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Interest rates, liquidity and the corporate financing decision throughout the business cycle: a European analysis

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ABSTRACT

The global financial crisis has shown that money affects the real economy. This study examines the influence of the price and stock of money in the economy on capital structure throughout the business cycle during the last financial crisis, with particular focus on the roles of long- and short-term interest rates, spread rates, and liquidity as reflected in the supply and velocity of money. The results, for a panel of listed European firms, indicate the significant impact of these variables on leverage, which they find to be linked positively to long- and short-term interest rates and negatively to term spread in both phases (expansion and recession) of the business cycle. They also suggest that liquidity requirements play a crucial role in the corporate financing decision. Finally, the speed of adjustment to the target debt ratio, normally significantly lower during recessions than during expansions, appears subject to business cycle fluctuations.

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1. Introduction

This paper investigates the role played by the price and supply of money in the economy on the capital structure decision taken by European firms throughout the business cycle at the time of the last financial crisis. The specific focus is on the effects of two monetary transmission mechanisms on firms' financing decisions. We begin by exploring the effect of interest rates, that is, the price of money, on capital structure (the interest rate channel). We then analyse the way in which the liquidity or stock of money in the economy, particularly that obtained from bank credit (the bank lending channel), affects the financing decision through money supply and velocity. In addition, we explore how the effects of these variables vary according to the orientation of the country's financial system.

Although the trade-off theory tells us that firms pursue a target leverage ratio, a recent strand of literature evidences its volatility over time (Campbell & Rogers, 2018; DeAngelo & Roll, 2015). In fact, many prior papers investigating how firms' financing decisions are affected by volatility in macroeconomic variables over time, have assumed or shown no role for fluctuations in the price and supply of money, (Cook & Tang, 2010; Hackbarth et al., 2006; Halling et al., 2016; Karpavičius & Yu, 2017; Korajczyk & Levy, 2003;

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Mokhova & Zinecker, 2014), whereas others present counter-evidence of a significant influence being exerted by monetary variables (Daskalakis et al., 2017; Grosse-Rueschkamp et al., 2020; Kajurová & Linnertová, 2018), especially when bank credit is one of the economy's most prevalent funding sources (Ciccarelli et al., 2015; Ippolito et al., 2018; Pindado et al., 2020). This contradictory empirical evidence may be due to institutional factors, a key role being played by the bank vs market orientation of a country's financial system.

While acknowledging previous contributions on the influence of macroeconomic variables on financing decisions, we find that the literature reveals gaps which our investigation aims to bridge. Firstly, a large body of prior research has explored the relationship between macroeconomic variables and financing decisions using long sample periods including both real and financial crises with different economic foundations, and, undoubtedly, a varying impact on financing decisions across firms (Cook & Tang, 2010). Other studies focus on a single European country, such as Greece, which constitutes a particular and extreme case of the effect of the financial crisis in European SME firms (Daskalakis et al., 2017). Our sample represents the European business environment during a particular business cycle (2003 to 2013) and a specific type of crisis, that is, a financial crisis of monetary origin, in which monetary policy played an important role. Secondly, our study contributes by developing a theoretical framework linking economic theory and business theory to support our results, since prior research does not include deep separate analyses of the different economic reasons for the influence of money on the financing decision in each phase of the cycle. Thirdly, past papers focus on the effect of interest rates on firms' financing decisions, while underestimating the influence of other important monetary variables, such as spread rates, and the supply and velocity of money. The study incorporates the unexplored effect on the corporate financing decision of European firms of two monetary variables: liquidity and velocity. Finally, unlike prior studies, which analyse the relationship between monetary variables and financing decisions under a specific type of financial system (Cook & Tang, 2010; Daskalakis et al., 2017; Karpavičius & Yu, 2017), ours goes a step further by considering differences due to country-specific financial systems, thus enabling us to test the findings of Karpavičius and Yu (2017) regarding the non-significance of interest rates on corporate financing.

This study contributes to research based on the dynamic analysis of capital structure throughout the business cycle at the time of the recent global financial crisis. The results confirm the assumption that marked differences in macroeconomic trends between growth and recession periods have a decisive influence on the capital structure of our sample companies. This is particularly noticeable in the positive relationship between leverage and the short- and long-term interest rates; in contrast to the negative influence of the term spread in both phases of the business cycle. The ratio of narrow to broad money is found to have a negative impact on leverage, while the velocity of money affects it positively in both growth and recession scenarios. The speed of adjustment to the target debt ratio is also faster during periods of expansion. In addition, this research shows that the effect of monetary variables on capital structure is attenuated under market-based European financial systems.

There are at least three reasons for considering Europe an appropriate setting for analysing the interaction between money and financing decisions. Firstly, although the European financial system is largely bank-oriented, and bank debt is a frequent feature

in countries with smaller lending markets and weaker investor protection (La Porta et al., 1998), our sample nevertheless represents both bank- and market-based financial systems. Bank lending contributes more effectively to the transmission of monetary policies through our chosen macroeconomic variables: interest rates and liquidity (Bernanke & Gertler, 1995; Bernanke et al., 1996). Lastly, lending is an important channel of the monetary transmission mechanism, because it reduces the problem of information asymmetry between borrowers and lenders (Mishkin, 2017), which suggests that credit intensity should be greater in countries where this form of financing is more common.

The remainder of this paper is organised as follows. Section 2 presents a review of the literature explaining the macroeconomic and capital structure theories on which the hypotheses are based. Section 3 describes the sample, variables, and research methodology. Section 4 presents and discusses the results. Section 5 presents some robustness tests, and the main conclusions of the study are summed up in section 6.

2. Theoretical background and hypotheses development

The irrelevance of capital structure, that is, the notion that changes in leverage do not affect firm value in a context of perfect capital markets was first postulated by Modigliani and Miller (1958). However, since the empirical evidence does not support the existence of perfect markets, capital structure does prove relevant, as the same authors demonstrated some years later. In fact, Modigliani and Miller (1963) proved that capital structure affects firm value through a trade-off between the tax benefits and bankruptcy costs generated by debt. These are, in fact, two of the most prevalent imperfections in capital markets. Optimal capital structure, therefore, is achieved at the point where the benefits of debt are in balance with the costs.

The agency theory of finance (Jensen & Meckling, 1976) complements the above by incorporating new factors, including other kinds of benefits and costs associated with the use of debt. This has contributed to the development of the so-called 'extended trade-off theory'. On the one hand, debt mitigates shareholder-manager conflicts arising from the discretionary use of resources (free cash flow) by managers for their own benefit (Jensen, 1986). However, it can, at the same time, exacerbate certain conflicts between shareholders and creditors (Frank & Goyal, 2009; Myers, 1977). In a limited liability context, debt usage can lead to asset replacement problems or the rejection of proposals for investment projects with positive net present value (Barnea et al., 1985; Myers & Majluf, 1984; Stulz, 1990).

A second theoretical approach, derived from Myers and Majluf (1984), proposes that capital structure only changes when firms are faced with a deficit of internal funds to finance their investment. In as far as different sources of finance are subject to different information asymmetries between managers and investors, Myers and Majluf (1984) propose a 'pecking order' hierarchy, according to which firms would prefer to resort to leverage after exhausting their internal funds, whereas equity issuance would be their last option for financing new investments.

Another more recent theoretical approach, the market timing theory (Baker & Wurgler, 2002), completes the academic debate on the financing decision. This theory postulates that the financing decision will depend on the difference between the firm's

market and book value. That is, the greater the difference, the higher the price of the stock and the more likely this firm is to opt for equity financing.

The empirical evidence obtained plays in favour of the trade-off and pecking-order theories to explain observed patterns in firms' capital structure decisions, finding an association between leverage and certain firm characteristics such as size, profitability, growth opportunities or asset tangibility (Frank & Goyal, 2009; De Miguel & Pindado, 2001; Rajan & Zingales, 1995).

The extended trade-off theory of capital structure states that the optimal structure for maximising firm value is reached when the firm succeeds in balancing the benefits of debt with the costs. However, in an imperfect market, firms can only partially adjust their capital structure. Furthermore, since target leverage is not directly observable, academics use a reduced equation to directly estimate the partial adjustment parameter, which is known as the speed of adjustment (SOA). This transforms the static trade-off theory into a dynamic econometric model to be described in greater detail in the methodology section.

However, recent studies show that optimal capital structure fluctuates over time (Akhtar, 2011; Campbell & Rogers, 2018; DeAngelo & Roll, 2015). Exploring this idea further, later literature addresses the impact of macroeconomic factors, usually of a monetary nature, which fluctuate over the business cycle and condition capital structure dynamics (Chang et al., 2019; Cook & Tang, 2010; Daskalakis et al., 2017).

2.1. Monetary macroeconomic effects over the business cycle

The last financial crisis shows that the price and supply of money are not neutral in affecting real economics (Stein, 2012). It is therefore necessary to return to the origins of economics to understand one of its most controversial issues: that is, the interaction between monetary and real economics (Borio, 2011).

The following subsections provide a theoretical rationale for the effect of interest rates and liquidity on the capital structure of listed European firms throughout the business cycle. We will focus on the effect of long- and short-term interest rates, spread, and liquidity as reflected in the supply and velocity of money.

