DELEVERAGING PATTERNS IN THE EURO AREA CORPORATE SECTOR

This article presents the key findings of the Structural Issues Report 2013 entitled "Corporate finance and economic activity in the euro area". The report was prepared by a European System of Central Banks Task Force, which took a threefold approach.[1] The first approach explored the build-up of leverage until the start of the financial crisis and the subsequent deleveraging in the non-financial corporate sector. While only rather gradual corporate deleveraging is observed at the aggregate euro area level up to the second quarter of 2013, more intense corporate deleveraging becomes apparent when different countries and sectors of economic activity are examined. In fact, deleveraging is more pronounced in the case of those countries and sectors that had accumulated large amounts of debt in the run-up to the crisis and were most severely affected by it. The second approach goes beyond country and sectoral considerations. It looks at the role of differences in structures and behaviours across firms when conditioning on a number of firm-specific characteristics. The report finds that the existence of considerable heterogeneity across companies and of non-linearities in the impact of the recent crisis are important elements to be taken into account for targeted policy prescriptions. In the third approach, the report compares debt developments during the euro area crisis with those observed in other major historical episodes, thus giving a clearer perspective of the severity of the crisis and its associated risks. If history is any guide, further adjustment is expected, particularly in those countries that experienced a pre-crisis boom.

In such an environment, policy-makers face a challenging balancing act in steering the necessary adjustment towards more sustainable economic patterns. Economic policies should support an orderly, yet steadfast, restructuring process in the non-financial and financial sectors that is consistent with sustainable long-term economic growth trends. Such restructuring should aim, in particular, to strengthen banks' and non-financial corporations' balance sheets and capital positions, which is crucial for the functioning of the monetary policy transmission mechanism. To enhance the sustainability of the economic recovery, structural reforms geared not only towards increasing competitiveness and enhancing genuine growth potential, but also towards further developing a financial system that offers a broader range of financing alternatives, are also crucial.

1 INTRODUCTION

This article reviews the build-up of leverage until the financial crisis and analyses the progress made by non-financial corporations, since the start of the crisis, in the process of deleveraging. The article first investigates the progress of non-financial corporations across euro area countries and economic activity sectors, presenting evidence on the speed of adjustment, the contribution of substitution effects and the vulnerabilities of the corporate sector. Second, going beyond country and sectoral heterogeneity and exploring the patterns in firm-level data, the article focuses on differences in debt developments across firms in order to arrive at a better understanding of the different degrees of intensity with which financial positions and financing decisions have affected firms' leverage during the crisis. Finally, the article sheds light on the role of corporate debt patterns in the financial crisis in the euro area by comparing this episode with other major historical financial crises. In this context, expected future deleveraging pressures are identified and analysed. The article concludes by drawing a number of policy messages, particularly concerning the impact of corporate sector debt developments on economic activity and on the transmission of monetary policy.

1 See Task Force of the Monetary Policy Committee of the European System of Central Banks, "Corporate finance and economic activity in the euro area – Structural Issues Report 2013", *Occasional Paper Series*, No 151, ECB, Frankfurt am Main, August 2013.

The assessment acknowledges that in some euro area countries there was an excessive build-up of corporate sector leverage during expansionary phases. This calls for corrective adjustments. By addressing balance sheet weaknesses, such adjustments are a necessary requirement for restoring the conditions for sustainable growth and a solid recovery.

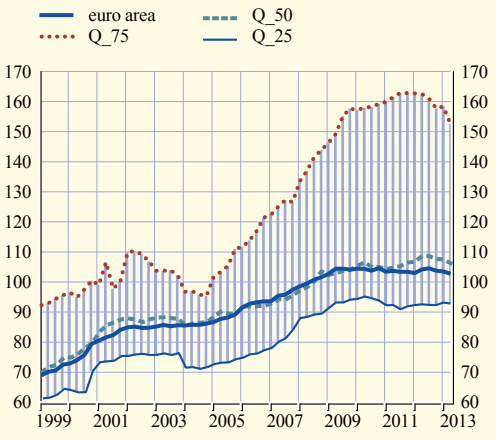
2 DEBT AND DELEVERAGING IN THE EURO AREA CORPORATE SECTOR

Following the strong increase in the leverage of euro area non-financial corporations in the period between 2000 and 2009-10, the data available show that leverage ratios have been gradually adjusting.[2] This section is largely based on unconsolidated euro area accounts data that include, as regards debt ratios, the debt of all non-financial corporations, irrespective of the holder of the debt.[3] Compared with a sector analysis based on consolidated data (see Section 4 of this article), this approach is closer to the microdata analysis, which looks at the average or median firm. At the same time, for some countries, where inter-company loans are very important, the difference between the two concepts is considerable, as in the cases of Belgium and Malta.[4]

The period from the first quarter of 2000 to the second quarter of 2008 – defined as the pre-crisis period in this article – was marked by a rapid increase in the unconsolidated debt of euro area non-financial corporations, which rose from 73% to 100% in relation to GDP (see Chart 1). The accumulation of debt differed markedly across euro area countries (see Chart 2) and was driven by several factors, including overly optimistic expectations regarding the long-term evolution of future income and growth, and favourable lending and financial market conditions. In addition, in some euro area countries – such as Ireland and Spain – exuberance in housing markets fuelled even higher levels of debt accumulation. This surge in leverage played a key role in creating the conditions for the financial crisis that started to unfold in 2008 and has also had a strong impact on the nature, severity and persistence of the economic downturn in certain euro area countries (see Section 4).

Chart 1 Debt-to-GDP ratio of euro area non-financial corporations

(unconsolidated; percentages)



Source: ECB.
Notes: Data are based on amounts outstanding and the four-quarter moving sum for GDP. Debt includes loans, debt securities and pension fund reserves. Q_75, Q_50 and Q_25 denote the 75th, 50th (median) and 25th percentiles, respectively.

Even after the outbreak of the financial crisis, debt-to-GDP ratios of euro area non-financial corporations continued to increase, peaking

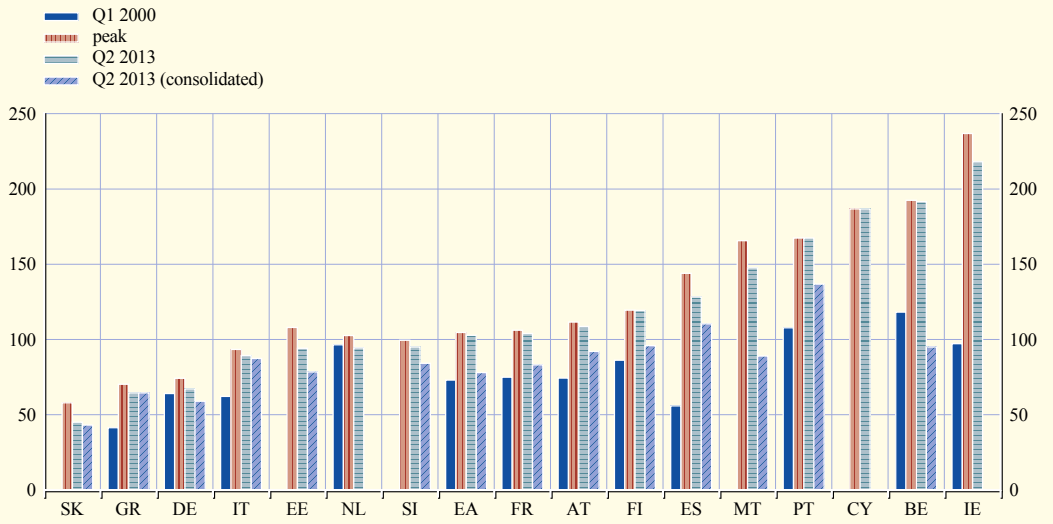
2 The latest euro area accounts data are for the second quarter of 2013. See also the articles entitled "Corporate indebtedness in the euro area", *Monthly Bulletin*, ECB, February 2012, "The financial crisis in the light of the euro area accounts: a flow-of-funds perspective", *Monthly Bulletin*, ECB, October 2011 and Winkler, B. van Riet, A. and Bull, P., "A Flow of Funds Perspective on the Financial Crisis", Vol. I and II, *Palgrave Macmillan Studies in Economics and Banking*, November 2013.

3 For a brief overview of the methodological issues related to the euro area accounts, see Annex 1 of the Structural Issues Report 2013.

