Financial frictions and corporate investments in bad times. Who cut back most?

(preliminary draft, June 2016)

Brunella Bruno*, Alexandra D'Onofrio **, Immacolata Marino***

June 2016

Abstract

We explore the differential impact of leverage and debt maturity structure on investment in European firms belonging to different countries and industries during the financial and sovereign crisis period. Our main result is that leverage exerts a strong and negative effect on the level of investment ex post. We also find that firms with more long-term debt invest less ex post. We uncover heterogeneous reactions to crisis due to debt level and its maturity by sorting firms by country-specific and firm specific-characteristics. We in particular find that firms who cut back most investment in crisis years (conditional on the level of leverage and long maturity) are (i) located in Periphery countries and (ii) featured by a small-scale. Factors that help firms alleviate financial frictions and shield investments are reliance on multiple bank relationships and ability to generate internal resources (cash flows). We find no evidence of a positive nexus between cash and investment, and only little evidence of a positive effect on investment of accessibility to capital markets, to mitigate the negative impact of debt in crisis years.

Keywords: Investment, leverage, long term debt, crisis

* Università Bocconi, Department of Finance;** Assonime;*** Università di Napoli Federico II and Center for Studies in Economics and Finance (CSEF).

1. Introduction

In this paper we look at the performance of European firms over 2006-2013, a boom and bust decade. We focus on the evolution of private fixed investments in the crisis and post-crisis years. Private fixed investment in advanced economies contracted sharply since the 2008-09 banking crisis, and there has been a little recovery since (IMF 2015). In Europe the combination of the banking crisis and the euro debt crisis has made the recovery particularly slow and uncertain. European countries' reaction to crises has been heterogeneous, being the Euro-Periphery countries notoriously more affected by the downturn than Euro-Core countries. In addition to country specificities, firm-specific characteristics may have contributed to firms' heterogeneous reactions to the weak economic environment. In other words, firms' balance sheet strength can have amplified or mitigated the negative effect of recent crisis years.

Several key determinants may have affected European firms' investment decisions. Among these, a major role is played by leverage. Many commentators argued that the lending boom of the early 2000s, which fuelled the run-up to the sub-prime crises, caused firms and banks to increase their leverage substantially (Rodriguez-Palenzuela and Dees 2016). When the boom turned into a bust and banks deleveraged through contraction of credit, the global economic meltdown occurred (Kalemli-Ozcan et al. 2012). Not only the level of debt but also its composition may play a role, because some debts can be easily renegotiated unlike other forms of debt. For example, small businesses tend to hold more bank debt, regardless of the sector considered.[1] For some sectors, trade credit is a more important source of external financing than bank credit. Real estate is the sector which is the most dependent on bank credit (between 60 and 70% of total debt) regardless of firm size (Rodriguez-Palenzuela and Dees 2016). These differences could have implications for investments.

Against this background, we want to explore the role of firms' leverage in influencing the impact of the crisis on investment. The theory predicts that financial structure affects output dynamics and it does it so more when financial frictions increase. While financial deepening, through greater access to bank credit and securities, can help boost productivity levels and reduce macro volatility by diversifying firms' funding options, excess leverage can more than offset these benefits by raising corporate vulnerabilities and amplifying firms' sensitivity to income and interest shocks. This financial accelerator effect can in turn lead to larger and more persistent cyclical fluctuations in the economy (Bernanke and Gertler 1989).

We also want to explore whether, together with leverage, the maturity structure of debt matters in explaining investment patterns in Europe through the cycle. The effect of debt maturity on investments is still unclear and mainly related to firms' characteristics.[2] Long term debt should be in principle better able to cover

---

[1] Compared to US firms, European corporates tend to be more leveraged and, overall, more relying on bank credit. This peculiarity is in part determined by the average smaller size of European firms, which amplifies information asymmetries and makes the access to public debt market costly, if not unfeasible.

[2] See Stohs and Mauer (1996) for a detailed literature review on the determinants of debt maturity structure.

financial needs emerging from long term investments such as capital expenditures. A common prescription in the literature is that a firm should match the maturity of its liabilities to that of its assets. If debt has a shorter maturity than assets, there may not be enough cash on hand to repay the principal when it is due. Alternatively, if debt has a longer maturity, then cash flows from assets cease, while debt payments remain due. Maturity matching can reduce these risks and is therefore a form of corporate hedging that reduces expected costs of financial distress (Stohs and Mauer 1996). In addition, a greater reliance on shorter term debt may increase rollover (liquidity) risk and hurting firm's incentive to invest especially in bad times, and when firm's value declines after the debt was issued (Diamond and He 2012), or for lower quality borrower (Diamond 1991). It is also plausible, on the other hand, that a greater reliance on short term debt makes it simpler to adjust a firm's financial structure. Hence, the leverage cannot be adjusted if there is long-term debt, but it can be adjusted every period if short-term debt is issued (Moyan 2007). The more so if growth opportunities are unanticipated, or if costs associated with the adjustment of debt maturity are high (Aivazian et al 2005).

We analyse a large sample of firms from five major European countries (France, Germany, Italy, Spain, and UK). It is well known that these countries' reaction to the banking and the euro sovereign crises has been heterogeneous. For example, GDP and bank credit have grown at different pace: according to IMF and World Bank data, GDP growth rate since 2008, on average, has been between -1.05% (Italy) and 0.91% (UK); bank credit growth rate, on average over the same period, oscillates between -1.04% (Spain) and 4.93% (Germany). Overall, the impact of the two crises (particularly of the Euro sovereign crisis) have been more severe in Periphery economies, rather than in Core or non-Euro countries (Acharya et al. 2015). Regardless of the country, not only firms but even sectors have been hit by the crises with different intensity and industry affiliation has become a key determinant of the level of corporate investment in Europe (Rodriguez-Palenzuela and Dees 2016).[3]

We assess the differential impact of leverage and debt maturity structure on investment in firms belonging to different countries and industries by employing a difference-in-difference approach. In our baseline specification we compare the investment of firms before and after the onset of the banking and the Euro sovereign crisis as a function of leverage and debt composition, controlling for country-sector-year fixed effects, firm fixed effects, size, cash and cash flows, and observable measure of investment opportunities (sales growth). Unlike previous contributions (Barbiero et al. 2015; Kalemli-Ozcan et al. 2015) we look at firms' financial position *prior* to the start of the crisis and sort firms into high versus low debt group.[4] This approach enables us to address endogeneity issues deriving from using a continuous difference-in-difference methodology, since variation in firms' financial position as the crisis unfolds might be endogenous to

---

[3] For example, one may expect that firms suffer less if they belong to less external finance dependent sectors or to traded sectors, because these firms can in principle tap their financial needs with internal sources of funds or by accessing foreign capital markets, when domestic credit is depressed (Duchin et al 2010; Dell'Ariccia et al 2008).
[4] Our approach resembles that employed by Duchin et al (2010), but it is different in that they look at the role played by cash holding on investments of large listed US firms during and after the onset of the sub-prime crisis.

unobserved variation in investment opportunities.[5] It also allows us to estimate the differential impact of debt, in that we are able to compare investment patterns of high-debt versus low-debt firms.

Our main result is that leverage exerts a strong, negative effect on the level of investment ex post. We also find that firms with more long-term debt invest less ex post. These results are consistent across specifications and different set of controls. We in particular find heterogeneous reactions to crisis due to debt level and its maturity by sorting firms by country-specific and firm specific-characteristics.

When we split the sample by countries, we find that overall high levered firms invested less then low levered firms in all countries since the banking crisis, but the more so in France, Italy, and Spain, while the differential role played by leverage on investment is less pronounced in Germany and UK. When we look at long term debt, we find evidence of a negative impact on investment in France, Italy, and UK, with no effect in German and Spanish businesses. When present, the negative impact of either leverage or long term is persistent over 2008-14 but becomes more severe since the onset of the sovereign crisis. Interestingly, we uncover a positive role played by short term debt in France and Italy, since firms with more short term debt do invest by more (relative to firms with less short term) in both countries. Such an effect is more evident in Italy, and is more accentuated during the banking crisis.

An important novel feature of our paper is that we employ additional sources of identification by carrying out cross-sectional analyses based on firm-level measures of dependence on internal and external sources of financing. Because, due to lack of data, we cannot distinguish debt by type, we first look at size to capture bank dependent borrowers. Considering the occurrence of large shocks to the banking system in Europe since the global financial crisis, we expect bank-dependent borrowers (namely smaller firms) to have reduced investment by more due to greater financial constraints. We find that highly levered small firms (as well as those with more long term debt) cut back investment by more in crisis years that less levered (with less long term debt) small firms. The discrepancy between highly levered (with more long term debt) and low levered (with less long term debt) medium-large firms is less pronounced. We interpret this finding as a consequence of a credit channel effect. To shed light on the effect of bank credit, we then split our sample according to the fact that firms have a single or multiple related banks. We find in particular that multibanking in crisis times may be beneficial in shielding investment in highly debt firms. We explain this result in light of the fact that firms with multiple related banks are better able to compensate credit constraints through substitution across banks (Detragiache et al. 2000).

When we account for firms' ability to tap capital markets, we find that the accessibility to bond market does not mitigate the negative role of leverage and long term debt on investment in crisis years. Hence, it appears

---

[5] Note that leverage and maturity structure maybe endogenuos to investment. In theory, even if (long-term) debt creates potential underinvestment incentives (suggestive of a negative nexus), the effect could be attenuated by the firm taking corrective action and lowering its leverage and maturity, in view of anticipated future investment opportunities.

that even if firms could make up decline in bank lending through borrowing in the bond market (Adrian et al. 2011), these funds are not used to increase capital expenditures, or are only partially used to this purpose. Instead, we find no impact of indebtedness on investment in listed firms. The effect of long term debt on firms' investment is even stronger if these firms are in principle able to access the capital markets.

Trade credit is an important source of borrowing, especially for small-sized firms. In principle, during monetary policy shocks or business downturns when bank credit becomes constrained, trade credit can provide access to capital for firms that might be unable to fund through more traditional channels (Petersen and Rajan 1997; Carbò- Valverde et al. 2016). To account for such an effect, we differentiate firms according to their level of trade debt over total debt. We find evidence of the opposite phenomenon, i.e. a high level of trade credit seems to amplify the negative effect of leverage and long term debt on investments.

Finally, following Duchin et al (2010) we explore the role played by cash and cash flows to measure firms' ability to alleviate financial constraints by using on internal funds. To understand whether higher (pre-crisis) internal funds mitigate the negative impact of debt on investment in crisis years we differentiate firm by cash holdings and cash flows. Contrary to previous evidence (Duchin et al 2010), we find that firms with high-leverage and high-cash holdings cut back investment by more in crisis than firms with high-leverage and low cash holding. This finding is not surprising, since in times of high uncertainty cash may serve not only as a financial buffer against liquidity shocks, but also as portfolio choice, replacing fixed investments (Rodriguez-Palenzuela and Dees 2016). Instead, we find evidence of a positive impact of cash flows in relaxing financial constraints and mitigating the negative impact on investment of both high leverage and high long term debt.

This paper provides new evidence on the relationship between financial leverage and investment. While most of the extant literature that links financial structure to investments is focused on large and listed US firms, our sample is made of European large and small-medium enterprises, both listed and unlisted.[6] This enables us to capture the differential role played by financial constraints on corporate investments and to exploit the heterogeneity across firms due to the reliance on different sources of funding. It also contributes to the literature on the real effect of financial crises (Dell'Ariccia et al 2008; Duchin et al 2010; Buca and Vermeulen 2015). We in particular extend the recent literature on the effect of debt overhang in Europe (Barbiero et al. 2015 and Kalemli-Ozcan et al. 2015) in several important dimensions pertaining to empirical methodology, including (1) the treatment of problem of endogeneity in the relationship between investment and leverage, (2) the introduction of various specifications to explore the role of different sources of financing, conditional on the pre-crisis firms' level of debt. We also complement the literature on multiple relationship banking, providing new evidence of a positive effects of multibanking in a context of reduced credit supply, when relying on a single bank may increase a firm's financial constraints.

---

[6] Recently, Barbiero et al. (2015) and Kalemli-Ozcan et al. (2016) have looked at a pan-European firm dataset.

This paper carries important policy implications. We find evidence of vicious feedback loops between investment and weak balance sheet and show different investment patterns in firms with different access to alternative source of funding. These results confirm the relevance of flexibility in the financial system (De Fiore and Uhlig 2015) and call for measures to incentivize firms' access to capital markets, especially those targeted to SMEs. In highlighting the strain posed by leverage on investment, our findings also point to the need for more effective institutional frameworks, especially in Periphery countries, to be in place to prevent the build-up of new imbalances. These include initiatives to enhance governance and transparency and tax policy measures to limit debt bias and other distortions in the corporate sector (Goretti and Souto 2013).

The structure of the paper is as follows. Section 2 reviews briefly the main related literature and develops our main hypothesis. Section 3 presents detailed stylised aggregate facts on European firms' performance over 2006-13. Section 4 describes data and statistics to highlight the considerable cross-sectional and times series variation present in our firm-level data. Section 5 illustrates our empirical strategy and presents results. Section 6 concludes.

2. Main literature on debt and investment and hypothesis development

We first briefly review the related literature underpinning our main hypothesis, i.e. leverage (low net worth) is a major factor to weaken firms' balance sheet.

A central and highly debated issue in corporate finance is the nexus between debt and investments. In a Modigliani-Miller setting the market value of a firm should be independent of its capital structure and, as a result, the firm's investment decisions should be unaffected by the type of security used to finance it. However, in the presence of market frictions, arising for example from asymmetric information between external investors and company managers, firms' capital structure would increasingly deviate from a well-defined leverage target at least in the short term, with firms favoring internal to external financing, and debt to equity (pecking order theory).[7]

The theoretical motivation behind this view is that asymmetric information makes it costly for investors to monitor managers that in principal may use borrowed resources inefficiently. Lenders require higher rate of return to be compensated for the possibility that the managers are wasting resources. Internal funds are therefore cheaper at the margin then external funds. It follows, *coeteris paribus*, that firms with plenty of internal resources tend to invest more and hence, overinvestment problem arises. Moreover, it seems that highly levered firms are less likely to exploit valuable growth opportunities as compared to firms with low leverage levels due to the agency cost of outstanding debt (Myers 1977). The shareholder-manager coalition in control of a firm with high-growth opportunities might pass up positive-NPV projects (giving rise to a underinvestment problem) because with risky debt, the payoff of such projects at least partially accrues to the

---

[7] These agency models clearly show that the conflicts of interest among managers, shareholders and debt-holders over the exercise of investment will create potential underinvestment and overinvestment incentives, in which corporate financing and investment decisions become interrelated.

debt-holders rather than fully accruing to the shareholders and managers. Alternatively, Jensen (1986) and Stulz (1990) argue that in low-growth firms with large free cash flows, leverage is a disciplining device because it discourages managers from overinvesting in risky projects and/or avoiding the empire building phenomenon (Stulz 1990).[8] Hence, leverage is one mechanism for overcoming the overinvestment problem suggesting a negative relationship between debt and investment for firms with weak growth opportunities (Aivazian et al 2005).

