# Development of the debt situation in the euro area private non-financial sector since the outbreak of the COVID-19 pandemic

*Despite the impact of the coronavirus pandemic, households and non-financial corporations in the euro area have not seen their debt situation deteriorate significantly overall. Patterns observed in the euro area as a whole have largely been matched by developments in the bloc's four largest Member States, though heterogeneity is evident. Across all the countries under review, debt levels in the household and non-financial corporations sectors rose substantially. At the same time, however, both sectors significantly expanded their stocks of liquid assets, and their assets grew to a noticeable degree. This mostly led to improvements in asset-based debt indicators such as leverage and the debt coverage ratio. Income levels, by contrast, declined considerably in some cases, worsening most of the income-based metrics such as the debt ratio and debt service ratio. Government assistance payments buoyed the income of households and non-financial corporations distinctly. The Eurosystem's non-standard monetary policy measures, too, stabilised sectoral income and the interest rate level, thus preventing the debt ratio and debt service ratio from climbing more significantly still.*

*The expected normalisation of monetary policy will probably not unduly exacerbate the debt situation of households and non-financial corporations. This conclusion is supported by simulations of the debt service ratio, which is particularly sensitive to interest rates. A simulation at the euro area level up to the end of 2024 indicates that the debt service ratio will increase only for households and noticeably so only under adverse conditions. The adverse scenario assumes that interest rates at the short and long ends of the yield curve increase by 100 basis points more than expected in the staff macroeconomic projections of the European Central Bank (ECB) from March 2022. The repercussions of the war in Ukraine are only incorporated into the projections to a certain degree. Scenario calculations indicate, however, that the additional price pressures might be greater than the losses sustained by the real economy. This would generally push up nominal income flows somewhat and mitigate developments in the debt service ratio.*

## ■ Introduction

*Private non-financial sector debt increased rapidly in the euro area as the coronavirus pandemic unfolded*

In the euro area, private non-financial sector debt as a proportion of nominal gross domestic product (GDP) rose rapidly at the onset of the coronavirus pandemic (see the chart below).[1] Non-financial corporations in particular increased their borrowing significantly in an effort to offset lost sales and build up liquidity buffers. At the same time, the pandemic-related restrictions and changes in behaviour sharply diminished national income. As the economy recovered in the second half of 2020, debt in the euro area and its four largest Member States – Germany, France, Italy and Spain – started to recede again relative to GDP, but was still above pre-pandemic levels as late as the autumn of 2021.

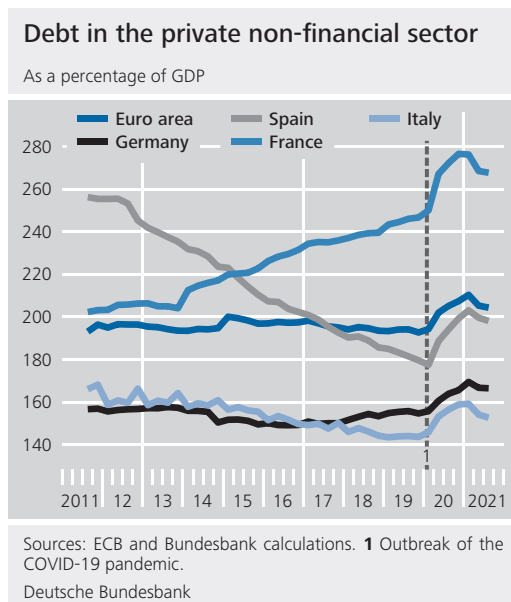*Strong increase in debt is of relevance for economic policy*

An increase in debt of this magnitude is of relevance for economic policy as it can have a variety of possible knock-on effects. For instance, in the past, multiple debt metrics proved to be effective early warning indicators of banking and financial crises.[2] In addition, periods of sharply rising debt are usually followed by phases of deleveraging, which are often associated with weak economic growth.[3] Furthermore, according to recent research findings, monetary policy might have a greater impact as a result of the financial restrictions imposed by high levels of debt.[4]

This article offers a detailed analysis of how the debt situation in the private non-financial sector in the euro area has evolved since the outbreak of the coronavirus pandemic. By drawing on a range of indicators, it is possible to perform a broad and nuanced assessment of the debt situation. The article furthermore examines how the debt service ratio – an indicator that is particularly sensitive to interest rates – might respond over the course of the expected normalisation of monetary policy. Finally, some conclusions for economic policy are drawn from these developments. There are three key findings:

*Analysis of how the debt situation in the euro area private non-financial sector has evolved since the outbreak of the COVID-19 pandemic …*

– despite the impact of the coronavirus pandemic, the debt situation of households and non-financial corporations in the euro area has not deteriorated significantly;

– the forthcoming normalisation of interest rates should not unduly increase the debt service ratios of households and non-financial corporations;

– it is unlikely that the private non-financial sector will significantly cut back its spending on account of the current debt situation in response to a normalisation of monetary policy.

### Debt in the private non-financial sector

As a percentage of GDP



Sources: ECB and Bundesbank calculations. **1** Outbreak of the COVID-19 pandemic.

Deutsche Bundesbank

**1** An international perspective is presented in Gaspar et al. (2021) and Kose et al. (2021). Debt developments in the United States are discussed in Faria e Castro (2021). Boone et al. (2022) put developments during the coronavirus pandemic into a long-term context.
**2** See Drehmann and Juselius (2014) and Aldasoro et al. (2018).
**3** See Eggertsson and Krugman (2012), Jordà et al. (2013), Mian et al. (2017) and Mian et al. (2021).
**4** See Cloyne et al. (2020), Deutsche Bundesbank (2021a) and Harding and Klein (2021).

## How the debt situation has evolved since the outbreak of the COVID-19 pandemic

*… using a range of debt indicators …*

A range of variables can be used to assess the debt situation of the private non-financial sector. These include income-based measures, such as the ratio of debt to GDP, on the one hand, and indicators based on balance sheet metrics, on the other. To obtain as robust an assessment of the debt situation as possible, the present article analyses a range of indicators, examining households and non-financial corporations not just in the euro area as a whole, but also in its four largest Member States (Germany, France, Italy and Spain).

*… based on financial accounts and national accounts data*

Non-financial corporate debt is the sum of consolidated loans, debt securities, pension provisions and trade credit.[5] For households, debt is comprised only of loans. The following metrics are based on data from the financial accounts and the national accounts.[6] They thus represent macroeconomic aggregates for the two separately analysed sectors of households and non-financial corporations. Specifically, the following indicators are analysed:

– Debt ratio: The debt ratio expresses debt in relation to sectoral disposable income. Using disposable income rather than GDP provides a more precise estimate of the sectoral income flows available to service the debt. A higher debt ratio means that debt has increased relative to current income, reducing the sustainability of the debt over the medium term.

– Leverage: This measures debt capital as a proportion of total assets.[7] Higher leverage means that the debt is covered to a lesser extent by assets. This increases the risk that the proceeds raised by liquidating the assets might not suffice to amortise the debt, reducing the sustainability of the debt over the long term.

– Debt service ratio: The debt service ratio represents the share of disposable income used for interest payments and amortisations.[8] A higher debt service ratio indicates a lesser ability to settle due payment obligations out of current income. This increases the risk of short-term payment defaults.

