Debt and ownership structure: evidence from Italy

Fabrizio Rossi and Richard J. Cebula

Fabrizio Rossi is Adjunct Professor of Economics and Business Organisation at University of Cassino and Southern Lazio, Cassino, Italy. Richard J. Cebula is Wells Fargo Endowed Chair in Finance at Jacksonville University, Jacksonville, Florida, USA.

Abstract

Purpose – *The purpose of this study is to investigate the relationship between the debt and ownership structure of a sample of Italian-listed companies to measure the role assumed in the control and monitoring of agency costs.*

Design/methodology/approach – *This study examines a balanced panel data, using both a random effects model and a generalized method of moments model to better capture any problems related to the endogeneity of the variables in the model.*

Findings – *The results provide evidence of a positive relationship between debt and ownership concentration on the one hand and a negative relationship between debt and institutional investors on the other hand. The debt seems to assume both functions, i.e. the disciplinary role of substitute at low levels of ownership concentration and a complementary role at high levels of ownership concentration.*

Practical implications – *This study provides three practical implications. The first is that the complementarity between debt and ownership concentration provides evidence of the entrenchment effect and tends to weaken the company financially. Second, the results also provide useful prompts to policy-makers who should encourage the presence of institutional investors. Third, the policy-makers should also encourage the expansion of the stock market to enhance the protection of shareholders, reduce private control benefits and provide Italy the same opportunities as other common and civil law countries to collect risk capital, avoiding the abuse of debt.*

Originality/value – *The empirical results suggest that ownership concentration increases the degree of corporate debt, whereas institutional investors assume the disciplinary role of monitoring and controlling agency costs. The results provide evidence of both the entrenchment effect and the alignment-of-interests hypothesis and that the expropriation theory seems to prevail over the control and monitoring role.*

Keywords *Corporate ownership, GMM, Panel data, Corporate governance, Corporate finances, Public companies, Debts*

Paper type *Research paper*

1. Introduction

Jensen and Meckling (1976) argue that the allocation of the funding sources of equity and debt affects agency costs arising from the separation of ownership and control and that these costs increase with a decreasing share of ownership held by managers. The optimal capital structure is the one that minimizes the agency costs of equity and debt. Jensen (1986) argues that debt helps reduce agency costs and improve the relationship between managers and stockholders because it limits the discretion of managers to manage liquid resources. Debt also induces managers to increase the value of the firm and to not jeopardize their managerial skills and their reputation on the market (Fama, 1980; Masulis, 1988), although this assumption may not be valid in countries, where the abuse of leverage would serve to expropriate minority shareholders (Faccio *et al.*, 2010).

Italy, being one of the civil law countries, which are known to have a lower level of shareholder protection than in common law countries (La Porta *et al.*, 1999) and which tend to have a high ownership concentration, is an ideal setting to analyze the control

JEL classification – G23, G32, G34

Received 3 February 2016
Revised 12 May 2016
Accepted 9 June 2016

The authors wish to thank both the Editor, Gabriel Eweje and two anonymous Referees for their helpful suggestions that improved this paper.

mechanisms of corporate governance used to mitigate the conflicts between majority and minority shareholders that causes Type II agency problems (Villalonga and Amit, 2006) and tends to increase the private benefits of control (Bigelli and Mengoli, 2004).

Accordingly, the objective of this study is to investigate the relationship between the debt and ownership structure of a sample of Italian-listed companies through the use of a balanced panel data of 369 firm-year observations during the period 2005-2013.

This study extends the knowledge of the literature in various directions.

First, there is an analysis of a country with a high ownership concentration that is characterized by the widespread presence of the family and pyramidal control model in which corporate leverage is widely used, and it increases the private benefits of control by fueling the conflict between majority and minority shareholders. During the period investigated, the results reveal, on average, that the first shareholder holds 46.42 per cent of voting rights. Furthermore, in Italy, the presence of institutional investors is still marginal compared to most other countries. In most cases, the latter are foreign investors, and this may reveal different results as compared to other similar countries in terms of ownership concentration. In the period 2005-2013, the percentage of shares held by institutional investors was 3.70 per cent.

Second, Italy is well known for being a bank-oriented country, where businesses rely mainly on bank debt to finance investments. The sample investigated shows a debt-to-capital ratio of 36.18 per cent during the period 2005-2013. According to Consob's (2014) data, the debt level is higher than firms in other countries and higher than the Eurozone average. The ratio of financial debt to net equity of Italian-listed companies at the end of 2013 was significantly greater in the Eurozone, with a value of 110 and 70 per cent, respectively. Despite experiencing a decline in bank loans during the crisis period, Italian companies are among the most indebted and the most financially vulnerable in Europe. Moreover, the major listed companies have experienced a reduction in liquidity and a decline in self-financing, which nevertheless remains the main channel for coverage of financial needs (Consob, 2014). Furthermore, compared to common law countries, Italy has a low protection of creditor rights (La Porta *et al.*, 1998) with a score – whose value ranges from 0 to 12 – of 2, against a score of 5 and 4 for Spain and France, respectively (World Bank Group, 2015).

Third, in Italy, the number of listed companies is lower than in most other nations. Most of the wealth is invested in the family business, and this may reduce the possibility to diversify equity portfolios. The Italian stock market, in comparison to other European civil law countries, is still small in size. The ratio between total market capitalization and gross domestic product at the end of 2013 was 28.6 per cent for Italy (Consob, 2014), against 81.9 and 81.5 per cent for Spain and France, respectively (World Bank, 2013). Lastly, unlike other civil law countries, and in particular with reference to Spain and France, both belonging to French civil law countries, Italy, as mentioned above, is a country with low minority shareholder protection (La Porta *et al.*, 1999). The latest figures available assign a shareholder protection score (ranging from 0 to 10) of 6.7 for Italy, compared to 7.3 for Spain and France. These figures rank Italy in 36th place in the world for investor protection against 29th place for Spain and France, respectively (World Bank Group, 2015).

Fourth, this research examines the relationship between ownership structure and debt considering a time horizon that embraces both the pre-financial crisis period and the start of that crisis (2005-2008) and the period during the crisis and the recession phase (2009-2013) thereof. During the crisis, Italy was engulfed by the credit crunch, and this consideration could reveal some interesting results in the relationship between ownership structure and debt as compared to other less "problematic" periods. This study investigates the possible difference between the two periods (2005-2008 and 2009-2013) through the use of a dummy variable.

Finally, two different econometric techniques are used. In particular, the sample is tested both through a random effects (RE) model, as suggested by the Hausman's (1978) test, and a generalized method of moments (GMM) model to better capture any problems related to the endogeneity of the variables in the model.

The remainder of this study is organized as follows. Section 2 of this study discusses related literature and provides hypothesis development. Section 3 describes the sample and survey methodology. Section 4 presents the estimation results and a discussion of the findings, whereas Section 5 provides closing observations.

2. Literature review and hypothesis development

Debt and ownership structure can represent excellent mechanisms for the control of agency costs. However, the results found in the relevant literature on the relationship between debt and ownership structure do not appear univocal because some studies provide evidence of a negative relationship and therefore point out the control of agency costs (Myers and Majluf, 1984; Friend and Lang, 1988; Jensen *et al.*, 1992), whereas other studies find evidence of a complementary relationship (Kim and Sorensen, 1986; Agrawal and Mandelker, 1987; Harris and Raviv, 1991; Boubaker *et al.*, 2014), which could imply both the monitoring and expropriation of minority shareholders.

Rajan and Zingales (1995) assume that the non-diversified portfolios of blockholders could prompt them to reduce debt because it could increase the company's risk of default. Other studies have instead empirically shown that family firms tend to increase the firm's debt level (King and Santor, 2008; Croci *et al.*, 2011). Jensen (1986) argues on theoretical grounds that debt could be a useful tool in monitoring the behavior of managers, in what he calls "control hypothesis". Lin *et al.* (2013) observed that the controlling shareholder tends to avoid dependence on debt to avoid the monitoring of banks.

While the relationship between ownership concentration and firm performance has been extensively investigated both theoretically (Berle and Means, 1932; Jensen and Meckling, 1976; Demsetz, 1983; Fama and Jensen, 1983) and empirically (Demsetz and Lehn, 1985; Morck *et al.*, 1988; Agrawal and Knoeber, 1996; Cho, 1998; Demsetz and Villalonga, 2001; Earle *et al.*, 2005; Barontini and Caprio, 2006; Perrini *et al.*, 2008; García-Meca and Sánchez-Ballesta, 2011), the relationship between ownership concentration and the influence it can have on debt has received far less formal attention (Boubaker *et al.*, 2014) and those results appear to be at least somewhat disputable.

Jensen *et al.* (1992) and Crutchley *et al.* (1999) in the USA find that debt, insider ownership and institutional investors are determined simultaneously and are good substitutes in the control and monitoring of agency costs. Other authors, instead, believe that the debt level in civil law countries, where there is a clear separation between ownership and control and a frequent use of pyramidal groups (Faccio and Lang, 2002), is increased and used as a tool to expropriate minority shareholders (Faccio *et al.*, 2010; Paligorova and Xu, 2012).

Boubaker *et al.* (2014) in France find that debt is used to expropriate minority shareholders, and Hernández-Cánovas *et al.* (2014) came to a similar conclusion after examining 2,544 small- and medium-sized Spanish companies. Instead, the results of de Miguel *et al.* (2005) appear to be more articulate because they maintain that the relationship between debt and ownership concentration can assume both a complementary and substitute role and that in both cases, there can be phenomena related to the convergence of interests and the expropriation of minority shareholders, according to the level of entrenchment of controlling shareholders. De La Bruslerie and Latrous (2012) found an inverse U-shape relationship, and, in particular, at a low level of ownership concentration, the relationship is positive and after a certain point it becomes negative. Ellul (2010) observes instead that family firms appear to be more willing to increase the debt level as compared to non-family firms and that the relationship is more pronounced in countries where minority shareholders are less protected.

In Italy, Bianco and Nicodano (2006) found that debt is increased above all by subsidiaries rather than by holding companies and that holding companies increase debt, exposing themselves also to the risk of default, when the behavior of the subsidiaries results in increased financing costs. Unlike other studies, La Rocca *et al.* (2011) found that while firms use more debt during the initial phase, in the maturity phase they tend to favor the use of internal sources.

The results of the literature on the relationship between ownership structure and capital structure are substantially mixed. Moreover, as rightly observed by Rajan and Zingales (1995, p. 1449), the relationship between ownership concentration and capital structure "is far from obvious". On the one hand, in fact, the presence of blockholders could curb conflicts between shareholders and managers, reducing agency costs and facilitating the growth of equity; on the other hand, it must be considered that the larger shareholders may have non-diversified portfolios and may be driven to reduce debt as a result of their risk aversion (John *et al.*, 2008; Paligorova, 2010; Faccio *et al.*, 2011; Boubaker *et al.*, 2016).

