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Peer effects on capital structure: evidence from the Italian market

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Introduction

The objective of this thesis is to investigate whether and how Italian firms are influenced by their industry peers in corporate financial policy. Traditional theories neglect the impact of peer firms on capital structure and suggest that leverage decisions are a function of bankruptcy cost, tax shield, agency cost and information asymmetries. Managers struggle to find the optimal capital structure as leverage decisions impact on firm's value and cost of capital. However, managers may judge difficult, time-consuming and uncertain the process to detect the best leverage ratio. As a result, firms may be tempted to follow their industry peers in financing decision making. Graham and Harvey (2001) performed a notable survey on 392 CFOs to shed light on different corporate finance's topics. The analysis reveals that almost one quarter of interviewees consider peer firms' financing policies as very important, or important, drivers for their capital structure decisions.

Given this framework, a recent field of research has started to investigate peer effect on capital structure decisions. Leary and Roberts (2014) find that a firm increases its leverage by 10% as a result of one standard deviation growth in peers' leverage. Their results show that small, young, unprofitable and financially constrained firms follow their industry leaders, thus they suggest that herding behavior is triggered by learning and reputational motives.

This thesis is composed by one theoretical section (Chapter 1 and Chapter 2) and one empirical section (Chapter 3 and Chapter 4).

Chapter 1 presents the main theories on capital structure: from Modigliani and Miller (1958) to market timing theory. Then, it describes how firm's size, profitability, tangibility and growth opportunities are related to leverage ratio. Finally, it reviews the literature on debt maturity structure.

After a brief introduction to the concept of herd behavior, Chapter 2 sheds light on the triggering factors behind peer effect. Among all theories, information-based model is the most investigated in corporate financial policy: mangers are unsure of how to set the optimal capital structure, the process is costly and time-consuming; thus firm may follow its peers or the industry leader (leader-follower model) to determine the optimal mix of debt and equity (Devenow and Welch, 1996;

Lieberman and Asaba, 2006; Leary and Roberts, 2014). The second Chapter concludes by presenting current research results of peer effects in firm's decision-making.

Chapter 3 illustrates, in detail, the research methodology, the sample definition and selection. Then, it turns the attention on the descriptive statistics to understand the main firms' characteristics.

Finally, Chapter 4 investigates peer effect on capital structure decision. First, the analysis decomposes leverage variation and proxies for herd behaviour by using the within-industry leverage dispersion. Then, the study focuses on the top ten industries with lowest and highest capital structure dispersion values to examine the main difference between the two groups and, lastly, it applies the empirical model developed by Leary and Roberts (2014).

To conclude, the thesis presents the main results, research limits and recommendation for future empirical studies.

1. Literature review on capital structure

This chapter examines both the quantitative and qualitative dimension of capital structure. The first paragraph offers a panorama of the main theories on capital structure, firm-specific factors are analysed in the second section, while the last paragraph moves the attention on debt maturity theory.

1.1 Theories on capital structure

Capital structure is a core issue in the field of corporate finance and Modigliani-Miller theorem represents a milestone study. This research triggered countless studies aimed at identifying the main determinant factors of the capital structure and the optimum level of debt and equity. This section provides an overview of the most important theories on capital structure.

1.1.1 Modigliani and Miller theorem

Modigliani and Miller are considered as the fathers of the modern finance because they formulated the most significant theory on capital structure choices. In 1958, Modigliani and Miller demonstrated that in presence of an efficient market and in a world where taxes, asymmetric information, agency costs and bankruptcy costs are absent the value of a firm is unaffected by its capital structure choices. This first proposition is also called as "irrelevance principle" because it argues that the value of a firm does not change by varying its capital structure and, hence, there is not an optimal capital structure. At the end of the 1950s the idea appeared to be revolutionary. Although the strict assumptions behind the model are not satisfied in the economy, Modigliani and Miller theorem represents one of the most important results of modern corporate finance.

In 1963, Modigliani and Miller released the hypothesis about the absence of taxes to take into account the fact that interest expenses are tax deductible. They showed that in presence of corporate taxes, the value of a levered firm is higher than the value of an unlevered firm because of benefits coming from tax shield. In particular, Modigliani and Miller demonstrated the following conditions: $V_L = V_U + t_c D$, in other words, the value of a levered company (V_L) is equal to value of an unlevered

company (V_U) plus the present value of the fiscal benefit (t_cD). However, the authors highlighted that firms should not rely only on debt because others form of financing, for example retain earning, could be cheaper and lenders are willing to finance only a specific percentage of the project.
Starting from these results, several theories about the optimum level of capital structures have been developed.

1.1.2 Trade-off theory

The statistic trade-off theory examines the impact of tax benefit of debt financing and bankruptcy cost on leverage. This theory was elaborated by Kraus and Litzenberger (1973) and it states that firms seek to achieve an optimal capital structure by balancing the cost of issuing debt (for example bankruptcy and financial distress costs) with the advantages of debt financing (interest expenses are deductible from the tax base). As argued by Haugen and Senbet (1978), bankruptcy costs can be classified as direct and indirect costs. Accounting and legal commissions, restructuring costs and loss of potential tax shield are example of direct costs. Indirect costs comprise the deterioration of firm's relation with suppliers and customers, loss of credibility and employees.

On one hand, firms limit the amount of leverage because higher debt means greater probability of bankruptcy and financial risk; on the other hand, firms prefer to issue debt in order to benefit from the tax shield. Therefore, the trade-off between these two opposite incentives determines the optimum level of leverage. Firms should opt for debt as long as tax shield benefit exceeds the greater probability of bankruptcy and financial distress cost. According to this theory, the value of a levered firm (V_L) is equal to the value of an unlevered firm (V_U) plus the difference between the present value of tax benefits (PV (tax benefit)) and the bankruptcy costs (PV (bankruptcy costs)): $V_L = V_U$ + PV (tax benefit) - PV (bankruptcy costs).

A natural extension of the trade-off theory is represented by the agency costs model developed by Jensen and Meckling (1976). They show that in the context of capital structure decisions additional costs, such as agency costs connected with debt and equity, have to be considered. According to this theory, debt can mitigate the agency

costs of equity also known as overinvestment problem. This issue arises when managers have free cash flow available and they invest them in projects with low profitability or even with negative net present value (NPV), thus acting against shareholders' interests. In these circumstances, debt can serve a disciplining function because on one hand managers are required to meet the payment schedule, on the other hand debt reduces the overall amount of free cash flow available.
However, a higher level of leverage increases the agency costs connected with debt, leading to underinvestment and asset substitution problems. Underinvestment occurs when managers forgo investment with positive NPV as the connected profit will accrue to lenders, this situation is common among highly leveraged firms (Myers, 1977). Asset substitution problem refers to the equity holders' incentive to undertake risky investment with the aim to increase their wealth when a debt is in place. In order to hedge against this risk-shifting practice, lenders will request higher interest rate ex-ante.

To conclude, firms need to take into account not only the trade-off between tax shield and bankruptcy costs, but also the agency costs connected with debt and equity.

1.1.3 Pecking order theory

Both Modigliani and Miller theorem and trade-off theory rely on the assumption of perfect information between managers and shareholders. However, this assumption is not found in the real world because managers know more than shareholders about company's future performances leading to the so-called "information asymmetries".
Pecking order theory, proposed by Mayer and Majluf (1984), includes the above-mentioned hypotheses of information asymmetries. It claims that firms determine their capital structure respecting a financing hierarchy to reduce information asymmetries. Thus, firms will first opt for internal funds, then they will rely on debt and, finally, the last financing option is equity. Pecking order theory does not set particular rules to follow in order to reach the optimal capital structure. The general advice suggests that companies should reduce conflicts between managers and stockholders due to information asymmetries by preferring internal fund to

external fund and choosing debt rather than equity within external financing resources. Firms choose equity financing only as a last resort because shareholders think that new shares are issued in case of overvaluation. Therefore, investors accept to pay less and shares' price will drop.

1.1.4 Market timing theory

According to this theory, capital structure decisions are based on fluctuations in share prices. Market timing theory, introduced by Baker and Wurgler (2002), argues that firms issue new shares in time of good market conditions (when the stock is overvalued) and repurchase their equity when shares are undervalued. Therefore, movements in market value affect capital structure decisions. The authors find that in time of high market value firms with low leverage raise capital, vice versa, in time of downward market value high leverage firms raise funds. The fluctuations in the price of shares have an important impact on capital structure and their effects span ten years at least.

The importance of market valuation in the issuance of equity is examined by the survey of Graham and Harvey (2001), their results confirm market timing theory: share prices are one of the most important factors examined by managers when they decide whether to raise new equity. However, the long-lasting effect of these fluctuations on capital structure is not found by Hovakimian (2006), Alti (2006) confirms this result: the effect of market timing on leverage disappears after two years.

1.2 Firm-specific factors

Several researches demonstrate that capital structure decisions are related to a set of firm-specific factors. In this paragraph, the following major firm-determinants are examined: size, profitability, tangibility and growth opportunities. However, the effect of each firm-determinant on leverage is unclear and their impacts are still investigated by researchers.

a) Size

According to the trade-off theory, large firms have small probability to default and low financial distress cost because they are diversified, thus large companies present high leverage (Frank and Goyal, 2009). Moreover, Rajan and Zingales (1995) argue that size can be considered as an inverse proxy for the probability of default, since large companies has lower probability of bankruptcy they can increase their leverage compared to small firms. Therefore, a positive link between leverage and size is assumed. The same result characterizes the agency cost theory: large firms are well-known in the market and their strong reputation decreases the agency cost of debt (Frank and Goyal, 2009). Empirical evidences carried out by Rajan and Zingales (1995), Bevan and Danbolt (2002), Frank and Goyal (2009), Antoniou et al. (2008) and Fan et al. (2012) confirm the positive relation.

However, according to Rajan and Zingales (1995) the effect of size on leverage is ambiguous. On one hand, they claim that size is positive correlated to leverage as above-mentioned. On the other hand, they suggest that size reduces information asymmetry between outsiders and insiders, hence large firms issue more equity than debt. The latter argument is supported by the pecking order theory: large firms are followed by many investor relations and benefit from strong reputation on the market, so they opt for equity financing because information asymmetry is lower. Based on these considerations, an inverse relation between size and leverage is supposed.

The most common measure of size is logarithm of total assets. The underlying assumption is based on the fact that large firm are characterized by a high value of assets, therefore the size can be quantified by total assets (Rajan and Zingales, 1995).

b) Profitability

Following the trade-off theory, firms should opt for debt until when the tax shield associated with an increased in leverage is greater than the bankruptcy and financial distress costs. Since profitable firms have lower bankruptcy cost, the optimal level of leverage at which tax benefit is equal to bankruptcy cost is higher compared to less profitable firms. Thus, trade-off theory forecasts a positive relationship

between the level of profitability and leverage. In accordance with the trade-off theory, the agency model predicts a positive link: profitable firms opt for debt-financing in order to reduce the overall amount of free cash flow available to managers, mitigating the overinvestment problem.

Conversely, the pecking order theory predicts a negative relationship: profitable firms finance their operations via retained earnings, then debt and, at the end, equity. The negative correlation between profitability and leverage is also found in the empirical researches conducted by Rajan and Zingales (1995), Bevan and Danbolt (2002), Frank and Goyal (2009), Antoniou et al. (2008) and Fan et al. (2012).

Profitability can be expressed as the ratio between EBITDA and total assets.

c) Tangibility

Tangibility, often measured as the ratio between fixed assets and total assets, represents an important aspect for creditors because in case of bankruptcy, lenders can liquidate the underlying asset used as collateral.

In accordance with the trade-off theory, firms with high degree of tangibility disclose great level of debt because their fixed assets are used as collaterals reducing the risk premium requested by lenders and financial distress costs (Frank and Goyal, 2009). Therefore, trade-off theory predicts a positive relation.

Following the agency cost theory, secured debt reduces asset substitution problem because shareholders are not able to realize risk-shifting practices. Therefore, lenders require lower risk premium and firms can afford a higher level of debt. The latter theory is also presented by Rajan and Zingales (1995), they state that high degree of tangibility entails high level of collaterals and, consequently, firms experience a decrease in agency costs connected with debt. This argument is confirmed by their empirical evidence on G-7 countries. Moreover, Frank and Goyal (2009), Antoniou et al. (2008) and Fan et al. (2012) find the same positive link.

On the other hand, as argued by Harris and Raviv (1991), pecking order theory claims a negative relation between tangibility and leverage. A high level of tangibility is associated with a decrease in information asymmetry, thus equity issuance costs are lower and companies rely first on equity and debt afterward.

d) Growth opportunities

Trade-off theory posits that firms with high growth opportunities face high level of agency cost, bankruptcy and financial distress cost, hence they present low level of leverage in order to avoid asset substitution and underinvestment problem (Baker and Martin, 2011). This negative relationship is confirmed by the researches carried out by Rajan and Zingales (1995), Frank and Goyal (2009) Antoniou et al. (2008) and Fan et al. (2012).

In contrast, pecking order theory predicts a positive relationship. Firms with high growth opportunities require external funds in order to finance their investment and, following the financing hierarchy, they employ first debt and then equity.

Growth opportunities can be measured through market-to-book asset ratio for listed firms or as variation in log asset for unlisted firms (Frank and Goyal, 2009).

To conclude this section, the traditional research on capital structure considers leverage as a function of different variables (e.g. tax shield, bankruptcy cost, information asymmetry). However, most part of the research on financial policy has neglected the potential role and effect of herding behaviour on capital structure, assuming that these decisions are made independently of peers' actions. Indeed, firms may find difficult to identify the optimal mix of debt and equity because the process is uncertainty and time-consuming, thus they can be inclined to consider peers' decisions on financial policy, setting their level of leverage accordingly.

1.3 Debt maturity puzzle

Capital structure literature has been largely focused on the quantitative dimension, investigating the leverage's determinants and its optimal level. Nevertheless, capital structure decisions concern both the quantitative and qualitative dimension.

As stated by Modigliani and Miller (1958), assuming a perfect capital market, firm value is not affected by debt maturity choices. However, their assumptions are unrealistic and subsequent researchers developed different models to explain debt maturity drivers including capital market imperfections. The following section presents the major theories about corporate debt maturity together with some empirical evidences.

1.3.1 Signaling theory

As reported by this theory, debt maturity operates as a signaling function since firms choose their debt maturity structure to inform lenders about their creditworthiness and quality.

Flannery (1986) carried out one of the early studies on debt maturity and information asymmetry between managers and creditors. He discovers that in absence on information asymmetries between insiders and outsiders, company's liabilities will be priced in order that firm is indifferent towards different debt maturity choices.

Nevertheless, in case of information asymmetries managers will opt for those debts with maturity that are overvalued by the market. In particular, his model considers: (i) a project with positive NPV, spanning two periods (ii) the investment can be financed issuing a long-term debt or a short-term debt that will be roll over for the second period (iii) lenders evaluate firms equally and are not able to distinguish different risk grades among projects. Since short term debt allows lenders to monitor and update the information about the investment and firm's creditworthiness, good companies should issue short-term debts while bad firms should prefer longer maturity. Good firms have low refinancing risk and they signal their high quality by issuing short-term debt. Conversely, bad firms prefer longer maturity because short-term debt entails higher transaction costs and refinancing risk.

To conclude, the signaling theory supposes a negative relationship between debt maturity structure and firm's quality.

Following Flannery's theory (1986), Diamond (1991) proposed a similar model with the following differences: (i) firms have diverse credit-rating (ii) not all projects have a positive NPVs (iii) lenders can only observe information about the firm's creditworthiness. As presented by the model, companies with high credit rating and positive NPV will issue short-term debts as they are sufficiently sure to roll over their liability at better terms. Firms with intermediate credit grade and profitable projects will opt for long-term debt with higher interest because they have low probability to roll over a short-term liability. Finally, firms ranked with a low grade

and a negative NPV will issue short-term debt because, given their credit-rating, lenders are not willing to finance long maturities.
Therefore, according to Diamond's model, debt maturity decisions are not a monotonic function of credit rating: firms with a low and high grade issue short term debt, while firms ranked with an intermediate rating prefer long term debt.