– Debt coverage ratio: This measures debt in proportion to liquid assets in the form of currency and deposits. A higher debt coverage ratio indicates a lesser ability to settle due payment obligations by reducing liquidity reserves. Here too, there is a greater risk of short-term payment defaults.

*Change in the debt situation of non-financial corporations*

The chart on p. 34 shows the development of these indicators between end-2019 and the close of the third quarter of 2021 for non-financial corporations as well as the contributions made by each determinant. The period thus covers the last pre-pandemic data vintage all the way up to the current figures. The lower part of the chart plots the evolution of the debt indicators over time. For all the metrics, a higher level is indicative of a worse debt situation.
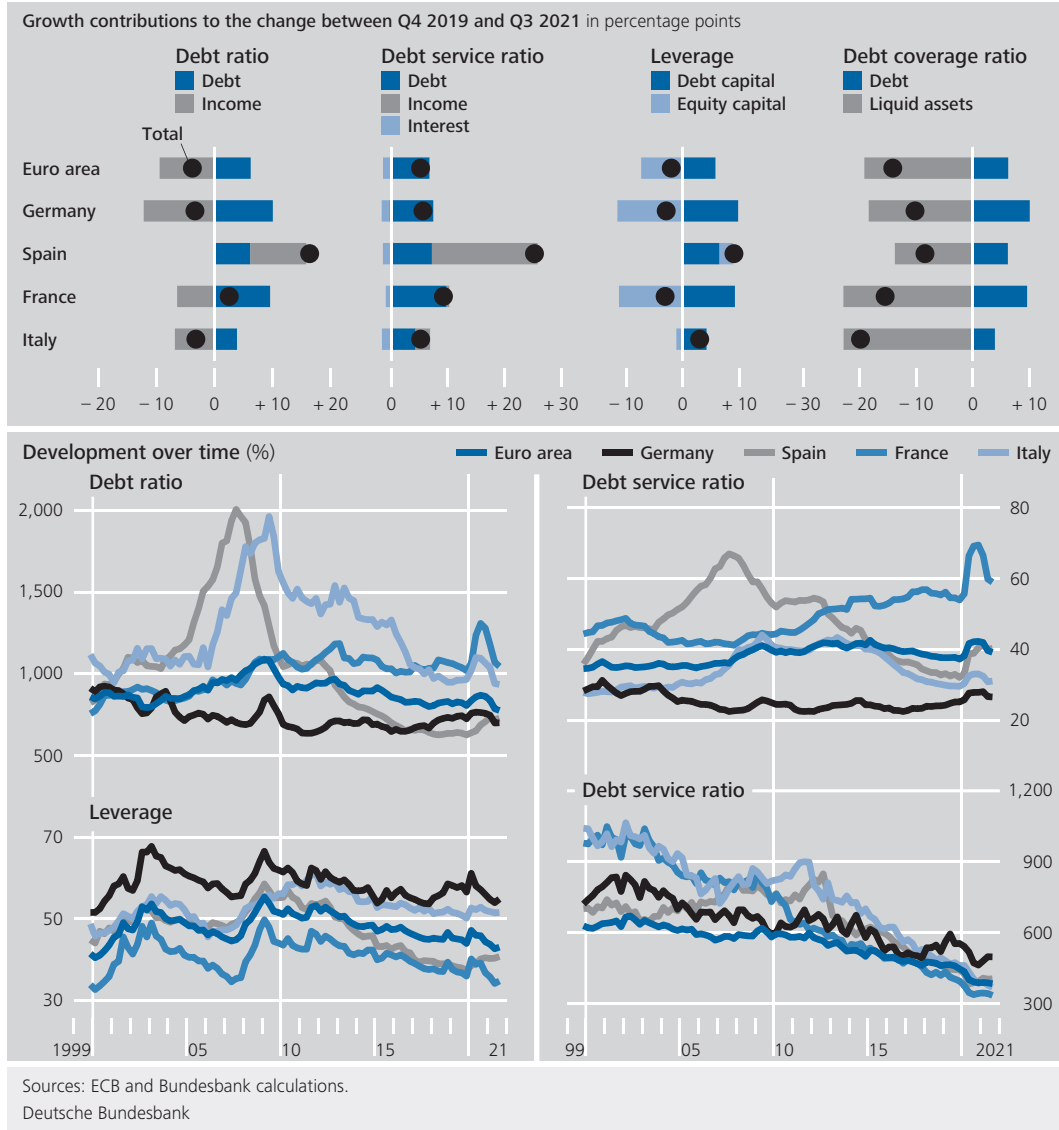
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**5** Consolidated loans are total loans adjusted for intra-sectoral lending. The bulk of the latter is probably attributable to intragroup transactions. As a result, using unconsolidated data would overstate the debt level.
**6** The statistical basis for these sets of accounts is the European System of Accounts (ESA) 2010.
**7** Debt capital corresponds to total non-equity liabilities for non-financial corporations and total liabilities for households, meaning that it is defined more broadly than debt. For non-financial corporations, total assets are approximated by total liabilities. For households, ECB estimations are used for total household assets. The ECB calculates quarterly data based on annual national data. Values for 2021 have been extrapolated. See European Central Bank (2022) for details on the interpolation and extrapolation of quarterly data.
**8** The debt service ratios presented in this article were calculated independently using the methodology of the Bank for International Settlements (BIS). According to this approach, debt consists solely of loans and debt securities. Furthermore, non-financial corporations' disposable income according to the national accounts is augmented by the dividends paid. The economic logic behind this is that shareholders have no firm entitlement to dividends, so enterprises are able to reduce dividend payments and use the funds thus released to service debt. See Bank for International Settlements (2017).

## Debt indicators for the non-financial corporations sector

Growth contributions to the change between Q4 2019 and Q3 2021 in percentage points