It is hypothesized that the presence of large blockholders may increase risk aversion, especially in countries such as Italy (Rossi, 2016), where most of the founder wealth is invested in the family business. This circumstance could fuel the phenomenon of wealth preservation, the so-called "creative destruction", which would cause the owner not to invest in risky projects, such as research and development (R&D), or might even influence the owner to make sub-optimal investments to preserve the accumulated wealth (Morck *et al.*, 2000). In such circumstances, the entrenchment effect may prevail over the alignment of interests between the majority and minority shareholders. On the other hand, it is also true that the large shareholders seek to maintain or increase the company's control and may increase the debt volumes instead of the full-risk capital. Their behavior could, therefore, be directed more toward a policy of increasing the debt, even at the risk of financial difficulties not to lose control of the company. In the authors' view, in the Italian context, it could be natural to encounter two apparently opposing effects. On the one hand, in fact, companies, in which control is firmly in the hands of the founder or his heirs, may pursue a more risk-averse behavior and avoid default rather than go into debt, thus raising the likelihood of financial distress and the loss of market reputation. On the other hand, they may pursue a debt policy using financial leverage and tax shields for their investment projects, instead of expanding their venture capital, which would dilute their control over the firm. Italian companies have typically made use of debt to take advantage of tax shields and, at the same time, have shown a closure toward the outside to avoid interference by third parties outside the family's group. In Italy, debt may play both a substitutive disciplinary role and a complementary role in monitoring agency costs. Therefore, the relationship between debt and ownership structure could assume both a positive and negative sign.

However, in both cases, the results must be carefully interpreted. If, for example, the relationship between debt and ownership structure is negative, and therefore substitutive (Myers and Majluf, 1984; Friend and Lang, 1988; Jensen *et al.*, 1992; Crutchley *et al.*, 1999), the controlling shareholders may be avoiding the scrutiny of bank debt thus shirking its role of monitoring agency costs, just as it is likely that ownership concentration alone may be sufficient as a tool to monitor managers' opportunistic behavior. If the relationship is positive, and therefore complementary (Kim and Sorensen, 1986; Agrawal and Mandelker, 1987; Harris and Raviv, 1991), the two instruments may act simultaneously in reducing agency costs or the debt increase may be aimed at the expropriation of minority shareholders (Faccio *et al.*, 2010; Paligorova and Xu, 2012; Boubaker *et al.*, 2014). The positive (negative) sign of the relationship between debt and ownership structure does not necessarily entail a complementary monitoring (substitute monitoring) because the increased debt level and share ownership may result in both an actual monitoring of agency costs (Jensen, 1989; Agrawal and Knoeber, 1996; de Miguel *et al.*, 2005; López-Iturriaga and Rodríguez-Sanz, 2012) and triggering a process of expropriation of

minority shareholders because with the increase in debt, the firm has greater financial resources which the controlling shareholders may use improperly (Faccio *et al.*, 2010; Boubaker *et al.*, 2014; Pindado and de la Torre, 2011). Faccio *et al.* (2010), in particular, argue that expropriation through debt occurs primarily in countries that have a high separation between ownership and control and low creditor protection; in these countries, the pyramidal group and debt often assume a complementary role, and these instruments are frequently used not to monitor agency costs but to expropriate minority shareholders. Santos *et al.* (2014) argue that the controlling shareholders reduce debt because, not having diversified portfolios, they are risk averse; on the contrary, they observe that the coalition between non-controlling shareholders turns out to be a more effective monitoring instrument.

In light of the existing empirical evidence, on the one hand, it is likely that the active monitoring hypothesis by the larger shareholder (Shleifer and Vishny, 1987), in addition to debt, could improve the control and monitoring of managers, informing the market at the same time of the quality of the expected cash flows and the firm's well-being (Ross, 1977), thus creating the conditions for an alignment and convergence of interests. On the other hand, instead, in the presence of a high ownership concentration, the complementary role of debt could be likewise used to expropriate minority shareholders, especially when the entrenchment effect becomes a reality (Morck *et al.*, 1988). In this hypothesis, the use of debt would be used to increase the resources for purposes not in line with the maximization of value but simply to extract the private benefits of control through "tunnelling" (Johnson *et al.*, 2000), avoiding an increase in risk capital and the dilution of control (Pindado and de la Torre, 2011). In other words, the use of debt becomes a tool to acquire resources while protecting the non-majority controlling shareholders from potential takeovers and, at the same time, to increase the private benefits of control through opportunistic behavior.

Consistent with the previous studies, the following two hypotheses are proffered:

H1. The relationship between leverage and ownership structure is positive in the presence of a high ownership concentration.

H2. The relationship between leverage and ownership structure assumes an inverted U-shape: it is positive at high levels of share ownership and becomes negative when the share ownership is marginal.

A growing literature has explored the relationship between the presence of institutional investors and firms' investment decisions. Several studies, for example, have analyzed the relationship between institutional investors and investment in R&D but have yielded mixed results (Graves and Waddock, 1990; Bushee, 1998; Eng and Shackell, 2001; Aghion *et al.*, 2013; Cebula and Rossi, 2015). La Porta *et al.* (2000) suggest that institutional investors reduce informational asymmetries and may act as substitutes in monitoring, thus leading firms to go into debt to a lesser degree. Therefore, they could improve investor protection by inducing firms to gravitate toward riskier forms of investment as well if they operate in a long-term perspective.

Crutchley *et al.* (1999) found a negative and significant relationship between institutional investors and debt in the USA. Michaely *et al.* (2015), by studying a large sample of companies in the USA during the period 1980-2013, found a negative and statistically significant relationship between institutional investors and corporate leverage. Chung and Wang (2014) also found that the debt level decreases when the share held by institutional investors increases and that the latter could substitute the disciplinary role of monitoring debt.

Institutional investors[1] are important figures because, in theory, they should not pursue short-term yield policies; rather, they should invest in projects with a prospect of enhancing medium- and long-term yields. It is little surprising they are called "patient investors" because they may guarantee greater activism with regard to innovation policies and push managers toward higher risk investments, such as R&D, and toward being growth-oriented

with a long-term perspective. Given the ownership structure in Italian publicly listed companies, it is hypothesized that institutional investors have a monitoring role in the agency conflict.

In accordance with the empirical evidence, the following hypothesis is formulated:

H3. The relationship between leverage and institutional investors is negative.

3. Sample, methodology and data

This empirical investigation is based on a balanced panel data set of Italian-listed companies observed during the nine-year period 2005-2013. It explores, using both RE, as suggested by Hausman's (1978) test, and dynamic panel data, including system-GMM (Anderson and Hsiao, 1981; Arellano and Bond, 1991; Blundell and Bond, 1998), the relationship between debt and ownership structure using 369 firm-year observations on the Italian stock market. The RE is a model that assumes the time-invariant of certain specific variables used or which, on the contrary, undergo small variations during the observation period, as in the present analysis, and assumes that the individual-specific effect is a random variable which is not correlated with the explanatory variables and that the repressors are not completely collinear. In these cases, adoption of the RE is advisable because the fixed effects may create inaccurate estimates (Wooldridge, 2002). The RE is also recommended when examining a subsample of the population (Greene, 2012) and has been used in other similar studies (King and Santor, 2008; De La Bruslerie and Latrous, 2012).

However, because in the empirical studies on ownership structure there might emerge serious endogeneity problems attributable to the reverse causality problem (Demsetz and Lehn, 1985), in accordance with other studies (de Miguel *et al.*, 2005; Marchica, 2008; Faccio *et al.*, 2010; Pindado and de la Torre, 2011; López-Iturriaga and Rodríguez-Sanz, 2012; Hernández-Cánovas *et al.*, 2014; Santos *et al.*, 2014), it was used as an alternative dynamic panel data econometric model, including two-step system-GMM, because it is a more powerful econometric tool that captures the two components of endogeneity attributable to the unobservable heterogeneity and the simultaneity of the variables, respectively (Wooldridge, 2002; Wintoki *et al.*, 2012). The dynamic panel data, including two-step GMM-system, direct any endogeneity problems through the use of a set of lagged variables as instruments for the explanatory variables. The Sargan test, which is also called test of the over-identification of the instruments, is used to measure the validity of the instruments used under the null hypothesis of no correlation between the error term and the variables used; in the authors' analysis, the Sargan test confirms the validity of all the instruments used. The Wald test measures the joint significance of the estimated coefficients, whereas autoregressive terms (AR) (1) and AR (2) indicate first-order and second-order serial correlation, respectively. The model maintains its validity in the absence of second-order serial autocorrelation (Wintoki *et al.*, 2012). A statistical test is also performed with regard to the multicollinearity problems, and a variance inflation factor maximum of 2.10 was found for all models tested. Therefore, it can be concluded that collinearity is not a serious problem in this analysis (Greene, 2012).

The sample investigated consists of 41 companies and accounts for more than 50 per cent of the total market capitalization in the Italian stock market at the end of 2013. The sample consisted primarily of manufacturing enterprises along with a few service enterprises and excluded all financial firms (SIC code from 6000 to 6999). The financial data and corporate governance indicators, during the entire observation period, were acquired through *Datastream*, the *Calepino dell'azionista* (Mediobanca), *Bloomberg*, *Indici e Dati* by Mediobanca, the reports on corporate governance and the financial statements of the individual companies and the Consob websites.

In the following sections of this study, there is a description of the research methods adopted and the statistical analysis is performed, designed specifically for the unique

panel data set based on both econometric techniques and the research objectives of this study. In the first step, the base-line "Random Effect" equation is constructed.

The following equation reflects the basic model specification:

$$y_{i,t} = \mu_{i,t} + \alpha_1 OWN\_STRUCTURE_{i,t} + \alpha_2 CONTROL\_VARIABLES_{i,t} + v_{i,t} \quad (1)$$

Where $y_{i,t}$ is the dependent variable that is measured as total debt scaled by total assets (*LEVERAGE*) or as debt-to-equity ratio (*GEARING*); $\mu_{i,t}$ is the constant; α_1, α_2 are the coefficients; $v_{i,t}$ is split into two terms: $e_{i,t}$ is the stochastic error term and $u_{i,t}$ that captures the random individual differences. *OWN_STRUCTURE* is measured as *OC3* (or *1SH*, *2SH*, *3SH*), *DUMMY_50*, *H-INDEX*, *EXCE_CONTROL*$_1$, *EXCE_CONTROL*$_2$, *BOWN* (or *D_BOWN*) and *INST_INVESTORS*. The *CONTROL_VARIABLES* are *ROA*, *R&D*, *TOBIN'S Q*, *FIRMAGE*, *SIZE* and *INDUSTRY*.

In this study, two different measures of debt are used, calculated as the ratio between total debt and total assets (*LEVERAGE*) and the ratio between total debt and total equity (*DEBT-TO-EQUITY RATIO*, also known as *GEARING*), respectively.

