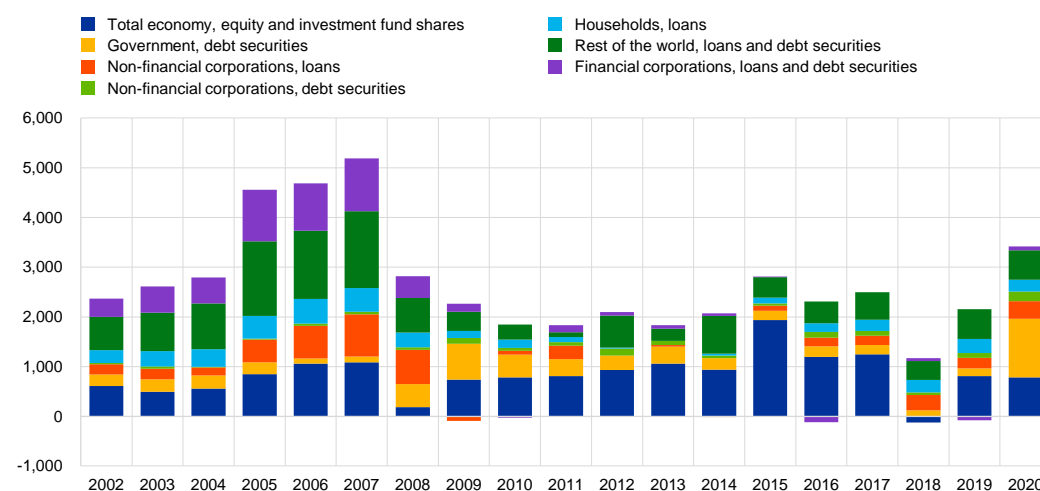


undertook sizeable transactions in debt securities (net issuance of debt securities) to finance their response to the ongoing crises. After 2008, flows of debt financing to all sectors except general government declined significantly, most notably for financial institutions, which registered negative net flows in several years. Financial flows to households recovered significantly after 2014, albeit reaching levels that were still well below those seen before 2008.

Chart 29

Main transactions with financial liabilities, EU

(EUR billions)



Sources: OECD and ESRB Secretariat calculations.

Notes: Each bar represents the transactions with a financial liability (in other words, the net flows of funding) over a year in billion euro.

During a savings glut the volume of bank and non-bank funding can remain high even if productive lending opportunities decline, as the demand for safe assets also remains elevated, encouraging the issuance of relatively safe assets such as own housing or investment-grade bonds. This process can also provide incentives for the proliferation of less stable safe assets such as those associated with the more senior tranches of structured products generated by the securitisation of originally riskier assets. Problems of information and incentives implied by this phenomenon, together with an inadequate regulatory treatment at various levels, were blamed for the de facto excessive risk taking that preceded the GFC. However, lessons learned from the crisis and the regulations enacted to address them might have led to the current contrasting situation in the EU, where activity in the securitisation markets remains fairly low (European Systemic Risk Board, 2022a).

4.1 Credit reallocation to mortgage lending

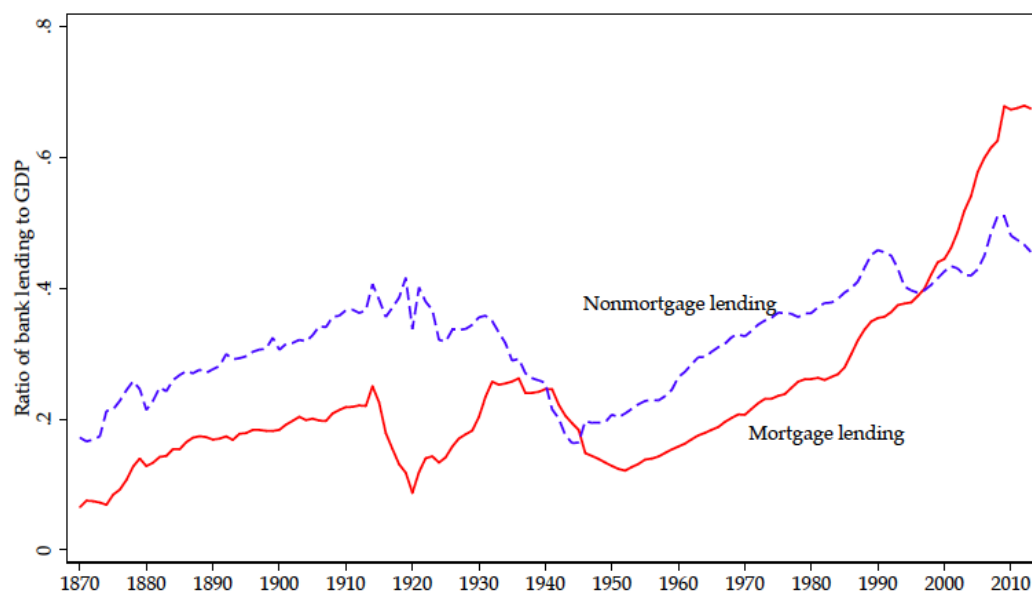
Since World War II there has been a continuous increase in mortgage lending by banks, which has accelerated in the last 30 years (Chart 30). Mortgage and non-mortgage bank lending in OECD countries have increased significantly in relation to GDP since around 1950. Their



evolution was largely parallel up to 1990, when non-mortgage lending started to grow at a slower pace while the growth in mortgage lending accelerated (Jordà et al., 2016). The differential growth in mortgage lending seems to have originated during the phase of declining real rates which started in the early 1980s (which has expanded households' debt servicing capacity and contributed to the rise in housing prices). This appears to be common to all OECD countries and constitutes a striking structural shift in the use of credit in developed economies. The parallel trend in housing prices has redistributive implications, including a wealth shift from younger to older generations and from new owners and renters to existing real estate owners. Importantly for our focus, the rise of house prices to average income and mortgage debt may have resulted in larger fractions of highly indebted households, which is a source of concern for macroprudential policy.

Chart 30
OECD bank lending as a percentage of GDP

(ratio)



Source: Jordà et al. (2016).

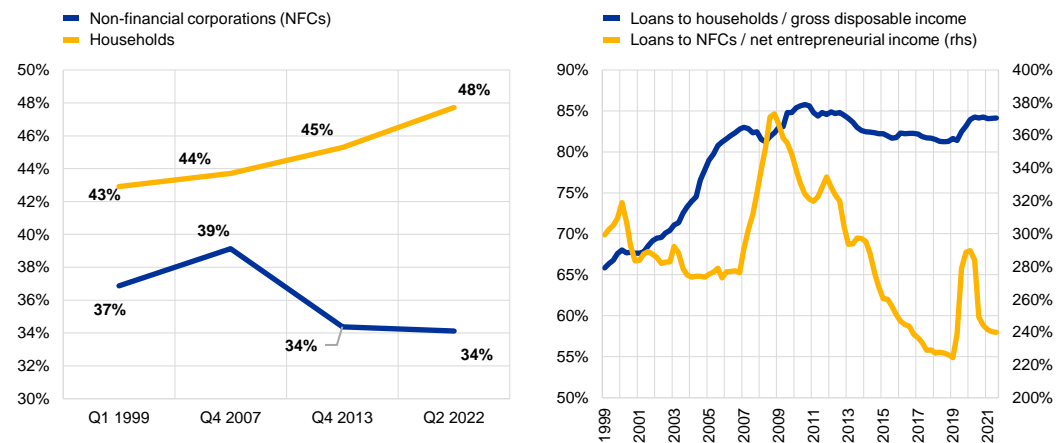
In the EU, over the last 20 years banks have steadily increased the share of their credit that is allocated to households, mainly in the form of mortgages. The left-hand panel of Chart 31 shows the share of loans granted by euro area monetary financial institutions to households and NFCs at four points in time between 1999 and 2022. The peak in the share of bank credit represented by loans to NFCs at the end of 2007 is consistent with the evolution of corporate leverage documented in Section 2. Thereafter, the share of bank lending directed to NFCs declines markedly, while the share directed to households shows an overall increase throughout the period. The right-hand panel of Chart 31 shows the evolution of the ratio between the stock of loans and gross disposable income (gross entrepreneurial income) for households (NFCs). In the case of households, the ratio has stabilised since the GFC, while the ratio for NFCs has experienced a sharp decline in the same period, interrupted only by the COVID-19 pandemic.



Chart 31

Distribution of bank loans according to borrower sector, euro area

(%)



Sources: ECB (who-to-whom) accounts and ESRB Secretariat calculations.

Notes: The left-hand panel shows the share of these loans to households and NFCs at the beginning of the time series (fourth quarter of 1999), just before the GFC (fourth quarter of 2007), after the sovereign debt crisis (fourth quarter of 2013) and at the latest observation (second quarter of 2022). The right-hand panel shows the evolution of outstanding loans to households and NFCs as a share of gross disposable income and net entrepreneurial income.