Development over time (%) — Euro area — Germany — Spain — France — Italy



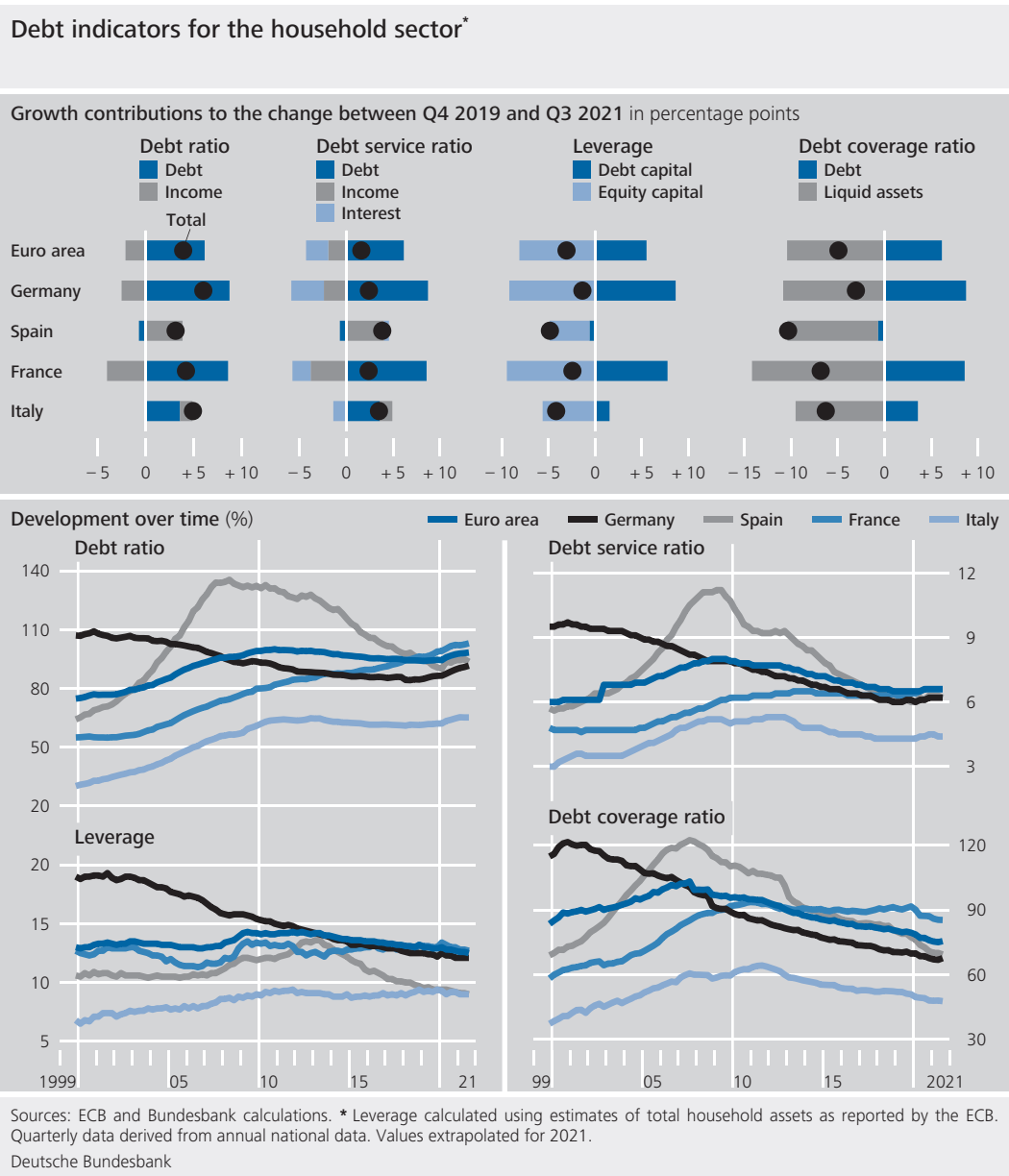Sources: ECB and Bundesbank calculations.
Deutsche Bundesbank

*Debt ratio increases noticeably only in Spain …*

Non-financial corporations significantly increased their borrowing at the onset of the COVID-19 pandemic in particular, not only to offset a distinct drop in sales, but also to build up buffers for potential liquidity bottlenecks. Despite this build-up of debt, it was only in Spain that the debt ratio rose noticeably over the entire period, though this was driven mainly by the sharp decline in income. Furthermore, this increase began from a low level by historical standards following a lengthy period of deleveraging in the wake of the European debt crisis.[9] In the euro area as a whole as well as in Germany and Italy, the debt ratio actually decreased thanks to the comparatively positive growth in income. The debt service ratio, by contrast, rose in each of the four largest countries and in the euro area as a whole.[10] Developments in Spain were especially pronounced in this case, too. Here again, though, the increase started from a comparatively low level. The monetary policy measures taken in re-

9 The deleveraging process in Italy and Spain is discussed in Deutsche Bundesbank (2017).
10 Income made smaller contributions to changes in the debt service ratio because of the significant reduction in dividend distributions. The income used to calculate the debt ratio was stabilised as a result. Since dividend distributions are added when calculating income used to determine the debt service ratio according to the BIS methodology (see footnote 8 on p. 33), this was not a source of relief.

## Debt indicators for the household sector*

**Growth contributions to the change between Q4 2019 and Q3 2021** in percentage points



Sources: ECB and Bundesbank calculations. **\*** Leverage calculated using estimates of total household assets as reported by the ECB. Quarterly data derived from annual national data. Values extrapolated for 2021.
Deutsche Bundesbank

sponse to the coronavirus pandemic contributed to a further decline in the interest rate level, which reduced debt service ratios in all countries.

*… and the same holds true for leverage*

Non-financial corporations considerably expanded their stocks of liquid assets at the onset of the coronavirus pandemic in particular, which pushed down the debt coverage ratio across all countries. This effect was most pronounced in France and Italy. Leverage, by contrast, moved in different directions in different countries. It rose slightly in Italy and climbed significantly in Spain. The developments in both countries resulted above all from the build-up

of debt capital. An additional factor in Spain was that the losses in the market value of equity sustained at the onset of the coronavirus pandemic were not fully recouped. Germany, France and the euro area as a whole, by contrast, saw declines in leverage, with the issuance of equity and growth in the market value of equity more than making up for the increase in debt capital.

The numbers discussed above for the non-financial corporations sector as a whole may mask possible heterogeneity across individual firms. A more nuanced assessment, however, is possible by drawing on granular microdata,

# The development of the debt situation since the outbreak of the coronavirus pandemic: a sectoral perspective based on the AnaCredit dataset for the euro area

The economic repercussions of the coronavirus pandemic differ greatly across various categories of enterprise. Consequently, for a differentiated assessment of the debt situation, granular data are required. The analytical credit datasets for the euro area (AnaCredit) provide data on debt in the form of bank loans at the individual borrower level.[1] In addition, information on sectoral affiliation is available for each borrower. This enables an analysis of the debt situation broken down by sectors which are particularly affected by the coronavirus pandemic or not.[2]

To calculate debt indicators, bank loan liabilities have to be expressed as a ratio. The AnaCredit dataset, expanded to include enterprise-specific information, provides two balance sheet metrics in this regard. If an enterprise's outstanding bank loans are expressed relative to its total assets, this results in enterprise-specific bank loan-based leverage (for the sake of simplicity, hereinafter referred to as leverage). Annual turnover is an income flow which, when expressed in relation to bank loans, results in an enterprise-specific bank loan-based debt ratio (for the sake of simplicity, hereinafter referred to as the debt ratio).

The analysis below subdivides the entire sector of non-financial corporations in the euro area into two groups. The first group comprises non-financial corporations from sectors that were hit particularly hard by the coronavirus pandemic. These include enterprises whose business activity was substantially hampered by government restrictions and changes in consumer behaviour, in particular services with direct customer contact, such as hospitality or travel.[3] The second group comprises the other enterprises.