2.1.1. Interest rates and spread

To better understand the relevance of interest rates, it should be borne in mind that the monetary policy objective set by central banks – in our case the European Central Bank and the Bank of England – focuses on price stability. Our study period is no exception; however, the outbreak of the 2008 crisis brings together a series of peculiarities worth mentioning. The low- interest monetary policy in force prior to the crisis served to overstimulate the economy. Overheating of economic activity, uncertainty and high interest rates at the end of the period brought to light the bad investments made in the previous period and triggered a drop in real activity. Governments took over from the private sector to boost the economy, generating high public deficit and sovereign debt which threatened their placement in the financial markets.

Even after the outbreak of the crisis, monetary policy continued to play an important role (Gerdesmeier, 2010) as the interest rates on credit facilities and the minimum reserve ratio were reduced. However, the post-crisis period revealed the ineffectiveness of

traditional monetary policy tools in stimulating the economy due to the malfunctioning of the interbank market and the difficulty of using official rates at levels close to zero. This led central banks to devise unconventional monetary policies with the aim of expanding the monetary base and the money in circulation, and thus reactivating the economy.[1] One of the most popular measures in this regard was the introduction of asset purchase programmes, generally of public and private debt, which ran in the UK and the European Union from 2009, continuing, albeit less formally, in the latter until 2015.[2] Finally, an episode of sovereign crisis debt took place during the recession period, although it was more of a threat than a reality for our sample countries, which were cushioned by various measures, such as the European Financial Stability Facility (EFSF) or Mario Draghi's announcement of support for the Euro currency, which led to the sovereign debt purchase programs. The most badly affected countries were Greece, which had to be rescued, and Ireland and Portugal; whereas, in our sample, Spain[3] and Italy[4] experienced a very limited impact.

The influence of interest rates on the cost of debt and their role as a channel for the transmission of monetary policy to the real economy is widely studied in the financial and macroeconomic literature (Taylor, 1995). Interest rates effects are likely to condition firms' investment opportunities and debt financing decisions; and there is, in fact, abundant empirical evidence of a relationship between capital structure and interest rates (Chang et al., 2019; Daskalakis et al., 2017; Frank & Goyal, 2004; Karpavičius & Yu, 2017). Karpavičius and Yu (2017), find evidence based on a US sample of firms during the period 1975–2014, suggesting that the impact of interest rates on firms' leverage is economically insignificant and that adjustments to capital structure are not made on the basis of interest rates. Other studies, such as Daskalakis et al. (2017), or Kajurová and Linnertová (2018), undertaken in a European Union context and amid the recent financial crisis of 2008, find clear evidence to the contrary. Ippolito et al. (2018) and Ciccarelli et al. (2015) state, furthermore, that this influence is even more pronounced in scenarios with a strong presence of bank debt, such as the European economies.

Economic growth is usually accompanied by a monetary policy under which low interest rates encourage credit usage (Beck et al., 2017), thereby causing an increase in corporate indebtedness. Nevertheless, we observe a positive relationship between interest rates and leverage throughout the business cycle (Daskalakis et al., 2017; Kajurová & Linnertová, 2018). The reason for this apparent contradiction is that debt remains attractive as long as the increasing interest rates of the growth phase do not surpass the expected profit margin on new projects. In the early stages of the growth phase, interest rates are lowered to bolster the economy, but firms need time to reduce their debt overhang from the preceding recession. Once bankruptcy costs drop to a tolerable level, low interest rates spur firms to debt-finance new profitable investments. However, excessively low interest rates encourage firms to make new, very long-term investments and to neglect present consumption needs (Garrison, 2001; Rothbard, 2004), which results in overinvestment in projects involving future consumption and underinvestment in those involving current consumption. Such overinvestment in the growth phase is frequently linked by researchers to events in the subsequent recession (Barro, 2006; Reinhart & Rogoff, 2009). The market compensates for this current goods supply shortage by upwardly adjusting current and expected inflation rates; this being reflected

in initially low but rising interest rates that eventually freeze investment and credit. In the growth phase, therefore, the relationship between interest rates and leverage is positive.

According to Cook and Tang (2010), one particularly interesting feature of the interest rates pattern, which is considered an indicator of the business cycle phase, is the term spread; that is, the difference between long-term and short-term interest rates. Recently, Chang et al. (2019) have established that, at the beginning of the growth phase, when inflation is still low, the term spread is wide, but that it begins to narrow, towards the end, when the climate turns inflationary. This is the result of asymmetric movement in interest rates, with short-term interest rates increasing more rapidly for several reasons. One is that they are used as a key monetary policy tool for curbing rising inflation (Taylor, 1993). Another is that firms whose cash flow forecasts have failed due to overconfidence may begin seeking short-term refinancing to pay debt maturities (Minsky, 2008). However, as the crisis approaches, savers' short-term expectations fade, their willingness to lend funds in the short-term subsides and interest rates rise. Finally, investment in capital goods leads to an autonomous demand for further capital goods to complement those already produced, and this, when the crisis looms close, encourages firms to demand new short-term finance to complete investment projects into which they have poured significant volumes of resources during the growth phase (Gerald et al., 2009; Huerta De Soto, 2009). Thus, the growth phase starts with a wide spread, inherited from the end of the previous recession phase, in the anticipation of investment opportunities (Cook & Tang, 2010; Estrella & Mishkin, 1996, 1998; Korajczyk & Levy, 2003) and the desire for increased leverage in a context of low interest rates. However, as the growth phase nears its end, disparately increasing long and short-term interest rates cause a narrowing of the spread and, thereby, a reduction in investment opportunities while leverage continues to grow, albeit at lower rates. In the growth phase, therefore, the relationship between spread and leverage is negative.

The recession phase of the cycle, meanwhile, is characterised by widespread liquidation of bad investments undertaken during the growth phase; because many businesses cease to be profitable as inflation drives up interest rates (Hayek, 1931). In this situation, although monetary authorities reduce interest rates to revive the economy, businesses cannot immediately take advantage of the lower financing costs. Indeed, economic unpredictability discourages both investment and borrowing. At the same time, however, the main strategic objective of businesses is not to grow, but to achieve financial security by reducing bankruptcy risk and shrinking the indebtedness hanging over from the growth phase. The term spread increases with the recession, because interest rates start to drop; but, despite having shown a sharper rise during the growth phase, the short-term rate now drops more heavily than the long-term rate, because it is more sensitive to the phase of the business cycle for the reasons given in the previous paragraph. That is, a broad term spread indicates low investment opportunities and high bankruptcy costs (Cook & Tang, 2010). During the recession, therefore, leverage is positively related with interest rates and negatively related with the term spread. The above reasons lead to the following research hypotheses:

H1: *The relationship between leverage and the long-term interest rate is positive.*

H2: *The relationship between leverage and the short-term interest rate is positive.*

H3: *The relationship between leverage and the term spread is negative.*

2.1.2. Liquidity, the bank lending channel and asymmetric information

Although GDP fluctuations are the traditional business cycle indicators, liquidity is another good business cycle predictor because agents tend to weaken their liquidity position in times of economic expansion and strengthen it in times of crisis. Liquidity influences financing both by lowering the price of money and by increasing its availability. Thus, liquidity is directly linked to another powerful channel of monetary policy transmission: the bank credit channel, which operates through financial frictions in credit markets (Bernanke & Gertler, 1995; Kashyap & Stein, 2000; Kiyotaki & Moore, 1997; Korajczyk & Levy, 2003; Pindado et al., 2020). Banks play a key role in the financial system because they are particularly effective in solving asymmetric information problems between borrowers and lenders (Fernández et al., 2013; Mishkin, 2017). Also, bank financing can offer greater flexibility when renegotiating credit terms, because banks have more capacity to monitor firms and greater access to private information about them (Boot, 2000; David et al., 2008; Pindado et al., 2017).

Bank credit has a particularly strong influence on the financing decisions of European firms. In what follows, we propose two variables for capturing the power of bank lending as a channel for monetary policy transmission and state our hypothesis for each of them.

By analysing money supply, we are able to study the liquidity of economic agents in relative terms; that is, not by the stock of money on their balance sheets, but by how easily their assets and liabilities can be converted into cash. We propose that a monetary transmission mechanism operates through changes in the liquidity preference of economic agents, which can be measured indirectly through changes in their ratios of monetary aggregates, which include assets with different degrees of liquidity. Thus, our proxy for the liquidity preference of economic agents will be the ratio of more liquid assets (M1 or narrow money) to total monetary aggregates (M3 or broad money) in their balance sheet structure. During the growth phase, the ratio of narrow to broad money decreases, thereby reflecting a tendency on the part of economic agents, encouraged by a relaxed monetary policy, to shift towards less liquid balance sheet compositions. This global degradation in the degree of relative liquidity leads to higher illiquidity risk, which is fostered by the bank system in two ways. Firstly, the monetary authority reduces interest rates (Taylor, 1995), especially short-term rates, thereby cutting the cost of debt. Furthermore, given the information asymmetry between lenders and borrowers, the bank credit channel enables an increase in the stock of bank deposits available for lending (Bernanke & Gertler, 1995), especially in the short term. Secondly, during the growth phase, banks perform uncoordinated credit expansion (Hayek, 1931; Huerta De Soto, 2009; Mises, 1912) by transforming cheap short-term deposits into cheap long-term financing, thus increasing the amount of profitable long-term investments financed with debt. In this way, firms not only reduce the liquidity of their assets, but also go deeper into debt, thus increasing their illiquidity risk and bankruptcy costs. Under recessions, on the other hand, the ratio of narrow to broad money grows, reflecting a move among economic agents towards more liquid balance sheet structures looking for financial security. On the credit supply side of the economy during the recession period that concerns us, despite banks obtaining credit from the central bank, it was some time before bank loans to firms were resumed. Banks feared non-recovery of loans granted

during the growth phase and therefore replaced their demand for credit from the central bank with a demand for liquidity while waiting for companies to recover financially and reorient their productive system towards new profitable investments, thus preventing a zombification of the economy. Meanwhile, on the credit demand side, amid declining profitability, higher uncertainty, and the lack of good investment opportunities, firms increased their liquidity demand in order to reduce potential bankruptcy costs. This process enables bank systems to increase their money reserves by reducing their business debt collection rights, while firms improve their liquidity by reducing their payment obligations to banks. This alleviates the illiquidity risk incurred by firms during the growth phase due to bank loans backed by investment projects with excessive insolvency risk. The above leads us to consider the following hypothesis:

H4: *The relationship between leverage and the ratio of narrow to broad money is negative*

The velocity of money is the number of times it moves from one economic agent to another through transactions. Thus, it enables us to measure liquidity in absolute terms, because it represents the number of transactions per unit of currency and unit of time and is inversely related to the average level of cash holdings on the balance sheets of economic agents per unit of time (Cannan, 1921; Selgin, 2011). The velocity of money increases during economic growth periods (Leao, 2005; Mishkin, 2017), because a monetary policy characterised by low interest rates and a greater stock of money available for lending makes it easier to launch new investment projects and increases the number of transactions in the economy. Thus, higher velocity implies lower average corporate cash holdings and less likelihood of the discretionary use of resources by managers facing free cash flow problems (Jensen, 1986). Thus, conflicts due to information asymmetry between shareholders and debt holders are mitigated and firms have easier access to credit markets. When a recession looms, the liquidation of investments hatched in the heat of an excessive reduction of interest rates reduces the volume of economic transactions, slowing down the velocity of money and encouraging firms to build up their cash reserves. This cash boost increases adverse selection and moral hazard problems between the firm and its lenders. In these circumstances, firms' access to credit is more likely to be hampered by the discretionary use of resources by managers. Based on these arguments, we posit the following hypothesis:

H5: *The relationship between leverage and the velocity of money is positive.*

2.2. The speed of capital structure adjustment over the business cycle

Although the main purpose of this work is to analyse the relationship between debt levels, macroeconomic variables and business cycles, we must not lose sight of one of the most interesting issues surrounding the capital structure theory in recent years: the speed of adjustment of capital structure to its target rate (Rubio & Sogorb-Mira, 2012), and how it varies between recessions and growth periods.

According to theory, capital structure adjusts more quickly to its target ratio during good times than bad. Easier access to capital markets during economic growth periods

provides greater scope for debt adjustments (Cook & Tang, 2010; Hackbarth et al., 2006). Recessions, however, lead to greater bankruptcy risk and information asymmetry, making it difficult to issue securities, limiting the supply of capital and slowing the capital structure adjustment process (Drobetz et al., 2015; Halling et al., 2016). This insistence of the last decade of financial literature on a pro-cyclical relationship between the speed of adjustment and the macro economy leads us to this simple research hypothesis:

H6: *Capital structure adjustment is faster in times of expansion than in times of recession.*

3. Empirical design: sample, variables and method

3.1. Sample

The sample includes all the non-financial listed firms from five European Union countries (Germany, Spain, France, Italy, and the United Kingdom) covered in the ORBIS database by Bureau van Dijk. The macroeconomic data on interest rates and monetary supply for each country were obtained from the Thomson and Eurostat databases. We removed those observations with negative equity or missing values for the variables considered in our estimation models. Although the initial sample comprises 2,892 nonfinancial firms, the application of these filters left us without full firm/year data. This resulted in an unbalanced panel with 15,335 firm-year observations of 2,193 firms from different sectors for the period 2003 to 2013.[5] To avoid distortion from outliers, all variables are winsorised at the 2% level.

The distribution of the sample (firms and observations) by country of origin is given in Table 1, which shows that Germany and the UK have a higher representation in the sample (20% and 30%) than the significantly lower percentages of Spain and Italy (6% and 10%, respectively).

3.2. Variables

The dependent variable is the leverage ratio (*LEV1*) of firm i at the end of period t

$$LEV1_{i,t} = \frac{LTD_{i,t} + STD_{i,t}}{TA_{i,t}}$$

where $LTD_{i,t}$ is the firm's long-term debt excluding risk and pension provisions, deferred taxes and deferred income, $STD_{i,t}$ is its short term debt, and $TA_{i,t}$ is its total assets.

Table 1. Sample distribution by countries.

Countries	Companies	%	Observations	%
Germany	503	22.94%	3,600	23.48%
Spain	106	4.83%	800	5.22%
France	614	28.00%	4,505	29.38%
Italy	184	8.39%	1,433	9.34%
U.K.	786	35.84%	4,997	32.59%
Total	2,193	100%	15,335	100%

The following is the set of explanatory or independent variables included in the equation to be estimated. A group of six independent variables is used to capture the main microeconomic factors with the potential to explain the leverage ratio:

(1) leverage in the previous period ($LEV1_{t-1}$).
(2) growth opportunities (*MTB)* measured as the sum of the market value of shares plus total debt over total assets. On the one hand, a higher MTB ratio reflects valuable growth options, which are better protected by avoiding debt financing (e.g., Flannery & Rangan, 2006; Hovakimian et al., 2004). The pecking order theory, meanwhile, indicates that debt increases when investment needs exceed retained earnings (Drobetz & Wanzenried, 2006), thus suggesting a positive relationship between the two variables.
(3) profitability (*ROA*) measured as the ratio of profits before interest and taxes (*EBIT*) to total assets. The pecking order theory posits that internal funds are preferred to external ones, such that more profitable firms are less inclined towards debt financing. The trade-off theory, however, argues for a positive relationship whereby the lower bankruptcy risk of profitable firms enables them to handle debt financing more easily.
(4) tax shields (*NDTS*) measured as the ratio of depreciation expenses to total assets. Depreciation is an alternative to debt-service expenses as a means to reduce taxation. An inverse relationship between tax shields and debt is therefore expected (Barton et al., 1989; Prowse, 1990).
(5) tangibility (*TANG*) measured as the percentage of tangible assets over total assets. A higher share of tangible assets reduces the risk of bankruptcy costs and, thus, enables more flexible debt management (Hovakimian et al., 2004; Titman & Wessels, 1988).
(6) firm size (*SIZE*) measured as the natural logarithm of its total assets. Larger firms usually have lower cash-flow volatility, which reduces information asymmetry between management and investors, thus enhancing access to credit (Hovakimian et al., 2004; Rajan & Zingales, 1995).

A second group of five independent variables is included to measure various macroeconomic and business-cycle effects[6]:
(1) long-term interest rates (*LIR*) measured through the ten-year sovereign bond yield;
(2) short-term interest rates (*SIR*) measured through the two-year sovereign bond yield; and
(3) the interest rates spread (*SPR)* measured as the difference between the two.

The last two relate to liquidity:

(1) the narrow to broad money ratio (*NBR*) measured as the ratio of M1 to M3 monetary aggregates, and
(2) the velocity of money (*VOM*) measured as the ratio of the nominal GDP to M1 money supply.

The two main components of money supply are money in the broad sense, also termed 'broad money', denoted by M3, which includes time deposits; and money in the strict sense, also termed 'narrow money', denoted by M1, which is the fully liquid part of M3, and includes coins, notes and overnight deposits. Therefore, the narrow to broad money ratio (*NBR*) captures the most liquid portion of M3 and is calculated as follows:

$$NBR = M1/M3$$

The velocity of money (*VOM*) is obtained through the application of Fisher's quantity theory of money (Fisher, 1911), which is given by the following accounting identity:

$$M1 \times VOM = P \times Y$$

where $M1$ is broad money supply; VOM is the velocity of money in circulation or the number of times that money changes hands; P is the average price level within the economy; and Y is real GDP. Based on the above, the velocity of money (*VOM*) is calculated as:

$$VOM = (P \times Y)/M1$$

Table 2 shows the correlations between the model variables, none of which is high enough to cause collinearity. The exceptions are the macroeconomic variables, which are entered separately.

3.3. Methodology

Based on the fact that firms pursue a target leverage ratio ($LEV^*_{i,t}$), the method involves a two-stage, dynamic partial adjustment model (Cook & Tang, 2010; Flannery & Rangan, 2006; Hovakimian et al., 2001; Smith et al., 2014) allowing target debt ratios to vary by firm and time.

In the first stage, the target leverage ratio $LEV^*_{i,t}$ is regressed (e.g., Fama & French, 2002; Kayhan & Titman, 2007) against the set of microeconomic (*MIC*) and macroeconomic (*MAC*) variables described in paragraph 3.2.

$$LEV^*_{i,t} = \beta^0 + \sum_{j=1}^{5} \beta^j MIC^j_{i,t} + \sum_{k=1}^{5} \gamma^k MAC^k_{i,t} + \eta_i + \varepsilon_{i,t} \quad (1)$$

where i denotes the firm and t denotes the year.

Table 2. Variable correlation matrix.