The ownership structure is measured using a number of different indicators. The first is the sum of the percentage of shares held by the three largest shareholders (*OC3*). Alternatively, ownership structure, as reflected by the percentage held by the largest shareholder (*1SH*), the second largest shareholder (*2SH*) and the third largest shareholder (*3SH*), is separately considered. The second indicator of ownership structure, (*DUMMY_50*), is a binary (dummy) variable; this dummy variable assumes a value of 1 if at least one shareholder held more than 50 per cent of the shares and a value of 0 otherwise. The third indicator of ownership structure, (*INST_INVESTORS*), is also a binary variable; it assumes a value of 1 if at least one shareholder is an institutional investor and a value of 0 otherwise. The fourth indicator, (*B_OWN*), measures the percentage of shares owned by members of the Board of Directors. The fifth indicator is measured by the Herfindahl index, (*H_INDEX*). The sixth indicator is a dummy variable that takes on value of 1 if at least one director owns shares and a value of 0 otherwise (*D_BOWN*). Lastly, two dummy variables were constructed, *EXCE_CONTROL*$_1$ and *EXCE_CONTROL*$_2$, each of which assumes a value of 1 if the ownership concentration of the top three largest shareholders (*OC3*) is higher than the average (median) of the sample and 0 otherwise. The excess of control may represent a good proxy for the entrenchment level of the controlling shareholders. This approach, although methodologically different, was also followed in other analogous studies (de Miguel *et al.*, 2005; Pindado and de La Torre, 2011; Boubaker *et al.*, 2014).

As control variables, the following are adopted: the size of the enterprise is measured by the logarithm of total assets (*LOG SIZE*); the logarithm of firm age, considering the first year as the establishment of the firm (*LOG Firm AGE*), as a proxy of the enterprise life cycle; the R&D in logarithmic form[2] as a measure of intangible assets; and the industrial sector (*INDUSTRY*) variable is used as a diversification indicator while excluding all companies belonging to the financial sector (SIC code 6000-6999). As a measure of profitability and growth opportunities, respectively, the Return on Assets (*ROA*) and *TOBIN'S Q* are included. The control variables were chosen following the prevailing literature mentioned in Table I.

As argued by Kirkpatrick (2009, p. 2), "the financial crisis can be, to an important extent, attributed to failures and weaknesses in corporate governance arrangements". For example, Levine *et al.* (2015), investigating on 3,600 enterprises in 36 countries around the world, found that the credit crunch to be more dangerous for those countries having low shareholder protection and in which the enterprises cannot use the stock market as a "spare tire". In these contexts, because the enterprises cannot obtain capital from other sources, as a substitute for debt, they suffer most from the crisis period. Italy fits perfectly into these frameworks because, as mentioned above, it is a bank-centric country with low-minority shareholder protection (La Porta *et al.*, 1999; Rajan and Zingales, 1995). Therefore, because this study includes both the pre-crisis period (2005-2008) and the

Table I Variable definitions

Variables	*Measurement*	*Source*	*Previous studies*
LEVERAGE	Total debt scaled by total assets	Bloomberg, Datastream and manual collection from *Calepino dell'azionista*	Rajan and Zingales (1995), Crutchley *et al.* (1999), King and Santor (2008), Marchica (2008), Ellul (2010), Faccio *et al.* (2010), Croci *et al.* (2011)
GEARING	Total debt scaled by total equity	Bloomberg, Datastream and manual collection from *Calepino dell'azionista*	López-Iturriaga and Rodríguez-Sanz (2012)
1SH	Largest shareholder	Hand collection from Consob, Corporate Governance Reports, and *Calepino dell'azionista*	López-Iturriaga and Rodríguez-Sanz (2012), Hernández-Cánovas *et al.* (2014), Santos *et al.* (2014)
2SH	Second largest shareholder	Hand collection from Consob, Corporate Governance Reports, and *Calepino dell'azionista*	Croci et al (2011), Paligorova and Xu (2012), Santos *et al.* (2014)
3SH	Third largest shareholder	Hand collection from Consob, Corporate Governance Reports, and *Calepino dell'azionista*	Santos *et al.* (2014)
OC3	Top three largest shareholders	Hand collection from Consob, Corporate Governance Reports, and *Calepino dell'azionista*	Santos *et al.* (2014)
Herfindahl index (H)[a]	$H = \sum_{i=1}^{N} p_i^2$	Our calculation	Marchica (2008), López-Iturriaga and Rodríguez-Sanz (2012), Hernández-Cánovas *et al.* (2014), Michaely *et al.* (2015)
B_OWN	% of shares owned by Board of Directors	Manual collection from Corporate Governance Reports	Crutchley and Hansen (1989), Crutchley *et al.* (1999), Marchica (2008), Pindado and de la Torre (2011), López-Iturriaga and Rodríguez-Sanz (2012), Michaely *et al.* (2015)
D_BOWN	Dummy = 1 if board held % shares; 0 otherwise	Authors' calculation	
DUMMY_50	Dummy = 1 if majority shareholder held more than 50 per cent; 0 otherwise	Authors' calculation	de Miguel *et al.* (2005), Pindado and de la Torre (2011), Santos *et al.* (2014)
INST_INVESTORS (D_INST)	Dummy = 1 if present; 0 otherwise	Manual collection from Corporate Governance Reports and Consob	Crutchley *et al.* (1999), Michaely *et al.* (2015)
INDUSTRY	Four-digit SIC (Standard Industrial Classification) codes	Italian National Institute of Statistics	Faccio *et al.* (2010), Boubaker *et al.* (2014)
TOBIN'S Q	([Book value of total assets–book value of shareholder's equity + market value of shareholder's equity]/book value total assets)]	Bloomberg and hand collection from *Calepino dell'azionista and Indici e Dati Mediobanca*	King and Santor (2008), Faccio *et al.* (2010), Ellul (2010), Pindado and de la Torre (2011), Hernández-Cánovas *et al.* (2014), Boubaker *et al.* (2014)
ROA	Operating profit/total assets	Bloomberg, Datastream and manual collection from *Calepino dell'azionista*	Rajan and Zingales (1995), Crutchley *et al.* (1999), Fama and French (2002), King and Santor (2008), Ellul (2010), Croci *et al.* (2011), López-Iturriaga and Rodríguez-Sanz (2012), Hernández-Cánovas *et al.* (2014), Boubaker *et al.* (2014), Venanzi *et al.* (2014), Santos *et al.* (2014)
FIRM SIZE	Log total assets	Bloomberg, Datastream and manual collection from *Calepino dell'azionista*	Harris and Raviv (1991), Rajan and Zingales (1995), de Jong *et al.* (2008), Ellul (2010), López-Iturriaga and Rodríguez-Sanz (2012), Hernández-Cánovas *et al.* (2014), Boubaker *et al.* (2014), Santos *et al.* (2014), Michaely *et al.* (2015)
FIRM AGE	Log years by firm establishment	Firms' websites	King and Santor (2008), La Rocca *et al.* (2011), Croci *et al.* (2011), Hernández-Cánovas *et al.* (2014), Santos *et al.* (2014)
R&D	Log of research and development	Scoreboard of the Top EU companies	Crutchley and Hansen (1989), Jensen *et al.* (1992), Agrawal and Knoeber (1996), Crutchley *et al.* (1999), De La Bruslerie and Latrous (2012)

Notes: [a]The Herfindal index has been calculated as the sum of the squares of the top three shareholders; P^2_i is the percentage of shares held by shareholder *i*

period during the crisis (2009-2013), a dichotomous variable *CRISIS*, which takes a value of 1 for the crisis period and 0 otherwise, was used to measure any differences between the two periods.

As a moderating effect, there is a separate examination of the interaction of a number of variables, including the multiplication between the top three largest shareholders and institutional investors (*OC3* × *D_INST*), the multiplication between the Herfindahl index and institutional investors (*H-INDEX* × *D_INST*), the multiplication between *DUMMY_50* and institutional investors (*DUMMY_50* × *D_INST*) and the multiplication between board ownership and institutional investors (*BOWN* × *D_INST*). The interaction terms *OC3* × *D_INST, H-INDEX* × *D_INST* and *BOWN* × *D_INST* are used to verify whether the three variables (*OC3, H-INDEX and BOWN*) change their signs when they interact with the institutional investor's variable. Finally, a moderating effect between *OC3* and *CRISIS* (*OC3* × *CRISIS*) was also tested.

Table I illustrates the definition and measurement of the variables considered in this study.

Table II provides the descriptive statistics[3]. For the variables *LEVERAGE* and *GEARING*, respectively, an average (median) of 36.18 per cent (33.20 per cent) and 1.47 (0.50) is observed. From an analysis of the data during the pre-crisis period, not shown here for practical reasons of space, there is an average (median) value for *LEVERAGE* of 33.05 per cent (31.51 per cent) against 38.68 per cent (38.13 per cent), during the crisis period and recession. While at the end of 2007, the last year before the beginning of the crisis, there was an average (median) value of the indicator of 34.60 per cent (32.28 per cent), at the end of 2013 the average (median) value of the indicator stood at 50.53 per cent (52.94 per cent). These values, although not completely comparable because of the different composition of the sample and the different survey period, are lower than those of Venanzi *et al.* (2014). Alternatively, with regard to *GEARING*, at the end of 2013, the average (median) values recorded for our sample were 1.97 (1.13), values similar to the Consob (2014) findings, against an average (median) value of 1.33 (0.48) in 2007.

Table II Variables descriptive statistics

Variables	*Observations*	*Average*	*Median*	*SD*	*Minimum*	*Maximum*	*Mean difference*[a] *(t-value)*
Dependent variables							
LEVERAGE	369	36.18	33.20	23.16	0.00	97.17	−5.63 (1.28)
GEARING	369	1.47	0.49	4.05	0.00	34.33	0.01 (0.90)
Independent variables							
OC3 (%)	369	56.32	59.58	24.71	0.00	100	−0.05 (1.04)
H-INDEX	369	0.29	0.27	0.26	0.00	1.00	−2.88 (0.51)
1SH (%)	369	46.42	51.27	25.82	0.00	100	−2.69 (0.62)
2SH (%)	369	6.56	5.01	6.61	0.00	35.00	−0.95 (0.50)
3SH (%)	369	3.33	2.63	3.53	0.00	18.40	−1.01 (1.41)
DUMMY_50	369	0.53	1.00	0.50	0	1	−0.00 (0.09)
B_OWN (%)	369	9.94	0.00	19.80	0.00	71.08	−0.00 (0.00)
D_BOWN	369	0.31	0.00	0.46	0	1	−0.03 (0.30)
INST_INVESTORS	369	0.51	1.00	0.50	0	1	−0.07 (0.89)
Control variables							
R&D (million euros)	369	203.28	35.00	591.67	2.40	3.362	−45.27 (0.48)
LOG_R&D	369	2.31	1.54	2.77	0.38	3.53	−0.17 (1.23
ROA (%)	369	3.09	2.46	6.08	−24.02	34.14	0.92 (0.85)
TOBIN'S Q	369	1.26	1.02	0.70	0.70	7.76	0.06 (0.88)
FIRM AGE	369	60.20	52.00	42.88	8	177	–
SIZE	369	52,612.35	1,618.90	160,026.61	51,53	827,217.57	−34,574 (0.28)
LOGSIZE	369	4.72	3.21	5.20	1.71	5.92	−0.10 (0.39)
INDUSTRY	YES						–

Note: [a]The value has been obtained by computing the difference between the average of the variables (2005-2008) and (2009-2013)

In the period studied, the average (median) percentage of shares held by the top three largest shareholders amounted to 56.32 per cent (59.98 per cent), and, in most cases, the controlling shareholder is a legal entity. The first largest shareholder has an average (median) stake of 46.42 per cent (51.27 per cent), the second largest shareholder holds an average (median) equity stake of 6.56 per cent (5.01 per cent) and the third largest shareholder has an average (median) value of 3.33 per cent (2.63 per cent). The values are consistent with both the Consob figures (2014) and those of Bianchi *et al.* (2001), La Porta *et al.* (2002) and Faccio and Lang (2002). The Herfindahl index has an average (median) value of 0.29 (0.27).