Both debt indicators are initially calculated at the individual enterprise level, based on which an adjusted mean value is computed.[4] The balance sheet metrics are either flows over a calendar year (annual turnover) or values as at the end of the year (total assets). Correspondingly, the debt indicators are each observed at year-end. The value as at the end of 2019 thus shows the situation prior to the outbreak of the coronavirus pandemic. The change between the end of 2019 and 2020 provides information about the impact of the first phase of the coronavirus pandemic. The change between 2020 and 2021 indicates

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**1** For a detailed classification of the German AnaCredit dataset, see Kolb et al. (2021).
**2** The analysis is subject to certain constraints. One is that the AnaCredit dataset, containing loans granted by banks from the euro area, covers only part of aggregate debt. This means that changes in the debt situation caused by shifts within the debt instruments cannot be identified. Nor does the AnaCredit dataset record enterprises whose total loans, as reported by the lender, come to less than €25,000. Another constraint is that enterprises which do not maintain credit relationships with banks within the euro area are disregarded in the dataset. Moreover, discernible statistical challenges still exist in terms of the balance sheet metrics available for calculating debt indicators.
**3** Specifically, this group is made up of the following sectors according to NACE Rev. 2 codes: 47: "retail trade, except of motor vehicles and motorcycles", 51: "air transport", 55: "accommodation", 56: "food and beverage service activities", 79: "travel agency, tour operator reservation service and related activities", 90: "creative, arts and entertainment activities", 93: "sports activities and amusement and recreation activities", 96: "other personal service activities".
**4** Owing to flawed balance sheet data, this results in economically implausible values for both indicators in some cases. To adjust for these outliers, the analysis is limited to values between 1% and 100%. This roughly corresponds to one-tenth or ten times the value for the aggregate corporate sector.

whether the trends from the previous year intensified once again or whether the situation was already able to ease somewhat. The adjacent chart shows the results of the evaluation.

Both debt indicators rose over the entire period at a discernibly steeper pace in the particularly affected sectors.[5] The difference between these sectors and the other enterprises is more noticeable in terms of the debt ratio, with, above all, the turnover of particularly affected enterprises falling relatively sharply on account of the pandemic-related restrictions and changes in behaviour. Across all enterprises, both debt indicators increased especially in the first year of the pandemic. In 2021, leverage among the particularly affected enterprises decreased perceptibly once more. Within the group of particularly affected sectors, hospitality and travel saw the most significant deterioration in their debt situation.



Change in debt indicators of non-financial corporations in the euro area depending on the extent to which they were affected by the coronavirus pandemic
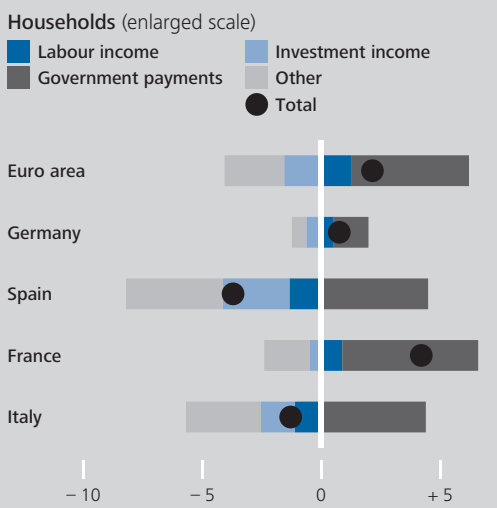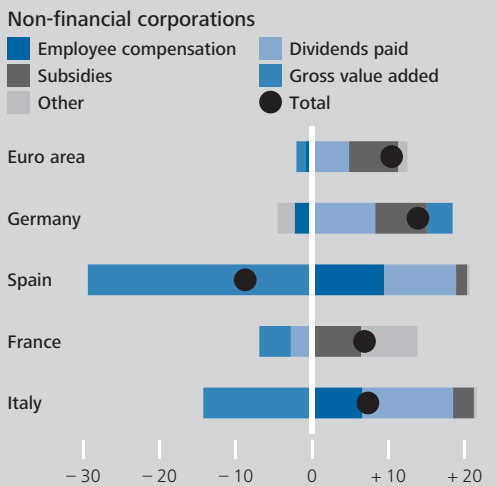
Percentage points
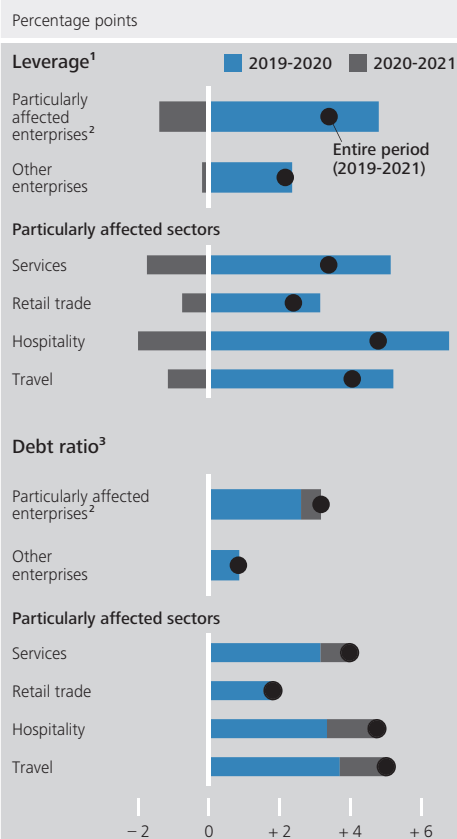
Sources: ECB and Bundesbank calculations. **1** Ratio of bank loan liabilities to total assets. **2** Sectors with NACE Rev. 2 codes 47, 51, 55, 56, 79, 90, 93 and 96. **3** Ratio of bank loan liabilities to annual turnover.

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**5** By contrast, leverage declined among non-financial corporations on aggregate. One notable reason for this is probably that the equity capital used in the aggregate figures is based on market values while the AnaCredit data are based on (lower) carrying amounts.

## Growth contributions to the change in disposable income

Q4 2019 to Q3 2021, in percentage points

**Non-financial corporations**

- Employee compensation
- Subsidies
- Other
- Dividends paid
- Gross value added
- ● Total

Euro area
Germany
Spain
France
Italy

− 30   − 20   − 10   0   + 10   + 20

**Households** (enlarged scale)

- Labour income
- Government payments
- Investment income
- Other
- ● Total

Euro area
Germany
Spain
France
Italy

− 10   − 5   0   + 5

Sources: ECB and Bundesbank calculations.
Deutsche Bundesbank

*Microdata analysis reveals that debt indicators rose primarily in sectors hit particularly hard by the COVID-19 pandemic*

such as the analytical credit datasets for the euro area (AnaCredit), which are a source of timely information on firm-level bank loans to the corporate sector. An analysis of AnaCredit data shows that both the debt ratio and leverage increased primarily in sectors that were hit particularly hard by the coronavirus pandemic (see the box on pp. 40 f. for further details).

*Household debt ratio and debt service ratio up …*

Households saw their debt ratios and debt service ratios increase across all countries (see the chart on p. 35). In Germany, France and the euro area as a whole, this was attributable solely to the increase in debt, with households borrowing to purchase residential real estate in

particular. Higher income levels, however, reduced these two debt indicators when viewed in isolation. By contrast, it was the decline in income that explained almost all of this rise in Spain, and just over one-third of it in Italy. With the exception of Spain, the further decline in interest rates during the period under review noticeably eased the debt service burden.

In the household sector, too, the strong build-up of liquid assets lowered the debt coverage ratios in all the countries under review. This was notably because the coronavirus pandemic reduced the opportunities for consumption. Income trends were relatively robust, which meant that households built up excess savings, primarily in the form of deposits.[11] Leverage declined as well across all the countries observed here, partly as a result of the acquisition of financial and non-financial assets and partly due to valuation gains on assets. Residential real estate markets in particular were robust, with prices continuing to rise.[12] Households in Spain registered the steepest decline in the debt coverage ratio and leverage. Their liquid assets and assets grew substantially, while their borrowing and debt capital actually declined slightly at the same time.