These underinvestment incentives can be mitigated, however, if in anticipation of valuable growth prospects, the firm lowers its leverage and/or shortens the maturity structure of its debt (Myers, 1977). Lowering leverage directly reduces the cost of risky 'debt overhang' and allows valuable growth opportunities to be taken. Maturity matters because, using short-term debt that expires before an investment project enables shareholders to gain the full benefit from the new project through renegotiation of the debt contracts, thereby mitigating the underinvestment problem. In this view, leverage and debt maturity may work as substitute device to control the underinvestment problem. If leverage and maturity are considered strategic substitutes, firms using short-term debt to sufficiently resolve the underinvestment problem have less incentive to lower leverage. Similarly, firms that can sufficiently control underinvestment incentives by reducing leverage will have less incentive to use short-term debt (the negative effect of growth opportunities on debt maturity can be attenuated by the initial decision to use low leverage).

The liquidity risk hypothesis developed by Diamond (1991) and Sharpe (1991) has important implications for the interactions among growth, leverage and debt maturity. Liquidity risk may impose a constraint on a firm's choice of short-term debt maturity, which may be required to control the underinvestment problem. Due to asymmetric information regarding investment, firms using short-term debt may not be able to roll over the outstanding debt contracts. Too much short-term debt creates significant liquidity risk. Similarly, when the cost of the liquidity risk associated with short-term debt is greater than the reduced cost of underinvestment problems, firms will have less incentive to shorten their debt maturity. Overall, transaction costs and liquidity risk may constrain firms from fully adjusting their leverage and debt maturity structure, resulting in underinvestment ex post.

Furthermore, when growth opportunities are not anticipated sufficiently early and completely, there is even less scope for alleviating underinvestment incentives (Aivazian et al. 2005). Renegotiation with the debt-holders will have to be completed quickly, thus increasing the bargaining and transaction costs faced by the firm. These increased costs will further prevent the firm from adjusting their leverage and debt maturity. Hence, firms with a high leverage ratio and/or a long-term debt maturity ex ante will be likely to forgo valuable growth opportunities, implying a negative effect of leverage and debt maturity on their ex post investment levels.

---

[8] Debt serves as a protection mechanism against overinvestment, because free cash flow that can be used for personal benefits of the managers should be paid to bondholders in the form of interest. Unlike dividends the interest payments are mandatory and not paying them leads to default and eventually bankruptcy

Myers (1977) underinvestment hypothesis also provides important empirical implications for the interactions among leverage, debt maturity, and investment outcomes ex post. The discussion above demonstrates how lowering leverage and/or shortening debt maturity can help mitigate underinvestment incentives. The argument follows that if in anticipation of high-growth options, firms can resolve the underinvestment problem completely by ex ante restructuring of leverage and debt maturity, they will be able to exploit more growth opportunities ex post. In particular, a low-leverage and/or a short-term debt maturity strategy allow more growth options. This prediction, however, depends on the assumptions that growth opportunities are fully recognised and that underinvestment incentives can be controlled completely through the ex ante restructuring of leverage and debt maturity (Aivazian et al. 2005a). A violation of any of these two assumptions will give rise to a negative effect of leverage and/or debt maturity on investment. For example, it can be argued that it is costly to implement these strategic financing adjustments. Specifically, if renegotiation and transaction costs incurred to repurchase debt or to shorten the maturity of debt outweigh the benefit of attenuated underinvestment, firms will be better off not adjusting leverage and debt maturity. Similarly, when the cost of the liquidity risk associated with short-term debt is greater than the reduced cost of underinvestment problems, firms will have less incentive to shorten their debt maturity.

Motivated by the main related literature, we highlight the following key points:

(1) Higher debt gives rises to underinvestment problem, that can be mitigated if growth opportunities are fully recognised and if leverage can be restructured ex-ante.

(2) Longer term maturity gives rise to underinvestment problem, that can be mitigated if the maturity of debt can be easily lowered in view of future investment opportunities. On the other hand, it reduces the liquidity (rollover risk) associated to shorter term debt.

(3) Overall, transaction costs and liquidity risk may constrain firms from fully adjusting their leverage and debt maturity structure, resulting in underinvestment ex post.

All of the above lead to our main hypothesis. We expect uncertainty and lenders' constraints to increase in the run-up of crisis years (Banerjee et al. 2015). The uncertain scenario makes it difficult to anticipate investment opportunity and restructuring debt (i.e. lowering the debt overhang and shortening the debt maturity), which gives rise to underinvestment problems associated to either high leverage or high long term debt.

3. Stylized facts

This section provides some stylized facts about European firms' performance over 2006-13. We gathered together balance sheet data to compare financial structure, profit margins and investment decisions of firms in five European countries. Overall, we are considering a span of time characterized by subdued growth, low investment, increasing financial constraints and declining profitability.

Profitability. The ability of a firm to generate profits is one of the main indicators of corporate performance. It captures the extent to which a firm can compete on both domestic and international markets. Profitable firms have more opportunities to invest, create employment and boost overall economic growth and better cope with economic downturns as in crisis periods. Data on profitability are particularly interesting since it is highly likely that profit-constrained firms have a lower propensity to invest. We analyse firm profitability using different indicators. We report data on average profitability as well as on the first and third quartile of the underlying distribution. Next, the pattern of firm profits for firms of different sectors and size classes are presented. By comparing country by country data, we emphasize the impact of the crisis and show the different recovery pattern across the countries under study.

Turnover is a commonly used measure of profitability but also reflects perspective demand. Uncertainty about future demand and expected low returns on additional capital might explain why firms are reluctant to expand their capital stock and undertake investment. Data on turnover show a high variability across sectors and countries. In particular, only the energy sector (Figure 1) has registered a good performance with an increase of 40 percent from 2006 to 2013. Most sectors registered growth rates between 20 and 25%. Over the same period, the average growth rate of aggregated nominal GDP of the five countries was 8.4 percent. In Germany, the manufacturing sector (Figure 2) reported a good performance (with a growth rate above 3 percent) while it has been less dynamic in other countries (2.0-2.4% and stagnant in Spain with 1.1%). The construction sector (Figure 3) shows significant differences across countries, with a strong decline in turnover in Spain (more than -20 percent), stagnation in UK and strong growth in France (34 percent), reflecting the different intensity of the housing bubble or different phases of the cycle. The growth rates of turnover seem to be positively correlated with the size of the firms until 2011 (Figure 4), with correlation decreasing in the last years. Over the whole period the decline in turnover has hit in particular SMEs. Differences between size classes are less significant than between sectors. As expected, in all countries there are wide differences between the fastest and the slowest growing sector. While in Germany and France even the slowest sectors show an increase, although modest, in Italy, UK and Spain many sectors registered a contraction, in some cases significant. Moreover, 2012-2013 data seem to point to a deceleration of growth rates for all sectors and countries. The interquartile difference (difference between growth rate of 3rd and 1st quartile) has widened with the only exception of a modest correction after 2010 (Figure 5). Over the whole period, Italy and UK show the largest difference (over 150 percent), France the smallest (110 percent).

Profitability, measured by the Return on Sales (ROS) is falling in all countries except UK. Data on ROS show a significant contraction, particularly in France, Italy and Spain (Figure 6). Differences across countries have widened. Starting from similar levels, the five countries have now a remarkable dispersion (from 2.1% in France to 3.3 in UK, starting from a small difference – 0.5 – between top and bottom country before the crisis). The reason behind this phenomenon might be that firms were willing to accept lower prices than before to maintain their levels of business activity. The decline in ROS has involved all sectors and size

classes. Positive signs (i.e. increases) are registered in only 7 cases out of 40 observations (Figure 7). At the beginning of the period, the worst quartile of European firms reported a very low ROS, close to 1% in every country (Figure 8). The crisis has further reduced this indicator to 0.5 on average, and to a negative value in Spain. The upper quartile declined from a range of 7-8% at the beginning of the period to a range of 5-7% in 2013 (only UK registered a better performance). A more granular analysis reveals that the bottom decile was already below 0 in 2007 (Figure 9). A partially different picture emerges from deciles' analysis, with the bottom one, below 0 at the beginning, decreasing at a faster pace (-1.3 %) than the top one (-0.1 %) and the median (-0.7 %), widening the vulnerability of these firms. Firms' size is not correlated with profitability. Within countries, there are strong differences among sectors: the fall in the construction sector's profitability was the highest in Spain and Italy, while in Germany and France industry was the most penalized sector. The trend in ROS drives the trend of return on Investment (ROI), another key measure of companies' profitability. Rotation of invested capital (sales/total assets) has been relatively constant over the whole period (Figure 10).

Investment. Long-term economic growth has been closely associated with a steady increase in stocks of capital. Over the last decade, aggregate data reveal that the economic crisis caused a historically unprecedented collapse in fixed capital investment in the EU. Balance-sheet data from our sample confirm the overall decline in investment after the two crises. Indeed, investment in fixed assets declined over the period, in line with the trend observed in all countries at the aggregate level. The decline can be seen as a percentage of capital stock (Figure 11). The two most dramatic scenarios have been recorded in Spain and Italy (almost - 6 % in both countries), in particular for what concerns investment in the construction and service sectors. Surprisingly, a different trend for investment is registered in UK, where investment in fixed assets remained almost constant. Top investors, i.e. the 3rd quartile of the distribution, have reduced investment at a faster pace (Figure 11): in 2013 the I/K value is closer to the median (24% versus 12) than it was in 2007 (30% versus 15%). Industry, except energy, had the most moderate fall (-3.4%), but its absolute level is still the lowest among the main sectors. Across the five countries, aggregate data show that financial imbalances are decreasing (Figure 12). Looking at the median, from a position of net borrower in 2007-2008, Italy has reached almost the equilibrium between financial liabilities and assets in 2013; Germany experienced the same trend but starting from a position of net lender. French data show a substantial stability in its net lender position between 2007 and 2013, while Spain started as a net borrower at the beginning of the period and became recently a net lender, because of the dramatic fall registered in this indicator, in particular, in the constructions sector that experienced a shortage of bank loans. UK data are not consistent because of a strong bias in the *Other Financial Activities* item. The gap between the first and the third quartile does not change during the whole period in any of the countries, because of the reduction of imbalances for net borrower firms and an increasing position of net lender ones. These stylized facts might point to the existence of internal capital markets in Europe.

Financial structure and debt sustainability. Data show wide differences among countries in terms of composition of liabilities, with no relevant changes over the 2007-2013 period. The idiosyncratic nature of the financial structure of European companies is thus confirmed (Figure 13). Germany is characterized by high levels of capital and particularly of long term financial debts. German companies confirm their significant advantage in terms of availability of long-term funds. Italy and France show a similar structure, with high relevance of trade credit and short term debt (but in Italy these components have a much greater weight in terms of turnover). Spain and UK had a common trend of moderate reduction of trade credit, with an increase in capital's weight. In terms of payment periods, Italy shows a strong peculiarity (Figure 14): not only it is the country with the highest number of days (over 80, twice the average number of the other countries), but also shows a wide gap between small and large firms, with the former having a payment period over 100 days, both responding to their high collection period (over 100) and to the use of trade credit towards micro enterprises as a source of financing. Moreover, the change over the period has been negligible, which means that the decline in total sales was mirrored by a similar decline in total assets. Companies with significant reduction in sales, therefore deleveraged significantly. The Net financial position (NFP) on EBITDA can be interpreted as the number of years to repay debt with current cash flows. Differences across countries for the whole sample (median levels) are more important than changes over the period (Figure 15). In 2013 Germany and France show significantly lower levels (around 2.5) than Spain, Italy and the UK (4.5, 4.2 and 3.6 respectively). Looking at the third quartile (Figure 15), Germany shows the lowest (and stable) value: below 6, which means that Ebitda is about 16 % of the NFP. France and Spain end up with values around 15, more than twice the initial level, revealing a wide area of financial vulnerability, while in Italy the worsening was moderate (from 6.4 to 9.4). Only in UK, because of a better trend of turnover and EBITDA, in 2013 there are much better conditions than at the beginning of the period. Finally, in terms of gross debt interests (in percentage of EBIT) the reduction in interest rates was much more intense than the one of EBIT, so that in all countries the sustainability of debt interests did not weaken (Figure 16). These stylized facts might show the existence of an area of vulnerability that depresses investment.

Summarizing, the main stylized facts emerging from our analysis are the following:

1) Profitability of firms, as measured by turnover and ROS, shows a high variability across sectors and countries. In particular, in terms of turnover, only the energy sector has fared well. SMEs have registered the most dramatic decline in turnover everywhere, although country differences between size classes are less significant than between sectors. ROS is falling in all countries except UK, and differences across countries have widened. The decline in ROS has involved all sectors and size classes, although firms' size is not correlated with profitability. Within countries, there are strong differences among sectors: the fall in the construction sector's profitability was the highest in Spain and Italy, while in Germany and France industry was the most penalized sector.

2) Investment in fixed assets declined over the period, in line with the trend observed in all countries at the aggregate level. The two most dramatic scenarios have been recorded in Spain and Italy, in particular for construction and service sectors. UK show a different trend, with constant investment in fixed assets. The fall in fixed asset investment has been heterogeneous across sectors with industry, except energy, showing the most moderate fall.

3) In all countries financial imbalances have decreased suggesting the existence of internal capital markets in Europe.

4) The financial structure of European firms is idiosyncratic, with wide differences among countries in terms of composition of liabilities and no relevant changes over the 2007-2013 period. Data on financial structure and debt sustainability suggest the existence of an area of vulnerability that depresses investment.

5) On average, SMEs are the segment of firms that has suffered most across all countries.