Several researchers have tested Flannery and Diamond's theory. Stohs and Mauer (1996) found that firms use debt maturity as signaling strategy about their quality, in accordance with Flannery' theory. Whereas, both Barclay and Smith (1995) and Guedes and Opler (1996) find little support. Focusing on Diamond's model, the empirical investigations by Barclay and Smith (1995), Guedes and Opler (1996) and Stohs and Mauer (1996) confirm the nonmonotonic relationship between debt maturity and firms' credit rating.
Other variables, such as leverage ratio, liquidity and firm volatility have been investigated within the signalling framework because they affect the liquidity risk, bankruptcy cost and debt maturity as well.

a) Leverage

Leland (1994) was the first to study the relationship between debt value and capital structure. He developed a closed-form solution for the value of debt and the optimal debt-equity ratio by including taxes and bankruptcy cost. In the analysis both protected debt by covenants and unprotected debt are examined because they trigger bankruptcy differently and, then, they have dissimilar impact on debt value and the optimal capital structure. If we are in presence of a protected bonds, bankruptcy is trigger when value of firm's asset is lower than the debt's principal value, vice versa, bankruptcy is determined endogenously in case of unprotected bonds.
According to Leland, the optimal leverage in case of unprotected debt is *"about 75 to 95 percent for firms with low-to-moderate levels of asset value risk and moderate bankruptcy. Even firms with high risks and high bankruptcy costs should have leverage*

on the order of 50 to 60 percent, when the effective tax rate is 35 percent." [1]. However, when firms issue protected debt the optimal level of leverage connected with them is lower than those found for unprotected debt.
According to the author, firms use protected debt because they overcome asset substitution problem but, at the same time, lenders will require lower interest rate because shareholders cannot transfer the risk and, thus, tax benefit associated with protected bond is lower.

A natural extension of Leland (1994) is represented by Leland and Tolf (1996). They study the optimal capital structure in a framework with endogenous bankruptcy and where firms decide both the level and the maturity of their debt. They conclude that firms with high level of leverage have long-term debt. Debt maturity choices entail a trade-off between agency costs, bankruptcy cost and tax benefits.
On one hand, highly leveraged firm should prefer long-term maturity to defer bankruptcy costs and reduce liquidity risks (Stohs and Mauer, 1996). On the other hand, from the agency theory's perspective, highly leveraged firm should opt for short-term maturity to reduce conflicts between shareholders and creditors (i.e. asset substitution problems), as argued by Myers (1977).
Empirically, the positive correlation between leverage and debt maturity is confirmed by Stohs and Mauer (1996), Scherr and Hulburt (2001), Johnson (2003) and Antoniou et al (2006) while Magri (2006) find and inverse relation.

b) Liquidity

The concept of liquidity measures how easily an asset can be bought and sold in the market. Asset characterized by great liquidity are traded easily on the market and, thus, firms with liquid assets should raise external funds as, in case on liquidation, companies can quickly sell the assets (Myers and Rajan, 1998). Following this argument, liquidity and debt maturity are expected to be positively correlated.
Nevertheless, Myers and Rajan (1998) present an opposite relationship: a great level of liquidity increases agency conflict because on one hand liquid asset gives

[1] Leland, H. E. (1994). Corporate Debt Value, Bond Covenants and Optima Capital Structure. *The Journalof Finance* 49: 1230

lenders more value in case of liquidation, on the other hand, managers have more freedom to act in their best interest at the expense of creditors. For example, managers could change the project by choosing riskier investments. Therefore, in case of asset with high liquidity, firms face a dark side since their ability to raise external financing may decrease. Firms can reduce this negative effect of liquidity by establishing some limitations on long-term debt to limit managers decision making.

c) Volatility of firm value

As previously presented, variables that increase the liquidity risk and bankruptcy cost (for example leverage and asset liquidity) make firms more inclined to lengthen their maturity. A growth in firm value volatility has the same effect on debt maturity because outsiders may be unwilling to invest in a firm with high volatility. This positive link between variability of firm value and corporate debt maturity is confirmed by Wiggins (1990). Starting from a framework where interest expenses are deductible, firms face bankruptcy costs but transaction cost are absent, Wiggins argues that lenders ask higher risk premium on long maturity to bear the great volatility of firm value. Therefore, firms experience high interest expenses but, at the same time, they benefit from high tax shields while bankruptcy cost are incurred at the maturity date.

However, Kane at al. (1985) show a negative relation between debt maturity and variability of firm value. In presence of a low volatility of firm's value, managers are less willing to change the capital structure frequently and hence firms issue more long-term debt. Moreover, bankruptcy cost declines when the variability of firm's value decreases and, thus, firms increase both leverage and maturity structure.

1.3.2 Agency theory

In debt maturity literature, agency problem consists in the conflict between creditors and shareholders. This issue triggers underinvestment and asset substitution problems.

Myers (1977) conducted the first study on underinvestment problem, otherwise known as debt overhang problem. He argues that when companies have issued long-

term debt in excess, profitable investment may be forgone. This circumstance arises when a firm has a current investment financed by long-term debt and the profit coming from a new investment (also called growth opportunity) will have to be shared with those lenders that are currently financing the investment in place. Therefore, shareholders will reject the new investment because of debt overhang leading to the so-called underinvestment problem.

As proposed by Myers (1977), underinvestment problem can be overcome by issuing short-term debt, consequently firms with more growth opportunities should decrease their debt maturity. This assumption is confirmed by Barclay and Smith (1995) and Guedes and Opler (1996), while Stohs and Mauer (1996) find mixed results about the negative relationship between debt maturity and measures for growth opportunities: firms with high growth opportunities have small incentives to reduce debt maturity because they employ low leverage level.

Asset substitution problem refers to the equity holders' incentive to undertake risky investments with the aim to increase their wealth when a debt is in place (Jensen and Meckling, 1976). To hedge against this risk-shifting practice, lenders will request higher interest rate ex-ante.

According to Leland and Toft (1996), asset substitution problem can be mitigated by issuing short term debt as creditors can better monitor firm's investment decisions. Shareholders are forced to assess risk and return of their projects in order that lenders grant new financings. Smith and Warner (1979) suggest that debt covenants can reduce both underinvestment and asset substitution problems. In particular, financing policy covenants prescribe a set of financial viability ratios that firm need to maintain in order to issue new debt. Since the issuance of new debt depends on the respect of certain financial performance, these covenants limit underinvestment problem. Asset substitution conflicts can be reduced through covenants that restrict shareholders' decision-making concerning investment policy. Consistent with the above argument, the empirical evidence carried out by Billet et al. (2007) shows that firms employ more covenants when they face high growth opportunities or when they are highly leverage, thus covenants are used to mitigate conflicts between creditors and shareholders (i.e. underinvestment and asset substitution problem).

Within the agency theory, the issuance of short-term debt is not the unique strategy to reduce agency conflicts. Maturity matching policy and firms size are investigated because both variables affect the conflict between shareholders and investors.

a) Maturity matching

Debt maturity literature frequently suggests to match the maturity of debt to those of the underlying asset so that liquidity risk, financial distress costs and underinvestment problem are mitigated. The incongruity between the two maturities is risky both when debt maturity is longer than asset's life and in the opposite circumstance (Morris, 1976). In the first case, firms may not be able to meet the repayment schedule as the asset has been retired while the debt has not yet been settled. Vice versa, firms face the risk that the investment could not yield sufficient cash flow within the maturity date to meet debt payments when the liability's maturity is shorter than the maturity of the asset. Maturity matching strategy is not only a hedging policy, but it also serves to reduce underinvestment problem as argued by Myers (1977).

Based on above-mentioned arguments, the maturity matching principle predicts a positive relationship between corporate debt maturity and the maturity of firm's assets. Empirical results confirm this relation, among others: Stohs and Mauer (1996), Graham and Harvey (2001) and Ozkan (2002).

b) Firm size

The relationship between firm size and debt maturity is unambiguous: large company have lower information asymmetry because they are well-known in the market, they have strong reputation and reporting requirements, thus lenders are more willing to invest in long maturity as it is not necessary to monitor large firms through short-term debt. Therefore, the theory suggests a positive relationship between firm size and debt maturity. Numerous researches support this prediction, among others: Barclay and Smith (1995), Stohs and Mauer (1996), Ozkan (2000) and Magri (2006).

1.3.3 Tax-based theory

Tax-based theory relies on the fact that interest charges are tax-deductible and diverse debt maturities entail different tax-shield benefits, thus firms choose their debt maturity to maximize tax-shield. In many countries, interest costs on debt are deductible from the tax base while the return to equity does not benefit this treatment. Thus, tax system favors debt financing over equity leading companies to make distorted financing decisions. This situation is known in technical jargon as "debt bias".

Tax-based theory has been investigated by analyzing the following variables:

a) Term structure of interest rates

Brick and Ravid (1985) analyse how tax shield impacts on different debt maturities assuming that there is certainty about the future trend of interest rates. They argue that in presence of upward term structure of interest rates, firms will employ long-term debt because tax shield and shareholders wealth are maximized. Conversely, in presence of a downward term structure, companies will issue short-term debt. The model assumes that firms decide first their leverage and, then, the debt maturity. Lewis (1990) shows that when these choices are made simultaneously, tax considerations do not affect debt maturity and firm value.

Empirical researches on term structure provide weak results. Both Barclay and Smith (1995) and Guedes and Opler (1996) do not find any relationship between interest term structure trend and debt maturity, whereas Stohs and Mauer (1996) confirm partly Brick and Ravid's model.

b) Tax rate

Kane et al. (1985), through a multi-period model, argue that the debt maturity structure choices entail a trade-off between the benefit of tax shield and the costs of bankruptcy and debt issuance. The authors show that when transaction costs increase and tax benefit declines, firms extend their debt maturity as more time is needed to amortize the debt issuance costs.

Therefore, the interactions between transaction costs, tax-advantage and debt maturity involves an inverse correlation between the tax rate and maturity

structure of corporate debt. Firms lengthen debt maturity when tax rate declines to ensure that tax shield is higher than debt issuance costs.

c) Volatility of interest rate

Using a multi-period model, Kim et al. (1995) suggest that in presence of interest rate volatility, long-term debt creates more tax-timing option value than those generated by short maturity. The tax-timing option consists in capacity to realize (defer) tax gains (tax losses) between different tax periods. The authors test their predictions on a sample of 328 firms confirming the positive relationship between debt maturity and interest rate volatility.

To conclude, as highlighted by Antoniou et al (2006), the empirical evidences on tax-based theory are often weak or inconclusive and the results often depend on both sample, country and period analysed.

2. Peer effects

After a brief introduction to the concept of peer effects, this chapter sheds light on the triggering factors behind herd behaviour by presenting the main theories. Then, it discloses the major empirical researches on peer effects in firm's decision-making.

2.1 Introduction to peer effects

Economists apply different synonyms to identify peer effects, such as: herd behaviour, social interactions, bandwagon effects, mimicking and informational cascades. All these phenomena span several situations from fads and fashion to investment choices as imitation is among one of the first human instincts. From a general point of view herding can be described as "*behavior patterns that are correlated across individuals*" [2].

The successful selling story of the strategy book *The Discipline of Market Leaders* (1995), written by Fred Wiersema and Michael Treacy, represents a shining example of herding behaviour. The authors believed that people base their decisions on the bestsellers list rather than on the book's review. Therefore, they furtively bought 50.000 copies of their book reaching the best-selling list despite the review was not outstanding. Afterward, the book remained in the bestsellers list without any demand manipulation.

Another example is presented by Banerjee (1992). He defined herding as *"everyone doing what everyone else is doing, even when their private information suggests doing something quite different"* [3]. The model supposes: (i) there are two close restaurants, A and B, (ii) each individual has an imperfect signal about the quality and these signals have same value and (iii) people arrive and choose the restaurant at different time. While the first individual is guided by his/her signal, those arriving later may be tempted to follow the decision previously taken by the others ignoring their private signals. Therefore, people can choose the wrong restaurant if the first signals were misleading. In this situation the optimum equilibrium is not reached and we highlight a herd externality.

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[2] See: Devenow, A. & Welch, I. (1996). Rational herding in financial economics. *European Economic Review* 40: 604

[3] See: Banerjee, A. V. (1992). A Simple Model of Herd Behavior. *The Quarterly Journal of Economics* 107: 798

Solomon Asch (1951), the pioneer of social psychology, conducted one of the first experiments on peer effects and social pressures. The result showed that people try to obtain new information by spotting peers' behavior and actions. The experiment included a group of people composed by one participant and seven Asch's collaborators, but the only participant believed that all individuals were part of the experiment. Asch presented to the group a card with three segments characterized by different length and another card with one segment. People had to find which segment in the first card was equal to the segment drawn in the second card. The only participant was the last to answer and there were different rounds. At the beginning, collaborators answered correctly but then they started to give the wrong answer. As a result, the participant started to be influenced by the others' answers and, under the group pressure, he answered wrongly.

Focusing our attention on the economic perspective, irrational herding and its implications are studied by behavioral finance. This new field of studies attempt to connect behavioral and psychological aspects with the traditional economic and financial theories so that it is possible to explain why economic agents act irrationally.

However, this contamination between rational economic theory and psychological and social factors is not a recent phenomenon because it stems from Keynes' works. In his book *The general Theory of Employment, Interest and Money* (1936), the author defined the notion of "animal spirits" as the set of emotions and instincts that lead human behaviour. Keynes can be considered as the forerunner of behavioural finance: he was the first to understand that economic decisions are the result of both rational and irrational mechanisms such as sentiments. The "animal spirit" triggers optimism, pessimism, confidence or fear impacting on economic cycle and, thus, it is considered as one of the cause of speculation. According to Keynes (1937), uncertainty together with the necessity to maximize utility trigger peer effect: people believe that the crowd is better informed and they will follow the others disregarding their personal judgements.

In chapter twelve of *The general Theory of Employment, Interest and Money* (1936), Keynes compared stock exchange to a beauty contest. The basic idea of this famous metaphor is that participants do not choose the girl who they think is most beautiful,

but the girl who they believe most people think is most beautiful. Therefore, investors play a complex guessing competition trying to anticipate the average opinion, they base their decisions on crowd's value not on fundamental value.
Keynes' analogy entails that current prices are the outcome of the average opinion and investors seek to make profits by buying those stocks that they think will worth more according to the crowd's judgment. This investors' behaviour has been labelled as castle in the air theory and it is the opposite of the firm foundation theory. The latter theory states that the intrinsic value of each financial instrument can be determined through a precise analysis of the current and future conditions. However, Keynes believed that professional experts do not use their superior knowledge to detect this intrinsic value but they try to foresee what will be the average opinion in the shot-term so that they will make profits by investing before the crowd. This is a clear example of herding behaviour and it can well describe financial speculation: people buy a stock not because they think that it is has this high value but simply because they deem that other people believe that the stock is worth the price.

2.2 What drives peer effects?

Several studies have investigated the causes of peer effects proposing theories on corporate imitation. Before to present the triggering factors of this phenomenon, it is vital to distinguish "spurious herding" from "intentional herding" (Bikhchandani and Sharma, 2001). The first stems from the fact that financial managers may face similar problems and have similar sets of information, thus they take similar decisions. This behaviour leads to efficient outcome but it cannot be considered as herding since individuals, facing the identical environment and problems, act similarly and none follows the peers' decisions. On the contrary, intentional herding occurs when managers follow the financing decisions of their peers, this business imitation may produce inefficient results.

Moreover, it is important to highlight that herd behaviour can be divided into rational and irrational, as argued by Devenow and Welch (1996). Irrational herding occurs when a firm does not take into account its internal analysis and the final decision is the result of the peers' corporate decisions. Managers will act as mimics,

neglecting or not performing their rational analysis. Irrational herding is the consequence of psychological mechanisms. For example, in times of market stress and great uncertainty, an investor prefers to follow its peers because he is not unsure about the investment's profitability. Therefore, investors feel a sense of protection from being close to the group in times of high market uncertainty and volatility. On the other hand, rational herding arises when peers' decisions deliver useful information to manager about the best policy to adopt. Rational herding stems from different reasons, the most important are: informational cascade, reputational concerns, compensation structures and competitive position concerns (Bikhchandani and Sharma, 2001; Lieberman and Asaba, 2006).

The following paragraph examines the causes of rational herding, then it focuses on other factors (i.e. external pressure, uncertainty and social ties) responsible for herding behaviour and similarity among peer firms.

2.2.1 Information-based theory

Both Banerijee (1992) and Bikhchandani et al. (1992) develop a theory that explains herd behaviour based on "informational cascades", known also as "social learning". Informational cascade arises when an individual observes predecessors' actions to infer useful information and he rationally follows the actions of their previous peers rather its private information. Both models assume:

- Investors act in an uncertainty environment, they have private and imperfect signals about the investment opportunity and face analogous decisions;
- Individuals make their investment decisions in sequence;
- The predecessors' actions are observed by the individual entering into the decision-making process when he faces the investment decision. Bayes' law is used by investors when they need to correct their judgments thank to information delivered by peers' actions;
- There is a perfectly elastic supply.

Given these assumptions, both models prove that individuals try to detect the private information of their predecessors by observing their actions with the object to learn new and useful information and to improve their decision-making process

(this procedure is known in psychology as social learning [4]). However, at some point, investors will follow their peers rather than their private signal leading to an informational cascade.