*… but debt coverage ratio and leverage down*

Government assistance payments distinctly buoyed the disposable income of households and non-financial corporations (see the adjacent chart), thus preventing the private non-financial sector's debt and debt service ratios from climbing more significantly still. Conversely, this government assistance drove up public debt as well, however.[13] In Germany and France in particular, mounting government subsidies stabilised non-financial corporations' sales, which were experiencing a downturn. In

*Government assistance payments distinctly buoyed disposable income of non-financial corporations …*

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**11** For the euro area, see European Central Bank (2020b, 2021b). For Germany, see Deutsche Bundesbank (2021b).
**12** For the euro area, see European Central Bank (2021c). For Germany, see Deutsche Bundesbank (2020, 2022a). Developments in real estate markets during the coronavirus pandemic diverged noticeably from earlier crisis episodes. See Igan et al. (2022).
**13** For the euro area, see European Central Bank (2020a, 2021a).

Italy and Spain, these direct assistance payments were much smaller in size, and non-financial corporations in these two countries shored up their income instead by reducing spending on employee compensation in particular. In all the countries with the exception of France, non-financial corporations furthermore increased their disposable income by cutting back on their dividend payouts.

*… and of households*

In turn, these lower dividend payouts translated into lower investment income for households. In Italy and Spain, furthermore, reductions in wage expenditure among non-financial corporations spilled over to households in the form of declining labour income. Government transfer payments to households, meanwhile, increased significantly in all the countries under review, making large positive contributions to income growth. In the euro area as a whole and particularly in France, these transfer payments were so extensive that disposable income even rose substantially as a result. In Germany, they stabilised disposable income, if nothing else, while in Italy and Spain, they at least prevented an even greater slump in disposable income.

*Composite indicator to assess the debt situation …*

Given the sometimes contradictory signals sent out by the individual indicators, there is the question of how developments in the debt situation should be assessed as a whole. To allow for a comparison of the information provided by each metric, they must first be standardised by transforming them into what are known as z-scores.[14] The information is condensed by computing the unweighted means of the four individual indicators for both sectors. As above, a higher value indicates a worse debt situation. The chart above illustrates how this composite indicator has evolved.

*… only points to a noticeable deterioration among non-financial corporations in Spain*

This composite indicator revealed that, since the outbreak of the COVID-19 pandemic, only non-financial corporations in Spain saw their debt situation worsen noticeably, though this deterioration did admittedly begin from a favourable level by historical standards. In France



Composite debt situation indicator*
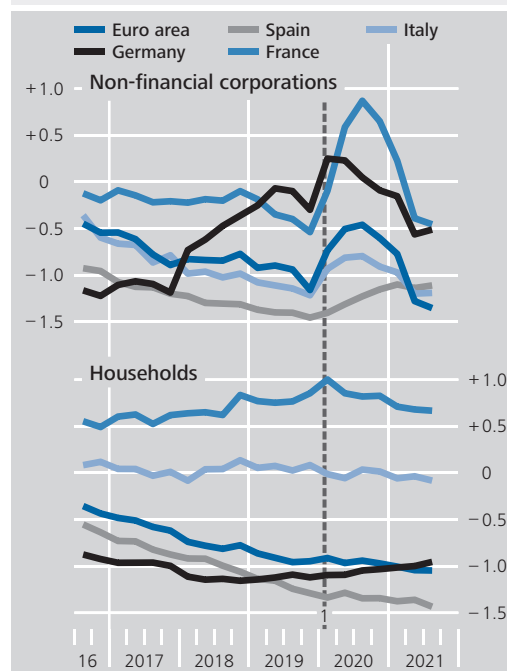
Sources: ECB and Bundesbank calculations. * Mean of the z-scores of the debt ratio, leverage, debt service ratio and debt coverage ratio. An increase indicates that the debt situation has deteriorated, a decrease indicates that it has improved. 1 Outbreak of the COVID-19 pandemic.
Deutsche Bundesbank

and Italy, the composite indicator registered a minimal increase over the entire period. Non-financial corporations in Germany and the euro area as a whole even saw their debt situation ease somewhat over the entire period, after having tightened briefly. Households likewise found that their debt situation generally improved irrespective of the coronavirus pandemic, though there was one exception – only in Germany did the composite indicator rise slightly. Viewed on aggregate, the debt situation of the private non-financial sector deteriorated by significantly less than suggested by the debt-to-GDP ratio, which is often the only measure used to assess the debt situation. In addition, the increase in debt relative to GDP is, for the most part, not unusually strong by historical standards (see the box on pp. 40 f.).

14 Here, the mean of the entire observation period is deducted from each individual value in the time series and the result is divided by the standard deviation.

# The development of debt since the outbreak of the coronavirus pandemic in historical perspective

How should the rise in debt ratios since the outbreak of the coronavirus pandemic be viewed in historical perspective? To answer this question, stylised facts on previous debt phases are first derived using long time series.[1] The evaluation is based on debt data from the Bank for International Settlements (BIS).[2] To ensure as long-term a perspective as possible, the analysis makes use of data for the private non-financial sector as a whole. For reasons of data availability, debt in this context corresponds to the sum of households' loans and non-financial corporations' loans and debt securities. Nominal gross domestic product (GDP) is used as the income flow for calculating the debt ratio. The analysis focuses on industrial countries as, first, longer time series are available for these countries and, second, this produces a more homogeneous sample from which more representative conclusions for the euro area can be drawn. In total, for the 24 countries and territories included in the study, there are data covering an average time period of more than 55 years.[3] To allow for comparison with current developments, the analysis is limited to data up to the end of 2019.

A "debt phase" refers to a period in which the debt ratio rises on the previous year continually over three consecutive years and increases by a total of at least 10%.[4] Across all of the 24 countries and territories and their combined 1,320 years of data, a total of 41 debt phases can be identified. The median rise in the debt ratio per quarter is just over 0.9 percentage point. The interquartile distribution, i.e. the 25th to the 75th percentile of the distribution, ranges from 0.6 to 1.2 percentage points. The minimum is 0.3 percentage point and the maximum is 3.2 percentage points.

The chart on p. 41 depicts the development of the debt ratio in the private non-financial sector of the euro area and its four largest Member States since the outbreak of the coronavirus pandemic. This is shown against stylised debt paths, which are calculated based on changes in the debt ratios along the historical distribution described above. For reasons of simplicity, it is assumed here that the rise is linear and quarterly changes are cumulated. The light shaded area shows the minimums and maximums of previous debt phases, while the dark shaded area depicts the interquartile distribution. The dashed line represents the median of historical development.