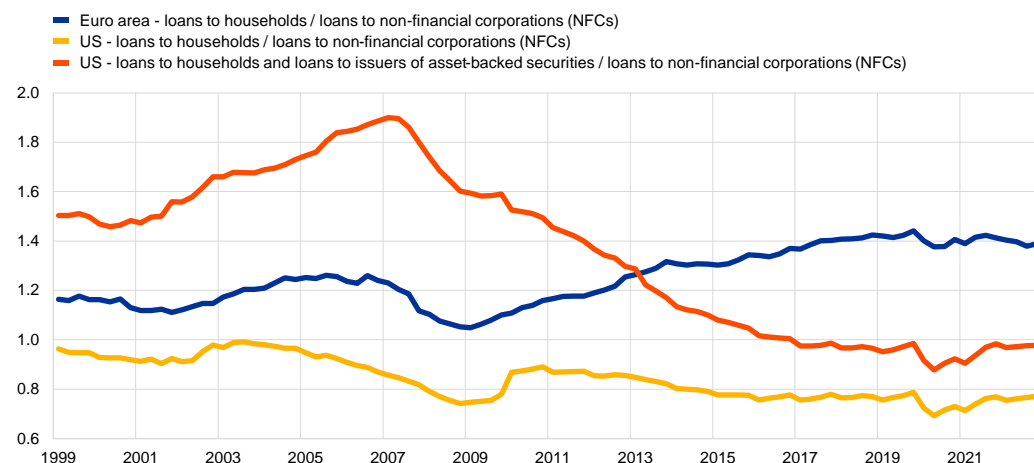
In the United States the evolution of household lending relative to NFC lending has followed a different trend since the GFC. The evolution of the ratio of household lending to corporate lending before 2008 exhibits an evolution similar to that seen in the EU, where the upward trend before 2008 is quite notable once loans held by issuers of asset-backed securities are added to loans to households in the books of US banks.³⁰ From 2008 onwards the ratio in the United States decreases and the trends in the euro area and in the United States diverge: in the United States the ratio decreases, while the euro area shows a clear upward trend interrupted only by the COVID-19 pandemic (Chart 32).

³⁰ Adding these loans is important to account for the significant share of mortgage loans held by securitisation vehicles rather than banks (Rosen, 2010; Purnanandam, 2011; Bord and Santos, 2012).

Chart 32

Loans to households divided by loans to NFCs, euro area and the United States

(ratio)



Sources: ECB (who-to-whom accounts), FDIC, Board of Governors of the Federal Reserve System, Federal Reserve Bank of St. Louis and ESRB Secretariat calculations.

Notes: the latest observation is for the fourth quarter of 2022. For US data, loans of issuers of asset-backed securities are taken from the financial accounts of the United States (table L.127). Data are based on the quarterly Banking Profile covering all FDIC-insured institutions. Loans to households are loans to individuals plus ¼ family residential mortgages. Loans to NFCs include commercial and industrial loans, farm loans and loans secured by real estate other than ¼ family residential mortgages. Banks going into resolution are excluded from the sample, but the time series is not corrected.

This shift of bank lending towards real estate related activities is visible across many EU

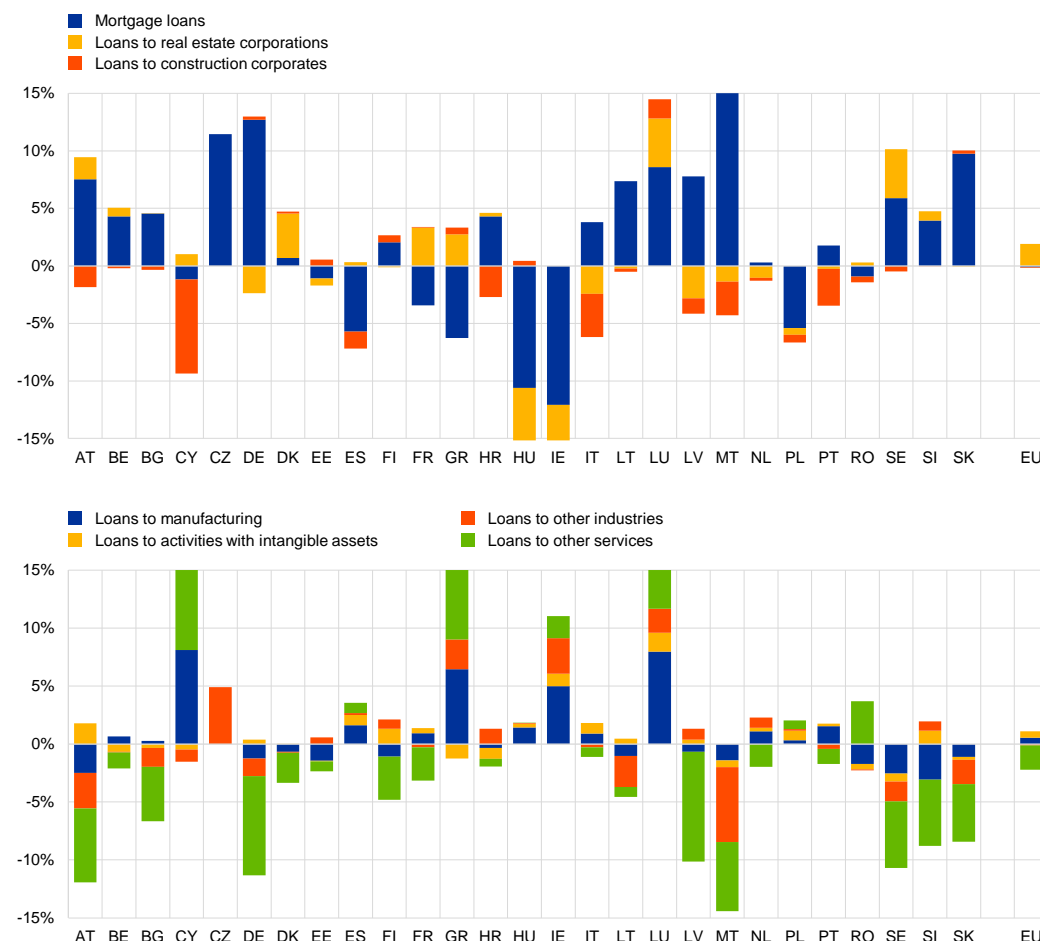
countries. Chart 33 shows the change between 2014 and 2021, in percentage points, of the share of total loans to households and NFCs granted to real-estate-based versus non-real-estate-based activities. The left-hand panel shows the variation in the share of lending in the form of mortgages and in the form of loans to NFCs in the Construction and real estate sectors, while the right-hand panel shows the variation in the share of loans to NFCs in other sectors. Leaving aside the countries that experienced a real estate crisis around the time of the GFC (i.e. Cyprus, Greece, Hungary, Ireland and Spain), it is possible to observe a shift in the composition of the banks' loan portfolios, with the share of mortgage loans increasing by more than 10 percentage points in several countries.



Chart 33

Change in the share of loans to households and NFCs, 2014-2021

(percentage points)



Sources: ECB consolidated banking data and ESRB Secretariat calculations.

Notes: There are no data for Czech Republic. Data for Bulgaria are only available from 2015. Data on construction and real estate lending for Spain are not available before 2017. Activities with intangible assets include the following sectors: I – Information and communication and M – Professional, scientific and technical activities. Other industries comprise the following sectors: A – Agriculture, forestry and fishing, B – Mining and quarrying, D – Electricity, gas, steam and air conditioning supply, and E – Water supply; sewerage, waste management and remediation activities. Other services comprise: G – Wholesale and retail trade; repair of motor vehicles and motorcycles, H – Transportation and storage, I – Accommodation and food service activities, N – Administrative and support service activities, O – Public administration and defence; compulsory social security, P – Education, Q – Human health and social work activities, R – Arts, entertainment and recreation, and S – Other service activities. Loans to corporations classified in Sector K (Financial and insurance activities) are excluded.

Overall there is evidence that easy access to credit and falling interest rates boost asset prices, especially real estate prices (European Systemic Risk Board, 2021); the reallocation of bank credit towards households may have contributed to support rises in housing prices.

There is some long-term evidence of a structural break in the evolution of real house price indices (Knoll et al., 2017) and stock price indices (Kuvshinov and Zimmermann, 2021). Between 1870 and the 1990s, house prices appear to fluctuate around a stable ratio to per capita income, contributing



to sustain a stable average loan-to-income ratio for homebuyers. These patterns alter from the 1990s onwards, suggesting that the shift is related to the unprecedented decline in (nominal as well as real) interest rates across the term structure since the 1980s – a sign of abundant savings. Mortgage lending from banks to households (as well as lending to commercial real estate) played a role in the credit booms seen before 2008 and has risen again in several EU countries in recent years, in tandem with significant real estate price increases (European Systemic Risk Board, 2022c). This reallocation of bank credit towards mortgages may be related to the decline in corporate leverage and NFCs' increasing reliance on intangible assets, which we have documented in Section 3. US evidence suggests that as NFCs increase their reliance on intangibles, local banks shift their loan portfolio towards mortgage lending (Dell'Ariccia et al., 2021).

4.2 Macprudential implications

This section focuses on the macroprudential implications of lower corporate leverage and of the increasing role of non-banks as providers of funding to NFCs. In Section 2 we presented evidence of a decrease in corporate leverage in the EU and of the increasing role of non-bank financial intermediaries in the provisioning of debt financing to NFCs, especially large corporations. The documented recent trend towards lower leverage is common to most EU countries as well as several other advanced economies, it occurs across many sectors of activity, and across large and small corporations. In Section 3 we discussed possible drivers of this evolution, identifying supply and demand-side factors that might have induced NFCs to reduce their leverage.