The value of *B_OWN* varies between 0.00 and 71.08 per cent. On average (median), the board holds 9.94 per cent (0.00) of the shares of the companies investigated. The average investments in R&D amounted to €203.28m, with a median value of €35.00m. The *ROA* has an average (median) value of 3.09 per cent (2.46 per cent), and *TOBIN'S Q* has an average (median) value of 1.26 (1.02). The average total assets of the sample are equal to €52,612.35m, with a median value of €1,618.90m. The *average* age of the company, starting from its inception, is equal to 60.20 years (median = 52.00), with a range that varies between 8 and 177 years.

Comparing the pre-crisis period/start of the crisis period (2005-2008) to the following period (2009-2013), which is characterized by the crisis and its accompanying recession, a number of differences are observed for all the variables examined. For example, *LEVERAGE* seems to vary when the two periods are compared: in the period 2009-2013, the debt-to-capital ratio increases by an amount equal to 5.63 per cent. However, by applying the test on the averages for each variable, *no statistically significant difference* can be inferred between the pre-crisis period and the start of the crisis (2005-2008) and the crisis period and its accompanying recession phase (2009-2013). Therefore, with regard to statistical significance, the differences are effectively irrelevant. No variables tested among the means exceed the 5 per cent ($p = 0.05$) critical threshold of statistical significance.

4. Results and discussion

Tables III to VIII report the results of the empirical estimation process. Table III illustrates the results obtained using the RE model. The relationship between *LEVERAGE* and *OC3* is

Table III Random effects using leverage as dependent variable

Explanatory variables	*1*	*2*	*3*	*4*	*5*	*6*
Constant	0.064 (0.065)	0.137** (0.063)	0.095 (0.068)	0.127* (0.069)	0.152** (0.068)	0.158** (0.069)
OC3	0.378*** (0.044)					
H-INDEX		0.382*** (0.039)				
DUMMY50			0.120*** (0.021)			
BOWN				−0.002*** (0.000)		
D_BOWN					−0.111*** (0.024)	
D_INST						−0.065*** (0.021)
Control variables						
R&D	−0.018 (0.019)	−0.028 (0.018)	−0.049** (0.019)	−0.096*** (0.019)	−0.104*** (0.019)	−0.075*** (0.019)
ROA	−0.739*** (0.191)	−0.729*** (0.186)	−0.668*** (0.201)	−0.527** (0.204)	−0.568*** (0.202)	−0.560*** (0.205)
TOBIN'S Q	−0.036** (0.016)	−0.034** (0.016)	−0.034** (0.017)	−0.039** (0.017)	−0.033* (0.017)	−0.033* (0.018)
FIRM SIZE	0.083*** (0.009)	0.081*** (0.009)	0.098*** (0.009)	0.097*** (0.010)	0.095*** (0.068)	0.099*** (0.010)
FIRM AGE	−0.047* (0.027)	−0.039 (0.026)	0.012 (0.026)	0.065** (0.026)	0.070*** (0.026)	0.042 (0.026)
INDUSTRY	YES	YES	YES	YES	YES	YES
E.R.	0.180	0.176	0.190	0.194	0.192	0.195
R^2	0.402	0.430	0.337	0.305	0.321	0.299
Adjusted R^2	0.390	0.419	0.325	0.292	0.308	0.286
F-value	34.73***	39.00***	26.30***	22.67***	24.43***	22.06***
VIF_{MAX}	1.89	1.77	1.77	1.71	1.74	1.64
No. of observations	369	369	369	369	369	369

Notes: The *, ** and ***notation indicates statistical significance levels of 10, 5 and 1%, respectively; VIF = variance inflation factor; standard errors are given in parentheses

positive and statistically significant, just as the relationships between *LEVERAGE* and *H-INDEX* and between *LEVERAGE* and *DUMMY_50* are positive and statistically significant.

By contrast, in Tables III, IV and VI, there is a negative and statistically significant relationship between *LEVERAGE* and *BOWN*. The presence of institutional investors also seems to reduce the volume of debt. From the results, it appears that debt and ownership concentration assume a complementary, but not substitute, function in monitoring agency costs. Instead, both the director's ownership and institutional investors take on a substitute function. With regard to the control variables, it is noted that the relationship between *LEVERAGE* and *R&D* is negative and statistically significant in most cases, whereas the relationship between profitability and *LEVERAGE* is always negative and statistically significant, similar to the growth opportunities measured by Tobin's Q. The size of the enterprise always assumes positive and statistically significant values, whereas the *FIRM AGE* variable alternates its sign with a prevalence of positive values, and, in two models, the coefficients are statistically significant. However, when the dynamic panel data GMM-system is used (Table IV), more robust results are observed for all the variables.

In particular, although the coefficients of the ownership structure maintain the same sign and the same robustness, the control variables, as well as R&D, Tobin's Q and *FIRM AGE*, have statistically more robust results. The *R&D* coefficient is always negative and statistically significant, similar to Tobin's Q. Even the *FIRM AGE* variable, while alternating its sign, shows a greater statistical significance.

Table V provides the results obtained after adopting the three individual indicators of ownership.

The coefficients of the first (*1SH*) and second (*2SH*) largest shareholder variables exhibit a positive sign, whereas the third largest shareholder (*3SH*) variable shows a negative and statistically significant value in both the GMM and RE model. While the second (*2SH*)

Table IV Dynamic panel data including system-GMM model (two-step) with leverage as dependent variable

Explanatory variables	*1*	*2*	*3*	*4*	*5*	*6*
Constant	0.036 (0.031)	0.083*** (0.030)	0.053* (0.032)	0.045 (0.032)	0.064* (0.034)	0.084*** (0.027)
$LEVERAGE_{t-1}$	−0.010 (0.019)	0.010 (0.018)	−0.032 (0.020)	0.053** (0.022)	0.034* (0.020)	0.066*** (0.027)
OC3	0.360*** (0.025)					
H-INDEX		0.418*** (0.013)				
DUMMY50			0.127*** (0.008)			
BOWN				−0.002*** (0.000)		
D_BOWN					−0.096*** (0.008)	
D_INST						−0.062*** (0.010)
Control variables						
R&D	−0.034*** (0.008)	−0.043*** (0.008)	−0.058*** (0.010)	−0.101*** (0.010)	−0.106*** (0.012)	−0.077*** (0.011)
ROA	−0.833*** (0.155)	−0.904*** (0.137)	−0.744*** (0.121)	−0.717*** (0.129)	−0.679*** (0.125)	−0.825*** (0.165)
TOBIN'S Q	−0.033*** (0.006)	−0.030*** (0.007)	−0.029*** (0.006)	−0.024** (0.011)	−0.023** (0.010)	−0.021** (0.09)
FIRM SIZE	0.092*** (0.003)	0.103*** (0.003)	0.105*** (0.003)	0.104*** (0.005)	0.102*** (0.004)	0.105*** (0.004)
FIRM AGE	−0.043*** (0.012)	−0.046*** (0.015)	0.022 (0.016)	0.058*** (0.016)	0.067*** (0.014)	0.036** (0.015)
INDUSTRY	YES	YES	YES	YES	YES	YES
E.R.	0.169	0.165	0.180	0.185	0.183	0.186
Sargan test	36.05	34.63	37.28	35.30	36.59	35.19
Wald test	2,603.47***	4,971.61***	4,130.23***	1,135.44***	2,496.74***	1,871.77***
AR (1)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
AR (2)	(0.14)	(0.29)	(0.15)	(0.29)	(0.70)	(0.70)
VIF_{MAX}	1.89	1.77	1.77	1.71	1.74	1.64
No. of observations	328	328	328	328	328	328

Notes: The *, ** and ***notation indicates statistical significance levels of 10, 5 and 1%, respectively; VIF = variance inflation factor; standard errors are given in parentheses; AR (1) and AR (2) are serial correlation tests using residuals in first and second differences, asymptotically distributed as $N(0, 1)$ under the null hypothesis of no serial correlation, respectively; the Wald test indicates the joint significance of the reported coefficients; Sargan is a test of the over-identifying restrictions, asymptotically distributed as λ^2 under the null of no correlation between the instruments and the error term

Table V Random effects and dynamic panel data including system-GMM models (two-step) with leverage as dependent variable

Explanatory variables	*1*	*2*	*3*	*4*	*5*	*6*
Constant	0.083 (0.065)	0.145** (0.070)	0.205*** (0.069)	0.059* (0.031)	0.067** (0.036)	0.120*** (0.031)
1SH	0.334*** (0.040)			0.343*** (0.016)		
2SH		0.228 (0.167)			0.368** (0.158)	
3SH			−1.445*** (0.288)			−1.774*** (0.223)
$LEVERAGE_{t-1}$				−0.021 (0.019)	0.040** (0.020)	0.042** (0.019)
Control variables						
R&D	−0.037** (0.018)	−0.073*** (0.020)	−0.085*** (0.019)	−0.085*** (0.008)	−0.070*** (0.011)	−0.094*** (0.010)
ROA	−0.771*** (0.193)	−0.487** (0.207)	−0.656*** (0.203)	−0.880*** (0.152)	−0.672*** (0.154)	−0.868*** (0.121)
TOBIN'S Q	−0.036** (0.016)	−0.045** (0.018)	−0.040** (0.017)	−0.031*** (0.006)	−0.033*** (0.008)	−0.029*** (0.005)
FIRM SIZE	0.089*** (0.009)	0.096*** (0.010)	0.098*** (0.069)	0.104*** (0.003)	0.095*** (0.004)	0.111*** (0.004)
FIRM AGE	−0.027 (0.026)	0.041 (0.027)	0.040 (0.026)	−0.033** (0.015)	0.036** (0.014)	0.052*** (0.012)
INDUSTRY	YES	YES	YES	YES	YES	YES
E.R.	0.181	0.197	0.191	0.172	0.186	
R^2	0.393	0.285	0.328			
Adjusted R^2	0.381	0.271	0.315			
F-value	33.48***	20.54***	25.17***			
AR (1)				(0.00)	(0.00)	(0.00)
AR (2)				(0.19)	(0.43)	(0.25)
Sargan test				35.43	36.19	36.43
Wald test				3,262.21***	2,344.74***	1,191.33***
VIF_{MAX}	1.76	1.75	1.63	1.76	1.75	1.63
No. of observations	369	369	369	328	328	328