In particular, Bikhchandani and Sharma (2001) describe informational cascade with a simple example. Considering the previous hypotheses, *V* represent the individual's payoff assuming value of +1 or -1 with same probability and each investor has a private signal (good *G* or bad *B*). When *V*=+1, the signal is good with probability equals to *p* (where 0,5<p<1) and the signal is bad with 1-p probability. Likewise, the probability that the signal is bad (good) is p (1-p) if V=-1. The first investor (X) will follow its signal investing if he observes G and rejecting in presence of B. If the signal of the second investor (Z) is G and X has invested, Z will invest too. On the other hand, if Z's signal is B and X has invested, Z is indifferent between the two options and he will toss a coin. The third investor (W) will face two situations: both previous individuals have invested or one has invested and the other has rejected. In the first case, W will infer that X's signal was G and probably also Z observed G rather than B. Investor W will always invest neglecting its private information: X's G signal offset the W's B signal and, since Z has also invested, W thinks that G is more likely than B. Therefore, an invest cascade starts with W and all subsequent individuals will invest. In the opposite case, when investor X and Z take opposite decisions, then both solutions have the same probability according to the third investors and W will follow his signal.

To summarize, herd behaviour arises when the number of peers who have already invested in a particular asset is higher (lower) than the number of predecessors who have rejected the investment. Therefore, the models predict both an "invest cascade" when the individual invest in the asset and a "reject cascade" in the opposite case. Vice versa, when the predecessors have equally invested and rejected the asset, the individual will follow its private information.

[4] Albert Bandura, a Canadian psychologist, proposed one of the most important theories on learning process in 1977 - the social learning theory. He argues that individuals learn by observing, mimicking and modelling the actions of others.

Bikhchandani and Sharma (2001) argues that an informational cascade arises with a probability greater than 93% (99,6%) after four (eight) individuals. Once an informational cascade has started, the information revealed by investors' actions are useless: investors do not reveal their private signal through their decisions because they simply follow the herd. Both the quantity of good/bad signals and their order determine the type of cascade. If the signals are GGBB all participants invest, while the individuals reject the investment when the signals are BBGG, hence an informational cascade is *path-dependent*. Moreover, a cascade is fragile because even small shocks could stop herd behavior, such as: the entry of more informed investors and the arrival of new information (Bikhchandani et al., 1998).

Informational cascade occurs also in capital structure decisions. In fact, managers may find expensive and time-consuming to evaluate all the inputs and to estimate the optimal model for their capital structure, hence they prefer to follow their peers. In particular, if companies operate in an uncertainty and volatile environment and managers are uncertain of how to determine the optimal amount of debt and equity, firms are more likely to herd (Lieberman and Asaba, 2006). This behavior is confirmed by the experiment of Deutsch and Gerard (1955): it is more likely that an individual will be influenced by group actions when he is uncertain about its decisions. Devenow and Welch (1996) argue that informational cascade arises when, in absence of a suitable model, managers evaluate debt issuance strategies of their peers to infer the best decision for their capital structure. Moreover, Leary and Roberts (2014) argue that peer effect within financing decisions may be triggered by learning motivation: managers are unable to set the optimal leverage because it is difficult to consider all the relevant factors, thus managers deem the financial choices and characteristics of peers as benchmark for their capital structure decisions.

Up until now, the discussion has assumed that investors receive different signals but their actions have identical importance since agents have equal cognitive capacity and skills. However, some individuals can be viewed as leaders with superior information because they perform the task for a long time, thus they have the knowledge needed to achieve success. In this context, these individuals are

perceived as "fashion leaders" (Bikhchandani et al., 1992), they have a great influence on other individuals becoming a model to follow. Several psychological evidences show that individuals imitate a model when they have previously failed to perform a task (Thelen et al., 1979).

With regard to capital structure decisions, small and unsuccessful firms may imitate the financial decisions of the leader because their strategies are considered as the most successful and value enhancing. In addition, firms are tempted to employ the same mix of debt and equity adopted by the leader in order to avoid the costly and time-consuming evaluation process, as above mentioned. According to Zeckhauser et al. (1991), peer effect within capital structure decisions occurs because managers act as free-rider: they gain superiors information by analysing the actions of firms with great expertise. Moreover, Patel et al. (1991) suggest that the managers' inclination to act as free-riders together with the uncertainty regarding the optimal capital structure model induce managers to think that their peers have superior knowledge and hence lead them to herd.
However, if the adoption of the same leverage could generate some advantages, it is worth noting that there are some drawbacks. Numerous crucial elements (such as: agency cost, bankruptcy costs, financial needs, investment opportunities) are different between leader and follower firms, large and small companies; these discrepancies may negatively impact on the cost of capital, financial flexibility and firm value (Filbeck et al., 1996).

To conclude, informational cascade arises when an individual infers new information from the actions of its predecessors up to the point where he or she rationally follows their peers disregarding its private signal. Cascades can help to shed light on wide array of situations: from consumer marketing to crime and enforcement including medical (mal)practice, business strategy and capital structure decisions [5]. Focusing of financial decisions, informational cascade occurs because mangers are unsure of how to set the optimal capital structure, the process

[5] Each phenomenon is examined in detail by: Bikhchandani, S., Hirshleifer, D. & Welch, I. (1998). Learning from the Behavior of Others: Conformity, Fads, and Informational Cascades. *Journal of Economic Perspectives* 12: 151-170

is costly and time-consuming or even unknown, thus firm may follow its peers or the leader (leader-follower model) to determine the mix of debt and equity. This behaviour is rational as managers herd because of information distortion and it can lead to both positive and negative performance.

2.2.2 Reputation-based theory

Reputational concern is the second triggering factor responsible for rational herding. Scharfstein and Stein (1990) show that managers imitate the investment decisions of their peers when they are concerned about their reputation in the labour market. From a general point of view, in *The General Theory of Employment, Interest and Money* (1936), chapter twelve, Keynes anticipated this behaviour by arguing that investors are unwilling to follow their private information and act unconventionally for fear of damaging their reputation.

The model proposed by Scharfstein and Stein (1990) relies on the following assumptions:

- There are two categories of managers (I_1 and I_2) characterized by a high or low ability;
- Managers face the same investment opportunity at the same price, they receive a signal (good, G, or bad, B) about the profitability of the investment and make their investment decisions sequentially;
- A high ability manager receives an informative signal while the other manager receives a noisy signal;
- The ability of the manager is unknown to themselves and to the labour market
- Once the investment managers have made their decisions, the labour market can judge their skills and abilities based on two evidences: the investment profitability and whether the investment decision of a manager was similar or not from that of his peers.
- The probability of receiving G signal is the same for both types of managers.

The authors prove that a herding equilibrium exists. The first manager, I_1, decides whether to invest or not based on his signal. The second manager will evaluate both its signal and the action of the first manager in order to make the investment

decision. Since the second manager is unsure about its ability, I_2 will follow I_1 because if the investment decision reveals to be unsuccessful, the labour market will not penalize I_2's reputation as all peers have made the same error. In the opposite case, when the second manager act differently and the investment reveals to be unprofitable, the labour market will consider I_2 as a low-ability manager.

This "sharing-the-blame" effect leads managers to mimic the investment decisions of their predecessors even if their signals tell the opposite, highlighting a herding equilibrium. Moreover, when managers herd, they reduce the likelihood to be classified as "low-ability managers" by the labour market. This herding behaviour is rational from the manager's angle who are worried about their career evaluation but it is inefficient from the social perspective because the private signals of managers are not disclosed (Bikhchandani and Sharma, 2001).

The "sharing-the-blame" effect explains herding behaviour within capital structure decisions. As argued by Zeckhauser et al. (1991), relative performance assessment incentives managers to find protection from criticism by adopting the capital structure of their peers. Managers are tempted to herd the financial strategies of their peers to share the blame in case of a negative outcome. Small firms may mimic their peers with the aim to increase their status, notwithstanding that this behaviour is against the firm's best interest. Firms may follow their peers in order to improve its relationship with external capital providers when the context is uncertain. For example, during the internet bubble, follower firms entered this market to easily raise additional capital (Lieberman and Asaba, 2006). Furthermore, Patel et al. (1991) argue that firms offset the advantages of approaching the optimum capital structure against the disadvantages of being an outliner and leaving the crowd. For example, investors and lenders may be concerned about the discrepancy between the firm's leverage and industry average and banks may not be willing to provide additional funds.

As shown above, reputational concern together with the "sharing-the-blame" effect trigger rational herding. However, Oruç and Şen (2009) suggest that the tendency of decision makers to avoid regret and distress may incentives financial managers

to follow industry peers' capital structure. Thus, firms will be more able to accept a failure when all their peers take the wrong decision in comparison with bearing a failure when their peers succeed. This behaviour finds its roots in the prospect theory and it leads to irrational herding.

2.2.3 Compensation-based theory

The third cause of rational herding is based on compensation structure. As presented by Maug and Naik (1996), an investment manager has an incentive to herd when its compensation depends on the comparison between its performance and the results of similar professionals.

The model is based on the following assumption:

- There is a unique risky asset;
- The investment manager's compensation is positively linked to its performance and negatively linked to a benchmark;
- The benchmark includes the yields of similar investment managers;
- Both managers and its peers have private and imperfect signal about the market return;
- Investment decisions are made sequentially: the benchmark acts first and then the manager will decide based on its signal and peers' action.

Similarly to the reputation-based herding, the model shows that the manager is inclined to herd the benchmark since the compensation will decrease if the peers' performance overcomes agent's result. Moreover, reputational concern increases the incentive to imitate peers since an unprofitable investment will impact also on career evaluation. This compensation scheme, based on relative performance contract, is optimal when the principal wants to reduce moral hazed or adverse selection problem [6].

[6] For example, the principal may not be able to asses and monitor completely the actions and performance of the agent. A contract based on relative performance evaluation will allow principal to better observe agent's performance and it reduces moral hazard problem. Moreover, this compensation structure allows to screen between good agents (managers who have the capacity to elaborate information and perform well) from bad agents reducing adverse selection problems (Maug and Naik, 1996).

This relative performance assessment could lead financial managers to mimic their benchmark by taking similar capital structure and investment decisions. This behaviour protects managers from both reputational damages and compensation risks (Oruç and Şen, 2009).

2.2.4 Rivalry-based theory

The rivalry-based theory of imitation, developed in the field of business strategy, claims that firms mimic peers to protect their competitive position and to reduce rivalry. Imitation to alleviate competitive rivalry is more likely to occur when firms have similar size, market positions and resources (Lieberman and Asaba, 2006). In this context, the rivalry can be very strong and firms can engage in two complementary tactics to reduce competition (Deephouse, 1999).

On one hand, firms can differentiate their strategies to ease rivalry. This option is risky because firms are not sure that the new strategy and market position will be profitable and attractive, this approach could lead both positive and negative results. As discussed by Deephouse (1999), when firms adopt a different strategy, they are challenging the industry wisdom and their legitimacy. This could negatively impact on firms' ability to raise resources from third parties because lenders cannot fully understand the strategy, therefore they will reduce the supply of funds and ask for a higher risk premium since these firms are more likely to go bankrupt. Additionally, firms that faces great bankruptcy risk have some difficulty retaining high quality managers, damaging firm's decision-making and performance.
On the other hand, firms can follow their competitors by adopting the same strategy to gain legitimacy and to mitigate competition and uncertainty. A company's strategy is legitimate when it receives the consensus from the organizational field and it is endorsed by the members. Homogeneous strategies can potentially increase competition but they can also reduce competitive rivalry by establishing tacit collusion among competitions. Porter (1979) claims that companies within the same strategic group tend to adopt similar strategies to preserve collusion and to

limit competition [7]. He suggests that tacit coordination is threatened when firms adopt different strategies, this patchy behaviour reduces average industry profit. The desire to protect the competitive position is an additional reason that push firms toward imitation. A shining example of this herding behaviour regarding foreign direct investment (FDI) is presented by Knickerbocker (1973) [8]. He argued that firms mimic the investment decision of their rivals to preserve their competitive position in the industry. In fact, if competitors imitate each other, they will both gain or loss and none will have a higher market share. Therefore, when firms evaluate the entry into a foreign market, they employ a "leader-follower model" to minimize the risk of losing their competitive position.

The link between strategy conformity, legitimacy and performance improvement has not been fully demonstrated and empirical results are ambiguous. Miller and Cheng (1995) find that strategic nonconformity is associated with a deterioration of performance. However, the relationship turns out to be positive for large firms. The authors argue that strategic deviation undertaken by large firms is less likely to be detrimental to performance since these firms have a strong reputation, both customers and market accept more easily the strategic nonconformity and thus companies can change industry conventions successfully. Deephouse (1999) discovers that the relationship between strategic deviation of commercial banks in Minnesota and their performance follows an inverted U function. Barreto and Baden-Fuller (2006) examine the bank branching choices in the Portuguese market and they find that mimetic behaviour leads to negative performance.

The strategy based on conformity pressure and differentiation is not the only feasible approach. Porac et al. (1989) and Deephouse (1999) present a solution to solve the apparently dichotomy on strategic positioning based on "competitive cups", also known as "strategic balance". As highlighted before, strategic differentiation challenges legitimacy but reduces competitions; thus, according to

[7] Porter (1979) defines a strategic group as a cluster of firms following similar strategies. Therefore, different strategic group form an industry, firms within a cluster react similarly to shocks and they are able to forecast each other's actions.
[8] The model developed by Knickerbocker (1973) is based on the following assumptions: oligopoly, risk aversion and uncertainty about the economic outlook of the FDI.

the strategic balance theory, firms should engage in nonconformity strategy until when the benefits of a lower level of competition offset the cost associated with a legitimacy threat. Therefore, firms will maximize their performance by positioning at an intermediate degree of strategic conformity. Deephouse (1999) defines the concept of strategic balance by introducing the notion of "range of acceptability". This concept refers to the degree of strategic deviation that allows firms to employ nonconformity without threating their legitimacy: companies can differentiate from their competitors and take advantage from the reduced rivalry.

2.2.5 Isomorphic pressures on capital structure

From a review of the literature, several rational reasons (informational cascade, concern for reputation, compensation or competition) trigger herd behaviour and homogeneity among companies. However, DiMaggio and Powell (1983) argue that the similarity in organizational forms and procedures among firms is the result of institutional isomorphism. This concept is defined as the set of forces that push firms to imitate peers. DiMaggio and Powell (1983) present three forces that cause isomorphism and lead firms to resemble each other.

Firstly, coercive forces refer to the pressures exerted by other organizations (such as industry and governmental institutions) and by cultural expectations on a firm. With regard to capital structure, rating agencies exert coercive pressure on firms. These agencies assess the firm's creditworthiness by giving rates in form of letters that reflect the probability of default. Based on the evidence of Kisgen (2006), managers consider credit ratings when deciding whether to change firm's capital structure. Managers are concerned about the credit ratings because different rating levels generate costs and benefits impacting on firm's ability to access to some form of financing.

As discussed by Kisgen (2006), some investor group (including banks and pension funds) can invest only in some rating levels, therefore firms strive to remain within the rating to ensure the supply of credit. Moreover, rating agencies are specialized in gathering and processing information and hence their judgments provide signals to investors about the firm's quality. Firms within the same grade are perceived by investors as similar, thus the rating level also impacts on firm's cost of capital. As a

result, firms may decide to conform to the industry average capital structure to ensure access to financing and to avoid the cost connected with being an outlier with respect to its peers. Furthermore, Graham and Harvey (2001) reveal that a good credit rating is one of the most important factors when managers make capital structure decisions.

Secondly, mimetic pressures occur when organizations mimic their peers because of uncertainties in the environment. Firms imitate the actions of those organizations that are perceived as legitimate or successful. This herding behaviour is rational because it allows to reduce both uncertainty and costs (DiMaggio and Powell, 1983). As argued by Lieberman and Asaba (2006), a firm is more likely to be followed when its actions deliver informative signals and the firm has strong communication and contacts with its peers. According to Haveman (1993), firm's probability to be copied increases with its size and profitability. In addition, as argued by Gulati et al. (2010), when firms are linked by strategic networks, they share information and resources, fostering imitation. On this topic, Patnam (2011) shows that corporate networks in form of interlocking directors trigger a positive peer effect on firm's investment and executive compensations.
Based on these arguments, firms may imitate their peers' capital structure when the environment is uncertain. Evidences of the interactions between uncertainty, peer effect and corporate policies are lacking. Im et al. (2017) demonstrate that economic policy uncertainty intensifies peer effect on firm's investment by analysing a sample of Chinese firms from 1999 to 2003.