4. Data

This section describes our data sources and provides details about the main variables definitions together with descriptive statistics.

4.1. Sample and data sources

The data set constructed for the empirical analysis connects three databases lining up yearly information on balance sheet items for firms in our selected countries. Firms' balance sheet information and income statement, as well as information about the shareholders of the company come from the ORBIS dataset provided by Bureau van Dijk (BvD). This is a commercial data set, which contains administrative data on 130 million firms worldwide. The financial and balance-sheet information is initially collected by local Chambers of Commerce and in turn, is relayed to BvD through some 40 different information providers including official business registers. The main feature of this dataset is that about 99% of companies are private (only less than 2 % of the firms are publicly listed). We complement the balance sheet indicators with individual bond issuance drawn from Thomson Reuters. Finally, we use the variable "Banker" in ORBIS to determine each firm's bank relationship, and then we use Bankscope to explore the heterogeneity in terms of her banks' balance sheet strength.

We start with ORBIS database taking companies with financial data in the period 2006–2013 and we work with unconsolidated accounts. Our sample comprises 3,108,918 firm-year observations, corresponding to 514,287 firms from France (27.87%), Germany (17.67%), Italy (28.33%), Spain (17.29%), and United Kingdom (8.84%). The sample is mainly composed of small and medium size enterprises with sales turnover greater than 2 million, from the following industries: construction (16.4%), energy (2%), manufacturing (24.75%), and services (56.79%).

We use the following variables: total assets, tangible fixed assets, total debt, long-term debt, short-term debt, trade payable, cash, EBITDA, sales, and interest expenses. These are first checked for consistency and inconsistent firm-year observations are dropped. Our consistency checks make sure that balance-sheet identities hold within a small margin and entries are meaningful from an accounting point of view. We use real variables at current 2010 price in current EUR/mil, deflated using GDP deflator. All variables are winsorizing at the 1% level.

Next, to determine whether a firm has access to the bond market, we collect data from Thomson on all firms' bond issuance over 1996-2014. This dataset provides information on bond issued by 1,498 firms over this time span (corresponding to the 3% of ORBIS dataset). We aggregate this bond-level information at firm-level, by computing the number of bond issuance by firm, and the number of bond issuance by firm only before 2008. The average firm in Thomson has issued four bonds before the onset of financial crisis. Then, we merge this information with our master ORBIS database using the full name of the firms as key variable for the merge. We assign to our firms in ORBIS a dummy variable indicating if the firm and/or any of her parents issued bonds at least once before 2008. Our perfect merge procedure on the full name allows us to match 129,276 firm-year observations (4% of ORBIS database). This match rate is very high if we consider that first, no fuzzy procedures are used to keep the match and second, the entire sample of Thomson is only 3% of the ORBIS dataset.

4.2 Main variables and descriptive statistics

Table 1 shows descriptive statistics on all variables, including our main variable of interest "Investment/Capital". We measure investment in real capital expenditures on net basis as percentage of lagged capital stock. Investment can be measured on a gross or net basis. Using net investment would help in having a pure measure, not influenced by the depreciation of capital equipment (gross investment rate is computed as net investment plus depreciation rate). An additional advantage of using net investment is that we do not lose observations that otherwise would be lost due to missing data on depreciation. While the sample mean of our "Investment/Capital" variable is 19.97% over 2006-2013, it varies significantly across firms, with a 25 percentile of -16.66% and a 75 percentile of 12.52%, and after the financial crisis. Figure 1 shows that it declines over the crisis years from 25% to 12% in 2013.

Our leverage indicator is the Debt/Assets ratio, where Debt is the sum of long-term debt, loans, credit, and other current liabilities. This is a proxy of long term (over 1 year maturity) financial liabilities held by the firm.[9] On average firms' total debt amounts to 70% of total assets, with a 75 percentile close to 90% (Table 1). Debt composition also varies markedly across firms with 25% of firms in our sample showing no long-term debt as percentage of total debt. Short-term debt includes current liabilities (e.g. bank loans) and is

---

[9] Note that our measure of long-term debt does not include provisions.

calculated net of trade debt and non-financial short term liabilities.[10] Trade debt is the component of the short-term debt attributable to trade payables. Trade credit is an important source of borrowing, especially for small firms, that can provide access to alternative source for constrained firms when bank credit becomes constrained (Petersen and Rajan 1997; Carbò- Valverde et al. 2016). [11] Unfortunately, ORBIS dataset does not break down debt by type of lender; therefore, we cannot account for the amount of bank debt held by sample firms.

In our analysis we include variables that are standard in the literature on investment. We look at size in terms of Log (Assets) and the variable sales growth (the annual percentage change in sales) as an indicator of firms' growth opportunities. We consider size because firms are expected to react differently to crisis according to their business scale. For example, small firms, which are commonly bank debt dependent, are expected to suffer more during a banking crisis, consistent with the hypothesis that a banking channel is operative (Dell'Ariccia et al 2008; Duchin et al. 2010; Acharya et al. 2016). To account for firms' ability to generate internal source of funds we look at cash (cash holding to total asset ratio) and cash flows (EBITDA over total assets).[12] The literature on the role of corporate demand for cash shows the precautionary benefits of cash holdings when credit is tighter and firms are financially constrained and run the risk of underinvestment in future states of the world (Almeida et al. 2004, Acharya et al 2007, Campello, and Weisbach 2004). Several contributions also emphasize the fact that investment is highly correlated with cash flows. A possible explanation of this nexus is that a shock to current earnings affects future net worth and therefore the term of credit available to the firms. Or simply, investment is directly tied to available internal funds in the case of credit rationing (Gilchrist and Himmelberg 1995).[13] We then use a set of variables that may influence firms' ability to access external source of funds. We introduce a measure of debt overhang as the ratio of net debt to

EBITDA (Kalemli-Ozcan et al. 2015), the EBITDA to interest coverage ratio to account for a company's ability to meet its interest expenses, and a measure of asset tangibility (tangible asset to total asset ratio). We use these variables as additional controls (together with sales growth, firm size, and cash flows) to explore the idea that variables that increase firms' ability to obtain external funding may also increase investment when the access to credit is imperfect. Asset tangibility is important for the real decisions of financially constrained firms in several respects (Almeida and Campello 2007). Tangible assets support firms' borrowing, which allows for further investment. They act as collaterals mitigating contractibility problems.

---

[10] Precisely, Orbis defines "current" liabilities the following items: creditors (trade debt), loans (including bank loans), and other current liabilities (taxes payables and accrued expenses). Hence, our indicator of short term debt corresponds to "loans" category according to the Orbis definition. Our indicator of trade debt corresponds to the item "creditors" in Orbis.

[11] Beck et al. (2008) find that in most countries trade credit represent the second most important source of external finance, after bank credit.

[12] EBITDA: earnings before interest, tax, depreciation, and amortization

[13] Because cash flows can be used for several purposes (Lewellen and Lewellen 2014), a different relation is also possible. For example it is plausible that in times of high uncertainty firms, instead of investing in physical assets, may want to use the cash flow for other purposes (Rodriguez-Palenzuela and Dees 2016).

Among other things, tangibility increases the value that can be captured by creditors in default states, reduces firms' incentives to default strategically, can be used as a screening device in environments with asymmetric information, etc. Since tangible assets serve as a support for financially constrained firms, their differential effect on investment at the onset of the crisis might be appreciable.

The annual change in net fixed tangible assets over capital has been, on average, negative for most of the firms in the sample (the median value is -4,5 %) thus confirming the stylized fact that investment in fixed assets declined over the period almost everywhere, besides UK; moreover, there is a good degree of variation in the sample allowing for identification of the effects to be studied. We capture profitability by computing sales growth and the ratio of EBITDA to interest expenses. In particular, the ratio of EBITDA to interest expenses (EBITDA to interest coverage ratio) is usually computed to assess the financial durability of a firm by examining whether it is profitably enough to pay off its interest expenses. A ratio greater than the unity is a signal that the firm has more than enough interest coverage to pay off its interest expenses. It can be read in terms of number of years that the firm can sustain that interest expense. In our sample, the mean value is high, around 35 years. However, the median is only about 7 years, a value, although lower than the mean, that still indicates an acceptable performance, given the two crises, over the medium term for most of the companies in the sample. The median value of sales' growth rate is less than 1, in line with the decline in ROS and turnover observed over the same years. With reference to the financial structure, the average firm in our sample shows a debt structure characterized by almost 18% of long term debt (beyond one year of residual maturity) and almost 12% of short term (below one year). It is interesting how, on average, European firms have conducted their business during those years relying mainly on trade credit (around 36% of total debt). Total assets (in log) do not show a high variation in the sample, thus suggesting that we are dealing with an homogenous sample at least in terms of average size of the firm. Cash holdings, as a ratio of total assets, have been moderately high (average around 13%) for almost all the firms in the sample, thus suggesting that the average firm in our sample has reached a good ability to generate internal sources of funds, probably more so towards the end of the period, when the weight of the financial constraints imposed by the crisis has increased further.

5. Debt structure and investment in crisis and post crisis years

5.1 Baseline specification

To analyze the impact of the financial and sovereign crisis on corporate investment, we employ a differences-in-differences approach in which we compare the investment of firms before and after the onset of the financial crisis as a function of their leverage level and composition, dependence on external and internal finance, controlling for firm fixed effects, country-industry-year fixed effects, and observable

measures of size, as proxied by log (Assets), investment opportunities, specifically sales growth and cash flow. Following much of the investment literature, our analysis measures investment in real capital expenditures as the annual change in fixed tangible assets, specifically as a ratio to lagged capital stock. We are mostly interested in studying the role of firms' debt positions in mitigating or worsening the impact and the persistence of the crisis on investment. The main struggle in addressing this research question is to deal with the endogeneity issue. Inferences may be confounded by the potential endogeneity of the firm's leverage position. Because unobservable changes in the investment rate as the crisis unfolds may lead to higher indebtedness, we clean our specifications of this variation by measuring the firms' leverage position in the pre-crisis period, specifically over 2006-2007. Thus, our empirical approach specification is similar to an instrumental variables approach in which the identifying assumption is that firms' debt position before financial crisis is not correlated with unobserved within-firm changes in investment rate following the onset of the crisis (Duchin et al. 2010).[14]

We estimate the following regression model:

$$IK_{jcit} = \beta_0 Leverage_{jci} \times Post_t + \beta_1 LongTermDebt_{jci} \times Post_t + \beta_2 ShortTermDebt_{jci} \times Post_t$$
$$+ X'_{jcit-1}\varphi + \alpha_j + \mu_{cit} + \varepsilon_{jcit} \tag{1}$$

where α_j are firm fixed effetcs and μ_{cit} are country-industry-year fixed effects. Dependent variable IK denotes annual percentage investment rate (change in tangible assets as percentage of lagged tangible assets). X_{jcit} is a vector of control variables including sales growth (annual percentage change in sales), firm size (measured as log of assets), and cash flow (measured as ratio of EBITDA to assets). $Leverage_{jci}$ is a time-invariant dummy variable equal to 1 if the firm is high leveraged and zero otherwise. Specifically, we consider a firm being high Leveraged if it is in the top 50% of the Debt/Assets ratio before 2008. $LongTermDebt$ and $ShortTermDebt$ are time-invariant dummies equal to 1 if the firm is highly long-term (short-term) indebted and zero otherwise. Specifically, we consider a firm being high long-term (short-term) firm if it is in the top 50% of the Long Term Borrowing/Total Debt ratio distribution before 2008. We compute the median for each of these treatment variables within country and industry.

Table 2 presents estimates from our base specification described in Section 5 above. Columns 1, which do not include controls for growth sales, firm size and cash flow but do include firm fixed effects and country-year fixed effects, establish the basic patterns in the data. It shows that the decline in the annual investment as a fraction of lagged capital stock is substantially greater for firms that were high leveraged over the two

---

[14] According to Aivazian et al (2005a) leverage can be optimally reduced by management ex ante in view of projected valuable ex post growth opportunities, so that its impact on growth is attenuated. Thus, a negative empirical relation between leverage and growth may arise even in regressions that control for growth opportunities because managers reduce leverage in anticipation of future investment opportunities. Leverage simply signals management's information about investment opportunities. The authors refer to the possibility that leverage might proxy for growth opportunities as the endogeneity problem.

years before the onset of the crisis. The coefficient estimates imply a 9 % decline in investment more for a firm with high leverage relative to firms with low leverage (measured as an indicator variable prior to the onset of the crisis). Column 1 also shows that high long-term debt firms make less investments relative to low long-term debt firms, while the opposite is true for short-term debt. Columns 2 and 3 of Table 2 show that results on leverage and long-term debt are stable if we control for additional observables factors. Columns 2 we introduce standard controls for growth opportunities, firm size, and cash flow. In Column 3 we further control for continuous, one year lagged leverage and debt composition. The estimated coefficients on the interactions between our 'treatment' variables and Post are unchanged and statistically significant. The estimates in column 3 imply that investment declines by 8.64% more in high leveraged firms, and this effect is statistically and economically important (51% of the average dependent variable). Additionally, high long-term debt implies that investment decreases by 10.21% more in treated firms relative to control group firms.

The definition of our treatment dummies in the pre-crisis period helps dealing with the endogeneity issue, and it is developed on the hypothesis that the distribution of the Debt/Assets (as well as Long-Term Debt/Debt and Short-Term Debt/Debt) ratio is stable over time, and after the crisis shock. In order to interpret properly the effect of our treatments in the short-run vs. long-run period, we split the Post financial crisis period in three time dummies: BankingCrisis equal to one in 2008 and 2009 and zero otherwise, SovereignCrisis equal to one in the period 2010-2012 and zero otherwise, and Post2012 dummy that indicates the period after 2012. As in the main specification, we interact each of these time dummies with our treatment variable. This approach would allow us to capture the precise impact of Leverage (and long-term, short-term debt component) on investment opportunities during the financial crisis, and the persistence of this impact during and after the sovereign crisis.

Table 3 shows that the negative impact of either leverage or long term is persistent over 2008-14 but becomes more severe since the onset of the sovereign crisis. To better investigate whether these results are driven by country-specificities we replicate the main strategy by country, and include industry-year fixed effects. Results in Table 4 show that overall high levered firms invested less then low levered firms in all countries since the banking crisis, but the more so in France, Italy, and Spain, while the differential role played by leverage on investment is less pronounced in Germany and UK. When we look at long-term debt, we find evidence of a negative impact on investment in France, Italy, and UK, with no effect in German and Spanish businesses. Interestingly, we uncover a positive role played by short-term debt in France and Italy, since firms with more short-term debt do invest by more (relative to firms with less short term) in both countries. Such an effect is more evident in Italy, and is more accentuated during the banking crisis.