Notes: The *, ** and ***notation indicates statistical significance levels of 10, 5 and 1%, respectively; VIF = variance inflation factor; standard errors are given in parentheses; columns 1, 2 and 3 show the estimation results using the random effects model; columns 4, 5 and 6 show the results of the GMM model; AR (1) and AR (2) are serial correlation tests using residuals in first and second differences, asymptotically distributed as *N* (0, 1) under the null of no serial correlation, respectively; the Wald test indicates the joint significance of the reported coefficients; Sargan is a test of the over-identifying restrictions, asymptotically distributed as λ^2 under the null of no correlation between the instruments and the error term

largest shareholder has a positive sign in both models, but is statistically significant only in the GMM model, the coefficients of the first (*1SH*) and third (*3SH*) largest shareholder are statistically significant in both models. These results suggest that at low levels of ownership concentration, the relationship with *LEVERAGE* is negative, whereas the relationship changes its sign at high levels of ownership concentration. The third largest shareholder, a variable that in this sample assumes an average value of 3.33 per cent, has a negative sign. This may indicate that when the share ownership is low, debt takes on a substitute role in monitoring agency costs. From the data, it can be seen how the relationship between *LEVERAGE* and the three indicators of ownership structure (*1SH*, *2SH* and *3SH*) assumes a non-linear trend; indeed, it seems to take on an inverse U-shape, and this result is confirmed in both models. With regard to the control variables, the same results as discussed above are obtained.

In Table VI, the moderating effect is used, with the coefficients of ownership concentration measured by *OC3*, *DUMMY50* and *H-INDEX* confirming in statistically significant fashion the *positive* sign with respect to the dependent variable *LEVERAGE*, whereas the *BOWN* variable confirms the negative sign with respect to *LEVERAGE*.

However, when the variables of ownership concentration are permitted to interact with the dummy *INST*, the coefficient sign changes from positive to negative. This seems to indicate that institutional investors act as substitutes in the presence of high ownership concentration. Therefore, while ownership concentration confirms its complementary disciplinary role, institutional investors negatively affect *LEVERAGE*, either alone or when they interact with the coefficients of ownership concentration, thus confirming the disciplinary role of substitutes in the monitoring of agency costs. By including the variable

Table VI Random effects and dynamic panel data including system-GMM model (two-step) with leverage as dependent variable and moderating effects

Explanatory variables	*1*	*2*	*3*	*4*	*5*
Constant	0.141** (0.063)	0.062 (0.063)	0.093 (0.066)	0.149** (0.069)	0.072 (0.063)
H-INDEX	0.278*** (0.039)				
OC3		0.422*** (0.045)			
DUMMY_50			0.168*** (0.023)		0.103*** (0.025)
BOWN				−0.106*** (0.028)	
$LEVERAGE_{t-1}$					
Moderating effects					
OC3 × INST	−0.054* (0.032)				
H-INDEX × INST		−0.218*** (0.060)			
DUMMY_50 × INST			−0.119*** (0.028)		
BOWN × INST				−0.023 (0.072)	
OC3 × CRISIS					0.083** (0.040)
Control variables					
R&D	−0.030* (0.017)	−0.015 (0.019)	−0.047** (0.019)	−0.104*** (0.019)	−0.049*** (0.015)
ROA	−0.743*** (0.185)	−0.771*** (0.188)	−0.705*** (0.197)	−0.567*** (0.202)	−0.628*** (0.217)
TOBIN'S Q	−0.028* (0.016)	−0.024 (0.016)	−0.022 (0.017)	−0.033* (0.017)	−0.033** (0.014)
FIRM SIZE	0.080*** (0.009)	0.077*** (0.009)	0.093*** (0.009)	0.095*** (0.010)	0.097*** (0.010)
FIRM AGE	−0.036 (0.025)	−0.052* (0.026)	0.008 (0.026)	0.071*** (0.026)	0.006 (0.021)
INDUSTRY	YES	YES	YES	YES	YES
E.R.	0.175	0.177	0.185	0.192	0.188
R^2	0.435	0.423	0.369	0.321	0.350
Adjusted R^2	0.422	0.410	0.355	0.306	0.337
F-value	34.64***	32.99***	26.37***	21.35***	27.79***
AR (1)					
AR (2)					
Sargan test					
Wald test					
VIF_{MAX}	1.78	1.89	1.77	1.75	1.58
No. of observations	369	369	369	369	369

(*continued*)

Table VI

Explanatory variables	*6*	*7*	*8*	*9*	*10*
Constant	0.089*** (0.031)	0.043 (0.034)	0.069* (0.036)	0.054 (0.034)	0.029 (0.018)
H-INDEX	0.418*** (0.013)				
OC3		0.420*** (0.027)			
DUMMY_50			0.172*** (0.013)		0.109*** (0.007)
BOWN				−0.092*** (0.011)	
$LEVERAGE_{t-1}$	0.031 (0.024)	−0.004 (0.024)	−0.033 (0.024)	0.036* (0.021)	
Moderating effects					
OC3*INST	−0.082*** (0.022)				
H-INDEX × INST		−0.217*** (0.046)			
DUMMY_50 × INST			−0.110*** (0.017)		
BOWN × INST				−0.027 (0.040)	
OC3 × CRISIS					0.077*** (0.015)
Control variables					
R&D	−0.041*** (0.009)	−0.025*** (0.009)	−0.056*** (0.010)	−0.106*** (0.012)	−0.062*** (0.09)
ROA	−0.937*** (0.150)	−0.861*** (0.153)	−0.802*** (0.162)	−0.716*** (0.123)	−0.778*** (0.066)
TOBIN'S Q	−0.022*** (0.007)	−0.024*** (0.006)	−0.018*** (0.006)	−0.021** (0.010)	−0.027*** (0.003)
FIRM SIZE	0.101*** (0.003)	0.086*** (0.003)	0.100*** (0.003)	0.102*** (0.005)	0.106*** (0.003)
FIRM AGE	−0.048*** (0.016)	−0.057*** (0.015)	0.009 (0.017)	0.070*** (0.014)	0.024*** (0.008)
INDUSTRY	YES	YES	YES	YES	YES
E.R.	0.165	0.166	0.175	0.183	0.177
R^2					
Adjusted R^2					
F-value					
AR (1)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
AR (2)	(0.11)	(0.36)	(0.87)	(0.52)	(0.34)
Sargan test	33.51	34.73	36.99	36.86	39.16
Wald test	5,071.30***	2,704.66***	4,389.54***	1,298.16***	7,006.22***
VIF_{MAX}	1.78	1.89	1.77	1.75	1.58
No. of observations	328	328	328	328	328

Notes: The *, ** and ***notation indicates statistical significance levels of 10, 5 and 1%, respectively; VIF = variance inflation factor; standard errors are given in parentheses; columns 1, 2, 3 and 4 show the estimation results using the random effects model; columns 5, 6, 7 and 8 show the results of the GMM model; AR (1) and AR (2) are serial correlation tests using residuals in first and second differences, asymptotically distributed as $N(0, 1)$ under the null of no serial correlation, respectively; the Wald test indicates the joint significance of the reported coefficients; Sargan is a test of the over-identifying restrictions, asymptotically distributed as λ^2 under the null of no correlation between the instruments and the error term

CRISIS, it is observed that the sign of the interaction between *OC3* × *CRISIS* remains positive, but the values are lower and statistically weaker as compared to the results in the other models. This finding may indicate that the complementary role between debt and *OC3* remains, but the effect was more mitigated during the crisis period. In other words, during the crisis period, the ownership concentration has a positive impact on the debt level but in a more insignificant manner as compared to the previous period, and this may derive from the fact that during this period, the credit crunch in itself limited the use of debt as a source of financing, in accordance with the arguments of Levine *et al.* (2015). Indeed, even the control variables substantially confirm both their signs and statistical robustness.

Table VII reports the results obtained with the RE and with the GMM using both *LEVERAGE* and *GEARING*.

The results obtained are consistent with those already discussed. When *GEARING* is used as a dependent variable, the same signs and the same trend are obtained with respect to the three indicators of ownership concentration. In addition, the analysis confirms the negative relationship between the interaction terms (*H-INDEX* × *INST* and *BOWN* × *INST*) and the indicators of debt within the sample.

Table VIII illustrates the results of the final estimations. From these results, it can be observed that the value of the coefficients of $EXCE\_CONTROL_1$ (0.112) and $EXCE\_CONTROL_2$ (0.117) are both positive and statistically significant and that the value increases when they interact with the variable *OC3* ($EXC_1 \times OC3$ and $EXC_2 \times OC3$). In fact, the value of the coefficients changes to 0.224 (0.215), and this may indicate, according to the perspective in the present study, that at high levels of ownership concentration, the abuse of leverage aims at expropriating minority shareholders more than at monitoring agency costs. If the ownership concentration actually represented a deterrent for the control and monitoring of agency costs, beyond a certain threshold, there should not be a further increase in debt, which risks weakening the enterprise on a financial level and increasing the cost of debt, on the one hand, while shifting the risk excessively upon the creditors on the other hand. On the contrary, in the authors' opinion, there should be a relationship of substitution and no longer a relationship of complementarity. Therefore, the complementary role of ownership structure-debt risks becoming an expropriation tool. In fact, when the variable $EXCE\_CONTROL_2$ interacts with the first largest shareholder ($EXCE\_CONTROL_2 \times 1SH$), with the second ($EXCE\_CONTROL_2 \times 2SH$) and with the third largest shareholder ($EXCE\_CONTROL_2 \times 3SH$), the values of the coefficients seem to assume a trend similar to an inverted U-shape. In the last column of Table VIII, there is further confirmation that the relationship is non-linear. The increase in debt in the presence of a high ownership concentration appears to carry out more a role of expropriation than of control and monitoring of agency costs.