Finally, normative pressures concern the set of ties among professionals within an industry that engenders the likeness of firms. These ties refer to common educational backgrounds, professional experiences, trainings and professional networks. All these forces provide managers with common standards and norms. Thus, they will approach and solve problems in the same way, contributing to similarity in organizational forms and procedures among firms within an industry. Another important factor that facilities normative similarity is the filtering of employees. Firms frequently filter their personnel by hiring professionals with experience in the industry, managers with professional certifications, candidates

from top universities. These mechanisms shape organizations, favouring normative isomorphism.

Fracassi (2017) examines how social connections impact on corporate finance decisions by analysing 30000 executives and directors of 2100 US public firms between 2000 and 2006. He considers the information regarding education (e.g. university, membership in organizations or clubs) and professional experiences (e.g. current and past employment) to discover social peers and to establish social connections among managers. He discovers that investment similarity between two firms increases with the magnitude of social connections. The results reveal that firms with strong social connections show better performance as managers exploit their social network and access to useful information easily. Moreover, similarity in corporate investment policies decreases when a manger that links firms dies. All these findings confirm the normative isomorphism's predictions on corporate finance policy decisions.

The main difference between the isomorphic framework presented in this section and the herd behaviour models described above rests on the underlying mechanisms responsible for imitation. Economic rational purposes based on informational cascade, concern for reputation, compensation or competition trigger herd behaviour. While, within the isomorphic framework, external pressure, uncertainty and social ties prompt firm to mimic.

2.3 Researches on peer effects in firm's decision-making

This paragraph presents the major results of empirical investigations on peer effect among firms. First, herding behaviour in corporate decisions is examined, then the analyse reviews peer effect in capital structure decisions.

2.3.1 Evidence of peer effects in corporate decisions

Peer effects play a central role in numerous corporate decisions as suggested by different researches. Firms are influenced by their competitors in multiple fields: from investment to dividend decisions including cash holding and stock split choices.

Foucault and Fresard (2014) investigate whether peers' valuation impact on firm's investment by examining a US sample of listed firms between 1996 and 2008. They find that peers' valuation is positively connected to firm's investment: managers infer useful information about the company's growth opportunities by analysing stock prices of their peers. In particular, corporate investment increases by 5,9% in response to a one standard deviation rise in peers' market valuation. They test not only whether managers learn from stock prices but also how this behaviour changes. The findings prove that firm's investment is less sensitive to their peers' valuation when firm experience an increase in its stock prices' informativeness. Similarly, firm's investment is less sensitive to its market valuation when peers' stock prices informativeness increases or when managerial information decreases.

Using a sample US firms from 1996 to 2001 based on TNIC parameter [9], Dessaint et al. (2016) provide analogous findings. They show that managers have an imperfect ability to separate fundamental from non-fundamental shocks in peers' stock prices. Thus, firm's investment is also sensitive to the noisy signal of peers' valuation: a 5% non-fundamental decline in peers' stock prices lead firms to reduce fixed investment by 2,5%. However, once managers have discovered that the signal was a simply noisy, they correct their decisions. Moreover, the results confirm the finding of Foucault and Fresard (2014): an increase in the informativeness of peers' stock prices or a decrease in managerial information ability makes firm's investment more connected to its peers' valuation.

[9] Text-based Network Industry Classification (TNIC) allows to identify peer firms based on product similarity. This measure is defined by analysing the common words used by firms to describe their products.

The peer effect on firm's investment has been recently investigated by Park et al. (2017). Spanning 12.192 US listed firms from 1980 to 2010, the analysis reveals that firms' investment decisions are influenced by industry peers. Furthermore, companies with constrained finance disclose a stronger mimicking behaviour.
Chen and Ma (2017) confirm the peer effect on firm's investment policies by analysing a sample of Chinese listed firms between 1999 and 2013: firm's investment increases by 4% in response to a one standard deviation growth in peers' investments. Besides, the findings show that firms categorized as "industry follower" and "young" are more influenced by their peers, consistently with the social learning hypothesis. However, in contrast to the results of Park et al. (2017), Chen and Ma (2017) prove that financially constrained firms are less sensitive to their peer firms' investments.

Kaustia and Rantala (2015) investigate the presence of peer effect on stock split decisions in a sample of US firms listed in NYSE from 1983 to 2009. The evidence reveals that when peer firms split their stock, it is more likely that a firm will perform the same operation. The magnitude of peer effect is equivalent to a 45% increase in the share prices. Moreover, firms are more likely to split when their peers have experienced positive announcement returns. This behaviour is in agreement with the social learning argument. However, this herding behaviour proves to be unprofitable because follower firms do not enjoy the same benefit of their predecessors.

Chen and Chang (2013) examine 2855 US firms between 1980 and 2011, they discover that managers consider peers' cash levels to determine their cash holding ratio. They show that firms disclose a stronger herding behaviour when they are financially constrained or when their R&D investment level is high. The authors claim that firms follow the others to maintain their competitive position and to mitigate rivalry (i.e. rivalry-based imitation).

Popadak (2013), through a sample of US listed firms from 1975 to 2011 show that peer firms influence both the timing and level of companies' dividends. In particular, a firm rises its dividend by 15% following a one standard deviation increase in peer influence [10]. Moreover, peer influence is present only when managers decide an increase in dividend, while managers' decisions to decrease dividend are not affected by peer firms.

2.3.2 Evidence of peer effects in capital structure decisions

The review of the existing researches of peer effect in firm's decision making suggests that peer firms may also impact on capital structure decisions. Graham and Harvey (2001) carry out a notable survey on 392 CFOs to shed the light on different corporate finance's topics. The analysis covers US and Canadian firms and it reveals that almost one quarter of interviewees consider peer firms' financing policies as very important, or important, drivers for their capital structure decisions. However, few works examine the influence of industry peers in capital structure decisions and the results are ambiguous. Here below are presented the existing researches on this topic.

Patel et al. (1991) investigate whether managers follow the average mix of debt and equity of the industry. Based on a sample of 182 US firms divided into 10 sectors from 1971 to 1989, they discover that for three industries less than 15% firms reveal a significant herding behaviour, while the other seven industries show a greater proportion of follower firms.

Filbeck et al. (1996) apply the same procedure of Patel et al. (1991) to a US sample of 120 firms between 1981 and 1990. However, they do not find evidence of peer effect on capital structure. They next test the "follower-leader model" and the results provide weak support for this hypothesis.

[10] Peer influence is measured as the number of peers that have increased (reduced) their dividend yields.

Welch (2004) show that US firms that deviate from the industry average leverage ratio are inclined to realign to it. Mackay and Phillips (2005) investigate how the industry affect firm's capital structure and find that firm's leverage hinger on peer firms' financial policies. Frank and Goyal (2009) find that the median industry leverage is an important determinant of firm's leverage.

Using a sample of 45 firms listed in ISE (Istanbul Stock Exchange) divided into four sectors, Oruç and Şen (2009) examine herd tendency in capital structure over the period 1999-2006. Their findings do not provide evidence of peer effect in term of following the industry average or the leverage ratio of the industry leader.

Finally, Leary and Roberts (2014) study the impact of peer firms on capital structure decisions by analyzing the financial policies of 9126 US firms classified into 217 industries from 1965 to 2009. They find that peer effect has a significant influence on firm's capital structure and its magnitude is greater than the other estimated determinants. In particular, a firm increases its leverage by 10% as a result of one standard deviation growth in peers' leverage. Their results show that small, young, unprofitable and financially constrained firms disclose a stronger herding behavior: these firms mimic larger and more profitable peers. Therefore, they suggest that herding behavior is triggered by learning and reputational motives.

Peer effect on corporate financial policies has been mainly investigated under the quantitative dimension. Duong et al. (2015) carry out a recent research about herding behavior on the qualitative aspect of debt. They analyze 6114 US firms of 236 industries between 1973 and 2012 showing that peer firms influence firm's debt maturities decisions. According to their evidences, a firm experiences a 50% (37%, 23%) change in its debt maturity following a one standard deviation change in peers corresponding maturity structure. The findings differ from the result of Leary and Roberts (2014) because they show that firms imitate peers with similar size, not larger size peers. Lastly, the research reveals that corporate performances increase (decrease) when firms imitate short, medium (and long) maturity debt decisions of their peers.

As it has been shown above, the researches disclose contrasting results about peer effect on capital structure. Moreover, from a review of the existing studies, major evidences have focused the attention on US firms. Therefore, it is relevant to conduct this research with a double purpose: increasing the number of evidences available and providing analysis on a different unexplored market.

3. Research methodology and sample definition

This chapter, divided into three sections, is dedicated to description of the research methodology. The first paragraph describes the empirical model together with the respective variables. The second section explains the data collection and cleaning process, while the final paragraph focuses on the descriptive statistics to outline the main characteristics of our sample.

3.1 Empirical model

To understand whether and how peer firms affect firm's financial policies we apply the empirical model developed by Leary and Roberts (2014). They have based their investigations on previous researches on capital structure by Rajan and Zingales (1995) and Frank and Goyal (2009). The empirical model is the following:

$$\begin{aligned} LEV_{it} = \; & \alpha + \beta_1 SIZE_{it-1} + \beta_2 PROF_{it-1} + \beta_3 TANG_{it-1} + \beta_4 GROWTH_{it-1} \\ & + \beta_5 LEV\_AVG_{-it} + \beta_6 SIZE\_AVG_{-it-1} + \beta_7 PROF\_AVG_{-it-1} \\ & + \beta_8 TANG\_AVG_{-it-1} + \beta_5 GROWTH\_AVG_{-it-1} + \varepsilon_{it} \end{aligned} \qquad (1)$$

As we can see, leverage (LEV) is related to both firm's specific characteristics (size, profitability, tangibility and growth opportunities) and peer firms average. Following Leary & Roberts (2014), peer firm variables measure how peer firm action (i.e. leverage) or characteristics (i.e. size, profitability, tangibility, growth) influence firm's financial policies. These variables are computed as the average of all firms within a particular industry-year combination, excluding the ith observation. For example, focusing on sector 107 (manufacture of bakery and farinaceous products), peer firm leverage in 2014 for Barilla Group S.p.A is equal to the average of all firms' leverage within this industry, not including Barilla Group's leverage.

We compute the variable in equation (1) as follows:

- Leverage (LEV) is our dependent variable. Leary & Roberts (2014) define this variable as the ratio between total debts and total assets. However, we take a different approach to measure gearing. In particular, we decide to exclude all non-financial debts from our leverage ratio since they do not allow us to understand how firms are financed. Thus, we define leverage as

the ratio between financial debts and total assets. Financial debts are defined by the sum of the following financial liabilities: bonds, convertible bonds, shareholder loans, bank loans and other financial loans.

- Following Rajan and Zingales (1995) and Leary and Roberts (2014) we define firm size ($SIZE$) as the natural logarithm of sales.
- Profitability ($PROF$) is proxied by the ratio between EBITDA and total assets (Leary and Roberts, 2014).
- Tangibility ($TANG$) is computed by the ratio between property, plant and equipment and total assets (Leary and Roberts, 2014; Frank & Goyal, 2009).
- Leary and Roberts (2014) employ market-to-book ratio as a proxy for growth opportunities ($GROWTH$). However, the majority of firms within our sample are not listed, thus we measure growth opportunities as the change in logarithm of total assets (Frank & Goyal, 2009).

3.2 Sample definition and data cleaning

This paragraph explains the data collection and, later the data management and cleaning process.

3.2.1 Sample definition

The data set is composed by financial data of Italian firms extracted from AIDA Bureax Van Dijck database [11]. We define industry classification based on ATECO 2007 code [12].

First of all, we decide to exclude the following sector code from our analysis: A) agriculture, forestry and fishing industry; B) mining industry; code D) and E) (i.e.: the utilities sector: water and sewage facilities, gas and electricity); F) construction industry; G) wholesale and retail industry; H) transportation and logistics industry; K) financial services; L) real estate industry; M) professional services; and all the other sectors from code O) to code U).

[11] AIDA is a comprehensive data-base that comprises detailed information on Italian companies. It encompasses approximately 1.000.000 firms.

[12] ATECO 2007 code is the Italian official national classification of economic activities, ATECO stand for Attività Economica. It can be viewed as the Italian version of NACE Rev.2 code (the statistic European industry classification).

We decide to exclude sector A) because the agricultural industry employs a simplified accounting system and full financial data are available only for large firms. We do not include sector B) and F) because both the mining and the construction industry recognize revenues following particular accounting rules. Our sample also omits the utilities sectors (code D and E) since these sectors are partially controlled by the government and we want to prevent regulatory concerns. The wholesale and retail industry (code G) has been removed as the evaluation process is based on the mark-up (the difference between the retail price and the cost of acquisition) while firms in the manufacturing industry are evaluated on sales revenues, this discrepancy does not allow us to compare these two sectors. Finally, code H), K), L) and M) (i.e.: transportation and logistics industry, financial services, real estate industry and professional services) have been removed since we are interested to study the manufacturing services. For the same reasons we also exclude sectors from code O) to code U).

To remove the presence of not available data (NAs), we extract data according to the following criterions:

- Continuous availability of balance sheets from 2007 to 2016;
- All companies with a known value from 2007 to 2016 for: short-term bonds, short-term convertible bonds, long-term bonds, long-term convertible bonds, short-term shareholder loans, long-term shareholder loans, short-term bank loans, long-term bank loans, other short-term loans, other long-term loans;
- All companies with a known value from 2007 to 2016 for: total assets and property, plant and equipment (PPE);
- All companies with a known value from 2007 to 2016 for: sales, EBITDA and number of employees.

We require our sample to comply to the above-mentioned conditions for different reasons. First of all, we need all these financial data since they represent the starting point for our empirical model. Then, we require continuous availability of balance sheets since we want to have a dataset with no missing observations for each firm-financial data combination from 2007 to 2016 (i.e. a balanced panel). Finally, all the conditions and data allow us to remove from the sample firms with simplified

balance sheets. As explained below in detail, the Italian law grants firms to present a short-form version of their annual reports where accounting data are not split between financial and commercial debts. This accounting law need to be taken into account since we require availability of financial debts to compute leverage.
The sample based on these restrictions includes 34,219 firms divided between 88 industries. We define industry classification based on three-digit ATECO 2007 code as this type of sector classification provides us, on one hand, with a significant number of firms within each industry and, on the other hand, with a sufficient uniformity and comparability of firm within the sector [13]. Moreover, we demand industries to have at least 50 firms in order to have a sufficient number of companies within each industry.

3.2.2 Data cleaning process

As described above, thanks to the option "all companies with a known value", we require AIDA to not extract accounting data when a firm presents N.A. (not available data). Nevertheless, we needed to clean data for several reasons.

First of all, we realized that AIDA avoids N.A. through the option "all companies with a known value", however, at the same time, the database extracts account data even if their values are equal to zero. These zero values constitute a problem because they can represent both N.A and accounting data with values equal to zero. Given the ambiguity that surrounds the correct interpretation of zero values, we decided to remove firms when they display such unclear financial data for the following balance sheet items: total assets, sales and PPE. This first elimination has led to a loss of 219 firms since they had zero-value for one or more of the accounting data above-mentioned. Then, after first elimination, we also removed the industry code 592 (Sound recording and music publishing activities) and 774 (Leasing of intellectual property and similar products, except copyrighted works) since they had less than 50 firms. Overall, the sample encompassed 33,906 firms and 86 industries.

[13] The criteria employed to outline industry classification based on three-digit ATECO 2007 code are the following: characteristics of goods and services produced, application of goods and services produced, production factors, production process and technology.

Then, we eliminated 334 firms because they presented a leverage ratio higher than one. Since leverage is computed as the ratio between financial debts and total assets, this measure of gearing cannot be greater than 1. Before we proceeded with the elimination, we analysed these anomalous companies: 130 firms presented the compulsory description "in liquidation" at the end of business name. Thus, these firms are at the end of the business life cycle and we decided to remove them from the sample. To detect the reason behind an anomalous level of leverage for the remaining 204 firms, we examined a sample of 30 companies. The results show that 20 firms are in liquidation even if it is not explicitly highlighted by the business name while only 10 firms don't seem to be in any liquidation procedures. However, all management reports highlight that these firms are facing a tough financial crisis and the majority of firms are considering going into liquidation in 2017. Therefore, we decided to remove also this second group of anomalous firms for two reasons. First, when a firm goes into liquidation the balance sheet is often drawn up according to the liquidation principles instead of classical going concern principle. Second, we expect that peer firms are not influenced by the gearing's decisions of the financially distressed companies when they face capital structure choices. After this second step in the elimination process, the sample included 33,572 firms and 86 industries.