4 The high unconsolidated debt-to-GDP ratio of non-financial corporations in Belgium and the increase in this ratio are related to structural features, e.g. the attractiveness of the country for multinational groups, which lead to large-scale inter-company lending. Among all euro area countries, the difference between the unconsolidated and the consolidated debt-to-GDP ratios in the second quarter of 2013 was highest in Belgium (97 percentage points) and Malta (59 percentage points).

Chart 2 Debt-to-GDP ratio of non-financial corporations across euro area countries

(unconsolidated, unless otherwise noted; percentages; ranking according to unconsolidated Q2 2013 value)



Source: ECB.
Notes: The peak denotes the country-specific maximum value between the first quarter of 2000 and the second quarter of 2013. Unconsolidated debt is defined as loans, debt securities and pension fund reserves. Consolidated debt is defined as loans (excluding inter-company loans), debt securities and pension fund reserves. Data are based on amounts outstanding. Owing to data availability, the first bar, in the case of Ireland, refers to the first quarter of 2001 and, in the case of Greece, to the second quarter of 2000. Data for Estonia, Cyprus, Luxembourg, Malta, Slovenia and Slovakia are partly unavailable. Consolidated debt is not available for Ireland, Cyprus or the Netherlands. "EA" denotes euro area.

only in 2009-10 at 105%. This reflected a "normal" pattern of somewhat delayed debt deleveraging, mainly related to the lagging pattern of bank credit around turning points in economic activity. The rising leverage ratio is also explained by a sharp contraction in real GDP (i.e. the denominator effect). A similar picture appears when investigating debt-to-gross operating surplus ratios, which are more specifically linked to the amount of debt relative to a firm's income situation and hence to the ability of the euro area corporate sector to repay its debt obligations.[5]

Despite the small adjustment visible at the aggregate euro area non-financial corporate level, a more nuanced picture of corporate deleveraging becomes apparent (i) at the country level, (ii) at the sector of economic activity level, (iii) when investigating substitution effects in firms' financing and (iv) when disentangling effects on firms' leverage stemming from transactions and valuation effects.

DELEVERAGING PROGRESS MADE BY NON-FINANCIAL CORPORATIONS ACROSS EURO AREA COUNTRIES

The speed of adjustment from the pre-crisis peak in corporate indebtedness varied notably across euro area countries (see Chart 2). By the second quarter of 2013, progress in the reduction of high debt-to-GDP ratios had been made by non-financial corporations in Spain (-11% from its peak, to 128% of GDP), Malta (-11%, to 148% of GDP) and Ireland (-8%, to 218% of GDP), while for other countries like Portugal (167% of GDP) and Cyprus (187% of GDP) the weakness in economic activity impeded a reduction in corporate debt ratios up to the second quarter of 2013. At the same time, corporate debt ratios remained considerably above the euro area average in these countries.

5 Despite the more specific information content of the debt-to-gross operating surplus ratio, the analysis of debt-to-income ratios is based on the debt-to-GDP ratio due to lack of available data for some euro area countries.

RE-ALLOCATION OF FUNDS BETWEEN ECONOMIC SECTORS

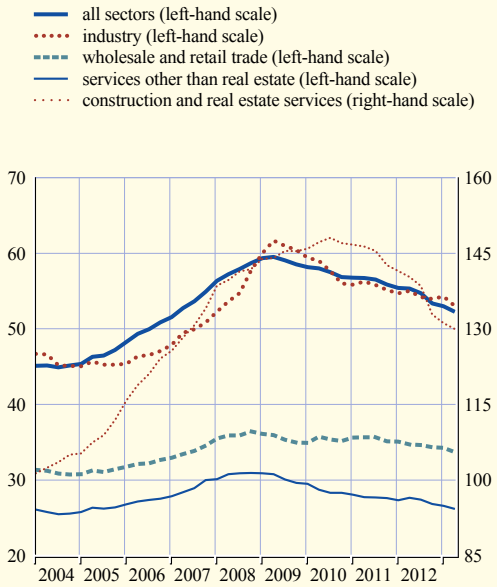
Macroeconomic aggregates at the level of the total non-financial corporate sector mask the re-allocation of funds that has taken place across productive sectors and firms in the euro area. Over-indebted sectors have tended to reduce their leverage levels more significantly than less indebted sectors. In fact, the construction and real estate services sectors, and to a lesser extent the industrial sector, have reduced their ratios of MFI loans to gross value added considerably since their respective peaks (see Chart 3).[6] Mainly related to the boom in housing markets prior to the financial crisis, the leverage of firms in the construction and real estate services sectors has been highest in Ireland, Spain, Cyprus and Malta.

SUBSTITUTION EFFECTS IN THE FINANCING OF NON-FINANCIAL CORPORATIONS DURING THE CRISIS

Further evidence on non-financial corporations' debt deleveraging patterns during the financial crisis can be obtained from analysing firms' transactions in financing instruments, which reveal incipient but potentially important changes in financing structures. Generally, developing a financial system that offers a broader range of financing alternatives and instruments can contribute to more diverse corporate financing sources and thus to a more resilient corporate sector in the face of abruptly changing credit conditions. Specifically, in the context of tighter bank credit conditions related to macroeconomic uncertainty and banks' high risk aversion during the financial crisis, firms have partially replaced bank loans with other sources of financing (see Chart 4). This has played a role in mitigating the adverse effects of the financial crisis on corporate financing and can thus be seen

Chart 3 Ratio of MFI loans to gross value added across euro area sectors of economic activity

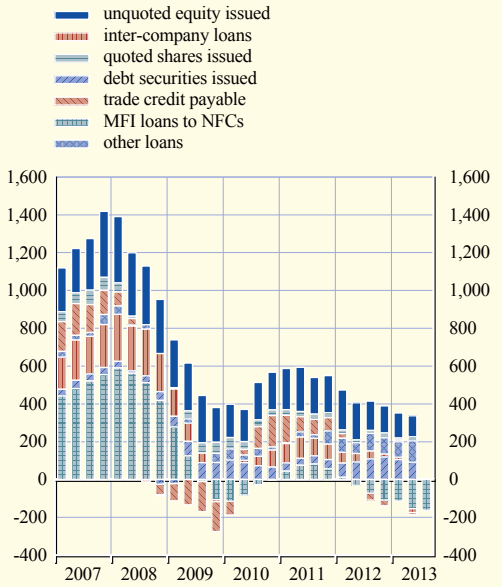
(percentages)



Source: ECB.
Notes: Sectors are defined according to the NACE Rev.2 classification. Data are based on outstanding MFI loans and the four-quarter moving sum of the gross value added.

Chart 4 Financing of euro area non-financial corporations – evidence on substitution effects

(four-quarter moving sums of transactions; EUR billions)



Source: ECB.

6 Owing to data unavailability, the leverage of non-financial corporations across sectors of economic activity refers to the ratio of MFI loans to gross value added.

as one margin of adjustment used by non-financial corporations for coping with tensions stemming from financial intermediaries. At the same time, substitution effects have varied across euro area countries and have remained overall limited, partly reflecting weak demand by corporations for external financing and the difficulties experienced by small and medium-sized firms in tapping funding markets.