Over the course of the second quarter of 2020, the debt ratios rose to a historic degree. While this growth was due in part to borrowing, particularly among non-financial corporations, the main driver was, however, the extraordinary drop in GDP. The debt ratios first began to rise less sharply as the economic recovery progressed. They were in decline again as of the first quarter of 2021. At the end of the third quarter of

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**1** The following data analysis serves only to derive stylised descriptive facts. It cannot be used to draw conclusions on whether the build-up of debt is sustainable or fundamentally justifiable. For more information, see Schularick and Taylor (2012) and Greenwood et al. (2022).
**2** See https://www.bis.org/statistics/totcredit.htm
**3** The dataset comprises the following countries and territories: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Singapore, South Korea, Spain, Sweden, Switzerland, the United Kingdom, and the United States. For the majority of these countries and territories, the length of their time series is very close to the average. The only downward and upward outliers are Hong Kong (40 years) and the United States (72 years).
**4** In principle, this approach follows a study that was published in the wake of the global financial crisis. See McKinsey Global Institute (2010).

2021 (current end of the data), only the debt ratio of the French private non-financial sector was at the upper edge of the historical distribution. It also remained relatively high in Spain, but was still within the interquartile distribution. For the euro area as a whole as well as Germany and Italy, it was just barely above the median. Assuming that the economic recovery continues, these rises will be put into even greater perspective over the coming years. Furthermore, the disposable income of the private non-financial sector, which is more relevant to debt sustainability, saw considerably better development than GDP, which was used as the income flow for this analysis. Overall, the rise in the debt ratios of the private non-financial sector since the outbreak of the pandemic is indeed considerable, but not exceptional when viewed in historical perspective.

**Rise in the debt ratio of the private non-financial sector over time**

Cumulative change in percentage points since end-2019
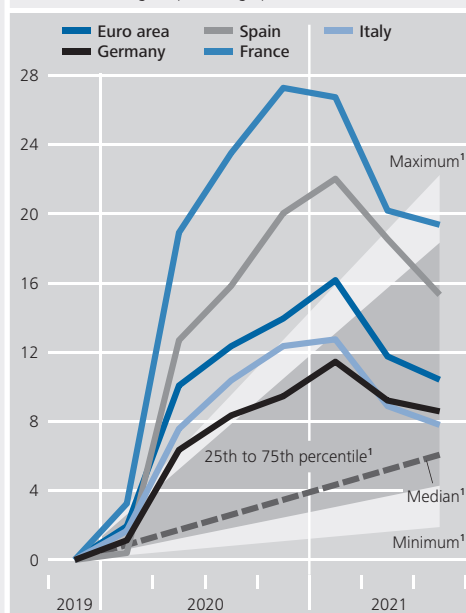


Sources: BIS, ECB, and Bundesbank calculations. **1** The median, minimum and maximum as well as the percentiles shaded in grey correspond to distribution values from previous debt phases derived from a sample of industrial countries.

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## Potential impact of interest rate normalisation on the debt situation

*Monetary policy normalisation on the horizon in light of current inflation developments*

In light of current inflation developments, a potential normalisation of monetary policy is on the horizon. This could also have an impact on the debt situation of the private non-financial sector. The debt service ratio is of particular interest in this context. Via interest payments, it is directly influenced by the general interest rate environment and therefore by monetary policy. The following depicts simulations of possible paths that the debt service ratio could take. These simulations are conducted for households and non-financial corporations in the euro area as a whole, as well as for its four largest Member States. When calculating the debt service ratio, three variables are considered: the level of debt, the average rate of interest to be paid on this debt (average debt interest rate), and the level of disposable income.[15] For the simulations, either assumptions

have to be made regarding the future development of these variables or their development has to be projected using statistical models.

The level of households' disposable income in the simulations is taken from the ECB staff macroeconomic projection exercises (MPEs) of March 2022.[16] These projections make no forecasts for non-financial corporations' disposable income. Instead, the relationship between nominal GDP growth and non-financial corporations' disposable income is determined using a simple linear model. Separate estimates are made for the euro area and each of its four

*Simulations based on March 2022 MPE forecasts …*

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[15] Generally speaking, the residual maturities on the debt are also included in the calculation. However, no time series are available for this variable. In the following, the residual debt maturity is accordingly always taken as constant. For non-financial corporations, it is assumed to be 13 years; for households, it is assumed to be 18 years. For the reasoning behind these residual maturities, see Bank for International Settlements (2017).

[16] Detailed information on the Eurosystem's macroeconomic projections can be found at https://www.ecb.europa.eu/pub/projections/html/index.en.html.

## Assumptions for simulations of the debt service ratios*

| Scenario/Variable | Interest | Income | Debt[1] |
|---|---|---|---|
| Baseline | March 2022 MPE | March 2022 MPE | 2020-2021 |
| Mild | March 2022 MPE | March 2022 MPE | 2010-2019 |
| Adverse | Euro area: March 2022 MPE + 100 basis points (short-term and long-term)<br>Countries: March 2022 MPE + 100 basis points (short-term)/<br>double yield differential to the euro area (long-term) | March 2022 MPE, corrected for the impact of higher interest rates | 2020-2021 |

* MPE: Macroeconomic Projection Exercise (ECB staff macroeconomic projections). **1** Average quarterly growth over the given period.
Deutsche Bundesbank

largest Member States. Using the forecasts of GDP growth, values are then calculated for disposable income in the simulation period.

*… over the period Q4 2021 to Q4 2024, and for three scenarios*

The development of the average debt interest rate is also derived from simple regression models. These regress the debt interest rate on the three-month EURIBOR (short-term market interest rate) and the (country-specific) ten-year interest rate on government debt (long-term market interest rate). In addition, the first two time lags of the debt interest rate and of both market interest rates are incorporated into the estimation equation. Using the estimation results, the development of the debt interest rate is then derived on the basis of the market interest rate path assumed in the macroeconomic projections. Here, too, the calculations are performed separately for the euro area as a whole and each of the four countries, as well as for households and non-financial corporations. The following simulations cover a period from the fourth quarter of 2021 to the end of 2024 (end of the projection horizon in the March forecast). On the one hand, the start of this time period marks the current end of the data. On the other hand, financial markets began to increasingly price in an imminent normalisation of monetary policy over the course of the fourth quarter of 2021. The simulations differ-

entiate between three scenarios (for more on this, see also the table above):

– Baseline scenario: Interest rates and disposable income develop as depicted in the March 2022 macroeconomic projections. Debt increases with the historically high rates seen since the outbreak of the COVID-19 pandemic.

*Baseline scenario aligned with macroeconomic projections …*

– Mild scenario: Interest rates and disposable income develop as depicted in the March 2022 macroeconomic projections. However, debt is assumed to rise at the same average pace as between the start of 2010 and the end of 2019. In that period, debt saw considerably weaker growth compared to the period following the outbreak of the pandemic. This scenario thus assumes a return to the trends that were seen in the wake of the global financial crisis.[17]