An important contribution of our paper is that we address the endogeneity issue by looking at leverage and debt composition before 2008. Table 5 shows that our results are unclear if we use a rolling window strategy, as in Kalemli-Ozcan et al. 2015.

The specification becomes:

$$IK_{jcit} = \vartheta_0 Leverage_{jcit-1} + \beta_0 Leverage_{jcit-1} \times Post_t$$
$$+\vartheta_1 LongTermDebt_{jcit-1} + \beta_1 LongTermDebt_{jcit-1} \times Post_t$$
$$+ \vartheta_2 ShortTermDebt_{jcit-1} + \beta_2 ShortTermDebt_{jcit-1} \times Post_t$$
$$+X'_{jcit-1}\varphi + \alpha_i + \mu_{cit} + \varepsilon_{jcit} \qquad (2)$$

5.2 The role of external and internal finance

An important novel feature of our paper is that we employ additional sources of identification by carrying out cross-sectional analyses based on firm-level measures of dependence on internal and external sources of financing. Specifically, we consider how the effects of leverage and debt composition vary in the cross-section of firms by access to external sources of finance and reliance of internal funding. In Table 6 we consider several measures of access to external finance, all computed before 2008. Columns 1 and 2 shows that highly levered small firms (as well as those with more long term debt) cut back investment by more in crisis years that less levered (with less long term debt) small firms. We identify small and medium-large firms according to the threshold of ten EUR/million before 2008. The discrepancy between highly levered (with more long-term debt) and low levered (with less long-term debt) medium-large firms is less pronounced. We interpret this finding as a consequence of a credit channel effect It is well known that smaller firms are commonly bank debt dependent, especially in Europe where the corporate bond and commercial papers markets are less developed than in the US (European Commission 2013). Considering the occurrence of large shocks to the banking system in Europe since the global financial crisis, we expect bank-dependent borrowers to have reduced investment by more due to greater financial constraints. Our finding is suggestive indirectly of how shocks to the banking sector are propagated into the real economy (Buca and Vermeleun 2015). To shed light on the effect of bank credit, Columns 7 and 8 present results for firms with a single or multiple bank relationship. There are several reasons why a firm may want to seek multiple lenders, as well as there might be several effects on lending and firm's performance induced by single versus multiple bank relationships (Petersen and Rajan 1994; Farinha and Santos 2002). We find in particular that multibanking in crisis times may be beneficial in shielding investment in highly debt firms. We explain this result in light of the fact that firms with multiple related banks are better able to compensate credit constraints through substitution across banks. This evidence is in line with Detragiache et al. (2000) who provide a rationale for a firm to seek multiple lenders by considering the cost it incurs when it is denied credit by its bank for reasons that have to do with the bank itself.

Columns 3 and 4 show that accessibility to bond market does not mitigate the negative role of leverage and long term debt on investment in crisis years. There is no differential impact of leverage and long-term debt component in the group of firms that issued bonds (directly or indirectly though their parent) before 2008. Hence, it appears that even if firms could make up decline in bank lending through borrowing in the bond

market (Adrian et al. 2012), these funds are not used to increase capital expenditures. Instead, in Columns 5 and 6 we find no impact of indebtedness on investment in listed firms. The effect of long-term debt on firms' investment is even stronger if these firms are in principle able to access the capital markets.

Next, we also look at trade credit as important source of borrowing, especially for small-sized firms. In Columns 9 and 10 we differentiate firms according to their level of trade debt over total debt, before 2008. Contrary to previous literature (Carbò-Valverde et al. 2016), we find evidence that higher level of trade credit seems to amplify the negative effect of leverage and long term debt on investments.

In Table 7 we present results for the effect of leverage and long-term debt on investment in firms with different internal funding opportunities. Following Duchin et al (2010) we explore the role played by cash and cash flows to measure firms' ability to alleviate financial constraints by using on internal funds. Columns 1 and 2 show that companies with high-leverage and high-cash holdings cut back investment by more in crisis than firms with high-leverage and low cash holding. This finding suggests that in times of high uncertainty cash may serve not only as a financial buffer against liquidity shocks, but also as portfolio choice, replacing fixed investments (Rodriguez-Palenzuela and Dees 2016). As expected, results in Columns 3 and 4 show that higher cash flows have a beneficial impact, making firms better able to mitigate the negative impact on investment of both high leverage and high long term debt.

6. Conclusions

We analyse a comprehensive dataset of firms, both small and large, from five major European countries to explore the role of leverage on corporate investments over 2005-2014. This is a boom and bust decade featured by the lending boom of early 2000s and two dramatic crisis episodes (the global banking and the Euro sovereign crisis) since 2008 onward. During the boom period firms increased leverage substantially while during the crisis period they reduced investment substantially. We want to shed light on the nexus between *pre* high debt and *post* low investment by accounting for firms and country specificities. Particularly, we want to understand whether firms, conditional on the level of debt and its maturity structure prior to the crisis, might have taken heterogeneous investment decision in crisis years as a consequence of their different ability to access alternative source of funds.

Our main result is that leverage exerted a strong, negative effect on the level of investment ex post, possibly due to an agency cost of debt that cannot be completely alleviated. We also find that firms with more long-term debt made fewer investments ex post. These results are consistent across specifications and different set of controls. When we split the sample by countries, we find that overall high levered firms invested less then low levered firms in all countries since the banking crisis, but the more so in Periphery countries (Italy and Spain) and France. When we look at long term debt, we find evidence of a negative impact on investment in

France, Italy, and UK. The negative impact of either leverage or long term persisted over 2008-14 but become more severe since the onset of the sovereign crisis.

We uncover also that firms' dependence on either internal or external sources of financing matters in explaining investment patterns of high debt firms. We find that leverage and long term debt had a more severe impact on investment in small firms. This is consistent with the hypothesis that a lending channel is operative; therefore more bank dependent borrowers (such as small firms) suffered more during crises, when bank credit shrunk. We also find that multibanking in crisis times was beneficial in shielding investment in highly debt firms. We explain this result in light of the fact that firms with multiple related banks are better able to compensate credit constraints through substitution across banks (Detragiache et al. 2000).

We also find some evidence that firms capable to tap public (bond and equity) capital markets, can mitigate the negative role of leverage and long term debt on investment in crisis years. This evidence however deserves further analysis and robustness checks, because while we find no impact of indebtedness on investment in listed firms, the nexus between our proxy for companies' ability to issue bonds is significantly and negatively related to investment. Hence, it appears that even if firms could make up decline in bank lending through borrowing in the bond market (Adrian et al. 2012), these funds were not used to increase capital expenditures. Interestingly, we find a similar negative impact on investment in firms with a high level of trade debt. Finally, we uncover that high cash flows helped firms to alleviate constraints posed by high debt. On the contrary, it appears that cash was not used as a financial buffer to shield investment, but as portfolio choice that replaced investment in fixed capital assets.

Overall, our analysis confirms the negative role played by high debt in holding back European corporate investment during the crisis years (Kalemli-Ozcan et al. 2015). It also places new emphasis on the importance of debt maturity structure (together with the level of debt) in influencing investment in crisis times. As hypothesized, the uncertain scenario in crisis times made it difficult to anticipate investment opportunity and/or restructuring debt (by either lowering the debt overhang or shortening the debt maturity). Hence, firms that entered the crisis years with an inflexible financial structure, made of either high leverage or high long term debt, were those who cut investment most.

Our findings bear important policy implications. Financial constraints of high levered firms can be only partially relaxed by using internal source of funds or by accessing external funds other than bank debt. This is because under uncertainty internal funds can be retained for precautionary motives. Also, small firms are precluded from accessing capital markets. In light of this evidence, our paper points to the importance of increasing flexibility in financial systems (De Fiore and Uhlig 2015), e.g. by stimulating small firms' access to capital markets. It also stresses the importance of more effective institutional frameworks, especially in Periphery countries, to be in place to strengthen balance-sheets by preventing the build-up of excessive leverage as well as by favouring deleveraging and restructuring processes (Goretti and Souto 2013).

References

- Acharya, V.V., Eisert, T., Eufinger, C. and Hirsch, C. W. (2015). "Real Effects of the Sovereign Debt Crisis in Europe: Evidence from Syndicated Loans". Available at SSRN: http://ssrn.com/abstract=2612855.

- Acharya, V., Almeida, H. and Campello, M. (2007). "Is cash negative debt? A hedging perspective on corporate financial policies". Journal of Financial Intermediation, vol. 16, issue 4, pages 515-554

- Adrian, T., Colla, P. and Shin, H. S. (2011). "Which Financial Frictions? Parsing the Evidence from the Financial Crisis of 2007-09". FRB of New York Staff Report No. 528; Economic Theory Center Working Paper No. 36-2012. Available at SSRN: http://ssrn.com/abstract=1976322.

- Aivazian, V. A., Ge, Y. And Qiu, J. (2005). "Debt Maturity Structure and Firm Investment". Financial Management, Vol. 34, Issue 4, 107-119.

- Aivazian, V. A., Ge, Y. And Qiu, J. (2005a). "The impact of leverage on firm investment: Canadian evidence". Journal of Corporate Finance 11, 277– 291.

- Almeida, H., Campello, M. and Weisba, M. (2004),"The Cash Flow Sensitivity of Cash", Journal of Finance, 2004, vol. 59, issue 4, 1777-1804.

- Almeida, H. and Campello, M. (2007). "Financial constraints, asset tangibility, and corporate investment." Review of Financial Studies, 20(5), 1429-1460.

- Almeida, H., Campello, M., Laranjeira, B. and Weisbenner, S. (2012). "Corporate Debt Maturity and the Real Effect of the 2007 Credit Crisis." Critical Finance Review 1, 3-58.

- Banerjee, R., Kearns, J. and Lombardi, M. (2015). "(Why) Is investment weak?" BIS Quarterly Review, 67-82, March.

- Barbiero, F., Brutscher, P. B., Kolev, A. and Wolski, M. (2016). "Misallocation of Investment in Europe: Debt Overhang, Credit Market Distress, or Weak Demand?", working paper.

- Beck, T., Demirgüç-Kunt, A. and Maksimovic, V. (2008). "Financing patterns around the world: Are small firms different?". Journal of Financial Economics 89, 467-487.

- Bernanke, B. and Gertler, M. (1989). "Agency Costs, Net Worth, and Business Fluctuations," American Economic Review, vol. 79(1), 14-31.

- Bloom, N., Bond, S. and Van Reenen, J. (2007). "Uncertainty and investment dynamics." Review of Economic Studies, 74(2), 391–415.

- Buca, A, and Vermeulen, P., (2015). "Corporate Investment and Bank-Dependent Borrowers During the Recent Financial Crisis". ECB Working Paper No. 1859.

- Carbò-Valverde, S., Rodriguez-Fernandez, F. and Udell, G.F., (2016). "Trade Credit, the Financial Crisis, and SME Access to Finance". Journal of Money, Credit and Banking Vol. 48, Issue 1, 113-143.

- Chenery, H. B. (1952). "Overcapacity and the acceleration principle." Econometrica, 20(1), 1-28.

- De Fiore, F. and Uhlig, H. (2015)."Corporate Debt Structure and the Financial Crisis," Journal of Money, Credit and Banking, vol. 47(8), 1571-1598.

- Dell'Ariccia, G., Detragiache, E. and Rajan, R. (2008). "The real effect of banking crises," Journal of Financial Intermediation, Elsevier, vol. 17(1), 89-112.

- Detragiache E., P. Garella and Guiso, L. (2000). "Multiple versus Single Banking Relationships: Theory and Evidence". The Journal of Finance 55 (3), 1133-1161.

- Diamond, D. W. (1991). "Debt Maturity Structure and Liquidity Risk". The Quarterly Journal of Economics, vol. 106, issue 3, 709-737.

- Diamond, D. W. and He, Z. (2014). "A Theory of Debt Maturity: The Long and Short of Debt Overhang." The Journal of Finance, 69: 719-762.

- Duchin, R., Ozbas, O. and Sensoy, B.A. (2010). "Costly External Financing, Corporate Investment, and the Subprime Mortgage Credit Crisis." Journal of Financial Economics 97: 418-35.
- European Commission (2013). "Quarterly report on the Euro area. October 2013". Directorate General for Economic and Financial Affairs (ECFIN). Vol. 12, Issue 3.
- Farinha, L. A. and Santos, J. (2002). "Switching from Single to Multiple Bank Lending Relationships: Determinants and Implications". Journal of Financial Intermediation, 2002, vol. 11, issue 2, 124-151.
- Fazzari, S. M., Hubbard, R. G. and Peterson, B. C. (1988). "Financing constraints and corporate investment." Brookings Papers on Economic Activity, Vol. 1, 141-206.
- Gilchrist, S. and Himmelberg, C. P. (1995). "Evidence on the Role of Cash Flow for Investment". Working Papers 95-01, New York University, Leonard N. Stern School of Business, Department of Economics.
- Goretti, M. and Souto, M. (2013). "Macro-Financial Implications of Corporate (De)Leveraging in the Euro Area Periphery", IMF Working Papers 13/154.
- Guariglia, A. (2008). "Internal financial constraints, external financial constraints, and investment choices: evidence from a panel of UK firms." Journal of Banking and Finance, 32(9), 1795–1809.
- Hennessy, C. A., Levy, A. and Whited, T. M. (2007). "Testing Q theory with financing frictions." Journal of Financial Economics, 83(3), 691-717.
- Hart, O. and Moore, J. (1995). "Debt and Seniority: An analysis of the Role of Hard Claims in Contracting Management." American Economic Review 85 (3): 567-85.
- IMF (2015). "World Economic Outlook (WEO) Uneven Growth: Short- and Long-Term Factors". April.
- Jensen, M. (1986). "Agency Costs of Free Cash Flow: Corporate Finance and Takeovers." American Economic Review 76 (2), 323-29.
- Kalemli-Ozcan, S., Sorensen, B. and Yesiltas, S. (2012). "Leverage across firms, banks and countries". Journal of International Economics, 88, 284-298.
- Kalemli-Ozcan, S., L. Laeven and Moreno, D. (2015). "Debt Overhang in Europe: Evidence from Firm-Bank-Sovereign Linkages", March, mimeo.
- Kaplan, S. N. and Zingales, L. (1997). "Do investment-cash flow sensitivities provide useful measures of financing constraints?" Quarterly Journal of Economics, 112(1), 169-215.
- Lewellen, J. and Lewellen, K. (2014). "Investment and Cash Flow: New Evidence". Tuck School of Business Working Paper No. 2010-77. Available at SSRN: http://ssrn.com/abstract=1570640; forthcoming Journal of Financial and Quantitative Analysis.
- Li, K., Heng, Y., and Zhao, L. (2009). "Ownership, Institutions, and Capital Structure." Journal of Comparative Economics 37: 471-90.
- Lucas, R. E. (1967). "Optimal investment policy and the flexible accelerator." International Economic Review, 8(1), 78-85.
- Myers, S.C. (1977). "Determinants of corporate borrowing". Journal of Financial Economics, 1977, vol. 5, issue 2, 147-175.
- Moyan, N. (2007). "How Big is the Debt Overhang Problem?". Journal of Economic Dynamics & Control 31, 433-472.
- Ongena, S., Peydrò, J.L., Van Horen, N. (2015). "Shocks Abroad, Pain at Home? Bank-Firm Level Evidence on the International Transmission of Financial Shocks". September, Mimeo.
- Petersen, M.A. and Rajan, R.G. (1997). "Trade credit: theories and evidence". The Review of Financial Studies 10, 661-91.
- Rajan, R. G. (1992). "Insiders and Outsiders: The Choice between Informed and Arm's-Length Debt." Journal of Finance 47 (4), 1367-1400.