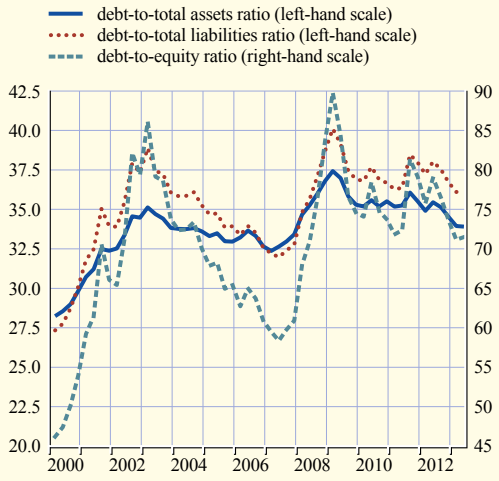
DISENTANGLING TRANSACTION-BASED AND VALUATION-BASED CHANGES IN LEVERAGE RATIOS

Corporate leverage ratios, such as the debt-to-total assets ratio, generally develop in a more volatile manner than debt-to-income ratios, as they are influenced strongly by valuation effects.[7] The ratio of debt to assets is informative because assets can be sold by a firm in order to generate funding liquidity. In addition, they can serve as collateral and contribute positively to firms' available financing. The debt-to-total assets ratio of euro area non-financial corporations increased during the financial crisis, peaking at 37.4% in the first quarter of 2009, but it has fallen back since then as data up to the second quarter of 2013 show (see Chart 5). Even more than the ratio of debt to total assets, the debt-to-equity ratio of euro area non-financial corporations fluctuated considerably within the period under review due to the impact of valuation changes on equity.[8] In terms of the capital structure of euro area non-financial corporations, equity accounts for 50% of firms' total liabilities, with a much higher share of unquoted equity than quoted equity (36% as opposed to 14% of firms' total liabilities, respectively, in the second quarter of 2013).[9]

Disentangling the changes in the debt-to-equity ratios stemming from transactions (in the form of net equity issuance and changes in debt financing) from changes in the ratios due

Chart 5 Debt ratios of euro area non-financial corporations

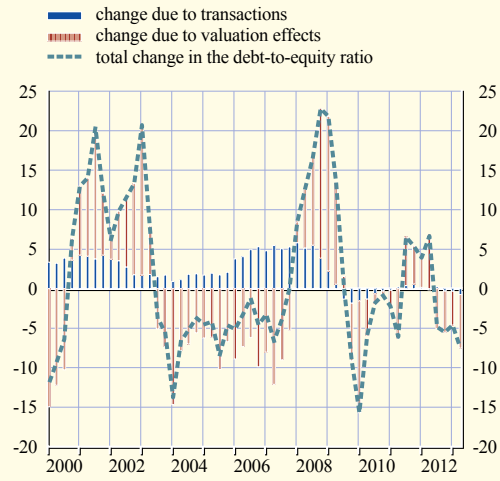
(unconsolidated; percentages)



Source: ECB.
Notes: Debt is defined as loans, debt securities and pension fund reserves. Total assets are defined as financial assets plus fixed assets.

Chart 6 Changes and contributions to changes in the debt-to-equity ratio of euro area non-financial corporations

(unconsolidated; percentage points; four-quarter moving sum)



Source: ECB.
Notes: Data are based on amounts outstanding and notional stocks. Notional stocks are compiled by adding transactions to the amounts outstanding for a base period (the first quarter of 2000).

7 In the euro area accounts, financial assets and liabilities are valued at current market prices.
8 The debt-to-equity ratio at market value can be used as a measure of corporate debt relative to the expected income stream generated by a firm, indicating the perceived market value of a firm.
9 While quoted shares are mainly used by large enterprises, unquoted equity is not traded on financial markets and is very heterogeneous across euro area countries.

to valuation effects[10] allows a deeper insight into leverage developments (see Chart 6). Following a transaction-based increase in leverage from 2004 broadly until the outbreak of the financial crisis, equity and debt transactions have contributed mostly to a decline in the debt-to-equity ratio of euro area non-financial corporations through debt redemption and equity issuance since 2008. However, euro area non-financial corporations' deleveraging was hampered severely by an environment of falling equity prices between 2008 and 2009, which led to a general increase in the debt-to-equity ratio. The overall decline in the ratio between the fourth quarter of 2009 and the second quarter of 2011, and again between the third quarter of 2012 and the second quarter of 2013, was mainly due to valuation gains in equity markets.

ASSESSING THE VULNERABILITY OF NON-FINANCIAL CORPORATIONS' DEBT

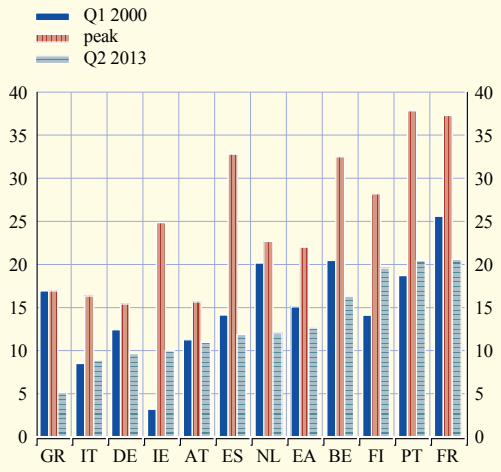
The assessment of the sustainability of corporate leverage needs to take into account a range of indicators related to the vulnerabilities of corporations stemming from their level of indebtedness. Such indicators would include, in particular, the interest payment burden, the maturity structure of debt and the share of debt financed at variable interest rates.

First, the interest payment burden of euro area non-financial corporations, defined as the proportion of income that has to be used for interest payments on debt, declined from 22% at the end of 2008 to 13% at the end of second quarter of 2013, mainly as a consequence of low interest rates and deleveraging. There is substantial variation across euro area countries (see Chart 7). Firms in Ireland, Spain and Portugal faced the strongest increase in their interest payment burden. The percentage of their income that had to be used for interest rate payments rose by roughly 20 percentage points in the period from 2000 until the respective country-specific peak in the second half of 2008. This, in turn, reflects the tensions in the cost of financing of non-financial corporations in these countries. From the respective peak, the interest payment burden has generally declined, as the data for the second quarter of 2013 show, reflecting the pass-through of key interest rate cuts and some improvement in the credit conditions of firms.

Second, with respect to the maturity structure of assets and liabilities of non-financial corporations, a high share of short-term funding in total funding implies potential refinancing risks and may give rise to liquidity shortages in a stressed market environment. At the euro area level, the share of short-term debt in total non-financial corporations' debt decreased from 33% in 2000 to 24% by the end of the second quarter of 2013. Thus, at least from this perspective, non-financial corporations seem to be relatively well protected against sudden changes in short-term financing conditions.

Chart 7 Interest payment burden of non-financial corporations across euro area countries

(percentages; gross interest payments to gross operating surplus; ranking according to Q2 2013 value)

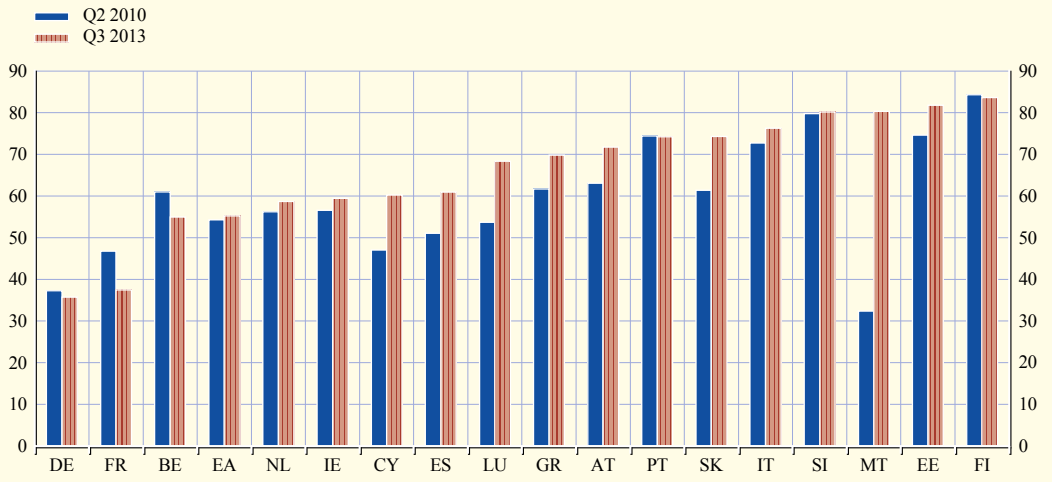


Source: ECB.
Notes: The peak denotes the country-specific maximum value between the first quarter of 2000 and the second quarter of 2013. Data are missing for Estonia, Cyprus, Luxembourg, Malta, Slovenia and Slovakia. "EA" denotes euro area.

10 Valuation effects on the outstanding amount of debt and/or equity include holding gains or losses owing to changes in market prices or other changes, e.g. write-downs in debt positions.

Chart 8 Share of short-term loans and long-term loans at floating rates in total MFI loans to non-financial corporations

(percentages; ranking according to Q3 2013 value)



Source: ECB.
Notes: Data based on amounts outstanding. "EA" denotes euro area.