While the decline in corporate leverage and the decreasing role of banks in funding NFCs may appear to be a reassuring development from a financial stability perspective, there are reasons to be cautious. If NFCs reduce their leverage in response to higher uncertainty, lower profitability prospects or costlier access to bank funding, they reduce their financial vulnerability in the face of a counterfactual situation in which they do not adopt these more conservative capital structure decisions. However, this does not mean that NFCs are less vulnerable than in an economy in which, under less adverse economic and financial conditions, they were adopting less conservative financing choices. Therefore, the observed fall in leverage should not be observed with complacency. In other words, if NFCs are more prudent in their borrowing, they may be anticipating hard times or less valuable assets and, hence, this may not necessarily imply lower vulnerability than in a situation where NFC leverage is higher.³¹

Additionally, the diagnosis based on the analysis of sector level aggregate or average leverage ratios may conceal the existence of NFCs that are exposed to debt overhang problems and at high risk of financial distress. These are the NFCs that will risk default under adverse aggregate circumstances, causing losses to their lenders and acting as a source of propagation of financial distress across the financial system. In this sense, some evidence points to an increase of in the number of NFCs classified as “zombies” over the last few decades (Adalet

³¹ However, Schularick (2021) notes that the sectoral composition of corporate debt in Europe in the past decade was not particularly concentrated in the non-tradable sector (which is more commonly associated with fragility in credit booms). Furthermore, asset-based borrowing is rare in Europe, which reduces the vulnerability to knock-on effects from sudden asset price corrections.



McGowan et al., 2018; Acharya et al., 2022; and Banerjee and Hofmann, 2022) but not necessarily in the most recent years (Helmertsson et al., 2021). Consistent with other studies, Schularick (2021) argues that the share of zombie NFCs (defined as those that are unprofitable with both an interest coverage ratio of below one and a low stock market valuation) has not declined after the initial rise seen during the GFC, sparking fears that the low interest environment has allowed unprofitable companies to survive longer than they should. In relation to recent developments, Zakrajšek (2021) observes that both the COVID-19-related shock and the support measures adopted in response to it were unprecedented, leaving room for further analysis of the heterogeneous response by NFCs across countries. In France, for instance, pre-COVID-19 zombies did not make a disproportionate use of the credit support schemes,³² while the take-up rate was highest for the financially weakest NFCs.³³

Future academic and supervisory research should use granular data to identify vulnerabilities at individual level and use or develop methods to estimate how those vulnerabilities might hit the system in adverse scenarios. Such an approach should allow us to gauge whether the fall in aggregate corporate leverage is accompanied by a reduction in the systemic vulnerability stemming from the indebtedness of the corporate sector or whether there is a latent development in the background that makes the change in the aggregate compatible with an increase in the systemic risk potentially associated with NFCs. For instance, recent dynamics related to zombie NFCs would seem to be closer to microprudential policies. In this regard, Schularick (2021) stresses the need for strict microprudential policy and clean-up measures to free up bank balance sheets, as well as additional efforts to accelerate the restructuring or liquidation of insolvent NFCs.

The shift of bank lending away from corporate loans and into mortgages (or other forms of real estate related lending) makes the banking system potentially exposed to more correlated losses as a result of cyclical housing prices. The academic literature has found ample evidence of a high correlation between sustained house price booms, mortgage credit expansion and subsequent financial instability (Mian and Sufi, 2009; Jordà et al., 2015). Using a sample of 45 advanced and developing economies, Beck et al. (2012) find that corporate credit is positively associated with economic growth, but household credit is not. Müller and Verner (2021) find that expansions in credit to the non-tradable sector (which includes real estate) tend to lead to growth slowdowns and financial crises similar to household credit expansions. By contrast, expansions in lending to the tradable sector are followed by stronger output and productivity growth, and no significant increases in the risk of a financial crisis. In addition, the persistence and magnitude of house price booms is strongly correlated with the persistence and magnitude of subsequent busts (Agnello and Schuknecht, 2011). The highly correlated nature of the defaults and value losses suffered by lenders during real estate crises adds to the macroprudential vulnerabilities implied by the concentration of lending in real estate related activities. These vulnerabilities are further aggravated if factors such as inflation, interest rates or the international business cycle increase the correlation between fluctuations in real estate prices across countries.

³² Helmertsson et al. (2021) find some evidence that eligibility criteria for credit support schemes generally did not exclude zombie NFCs.

³³ This assessment is also consistent with the findings of the European Systemic Risk Board (2021a).



As discussed in Section 3.1.2, mortgage debt typically features lower average credit risk than other loan categories and, as a result, it carries low regulatory risk weights; this ensures lower microprudential capital requirements than other loan categories but not necessarily lower scope to suffer large, unexpected credit losses. However, this calibration has a shortcoming that is common to other microprudential risk weights: it does not necessarily fully account for the varying degree of credit risk correlation across exposures. Arguably, and especially in the presence of real estate booms and busts, mortgage credit risk may be more correlated across exposures (and the implied defaults more concentrated over time) compared with corporate credit risk. Loans with lower average but more positively correlated default rates (or LGDs) can expose banks to larger unexpected losses than loans with higher average but less correlated credit losses.

To avoid defaulting on their mortgages overindebted households may react to adverse economic conditions with sharp reductions in consumption that, from a macroeconomic perspective, contribute to the severity of aggregate contractions during downturns. Cutting back on consumption is a way for homeowners to avoid defaulting on their mortgages and prevent the foreclosure of their dwellings.³⁴ While this reaction directly reduces the credit losses suffered by lenders, at the macroeconomic level it contributes to a decline in aggregate demand, creating a negative feedback loop (Mian et al., 2017)

For macroprudential authorities, a steady reallocation of (bank) credit away from NFCs to real estate related activities calls for increased attention to cyclical risks and enhances the relevance of cyclical macroprudential tools (i.e. the countercyclical capital buffer) as a means to build resilience and have the capacity to react during downturns. A steady decline in the role of private savings in creating new productive assets can lead to higher cyclicalities in the prices of existing assets and in household leverage, more correlated credit losses and stronger negative feedback loops during downturns. In view of the greater synchrony of real estate developments with economic and financial cycles, macroprudential authorities should play a more active role in building up resilience in the upward phases of those cycles.³⁵ In the well-known BIS report that anticipated the need for macroprudential policy in 2004 (Borio and White, 2004), credit risk accumulates in good times and becomes manifest in bad times. A rising concentration of credit in correlated assets subject to cyclical price fluctuations may thus be a cause of concern.

Importantly, credit has also shifted within the financial sector, with the expansion of non-bank financial intermediaries. As shown in Beck et al. (2022), the growth of the non-bank financial sector in recent years, assets under management of EU investment funds and other financial institutions surpassed the total size of the EU banking sector in 2015, with the gap increasing over time. The increasing role of non-banks in financing the real economy is taking place through direct lending transactions, but also through holdings of debt and equity securities issued by larger NFCs. Overall, the linkages between the non-bank financial sector and the corporate sector are growing stronger.

³⁴ In the EU, the recourse nature of most mortgages makes borrowers even more reluctant to default than in countries such as the United States where most mortgages are non-recourse.

³⁵ Lo Duca et al. (2023) provide an extensive discussion on different combinations of macroprudential instruments to address systemic risks.



From a macroprudential perspective, the development of the non-bank financial sector can be beneficial for the financial system, as it can increase risk sharing (Beck et al., 2022) and diversify funding for NFCs. Pagano et al. (2014) identified a certain level of overbanking in the EU, which was leading to suboptimal outcomes in terms of credit, output growth and systemic risk emanating from the banking system. This also relates to the “spare tyre” hypothesis, where NFCs would have two sources of funding (banks and financial markets) at their disposal, increasing their resilience to adverse shocks that could impair access to one of these sources. In this context, in 2014 the EU launched the capital markets union (CMU), with the ultimate objective of establishing a genuine single capital market in the EU where investors can invest their funds across borders without hindrance and businesses can raise the required funds from a diverse range of sources, irrespective of their location.

Against the risk of an excessively optimistic reading of these developments, attention must be paid to the nature of non-bank financing and the extent to which it may involve financial stability challenges similar to those posed by bank financing. Many forms of non-bank intermediation involve maturity and liquidity transformation and hence vulnerabilities to liquidity risk and the potential to generate fire sale dynamics similar to some of those that are typically attributed to banking activities. Connections between bank and non-bank intermediation or with the broader financial system are a further potential source of concern. Incentive problems, especially under implicit safety net guarantees potentially extended to non-bank forms of funding, also need to be addressed.

The growing role of non-banks in the provision of funding to NFCs should increase the attention they receive from the macroprudential authorities. A key step in supporting this task is the substantial enhancement of available data, which are currently fairly scarce and dispersed across databases and institutions (European Court of Auditors, 2022). Over a medium-term horizon, there should be a regulatory effort to ensure that the regulation of non-banks is commensurate to their role in lending to the real economy (European Systemic Risk Board, 2016; European Systemic Risk Board, 2022b). In this regard, the regulatory effort should be ambitious, as simply expanding the requirements for disclosures of non-banks may not be enough. Ensuring a consistent treatment of certain risks across the financial system by complementing entity-based regulation with activity-based regulation can contribute to the avoidance of regulatory arbitrage and the transfer of risks to less regulated parts of the system (Gai et al., 2019). For example, as noted by the European Banking Authority (2022), there may be a risk of regulatory arbitrage if borrower-based measures for real estate exposures are only targeting banks, as non-banks would have a more favourable position.