	LEV1	MTB	TANG	SIZE	ROA	NDTS	LIR	SIR	SPR	NBR	VOM
LEV1	1.000										
MTB	0.0258	1.000									
TANG	−0.0770	−0.1819	1.000								
SIZE	0.1066	−0.2222	0.3163	1.000							
ROA	−0.1113	−0.1924	0.0686	0.3364	1.000						
NDTS	0.0847	0.0346	0.0827	−0.1095	−0.2765	1.000					
LIR	0.1017	−0.0395	−0.0051	0.0885	0.0403	−0.0110	1.000				
SIR	0.0608	0.0129	−0.0261	0.0541	0.0530	−0.0146	0.8575	1.000			
SPR	0.0012	−0.0638	0.0386	0.0026	−0.0500	0.0128	−0.4503	−0.8446	1.000		
NBR	−0.1303	0.1085	0.0554	−0.0992	−0.0311	0.0289	−0.4277	−0.1901	−0.1161	1.000	
VOM	0.0288	0.0497	−0.1162	−0.0265	0.0587	0.0017	0.3733	0.5987	−0.6482	0.1449	1.000

The second stage considers the fact that high transaction costs can prevent firms from adjusting rapidly from their current leverage $LEV_{i,t}$ to the target $LEV^*_{i,t}$. This can lead to a process of partial adjustment (De Miguel & Pindado, 2001) which can be described through the following equation:

$$LEV_{i,t} - LEV_{i,t-1} = \alpha\left(LEV^*_{i,t} - LEV_{i,t-1}\right) \quad (0 < \alpha < 1) \tag{2}$$

where $LEV_{i,t}$ and $LEV_{i,t-1}$ are current and lagged leverage, respectively, and $LEV^*_{i,t}$ is target leverage, regardless of transaction costs.

The coefficient α denotes transaction costs, which, if equal to zero, i.e., $\alpha = 1$, then $LEV_{i,t} = LEV^*_{i,t}$ and the firm automatically adjusts to its target leverage. Conversely, if α = 0, then $LEV_{i,t}$=$LEV_{i,t-1}$, which implies that the transaction costs are so high that the firm makes no leverage adjustment at all, but remains at the previous level. In intermediate situations, where the value of α is between 0 and 1, firms adjust their leverage in inverse proportion to transaction costs.

Clearing current leverage $LEV_{i,t}$ from Equation (2), gives a third equation:

$$LEV_{i,t} = \alpha LEV^*_{i,t} + (1-\alpha)LEV_{i,t-1} \tag{3}$$

Finally, by incorporating Equation (1) into Equation (3) and taking into account that the estimates were obtained from panel data, we obtain the equation for the econometric model that is used to test the proposed hypotheses:

$$LEV_{i,t} = \beta^0 + (1-\alpha)LEV_{i,t} + \sum_{j=1}^{5} \alpha\beta^j MIC^j_{i,t} + \sum_{k=1}^{5} \alpha\gamma^k MAC^k_{i,t} + \alpha\eta_i + \alpha\varepsilon_{i,t} \tag{4}$$

where $\alpha\eta_i$ is the fixed effect of firm *i*, and $\alpha\varepsilon_{i,t}$ is the random disturbance.

The reason for the inclusion in the estimation model of so-called fixed effects, that is, the usual firm-specific effects or influences (η_i) usually included in the explanation of capital structure, is to capture so-called 'constant unobservable heterogeneity', for which panel data methodology is recommended. This, however, is not enough to address the endogeneity problem which automatically arises when the lagged dependent variable (leverage) is used as an explanatory variable. One of the most recommended ways of addressing this issue and avoiding inconsistent estimates is by means of generalised method of moments (GMM) estimation (Arellano & Bond, 1991). In this particular case, the system estimator version of GMM (Blundell & Bond, 1998) is applied. This not only corrects problems of simultaneity and observational errors, but also allows for the estimation of robust standard errors by helping to prevent heteroscedasticity and auto-correlation problems.

4. Empirical results

4.1. Descriptive analysis

We perform a two-stage empirical analysis, in which we first define some descriptive statistics for the study sample. Table 3 shows the mean, standard deviation, minimum, maximum and median values of the dependent variable, i.e., the leverage ratio (*LEV1*), and the two groups of explanatory variables mentioned in the theory and methodology

Table 3. Descriptive statistics of the variables for the whole sample. Mean, standard deviation, minimum, maximum and median of the dependent and independent variables.

Variable	Obs.	Mean	Std. Dev.	Min.	Max.	Median
LEV1	20,069	.4897	.1972	.0792	.9897	.4945
MTB	19,885	1.6719	1.3349	.5275	7.7122	1.2318
TANG	25,012	.4986	.2602	.0108	.9673	.4968
SIZE	25,012	11.976	2.4697	6.8491	17.579	11.706
ROA	24,778	−.0071	.2253	−1.0277	.3009	.0453
NDTS	24,378	.0432	.0460	0	.2411	.0320
LIR	25,178	.0359	.0098	.0160	.0590	.0360
SIR	25,178	.0235	.0174	0.001	.0590	.0230
SPR	25,178	.0126	.0103	−.0150	.0270	.0160
NBR	25,178	.4364	.1243	.0060	.6240	.4710
VOM	25,178	2.6782	.7186	1.661	4.310	2.557

sections, i.e., firm characteristics and macroeconomic variables. Table 4 reports on a means comparison test of the variables between pre- and post-crisis periods.

Among other things, it is worth noting the value of the dependent variable, *LEV1*, which, at around 0.5, is significantly higher in the pre-crisis period, thereafter trending very smoothly towards deleveraging in the recession period. Other mean values of interest are an MTB of 1.67 for the whole sample, this being the only variable with no significant differences between the pre- and post-crisis periods. Average profitability, on the other hand, is practically zero, and shows clearly negative values in the recession phase. Tangibility and depreciation expenses account for 50% and 4% of total assets, respectively, although the trend in their respective values between phases of the cycle, increasing in the first and decreasing in the second.

As for the macro variables, the downward path of interest rates is evident both in the short (2 years) and long term (10 years) with significantly lower values in the post-crisis period, although the spread is higher. Relative liquidity, expressed as the ratio of narrow to broad money, shows that economic agents seek financial security through higher liquidity in times of recession. Moreover, the speed with which money changes hands is significantly slower in this period, indicating less inclination on the part of economic agents to use money in transactions in times of crisis. Finally, the post-crisis period shows

Table 4. Means comparison.

Variable	Pre-crisis	Post-crisis	P-value
LEV1	0.4980	0.4818	0.000***
MTB	1.6824	1.6637	0.326
TANG	0.4799	0.5155	0.000***
SIZE	12.048	11.910	0.000***
ASSETS	1,597,373	1,561,135	0.404
ROA	0.0076	−0.0202	0.000***
NDTS	0.0442	0.0423	0.002***
LIR	0.0426	0.0304	0.000***
SIR	0.0389	0.0101	0.000***
SPR	0.0037	0.0205	0.000***
NBR	0.4231	0.4460	0.000***
VOM	3.2527	2.1895	0.000***

Means for subsamples by first impact of 2008 Crisis. *Pre-crisis* and *Post-crisis* columns capture mean values for observations in the pre-crisis period (2003–2008) and the post-crisis period (2009–2013). *P-value* for *t* test of mean differences is reported. ASSETS are expressed in millions US dollars.

Table 5. Descriptive statistics of variable means by country.

Variable	Germany	Spain	France	Italy	U.K.	Total
LEV1	.4558	.5492	.5275	.5496	.5363	.4897
MTB	1.629	1.4706	1.5421	1.3025	1.9154	1.6719
TANG	.4797	.5601	.4384	.5171	.5350	.4986
SIZE	11.892	13.610	11.997	13.184	11.599	11.976
ROA	.0150	.0383	.0326	.0327	−.0446	−.0071
NDTS	.0475	.0356	.0402	.0440	.0435	.0432
LIR	.0312	.0447	.0345	.0446	.0366	.0359
SIR	.0185	.0284	.0198	.0283	.0269	.0235
SPR	.0127	.0164	.0151	.0164	.0098	.0126
NBR	.4969	.4587	.3831	.0630	.5029	.4364
VOM	2.700	2.3257	2.9395	1.8757	2.6931	2.6782

significantly lower values in terms of profitability and firm size, albeit with higher tangible asset ratios.

Table 5 shows the variables grouped by country. Among other things, it is worth noting the value of the dependent variable, *LEV1*, which is around 0.5, with German firms showing the lowest debt ratio during the sample period and Spanish firms the highest. With respect to growth opportunities (*MTB*), UK firms have the highest average value, (1.9154), while Italian firms have the lowest, (1.3025). It must also be emphasised, however, that both the Spanish and Italian firms surpass those of the UK in terms of *ROA*.

With respect to the macroeconomic variables for the study period, Spain and Italy have the widest term spreads (*SPR*), while the UK and Germany stand out in terms of the narrow to broad money ratio (*NBR*). The velocity of money *(VOM)* is greatest in France and the UK.

4.2. Explanatory analysis

The most relevant results of the explanatory stage of the empirical analysis, that is, the system GMM estimation of the proposed models, are given separately for each phase of the business cycle. Although business cycles neither begin nor end on the same day for all countries, we follow other authors (Bournakis & Mallick, 2018; Daskalakis et al., 2017), by using 2009 as the joint cut-off year. There are several reasons for this decision. Firstly, 2009 was the first year in which the effects of the crisis were felt; GDP growth rate being substantially negative in Europe (−4.30%) and in all the European countries included in our sample.[7] In 2008, the GDP growth rate had been positive in Europe (+0.48%) and in all our sample countries, except the UK and Italy.[8] Secondly, 2009 was the first year marked by massive job destruction in Europe, and the unemployment rate grew by almost 2% despite having decreased the previous year. The exception was Germany, thanks to the flexibility of its labour market (Boysen-Hogrefe & Groll, 2010).