These results appear to be consistent with respect to both the alignment and the entrenchment effect and in line with those of López-Iturriaga and Rodríguez-Sanz (2012), Boubaker *et al.* (2014), Ellul (2010), Kim and Sorensen (1986), Agrawal and Mandelker (1987), Harris and Raviv (1991) and in part similar to those of Santos *et al.* (2014), de Miguel *et al.* (2005) and Pindado and de La Torre (2011) and close to the arguments of Faccio *et al.* (2010). The authors' results contrast with those of La Rocca *et al.* (2011) for Italy and appear at least partially different from those found by Hernández-Cánovas *et al.* (2014) for Spain[4]. In fact, Hernández-Cánovas *et al.* (2014) found that the relationship between leverage and controlling shareholder becomes positive and statistically significant when the main shareholder is an individual or a family group, whereas when the controlling shareholder is a corporation the relationship is negative.

Similar to the work of De La Bruslerie and Latrous (2012) for France, there is also an inverted U-shape. Unlike De La Bruslerie and Latrous (2012), however, it is noted that at a low level of ownership concentration, debt seems to take on the disciplinary role of monitoring agency costs and the relationship becomes negative, whereas when the share

Table VII Random effects and dynamic panel data including system-GMM model (two-step) with gearing and leverage as dependent variables and moderating effects

Explanatory variables	*LEVERAGE* (1)	*GEARING* (2)	*LEVERAGE* (3)	*GEARING* (4)	*LEVERAGE* (5)	*GEARING* (6)	*LEVERAGE* (7)	*GEARING* (8)
Constant	0.124* (0.064)	−3.084*** (0.089)	−0.042 (0.046)	−4.735*** (0.674)	0.109* (0.065)	−3.200*** (0.894)	−0.039 (0.046)	−4.737*** (0.675)
1SH	0.359*** (0.044)	1.997*** (0.617)	0.397*** (0.027)	2.149*** (0.412)	0.366*** (0.047)	2.035*** (0.651)	0.409*** (0.028)	2.528*** (0.446)
2SH	0.662*** (0.176)	47.153*** (2.422)	0.801*** (0.105)	51.983*** (1.593)	0.598*** (0.177)	46.647*** (2.454)	0.746*** (0.108)	51.723*** (1.659)
3SH	−0.889*** (0.313)	−56.035*** (4.300)	−1.151*** (0.187)	−61.853*** (2.842)	−0.777** (0.314)	−55.176*** (4.350)	−1.002*** (0.191)	−60.203*** (2.925)
DV_{t-1}			0.063** (0.031)	0.024 (0.019)			0.056* (0.030)	0.027 (0.019)
Moderating effects								
H-INDEX × INST					−0.055 (0.062)	−0.382 (0.869)	−0.064* (0.037)	−1.414** (0.563)
BOWN × INST					−0.105* (0.060)	−0.844 (0.839)	−0.056 (0.036)	0.160 (0.565)
Control variables								
R&D	−0.006 (0.019)	−0.224 (0.265)	−0.020* (0.011)	−0.304* (0.166)	−0.014 (0.019)	−0.282 (0.270)	−0.022** (0.011)	−0.286* (0.171)
ROA	−0.696*** (0.178)	−5.434** (2.456)	−0.783*** (0.106)	−7.921*** (1.605)	−0.706*** (0.177)	−5.513** (2.458)	−0.798*** (0.105)	−8.188*** (1.607)
TOBIN'S Q	−0.021 (0.015)	0.053 (0.027)	−0.027*** (0.008)	0.067 (0.128)	−0.014 (0.015)	0.104 (0.210)	−0.022** (0.008)	0.132 (0.130)
FIRM SIZE	0.066*** (0.009)	0.800*** (0.128)	0.802*** (0.006)	0.808*** (0.101)	0.066*** (0.009)	0.794*** (0.129)	0.078** (0.006)	0.778*** (0.102)
FIRM AGE	−0.035 (0.026)	1.082*** (0.362)	−0.037** (0.016)	0.983*** (0.244)	−0.027 (0.027)	1.150*** (0.370)	−0.035** (0.016)	0.938*** (0.250)
INDUSTRY	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUMMY	YES	YES	YES	YES	YES	YES	YES	YES
E.R.	0.161	2.212	0.148	2.213	0.231	4.055	0.147	2.216
R^2	0.449	0.666			0.465	0.673		
Adjusted R^2	0.435	0.658			0.449	0.663		
F-value	32.55***	79.77***			28.30***	66.74***		
AR (1)			(0.00)	(0.00)			(0.00)	(0.00)
AR (2)			(0.39)	(0.21)			(0.38)	(0.60)
Sargan test			110.52	99.99			112.30	99.78
Wald test			767.77***	1870.68***			779.27***	1874.22***
Wald test (year dummies)	66.96***	59.89***	237.18***	138.83***	61.26***	54.22***	219.05***	122.17***
VIF_{MAX}	2.00	2.00	2.00	2.00	2.10	2.10	2.10	2.10
No. of observations	369	369	328	328	369	369	328	328

Notes: The *, ** and ***notation indicates statistical significance levels of 10, 5 and 1%, respectively; VIF = variance inflation factor; standard errors are given in parentheses; columns 1, 2, 5 and 6 show the estimation results using the random effects model; columns 3, 4, 7 and 8 show the results of the GMM model; AR (1) and AR (2) are serial correlation tests using residuals in first and second differences, asymptotically distributed as $N(0, 1)$ under the null of no serial correlation, respectively; the Wald test indicates the joint significance of the reported coefficients; Sargan is a test of the over-identifying restrictions, asymptotically distributed as λ^2 under the null of no correlation between the instruments and the error term

Table VIII Dynamic panel data including system-GMM models (two-step) with leverage as dependent variable considering the interest convergence versus entrenchment hypothesis

Explanatory variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Constant	0.056*** (0.014)	0.081*** (0.016)	0.075*** (0.011)	0.100*** (0.013)	0.108*** (0.014)	0.140*** (0.011)	0.079*** (0.015)	0.270***(0.012)
$EXCE\_CONTROL_1$	0.112*** (0.009)							
$EXCE\_CONTROL_2$		0.117*** (0.003)			−0.332*** (0.019)	0.057*** (0.007)	0.161*** (0.008)	
$EXCE\_CONTROL_1 \times OC3$			0.224*** (0.012)					
$EXCE\_CONTROL_2 \times OC3$				0.215*** (0.005)				
$EXCE\_CONTROL_2 \times 1SH$					0.687*** (0.025)			
$EXCE\_CONTROL_2 \times 2SH$						0.905*** (0.106)		
$EXCE\_CONTROL_2 \times 3SH$							−1.530*** (0.329)	
OC3								−2.202*** (0.247)
$OC3^2$								10.437*** (1.194)
$OC3^3$								−16.684*** (1.875)
$OC3^4$								8.905*** (0.927)
$LEVERAGE_{t-1}$	−0.014 (0.009)	−0.008 (0.013)	−0.015 (0.013)	−0.006 (0.013)	0.047*** (0.014)	−0.002 (0.009)	0.014 (0.016)	0.033*** (0.012)
Control variables								
R&D	−0.057*** (0.009)	−0.052*** (0.008)	−0.041*** (0.009)	−0.038*** (0.007)	−0.055*** (0.007)	−0.024*** (0.009)	−0.047*** (0.008)	−0.032*** (0.005)
ROA	−0.716*** (0.088)	−0.766*** (0.064)	−0.758*** (0.048)	−0.776*** (0.056)	−0.715*** (0.103)	−0.684*** (0.079)	−0.809*** (0.080)	−0.809*** (0.057)
TOBIN'S Q	−0.034*** (0.003)	−0.033*** (0.003)	−0.035*** (0.002)	−0.034*** (0.003)	−0.038*** (0.004)	−0.034*** (0.003)	−0.035*** (0.004)	−0.029*** (0.005)
FIRM SIZE	0.104*** (0.003)	0.099*** (0.002)	0.099*** (0.003)	0.095*** (0.001)	0.104*** (0.002)	0.078*** (0.003)	0.098*** (0.002)	0.090*** (0.002)
FIRM AGE	0.017** (0.007)	0.009 (0.007)	−0.014** (0.005)	−0.018*** (0.006)	−0.025*** (0.009)	−0.013*** (0.004)	0.002 (0.008)	−0.088*** (0.004)
INDUSTRY	YES	YES	YES	YES	YES	YES	YES	YES
AR (1)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
AR (2)	(0.18)	(0.15)	(0.13)	(0.16)	(0.13)	(0.16)	(0.17)	(0.14)
Sargan test	37.73	39.42	39.60	40.15	35.46	38.56	37.66	37.65
Wald test	7,991.78***	6,416.45***	6,514.11***	10,501.1***	25,760***	26,464.4***	21,654.4***	46,555***
No. of observations	328	328	328	328	328	328	328	328

Notes: The *, ** and ***notation indicates statistical significance levels of 10, 5 and 1%, respectively; standard errors are given in parentheses; columns show the results of the GMM model. AR (1) and AR (2) are serial correlation tests using residuals in first and second differences, asymptotically distributed as $N(0, 1)$ under the null of no serial correlation, respectively; the Wald test indicates the joint significance of the reported coefficients; Sargan is a test of the over-identifying restrictions, asymptotically distributed as λ^2 under the null of no correlation between the instruments and the error term

ownership is higher, the relationship with leverage becomes positive and the larger shareholders assume a complementary role with respect to debt. In the present study, therefore, risk aversion is excluded with respect to debt on the part of controlling shareholders, and it is hypothesized that the preservation and/or enhancement of control by big blockholders prevails over risk aversion. Given the Italian context, with a high presence of pyramidal groups and low creditor protection, the authors' findings could also be consistent with respect to the study by Faccio *et al.* (2010), which suggests that in pyramidal groups the increase of debt by the holding companies would serve as a tool to expropriate minority shareholders, especially in countries with low creditor protection.

It is also observed that both the director's ownership and institutional investors hold back the debt. Institutional investors play a monitoring role in the place of debt, such that these results seem to be consistent with both the reasoning of La Porta *et al.* (2000) and with respect to the work of Crutchley *et al.* (1999), Chung and Wang (2014), Michaely and Vincent (2013) and Michaely *et al.* (2015).

With regard to the control variables, it can be concluded that the *ROA* negatively affects debt, and this result might appear in contrast with the thesis by Jensen (1986) but consistent with the arguments of Myers and Majluf (1984) and in particular with the fact that businesses with a higher profitability tend to use more internal resources and less debt to finance investments. In empirical terms, the results of the *ROA* are consistent with studies by Rajan and Zingales (1995), Crutchley *et al.* (1999), La Rocca *et al.* (2011), Venanzi *et al.* (2014), de Jong *et al.* (2008), Santos *et al.* (2014) and similar to those by López-Iturriaga and Rodríguez-Sanz (2012). The *SIZE* coefficient is always positive and statistically significant in all models, which could be consistent with the arguments of Harris and Raviv (1991) and with the results of other studies (Michaely *et al.*, 2015; Venanzi *et al.*, 2014; Hernández-Cánovas *et al.*, 2014; De La Bruslerie and Latrous, 2012; King and Santor, 2008; Faccio *et al.*, 2010). Larger-sized enterprises have a greater ease of access to the credit market and can obtain financing at a lower cost. Interestingly, both signs of the variables *ROA* and *SIZE* also seem to be consistent with the empirical evidence of Santos *et al.* (2014), La Rocca *et al.* (2011), de Jong *et al.* (2008), Ellul (2010), Rajan and Zingales (1995) and López-Iturriaga and Rodríguez-Sanz (2012) and Paligorova and Xu (2012).