The implementation of the CMU is expected to reduce the importance of banks in the provision of funding to the real economy but may require additional policy actions. In this context and in relation to the content of this report, it would be important to ensure fast insolvency procedures for NFCs and to reflect on the best way to reflect intangible assets in accounting standards (including ways to improve existing disclosures). Going beyond macroprudential policy issues, it would be necessary to increase the financial literacy of households, and enhance the



information on NFCs disclosed to market participants, in terms of quality and access by different authorities.³⁶

Last but not least, micro- and macroprudential authorities should continue to focus on the allocation of credit, specifically bank credit, across sectors in a context of declining bank intermediation. Confronted with a reduced role in the funding of NFCs, banks may choose to (i) reduce the size of their balance sheet, (ii) shift to other activities to maintain the size of their balance sheet (for instance, mortgage lending or lending to non-banks), or (iii) aim to maintain or regain their role in NFC funding by increasing risk taking. The choice between these alternatives will interact with parallel challenges to banks' business models and profitability stemming from, among other factors, digitalisation and the increasing competition from fintech and big tech (Beck et al., 2022). Macroprudential authorities will have to pay attention to the systemic vulnerabilities implied by banks' own structural transformation needs in light of these developments.

³⁶ The **European Single Electronic Format** is a welcome initiative in this area.



5 Concluding remarks

This report offers new perspectives on leverage and the evolution of credit allocation in Europe and discusses several relevant implications from a macroprudential perspective.

Since the GFC, there has been a decrease in corporate leverage in the EU and non-bank financial intermediaries have played an increasing role in the provision of financing to NFCs, especially large corporations. The heterogeneous paths of corporate leverage at country level suggest that there is more than one reason behind these developments, which also reflects the interaction of multiple forces. There are both supply and demand factors that explain the decrease in corporate leverage. On the supply side, an impaired credit supply could have played an important role in 2009-2014, while on the demand side, declining prospects and the move towards a digital economy, with intensive investment in intangible assets, may have reduced credit demand structurally in recent years.³⁷ Furthermore, the declining reliance of NFCs on debt financing and, specifically on bank lending might affect the transmission of both monetary and macroprudential policies that have traditionally focused on bank-based transmission channels and bank-based policy tools.

In terms of macroprudential issues, the decrease in corporate leverage is initially beneficial as it reduces credit risk for banks, but caution should be exercised with this assessment.

First, there may be a shift in the allocation of credit towards activities with macroprudential implications such as real estate, highly leveraged NFCs or other financial activities, which could be subject to correlated losses. For instance, excess credit supply to real estate activities (including mortgages) can lead to credit-induced house price bubbles, and ultimately, to lower equilibrium interest rates as a result of the lower productivity of these activities. Second, the development of market-based finance and the growing role of non-bank financial intermediaries is welcome from a macroprudential point of view as it provides an alternative to bank funding in the financing of NFCs, thereby reducing the dependence of European economies on bank funding. However, an effort should be made to ensure that the growth in non-bank financial intermediation is not the result of regulatory arbitrage and does not pose newer or more challenging sources of systemic risk. In this sense, it is important to have strong micro and macroprudential frameworks to avoid leakages of regulation and policy measures across sectors and allow similar risks across the whole financial system to be uniformly or similarly addressed (see European Systemic Risk Board, 2022b).

Further work is necessary to assess the evolution of the corporate sector and any potential macroprudential policy response, including access to granular datasets. In line with recent research (Jordà et al., 2016; Müller and Verner, 2021), there is a need to enhance the expertise of macroprudential authorities on the corporate sector, and how corporate leverage evolves at a granular level.³⁸ Working at the aggregate level is not sufficient to assess the evolution of credit risk emanating from the corporate sector, as the aggregate could hide dangerous concentrations of

³⁷ The observed reduction in corporate leverage as a result of a shift in investment towards intangible assets can be expected to continue in the future, with important policy consequences. A reduction in corporate financing needs driven by a shift to intangible capital may also reduce the effectiveness of monetary policy (Doettling and Ratnovski, 2020), and the increase in investment in intangible assets may call for policy actions on debt bias in taxation and the pledgeability of intangible assets.

³⁸ Several EU central banks have already developed studies combining financial stability risks with NFCs/households micro-level information, also for the most recent periods.



leverage. Therefore, there should be an expansion in the access of macroprudential authorities, and the research community, to granular data on bank lending activities (i.e. credit registers) and on the balance sheets of European corporates. Moving forward, understanding and removing potential financial obstacles to corporate investment is also crucial for the transition towards a green economy, which will require a mobilisation of private and public funds on a very large scale (European Court of Auditors, 2021).

The analysis has several macroprudential policy implications. First, granular data should be used to assess variations in corporate leverage across countries, industries and size groups and their correlation with debt capacity to detect early warning signs of distress. Second, the growing role of non-bank financial intermediaries in financing the real economy calls for the development of a macroprudential framework in similar terms to the existing framework for banks, so that leakages of policy measures are avoided and risks are addressed similarly across the financial system. Third, the ongoing process of credit reallocation away from corporate to household credit requires macroprudential authorities to focus more on the latter lending segment.



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Annex 1. Methodological notes on the main data sources

System of National Accounts

The System of National Accounts (SNA) is an internationally agreed standard set of recommendations on how to compile measures of economic activity. It is developed under the aegis of the United Nations and provides a coherent, consistent and integrated set of macroeconomic accounts for an economy, using internationally agreed concepts, definitions, classifications and accounting rules. The first SNA was published in 1953 and the most recent one dates from 2008. In the EU, Eurostat has developed the European System of Accounts (ESA), based on the SNA, which must be applied by EU Member States. National accounts are usually compiled by national statistical offices and by central banks.

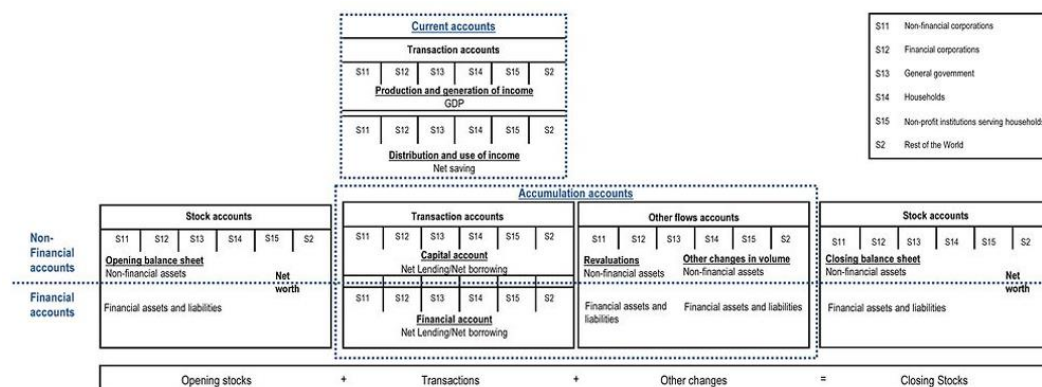
The SNA comprises current accounts, accumulation accounts and the balance sheets of the main economic sectors (Figure A1). Six economic sectors are defined in an economy: NFCs, financial corporations, general government, households, non-profit institutions serving households, and the rest of the world. The current account starts with the value of production and describes how the value of production is redistributed to other sectors or used for consumption or saving purposes. It also determines key variables such as the GDP. Accumulation accounts disclose transactions, revaluations and other changes of financial and non-financial assets and liabilities, while the balance sheet provides the opening and closing value for sectors. On the asset side, the balance sheet is further broken down into financial and non-financial assets. On the liabilities side, financial liabilities include mainly loans, debt securities issued and own equity instruments, together with other liabilities such as provisions, amounts due to suppliers or pension liabilities. Based on the basic accounting identity, total assets should equal total liabilities plus (accumulated) net worth.³⁹

National accounts can be presented consolidated or non-consolidated, the former excluding transactions within a sector. When non-consolidated, national accounts show the changes in financial assets and liabilities of a sector due to all financial transactions in which institutional units classified in that sector are involved, including intra-sectoral transactions and debt flows between the same NFC. As argued by the European Central Bank (2014), corporate balance sheets typically show significant amounts of loans extended between resident corporations belonging to the same group. There is little evidence about loans between corporations belonging to different groups.

³⁹ Importantly, for NFCs and financial corporations the economically relevant net worth (including the result of earnings retention) is not to be found in the residual “net worth” item reported in their balance sheets as presented by the SNA but in the liability item denoted “Equity and investment fund shares”.



Figure A1
Sequence of accounts in the 2008 SNA



Source: Figure 1.1 of Organisation for Economic Co-operation and Development (2014).

Assets and liabilities under national accounts are valued at market prices at the date to which the balance sheet relates (Eurostat, 2013).