Finally, the last step entailed the elimination of firms with short-form financial reports and firms in liquidation. First of all, we needed to remove firms when they presented a simplified balance sheet since this short-form version does not divide accounting data between financial and commercial debts. The Italian law grants firms to present a short-form version of their annual reports when they respect two out of three of the following criteria in the first financial years or, later, for two successive years: employees average number up to 50, total assets up to 4,000,000 and revenues up to 8,000,000 [14]. Therefore, to remove firms with short-form financial reports we selected firms with a leverage ratio equal to zero and we checked whether firms complied two out of three of the above-mentioned parameters for two consecutive year. As a result, we detected 3,822 firms with simplified balance-sheet. Afterwards, we removed the firms that are undergoing a

[14] See: Art. 2435-bis of the Italian Civil Code for further details, this regulation came into force in 2009.

liquidation process because we assume that peer firms are not influenced by the financially distressed companies' gearing decisions. We spotted the distressed companies by checking whether they presented the compulsory description "in liquidation" at the end of business name: we identified and removed 587 firms. These eliminations reduced the numbers of firms within industry 291 (Manufacture of motor vehicles) and industry 772 (Renting and leasing of personal and household goods) under the threshold of 50 companies, thus we removed these sectors.

As described by Table 1, our final sample includes 29,067 firms divided between 84 industries. Because of the proxy used to measure growth opportunities, the sample spans 9 years: from 2008 to 2016. This data cleaning procedure reduced the sample size of 15.05%. However, this elimination procedure was necessary to obtain a consistent and unbiased accounting data.

Table 1 – Distribution of firms across industries

Code	Sector Description	Number of firms
101	Processing and preserving of meat and production of meat products	442
102	Processing and preserving of fish, crustaceans and molluscs	52
103	Processing and preserving of fruit and vegetables	235
104	Manufacture of vegetable and animal oils and fats	99
105	Manufacture of dairy products	352
106	Manufacture of grain mill products, starches and starch products	155
107	Manufacture of bakery and farinaceous products	365
108	Manufacture of other food products	330
109	Manufacture of prepared animal feeds	124
110	Manufacture of beverages	374
131	Preparation and spinning of textile fibres	179
132	Weaving of textiles	303
133	Finishing of textiles	183
139	Manufacture of other textiles	396
141	Manufacture of wearing apparel	696
143	Manufacture of articles of fur	218

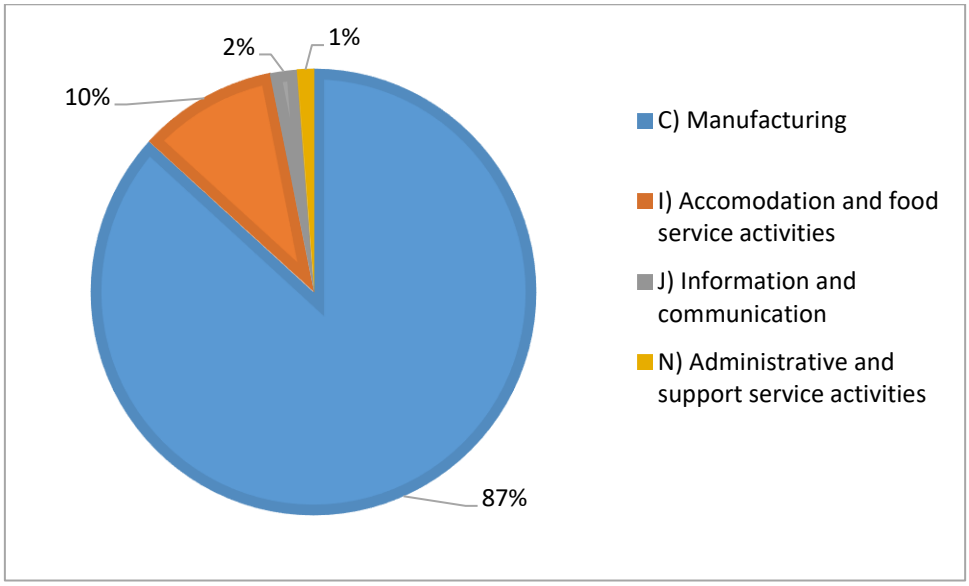
151	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and harness; dressing and dyeing of fur	356
152	Manufacture of footwear	516
161	Sawmilling and planing of wood	154
162	Manufacture of products of wood, cork, straw and plaiting materials	519
171	Manufacture of pulp, paper and paperboard	88
172	Manufacture of articles of paper and paperboard	523
181	Printing and service activities related to printing	691
192	Manufacture of refined petroleum products	89
201	Manufacture of basic chemicals, fertilisers and plastics and synthetic rubber in primary forms	311
203	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	174
204	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	217
205	Manufacture of other chemical products	277
211	Manufacture of basic pharmaceutical products	53
212	Manufacture of pharmaceutical preparations	140
221	Manufacture of rubber products	239
222	Manufacture of plastic products	1,325
231	Manufacture of glass and glass products	205
233	Manufacture of clay building materials	143
234	Manufacture of other porcelain and ceramic products	55
236	Manufacture of articles of concrete, cement and plaster	395
237	Cutting, shaping and finishing of stone	376
239	Manufacture of abrasive products and non-metallic mineral products n.e.c	152
241	Manufacture of basic iron and steel and of ferro-alloys	72
242	Manufacture of tubes, pipes and hollow profiles of steel	97
243	Manufacture of other products of first processing of steel	159
244	Manufacture of basic precious and other non-ferrous metals	130
245	Casting of metals	239
251	Manufacture of structural metal products	1,240
252	Manufacture of tanks, reservoirs and containers of metal	89
255	Forging, pressing, stamping and roll-forming of metal; powder metallurgy	390

256	Treatment and coating of metals	1,832
257	Manufacture of cutlery, tools and general hardware	450
259	Manufacture of other fabricated metal products	800
261	Manufacture of electronic components and boards	152
262	Manufacture of computers and peripheral equipment	131
263	Manufacture of communication equipment	154
265	Manufacture of instruments and appliances for measuring, testing and navigation; watches and clocks	218
266	Manufacture of irradiation, electromedical and electrotherapeutic equipment	107
271	Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus	248
273	Manufacture of wiring and wiring device	165
274	Manufacture of electric lighting equipment	125
275	Manufacture of domestic appliances	125
279	Manufacture of other electrical equipment	384
281	Manufacture of general — purpose machinery	586
282	Manufacture of other general-purpose machinery	1,450
283	Manufacture of agricultural and forestry machinery	213
284	Manufacture of metal forming machinery and machine tools	393
289	Manufacture of other special-purpose machinery	840
292	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	90
293	Manufacture of parts and accessories for motor vehicles	289
301	Building of ships and boats	143
309	Manufacture of transport equipment n.e.c.	94
310	Manufacture of furniture	939
321	Manufacture of jewellery, bijouterie and related articles	258
325	Manufacture of medical and dental instruments and supplies	214
329	Manufacturing n.e.c	237
331	Repair of fabricated metal products, machinery and equipment	330
332	Installation of industrial machinery and equipment	342
551	Hotels	1,205
552	Holiday and other short-stay accommodation	204
553	Camping grounds, recreational vehicle parks and trailer parks	116
561	Restaurants and mobile food service activities	906

562	Event catering and other food service activities	125
563	Coffee bar and other similar activities without kitchen	380
581	Publishing of books, periodicals and other publishing activities	335
591	Motion picture, video and television programme activities	229
771	Renting and leasing of motor vehicles	93
773	Renting and leasing of other machinery, equipment and tangible goods	248
	Total number of firms	29,067

To better understand the sample composition, we cluster firms following a classification based on sections. Figure 1 highlights that 87% of firms belong to manufacturing industries while the remaining 13% of firms are part of the service industry. The latter group is divided between accommodation and food service activities, information and communication and, finally, administrative and support service activities.

Figure 1 – Distribution of firms across sections



3.3 Descriptive statistics

This paragraph focuses the attention on descriptive statistics to outline the main characteristics of our sample. We first analyse each variable, then we present a bivariate analysis to understand how firm characteristics differ conditional on the level of leverage ratio.

3.3.1 Leverage

Since our dependent variable is leverage, first, we analyse this variable from 2008 to 2016, then, the analysis focuses the attention on leverage trend over time.

We define leverage as the ratio between financial debts and total assets, thus gearing can vary from 0 to 1. As we can see from Table 2, mean is higher than median, therefore 50% of observations have a gearing ratio below the mean leverage's value (i.e. 0.2725). Moreover, 50% of observations have a leverage ratio below to 0.2577. Both standard deviation and the coefficient of variation show high dispersion in leverage ratio.

From the box-plot we can infer that from 2008 to 2016: 25% of leverage values are below 0.1025, 50% (75%) of firm-year observations have a gearing ratio lower than 0.2577 (0.40107). Moreover, the middle 50% of the leverage distribution is comprised between 0.1025 and 0.4107, thus the interquartile range (IQR) is 0.3081. The frequency distribution graph shows a great number of firms with low level of leverage: 5,393 firms show a leverage equal to 0 for one or more years. As highlighted by frequency distribution graph and box-plot, leverage distribution is positively skewed and platykurtic. Finally, the box-plot displays the presence of some outliners: 474 firms presents a leverage ratio higher than 0.8730.

Table 2 – Leverage: summary descriptive statistics

Variable	Min	Q_1	Mean	Median	Q_3	Max.	C.V.	Std. Dev.
Leverage	0	0.1025	0.2725	0.2577	0.4107	0.999	0.7386	0.2012

Figure 2 – Box-plot[15] of leverage:

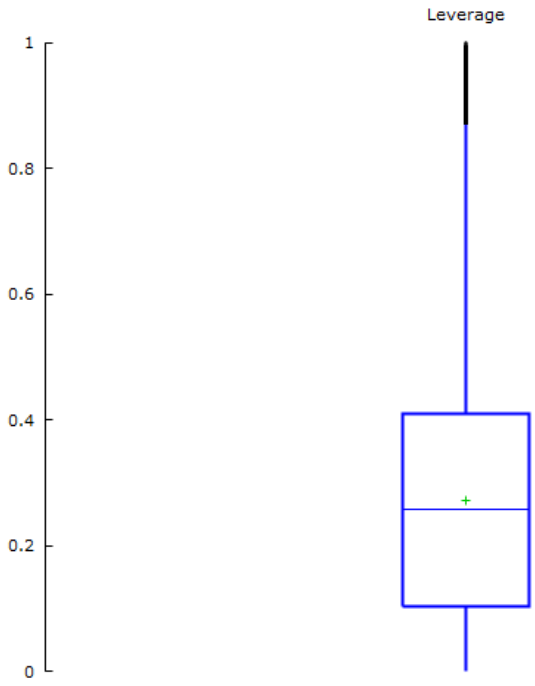
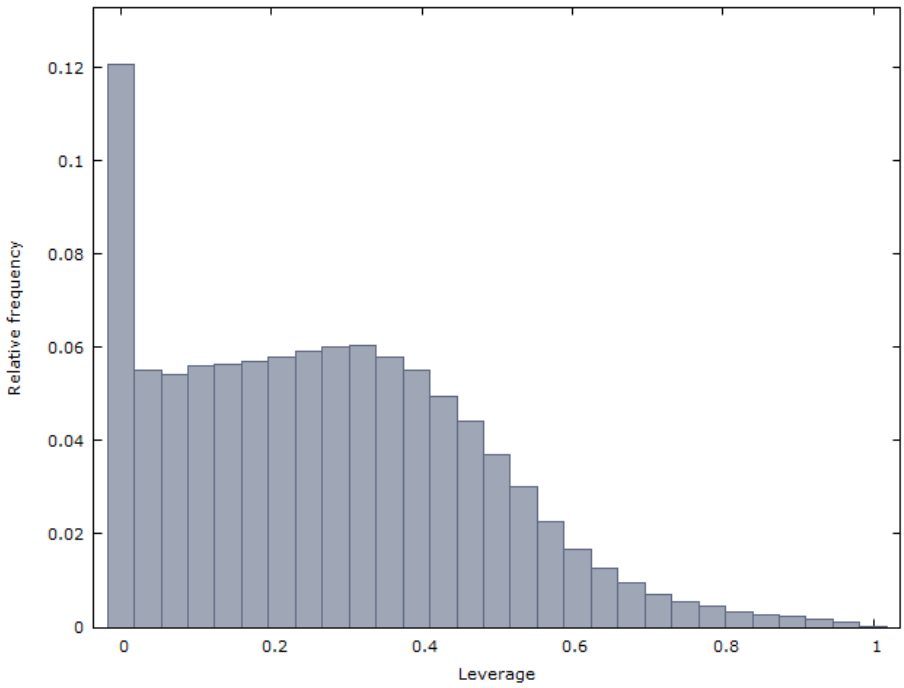


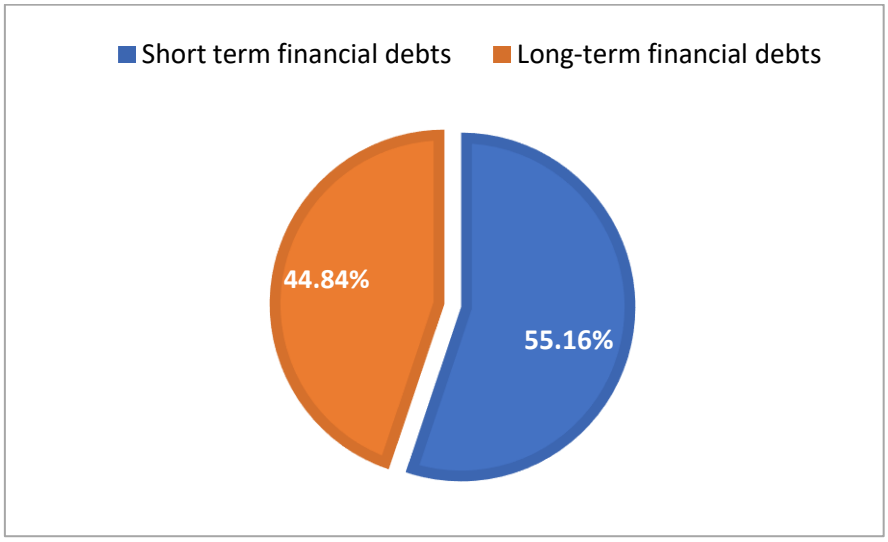
Figure 3 – Frequency distribution of leverage



[15] In the box-plot: median is the blue line, "+" represents mean, the box includes data within the first and the third quartiles, "whiskers" lengthen from the box edge until a value equals to 1,5 time the IQR, outliers are represented by black points.

Up until now, we have investigated the quantitative dimension of leverage disregarding the qualitative dimension. Now, we turn our attention to the debt maturity structure. To investigate this dimension, we can divide the financial debts between short-term liabilities (i.e. they mature within the next 12 months) and long-term liabilities (i.e. they become due over the next 12 months) [16]. As we can see from Figure 4, between 2008 and 2016, the overall weight of short-term financial debt on total financial debt is 55.16% while long term financial liabilities account only for 44.84%.

Figure 4 – Debt maturity structure between 2008 and 2016



Since our financial leverage spans several different typologies of financial debts, we are interested to study the weight of each liability compared to the total. Financial debts are equal to the sum of: bonds, convertible bonds, shareholder loans, bank loans and other financial loans. Figure 5 shows the percentage weight of each short-term (long-term) financial liability compared to the total amount of short-term (long-term) financial debts.

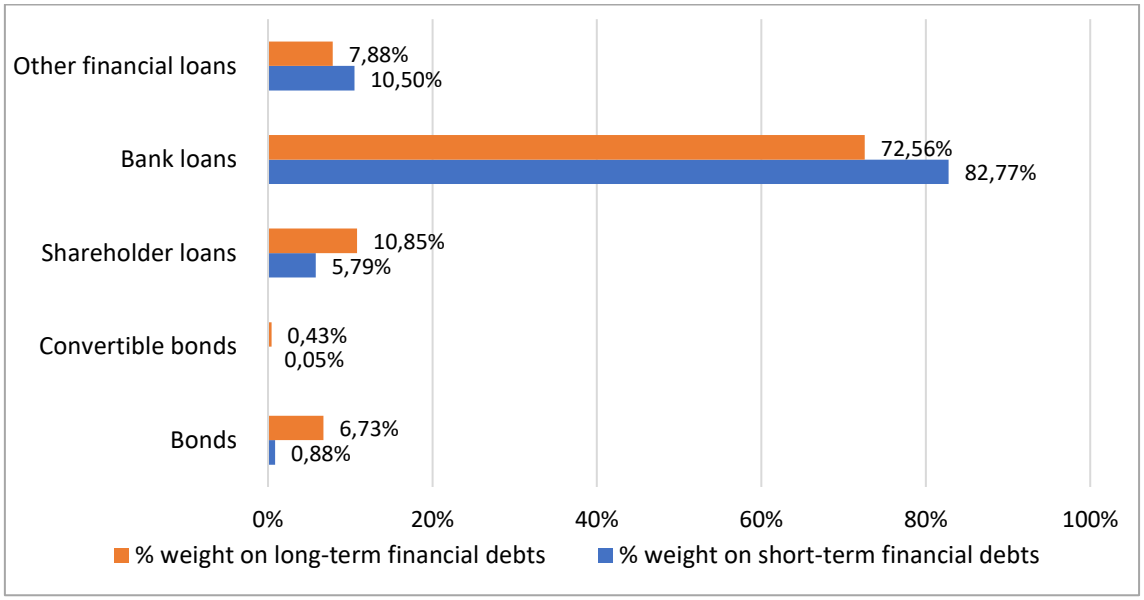
As we can see, bank loans are the main source of funds accounting for 82.77% on total short-term financial debt and 72.56% on total long-term financial debt. Other financial loans are the second most important type of fund within the short-term financing representing the 10.50%, but their weight decreases to 7.88% if we focus

[16] We can split corporate debt maturity structure only in these two categories since the Italian law requires firms to adopt this type of debt maturity's classification.

on longer maturity. The amount of shareholder loans on total doubles from 5.79% on short-term financial debt to 10.85% on long-term financing. Then, short-term bonds represent only 0.88% of short-term financial debt but they have a larger impact on long-term funds accounting for 6.73%. Finally, within the financing sources, convertible bonds represent a small portion: they account for 0.05% (0.43%) on short-term (long-term) financial liabilities.