Third, despite the fact that short-term funding accounts for a moderate percentage of total funding, interest rate risks may still be relevant if a large proportion of long-term debt is financed at floating, rather than at fixed, rates. Chart 8 shows the maturity composition of total outstanding bank loans accounted for by short-term MFI loans and long-term MFI loans at floating rates. Between the second quarter of 2010 (the start of the data series) and the third quarter of 2013, the euro area average increased only marginally, from 54% to 55%. Across euro area countries the situation varied widely, with the share of loans financed at variable rates being relatively small in Germany and France and highest in Estonia and Finland. While a higher share of financing at variable interest rates allowed companies to benefit from falling market reference rates (such as the EURIBOR) during the crisis, it potentially increases firms' vulnerability to interest rate rises.

Overall, only a gradual adjustment in debt is visible at the aggregate euro area level up to the second quarter of 2013, whereas more intense corporate deleveraging becomes apparent when looking at individual countries or at the different sectors of economic activity. In some countries and sectors, in fact, the accumulation of debt before the crisis was particularly strong, and it turns out that it is the same countries (like Ireland and Spain) and economic sectors (especially the construction and real estate services sectors) that have been most severely hit by the crisis and that have deleveraged most strongly up to the second quarter of 2013.

3 LEVERAGE DEVELOPMENTS ACROSS FIRMS' CHARACTERISTICS

A deeper analysis reveals that country and sectoral-level differences mask important heterogeneities across individual firms, reflecting a number of firm-specific characteristics. Focusing on these factors is crucial for a better understanding of whether and to what extent financing problems and general economic uncertainty have affected individual firms since the start of the crisis, and of the lingering vulnerabilities that stem from corporate financing challenges.[11]

11 For more detailed information on the firm-level dataset used for this article, see Annex 3 of the Structural Issues Report 2013.

The economic literature on firms' capital structures identifies a large number of factors that may explain the considerable degree of heterogeneity in firms' leverage (see the box). Some of these factors are firm-specific, such as profitability, the volatility and predictability of internal funds, the types of assets that should be financed and the willingness of entrepreneurs to accept new equity investors who could claim control rights. Other factors are generally common to firms belonging to the same sector of activity, such as the amount of working capital and fixed assets required to run the business. Finally, the firm's leverage could also be influenced by the characteristics of the institutional, legal and financial environment where the firm operates.[12]

12 These typically include country-level factors such as the development of financial markets, the types of relationship between firms and investors, the tax burden and structure, and the strength of the enforcement framework for creditor and shareholder rights. See, inter alia, Bancel, F. and Mittoo, U., "Cross-Country Determinants of Capital Structure Choice: A Survey of European Firms", *Financial Management*, Vol. 33, No 4, 2004, pp. 103-132; Fan, J.P.H., Titman, S. and Twite, G.J., "An International Comparison of Capital Structure and Debt Maturity Choices", *NBER Working Papers*, No 16445, 2010; De Jong, A., Kabir, R. and Nguyen, T.T., "Capital structure around the world: The roles of firm- and country-specific determinants", *Journal of Banking and Finance*, Vol. 32, No 9, September 2008, pp. 1954-1969; and Giannetti, M., "Do Better Institutions Mitigate Agency Problems? Evidence from Corporate Finance Choices", *The Journal of Financial and Quantitative Analysis*, Vol. 38, No 1, March 2003, pp. 185-212.

Box

WHY DOES CORPORATE STRUCTURE MATTER?[1]

The starting point for all the analyses of the capital structure of corporations is the Modigliani-Miller theorem (1958). The theorem suggests that, given perfect capital markets and a neutral tax system, the capital structure has no influence on a firm's value and the cost of capital. If the restrictive assumptions on which this theorem is based are relaxed, one can identify those factors that make corporate financing structures not indifferent and the underlying factors that drive them. For instance, the "trade-off" theory (Jensen and Meckling, 1976) stresses that companies set a target level of leverage at which the tax advantages resulting from the additional debt just offset the costs arising from potential financial distress. The "pecking order" theory (Myers and Majluf, 1984, and Myers, 1984) highlights the influence that asymmetric information between investors or lenders and company management can have on capital structure. Since asymmetric information increases financing costs, companies prefer internal financing to external financing and, since debt financing entails lower costs and no outside shareholders, companies prefer debt to equity if external funds are necessary. The above theories suggest a number of firm-specific characteristics should play a role in determining a corporation's capital structure. Empirical studies tend to find that leverage is affected negatively by firm-level profitability and growth opportunities but positively by firm size (e.g. book value of assets) and asset tangibility. Industry effects also play a role, as firms' debt ratios differ according to their respective industries. While most of these effects are roughly in line with the trade-off theory, the profitability effect is suggestive of a pecking order in financial decisions. Studies also often find that firms converge towards a target debt ratio, which corresponds with the trade-off theory.

From a financial stability perspective, one aspect to consider is the relationship between leverage and the probability of default. With rising indebtedness, borrowers' ability to repay becomes progressively more sensitive to falls in income and sales and, especially in the case of floating-

1 For detailed information on the references mentioned in the box, see the Structural Issues Report 2013.

rate debt, interest rate rises (Cecchetti et al. 2011). Moreover, in an economic downturn, the pressure of debt service costs is likely to cause highly leveraged firms to cut back investment (and, possibly, production and employment) more severely than less leveraged firms; thus high leverage may make the economy less stable (Bernanke and Campbell, 1988). From a conjunctural point of view, high leverage may lead to a debt overhang (Myers, 1977). If a firm has taken on too much debt, it might find itself in a situation where it cannot take on additional debt to finance future projects, even if these projects could generate a positive net present value, because the profit to be expected from them would be used to service existing liabilities. For the economy as a whole, the ensuing investment cuts might lead to a dampening of economic growth.

Recent studies (for example De Jong et al., 2011 and Almeida and Campello, 2010) stress that verifying capital structure theories should focus on joint tests of various theories that are able to discriminate between the different theoretical predictions. De Jong et al. (2011) establish that the pecking order theory better explains debt issuance, whereas the trade-off theory is better at predicting debt repurchase decisions. However, Byoun (2008) finds that, as firms approach their target leverage ratios, the speed of adjustment is faster when there is a financing deficit at below-target leverage and a financing surplus at above-target leverage. In addition, adjustment speeds are higher when firms have above-target leverage levels than when they have below-target levels. Moreover, firms facing a financial deficit (surplus) tend to increase (decrease) debt regardless of its level relative to the target. Thus, elements of both theories seem to be valid. Finally, Lemmon and Zender (2010) provide evidence in favour of the pecking order theory. After distinguishing financially constrained firms from unconstrained firms, they show that the latter satisfy their financing deficits almost entirely with debt, while the former (typically smaller firms) resort, to a larger extent, to equity issuance, owing to debt capacity concerns and their pronounced growth prospects.

The analysis in this section is based on firm-level balance sheet data from the Bureau van Dijk Amadeus database. The sample has approximately 13.8 million annual observations of 2.5 million firms in 17 countries between 2001 and 2011.[13]

LEVERAGE AND DELEVERAGING DEVELOPMENTS ACROSS EURO AREA FIRMS

Throughout the sample period, about one-third of firms did not show any leverage;[14] micro firms and young firms[15] account for 41% and 44% of these firms, respectively. The median level of leverage for indebted firms, mirroring the dynamics of the aggregate debt-to-assets ratio described in the previous section, increased steadily, by 8 percentage points to 22%, between 2001 and 2008 as a consequence of favourable conditions in credit and financial markets. Since 2008 the indicator has declined to 20%, primarily reflecting the weak dynamics of MFI loans (see Chart 9).

The leverage of a typical firm decreases with the firm's age and sales (see Charts 10a and 10b). This evidence, taken together with the high proportion of young and small firms with no financial debt, confirms the commonly held view that young and small companies face larger obstacles to borrowing

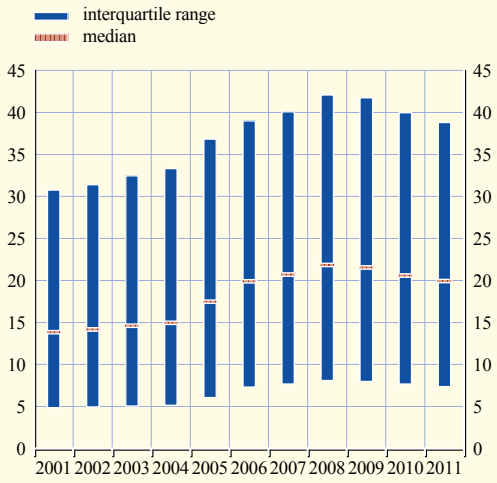
13 The main advantage of the Bureau van Dijk Amadeus database is that it includes comparable financial information for public and private companies in different countries. The sample used in the section comprises mostly non-listed non-financial enterprises, excluding those in the agriculture, forestry, fishing and mining sectors. For details on the dataset, see Annex 3 of the Structural Issues Report 2013.