The sign on the *TOBIN'S Q* variable, instead, is always negative and almost always statistically significant and seems to be congruent with both the theory of Myers (1977) and the empirical evidence of Boubaker *et al.* (2014), Hernández-Cánovas *et al.* (2014), and Ellul (2010) who use Tobin's Q, and in line with the results of Rajan and Zingales (1995), de Jong *et al.* (2008), Bigelli *et al.* (2001a,2001b) and Santos *et al.* (2014), although in the last four works the market-to-book ratio is used as a proxy for growth opportunities. Moreover, the sign on the Tobin's Q variable is also consistent with respect to the empirical evidence of Fama and French (2002), who observed that companies with the highest growth opportunities seem to use less debt.

The intangibility indicator, measured from *R&D*, is always negative and almost always statistically significant. The sign of the coefficient appears consistent with the theoretical arguments in Jensen (1986) and Harris and Raviv (1991) and the results of several empirical studies (Jensen *et al.*, 1992; Crutchley *et al.*, 1999; Ellul, 2010; De La Bruslerie and Latrous, 2012).

Lastly, with regard to the *FIRM AGE* variable, it is found that the coefficient alternates its sign in all models used. However, it is also observed that in the majority of cases (70 per cent), the sign is positive, and, in nine models, it is also statistically significant. This result may be consistent with respect to both the arguments in Berger and Udell (1998), namely, that the more mature companies have greater ease in increasing the debt and with the empirical evidence in La Rocca *et al.* (2011). La Rocca *et al.* (2011) find a non-linear relationship between leverage and firm age and conclude that younger firms, in the start-up and growth phases, use more debt to finance their business, whereas in the consolidation

and maturity phases, debt, although assuming a central role, tends to be used less extensively.

The results in this study in general appear compatible with the authors' forecast and therefore supportive of all three of the proposed hypotheses, such that the evidence provided here implies that *H1*, *H2* and *H3* can be regarded as having at least potential validity.

5. Conclusion

The relationship between debt and ownership structure is controversial, and research related thereto has produced mixed results. In the present study, the Italian context is examined, and the results are of interest because they reveal a positive relationship between debt and ownership concentration on the one hand and a negative relationship between institutional investors and debt on the other hand. With regard to the sample in the present study, debt seems to assume both functions, i.e. the disciplinary role of substitute at low levels of ownership concentration and a complementary role at high levels of ownership concentration. In particular, it seems that when the share ownership is low, the relationship is negative, but, when the level of ownership concentration is higher, the relationship becomes positive. The presence of institutional investors seems to reduce the debt level, thus assuming a substitution role.

The results found seem consistent with respect to both the entrenchment and alignment effects, and the expropriation hypothesis in the presence of entrenchment seems to prevail over that of the control and monitoring of agency costs. It is also quite clear that the findings suggest caution in their interpretation because of the limitations in this study. These limitations mainly concern the sample size and the period examined, which proved to be quite frenetic because of the economic and financial crisis and the recession phase thereof.

Notes

1. In this study, institutional investors understood consist of Italian and foreign mutual investment funds, operators of private equity, venture capital and banks and insurance companies. In the sample examined, there was an average institutional investor ownership stake ranging from 18.2 per cent in 2005 to 3.39 per cent in 2013. A comparison of the period 2005-2008 to the period 2009-2013 shows that on average the equity held by institutional investors increased from 3.24 to 4.21 per cent, respectively, of the share capital of the companies investigated.

2. The data regarding R&D were acquired through the *EU Industrial R&D Investment Scoreboard* (2005-2014) of the European Commission (2014). This annual ranking of the top 1,000 (or 2,500) European companies investing in R&D accounts for a very large part of European R&D.

3. By examining the sample, it is observed that in five companies, the majority shareholder is the State, which controls the company through the Ministry of Economy and Finance; in all other cases, the companies are controlled directly or indirectly by family groups, which use trust companies, holding companies and non-listed companies.

4. However, it should be noted that both cited works investigate the segment of small- and medium-sized enterprises (SMEs), whereas this work examines a sample of Italian listed companies that weighs more than 50 per cent of the total equity market capitalization.

References

Aghion, P., Van Reenen, J. and Zingales, L. (2013), "Innovation and institutional ownership", *The American Economic Review*, Vol. 103 No. 1, pp. 277-304.

Agrawal, A. and Knoeber, C.R. (1996), "Firm performance and mechanism to control agency problems between managers and shareholders", *The Journal of Financial and Quantitative Analysis*, Vol. 31 No. 3, pp. 377-397.

Agrawal, A. and Mandelker, G.N. (1987), "Managerial incentives and corporate investment and financing decisions", *The Journal of Finance*, Vol. 42 No. 4, pp. 823-837.

Anderson, T.W. and Hsiao, C. (1981), "Estimation of dynamic models with error components", *Journal of the American Statistical Association*, Vol. 76 No. 375, pp. 598-606.

Arellano, M. and Bond, S. (1991), "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations", *The Review of Economic Studies*, Vol. 58 No. 2, pp. 277-297.

Barontini, R. and Caprio, L. (2006), "The effect of family control on firm value and performance: evidence from continental Europe", *European Financial Management*, Vol. 12 No. 5, pp. 689-723.

Berger, A.N. and Udell, G.F. (1998), "The economics of small business finance: the roles of private equity and debt markets in the financial growth cycle", *Journal of Banking and Finance*, Vol. 22 Nos 6/7/8, pp. 613-673.

Berle, A.A. and Means, G.C. (1932), *The Modern Corporation and Private Property*, Macmillan Publishing, New York, NY.

Bianchi, M., Bianco, M. and Enriques, L. (2001), "Pyramidal groups and the separation between ownership and control in Italy", in Barca, F. and Becht, M. (Eds), *The Control of Corporate Europe*, Oxford University Press, pp. 154-186.

Bianco, M. and Nicodano, G. (2006), "Pyramidal groups and debt", *European Economic Review*, Vol. 50 No. 4, pp. 937-961.

Bigelli, M. and Mengoli, S. (2004), "Sub-optimal acquisition decisions under a majority shareholder system", *Journal of Management and Governance*, Vol. 8 No. 4, pp. 373-405.

Bigelli, M., Mengoli, S. and Sandri, S. (2001a), "I fattori determinanti la struttura finanziaria delle imprese italiane: una verifica empirica sulle società quotate", *Finanza, Marketing e Produzione*, Vol. 19 No. 3, pp. 104-116.

Bigelli, M., Mengoli, S. and Sandri, S. (2001b), "I fattori determinanti la struttura finanziaria delle imprese italiane: una verifica empirica sulle società quotate", *Finanza, Marketing e Produzione*, Vol. 19 No. 4, pp. 71-93.

Blundell, R. and Bond, S. (1998), "Initial conditions and moment conditions in dynamic panel data models", *Journal of Econometrics*, Vol. 87 No. 1, pp. 115-143.

Boubaker, S., Nguyen, P. and Rouatbi, W. (2016), "Multiple large shareholders and corporate risk-taking: evidence from French family firms", *European Financial Management*, Forthcoming.

Boubaker, S., Rouatbi, W. and Saffar, W. (2014), "The role of multiple large shareholders in the choice of debt source", available at: www.sussex.ac.uk/webteam/gateway/file.php?name=sabri-boubaker-paper.pdf&site=9 (accessed 15 March 2015).

Bushee, B. (1998), "The influence of institutional investors on myopic R&D investment behavior", *Accounting Review*, Vol. 73 No. 3, pp. 305-353.

Cebula, R.J. and Rossi, F. (2015), "Ownership structure and R&D: an empirical analysis of Italian listed companies", *PSL Quarterly Review*, Vol. 68 No. 275, pp. 295-323.

Cho, M.H. (1998), "Ownership structure. Investment and the corporate value: an empirical analysis", *Journal of Financial Economics*, Vol. 47 No. 1, pp. 103-121.

Chung, C.Y. and Wang, K. (2014), "Do institutional investors monitor management? Evidence from the relationship between institutional ownership and capital structure", *The North American Journal of Economics and Finance*, Vol. 30, pp. 203-233.

Commissione Nazionale per le Società e la Borsa (2014), "Relazione per l'anno 2013", available at: www.consob.it/documenti/Pubblicazioni/Relazione_annuale/2013/rel2013.pdf (accessed 10 July 2015).

Croci, E., Doukas, J.A. and Gonenc, H. (2011), "Family control and financing decisions", *European Financial Management*, Vol. 17 No. 5, pp. 860-897.

Crutchley, C.E. and Hansen, R.S. (1989), "A test of the agency theory of managerial ownership, corporate leverage, and corporate dividends", *Financial Management*, Vol. 18 No. 4, pp. 36-46.

Crutchley, C.E., Jensen, M.H., Jahera, J.S. Jr. and Raymond, J.E. (1999), "Agency problems and the simultaneity of financial decisions making: the role of institutional ownership", *International Review of Financial Analysis*, Vol. 8 No. 2, pp. 177-197.

de Jong, A., Kabir, R. and Nguyen, T.T. (2008), "Capital structure around the world: the roles of firm- and country-specific determinants", *Journal of banking and Finance*, Vol. 32 No. 9, pp. 1954-1969.

de Miguel, A., Pindado, J. and de la Torre, C. (2005), "How do entrenchment and expropriation phenomena affect control mechanisms?", *Corporate Governance: An International Review*, Vol. 13 No. 4, pp. 505-516.

De La Bruslerie, H. and Latrous, I. (2012), "Ownership structure and debt leverage: empirical test of a trade-off hypothesis on French firms", *Journal of Multinational Financial Management*, Vol. 22 No. 4, pp. 111-130.

Demsetz, H. (1983), "The structure of ownership and the theory of the firm", *Journal of Law and Economics*, Vol. 26 No. 2, pp. 375-390.

Demsetz, H. and Lehn, K. (1985), "The structure of corporate ownership: causes and consequences", *Journal of Political Economy*, Vol. 93 No. 6, pp. 1155-1177.

Demsetz, H. and Villalonga, B. (2001), "Ownership structure and corporate performance", *Journal of Corporate Finance*, Vol. 7 No. 3, pp. 209-233.

Earle, J.S., Kucsera, C. and Telegdy, A. (2005), "Ownership concentration and corporate performance on the Budapest stock exchange: do too many cooks spoil the goulash?", *Corporate Governance: An International Review*, Vol. 13 No. 2, pp. 254-264.