*… mild scenario with low-level borrowing …*

– Adverse scenario: Interest rates and disposable income initially develop as depicted in the March 2022 macroeconomic projections. Debt increases with the historically high rates seen since the outbreak of the COVID-19 pandemic. Over the course of the third quarter of 2022 in the scenario for the
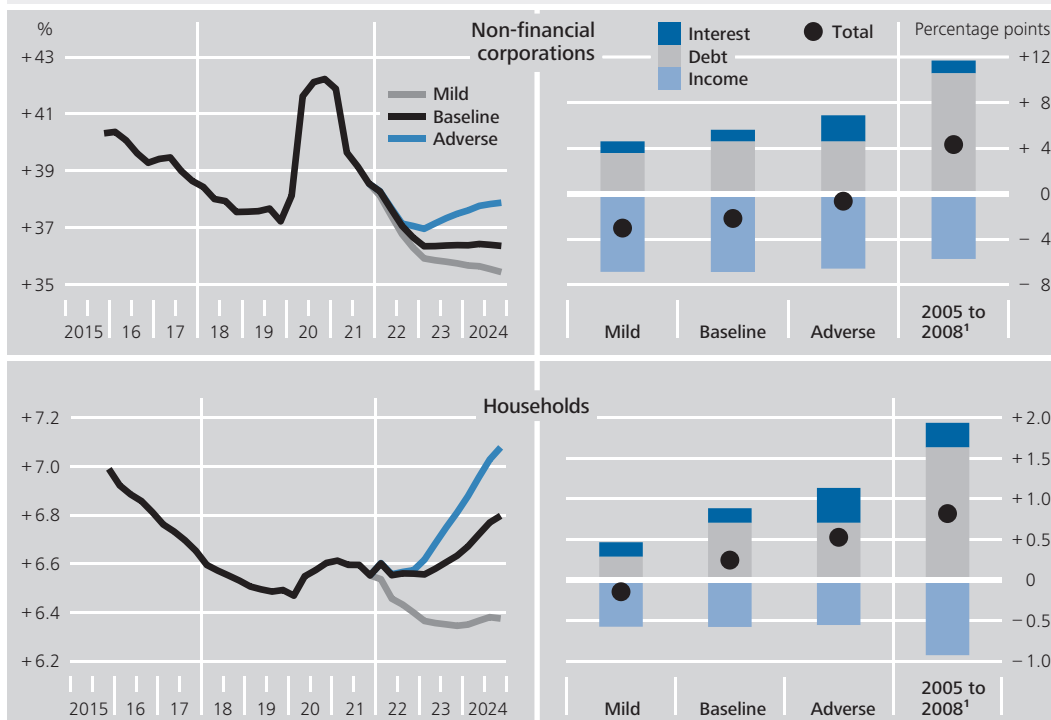
*… and adverse scenario with significantly larger interest rate increase*

17 See also Deutsche Bundesbank (2017, 2018).

**Simulated development of debt service ratios in the euro area and contributions to change\* in different scenarios**



Sources: ECB and Bundesbank calculations. **\*** Q4 2024 compared with Q4 2021. **1** Change during the last interest rate tightening cycle.
Deutsche Bundesbank

euro area, both the short-term and long-term interest rates rise by 100 basis points more than assumed in the projections. In the scenarios for the four largest Member States, the short-term interest rates likewise climb by an additional 100 basis points. For the long-term interest rates, changes in the spread in yield between the individual countries and the euro area as a whole are twice as great as forecast in the macroeconomic projections.[18] This scenario thus explores, in stylised form, how susceptible households and non-financial corporations are to an unexpectedly steep rise in interest rates.

The left-hand side of the above chart shows the progression of the debt service ratio of euro area non-financial corporations in each of the three scenarios. The right-hand side of the chart shows the contributions to the cumulative change made by the individual variables over the entire period. For comparative purposes, the development seen during the last

interest rate tightening cycle is also depicted (2005 to 2008).[19]

According to the simulations, the debt service ratio of non-financial corporations decreases over the entire period in all three scenarios. This means that the impact on the debt service ratio of non-financial corporations is set to be noticeably weaker than it was during the interest rate tightening cycle in the mid-2000s, even under adverse conditions. Taken in isolation, increased income leads to a perceptible reduction in the debt service ratio across all scenarios. Building up debt, however, always causes the debt service ratio to rise. The direct interest
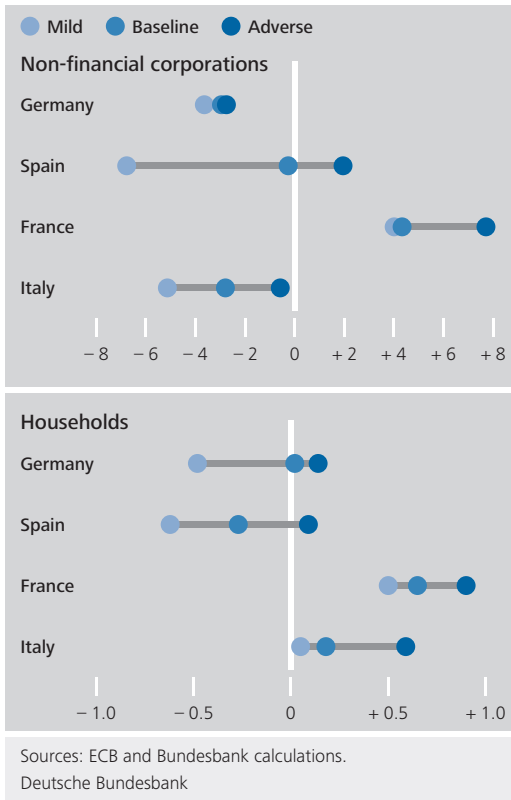
*In the case of non-financial corporations, the debt service ratio does not rise even in the adverse scenario …*

**18** To begin with, higher interest rates have a direct impact on the debt interest rate of households and non-financial corporations. Additionally, the (negative) effect of rising interest rates on the development of disposable income is quantified using basic model elasticities (BMEs). These show how deviations of exogenous variables from the baseline assumptions impact on the forecasts.
**19** Interest rates were first raised in Q4 2005. The tightening cycle ended in Q4 2008.

## Debt service ratios in different scenarios

Simulated changes, Q4 2024 compared with Q4 2021, in percentage points

● Mild ● Baseline ● Adverse

**Non-financial corporations**

Germany, Spain, France, Italy

−8  −6  −4  −2  0  +2  +4  +6  +8

**Households**

Germany, Spain, France, Italy

−1.0  −0.5  0  +0.5  +1.0

Sources: ECB and Bundesbank calculations.
Deutsche Bundesbank

service ratio. The accumulation of debt, however, increases the debt service ratio markedly in each of the scenarios. The individual contributions develop similarly to those of non-financial corporations over the projection horizon.

At the level of the four largest Member States, the two sectors exhibit substantial differences across all of the countries (see the adjacent chart). However, it is important to note that these differences hinge on assumptions made about debt developments. Particularly in France, borrowing makes a significantly positive contribution. This is due to the fact that the indebtedness of both households and non-financial corporations has been noticeably increasing for quite some time. The simulations extrapolate this trend by way of assumption. In Italy and Spain, by contrast, debt growth has been relatively weak, particularly prior to the outbreak of the pandemic. Its contributions in both sectors are correspondingly low in the simulations. In Germany, only households have expanded their borrowing significantly, which is reflected in the accordingly large contributions made by debt.