To sum up, the debt maturity breakdown highlights the importance of banks financing for Italian firms. Our results are in line with previous empirical evidences. According to annual report elaborated by Bank of Italy, in 2012, bank's funding represented the 66.5% of total financial debt while the same ratio for the euro-average was only 50%. Moreover, Italian firms presents a high level of leverage (computed as financial debt divided by the sum of financial debt and shareholders' equity) compared to other European countries. In 2012, in Italy, leverage ratio reached 48%, while in France and Germany leverage stopped to 34% and 42%, respectively. Overall, Italian firms gearing ratio exceed the euro-average by 6%. Finally, Bank of Italy highlights that bonds have a small impact on total sources of funding: their overall weight on total financial debt is below 10%.

Figure 5 - Debt maturity breakdown by type of financial liabilities



Heretofore, we have investigated the average composition of leverage between 2008 and 2016. Now the analysis focuses on the change in leverage ratio to infer

some useful information on how capital structure has changed during the financial crisis.

Figure 6 represents both mean, median and standard deviation leverage trend from 2008 to 2016. As we can see, all three statistics experience the same pattern. Between 2008 and 2009 figures remain steady but, from the beginning of the new decade, mean, median and standard deviation show a downward trend. In particular, mean decreases from 0.285 in 2009 to 0.249 in 2016. At the end of the first decade, median reached 0.272, then it experiences a continuous fall hitting 0.227 in 2016. Standard deviation displays a slight decline over time: from 0.208 in 2009 to 0.195 at the end of 2016.

Our results are in line with previous empirical researches. The different annual reports performed by the Bank of Italy highlight that leverage experience a continuous downward trend from 2011 to 2016. According to the Bank of Italy, the decline in leverage ratio is due to two causes. First, banks have started to apply more selective lending policies, this has led to a reduction in banks' funding toward firms. According 2014 Annual Report, 14.3% (11.5%) of firms have reported that their requests for new loans have been fully, or in part rejected, by banks in 2011 (2014). Second, because of financial crisis, firms have reduced the overall amount of investments and productions thus firms' demand for banking funds is decreased.

Figure 6 – Leverage trend from 2008 to 2016: the orange line represents mean, median is the yellow line and the green line describes standard deviation.

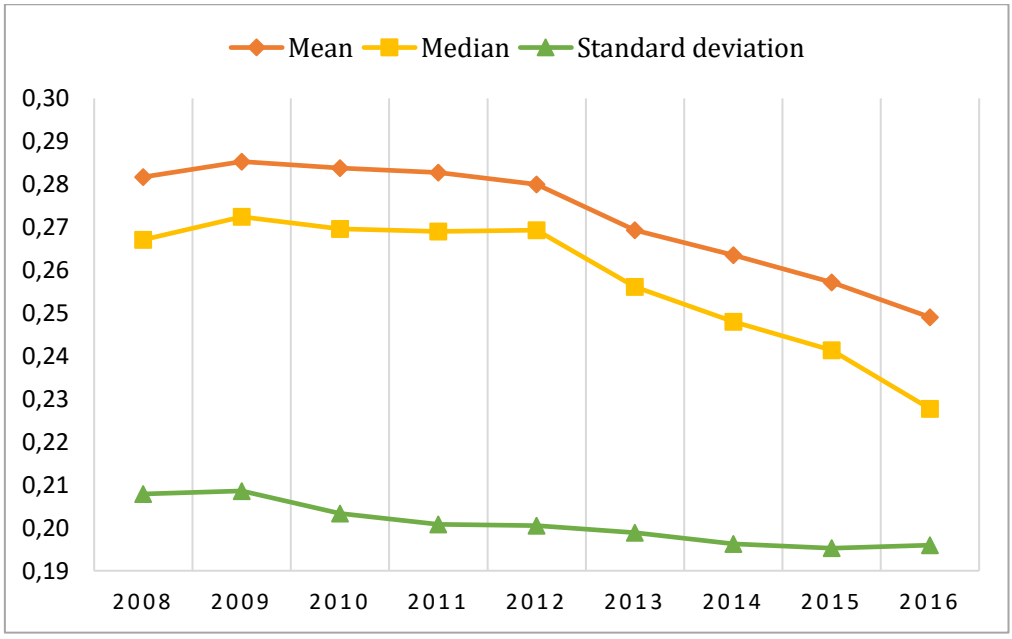


Figure 7 and 8 allow us to understand, on one hand, how the short-term financial debt is divided between the different liabilities from 2008 to 2016 and, on the other hand, the percentage change year over year for each financial debt.

As highlighted by Figure 7, bank loans represent the most important source of short-term financing for firms from 2008 and 2016. After a drop of 11.02% in 2009, bank financing slightly increases between 2010-2013 and then decreases from 2014 to 2016. Other financial loans show a downward trend year over year: their overall weight on short-term financial liabilities decrease from 13.20 % in 2008 to 4.94% in 2016. At the beginning of the economic downturn, short-term shareholder loans display a declining trend but starting from 2013 this source of funding has become more important. Both short-term bonds and convertible bonds show fluctuation from 2009 to 2016, however they have a small impact on all short-term source of funding as highlighted by Figure 7.

Figure 7 – Composition of short-term financial debt from 2008 to 2016

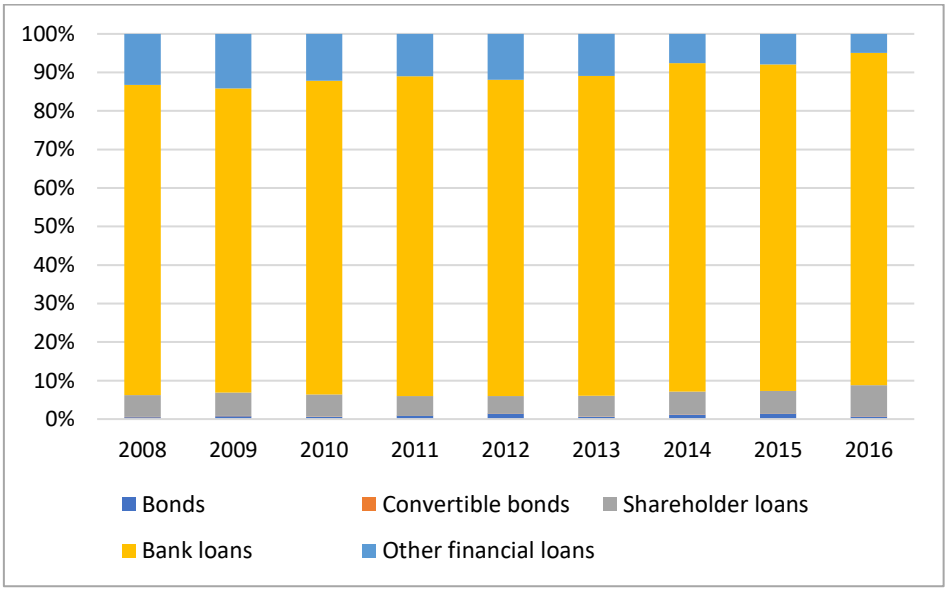
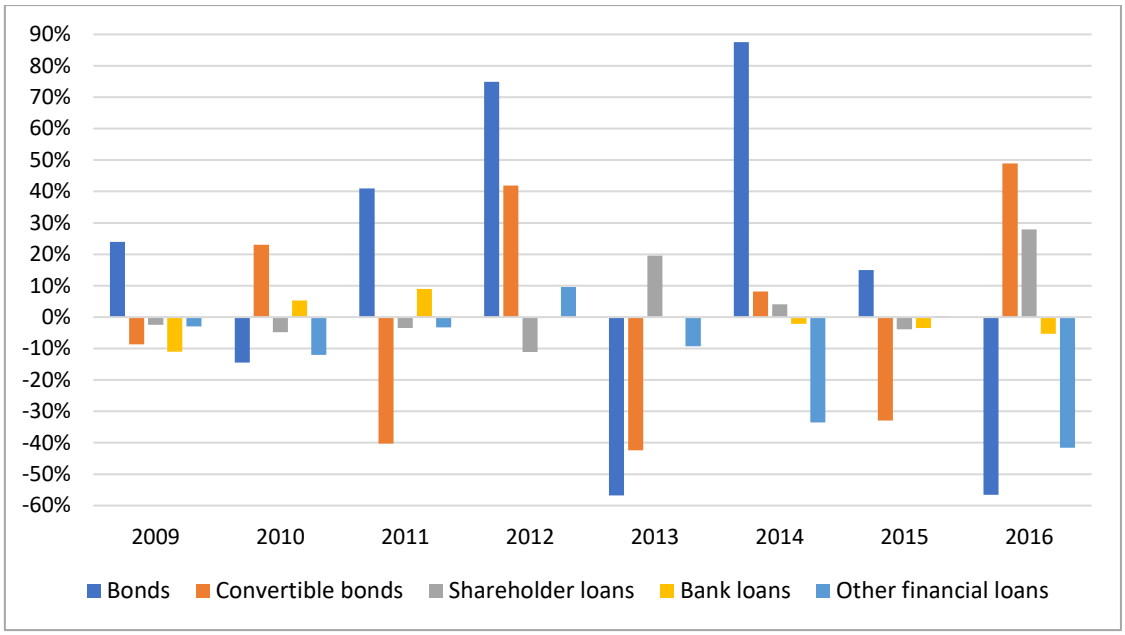


Figure 8 – Percentage change year over year for the different short-term financial liabilities



Now we move our attention on longer maturity to examine how long-term financial debt is composed by the different type of funds (Figure 9) and how each long-term financing changes over time (Figure 10).

As we can see, banks play a crucial role in financing firms both in short-term and long-term funds. This type of financing experiences fluctuations: from 2009 to 2011 it increases, the following two years it experiences a decline and then it growths. Shareholder loans are an important source of funds, accounting from 9% to 12.30% on the total long-term financial debts. This trend is partially confirmed by the annual reports performed by the Bank of Italy. According the different annual surveys, bank loans experienced a slight growth until 2011 then this financial liability decreased from 2012 to 2014 and it stabilized between 2015-2016.

During the financial crisis, firms seek new type of funds as witnessed by bonds' growth year over year: their percentage weight on long-term financing increases from 5.76% in 2008 to 10.48% in 2016. The continuous bonds' growth has been encouraged by the so-called mini-bonds law. The Law 134/2010 has granted unlisted firms, with the exclusion of micro-companies, to issue mini-bonds. This type of bond must be subscribed by professional investors. Firms, by issuing mini-bonds, can benefit from the fiscal deductibility of both interest expenses and the

issuance costs. The aim of this regulation is to create new sources of financing for the Italian firms. Moreover, the law aims to reduce the firms' dependence from banks financing. This bond's growth is confirmed by the 2013, 2014 and 2015 annual reports realized by the Bank of Italy.

Other financial loans show a lot of fluctuation between 2009 to 2016, they represent on average 10.80% of long-term financial debts. Finally, convertible bonds show great fluctuations, however they account the smallest part on long-term financing.

Figure 9 – Composition of long-term financial debt from 2008 to 2016

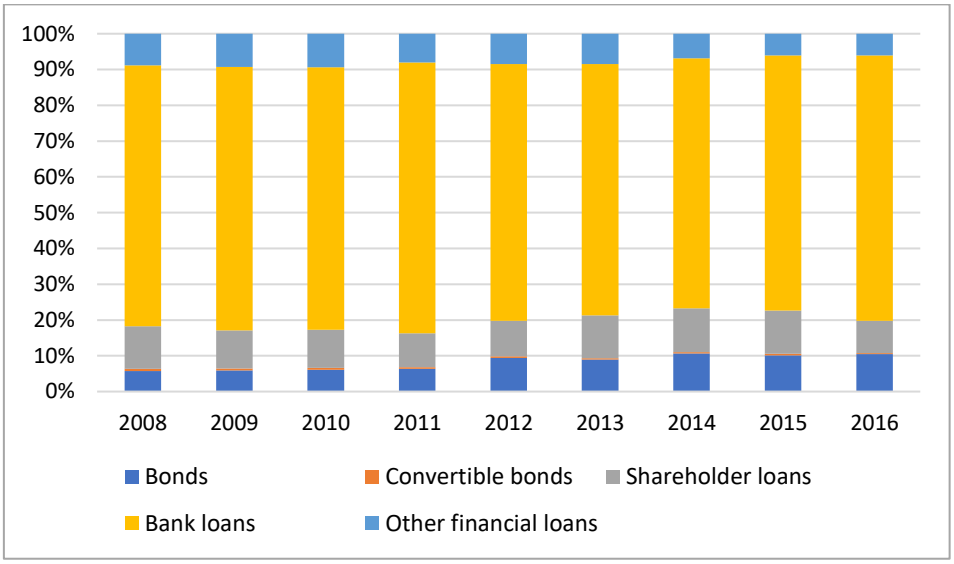
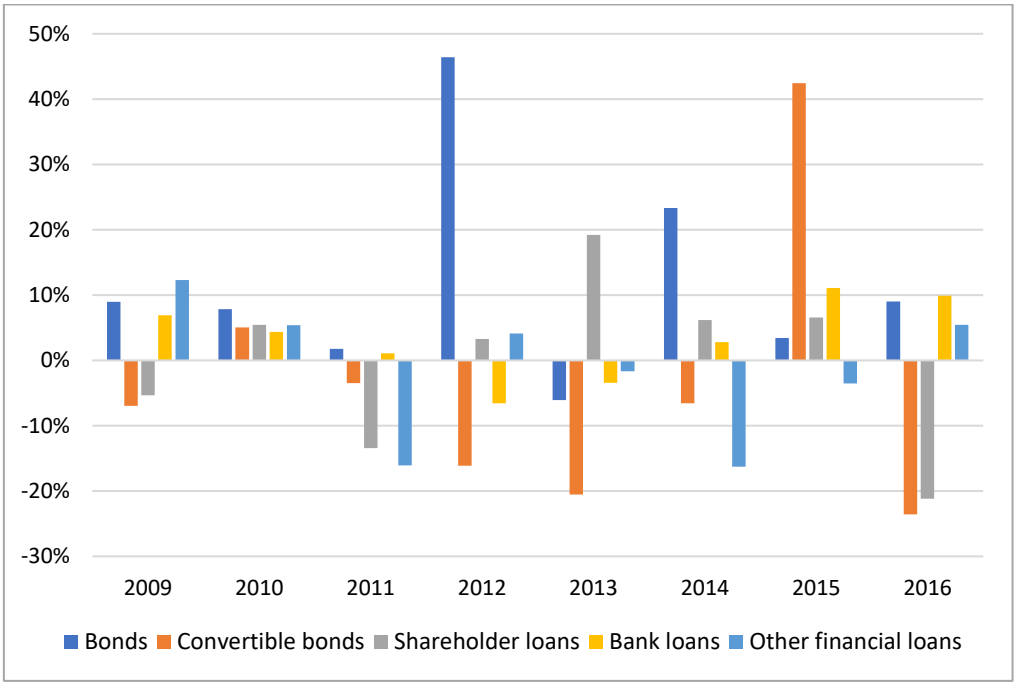


Figure 10 – Percentage change year over year for the long-term financial liabilities



3.3.2 Size

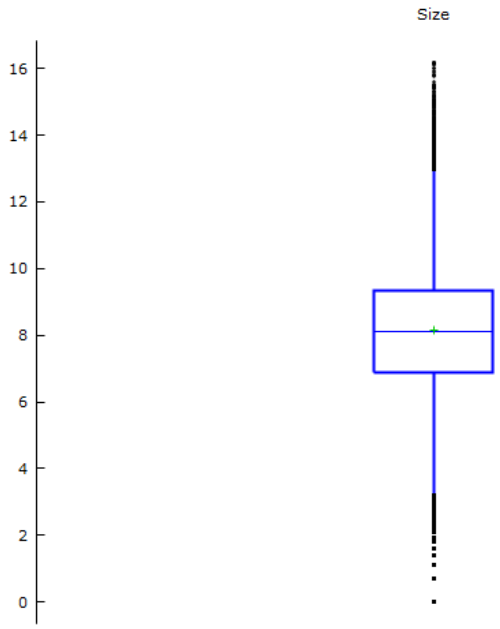
This variable is defined as the natural logarithm of sales (Rajan and Zingales, 1995; Leary and Roberts, 2014).