We place the end of the financial crisis in Europe at about the year 2014, when significant GDP growth (+1.75%) and job creation began. This came in contrast to 2013 when the GDP growth rate was close to zero in Europe (+0.29%) and still accompanied by job destruction. Thus, we consider the years 2003 to 2008 as the economic expansion phase and 2009 to 2013 the recession phase. Five different estimations are performed in each phase. In each regression, the same six microeconomic

Table 6. Growth phase.

	(1)	(2)	(3)	(4)	(5)
$LEV1_{t-1}$	0.7481***	0.7861***	0.7335***	0.7494***	0.8652***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
MTB	−0.0114**	−0.0137*	−0.0386***	0.0254*	−0.0053**
	(0.0115)	(0.0815)	(0.0000)	(0.0680)	(0.0218)
TANG	−0.0855	−0.0917	−0.1158	0.4741**	−0.0666***
	(0.1054)	(0.4296)	(0.3505)	(0.0143)	(0.0003)
SIZE	0.0178**	0.0059	−0.0022	−0.0093	0.0145***
	(0.0126)	(0.5979)	(0.8433)	(0.5494)	(0.0008)
ROA	−0.1330***	−0.1089**	−0.0119	−0.0470	−0.1633***
	(0.0008)	(0.0306)	(0.7927)	(0.4563)	(0.0076)
NDTS	0.9042**	0.5159**	0.4574**	0.8464**	1.1104***
	(0.0107)	(0.0173)	(0.0325)	(0.0500)	(0.0004)
LIR	0.6916*				
	(0.0750)				
SIR		0.9417**			
		(0.0342)			
SPR			−2.1894***		
			(0.0039)		
NBR				−0.4518***	
				(0.0081)	
VOM					0.0245*
					(0.0518)
Country dummies	NO	NO	NO	YES	YES
Observations	6,656	6,656	6,656	6,656	6,656
Wald test	773.7***	759.5***	151.4***	283.8***	513.1***
AR1	−5.594***	−6.268***	−8.005***	−8.105***	−5.841***
AR2	1.821	1.406	1.349	1.696	1.797
Hansen test	21.46	20.08	21.50	20.47	14.87

The dependent variable $LEV1_t$ is defined as the ratio of long-term debt excluding provision, pension fund provisions, deferred taxes and deferred income and short term debt to total assets at the end of period t; $LEV1_{t-1}$: debt ratio at time t-1; MTB: growth opportunities; TANG: tangibility of assets; SIZE: natural logarithm of the total volume of assets; ROA: EBIT/total assets; NDTS: amortisation over total assets; LIR: the 10-year sovereign bond interest rate; SIR: the 2-year sovereign bond interest rate; SPR: the difference between the 10- and 2-year sovereign bond interest rate; NBR: narrow to broad money ratio; VOM: velocity of money. Country dummies for firms' country of origin: Germany, France, Spain, Italy, or the United Kingdom. Estimated coefficients and p-values (P>|z|) in parentheses. The joint significance of the explanatory variables is tested by the Wald test. AR1 and AR2 are first and second order serial correlation statistics. The Hansen test is distributed as a χ^2 with degrees of freedom equal to the number of estimated coefficients and tests the validity of the instruments. ***, **, * denote statistical significance at the 1%, 5% and 10% level.

variables are jointly tested, whereas the five macroeconomic variables of interest are introduced one by one.

In Table 6 we show how lagged leverage ($LEV1_{t-1}$) exerts a significant and positive influence in all regressions, indicating a trend of partial adjustment of capital structure to target. There are no substantial differences between estimations in the SOA, which oscillates between 14% and 27%. Both long- and short-term interest rates (*LIR* and *SIR*) have a positive influence on leverage, thus providing support for hypotheses H1 and H2. For example, a 1% (100 basic points) increase in long-term and short-term interest rates would mean increases of 0.69% and 0.91% in corporate indebtedness in times of recession and expansion, respectively.[9] These results conflict with those obtained by Karpavičius and Yu (2017) using US data for a more extended sample period but fall in line with those of Daskalakis et al. (2017) and Kajurová and Linnertová (2018). The positive sign is a clear indication of the fact that debt remains attractive throughout the growth phase, as long as initially low but rising interest rates do not surpass the expected profit margin on the new investments.

The term spread (*SPR*), meanwhile, has a significant negative influence, confirming the sign of the relationship predicted by hypothesis H3. This phase begins with a wide spread indicating good investment opportunities, which are exploited by resorting to debt financing enabled by an environment of low interest rates. As the cycle runs its course, however, the spread starts to narrow whereas leverage continues to grow.

The estimation results shown in the last two columns confirm the key role played by liquidity as a determinant of capital structure. The negative sign of *NBR* evidences the fact that the increase in the available stock of money, driven by the monetary authority, causes a reduction in the cost of debt, an increase in debt financing and a lowering of the liquidity preference, thus providing support for hypothesis H4. The velocity of money (*VOM*) also has explanatory power to confirm hypothesis H5. New investments increase the speed of money circulation and lead to a reduction in information asymmetry between firms and lenders. Thus, bank borrowing is stimulated and firms gain easier access to debt funding.

Although the main focus of this study is on the influence of macroeconomic variables, it also concerns itself with the microeconomic determinants typically featured in the financial literature. However, for the sake of brevity and simplicity, a short summary of the results for said variables is given at the end of the report on each business cycle phase.

The results for the effects of the microeconomic variables on the capital structure of the sample firms during the growth phase reveal some fairly stable relationships. Worth mentioning are the negative sign shown by economic profitability (*ROA*) and the positive sign by non-debt tax shields (*NDTS*). The negative link with *ROA* is a manifestation of the pecking order theory described by Myers and Majluf (1984), whereby firms generating internal resources tend to elude debt financing. The positive sign of the *NDTS* provides no support for the fiscal theory on the use of debt; and the use of amortisation expenses exemplifies resorting to fixed assets as collateral to enable further borrowing (DeAngelo & Masulis, 1980). Size (*SIZE*), on the other hand, is significant (and positive) only in the first and last regression, while growth opportunities (*MTB*) behave as predicted by agency theory, showing negative significance in four of the estimations. Finally, the tangibility (*TANG*) coefficient is positive in the fourth regression, as predicted, but shows a negative sign in the last column.

Finally, a couple of clarifications to the above are worth making. Firstly, note that it is clearly indicated in Table 5 when, as in this first regression, the country dummies included in the estimation are not jointly significant. The significance (non-significance) of the country dummies in the remaining regressions will be indicated by YES (NO). The AR2 and *Hansen* statistics, in all cases, show the expected values. The p-value of second order correlation between the residuals indicates the absence of serial correlation, while the p-value for the *Hansen* statistic indicates the absence of any significant correlation between the instruments and the residuals.

Although Table 2 suggests no significant correlation between independent variables, the values of a subsequent VIF analysis (Table 7) are well below 10, thereby indicating the absence of multicollinearity. Changes observed with the joint introduction of the macro variables led us to make estimates in separate columns. The remaining VIF analyses, which, in any case, yield similar values to those reflected in Table 7, are omitted for the sake of brevity.

Table 8 shows how leverage (*LEV1*) is explained by lagged leverage ($LEV1_{t-1}$), microeconomic variables and macroeconomic variables in the recession phase. In the five

Table 7. VIF analysis.

Variable	VIF	1/VIF
$LEV1_{t-1}$	1.05	0.951206
MTB	1.26	0.792568
TANG	1.13	0.88434
SIZE	1.16	0.858466
ROA	1.26	0.79427
NDTS	1.01	0.99194
LIR	1.04	0.964504

Table 8. Recession phase.

	(1)	(2)	(3)	(4)	(5)
$LEV1_{t-1}$	0.9033***	0.7851***	0.8623***	0.8131**	0.8782***
	(0.0000)	(0.0000)	(0.0000)	(0.0122)	(0.0000)
MTB	0.0613***	−0.0005	−0.0124**	0.0682	0.0022***
	(0.0023)	(0.4684)	(0.0451)	(0.3257)	(0.0005)
TANG	0.0525	−0.0027	−0.0072	−1.8007**	0.0524
	(0.8497)	(0.9338)	(0.7048)	(0.0425)	(0.1511)
SIZE	0.0725***	0.0070***	0.0054	0.1032*	0.0203**
	(0.0043)	(0.0000)	(0.4711)	(0.0948)	(0.0300)
ROA	0.0128***	0.0023	−0.1381***	0.0070	−0.0072***
	(0.0086)	(0.5886)	(0.0087)	(0.7897)	(0.0006)
NDTS	−1.3983*	0.2076**	−0.0375	14.0337**	0.1409***
	(0.0810)	(0.0107)	(0.8487)	(0.0379)	(0.0003)
LIR	7.8038***				
	(0.0000)				
SIR		1.5065***			
		(0.0000)			
SPR			−1.9557***		
			(0.0000)		
NBR				−1.9923**	
				(0.0262)	
VOM					0.1171***
					(0.0000)
Country dummies	NO	NO	NO	NO	YES
Observations	8,679	8,679	8,679	8,679	8,679
Wald test	126.3***	1867***	2954***	18.14***	237.5***
AR1	−2.257***	−11.41***	−10.06***	−2.184***	−8.651***
AR2	−1.527	0.224	0.009	−1.466	0.0548
Hansen test	9.352	50.26	32.93	0.946	14.07