14 Leverage is defined as the sum of short-term debt and long-term debt, divided by total assets. The definition excludes trade credit and provisions. This definition of leverage is close to the debt-to-total assets ratio analysed in the previous section although provisions are excluded from the definition.

15 The size classification is derived from the European Commission's definition and includes four categories of firm: micro, small, medium and large. For a detailed description, see Annex 3 of the Structural Issues Report 2013. Young firms are firms that are less than three years old.

Chart 9 Leverage of euro area non-financial corporations

(percentages)



Sources: Bureau van Dijk Amadeus database and ECB calculations.
Notes: Leverage is defined as the sum of short-term debt and long-term debt, divided by total assets. Firms with no financial debt are excluded. The interquartile range is defined as the difference between the 75th percentile and the 25th percentile.

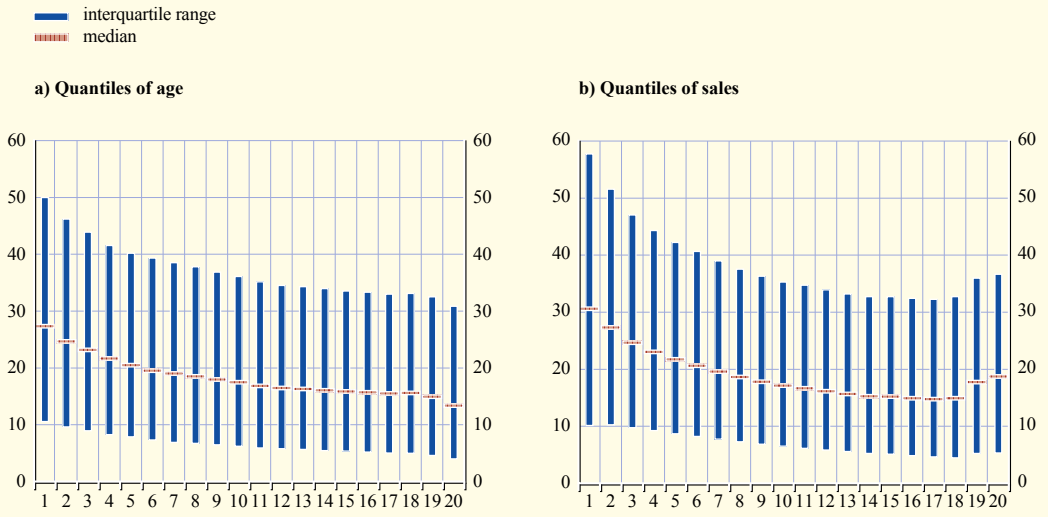
funds and that, once they borrow, they rely heavily on bank debt to finance their business. Firms with very high sales (presumably indicating high financing needs for investment and working capital) have higher levels of leverage.

Chart 11 shows the developments in firms' leverage over time according to size of firm. While remaining broadly stable between 2001 and 2004, corporate indebtedness in the euro area rose markedly among smaller-sized companies. Signs of deleveraging can be seen from 2009 onwards, but the leverage ratio remained high from a historical perspective.

To assess the extent to which such a pattern is common across firms with high and low levels of indebtedness, Table 1 shows the development of leverage ratios broken down by firms' size. It is interesting to note that the aggregate deleveraging pattern is compatible with one of increasing leverage for firms categorised as having low leverage levels, irrespective of the size of the firm. Indeed, the average leverage of firms that initially had zero or low levels of debt has continued to increase since the start of the crisis, while firms with initially high levels of leverage began deleveraging almost immediately. All firms with high ratios of debt to total assets, irrespective of their size, have

Chart 10 Leverage of euro area non-financial corporations, broken down by age and sales

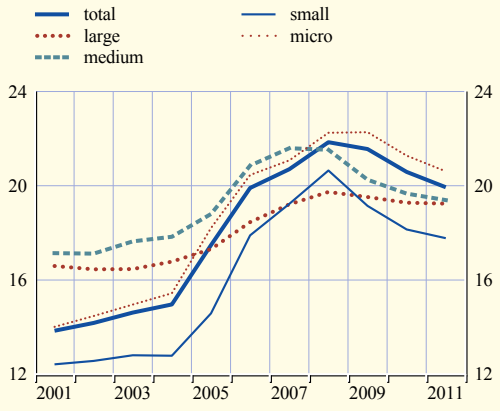
(percentages)



Notes: Leverage is defined as the sum of short-term debt and long-term debt, divided by total assets. Firms with no financial debt are excluded. The interquartile range is defined as the difference between the 75th percentile and the 25th percentile.

Chart 11 Leverage of euro area non-financial corporations by size

(median values; percentages)



Sources: Bureau van Dijk Amadeus database and ECB calculations.
Notes: See Chart 9. The size classes are defined using information on turnover, assets and the number of employees (if recorded). In order to control for differences in inflation, the values of turnover and assets are calculated in real terms, using the GDP deflator (the reference year is 2000). The classification is based on the ceilings defined by the European Commission. Micro firms have fewer than ten workers and a turnover or assets of less than €2 million. Small firms are those with fewer than 50 workers and a turnover or assets of less than €10 million, whereas medium-sized firms have fewer than 250 workers, a turnover of less than €50 million and assets of less than €43 million. Above these cut-off points, firms are classified as large.

undergone a deleveraging process. However, it has been more pronounced for micro firms and SMEs than for large firms, pointing once again to the fact that firms rely on bank loans and other sources of finance to different extents, depending on their size.

The pattern for firms with zero indebtedness during the crisis is consistent with and complements recent evidence on financially flexible firms. In particular, it has been shown that those companies that have accumulated spare debt capacity through a conservative leverage policy for a number of years before the crisis are those able to raise external finance and undertake investments when a growth opportunity comes along, despite a worse macroeconomic outlook.[16]

These results, therefore, add to the complexity of the assessment of the benefits of deleveraging and suggest that an aggregate deleveraging pattern might be compatible with one of increasing leverage at a certain point in time for firms categorised as financially flexible.

DETERMINANTS OF FIRMS' LEVERAGE DECISIONS AND THE IMPACT OF THE CRISIS

As explained in the box, a number of firm-specific characteristics can play a role in determining a corporation's capital structure. Firms with low or high operating profitability tend to be less leveraged than firms with intermediate operating profitability, pointing to the presence of a non-linear relationship between indebtedness and profits[17] (see Chart 12a). Moreover, Chart 12b shows that leverage increases with the proportion of tangible assets, which may be explained by the use of these assets as collateral or, more broadly, because tangible assets make borrowing firms more attractive to external investors (in this case, too, there are signs of a non-linear relationship between the two variables).[18]

When all these characteristics are taken together in an econometric analysis, the results confirm most of the existing empirical evidence.[19] For instance, the leverage of young firms (less than five years old) is approximately 4 percentage points higher than that of older firms. The empirical results

16 See Ferrando, A., Marchica, M.T. and Mura, R., "Financial flexibility across the euro area and the United Kingdom", *Working Paper Series*, No 1630, ECB, Frankfurt am Main, 2014. Using a similar sample of euro area non-financial companies, the authors observe that during the recent financial crisis all firms invested, on average, less than the preceding four years. However, financially flexible firms (defined as those that followed a conservative leverage policy before the crisis) seemed to be able to divest significantly less than others. During the period 2007-10, the reduction in their capital expenditure was about 6.8 percentage points, while for the other firms it was about 14.4 percentage points. Furthermore, financially flexible firms also seemed to be less exposed to market imperfections even during the severe conditions of the recent crisis, as they showed lower investment sensitivity to cash flow than the other companies.
17 The change in the slope is around the eighth quantile, where the profitability indicator is worth about 7%.
18 The change in the slope is around the seventh quantile, where the proportion of tangible assets is about 6%.
19 See Section 2.2 of the Structural Issues Report 2013. The analysis is based on a pooled Tobit model that covers the lack of leverage for many firms. Leverage is regressed against size, age, tangibility, profitability, growth of operating surplus and liquidity. Industry and country dummies are also included in the regressions.