*Simulated development at the level of the four largest Member States influenced by assumptions about development of debt …*

For non-financial corporations in Germany and Italy, the debt service ratio declines even in the adverse scenario. In France, on the other hand, it increases in all three scenarios, with the rise being particularly pronounced in the adverse scenario. For non-financial corporations in Spain, the debt service ratio increases only in the adverse scenario. In the case of households in France, by contrast, it rises in every scenario, and to a relatively strong degree at that. In Italy, the debt service ratio increases even in the baseline scenario. However, growth is noteworthy only in the adverse scenario – here, risk premia on Italian government bonds increase to a more significant extent. As a result, debt interest rates also climb by a noticeably larger amount. Households in Germany and Spain record a marked rise in their debt service ratios only in the adverse scenario. This rise is fairly small in both cases, however. The develop-

*… and exhibiting noticeable heterogeneity*

rate effects are noticeably positive only in the adverse scenario. The significance of the contributions of individual variables shifts over the projection horizon. For instance, in all three scenarios, the depressing effect of increasing income initially predominates. Over time, the impact of rising interest rates, which push up the debt service ratio, then becomes more pronounced. This makes the debt service ratios decline at first but rise again as of 2023 in the adverse scenario.

*… but it increases perceptibly for households*

For euro area households, the debt service ratio decreases only in the mild scenario (see the chart on p. 43). Even in the baseline scenario, however, it rises perceptibly. In the adverse scenario, this growth is markedly stronger still, although it lags behind the rise seen in the last interest rate tightening cycle. For households, too, the income growth generally provides relief. Likewise, only in the adverse scenario do the direct effects on debt interest make a noteworthy contribution to the increase in the debt

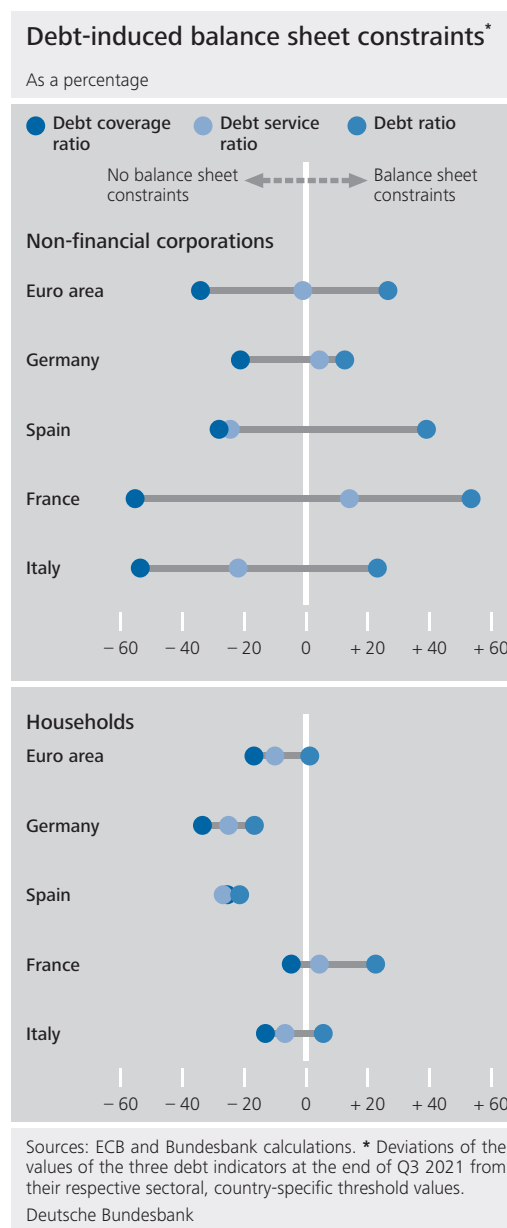ments at the country level follow similar paths to those of the euro area.

*War in Ukraine exacerbates uncertainty surrounding simulation results*

The simulation results are naturally subject to some degree of uncertainty. The war in Ukraine, in particular, is likely to alter the development of the variables used in the simulations. For example, real economic metrics could be lower than assumed in the March 2022 macroeconomic projections. Conversely, prices are likely to rise more steeply than projected. Scenario calculations indicate that the additional price pressures are likely to be greater than the losses sustained by the real economy.[20] This would tend to push up nominal income flows somewhat and mitigate developments in the debt service ratio. At the same time, the expected interest rate paths have significantly increased relative to the time at which the projections were made. However, the assumptions for debt developments tend to have been set rather high. A normalisation of interest rates could also lead to credit demand tailing off. This, taken in isolation, would decrease the debt service ratios or at least depress their growth. Overall, this means that the impact of the war in Ukraine on the development of debt service ratios is yet to be determined.

## ■ Summary and conclusions

*Debt situation barely exacerbated and relatively robust to interest rate normalisation*

Overall, the debt situation of the private non-financial sector has not deteriorated substantially since the outbreak of the coronavirus pandemic. Asset-based debt indicators such as leverage and the debt coverage ratio mostly saw relatively positive developments in both sectors in all of the countries under review. By contrast, income-based indicators such as the debt ratio and the debt service ratio largely deteriorated. In addition, simulations of the debt service ratio on the basis of the ECB staff macroeconomic projections from March 2022 indicate that the expected normalisation of monetary policy will not unduly exacerbate the debt situation of households and non-financial corporations.



**Debt-induced balance sheet constraints***

As a percentage

Sources: ECB and Bundesbank calculations. **\*** Deviations of the values of the three debt indicators at the end of Q3 2021 from their respective sectoral, country-specific threshold values.

Deutsche Bundesbank

*Absolute levels of debt indicators are also relevant for economic policy*

Not only the changes in debt indicators but also their absolute levels are relevant for economic policy.[21] Previous Bundesbank analyses have demonstrated that debt levels can influence the effectiveness of monetary policy in the euro area.[22] For instance, if debt levels are high, households and non-financial corporations reduce their expenditure relatively sharply in response to a restrictive monetary

**20** See Deutsche Bundesbank (2022b).
**21** The following remarks focus on the impact of the debt level on short-term fluctuations in economic activity. However, the debt level may also influence long-term economic growth. For more on this, see Cecchetti and Kharroubi (2012), Arcand et al. (2015) and Unger (2018).
**22** See Deutsche Bundesbank (2021a).

policy shock. By contrast, if debt levels are low, investment and consumption respond relatively weakly. The chart on p. 45 shows whether non-financial corporations and households are currently in a high-debt or low-debt state. To this end, country-specific threshold values are deducted from the current levels of each debt indicator. The thresholds are determined using a specific percentile that maximises the explanatory power of the underlying econometric panel model. The sectoral percentile calculated in this manner is ultimately applied to each individual country, producing country-specific threshold values for the debt indicators. If the current level of the debt indicator lies above the threshold value, this suggests a high level of debt. Current values below the threshold value point to a low level of debt.[23]

The results of the calculations essentially reflect the changes documented above since the start of the pandemic: non-financial corporations' debt ratios are currently relatively high across the board. In the case of households, this applies only to France. By contrast, the debt coverage ratio across all countries and both sectors consistently indicates a low-debt state. With regard to the debt service ratio, the current values are, for the most part, fairly close to or below the threshold and therefore send a mixed signal. All things considered, it is unlikely that the private non-financial sector will cut back significantly on its spending on account of the current debt situation in response to a tightening of monetary policy.

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23 For details on the calculation of these thresholds, see Deutsche Bundesbank (2021a), pp. 22-26. There are threshold values for the debt ratio, the debt service ratio and the debt coverage ratio. No time series were available for calculating threshold values for leverage at that point in time. The definition of debt in the previous analysis deviates slightly from that applied here.

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