As we can infer from Table 3 and Figure 11, the middle 50% of size distribution is comprised between 6.8946 and 9.3292 (i.e. sales range between 986 and 11,260 thousand euros), thus the interquartile range (IQR) is 2.4346. Moreover, the box plot shows that 25% of firms' size is below 6.8946 (i.e. sales are below 986 thousand euros) while 25% of observations display a size value higher than 9.3292 (i.e. sales exceed 11,260 thousand euros). Finally, the distribution is skewed to the right because mean is greater than median.

Table 3 – Size: summary descriptive statistics

Variable	Min	Q_1	Mean	Median	Q_3	Max.	C.V.	Std. Dev.
Size	0	6.8946	8.1402	8.1125	9.3292	16.1838	0.2116	1.7230
Sales [17]	1	987	3,429	3,335	11,262	10,681,245	0.0311	110,063

Figure 11 – Box-plot of size



[17] In thousands of euros

Figure 12 – Frequency distribution of size

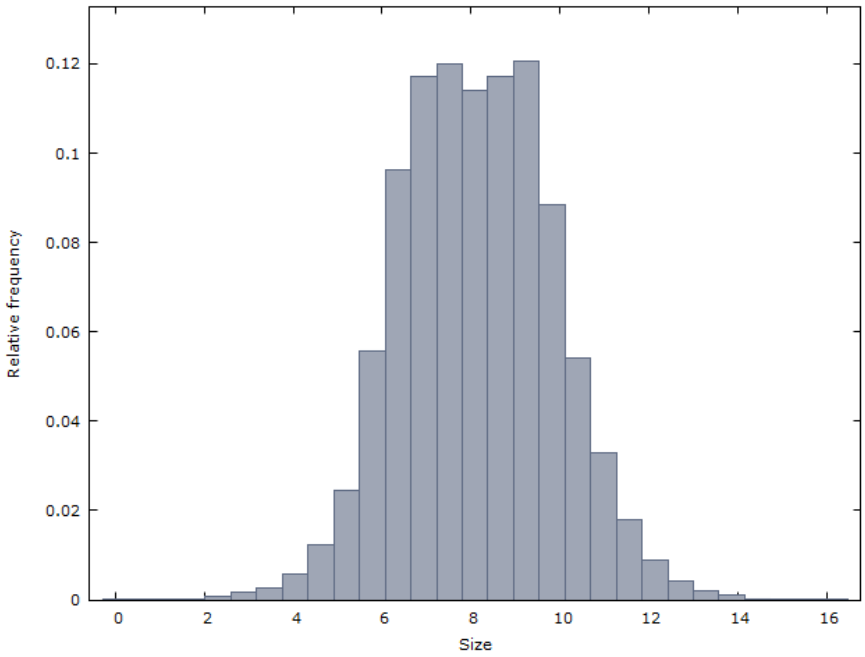
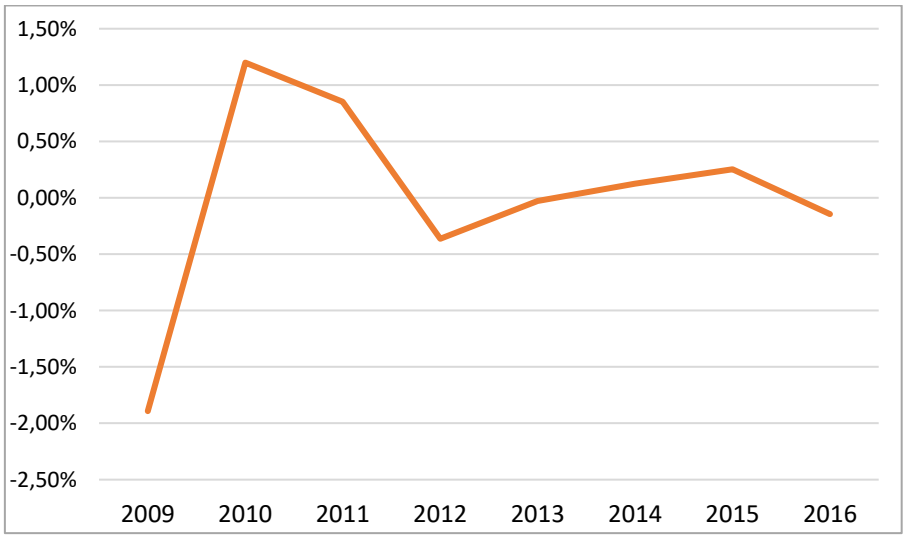


Figure 13 shows the percentage change in size year over year, thus it allows us to understand the impact of financial crisis on turnover. As we can see, firms' sales experience on average a decrease of 1.90% in 2009. The following two years sales rebound from their lowest value, but in 2012 they decline by 0.36%. Starting from 2013 sales stabilize and in 2016 they slightly decline by 0.15%. Overall, the figure represents a typical economic shock. Firms faced the economic crisis in 2008, consequently their overall turnover plunged. Over time sales' growth fluctuated and then it levels off.

Figure 13 – Size percentage change year over year



3.3.3. Profitability

Profitability is defined as the ratio between EBITDA and total assets. Thus, this measure gives us an indication of the amount of EBITDA produced by total assets. Since EBITDA measures the amount of profit without taking into account interests, taxes, depreciations and amortization, it allows us to compare companies with different capital structures.

Since the distribution is highly leptokurtic and it presents many outliers, a normal boxplot realized starting from all observations does not display values clearly and it is not explicative. Thus, we performed a box-plot only with observations between 1 and -1 (Figure 14) [18]. The middle 50% of profitability distribution is comprised between 0.0392 and 0.1176. As we can infer from the frequency distribution graph, the variable profitability is characterized by many outliers: 6,652 observations range from -0.0786 to -4.0775 while 12,357 observations vary between 0.2351 and 2.9103. Overall, 23,539 firms- year observations present a negative profitability ratio; they correspond to 10,226 firms with a negative EBITDA for one or more years from 2008 to 2016.

Table 4 – Profitability: summary descriptive statistics

Variable	Min	Q_1	Mean	Median	Q_3	Max.	C.V.	Std. Dev.
Profitability	-4.0775	0.0392	0.0813	0.0719	0.1176	2.9103	1.1786	0.0959

[18] This elimination has removed from the sample only 77 firm-year observations.

Figure 14 – Box-plot of profitability

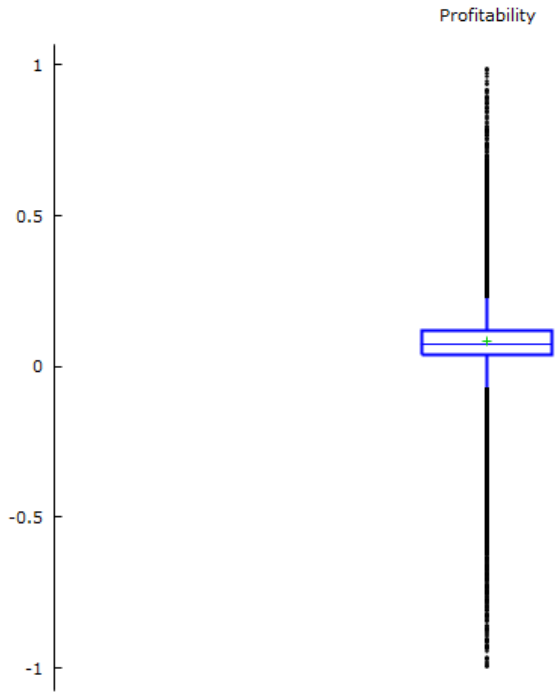
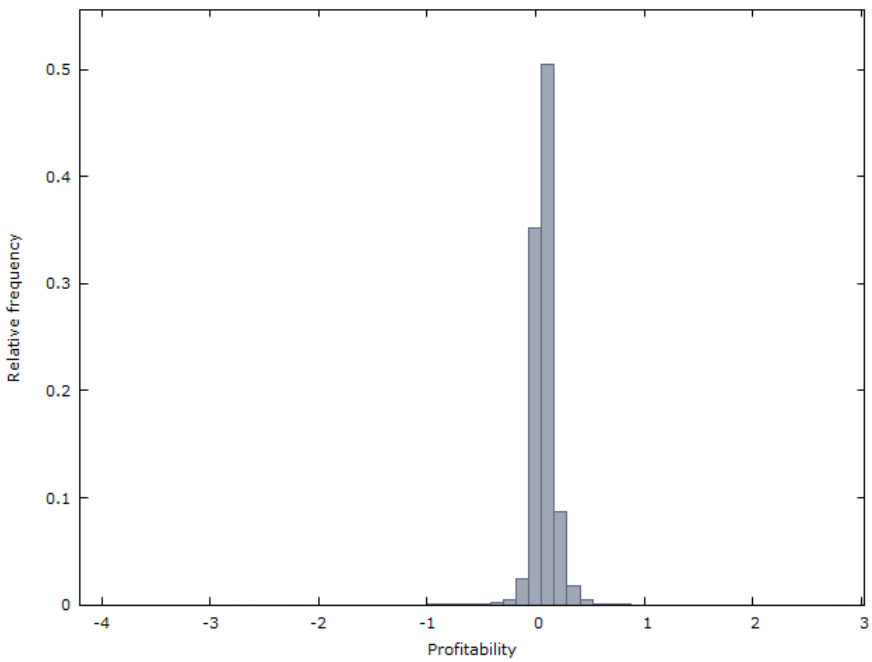


Figure 15 – Frequency distribution of profitability



3.3.4 Tangibility

We define tangibility as the ratio between Property, Plant and Equipment (PPE) and total assets.

As we can see, within our sample there is a lot of variation as the minimum value is near 0 while the maximum figure is 0.999. Since median is lower than mean, the distribution is not symmetric: both Table 5, Figure 16 and 17 evidence a positive skew and a leptokurtic distribution. From the box plot, we can infer that: the first 25% of observations are below 0.0835, the middle 50% of firm-year observations have a tangibility value between 0.0835 and 0.4142 and the remaining 25% of observations range between 0.4142 and 0.999.

Overall, 45,916 observations present a tangibility ratio greater than or equal to 0.50, while the other 215,687 firm-year observations display a tangibility ratio lower than 0.50. Within the first group, PPE represent the 95% of total assets for 2,668 observations (corresponding to 615 firms) while PPE constitute only 5% of total assets for 43,023 firm-year observations (i.e. 8,147 companies).

Table 5 – Tangibility: summary descriptive statistics

Variable	Min	Q_1	Mean	Median	Q_3	Max.	C.V.	Std. Dev.
Tangibility	1.36e-05	0.0835	0.2785	0.2181	0.4142	0.999	0.8497	0.2367

Figure 16 – Box-plot of tangibility

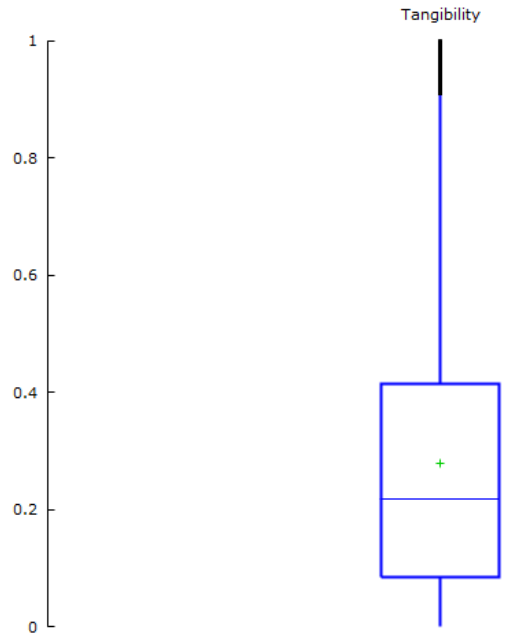
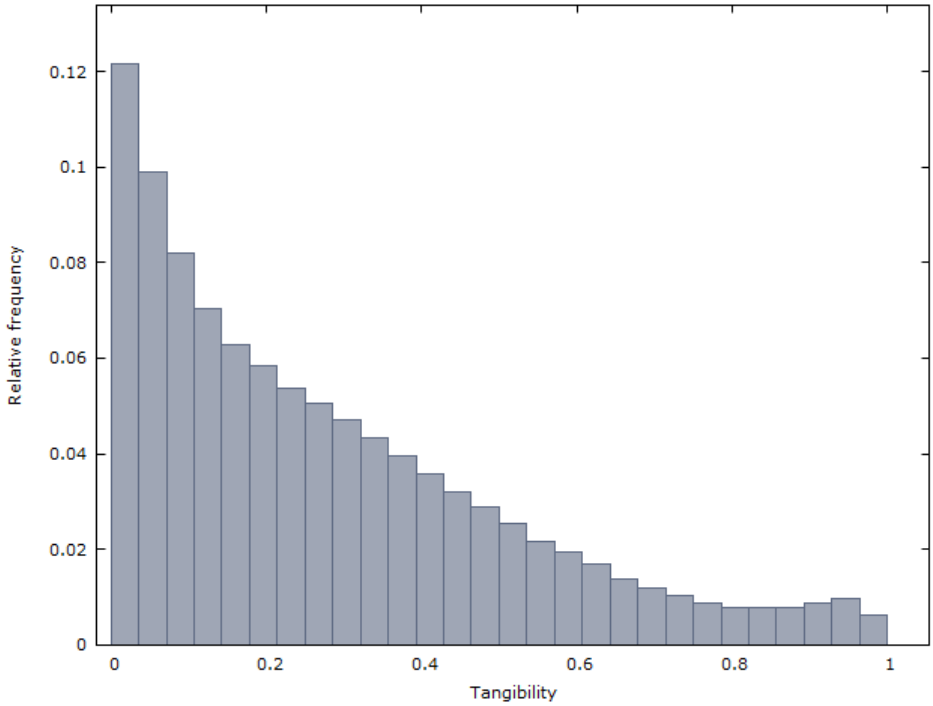


Figure 17 – Frequency distribution of tangibility



3.3.5 Growth Opportunities

We proxy for growth opportunities by using the change in logarithm of total assets (Frank and Goyal, 2009). Table 6 highlights great dispersion in growth opportunities: the minimum value is -9.80, the maximum is 9.70 and the coefficient of variation is 7.3337. As the distribution is highly leptokurtic and we observe many outliers, a normal boxplot realized starting from all firm-year observations does not provide a clear representation. Therefore, we performed a box-plot only with observations between +3 and -3 (Figure 18) [19].

From the descriptive statistics we can conclude that: 25% of observation are below -0.0573, the middle 50% of distribution is comprised between -0.0573 and 0.1043 and 25% of firm-year observations are higher than 0.1047. Moreover, mean is greater than median thus distribution is skewed to the right. The frequency distribution graph highlights that 96% of observations cluster between -0.2935 and 0.6813.

Overall, firms experience, on average, a slight growth in their total asset year over year as witnessed by the mean growth opportunities. The 45% (55%) of all

[19] This cut has removed only 145 firm-year observations.

observations show a negative (positive) value of growth opportunities, thus 45% (55%) of firm-year observations experience a decline (growth) in their total assets compared to the previous years.