Ellul, A. (2010), "Control motivations and capital structure decision", available at: www.eief.it/files/2010/11/andrew-ellul.pdf (accessed 12 February 2015).

Eng, L.L. and Shackell, M. (2001), "The implications of long term performance plans and institutional ownership for firm's research and development expenses", *Journal of Accounting, Auditing and Finance*, Vol. 16, pp. 117-139.

European Commission (2014), "The 2014 EU industrial R&D investment scoreboard", available at: http://iri.jrc.ec.europa.eu/scoreboard14.htmlThe%202014%20EU%20Industrial%20R&D%20Investment%20Scoreboard (accessed 25 March 2015).

Faccio, M. and Lang, L. (2002), "The ultimate ownership of Western European corporations", *Journal of Financial Economics*, Vol. 65 No. 3, pp. 365-395.

Faccio, M., Lang, L.H. and Young, L. (2010), "Pyramiding vs leverage in corporate groups: international evidence", *Journal of International Business Studies*, Vol. 41, pp. 88-104.

Faccio, M., Marchica, M-T. and Mura, R. (2011), "Large shareholder diversification and corporate risk-taking", *The Review of Financial Studies*, Vol. 24 No. 11, pp. 3601-3641.

Fama, E.F. (1980), "Agency problems and the theory of the firm", *Journal of Political Economy*, Vol. 88 No. 2, pp. 288-307.

Fama, E.F. and French, K.R. (2002), "Testing trade-off and pecking order predictions about dividends and debt", *The Review of Financial Studies*, Vol. 15 No. 1, pp. 1-33.

Fama, E.F. and Jensen, M.C. (1983), "Separation of ownership and control", *Journal of Law and Economics*, Vol. 26 No. 2, pp. 301-325.

Friend, I. and Lang, L.H.P. (1988), "An empirical test of the impact of managerial self-interest on corporate capital structure", *The Journal of Finance*, Vol. 43 No. 2, pp. 271-281.

García-Meca, E. and Sánchez-Ballesta, J.P. (2011), "Firm value and ownership structure in the Spanish capital market", *Corporate Governance: The International Journal of Business in Society*, Vol. 11 No. 1, pp. 41-53.

Graves, S.B. and Waddock, S.A. (1990), "Institutional ownership and control: implications for long-term corporate strategy", *Academy of Management Executive*, Vol. 4 No. 1, pp. 75-83.

Greene, W.H. (2012), *Econometric Analysis*, 6th ed., Pearson, Upper Saddle River, NJ.

Harris, M. and Raviv, A. (1991), "The theory of capital structure", *The Journal of Finance*, Vol. 46 No. 1, pp. 297-355.

Hausman, J.A. (1978), "Specification tests in econometrics", *Econometrica*, Vol. 46 No. 6, pp. 1251-1271.

Hernández-Cánovas, G., Mínguez-Vera, A. and Sánchez-Vidal, J. (2014), "Ownership structure and debt as corporate governance mechanisms: an empirical analysis for Spanish SMEs", *Journal of Business Economics and Management*, pp. 1-17, doi: 10.3846/16111699.2013.859171.

Jensen, G.R., Solberg, D.P. and Zorn, T.S. (1992), "Simultaneous determination of insider ownership, debt, and dividend policies", *The Journal of Financial and Quantitative Analysis*, Vol. 27 No. 2, pp. 247-263.

Jensen, M.C. (1986), "Agency costs of free cash flow, corporate finance and takeovers", *The American Economic Review*, Vol. 76 No. 2, pp. 323-329.

Jensen, M.C. (1989), "Eclipse of the public corporation", *Harvard Business Review*, Vol. 67 No. 5, pp. 61-75.

Jensen, M.C. and Meckling, W.H. (1976), "Theory of the firm: managerial behavior, agency costs, and ownership structure", *Journal of Financial Economics*, Vol. 3 No. 4, pp. 305-360.

John, K., Litov, L. and Yeung, B. (2008), "Corporate governance and risk taking", *The Journal of Finance*, Vol. 63 No. 4, pp. 1679-1728.

Johnson, S., La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (2000), "Tunnelling", *American Economic Review*, Vol. 90 No. 2, pp. 22-27.

Kim, S.W. and Sorensen, E.H. (1986), "Evidence on the impact of the agency costs of debt on corporate debt policy", *The Journal of Financial and Quantitative Analysis*, Vol. 21 No. 2, pp. 131-144.

King, M. and Santor, E.B. (2008), "Family values: ownership structure and performance of Canadian firms", *Journal of Banking and Finance*, Vol. 32 No. 11, pp. 2423-2432.

Kirkpatrick, G. (2009), "The corporate governance lesson from the financial crisis", *Financial Market Trends*, Vol. 1, pp. 1-30.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A. and Vishny, R. (1998), "Law and finance", *The Journal of Political Economy*, Vol. 106 No. 6, pp. 1113-1155.

La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (1999), "Corporate ownership around the world", *The Journal of Finance*, Vol. 54 No. 2, pp. 471-517.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A. and Vishny, R. (2000), "Agency problems and dividend policies around the world", *The Journal of Finance*, Vol. 55 No. 1, pp. 1-33.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A. and Vishny, R. (2002), "Investor protection and corporate valuation", *The Journal of Finance*, Vol. 57 No. 3, pp. 1147-1170.

La Rocca, M., La Rocca, T. and Cariola, A. (2011), "Capital structure decisions during a firm's life cycle", *Small Business Economics*, Vol. 37 No. 1, pp. 107-130.

Levine, R., Lin, C. and Xie, W. (2015), "Spare tire? Stock markets and systemic banking crises", available at: www.nber.org/papers/w20863.pdf (accessed 6 May 2016).

Lin, C., Ma, Y., Malatesta, P. and Xuan, Y. (2013), "Corporate ownership structure and the choice between bank debt and public debt", *Journal of Financial Economics*, Vol. 109 No. 2, pp. 517-534.

López-Iturriaga, F.J. and Rodríguez-Sanz, J.A. (2012), "Ownership structure, financial decisions, and institutional setting: an international analysis through simultaneous equations", *Economics Research International*, doi: 10.1155/2012/465265.

Marchica, M-T. (2008), "On the relevance of ownership structure in determining the maturity of debt", available at: www.econstor.eu/bitstream/10419/50703/1/572581343.pdf (accessed 12 August 2015).

Masulis, R. (1988), *The Debt/Equity Choice*, Ballinger Publishing, Cambridge, MA.

Mediobanca (2014a), *Il Calepino dell'azionista*, Milan, MI.

Mediobanca (2014b), *Indici e Dati Relativi ad Investimenti in Titoli Quotati*, Milan, MI.

Michaely, R., Popadak, J. and Vincent, C. (2015), "The deleveraging of US firms and institutional investors' role", available at: https://mpra.ub.uni-muenchen.de/66128/1/MPRA_paper_66128.pdf (accessed 15 September 2015).

Michaely, R. and Vincent, C. (2013), "Do institutional investors influence capital structure decisions?", available at: www.nccr-finrisk.uzh.ch/media/pdf/FS_spring13_Michaely_paper.pdf (accessed 15 September 2015).

Morck, R., Shleifer, A. and Vishny, R.W. (1988), "Management ownership and market valuation: an empirical analysis", *Journal of Financial Economics*, Vol. 20 Nos 1/2, pp. 293-315.

Morck, R., Strangeland, D.A. and Yeung, B. (2000), "Inherited wealth, corporate control and economic growth: the Canadian disease?", in Morck, R.K. (Ed.), *Concentrated Corporate Ownership*, University of Chicago Press, Chicago, IL, pp. 319-372.

Myers, S.C. (1977), "Determinants of corporate borrowing", *Journal of Financial Economics*, Vol. 5 No. 2, pp. 147-175.

Myers, S.C. and Majluf, N.S. (1984), "Corporate financing and investment decisions when firms have information that investors do not have", *Journal of Financial Economics*, Vol. 13 No. 2, pp. 187-221.

Paligorova, T. (2010), "Corporate risk taking and ownership structure", available at: www.bankofcanada.ca/wp-content/uploads/2010/05/wp10-3.pdf (accessed 10 January 2015).

Paligorova, T. and Xu, Z. (2012), "Complex ownership and capital structure", *Journal of Corporate Finance*, Vol. 18 No. 4, pp. 701-716.

Perrini, F., Rossi, G. and Rovetta, B. (2008), "Does ownership structure affect performance? Evidence from the Italian market", *Corporate Governance: An International Review*, Vol. 16 No. 4, pp. 312-325.

Pindado, J. and de la Torre, C. (2011), "Capital structure: new evidence from the ownership structure", *International Review of Finance*, Vol. 11 No. 2, pp. 213-226.

Rajan, R.G. and Zingales, L. (1995), "What do we know about capital structure? Some evidence from international data", *The Journal of Finance*, Vol. 50 No. 5, pp. 1421-1460.

Ross, S.A. (1977), "The determination of financial structure: the incentive-signalling approach", *The Bell Journal of Economics*, Vol. 8 No. 1, pp. 23-40.

Rossi, F. (2016), "Corporate governance, risk-taking, and firm performance: evidence from Italy", *Rivista Bancaria – Minerva Bancaria*, Forthcoming.

Santos, S.M., Moreira, C.A. and Vieira, E.S. (2014), "Ownership concentration, contestability, family firms, and capital structure", *Journal of Management and Governance*, Vol. 18 No. 4, pp. 1063-1107.

Shleifer, A. and Vishny, A.W. (1987), "Large shareholders and corporate control", *The Journal of Political Economy*, Vol. 94 No. 3, pp. 461-488.

Venanzi, D., Naccarato, A. and Abate, G. (2014), "Does the country effect matter in the capital structure decisions of European firms?", available at: www.efmaefm.org/0EFMAMEETINGS/EFMA%20ANNUAL%20MEETINGS/2014-Rome/papers/EFMA2014_0157_fullpaper.pdf (accessed 18 August 2015).

Villalonga, B. and Amit, R. (2006), "How do family ownership, control and management affect firm value?", *Journal of Financial Economics*, Vol. 80 No. 2, pp. 385-417.

Wintoki, M.B., Linck, J.S. and Netter, J.M. (2012), "Endogeneity and the dynamics of internal corporate governance", *Journal of Financial Economics*, Vol. 105 No. 3, pp. 581-606.

Wooldridge, J.M. (2002), *Econometric Analysis of Cross Section and Panel Data*, The MIT Press, Cambridge, MA.

World Bank (2013), "Market capitalization of listed domestic companies", available at: http://data.worldbank.org/indicator/CM.MKT.LCAP.GD.ZS?order=wbapi_data_value_2013+wbapi_data_value&sort=asc (accessed 4 May 2016).

World Bank Group (2015), "Protecting minority investors", available at: www.doingbusiness.org/data/exploretopics/protecting-minority-investors#close (accessed 4 May 2016).

Corresponding author

Fabrizio Rossi can be contacted at: f.rossi@unicas.it