The dependent variable $LEV1_t$ is defined as the ratio of long-term debt excluding provision, pension fund provisions, deferred taxes and deferred income and short term debt to total assets at the end of period t; $LEV1_{t-1}$: debt ratio at time t-1; MTB: growth opportunities; TANG: tangibility of assets; SIZE: natural logarithm of the total volume of assets; ROA: EBIT/total assets; NDTS: amortisation over total assets; LIR: the 10-year sovereign bond interest rate; SIR: the 2-year sovereign bond interest rate; SPR: the difference between the 10- and 2-year sovereign bond interest rate; NBR: narrow to broad money ratio; VOM: velocity of money. Country dummies for firms' country of origin: Germany, France, Spain, Italy, or the United Kingdom. Estimated coefficients and p-values (P>|z|) in parentheses. The Wald test contrasts the joint significance of the explanatory variables. AR1 and AR2 are first and second order serial correlation statistics. The Hansen test is distributed as a χ^2 with degrees of freedom equal to the number of estimated coefficients and tests the validity of the instruments. ***, **, * denote statistical significance at the 1%, 5% and 10% level.

estimates reported in the columns of Table 8, lagged leverage exerts a positive and significant influence on the dependent variable. In all of them we can verify that the adjustment speed adopts similar values, but these are lower than the growth phase estimates given in Table 6.

With respect to the macroeconomic variables, long-term interest rates (*LIR*) and short-term interest rates (*SIR*) have a positive influence on the firm's level of indebtedness, thus confirming the positive relationship outlined in hypotheses H1 and H2. For

example, a 1% (100 basic points) increase in long-term and short-term interest rates would mean increases of 7.80% and 1.51% in corporate indebtedness, respectively. In the same vein, the term spread (*SPR*) has a significant and negative influence on leverage, thereby validating H3 in this phase. The positive impact of interest rates on the debt rate in this phase of the cycle shows how the low interest rate policy implemented by the monetary authority focuses on revitalising economic activity and investment but has no effect on firm leverage. The cost of debt, proxied by interest rates, decreases, and investment opportunities increase as a result of a growing spread. However, the prevailing climate of uncertainty prevents firms from taking immediate advantage of these circumstances and turns their strategic focus towards achieving financial security by reducing their debt hangover from the growth years.

The hypotheses relating to liquidity (H4 and H5) are also confirmed in the recession period after 2008. Firms try to improve their balance structures by increasing their liquidity positions and lowering their leverage, which ultimately leads to a negative relationship between the narrow-to-broad money ratio (*NBR*) and debt. At the same time, the lower volume of transactions carried out during this phase reduces the velocity of money (*VOM*), thereby increasing information asymmetry between firms and their lenders and discouraging borrowing from banks.

Turning to the results for the recession years, a couple of points are worth mentioning in relation to the microeconomic variables. One is that, in general terms, *NDTS, SIZE* and *ROA* maintain the same sign as in the growth phase. The influence of *SIZE* is unsurprising, since their greater knowledge of the market makes large firms more prone to use debt, especially during weaker economic conditions. The other notable findings are the changes in the Market-to-Book (*MTB*) ratio estimates during recessions; this variable loses significance and changes its sign from negative to positive in two of the estimates. Finally, tangibility (*TANG*) plays a testimonial role, showing a negative influence only in the fourth estimation. In this case, a higher proportion of fixed assets or collateral does not imply an increase in firms' indebtedness.

A final comment remains to be made with respect to hypothesis H6, which deals with the speed of adjustment to the target debt ratio in the different phases of the cycle. The first thing to be noted is the consistency of this parameter throughout the different regressions, with values oscillating between 10% and 27%. The average speed values are 22.35% for the growth phase and 15.16% for the recession phase, which validates a pro-cyclical relationship between the speed of adjustment and the macro economy.

5. Robustness analysis

In order to test the consistency of our results, we now perform some robustness analyses using a different measure of the dependent variable (*LEV2*):

$$LEV2_{i,t} = \frac{TLD_{i,t}}{TA_{i,t}}$$

where $TLD_{i,t}$ is the total liabilities and debt of firm i at the end of period t, and $TA_{i,t}$ are the total assets of firm i at the end of period t.

In Table 9, we examine the influence of macroeconomic variables on capital structure in the growth and recession phases (panel A and panel B). In the first two columns of each panel, interest rates (*LIR* and *SIR*) continue to show a significant and positive impact on capital structure, once again confirming hypotheses H1 and H2, although the spread term retains significance only for the recession phase. This may indicate that total leverage increases in the growth phase as a first response to the monetary policy incentive at the beginning of the cycle, but the growth of leverage slows as interest rates start to rise. Columns 4 and 5 confirm the influence of liquidity variables on long term indebtedness with the same signs as for total leverage in the previous estimations reported in Tables 6 and 8.

The speed of adjustment to the target debt ratio oscillates between 15% and 25% in the growth phase, with an average value of 19.71%, whereas in the recession phase it ranges between 10% and 20% (average value 14.10%). Results confirm higher speeds in the growth phase in all estimations, as predicted by H6.

At this point, it is worth noting the different numbers of observations in the results tables, which are due to several factors: 1) the number of years across the subsamples is different; 2) the available data are lower for the earlier expansion phase than for the later recession phase; 3) the numerators and numbers of missing observations in the leverage measures (LEV1 and LEV2) are different.

In a second robustness analysis, we study the potential influence of the legal and institutional setting on the results obtained. There is some empirical evidence to suggest that the results in Civil Law Continental settings, traditionally characterised by a bank-based financial system (i.e., Daskalakis et al., 2017), might differ with respect to those obtained in Common Law, or Anglo-Saxon market-based settings (i.e., Karpavičius & Yu, 2017). Given that our sample includes the UK, a genuine example of the 'Anglo Saxon' system, we analyse the influence of the macroeconomic variables on the dependent variable (*LEV1*) taking into account the effect of a dummy variable (*dumUK*), which equals 1 for the UK, and 0 otherwise. In Table 10, this UK dummy is interacted with macroeconomic variables in order to test their influence during growth and recession phases (panels A and B). The results show that the monetary variables evaluated in our study, which relate to the price and supply of money, have greater impact in bank-based financial systems than in market-based ones. Karpavičius and Yu (2017) analyse the US market, an 'Anglo-Saxon', market-oriented financial system, and their results show how interest rates have little or no effect on leverage. The results presented in Table 10 reflect some loss in the significance of interest rates in the UK, when compared to their impact in the bank-based financial systems included in our sample, this last result being very similar to that reported by Daskalakis et al. (2017) for Greece. In particular, the negative effect of the interactive term *LIRxdumUK* on leverage in the growth phase indicates that UK firms looked to long term investments, taking advantage of their greater growth options (*MTB*), and financing them with more equity and lower leverages. In a very similar vein, and despite a lack of statistical significance and the impossibility of direct comparison with other studies, the results in all cases show that liquidity had the opposite effect on leverage for UK firms.

The results for SOA show values very close to those obtained in the baseline model, being higher in the expansion phase (average 21,53%) than in the recession (average 12,38%).

Table 9. Panel A: growth phase. Panel B: recession phase.

	Panel A					Panel B				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
$LEV2_{t-1}$	0.8498***	0.8112***	0.7582***	0.7462***	0.8491***	0.9015***	0.8875***	0.7925***	0.8220***	0.8914***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
MTB	0.0002	−0.0006*	−0.0004	0.0000	−0.0004	−0.0031	0.0000	0.0000	0.0003**	−0.0001
	(0.8465)	(0.0752)	(0.2508)	(0.8284)	(0.1700)	(0.3201)	(0.9988)	(0.8092)	(0.0358)	(0.7043)
TANG	0.2286*	0.1151**	−0.0471*	0.3564**	0.2597**	−0.6098*	0.1396***	0.0685***	0.0447	−0.3714**
	(0.0659)	(0.0402)	(0.0586)	(0.0121)	(0.0205)	(0.0882)	(0.0008)	(0.0000)	(0.8893)	(0.0483)
SIZE	0.0148*	−0.0015	0.0369***	−0.0088	−0.0068	0.0315***	−0.0063**	−0.0124***	0.0625**	0.0172***
	(0.0802)	(0.8486)	(0.0000)	(0.4418)	(0.6710)	(0.0053)	(0.0375)	(0.0000)	(0.0162)	(0.0071)
ROA	0.0164	0.0479	−0.4852***	0.0665*	−0.2342**	0.0238	0.0018	0.0001	0.0009	−0.0053
	(0.7038)	(0.1073)	(0.0000)	(0.0987)	(0.0207)	(0.2326)	(0.7756)	(0.9742)	(0.6899)	(0.5327)
NDTS	1.3934***	1.3935***	2.9205***	0.5831***	1.3066***	2.2456***	0.2171*	−0.2485	2.1212**	0.6383*
	(0.0000)	(0.0000)	(0.0005)	(0.0000)	(0.0000)	(0.0000)	(0.0816)	(0.1045)	(0.0107)	(0.0745)
LIR	1.3853**					2.6139*				
	(0.0402)					(0.0619)				
SIR		1.2303**					1.5786***			
		(0.0256)					(0.0000)			
SPR			−1.0376					−1.9811***		
			(0.4105)					(0.0000)		
NBR				−0.5269***					−0.5210***	
				(0.0000)					(0.0021)	
VOM					0.0227**					0.0788***
					(0.0123)					(0.0000)
Country dummies	NO	NO	NO	NO	YES	YES	NO	YES	YES	YES
Observations	8,211	8,211	8,211	8,211	8,211	10,885	10,885	10,885	10,885	10,885
Wald test	370.2***	1293***	438.8***	463.8***	188.3***	368.7***	1157***	5869***	586***	3426***
AR1	−5.636***	−6.481***	−5.400***	−7.117***	−5.643***	−2.012***	−10.60***	−8.201***	−1.869***	−3.184***
AR2	0.337	0.331	2.638	0.758	0.625	−0.0899	0.628	0.201	−0.433	0.404
Hansen test	10.21	24.01	8.55	26.67	12.03	12.68	31.78	22.73	3.104	14.43