- Rodriguez-Palenzuela, D. and Dees, S. (2016). "Savings and Investment Behaviour in the Euro Area", ECB Occasional Paper No. 167.

- Schiantarelli, F., and Sembenelli, A. (1997). "The Maturity Structure of Debt: Determinants and Effects on Firms' Performance, Evidence from the United Kingdom and Italy." Policy Research Working Paper 1699. World Bank, Washintgon, DC.

- Sharpe, S. (1991). "Credit rationing, concessionary lending, and debt maturity". Journal of Banking and Finance, 15, 581-604.

- Stohs, M. H. and Mauer, D. C. (1996). "The Determinants of Corporate Debt Maturity Structure", Journal of Business, vol. 69 No. 3.

- Stulz R. M. (1990). "Managerial discretion and optimal financing policies". Journal of Financial Economics 26, 3-27.

- Tobin, J. (1969). "A general equilibrium approach to monetary theory". Journal of Money, Credit and Banking, 1(1), 15–29.

- Vermoesen, V., M. Deloof, and Laveren, E. (2013). "Long-Term Debt Maturity and Financing Constraints of SMEs during the Global Financial Crisis." Small Business Economics 41, 433-448.

Figure 1: Turnover by sectors (index, 2006=100)
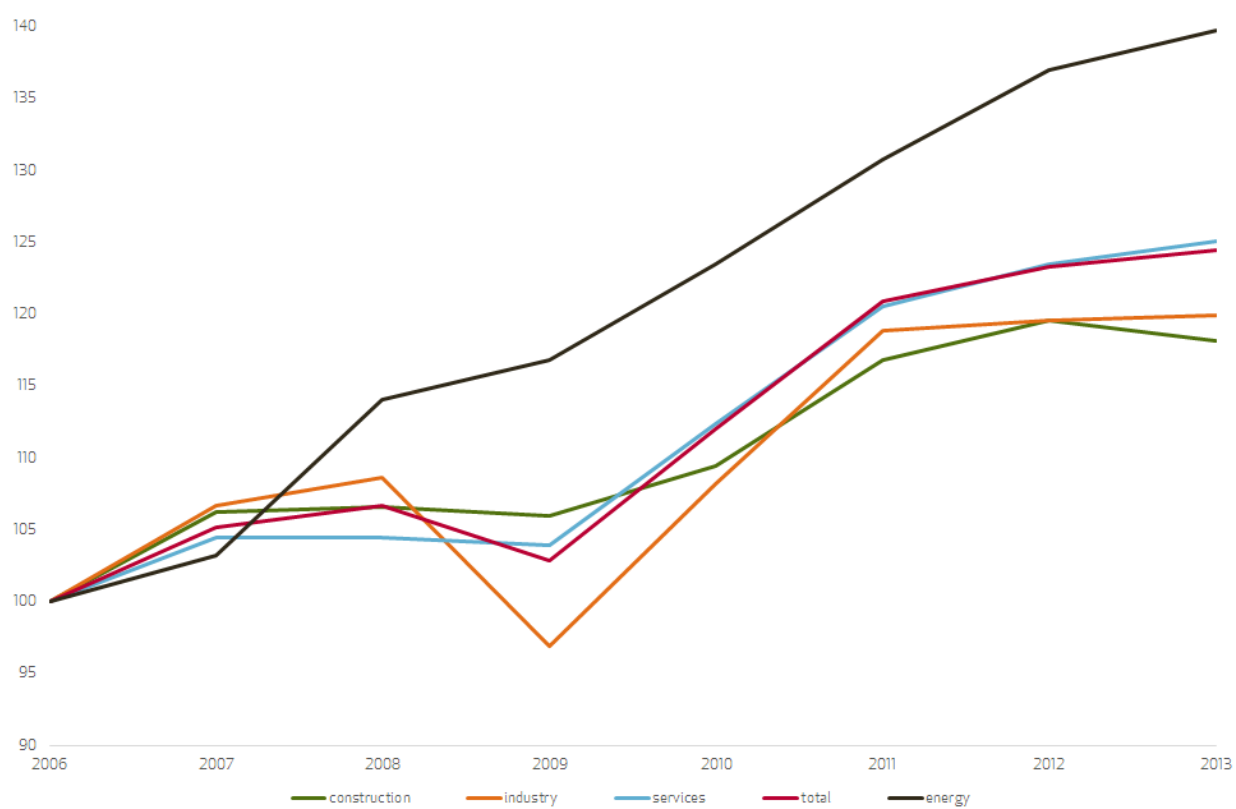
Figure 2: Manufacturing sector turnover by countries (index, 2006=100)
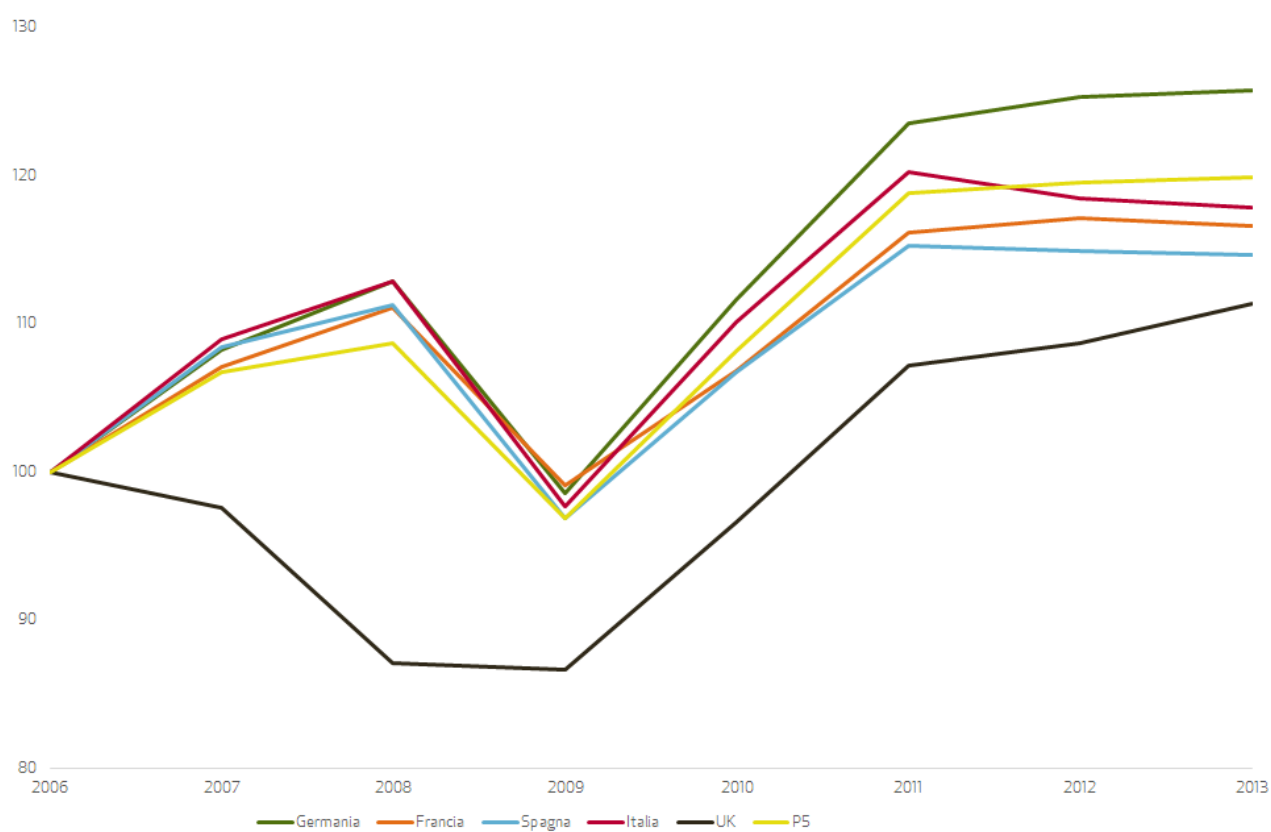
Figure 3: Construction sector turnover by countries (index, 2006=100)

Germania — Francia — Spagna — Italia — UK — P5
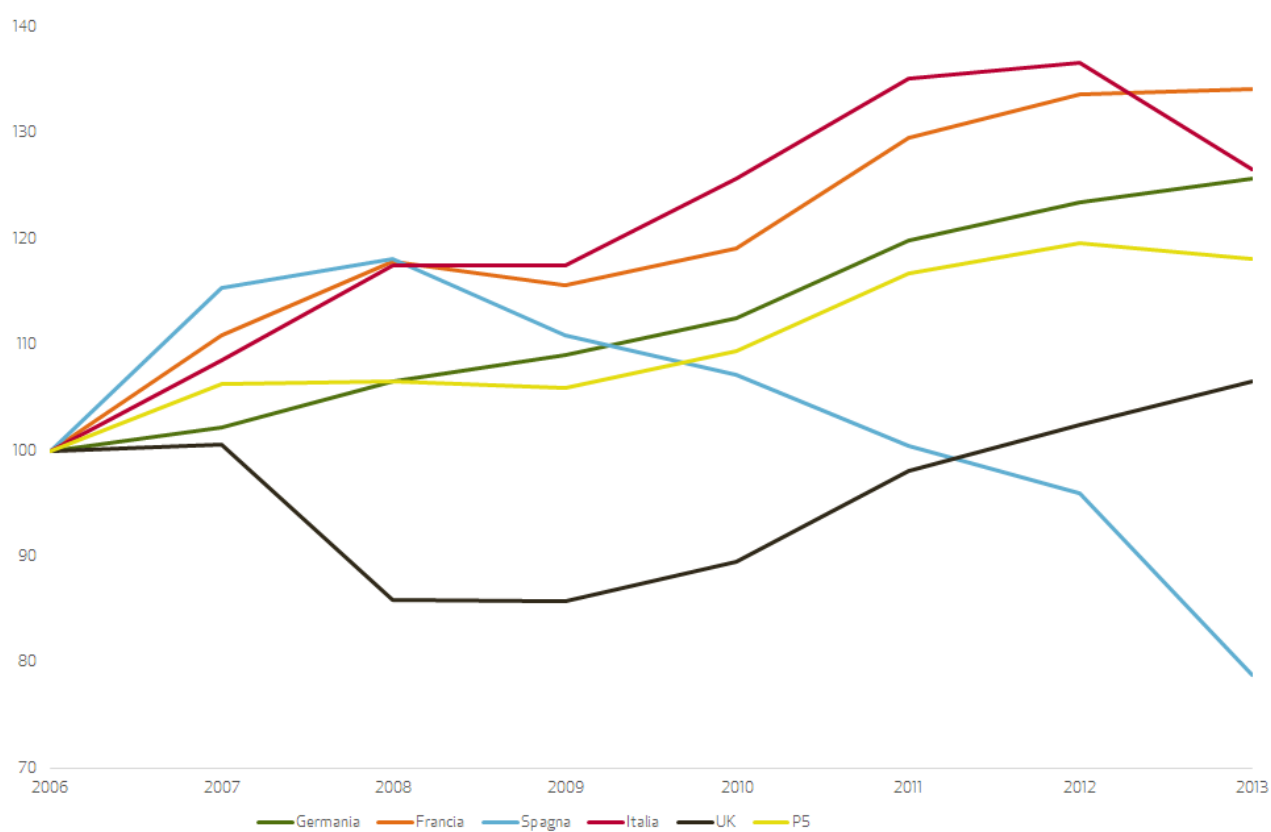
Figure 4: Turnover firms' size classes (index, 2006=100)
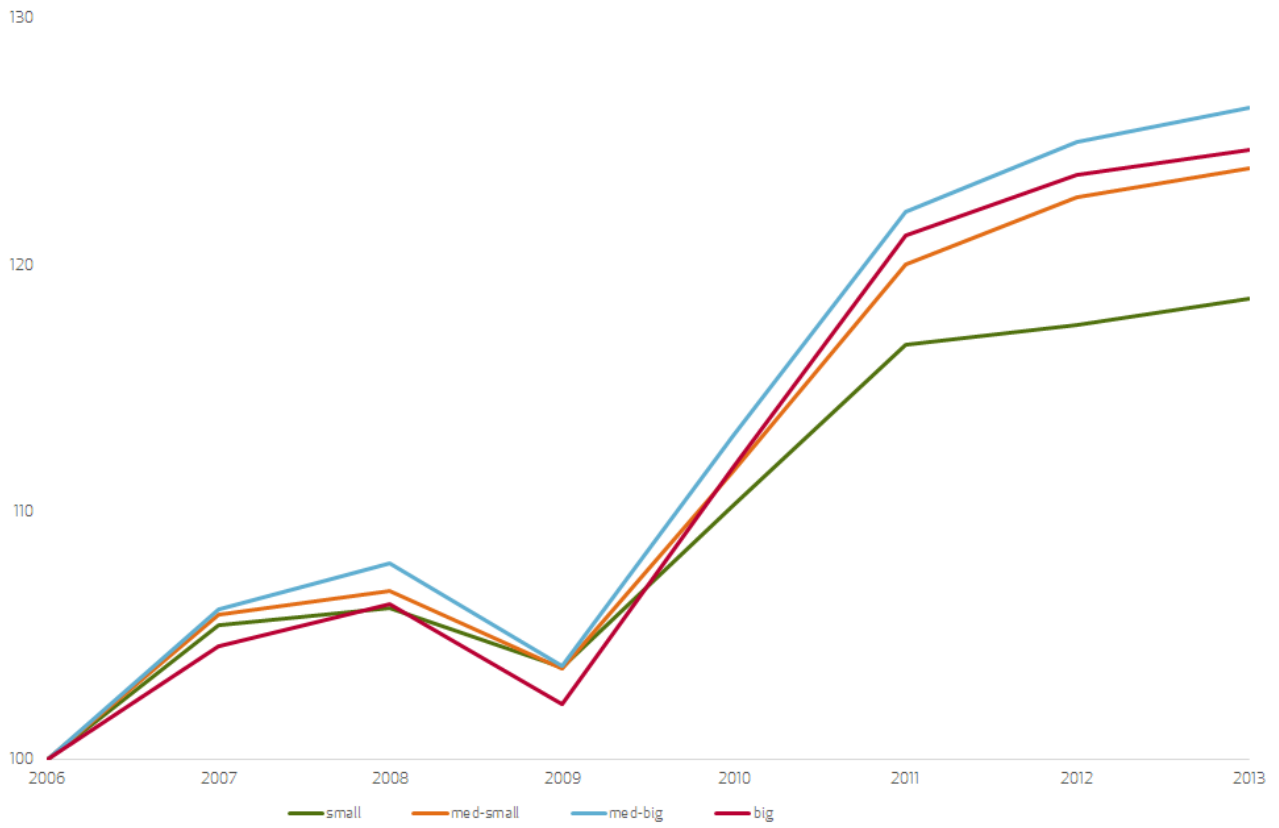
Figure 5: Turnover growth rate by quartile and country