Table 1 Leverage ratios before and after the crisis, broken down by size of firm and size of leverage

(percentages)

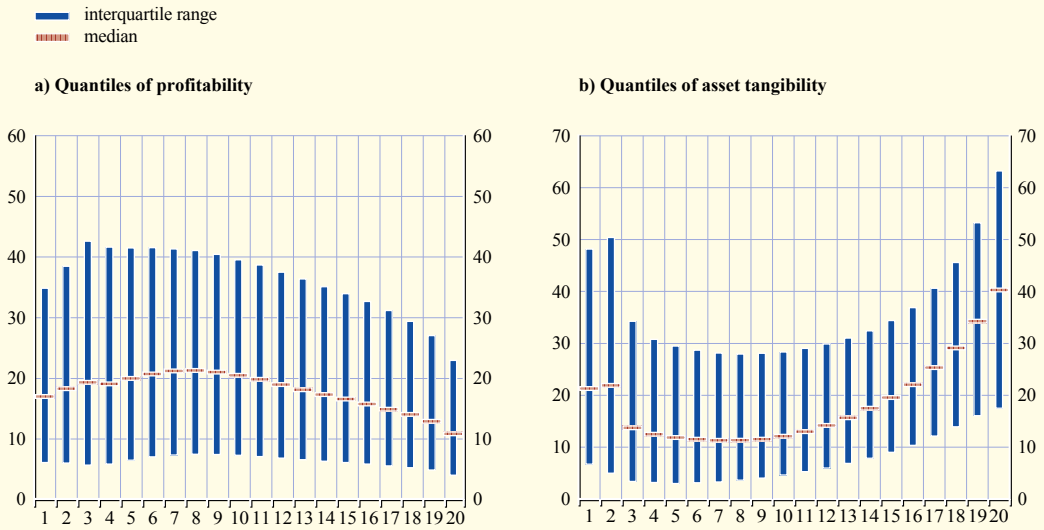
	2007	2008	2009	2010	2011
All firms with					
zero leverage in 2007	0.00	3.60	4.90	5.60	6.20
low leverage in 2007	9.80	11.10	11.60	11.50	11.90
high leverage in 2007	44.90	37.90	34.60	30.60	29.00
			Size breakdown		
Micro firms with					
zero leverage in 2007	0.00	3.60	5.00	5.70	6.30
low leverage in 2007	9.90	11.10	11.60	11.40	11.90
high leverage in 2007	45.70	38.00	34.50	30.00	28.30
SMEs with					
zero leverage in 2007	0.00	3.50	4.70	5.40	5.80
low leverage in 2007	9.50	11.40	11.70	11.70	11.90
high leverage in 2007	42.30	37.50	34.90	32.10	30.80
Large companies with					
zero leverage in 2007	0.00	2.50	2.80	4.10	4.00
low leverage in 2007	8.70	10.40	10.90	11.50	12.10
high leverage in 2007	41.30	38.00	35.80	35.20	34.00

Sources: Bureau van Dijk Amadeus database and ECB calculations.
Notes: Leverage is defined as the sum of short-term debt and long-term debt, divided by total assets. Firms with low leverage in 2007 are those which, in 2007, had positive leverage below the median (among indebted companies) in the corresponding sector and country in which they operated. Firms with high leverage in 2007 are those which, in 2007, had positive leverage above the median (among indebted companies) in the corresponding sector and country in which they operated. The size of companies is defined as in Chart 11.

also attest to the presence of asymmetries in the effect of firms' profitability, since leverage tends to be smaller both for firms with higher operating profits (in line with the pecking order hypothesis, for which profitable firms prefer to use internal funds) and for firms with higher operating losses (which are more likely to be subject to credit rationing by financial intermediaries). Among these

Chart 12 Leverage of euro area non-financial corporations, broken down by profitability and asset tangibility

(percentages)



Sources: Bureau van Dijk Amadeus database and ECB calculations.
Notes: Leverage is defined as the sum of short-term debt and long-term debt, divided by total assets. Firms with no financial debt are excluded. The interquartile range is defined as the difference between the 75th percentile and the 25th percentile.

factors, the most economically relevant variables appear to be firms' liquidity and tangibility of assets: an increase of one standard deviation is related to a decrease (increase) of 8 (6) percentage points in leverage.

The crisis seems to have not yet changed the main determinants of leverage across firms but there are some signals that the relevance of firms' characteristics has changed. For example, measures of profit, growth and tangibility seem to have had a smaller impact in the period after 2008. Cash is a notable exception, with the indications of a higher negative impact on leverage possibly stemming from the reduced availability of liquid assets during the crisis.

FIRMS' LEVERAGE RATIOS AND INVESTMENT DECISIONS

In the context of higher risk aversion of credit institutions, a firm's financial position is likely to have played a more relevant role in determining its access to external financing and in explaining both the recent decline in investment rates and the historical magnitude of the collapse in investment in 2009. Table 2 presents non-parametric results for the relationship between investment and financial pressure in 2008 and the subsequent investment rate drop in 2009. In particular, firms are grouped into three subsets, depending on whether they showed zero, intermediate or high levels of leverage in the run-up to the investment collapse in 2009. For each of these corporate groupings, a cross-sectional average of the investment rate in the period 2007-08 is computed and subtracted from the investment rate in 2009. A statistical test is then performed to check whether there are differences in the decline of investment rates across firms with different financial positions. The results in the table show that firms with higher levels of debt reduced their investment, indicating that the drain on future cash flows from debt repayments weighs negatively on firms' current spending and investment decisions when the macroeconomic outlook deteriorates. Higher interest payment ratios – which reflect the impact of changes in interest rates, company profitability and company indebtedness – are also associated with sharper declines in investment levels during crisis periods, large firms aside.

Overall, the fact that excessive corporate sector indebtedness may have become a drag on private sector investment is underpinned by firm-level evidence. Firms with higher levels of debt and with higher interest payment ratios reduced their investment more than others during the crisis. They also underwent a deleveraging process almost immediately. Conversely, a reverse pattern of increasing leverage is observed in the case of firms categorised by "low leverage" levels or by some degree of "financial flexibility" before the crisis. These distinct patterns on corporate balance sheet adjustment strategies should be taken into account when exploring the impact of policy interventions in the aftermath of the crisis.

Table 2 Declines in investment rates between 2007-2008 and 2009 for different corporate groupings, broken down by size

(percentage points)

	Firms with zero leverage in 2007-08	Firms with high leverage in 2007-08	Statistical difference between the two groups	Firms with low interest payment burden in 2007-08	Firms with high interest payment burden in 2007-08	Statistical difference between the two groups
Micro	-6	-9	yes	-6	-8	yes
Small	-8	-15	yes	-7	-13	yes
Medium	-12	-16	yes	-11	-15	no
Large	-11	-14	yes	-11	-13	no

Sources: Bureau van Diik Amadeus database and ECB calculations.

4 CORPORATE SECTOR INDEBTEDNESS AND MACROECONOMIC ENVIRONMENT

This section focuses on extracting lessons from the recent financial crisis – in comparison with previous similar episodes – for the medium-term analysis of the debt cycle in the corporate sector. The approach will be threefold. First, the recent euro area crisis is situated within the broader international and historical context of crisis episodes; the aim is then to derive a set of empirical regularities, draw lessons from them and infer policy responses that are also valid in today's circumstances. Second, expected future deleveraging pressures are identified. Third, alternative typologies of deleveraging patterns are explored, drawing on the historical episodes presented. The distinct patterns primarily differ on issues such as corporate balance sheet adjustment strategies, the interaction among deleveraging processes in various sectors and the role of policy.

THE EURO AREA CRISIS FROM AN INTERNATIONAL AND HISTORICAL PERSPECTIVE

In terms of severity, duration and scale, the recent financial crisis has caused the most serious economic downturn in several decades, both in the euro area and in most advanced economies. While many factors may well have contributed to the emergence and severity of past downturns, both theoretical insights and empirical evidence appear to point to the role played by debt accumulation in the run-up to the crisis.[20]

The present assessment considers recessions in 15 advanced economies between 1960 and 2013, drawing extensively on a dataset compiled by Schularick and Taylor (2012).[21] The analysis considers normal business cycle recessions, milder financial crisis recessions and systemic financial crises. Overall, 54 recessions are identified in the dataset, of which 40 are classified as normal business cycle episodes, nine as milder financial crises and five as severe (systemic) financial crises (the "Big Five" crises identified by Reinhart and Rogoff (2009)).