This marks an important difference with accounting standards such as IFRS or US-GAAP, which usually only require financial assets to be valued at market prices. For financial instruments, paragraph 7.38 of Eurostat (2013) establishes that “the market value is that at which financial assets are acquired or disposed of, between willing parties, on the basis of commercial considerations only, excluding commissions, fees and taxes. In determining market values, trading parties also take account of accrued interest”. For financial assets and liabilities, as well as for other non-financial assets, market values can be easily available to compilers of national accounts. If market values are not available for an asset or a liability, paragraph 7.34 of Eurostat (2013) establishes that “[...] estimates should be made of what the price would be if the assets were acquired on the market on the date to which the balance sheet relates”. Turning to the main categories of financial assets and liabilities, the computation of the market value for listed shares, debt securities and cash is straightforward. For loans, “the values to be recorded in the balance sheets of both creditors and debtors are the nominal values irrespective of whether the loans are performing or non-performing” (paragraph 7.70 of Eurostat, 2013). In the case of unlisted shares, market values do not exist and, as such, need to be estimated with “a reference to the values of quoted shares where appropriate; the value of own funds; or discounting forecast profits by applying an appropriate market price to earnings ratio to the smoothed recent earnings of the institutional unit” (paragraph 7.73 of Eurostat, 2013).

Flow of funds data or who-to-whom data are based on financial accounts and enable users to track the net inflows and outflows to and from various sectors of a national economy.

Financial accounts focus on the financial assets and liabilities in the balance sheet of the sectors of an economy, and how they change over a period. They exclude non-financial assets and flows not related to financial assets and liabilities. In the United States, the Board of Governors of the Federal Reserve System compile the flow of funds data, while the ECB compiles who-to-whom data for the euro area.



When referring to national accounts, this report shows data as compiled by the OECD and Eurostat. The SNA provides a strong methodological framework for the assessment of the NFC sector, with relatively long time series. The main drawback of this data source relates to the level of aggregation, as no further breakdown of the NFC sector is available. To the extent possible, this report relies on data compiled by supranational organisations such as the OECD or Eurostat. Data compiled by the OECD have the advantage of allowing for direct comparisons with non-EU countries, but may not always cover the 27 Member States. On the other hand, data compiled by Eurostat ensure a broad coverage of the EU and allow for more detailed disclosures that may not be available elsewhere (for example, on the composition of fixed assets).

Bank for the Accounts of Companies Harmonized (BACH)

BACH is a database containing harmonised accounting data of European NFCs. It is owned by the European Committee of Central Balance Sheet Data Offices, which created the database as a tool both for country comparisons and to analyse the structure and performance of the non-financial companies in Europe. It contains data based on national accounting standards, which, in some cases, are simply the International Financial Reporting Standards or adaptations of these. Data start in 2000 and cover 12 EU countries: Austria, Belgium, Croatia, Czech Republic, France, Germany, Italy, Luxembourg, Poland, Portugal, Slovakia and Spain.

BACH includes a broad number of financial ratios referring to the NFCs' balance sheets and profit and loss accounts, with further breakdowns by activity and size. The information included in the BACH database is often expressed as a ratio of total assets, even if other financial ratios are also available. For each ratio, the weighted average, the median and the first and third quartiles are available. NFCs are broken down by size (small, medium, small and medium-sized, and large) and by activity, with 17 one-digit NACE codes and further two-digit NACE codes. The European Committee of Central Balance Sheet Data Offices also publishes a methodological note with an exact definition of each ratio (European Committee of Central Balance Sheet Data Offices, 2022).

The charts in this report using BACH data are based on information from a varying sample of NFCs from nine EU countries (Austria, Belgium, France, Germany, Italy, Poland, Portugal, Slovakia and Spain) between 2000 and 2019. Data for Czech Republic and Poland show many gaps and have not been used in this report. Information from these nine countries is aggregated as the average (where the weighted average of individual countries is used) or as the median (where the first or third quartiles of individual countries are used) across the nine EU countries in the dataset. The number of NFCs included in the sample varies across years and ratios. Table A1 shows the aggregated number of NFCs reporting equity each year (numbers for other items do not vary significantly) for the nine EU countries. At the time of writing, not all countries had uploaded data for 2020 and 2021, so the time series ends in 2019.



Table A1
Number of NFCs in the BACH database

Year	Number of NFCs	Year	Number of NFCs
2000	930,397	2010	2,107,067
2001	966,455	2011	2,166,154
2002	1,045,714	2012	2,196,459
2003	1,145,099	2013	2,201,331
2004	1,233,183	2014	2,063,731
2005	1,424,118	2015	2,018,361
2006	1,800,807	2016	2,106,297
2007	1,876,202	2017	2,175,779
2008	1,910,368	2018	2,206,343
2009	2,021,469	2019	2,040,516

Sources: BACH and own calculations.



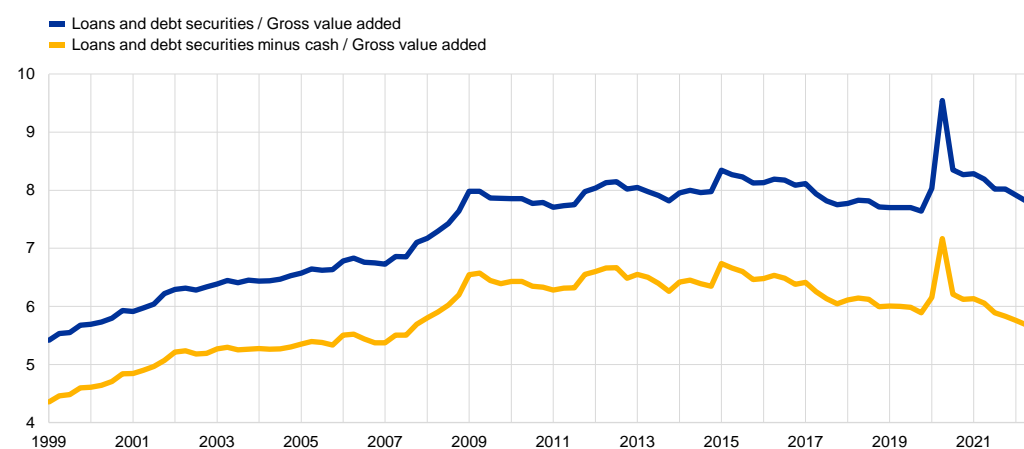
Annex 2. Corporate indebtedness under other metrics

The analysis presented in Section 2 focuses on corporate leverage, but other metrics are used to assess vulnerabilities related to corporate debt. While leverage is an important metric for assessing vulnerabilities in the corporate sector, it can be complemented by other measures of indebtedness that rely on the output generated by corporates, such as gross value added.

Gross corporate debt as a share of gross value added has remained stable since the GFC, increasing subsequently as a result of the COVID-19 pandemic (Chart A1). Debt to gross value provides a measurement of indebtedness based on the margin of the main activity of the NFC. According to this metric, euro area NFCs significantly increased their indebtedness between 1999 and 2008. Since then, corporate indebtedness in gross terms has remained broadly stable while, in net terms it has slightly declined. The shock to gross value added caused by the COVID-19 pandemic is the main reason for the sharp increase observed in 2020.

Chart A1
Corporate debt as a share of gross value added

(ratio)



Sources: ECB, Haver Analytics and ESRB Secretariat calculations.

Notes: Data are taken from the sectoral accounts of NFCs, as reported by the ECB Bank. Corporate debt includes debt securities and loans. Gross value added is refers to that generated over a quarter, and is seasonally and working-day adjusted. The last observation is the third quarter of 2022.

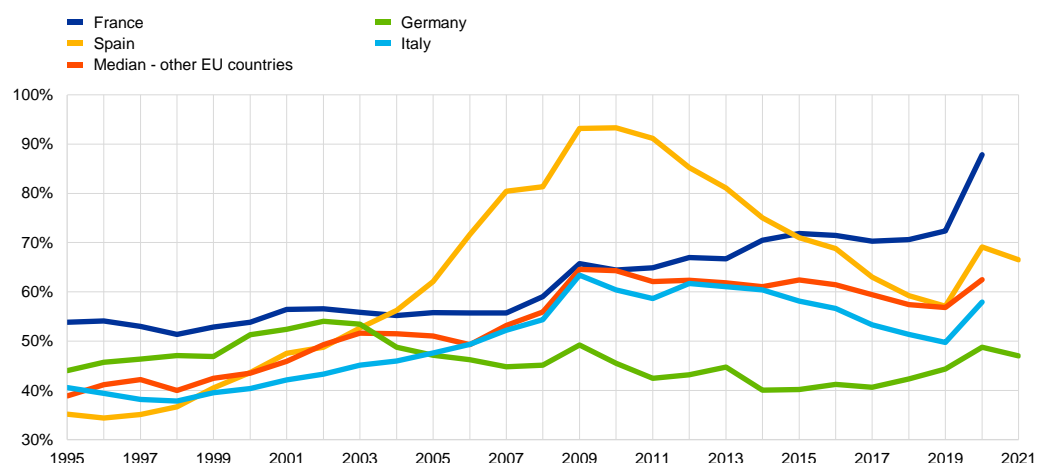
Similarly, the value of corporate debt as a share of the value of production has remained stable or declined in most EU countries. Another alternative to capture the level of indebtedness of an NFC is to use the value of its production in the denominator of the ratio. Chart A2 shows overall increases in the years before the GFC (particularly in Spain) and then a gradual decline or stabilisation (a marked decline in the case of Spanish NFCs), which was interrupted in 2020 by the



extraordinary measures taken to address the COVID-19 pandemic. French NFCs are an exception to the observed trend for the EU.