Germany

France

Spain

Italy

UK

Figure 6: Return on sales (measured as Ebit/turnover) by country (2006-2013)
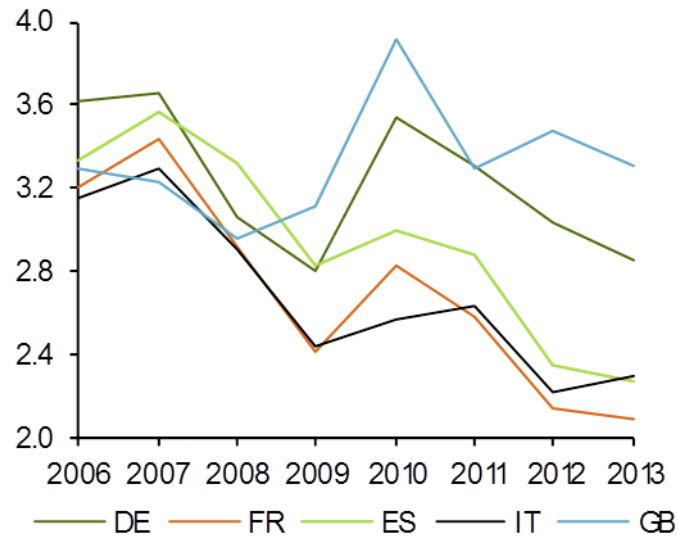
Figure 7: The variation of ROS (measured as Ebit/turnover) relative to 2007 by country, firm size, sector
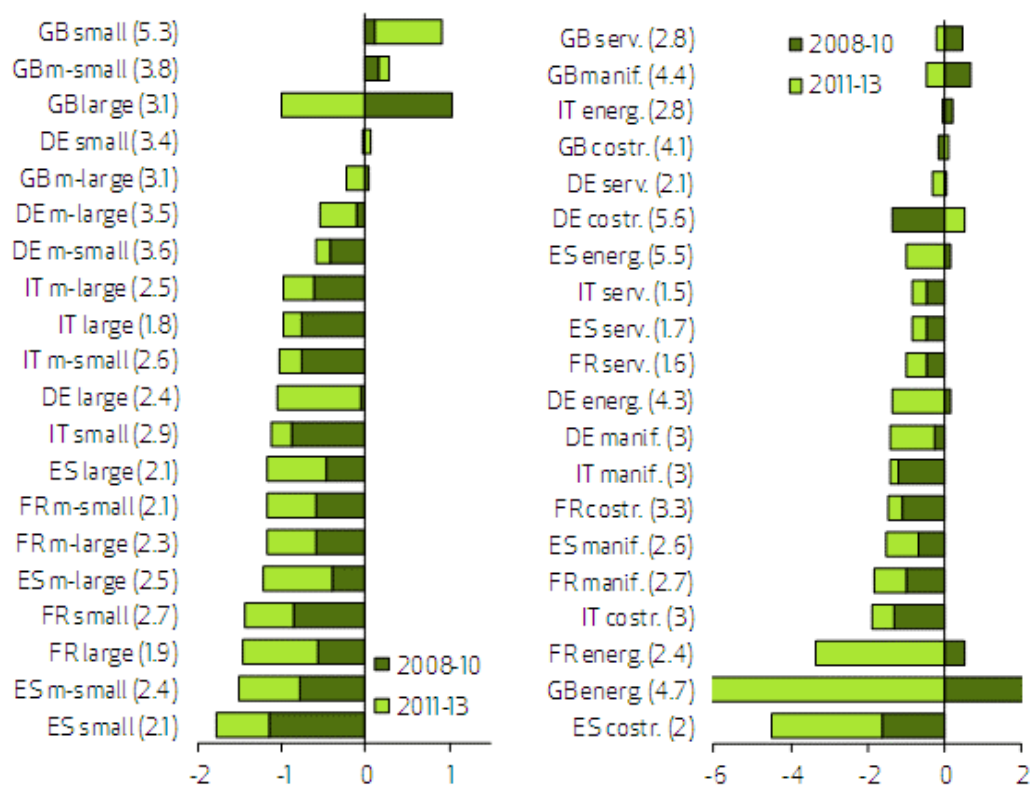
Notes: value in parentheses refer to 2013.

Figure 8: 1st and 3rd quartiles of ROS by country in 2007 and 2013
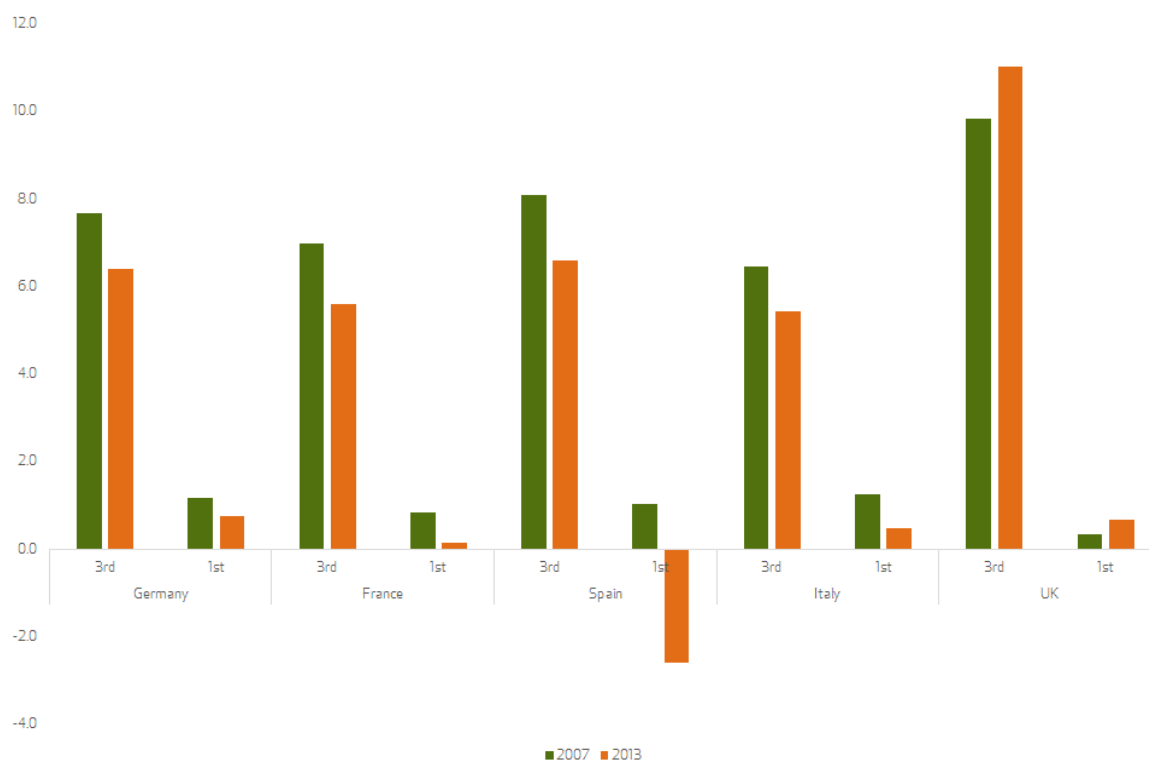
Figure 9: 10th and 90th deciles of ROS
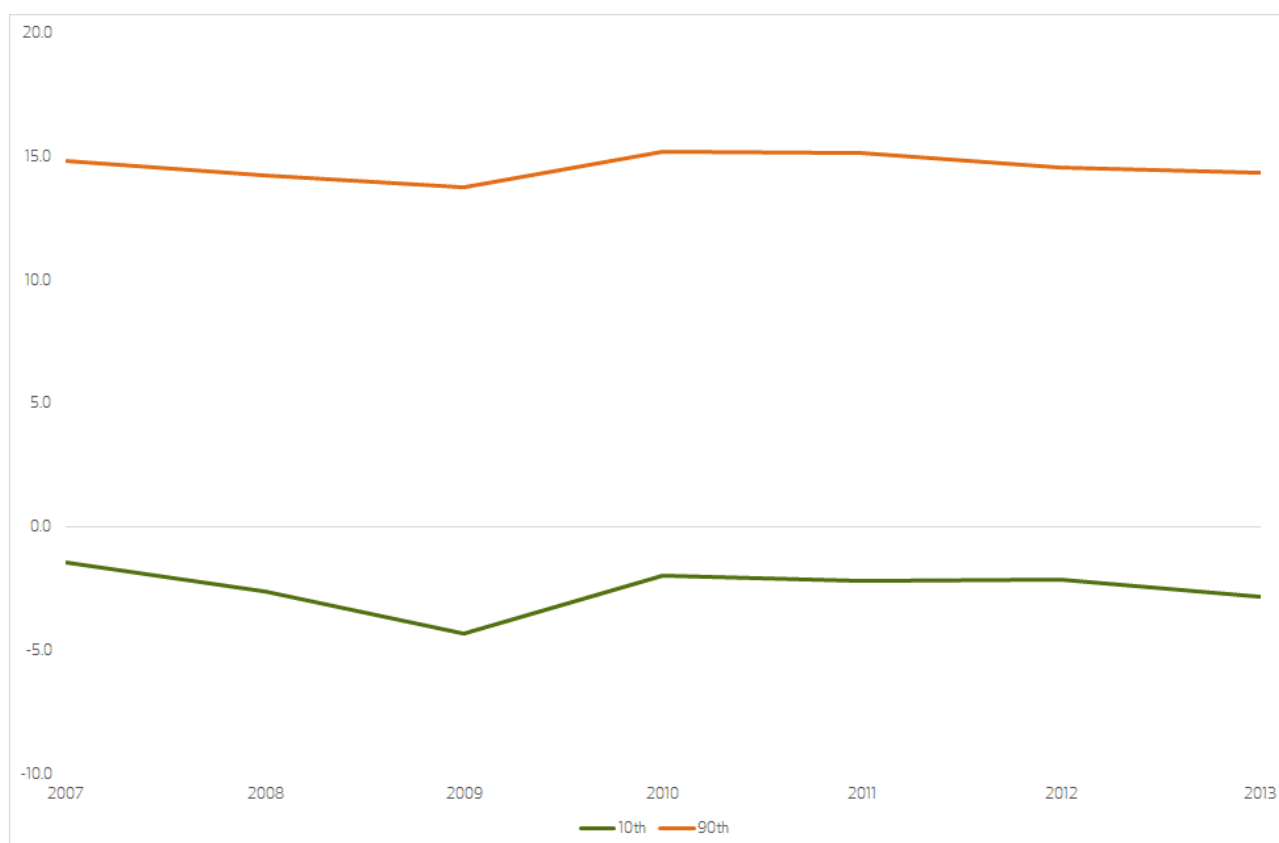
Figure 10: Capital rotation by countries
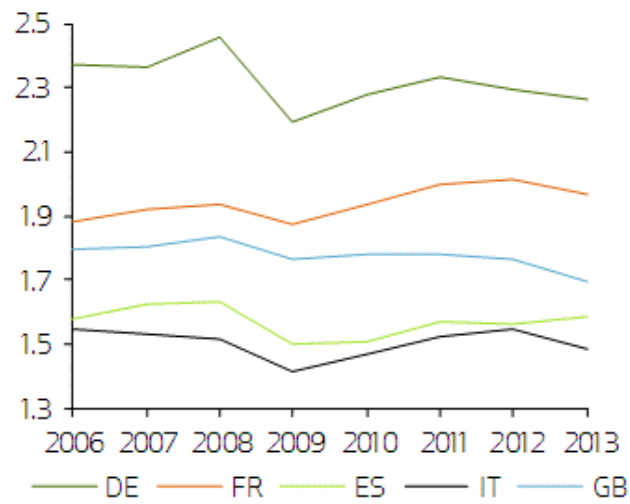
Figure 11: fixed investments in percentage of net fixed assets by countries