Chart 13 shows the increase in the ratio of bank credit to GDP around the peaks in economic activity.[22] In contrast with Section 2 of this article, this analysis is based on consolidated debt data, as the view is on the entire non-financial corporate sector and the relationship of corporate debt with the macroeconomy. Together with the developments in the latest euro area crisis, the chart shows the "average cycle", obtained by taking the average of all identified downturns. The blue area shows the interquartile range, a measure of the dispersion around the "average cycle". While the run-ups to crises have often been characterised by rising debt levels, the extent of debt accumulation in the latest euro area crisis appears remarkable in an historical perspective. The build-up of debt in the euro area prior to the economic downturn lies outside the interquartile range

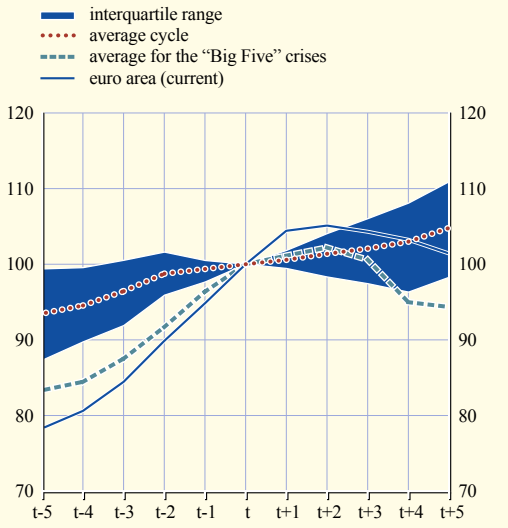
20 See Schularick, M. and Taylor, A.M., "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008", American Economic Review, Vol. 102, No 2, April 2012, pp. 1029-1061. While improving welfare when at moderate levels, debt adds to instability when excessive and weighs negatively on the economy. Indeed, literature dating back to the seminal contributions from, for instance, Fisher ("The debt-deflation theory of great depressions", *Econometrica*, Vol. 1, No 4, October 1933, pp. 337-357), Kindleberger ("Manias, panics and crashes: a history of financial crisis", *New York Basic Books*, 1978) and Tobin ("Review of Stabilizing an Unstable Economy by Hyman P. Minsky", *Journal of Economic Literature*, Vol. 27, No 1, pp. 105-108, 1989) has identified leverage, in the form of excessive credit, as a major source of macroeconomic instability and financial fragility. More recently, a number of empirical papers have focused on the role of debt accumulation and debt levels in shaping macroeconomic performance by considering a pool of countries across a number of decades. See, for example, Jorda et al., "Financial Crises, Credit Booms, and External Imbalances: 140 Years of Lessons", *NBER Working Papers*, No 16567, 2012, Reinhart and Rogoff, "From Financial Crash to Debt Crisis", *American Economic Review*, Vol. 101, No 5, August 2009, pp. 1676-1706, and Cecchetti et al., "The real effects of debt", *Working Papers*, No 352, Bank of International Settlements, 2011.

21 Notably, Schularick and Taylor (2012) analyse the behaviour of money, credit and macroeconomic indicators over a remarkably long time period from 1870 to 2008. The countries considered are Australia, Canada, Denmark, France, Finland, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States.

22 This section refers to the ratio of bank credit (consolidated) to GDP as an indicator of debt developments.

Chart 13 Ratio of bank loans to the private sector to GDP across cycle peaks

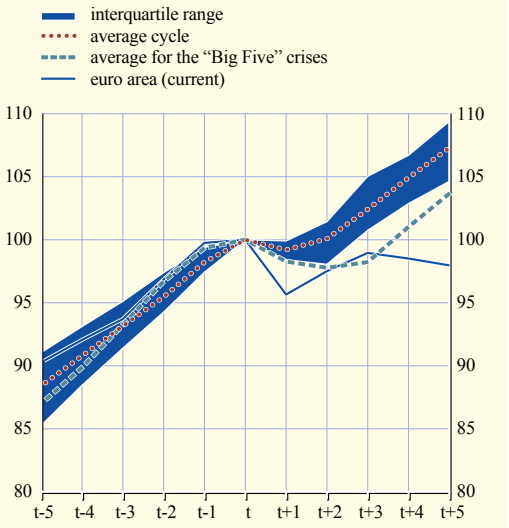
(as a percentage relative to the level recorded at the GDP peak)



Sources: ECB, national sources and ECB calculations.
Notes: The data for historical episodes are taken from the dataset compiled by Schularick and Taylor (2012). Period *t* represents the year of the peak in GDP prior to the crisis episodes. The level of indebtedness is normalised at 100 in the same year. For the euro area, the cycle peak is identified as 2008.

Chart 14 Real GDP level across cycle peaks

(as a percentage relative to the GDP peak)



Sources: ECB, national sources and ECB calculations.
Notes: The data for historical episodes are taken from the dataset compiled by Schularick and Taylor (2012). Period *t* represents the cycle peak. For the euro area, the cycle peak is identified as 2008.

and is more intense than the average developments across the "Big Five" financial crises. Provided that historical similarities can be used as a guide, further downward adjustment of the credit-to-GDP ratio is to be expected for the euro area.

Chart 14 shows the level of real GDP before and after major economic downturns. The exceptional severity of the latest euro area recession, even when measured against a wide range of historical and international episodes, is apparent from the sharp decline in GDP (around 5.6% from the pre-crisis peak to the trough). Moreover, the euro area economy levelled off only modestly after the trough and still stands around 2.0% below the pre-crisis peak.

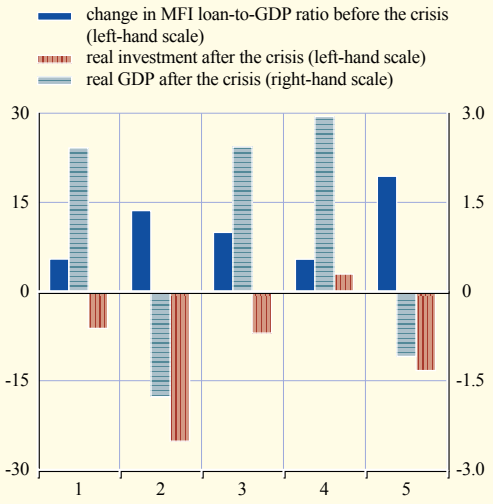
DEBT ACCUMULATION AND THE SEVERITY OF THE DOWNTURN

Overall, theory and evidence point to the fact that debt accumulation may not be problematic per se. In fact, by transferring resources across time and individuals, debt accumulation can improve welfare when kept at sustainable levels. However, when excessive and used to finance less profitable investments, debt adds to financial instability and weighs on the severity of the downturns and the subsequent recovery.[23]

23 Annex 6 of the Structural Issues Report 2013 provides a formal analysis that supports evidence of the impact of debt accumulation on the probability of a financial crisis episode in the 17 euro area countries, using quarterly data over the period from the first quarter of 1980 to the second quarter of 2012. More specifically, a logit model with country fixed effects is used, where the variable of interest (i.e. the crisis dummy) takes the value of 1 in the case of a crisis episode and 0 in all other cases. Notably high debt accumulation, in the form of past real loan growth, is statistically significant across various model specifications that control for real and financial variables and their interactions.

Chart 15 Credit accumulation prior to recessions and subsequent recovery

(percentage points)

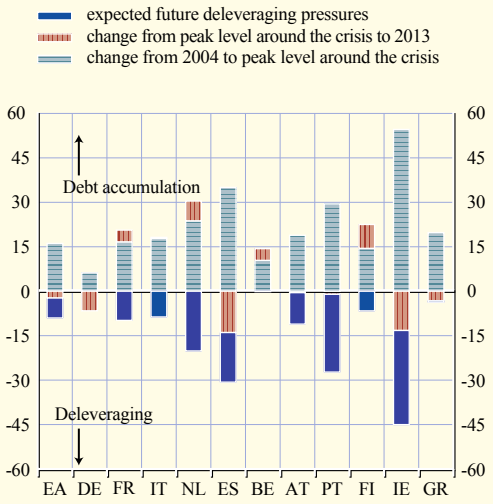


1 Average cycle
2 "Big Five" crises
3 Milder financial crises
4 Average non-financial episodes
5 Euro area (current)

Sources: ECB and ECB calculations.
Notes: The solid blue bars represent changes in percentage points, while the striped light blue and reddish bars represent the percentage deviations from pre-crisis levels. "Before the crisis" refers specifically to the four years immediately preceding the crisis and "after the crisis" refers specifically to the three years following the crisis peak. For the euro area, the cycle peak is identified as 2008.