Chart A2
Corporate debt as a share of production

(%)



Sources: OECD and ESRB Secretariat calculations.

Notes: Corporate debt includes loans and debt securities. Other EU countries include Austria, Belgium, Czechia, Denmark, Estonia, Finland, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Slovenia and Sweden.

Measuring corporate indebtedness as a share of other balancing items in national accounts may pose questions of a methodological nature.

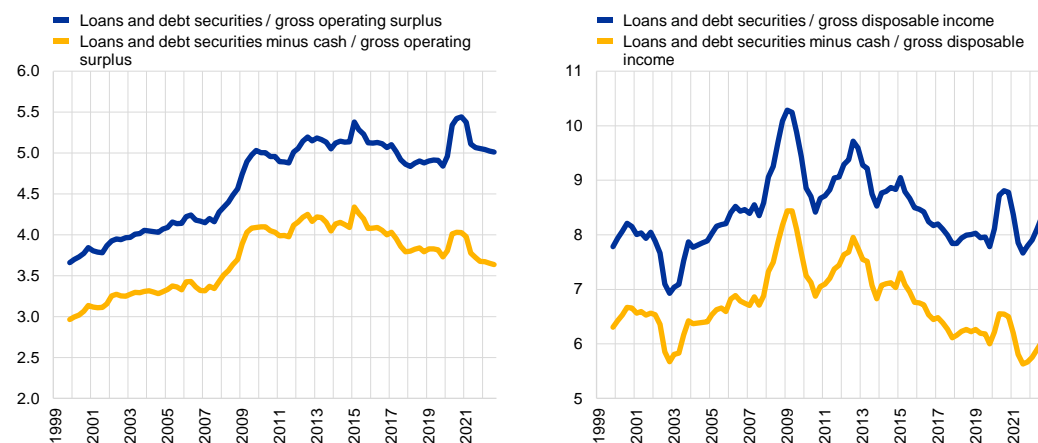
It is also possible to consider other flow variables in the denominator of the ratio to measure corporate indebtedness. However, before drawing conclusions about levels of corporate indebtedness based on these, it is important to consider some methodological issues. For example, Chart A3 shows two ratios of corporate debt: as a share of gross operating surplus (which in the national accounts framework could be taken as an approximation to EBITDA) and as a share of gross disposable income (which could be taken as an approximation to corporate profits). While benchmarking corporate debt to gross operating surplus would show a stable trend since the GFC, the trend would decline when gross disposable income is used. The consideration of taxes and interest expenses in gross disposable income could explain this difference. The two different trends observed in Chart A3 can be interpreted as showing a certain degree of stabilisation of corporate debt per unit of operating profit after the GFC, and a decrease when the lower debt service burden resulting from the low interest rate environment is taken into account.



Chart A3

Corporate debt as a share of gross operating surplus (left-hand panel) and of gross disposable income (right-hand panel)

(ratio)



Sources: Eurostat, ECB, Haver Analytics and ESRB Secretariat calculations.

Note: Data for the sectoral accounts are for the euro area NFCs. The last observation is the third quarter of 2022.

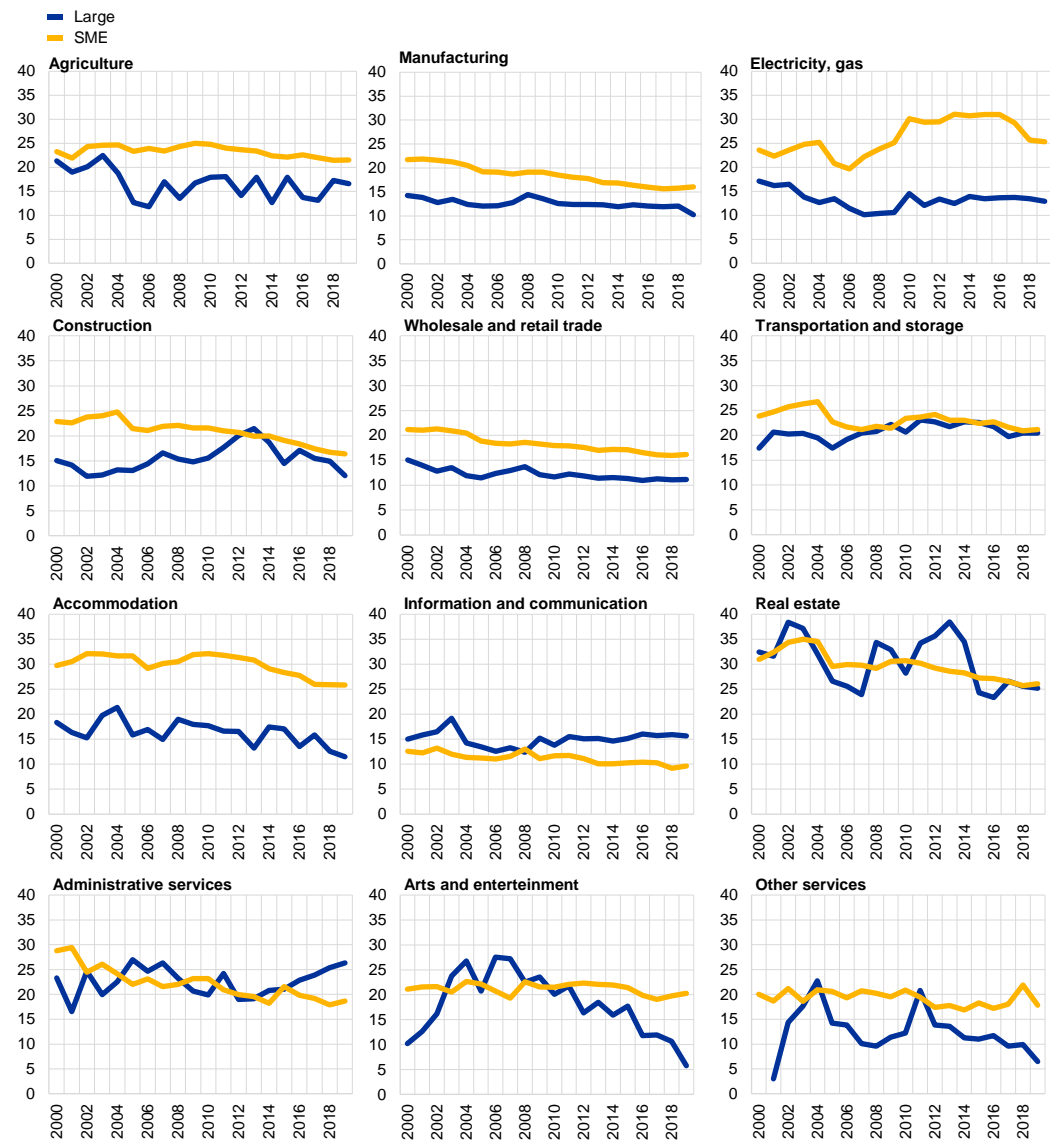


Annex 3. Additional charts and figures

Chart A4

Gross leverage (loans and bonds over total assets) of European corporates, by size and sector

(%)



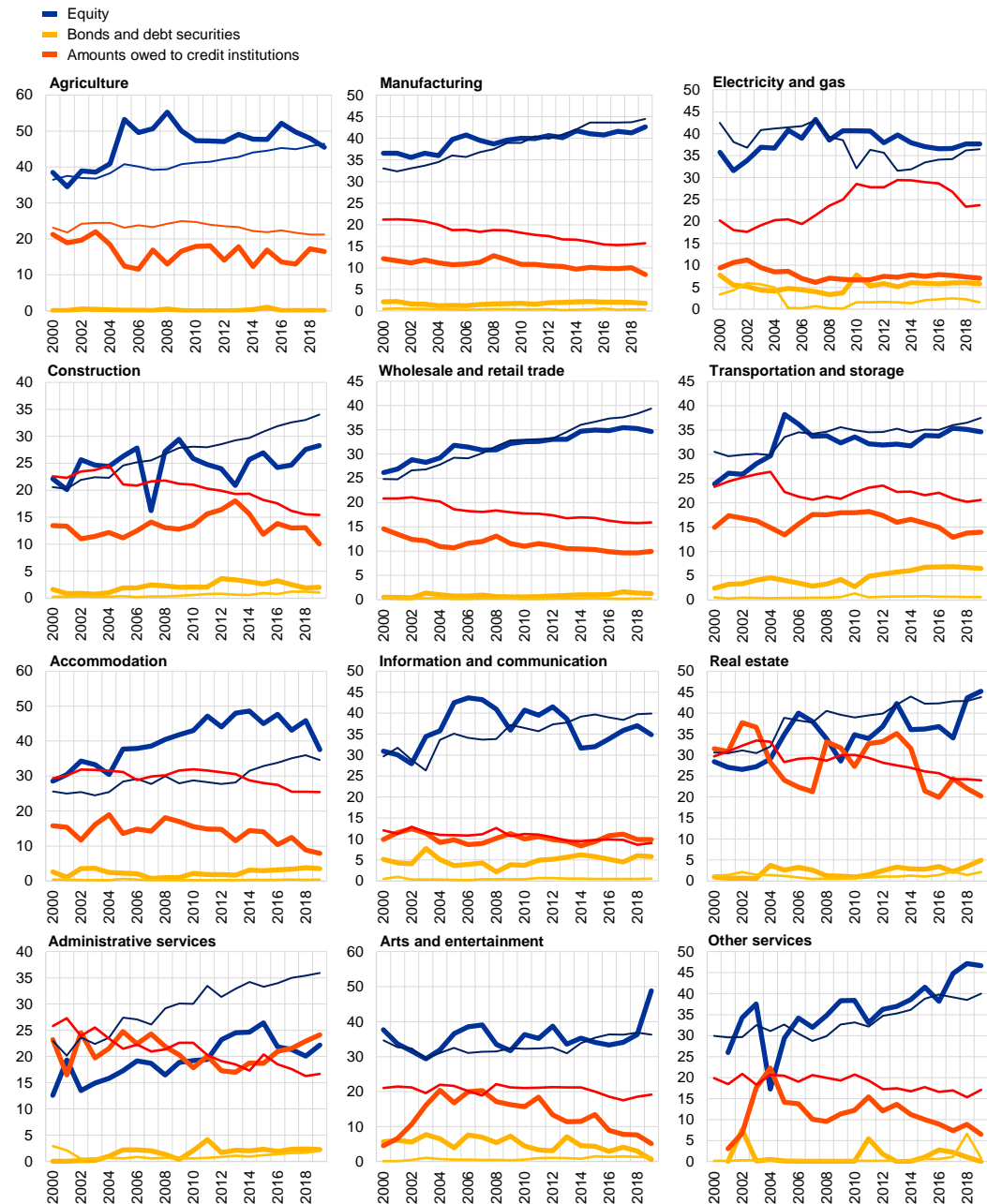
Sources: BACH database of the European Committee of Central Balance Sheet Data Offices and ESRB Secretariat calculations.