Median   3rd quartile
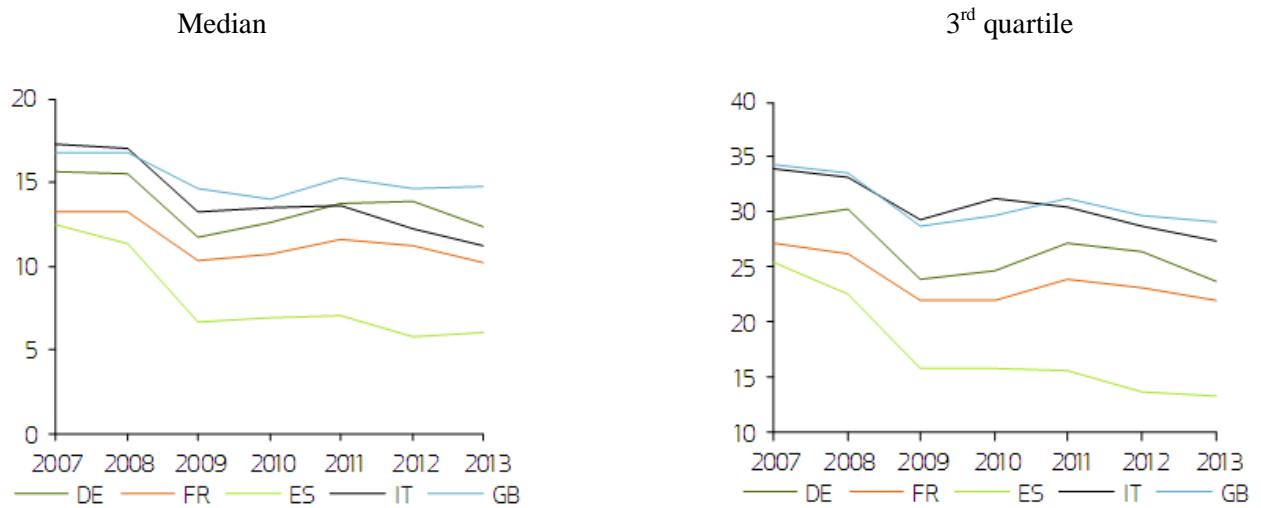
Figure 12: Financial structure by countries

1st quartile

median

3rd quartile
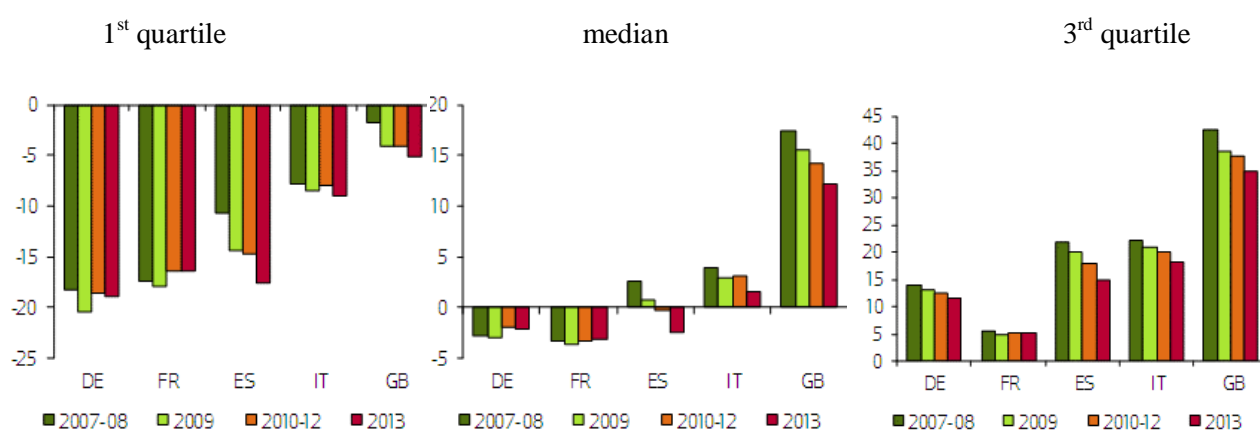
Note: in the three charts the indicator of financial structure is: (Financial liabilities – Financial assets)/Total Liabilities*100

Figure 13: Composition of liabilities by country (%)
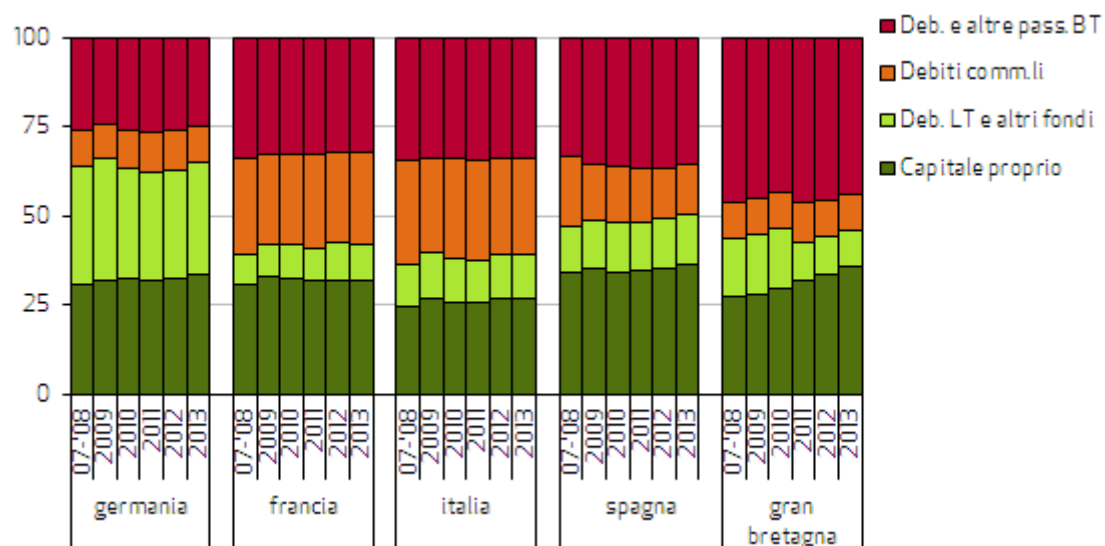
Figure 14: Payment periods by country and firm size (days, average 2011-2013)
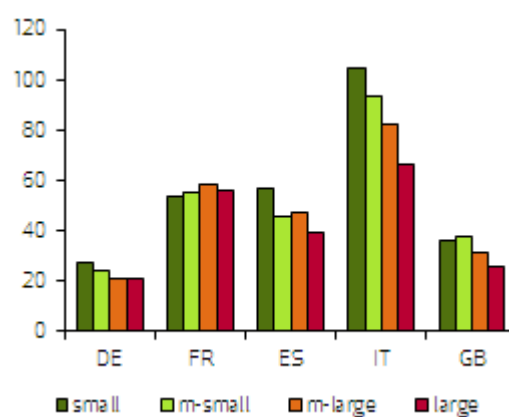
Figure 15: Debt sustainability by country

Median   3rd quartile

Figure 16: Gross debt interests in percentage of EBIT by country
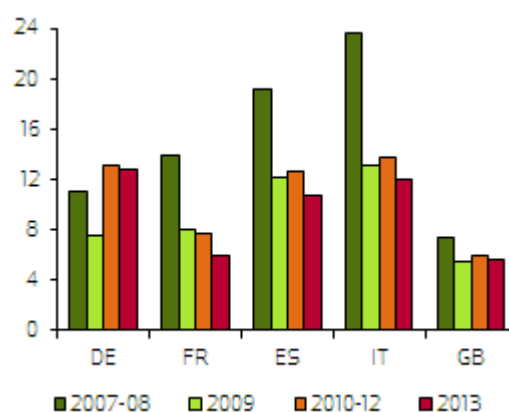
Figure 17: Average annual percentage change in net tangible investment
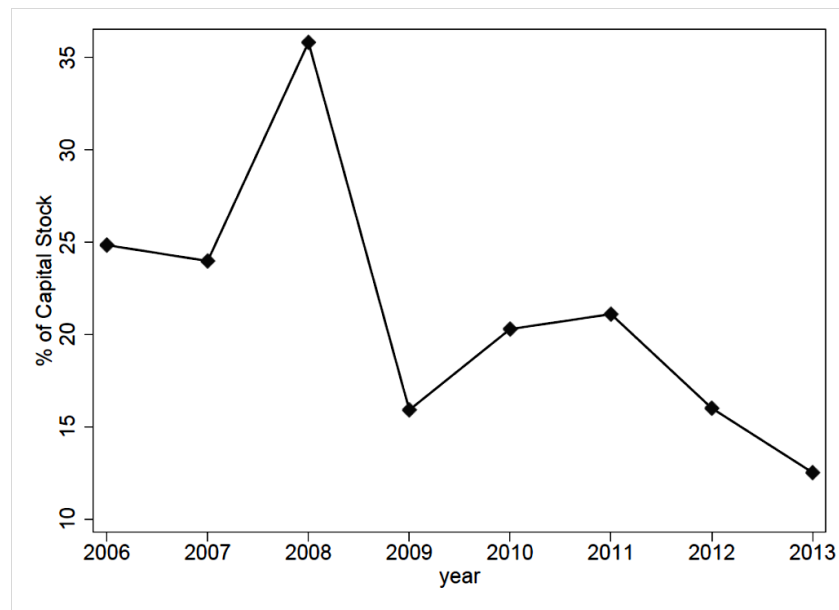
Figure 18: Average annual percentage change in net tangible investment by leverage position
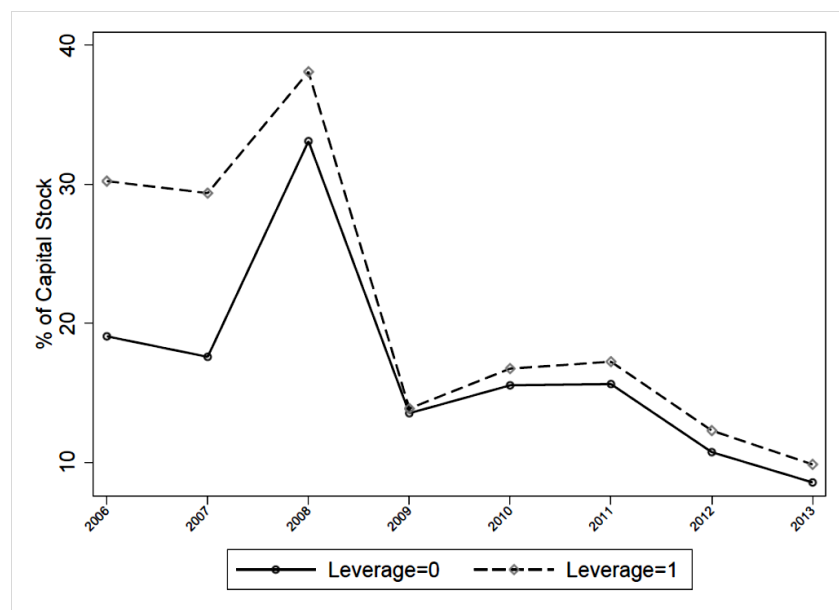
	Mean (1)	p25 (2)	Median (3)	p75 (4)	St.dev. (5)	N.obs (6)
Investment/Capital	19.97	-16.66	-4.53	12.52	109.39	2,403,879
Debt/Assets	69.92	52.38	71.93	88.13	26.69	3,108,904
Long-Term Debt/Debt	17.87	0.00	4.85	26.32	25.91	2,890,837
Short-Term Debt/Debt	11.71	0.00	2.73	17.17	17.64	2,925,241
Trade Debt/Debt	35.52	15.28	32.64	52.75	24.26	2,484,205
Sales Growth	9.26	-7.87	0.71	12.97	47.39	2,511,186
log(Assets)	15.11	14.10	14.87	15.90	1.47	3,108,918
Cash	12.85	1.31	6.30	18.69	15.84	3,023,950
Cash Flow	9.82	3.70	7.94	14.45	11.74	2,710,709
Ebitda/Interest Expenses	35.11	2.31	6.48	22.25	99.88	2,382,713
Tangible Assets/Assets	18.57	2.93	10.25	27.22	20.98	3,065,765
Debtoverhang	7.92	1.42	5.15	11.51	27.97	2,638,568

Table 1
Summary statistics.
The table reports summary statistics for the main sample of firm-year observations from 2005 to 2014. Investment/Capital is the annual change **in net fixed tangible assets** as a ratio to lagged capital stock, at constant 2010 euros. Cash measured as Cash holding/Assets. Cash Flow measured as Ebitda/Assets. Debtoverhang measured as the ratio of total debt to earnings.

	(1)	(2)	(3)
Post*Leverage	-9.92***	-8.25***	-8.64***
	(0.460)	(0.462)	(0.462)
Post*Long Term Borrowing	-7.36***	-7.11***	-10.21***
	(0.486)	(0.488)	(0.496)
Post*Short Term Borrowing	1.76***	-0.69	0.01
	(0.489)	(0.492)	(0.499)
Controls			
Sales Growth		0.26***	
		(0.005)	
log(Assets)		-43.67***	
		(0.513)	
Cash Flow		0.66***	
		(0.015)	
Leverage			0.01
			(0.012)
Long Term Borrowing			-0.68***
			(0.010)
Short Term Borrowing			-0.32***
			(0.010)
Country-industry-year FE	YES	YES	YES
Firm FE	YES	YES	YES
N.obs	1,820,823	1,773,011	1,712,941
N.firms	299,433	291,217	290,682
Mean	17.62	17.54	16.81
St.dev	103.1	102.8	101

Table 2
Debt structure and investment before and after the crisis.
The table reports estimates from panel regressions explaining firm-level investment for years 2005-2014. Dependent variable is the annual change **in net fixed tangible assets** as a ratio to lagged capital stock, at constant 2010 euros. Standard errors clustered at firm-level. ***, **, or * indicates that the coefficient estimate is significant at the 1%, 5%, or 10% level.