The dependent variable $LEV2_t$ is defined as total liabilities and debt to total assets at the end of period t; $LEV2_{t-1}$: debt ratio at time t-1; MTB: growth opportunities; TANG: tangibility of assets; SIZE: natural logarithm of the total volume of assets; ROA: EBIT/total assets; NDTS: amortisation over total assets; LIR: the 10-year sovereign bond interest rate; SIR: the 2-year sovereign bond interest rate; SPR: the difference between the 10- and 2-year sovereign bond interest rate; NBR: narrow to broad money ratio; VOM: velocity of money. Country dummies for firms' country of origin: Germany, France, Spain, Italy, or the United Kingdom. Estimated coefficients and p-values (P>|z|) in parentheses. The joint significance of the explanatory variables is tested by the Wald test. AR1 and AR2 are first and second order serial correlation statistics. The Hansen test is distributed as a χ^2 with degrees of freedom equal to the number of estimated coefficients and tests the validity of the instruments. ***, **, * denote statistical significance at the 1%, 5% and 10% level.

Table 10. Panel A: growth phase. Panel B: recession phase.

	Panel A					Panel B				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
$LEV1_{t-1}$	0.8035***	0.7631***	0.7579***	0.7531***	0.8457***	0.8867***	0.8966***	0.7596***	0.9062***	0.9315***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0009)	(0.0000)
MTB	−0.0030	−0.0066*	−0.0204***	0.0236	−0.0014*	0.0374**	0.0019**	−0.0005	0.0620*	0.0020***
	(0.5866)	(0.0929)	(0.0079)	(0.1212)	(0.0676)	(0.0112)	(0.0259)	(0.3022)	(0.0914)	(0.0021)
TANG	−0.0251	0.0291	−0.0876	0.4643**	−0.0505***	−0.1106	0.0559*	−0.0319***	−1.4657*	−0.2162
	(0.6864)	(0.6655)	(0.2724)	(0.0181)	(0.0071)	(0.5412)	(0.0926)	(0.0011)	(0.0624)	(0.1515)
SIZE	−0.0173**	0.0180***	−0.0022	−0.0088	0.0142***	0.0613***	0.0028	0.0101***	0.0617	0.0245***
	(0.0208)	(0.0004)	(0.8009)	(0.5728)	(0.0007)	(0.0032)	(0.3447)	(0.0000)	(0.3330)	(0.0084)
ROA	0.0312	−0.0320	−0.0270	−0.0483	−0.1143**	0.0066*	−0.0020	−0.0052	0.0070	−0.0064***
	(0.4562)	(0.2054)	(0.3964)	(0.4456)	(0.0435)	(0.0755)	(0.8068)	(0.6463)	(0.7783)	(0.0035)
NDTS	0.2637	0.7528***	0.5057***	0.8209*	1.0932***	−1.3913*	0.2083**	0.3521*	10.3960*	0.1358***
	(0.1256)	(0.0000)	(0.0001)	(0.0623)	(0.0004)	(0.0552)	(0.0124)	(0.0597)	(0.0865)	(0.0004)
LIR	1.1907**					5.8693***				
	(0.0104)					(0.0000)				
LIRxdumUK	−0.4612***					1.9373*				
	(0.0037)					(0.0674)				
SIR		0.9272**					1.4852***			
		(0.0105)					(0.0000)			
SIRxdumUK		−0.6802					0.4795			
		(0.2266)					(0.1496)			
SPR			−2.1117***					−2.3642***		
			(0.0009)					(0.0000)		
SPRxdumUK			17.972					1.2515		
			(0.1033)					(0.2328)		
NBR				−0.4489***					−1.9620***	
				(0.0087)					(0.0008)	
NBRxdumUK				0.0405					0.6656	
				(0.7669)					(0.2956)	
VOM					0.0380*					0.1118***
					(0.0902)					(0.0000)
VOMxdumUK					−0.0153					−0.0051
					(0.1846)					(0.8429)

(*Continued*)

Table 10. (Continued).

	Panel A					Panel B				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Country dummies	NO	NO	NO	YES	YES	NO	YES	NO	NO	YES
Observations	6,656	6,656	6,656	6,656	6,656	8,679	8,679	8,679	8,679	8,679
Wald test	588.8***	1083***	222***	293.5***	740.3***	214.7***	2829***	2998***	30.15***	261.3***
AR1	−8.019***	−7.438***	−7.135***	−8.069***	−5.892***	−3.777***	−11.28***	−10.79***	−1.975***	−8.541***
AR2	1.306	1.061	1.305	1.691	1.680	−1.828	0.239	0.214	−1.315	−0.0891
Hansen test	21.60	42.36	32.36	20.35	17.45	15.03	44.31	24.96	0.736	12.30

The dependent variable $LEV1_t$ is defined as the ratio of long-term debt excluding provision, pension fund provisions, deferred taxes and deferred income and short term debt to total assets at the end of period t; $LEV1_{t-1}$: debt ratio at time t-1; MTB: growth opportunities; TANG: tangibility of assets; SIZE: natural logarithm of the total volume of assets; ROA: EBIT/total assets; NDTS: amortisation over total assets; LIR: the 10-year sovereign bond interest rate; SIR: the 2-year sovereign bond interest rate; SPR: the difference between the 10- and 2-year sovereign bond interest rate; NBR: narrow to broad money ratio; VOM: velocity of money. The UK origin is approximated by dumUK (a dummy which equals 1 if country origin is UK, and null otherwise). Country dummies for firms' country of origin: Germany, France, Spain, Italy, or the United Kingdom. Estimated coefficients and p-values (P>|z|) in parentheses. The joint significance of the explanatory variables is tested by the Wald test. AR1 and AR2 are first and second order serial correlation statistics. The Hansen test is distributed as a χ^2 with degrees of freedom equal to the number of estimated coefficients and tests the validity of the instruments. ***, **, * denote statistical significance at the 1%, 5% and 10% level.

The removal of the UK companies to test the robustness of the findings indicates that the results are not driven by the UK subsample. The results, which show no significant variation, particularly with respect to the macroeconomic variables, are available upon request.

In Table 11 we broaden the robustness analysis by introducing a dummy variable discriminating between expansion (Crisis = 0) and recession (Crisis = 1) periods, which we interact with macroeconomic variables. The dummy equals 1 for the period 2009–2013 in panel A and for 2009–2015 in panel B, and 0 otherwise. In the estimation of panel B, the aim was to obtain a fuller picture of the prevailing complexity of the European economy (sovereign debt crisis) and add robustness to our findings by increasing the number of years. However, these additional years are not included in our original study or in panel A because for the reasons given at the beginning of section 4.2 (Explanatory analyses), they do not strictly form part of the post-crisis recession period.

The results do not differ substantially from those previously obtained in the separate estimates for the growth and recession phases.

Finally, although use is made in the capital structure literature of both lagged and current firm-level observations, we tried an alternative option, regressing on the first lag of the set of microeconomic (MIC) variables, which led to similar results (also available on request).

6. Conclusions

Traditional literature on capital structure has focused on the impact of firm-specific characteristics as determinants of financial decisions. However, the latest trends in this core area of research take a step further by considering the impact of the macroeconomic environment on firms' capital structure. Our study aims to respond to the research demands made in recent papers and to shed some light on the impact of monetary variables on firms' financing decisions by exploring the effect on capital structure of two key variables: interest rates or money price (interest rate channel) and liquidity or money supply in the economy (bank lending channel) throughout the business cycle.

Using a sample of listed non-financial firms based in the five major European economies from 2003 to 2013, we perform an empirical analysis, the main results of which are consistent with those reported in previous studies and confirm our empirical hypotheses, i.e., changes in interest rates and liquidity, as proposed, exert a decisive influence on the sample firms' capital structure. In particular, we show that the growth phase of the cycle begins with a drop in liquidity due to an increasing preference for the acquisition of rights and obligations. This is accompanied by a broad spread reflecting good investment opportunities, and low interest rates, which increase the propensity towards overinvestment and over-indebtedness. The velocity of money grows in parallel to deal with the higher transaction volume associated with new investments, which, in turn, reduces information asymmetry and encourages firms to increase their indebtedness. All these features of the growth phase of the cycle appear to confirm our empirical hypotheses; that is, a negative relationship between leverage, the term spread and the narrow-to-broad money ratio; and a positive relationship between interest rates, the velocity of money and debt.

Table 11. Panel A: 2003–2013. Panel B: 2003–2015.