Notes: Each line represents a year between 2000 and 2019. SMEs are defined as having annual turnover less than €50 million while large corporations have an annual turnover of over €50 million. Data are from the accounting financial statements of over 2,000,000 NFCs domiciled in Austria, Belgium, France, Germany, Italy, Poland, Portugal, Slovakia and Spain. The Mining and quarrying, and Professional activities sectors are excluded.



Chart A5
Structure of the liabilities side of NFCs

(%)



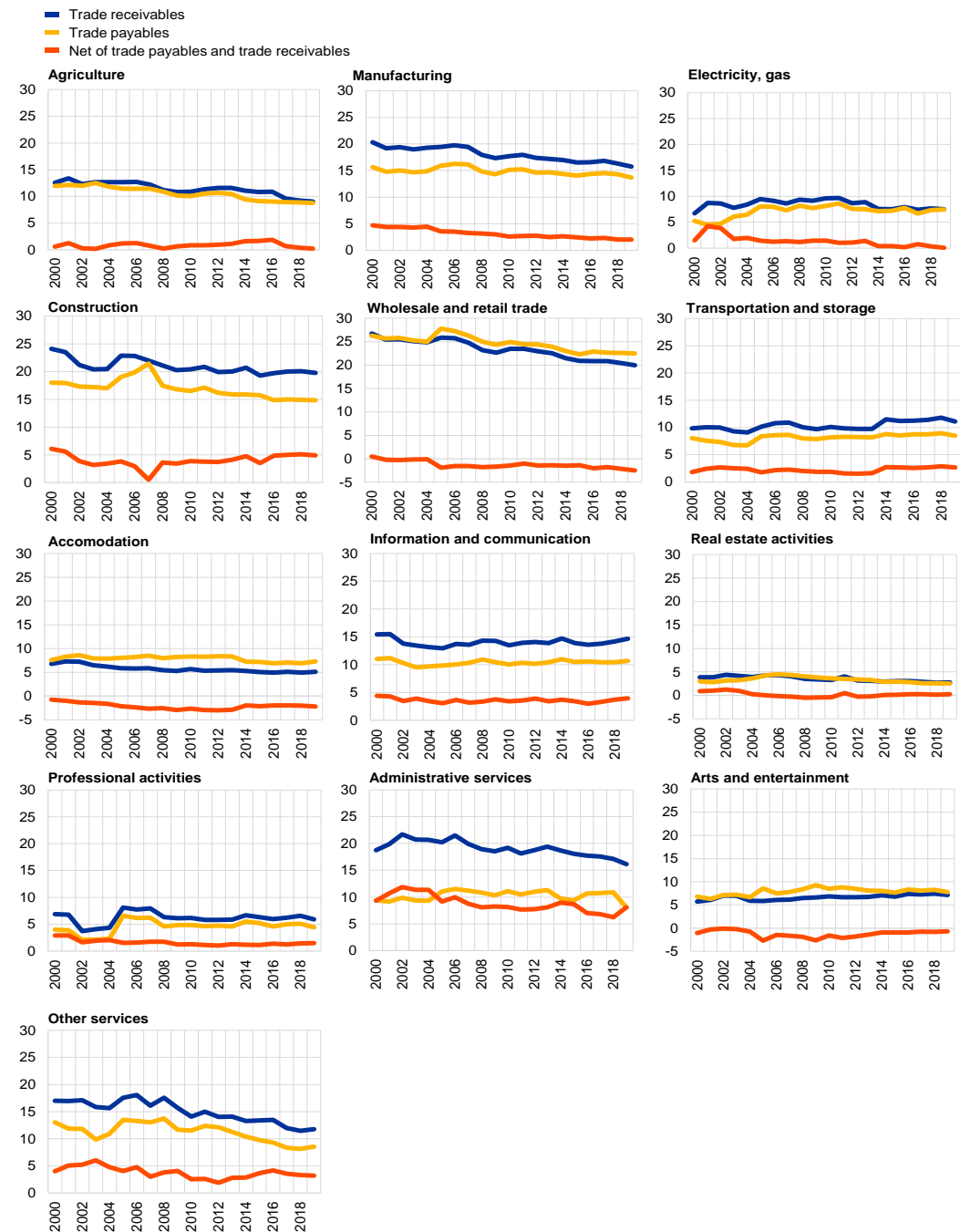
Sources: BACH database of the European Committee of Central Balance Sheet Data Offices and ESRB Secretariat calculations.

Notes: The thin lines represent the data for SMEs (annual turnover of less than €50 million) while the thick lines represent data for large corporations (annual turnover of over €50 million). Data are from the accounting financial statements of over 2,000,000 NFCs domiciled in Austria, Belgium, France, Germany, Italy, Poland, Portugal, Slovakia and Spain. Each line represents the mean of the weighted mean of each country. Sectors B (Mining and quarrying) and M (Professional activities) are excluded.



Chart A6
Evolution of NFC trade credit as a fraction of total assets across sectors

(%)



Sources: BACH database of the European Committee of Central Balance Sheet Data Offices, Eurostat and ESRB Secretariat calculations.

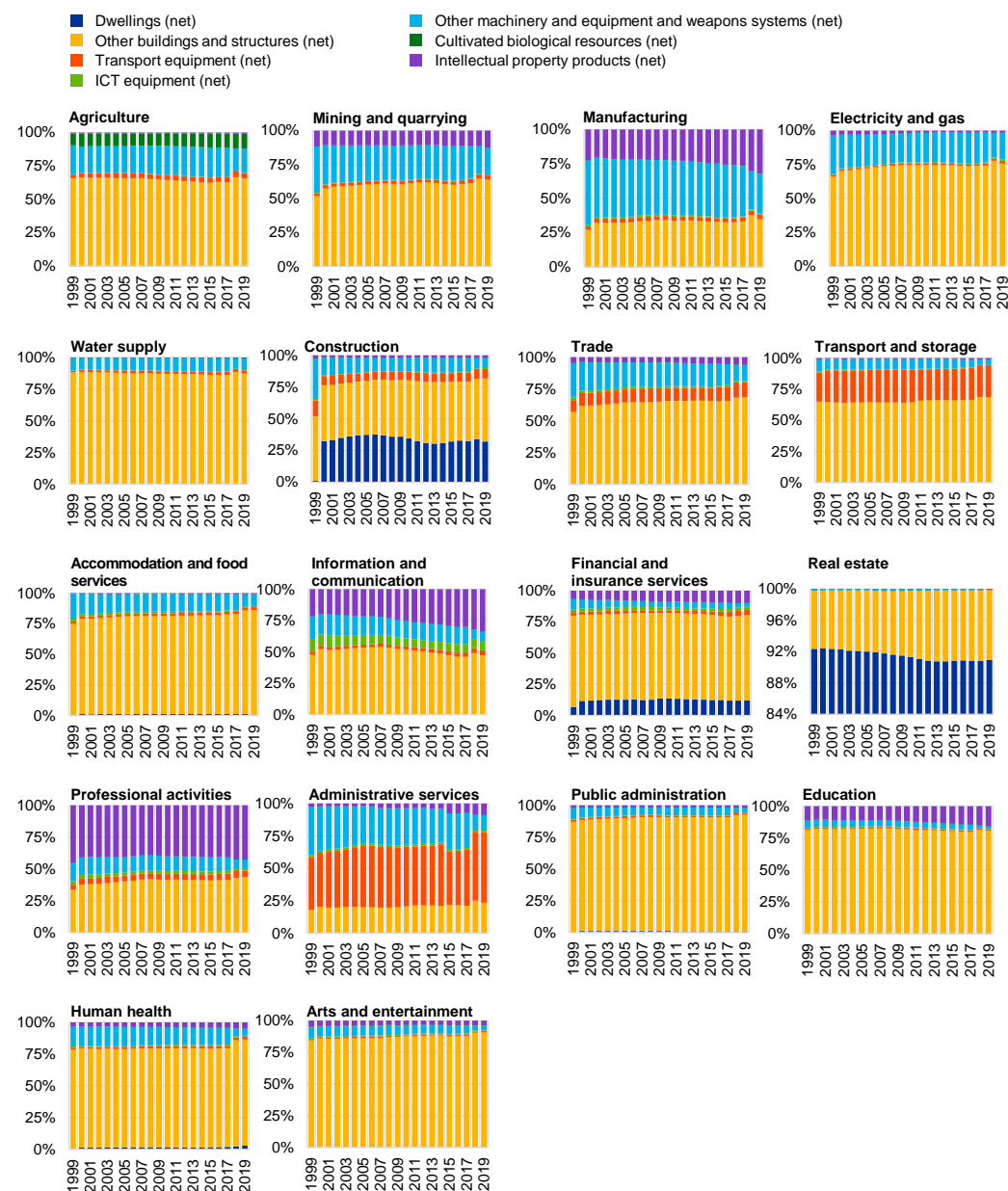
Notes: Data are from the accounting financial statements of over 2,000,000 NFCs domiciled in Austria, Belgium, France, Germany, Italy, Poland, Portugal, Slovakia and Spain. Sectors B (Mining and quarrying), E (Water supply), K (Financial and insurance activities), M (Professional, scientific and technical activities), O (Public administration), P (Education), Q (Human health), T (activities of households as employers) and U (Activities of extraterritorial organisations) are excluded.