	(1)	(2)	(3)
BankingCrisis*Leverage	-8.99***	-6.92***	-8.27***
	(0.529)	(0.531)	(0.530)
SovereignCrisis *Leverage	-10.23***	-8.86***	-8.65***
	(0.487)	(0.488)	(0.490)
Post2012*Leverage	-11.17***	-9.57***	-9.51***
	(0.557)	(0.558)	(0.561)
BankingCrisis*Long Term Borrowing	-8.62***	-7.57***	-9.28***
	(0.557)	(0.560)	(0.563)
SovereignCrisis*Long Term Borrowing	-7.23***	-7.27***	-10.94***
	(0.514)	(0.515)	(0.527)
Post2012*Long Term Borrowing	-4.74***	-5.51***	-10.18***
	(0.585)	(0.586)	(0.600)
BankingCrisis*Short Term Borrowing	-1.04*	-1.71***	0.14
	(0.561)	(0.565)	(0.571)
SovereignCrisis*Short Term Borrowing	3.03***	-0.08	-0.07
	(0.518)	(0.520)	(0.528)
Post2012*Short Term Borrowing	4.44***	-0.17	-0.06
	(0.588)	(0.591)	(0.601)
Controls			
Sales Growth		0.26***	0.26***
		(0.005)	(0.005)
log(Assets)		-43.59***	-41.52***
		(0.513)	(0.519)
Cash Flow		0.67***	0.59***
		(0.015)	(0.016)
Leverage			0.01
			(0.012)
Long Term Borrowing			-0.69***
			(0.010)
Short Term Borrowing			-0.32***
			(0.010)
Country-industry-year FE	YES	YES	YES
Firm FE	YES	YES	YES
N.obs	1,820,823	1,773,011	1,712,941
N.firms	299,433	291,217	290,682
Mean	17.62	17.54	16.81
St.dev.	103.1	102.8	101

Table 3
Debt structure and investment in crisis and post crisis years.
The table reports estimates from panel regressions explaining firm-level investment for years 2005-2014. Dependent variable is the annual change **in net fixed tangible assets** as a ratio to lagged capital stock, at constant 2010 euros. Standard errors clustered at firm-level. ***, **, or * indicates that the coefficient estimate is significant at the 1%, 5%, or 10% level.

	France	Germany	Italy	Spain	UK
	(1)	(2)	(3)	(4)	(5)
BankingCrisis*Leverage	-8.56***	-0.77	-10.99***	-0.25	-4.28**
	(0.879)	(1.769)	(0.954)	(1.282)	(1.825)
SovCrisis*Leverage	-9.13***	-4.28***	-7.77***	-14.27***	-3.94**
	(0.853)	(1.645)	(0.859)	(1.098)	(1.816)
Post2012*Leverage	-8.18***	-4.79**	-9.59***	-17.04***	-3.92*
	(0.999)	(1.883)	(0.962)	(1.227)	(2.156)
BankingCrisis*LongTermBorrowing	-17.01***	-3.35*	-5.48***	1.13	-7.01***
	(1.008)	(1.858)	(1.006)	(1.330)	(1.855)
SovCrisis*LongTermBorrowing	-15.26***	-0.87	-6.06***	-0.02	-7.13***
	(0.980)	(1.725)	(0.905)	(1.137)	(1.843)
Post2012*LongTermBorrowing	-12.84***	-0.94	-4.49***	-0.12	-6.19***
	(1.144)	(1.972)	(0.998)	(1.262)	(2.195)
BankingCrisis*ShortTermBorrowing	-0.51	-2.40	4.44***	-7.49***	-4.05**
	(1.024)	(1.947)	(1.035)	(1.263)	(1.845)
SovCrisis*ShortTermBorrowing	2.55***	1.39	2.00**	-3.54***	-4.27**
	(0.991)	(1.796)	(0.937)	(1.072)	(1.824)
Post2012*ShortTermBorrowing	2.81**	0.65	2.54**	-6.01***	-2.67
	(1.149)	(2.056)	(1.036)	(1.208)	(2.146)
Controls					
Sales Growth	0.41***	0.31***	0.22***	0.15***	0.26***
	(0.011)	(0.021)	(0.007)	(0.008)	(0.018)
log(Assets)	-39.02***	-38.40***	-53.66***	-37.20***	-23.47***
	(0.875)	(2.233)	(0.892)	(1.198)	(1.568)
Cash Flow	0.81***	0.41***	0.71***	0.55***	0.48***
	(0.024)	(0.052)	(0.033)	(0.036)	(0.043)
Industry-year FE	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES
N.obs	624,942	110,310	627,699	306,006	104,054
N.firms	105,078	21,126	98,736	48,153	18,124
Mean	18.35	12.84	21.06	14.36	5.772
St. Dev.	106	81.41	108.1	96.57	85.47

Table 4
Debt structure and investment in crisis and post-crisis years by country
The table reports estimates by country from panel regressions explaining firm-level investment for years 2005-2014. Dependent variable is the annual change **in net fixed tangible assets** as a ratio to lagged capital stock, at constant 2010 euros. Standard errors clustered at firm-level. ***, **, or * indicates that the coefficient estimate is significant at the 1%, 5%, or 10% level.

	(1)	(2)	(3)
PostxLev		-0.11*	-0.05
		(0.057)	(0.055)
Lev	0.09***	0.19***	0.14**
	(0.015)	(0.058)	(0.057)
PostxLongDebt		-0.08	-0.11*
		(0.064)	(0.064)
LongDebt	-0.66***	-0.58***	-0.56***
	(0.012)	(0.064)	(0.065)
PostxShortDebt		0.06	0.04
		(0.078)	(0.079)
ShortDebt	-0.32***	-0.38***	-0.35***
	(0.012)	(0.079)	(0.079)
PostxGrowthSales		0.03	
		(0.037)	
GrowthSales	0.05***	0.02	0.05***
	(0.003)	(0.037)	(0.003)
PostxSize1		-4.76***	
		(0.937)	
Size1	-54.93***	-50.22***	-54.93***
	(0.645)	(1.128)	(0.645)
PostxCashFlow		-0.19	
		(0.133)	
CashFlow	0.43***	0.62***	0.43***
	(0.018)	(0.133)	(0.018)
Observations	1,574,181	1,574,181	1,574,181
N. firms	354,138	354,138	354,138
Country-industry-year FE	YES	YES	YES
Firm FE	YES	YES	YES
Mean	16.22	16.22	16.22
St. Dev.	100.6	100.6	100.6

Table 5
Robustness: Debt structure and investment
The table reports estimates by country from panel regressions explaining firm-level investment for years 2005-2014. Dependent variable is the annual change **in net fixed tangible assets** as a ratio to lagged capital stock, at constant 2010 euros. Standard errors clustered at firm-level. ***, **, or * indicates that the coefficient estimate is significant at the 1%, 5%, or 10% level.

VARIABLES	(1) Small	(2) Medium-Large	(3) NoBond	(4) Bond	(5) NoTicker	(6) Ticker	(7) NoMultibank	(8) Multibank	(9) Low trade credit	(10) High trade credit
Post*Leverage	-6.00***	-2.55***	-5.19***	-5.45**	-5.30***	4.57	-6.47***	1.26	-5.91***	-6.72***
	(0.813)	(0.752)	(0.479)	(2.222)	(0.469)	(13.398)	(0.790)	(1.045)	(0.709)	(0.690)
Post*LongTermBorr.	-11.47***	-5.88***	-6.41***	-9.45***	-6.44***	-31.36***	-11.60***	-0.94	-6.73***	-9.01***
	(0.890)	(0.807)	(0.514)	(2.305)	(0.502)	(11.534)	(0.893)	(1.072)	(0.816)	(0.726)
Post*ShortTermBorr.	-3.33***	2.15**	-0.81	1.29	-0.68	17.62	-2.07**	-6.78***	1.35	1.43*
	(0.962)	(0.858)	(0.515)	(2.376)	(0.504)	(13.404)	(0.889)	(1.064)	(0.857)	(0.765)
Sales Growth	0.28***	0.34***	0.25***	0.46***	0.26***	0.49***	0.35***	0.17***	0.27***	0.31***
	(0.006)	(0.010)	(0.005)	(0.029)	(0.005)	(0.135)	(0.011)	(0.009)	(0.007)	(0.007)
log(Assets)	-45.20***	-40.35***	-42.34***	-39.16***	-42.26***	-25.78**	-36.47***	-45.23***	-40.82***	-39.83***
	(0.791)	(0.969)	(0.523)	(2.364)	(0.511)	(12.812)	(0.927)	(1.217)	(0.833)	(0.725)
Cash Flow	0.38***	0.46***	0.39***	0.52***	0.40***	0.82***	0.47***	0.36***	0.39***	0.44***
	(0.025)	(0.030)	(0.016)	(0.066)	(0.016)	(0.372)	(0.025)	(0.035)	(0.025)	(0.023)
Ebitda/Interest Expenses	0.04***	0.01***	0.02***	0.00	0.02***	-0.00	0.02***	0.01**	0.02***	0.02***
	(0.003)	(0.002)	(0.001)	(0.004)	(0.001)	(0.025)	(0.002)	(0.003)	(0.002)	(0.002)
Tangible Assets/Assets	-4.24***	-3.72***	-4.08***	-3.45***	-4.05***	-4.49***	-3.94***	-3.48***	-3.46***	-4.96***
	(0.029)	(0.037)	(0.020)	(0.106)	(0.020)	(0.739)	(0.043)	(0.039)	(0.030)	(0.031)
Net Debt/Ebitda	-0.00	0.00	0.00	-0.01	0.00	-0.16**	0.01	0.01	0.00	0.01
	(0.007)	(0.006)	(0.004)	(0.018)	(0.004)	(0.078)	(0.007)	(0.009)	(0.006)	(0.006)
Observations	687,242	468,263	1,516,374	62,921	1,571,133	2,269	449,501	283,017	605,765	767,009
N. firms	127,212	83,067	270,524	12,026	281,107	420	84,108	49,129	108,286	137,675
Country-industry-year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Mean	21.25	13.41	16.34	12.45	16.19	11.11	12.03	13.18	13.70	17.39
St. Dev.	110.2	86.20	98.37	94.92	98.20	93.69	88.28	89.24	93.18	99.80

Table 6
Debt structure, external finance dependence and investment in crisis and post-crisis years.
The table reports estimates by from panel regressions explaining firm-level investment for years 2005-2014. Dependent variable is the annual change **in net fixed tangible assets** as a ratio to lagged capital stock, at constant 2010 euros. Standard errors clustered at firm-level. ***, **, or * indicates that the coefficient estimate is significant at the 1%, 5%, or 10% level.

VARIABLES	(1) Low Cash	(2) High Cash	(3) Low Cash Flow	(4) High Cash Flow
Post*Leverage	-3.35***	-6.29***	-4.24***	-4.65***
	(0.675)	(0.658)	(0.779)	(0.596)
Post*LongTermBorr.	-4.89***	-7.62***	-8.26***	-5.60***
	(0.727)	(0.688)	(0.818)	(0.635)
Post*ShortTermBorr.	0.01	-1.35**	1.35	-1.80***
	(0.786)	(0.674)	(0.838)	(0.628)
Sales Growth	0.26***	0.26***	0.25***	0.28***
	(0.007)	(0.006)	(0.007)	(0.006)
log(Assets)	-42.62***	-41.76***	-44.87***	-40.70***
	(0.788)	(0.672)	(0.847)	(0.640)
Cash Flow	0.43***	0.38***	0.39***	0.45***
	(0.025)	(0.021)	(0.030)	(0.019)
Ebitda/Interest Expenses	0.01***	0.02***	0.02***	0.02***
	(0.002)	(0.002)	(0.003)	(0.002)
Tangible Assets/Assets	-3.61***	-4.43***	-4.19***	-3.98***
	(0.029)	(0.026)	(0.036)	(0.023)
Net Debt/Ebitda	0.01	-0.00	0.00	-0.00
	(0.005)	(0.006)	(0.005)	(0.006)
Observations	687,032	885,370	638,929	938,000
N. firms	120,131	159,961	115,119	166,641
Country-industry-year FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
Mean	13.95	17.93	16.11	16.20
St. Dev.	93.71	101.5	102.6	95.03

Table 7

Debt structure, internal finance and investment in crisis and post-crisis years.

The table reports estimates by from panel regressions explaining firm-level investment for years 2005-2014. Dependent variable is the annual change **in net fixed tangible assets** as a ratio to lagged capital stock, at constant 2010 euros. Standard errors clustered at firm-level. ***, **, or * indicates that the coefficient estimate is significant at the 1%, 5%, or 10% level.

	(1) Small Bank	(2) Large Bank	(5) Low GvBond Bank	(6) High GvBond Bank	(9) Low NPL Bank	(10) High NPL Bank
Post*Leverage	0.27	-0.50	1.40	-1.96	0.39	2.17
	(1.335)	(1.215)	(1.440)	(1.352)	(1.440)	(1.558)
Post*LongTermBorr.	-5.04***	-2.57**	-0.98	-5.64***	-2.05	-2.46
	(1.388)	(1.251)	(1.482)	(1.402)	(1.467)	(1.623)
Post*ShortTermBorr.	-7.76***	-4.57***	-9.67***	-1.04	-5.31***	-5.43***
	(1.431)	(1.247)	(1.454)	(1.469)	(1.468)	(1.649)
Sales Growth	0.21***	0.26***	0.20***	0.31***	0.25***	0.25***
	(0.014)	(0.013)	(0.014)	(0.018)	(0.015)	(0.018)
log(Assets)	-42.52***	-41.27***	-44.34***	-37.60***	-42.76***	-39.02***
	(1.516)	(1.424)	(1.635)	(1.658)	(1.558)	(2.041)
Cash Flow	0.32***	0.41***	0.38***	0.43***	0.41***	0.40***
	(0.044)	(0.041)	(0.047)	(0.046)	(0.048)	(0.054)
Ebitda/Interest Expenses	0.01***	0.01***	0.01	0.01***	0.01***	0.01*
	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
Tangible Assets/Assets	-3.44***	-3.74***	-3.61***	-3.72***	-3.76***	-3.54***
	(0.053)	(0.053)	(0.056)	(0.067)	(0.059)	(0.071)
Net Debt/Ebitda	0.00	0.00	-0.00	0.01	0.00	0.02
	(0.012)	(0.010)	(0.011)	(0.012)	(0.011)	(0.015)
Observations	159,085	209,001	147,501	155,334	159,163	109,376
N. firms	28,479	37,582	26,083	28,687	27,807	19,973
Country-industry-year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Mean	12.30	13	13.55	11.78	13.07	12.55
St. Dev.	86.04	89.87	90.18	84.88	91.11	85.28

Table 8
Debt structure, internal finance and investment in crisis and post-crisis years.
The table reports estimates by from panel regressions explaining firm-level investment for years 2005-2014. Dependent variable is the annual change **in net fixed tangible assets** as a ratio to lagged capital stock, at constant 2010 euros. Standard errors clustered at firm-level. ***, **, or * indicates that the coefficient estimate is significant at the 1%, 5%, or 10% level.