	Panel A					Panel B				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
LEV_{t-1}	0.7228***	0.8165***	0.8837***	0.8940***	0.9524***	0.8020***	0.8380***	0.8767***	0.9031***	0.9217***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
MTB	−0.0039***	−0.0093**	−0.0069*	0.0080	−0.0035	0.0432	−0.0177***	−0.0175***	0.0303	−0.0439***
	(0.0001)	(0.0272)	(0.0616)	(0.4364)	(0.9041)	(0.1488)	(0.0001)	(0.0001)	(0.1248)	(0.0044)
TANG	0.0779***	−0.0336	0.0169	0.1994*	−0.2840	−0.0720	−0.0272	−0.1549*	−0.0304	−0.8496**
	(0.0073)	(0.5362)	(0.2585)	(0.0607)	(0.5215)	(0.9016)	(0.6387)	(0.0856)	(0.5343)	(0.0360)
SIZE	0.0119***	0.0072	−0.0047	−0.0049	0.0178	0.0422*	0.0020	0.0057	0.0157*	0.0368
	(0.0002)	(0.1727)	(0.3419)	(0.2778)	(0.5771)	(0.0599)	(0.6689)	(0.3610)	(0.0637)	(0.1309)
ROA	−0.0271	−0.0656**	−0.0163*	0.0046	−0.4177***	−0.6960*	−0.0788**	−0.1010**	−0.3196	−0.1978***
	(0.4183)	(0.0383)	(0.0617)	(0.9457)	(0.0012)	(0.0862)	(0.0411)	(0.0208)	(0.3559)	(0.0036)
NDTS	0.3335**	0.7114***	0.4579***	0.1012**	1.7910*	−0.0466	−0.0039	1.2057***	0.4032	1.8916*
	(0.0222)	(0.0006)	(0.0017)	(0.0139)	(0.0900)	(0.9712)	(0.9628)	(0.0001)	(0.3682)	(0.0745)
LIR	1.2331***					3.6870**				
	(0.0000)					(0.0153)				
LIR x dumCRI	−0.7205***					−0.2733				
	(0.0000)					(0.2730)				
SIR		0.9301***					1.0453***			
		(0.0000)					(0.0000)			
SIR x dumCRI		−0.7904***					−0.4562***			
		(0.0000)					(0.0041)			
SPR			−0.9419*					−2.3251***		
			(0.0760)					(0.0000)		
SPR x dumCRI			−0.8641*					0.5691***		
			(0.0607)					(0.0011)		
NBR				−0.1897**					−0.3611*	
				(0.0169)					(0.0570)	
NBR x dumCRI				−0.0987***					−0.0432**	
				(0.0000)					(0.0289)	
VOM					0.0598*					0.0538**
					(0.0753)					(0.0109)
VOM x dumCRI					−0.0145**					−0.0031
					(0.0393)					(0.2824)

(*Continued*)

Table 11. (Continued).

	Panel A					Panel B				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Country dummies	NO	NO	YES	NO	YES	NO	NO	NO	NO	YES
Observations	15,335	15,335	15,335	15,335	15,335	19,153	19,153	19,153	19,153	19,153
Wald test	2705***	837.8***	5322***	881.1***	7945***	36,579***	913.8***	4240***	170,291***	6910***
AR1	−8.577***	−11.59***	−6.499***	−12.53***	−1.134***	−1.058***	−13.11***	−12.60***	−5.224***	−1.123***
AR2	0.331	0.934	0.124	0.451	1.087	1.132	0.105	0.0514	0.361	1.239
Hansen test	50.25	66.23	55.40	13.09	6.43	25.61	68.25	38.68	15.45	18.84

The dependent variable $LEV1_t$ is defined as the ratio of long-term debt excluding provision, pension fund provisions, deferred taxes and deferred income and short term debt to total assets at the end of period t; $LEV1_{t-1}$: debt ratio at time t-1; MTB: growth opportunities; TANG: tangibility of assets; SIZE: natural logarithm of the total volume of assets; ROA: EBIT/total assets; NDTS: amortisation over total assets; LIR: the 10-year sovereign bond interest rate; SIR: the 2-year sovereign bond interest rate; SPR: the difference between the 10- and 2-year sovereign bond interest rate; NBR: narrow to broad money ratio; VOM: velocity of money. The crisis period is approximated by dumCRI (a dummy which equals 1 for the 2009–2013 in panel A or 2009–2015 in panel B, and 0 otherwise). Country dummies for firms' country of origin: Germany, France, Spain, Italy, or the United Kingdom. Estimated coefficients and p-values (P>|z|) in parentheses. The joint significance of the explanatory variables is tested by the Wald test. AR1 and AR2 are first and second order serial correlation statistics. The Hansen test is distributed as a χ^2 with degrees of freedom equal to the number of estimated coefficients and tests the validity of the instruments. ***, **, * denote statistical significance at the 1%, 5% and 10% level.

The recession phase of the cycle is marked by a clear decline in interest rates, a narrow but growing spread, and an increase in liquidity measures. However, firms do not take immediate advantage of these circumstances, because of a prevailing climate of uncertainty, which drives them to prioritise financial security by reducing over-indebtedness. Meanwhile, the velocity of money slows down due to low transaction volume; and the resulting increase in information asymmetry with potential lenders makes borrowing more difficult for firms. The hypotheses formulated for this phase of the cycle are thus verified: indebtedness is positively related with interest rates and the velocity of money, and negatively related with the term spread and the narrow-to-broad money ratio. Additionally, and consistent with the prevailing theory, our findings indicate that the speed of adjustment to the target debt ratio is higher in the expansion phase than under the recession scenario.

Finally, the robustness analysis shows that the monetary variables evaluated in our study have less significant impact in the UK, included to represent the market-based financial system, than in the other four countries, which are all bank-based economies.

This study is not without limitations. Despite being representative of the largest European countries, the sample includes only five countries and, most importantly, obviates the possible influence of other country-specific institutional factors or firm-level characteristics such as size. This, however, opens some interesting possibilities for future research. It might, for instance, be worth analysing the influence on leverage of other monetary channels (the unanticipated inflation channel) and/or giving more explicit consideration to size segmentation or to country-specific legal and institutional factors and their interaction with firm characteristics and macroeconomic variables in order to explain the capital structure of European firms. A further avenue of research in the current scenario created by the COVID-19 pandemic might be to explore the link between financing decisions and the uncertainty arising from the health crisis. The moderating role of unconventional monetary channels (such as forward guidance) or the use of diversified sources of debt (not only bank or market debt) could mitigate the effect of the present climate of uncertainty.

The findings of this paper have important implications for practitioners. Managers could optimise their financial decisions and their firm's capital structure by analysing trends in long- and short-term interest rates, spread rates, and liquidity, particularly in bank-based financial systems. Firms operating in market-based economies, however, need to make their financing decisions paying special attention to key real macroeconomic variables, such as the productivity and flexibility of the labour market, technological innovation, or the degree of economic freedom. This study also includes some interesting recommendations for policy makers. A country's financial stability depends largely on its monetary policy and there are several critical factors for Central Banks to consider. One is too much liquidity, which can unnecessarily increase credit risk if poor-quality financial assets have been used to finance risky investments with low profitability. Another is changes in interest rates, which can increase asset price risk and hinder cash flow forecasts. A third is the acquisition of foreign financial assets, which could increase the exchange rate risk and the dependence on the monetary policy of other countries.

Summing up, this study enriches the literature on this topic and helps to address some important shortcomings in past research. While previous studies have examined longer time periods featuring both real and financial crises arising from different economic

conditions, ours concentrates on the analysis of a strictly financial crisis such as that of 2008. Furthermore, we widen the focus on interest rates to include other key monetary variables whose importance has been overlooked. Using these previously unexplored variables, we analyse the various economic explanations for the influence of money on financing decisions across different phases of the business cycle. Finally, our sample is enriched for environmental effects by including both bank- and market-oriented economies.

Notes

1. See, in this regard, Banco de España, Economic Bulletin, January 2013: *The ECB's unconventional monetary policy measures throughout the crisis.*
2. Such programmes include the Covered Bonds Purchase (CBPP) or the Outright Monetary Transactions Programme (OMT), the European Financial Stability Facility (ESFF) and the European Financial Stability Mechanism (EFSM). In 2015, the Asset Purchase Programme (APP) was developed for the acquisition of sovereign bonds, securities issued by supranational European institutions, corporate bonds, asset-backed securities and covered bonds.
3. The yield on Spanish sovereign bonds was never higher than 7%, which was considered by analysts to be the red line above which debt is not placed on the financial markets, as happened in the cases of Greece, Ireland and Portugal, which had to be bailed out (Moody & Mackenzie, 2011).
4. Italian sovereign debt has a longer than usual maturity which makes the country more resilient to a financial shock (Schmieding et al., 2011).
5. Although data are available from 2002, the final sample period covers the period 2003–2013 since some of the variables used in our estimates are lagged.
6. The expected sign of the relationship between macroeconomic variables and leverage is described in section 2.
7. In 2009, the growth rates in GDP were −2.90% in France, −3.80% in Spain, −4.20% in the UK, −5.30% in Italy, and −5.70% in Germany (Data from OCDE and Eurostat, 2020).
8. UK and Italy had positive and negative growth during the different quarters of 2008 with a small and insignificant effect on unemployment (Data from OCDE and Eurostat, 2020).
9. Further interpretation of the coefficient, leading to similar conclusions, is omitted for the sake of brevity.

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