Chart A7

Distribution of net fixed assets by sector of activity, EU

(% of total fixed assets)



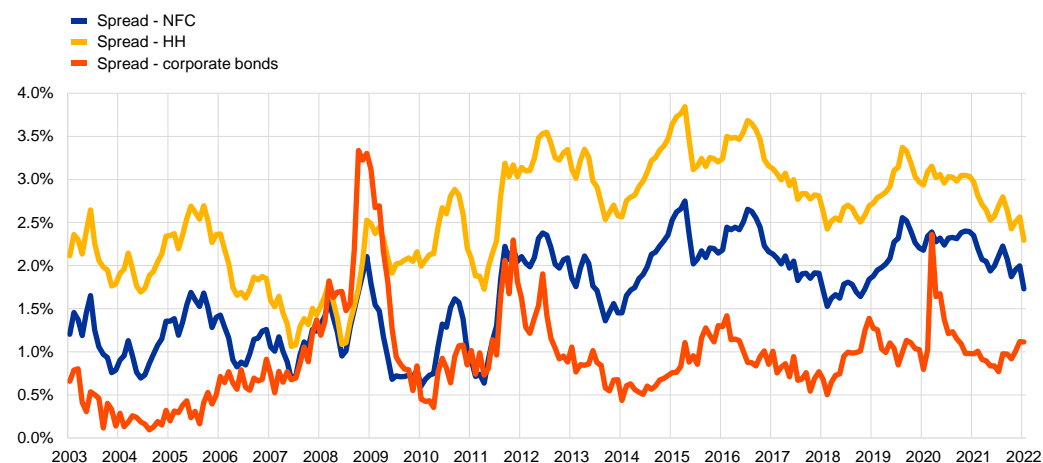
Sources: Eurostat and ESRB calculations.

Notes: Data are from the annual sectoral accounts, in accordance with ESA 2010, covering EU 27 countries (with the exception of Croatia). Yearly observations between 1999 and 2019.



Chart A8
Credit spreads of loans and corporate bonds, Germany

(%)



Sources: ECB, Deutsche Bundesbank, IHS Markit (S&P Global), Haver Analytics and ESRB Secretariat calculations.

Notes: Spreads are calculated as the difference between the nominal interest rates of loans and the yield of corporate bonds, and the yield of the German ten-year government bond.



Annex 4. The impact of valuation at market prices on the measurement of corporate leverage⁴⁰

When measuring corporate leverage with data from national accounts, market valuations can influence the observed trends. The observed trend in (net) corporate leverage may be the result of (i) a real decrease in the use of loans and debt instruments by euro area NFCs (changes in volume), (ii) changes in the market values of the balance sheet items used in the calculations (changes in prices), or (iii) a combination of both.

It is possible to create time series of the relevant balance sheet items where only transactions are taken into account. For that purpose and following Caprara et al. (2019), the starting point establishes that the amount of a balance sheet item in a period is equal to the amount shown in the previous period plus changes in prices and changes in volume:

$$BS_t = BS_{t-1} + P_t + V_t \quad (1)$$

where BS refers to any balance sheet item, P refers to changes in prices and V to changes in volume (i.e. transactions), assuming that changes in prices also include other changes. On that basis, the change in a balance sheet item can be decomposed as follows:

$$\frac{BS_t - BS_{t-1}}{BS_{t-1}} = \frac{P_t}{BS_{t-1}} + \frac{V_t}{BS_{t-1}} \quad (2)$$

And a new time series for the balance sheet item that only takes into account changes in volumes (i.e. transactions) can be created:

$$\overline{BS}_{t=2} = BS_{t=1} \left(1 + \frac{V_{t=2}}{BS_{t=1}} \right) \quad (3)$$

$$\overline{BS}_t = \overline{BS}_{t-1} \left(1 + \frac{V_t}{\overline{BS}_{t-1}} \right) \quad (4)$$

The first equation above refers to the first observation, while the second covers all subsequent observations.

Chart A9 shows three different measures of (net) corporate leverage: including revaluations, excluding revaluations of financial assets and financial liabilities, and excluding revaluations of financial liabilities. In the latter case, total liabilities are used as the denominator of the leverage ratio, comprising debt securities, loans, shares and other equity instruments, other liabilities and net worth. As per the basic accounting rule, total assets must be equal to total liabilities, although minor discrepancies remain in national accounts.

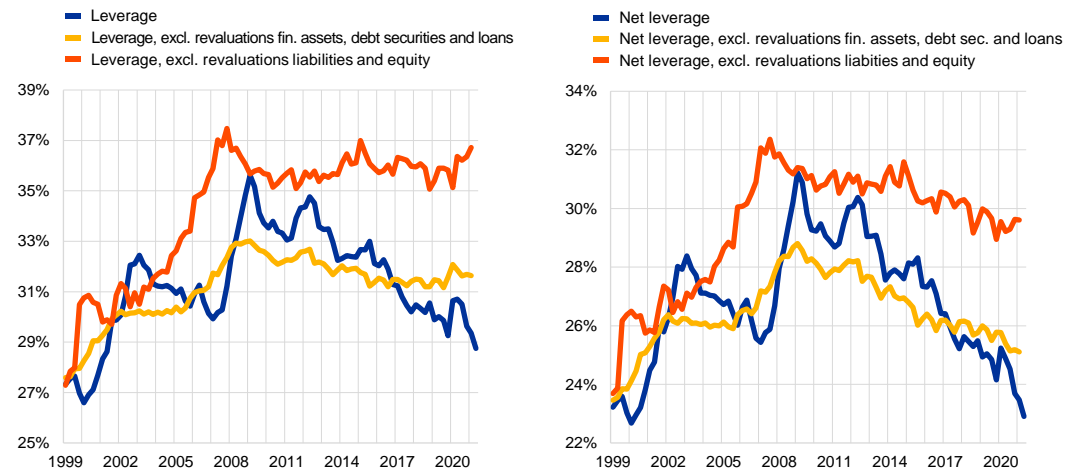
⁴⁰ This annex is based on Sánchez Serrano (2022).



Chart A9

Gross and net leverage including and excluding revaluations in financial assets and liabilities, euro area NFCs

(%)



Sources: ECB, Federal Reserve Board, Haver Analytics and ESRB Secretariat calculations.

Notes: Total assets are approximated as the sum of net fixed assets and financial assets. The yellow line represents the evolution of leverage and net leverage once revaluations of debt securities and loans (numerator of the ratio) and of financial assets (denominator of the ratio) are excluded, according to Equations (3) and (4) above. The red line represents the evolution of leverage and net leverage once revaluations of debt securities and loans (numerator of the ratio) and of financial liabilities and equity (denominator of the ratio) are excluded, according to Equations (3) and (4) above. The last observation is the second quarter of 2021.

After the peak in leverage in the GFC, both time series without revaluations show a more attenuated decrease than the original ones. In terms of trends up to the GFC, there is a continuous increase in our six time series (three for leverage and three for net leverage), with larger revaluations for time series where equity revaluations are excluded. Interestingly, the time series without revaluations peak earlier (around 2007 when revaluations of financial liabilities are excluded and around 2008 when revaluations of financial assets are excluded) than the others. That would also indicate a softening effect of market prices on the evolution of leverage, particularly at times where financial markets exhibit exuberant dynamics.

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

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