Chart 16 Ratio of corporate sector debt to GDP in euro area economies

(percentage points)



Sources: ECB and ECB calculations.
Notes: Corporate sector debt is defined as the sum of MFI loans and market-based debt (consolidated data). The peak level around the crisis refers to the maximum level reached between the first quarter of 2008 and the fourth quarter of 2009. The "expected deleveraging pressures" are calculated as the simple average of three statistical benchmark estimates: the deviation of corporate debt to GDP at the end of 2013 from (i) the historical average, from (ii) the pre-boom 2004 level and from (iii) the euro area median at the end of 2013. "EA" denotes the euro area.

To illustrate this point, by drawing on the historical international crises illustrated above, Chart 15 shows the accumulation of debt during the four years prior to the specific crisis and the level of real investment and real GDP three years after the crisis peak.[24] Two key conclusions can be drawn from the chart. First, large accumulation of debt prior to a crisis is associated with subdued development of real GDP and investment in the aftermath of the crisis. Second, consistent with what is illustrated above, there are some similarities between the pattern for the recent euro area crisis and the most severe financial crises (the "Big Five" crises): the large accumulation of debt prior to the crisis continues to weigh on the economy three years after the crisis peak, with real GDP and investment levels remaining below pre-crisis peaks.

Focusing on the latest episode, while some progress in deleveraging has been made, if history is any guide, further adjustment might be expected. This is particularly the case of those countries that experienced a relatively stronger pre-crisis boom. A tentative quantification of expected future deleveraging pressures for euro area corporate sectors is illustrated by the solid blue bars in Chart 16. It is derived on the basis of three distinct statistical benchmarks, namely the deviation of the

24 The connection between the intensity of credit accumulation in the expansionary phase and the severity of subsequent recessions has been recently documented by a number of empirical studies, which review historical episodes. See, in particular, Jorda, O. et al. (2011).

corporate debt-to-GDP level at the end of 2013 from (i) its historical average (calculated from the first quarter of 1995 to the fourth quarter of 2013), from (ii) the pre-boom 2004 level and from (iii) the euro area median at the end of 2013.[25] All three benchmarks identify deleveraging pressures for euro area firms in Ireland, Spain, the Netherlands and Portugal. The main caveat is that the equilibrium debt levels can differ across countries and vary over time. Structural change in the economy and sectoral composition, as well as developments in financial markets and economic patterns, among other factors, may explain the differences in the long-term equilibrium levels of debt.

ALTERNATIVE DELEVERAGING PATTERNS AND POLICY IMPLICATIONS

Drawing on the historical episodes presented above, several economic patterns are associated with deleveraging in the aftermath of financial crises. These distinct patterns primarily differ on issues such as corporate balance sheet adjustment strategies, the interaction among deleveraging processes in various sectors and the role played by policy.[26]

Historical evidence shows that the process of introducing policy measures to tackle structural corporate finance issues and investment decisions is a balancing act, as measures must also support a necessary and sound adjustment favouring more sustainable and stability-oriented economic growth. Policy interventions should, in general, avoid disorderly or abrupt deleveraging processes that could imply an abrupt tightening of lending standards or a withdrawal of credit by banks. In such circumstances, both supply-side and demand-side factors have a strong and self-reinforcing adverse impact on the economy. In such a scenario, timely monetary policy interventions may be effective in containing deleveraging pressures that stem from a shortage of liquidity and the associated funding for banks. However, monetary policy intervention aimed at preventing an abrupt credit crunch may not come without a price. In particular, if ill-designed and not supported by regulatory initiatives geared towards reinforcing lenders, it may contribute to delaying the necessary adjustment and, ultimately, increase the economic costs of the deleveraging process. Fragile banks would have an incentive to continue financing troubled and inefficient firms so as to avoid recognising further losses. In this scenario, the unwinding process can become a long-lasting drag on the economy and is likely to be curbed by subdued output dynamics.

Balancing the risks described above means encouraging a steady, controlled and ordered restructuring process in the financial and non-financial sectors, consistent with sustainable long-term patterns. Such interventions are centred on an early recognition of losses and write-downs on the part of creditors, thereby acknowledging that some lending is no longer viable. An overly indebted non-financial corporate sector puts particular strain on the banking sector. If creditors' balance sheet capacity is also restricted and capital eroded, a prompt recapitalisation of the banking system is of utmost importance as part of a general effort to reduce excess capacity and improve efficiency in the banking sector.[27] Previous crises have highlighted the importance of measures aimed at strengthening banks' balance sheets. Doing so allows financial institutions to withstand potential loan losses associated with the deleveraging process of the non-financial private sector and, at the same time, to continue providing credit to the economy. In addition, a firm's default

25 The estimate of the expected deleveraging pressures is the simple average of the three benchmark estimates.
26 See also the article entitled "Comparing the recent financial crisis in the United States and the euro area with the experience of Japan in the 1990s", *Monthly Bulletin*, ECB, May 2012.
27 Private burden-sharing should be used as far as possible. Only if this redistribution does not allow the private sector to fully absorb losses should the public sector support reparation and strengthen particular segments of the private sector's balance sheets. See the box entitled "Towards a new EU framework for bank recovery and resolution" in the article "Heterogeneity in euro area financial conditions and policy implications", *Monthly Bulletin*, ECB, August 2012.

could take the form of a broader cleansing process, in which resources are ultimately reallocated to more productive sectors.[28]

Looking forward, to resolve the current crisis, but also to prevent future crises, structural policies designed to develop a financial system that offers a broader range of financing alternatives and instruments can contribute to creating improved corporate capital structures that have more diverse financing sources and thus are, crucially, more resilient to abruptly changing bank lending conditions. Specifically, raising the proportion of risk capital in the financial structure of firms, in particular small and medium-sized enterprises, via measures that improve their access to equity and debt markets could encourage more moderate and stable recourse to loans. In addition, structural reforms that aim to increase competitiveness and reduce unemployment are a crucial part of crisis resolution. Historical evidence and theoretical insights suggest that, in a context of weak domestic demand associated with internal balance sheet adjustments, regaining competitiveness in the product and factor markets by reallocating resources towards better performing firms is crucial for stimulating exports and, hence, sustaining economic recovery.

5 CONCLUSIONS

There was a considerable accumulation of private debt prior to the outbreak of the financial crisis in 2008. So far, based on data up to the second quarter of 2013, the necessary deleveraging process has remained rather gradual at the aggregate euro area level. However, this article shows that a deeper analysis provides a more nuanced picture. Thus, aggregate euro area developments hide more significant movements in some euro area countries and in some sectors of economic activity, which were especially affected by the crisis. Notwithstanding, leverage still appears high in these areas. If history is any guide, further deleveraging is expected, particularly in those countries that experienced a more intense pre-crisis boom. The extent to which the corrective adjustments are a drag on the economy will depend primarily on the macroeconomic channels through which the adjustment process occurs and the progress made in those countries in terms of restoring overall debt sustainability, the solidity of the banking sector and the implementation of supportive structural reforms.

The historical episodes described in the article suggest that policy interventions should prevent a disorderly and disruptive deleveraging process. In this context, monetary policy in the euro area has proved effective in containing deleveraging pressures on banks by providing liquidity support. Conversely, economic policies should avoid contributing to a delay in the balance sheet adjustment process, which would ultimately increase the economic costs of the deleveraging process. In order to strike a balance, economic policies need to firmly encourage an orderly restructuring process in the non-financial and financial sectors that is consistent with sustainable long-term economic growth trends and geared, in particular, towards strengthening balance sheets. In this context, a properly funded and functioning banking sector is crucial for an adequate access to credit for the corporate sector. The banking union is of key importance in this respect, as it will not only accelerate necessary balance sheet adjustments but also support the stability of the financial system by leading to a unified framework for the supervision of banks. At the same time, structural policies aimed at developing a financial system that offers a broader range of financing alternatives and regaining competitiveness in the product and factor markets are crucial for sustaining the economic recovery.

28 See Giesecke, K. et al., "Macroeconomic Effects of Corporate Default Crises: A Long-Term Perspective", *NBER Working Papers*, No 17854, 2012.