Table 6 – Growth Opportunities: summary descriptive statistics

Variable	Min	Q_1	Mean	Median	Q_3	Max.	C.V.	Std. Dev.
Growth op.	-9.80	-0.0573	0.0335	0.0134	0.1047	9.70	7.3337	0.2463

Figure 18 – Box-plot of growth opportunities

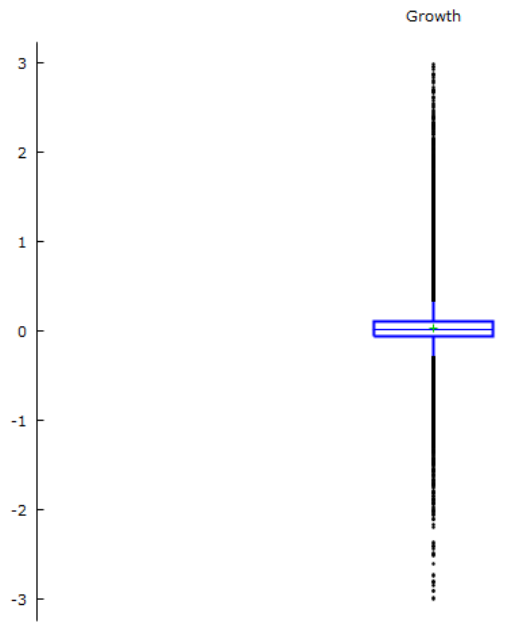
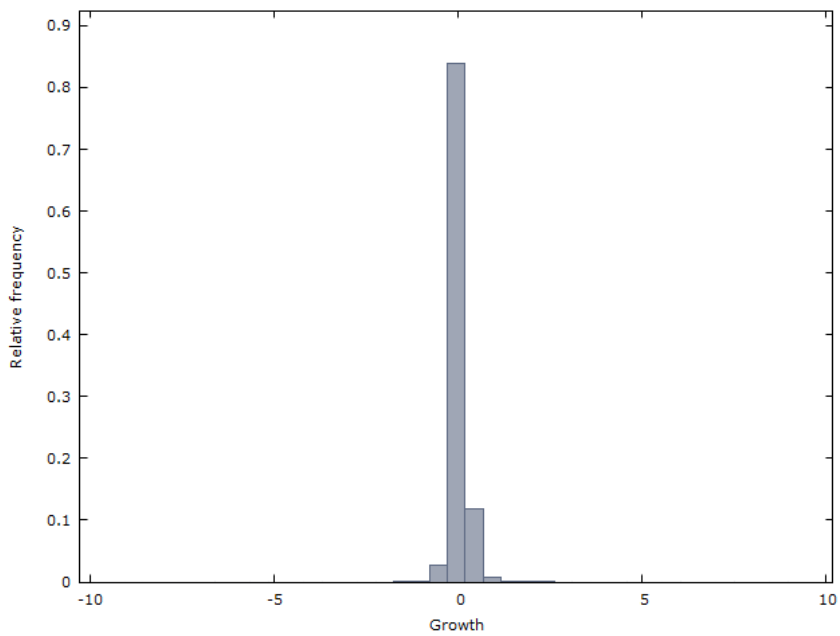


Figure 19 – Frequency distribution of growth opportunities



3.3.6 Bivariate analysis

In this section, we analyze how firm characteristics differ conditional on the level of leverage ratio. Then, we report the top ten industries with the highest and lower leverage and industry characteristics values to understand the interaction between industries features and gearing levels.

We divide our sample into quartiles based on leverage, then for each quartile we compute the mean of both leverage and firm features (i.e. size, profitability, tangibility and growth opportunities). Moreover, we report the correlation matrix between gearing ratio and firm characteristics. Overall, firms in our sample differ significantly in their use of debt: average leverage varies from 0.0321 in the first quartile to 0.5440 in the last quartile.

Average size declines from the lowest leverage quartile to the highest leverage quartile, the negative relationship is confirmed also by the correlation matrix, size discloses a negative and significant relation with firm's leverage: the correlation coefficient is equal to -0.1979. This result supports the pecking order theory: large firms have lower information asymmetries because there are well-known among investors and they are followed by many investor relations, thus they prefer internal funds to external source of financing.

Table 7 shows that firms with low leverage ratio have, on average, high level of profitability. The result is confirmed by the correlation matrix, profitability and leverage presents a negative and significant relationship. This outcome is in line with the pecking order theory: profitable firms finance their business via internal funds and, then external funds.

Firm with low and high level of gearing differ also in their tangibility level: average tangibility value increases from the lowest to the highest leverage quartile. In other word, firms with high level of tangibility disclose a high weight of debt financing on total assets. Table 8 shows a positive and significant correlation coefficient between these two variables equal to 0.2509. Our results confirm the argument of the trade-off theory: firms use tangible assets as collateral to reduce the risk premium demanded by lenders and financial distress cost, thus companies with high degree of tangibility disclose high gearing ratio.

Finally, average firm's growth opportunities decline slightly with the increase usage of leverage. Table 8 confirms the negative but weak relationship between growth opportunities and leverage: the correlation coefficient is equal to -0.0120. Our finding supports the trade-off theory: firms with high growth opportunities present low level of leverage to reduce asset substitution and underinvestment problem.

Table 7 – Leverage and firms features: we divide our sample into quartiles based on leverage, then for each quartile we compute the mean of both leverage and firm characteristics.

	Q_1	Q_2	Q_3	Q_4
Leverage	0.0321	0.1808	0.3329	0.5440
Size	8.5221	8.1395	8.1720	7.7293
Profitability	0.1067	0.0849	0.0724	0.0613
Tangibility	0.2108	0.2667	0.2860	0.3506
Growth opportunities	0.0340	0.0362	0.0356	0.0283

Table 8 – Correlation matrix between leverage and firm features

Leverage	Size	Profitability	Tangibility	Growth	
1.000	-0.1979***	-0.1809***	0.2509***	-0.0120***	Leverage
	1.000	0.0889***	-0.1986***	0.0280***	Size
		1.000	-0.0623***	0.1167***	Profitability
			1.000	-0.0214***	Tangibility
				1.000	Growth

Now, we turn the attention on the interaction between leverage and industries characteristics. For each industry we compute the average of both leverage and firms features from 2008 to 2016. From Table 9 to Table 18 we report the top ten industries with the highest and lowest average values for the following variables: leverage, size, profitability, tangibility and growth opportunities.

As we can see, six out of ten industries with the highest leverage values are among the top ten industries with the highest tangibility ratios. Thus, this industry analysis confirms the strong link between leverage and tangibility. In particular the accommodation industry (code 552, 551 and 561), the manufacture of vegetable and animal oils (code 104), renting and leasing of motor vehicles (code 771) and restaurants industries are the sectors (code 561) that rank among the top ten with

respect to both leverage and tangibility value. Moreover, six out of ten industries with the highest gearing ratios (code 551, 552, 553, 561, 563 and 771) are among the top ten industries with the lowest size values. This outcome respects the previous finding at firm's level: a high level of leverage is associated with a low level of firm's size. From this industry analysis, we find slight evidence for inverse relationship between profitability and leverage since only one industry (code 161) belong to both top ten lists. Then, none industries classify, at the same time, within the top ten industries with the highest leverage ratios and the lowest growth opportunities values.

We now focus our attention on Table 14 to detect pattern between the top ten industries with the lowest leverage values and their main characteristics. The analysis confirms the positive relationship between leverage and tangibility values: five out of ten industries with the lowest leverage values (code 581, 289, 266 and 279) rank among the top ten industries with the lowest tangibility values. This industry study finds that three out of ten industries with the lowest leverage values classify in the top ten industries' list with the highest profitability ratio (code 211, 212 and 266) and with the highest growth opportunities values (code 211, 212, 581). Finally, the analysis reveals that only two industries rank among the top ten industries with the lowest leverage ratios and the highest size values.

To conclude, we compare the top ten industries with the highest (lowest) leverage ratios with top ten industries with the highest (lowest) average size, profitability, tangibility and growth opportunities values. Our analysis confirms the positive relationship found in Table 8 between leverage and tangibility and the negative relation between leverage and size. This industry analysis finds only slight evidence for the inverse relationship between leverage and profitability and between leverage and growth opportunities.

Table 9 – Top ten industries with the highest average leverage values

Three-digit ATECO 2007 code	Average Leverage
552 Holiday and other short-stay accommodation	0.4576
551 Hotels	0.4147
104 Manufacture of vegetable and animal oils and fats	0.3799
553 Camping grounds, recreational vehicle parks and trailer parks	0.3723

771 Renting and leasing of motor vehicles	0.3623
161 Sawmilling and planing of wood	0.3539
561 Restaurants and mobile food service activities	0.3504
102 Processing and preserving of fish, crustaceans and molluscs	0.3463
563 Coffee bar and other similar activities without kitchen	0.3454
109 Manufacture of prepared animal feeds	0.3377

Table 10 – Top ten industries with the highest average size values

Three-digit ATECO 2007 code	Average Size
211 Manufacture of basic pharmaceutical products	10.5279
241 Manufacture of basic iron and steel and of ferro-alloys	10.1522
212 Manufacture of pharmaceutical preparations	10.1212
192 Manufacture of refined petroleum products	9.8606
171 Manufacture of pulp, paper and paperboard	9.7063
242 Manufacture of tubes, pipes and hollow profiles of steel	9.5711
244 Manufacture of basic precious and other non-ferrous metals	9.5380
201 Manufacture of basic chemicals, fertilisers and plastics and synthetic rubber in primary forms	9.2725
109 Manufacture of prepared animal feeds	9.2616
293 Manufacture of parts and accessories for motor vehicles	9.2369

Table 11 – Top ten industries with the highest average profitability values

Three-digit ATECO 2007 code	Average Profitability
211 Manufacture of basic pharmaceutical products	0.1387
771 Renting and leasing of motor vehicles	0.1382
553 Camping grounds, recreational vehicle parks and trailer parks	0.1339
212 Manufacture of pharmaceutical preparations	0.1174
773 Renting and leasing of other machinery, equipment and tangible goods	0.1166
591 Motion picture, video and television programme activities	0.1116
204 Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	0.1101
562 Event catering and other food service activities	0.1069
266 Manufacture of irradiation, electromedical and electrotherapeutic equipment	0.1051
108 Manufacture of other food products	0.1047

Table 12 – Top ten industries with the highest average tangibility values

Three-digit ATECO 2007 code	Average Tangibility
551 Hotels	0.6624
553 Camping grounds, recreational vehicle parks and trailer parks	0.6491
552 Holiday and other short-stay accommodation	0.6235
771 Renting and leasing of motor vehicles	0.4209
104 Manufacture of vegetable and animal oils and fats	0.4124

561 Restaurants and mobile food service activities	0.3918
773 Renting and leasing of other machinery, equipment and tangible goods	0.3781
233 Manufacture of clay building materials	0.3668
107 Manufacture of bakery and farinaceous products	0.3547
133 Finishing of textiles	0.3511

Table 13 – Top ten industries with the highest average growth opportunities values

Three-digit ATECO 2007 code	Average Growth
562 Event catering and other food service activities	0.0806
212 Manufacture of pharmaceutical preparations	0.0601
204 Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	0.0598
108 Manufacture of other food products	0.0581
103 Processing and preserving of fruit and vegetables	0.0554
331 Repair of fabricated metal products, machinery and equipment	0.0553
332 Installation of industrial machinery and equipment	0.0551
773 Renting and leasing of other machinery, equipment and tangible goods	0.0543
211 Manufacture of basic pharmaceutical products	0.0526
771 Renting and leasing of motor vehicles	0.0521

Table 14 – Top ten industries with the lowest average leverage values

Three-digit ATECO 2007 code	Average Leverage
212 Manufacture of pharmaceutical preparations	0.1717
211 Manufacture of basic pharmaceutical products	0.1975
581 Publishing of books, periodicals and other publishing activities	0.2032
281 Manufacture of general — purpose machinery	0.2042
289 Manufacture of other special-purpose machinery	0.2054
282 Manufacture of other general-purpose machinery	0.2080
266 Manufacture of irradiation, electromedical and electrotherapeutic equipment	0.2118
284 Manufacture of metal forming machinery and machine tools	0.2145
279 Manufacture of other electrical equipment	0.2193

Table 15 – Top ten industries with the lowest average size values

Three-digit ATECO 2007 code	Average Size
552 Holiday and other short-stay accommodation	5.9838
563 Coffee bar and other similar activities without kitchen	6.2405
561 Restaurants and mobile food service activities	6.4361
553 Camping grounds, recreational vehicle parks and trailer parks	6.8040
773 Renting and leasing of other machinery, equipment and tangible goods	6.9958
551 Hotels	7.0840
591 Motion picture, video and television programme activities	7.1249
237 Cutting, shaping and finishing of stone	7.3654

331 Repair of fabricated metal products, machinery and equipment	7.3822
771 Renting and leasing of motor vehicles	7.4651

Table 16 – Top ten industries with the lowest average profitability values

Three-digit ATECO 2007 code	Average Profitability
236 Manufacture of articles of concrete, cement and plaster	0.0433
233 Manufacture of clay building materials	0.0438
241 Manufacture of basic iron and steel and of ferro-alloys	0.0483
581 Publishing of books, periodicals and other publishing activities	0.0500
301 Building of ships and boats	0.0503
292 Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	0.0504
161 Sawmilling and planing of wood	0.0545
310 Manufacture of furniture	0.0603
131 Preparation and spinning of textile fibres	0.0610
162 Manufacture of products of wood, cork, straw and plaiting materials	0.0615

Table 17 – Top ten industries with the lowest average tangibility values

Three-digit ATECO 2007 code	Average Tangibility
581 Publishing of books, periodicals and other publishing activities	0.1423
266 Manufacture of irradiation, electromedical and electrotherapeutic equipment	0.1516
332 Installation of industrial machineryand equipment	0.1531
262 Manufacture of computers and peripheral equipment	0.1560
263 Manufacture of communication equipment	0.1678
141 Manufacture of wearing apparel	0.1678
279 Manufacture of other electrical equipment	0.1747
152 Manufacture of footwear	0.1777
289 Manufacture of other special-purpose machinery	0.1780
282 Manufacture of other general-purpose machinery	0.1794

Table 18 – Top ten industries with the lowest average growth opportunities values

Three-digit ATECO 2007 code	Average Growth
275 Manufacture of domestic appliances	-0.0005
581 Publishing of books, periodicals and other publishing activities	0.0035
236 Manufacture of articles of concrete, cement and plaster	0.0065
244 Manufacture of basic precious and other non-ferrous metals	0.0082
241 Manufacture of basic iron and steel and of ferro-alloys	0.0112
274 Manufacture of electric lighting equipment	0.0164
233 Manufacture of clay building materials	0.0173
181 Printing and service activities related to printing	0.0174
132 Weaving of textiles	0.0174
192 Manufacture of refined petroleum products	0.0175

4. Research results

This chapter presents the empirical results of this research. Before to apply the empirical model, we decompose leverage variation (section 1) and examine level and variability of within industry leverage dispersion (section 2). Then, the analysis focuses on the industries with the lower and higher capital structure dispersion values to investigate the main difference between the two groups (section 3) and, finally, the study presents the regression results (section 4).

4.1 Breakdown of leverage variation

As highlighted by the descriptive statistics, leverage ratio shows great dispersion. The purpose of this sections is to understand whether leverage varies more between industry, within-industry or within-firms (across time). We are interested to study the sources of leverage variation because, through this analysis, we can understand whether industry communalities matter in how firms finance their business. Thus, the analysis provides us a first sign of the importance of industry peers.

To study leverage variation, we follow the methodology proposed by Graham and Leary (2011).

Overall, we can split the total leverage variation into three components:

1) Within-firm variation measures the variability in firm's leverage ratio over time. For example, a high level of within-firm variation signifies that firm modifies a lot its gearing level across time.

2) Within-industry variation provides us an indication of the leverage's dispersion inside each sector. We can infer that, within an industry, capital structures vary a lot in presence of a high within-industry variation.

3) Between industry variation describes how much capital structure differ across diverse industries. For instance, a high level of between industry variation shows that leverage ratio varies significantly from one industry to another one, thus industry features impact on how companies finance their business.

We can measure the different sources of leverage variation through the following formula:

$$\sum_i \sum_j \sum_t \left(L_{ijt} - \bar{\bar{\bar{L}}}\right)^2 = \sum_i \sum_j \sum_t \left[\left(L_{ijt} - \bar{L}_{ij.}\right) + \left(\bar{L}_{ij.} - \bar{\bar{L}}_{.j.}\right) + \left(\bar{\bar{L}}_{.j.} - \bar{\bar{\bar{L}}}\right)\right]^2 \qquad (2)$$

$$= \sum_i \sum_j \sum_t \left(L_{ijt} - \bar{L}_{ij.}\right)^2 \quad \text{within-firm}$$

$$+ \sum_i \sum_j \sum_t \left(\bar{L}_{ij.} - \bar{\bar{L}}_{.j.}\right)^2 \quad \text{within-industry}$$

$$+ \sum_i \sum_j \sum_t \left(\bar{\bar{L}}_{.j.} - \bar{\bar{\bar{L}}}\right)^2 \quad \text{between industries}$$

Where:

- L_{ijt} is the leverage ratio for firm *i* belonging to the industry *j* in period *t,*
- $\bar{L}_{ij.}$ is the within-firm mean for firm *i* belonging to the industry *j,*
- $\bar{\bar{L}}_{.j.}$ is the industry mean for industry *j*
- $\bar{\bar{\bar{L}}}$ is the grand mean

Table 19 presents the breakdown of total leverage variation. First, we observe that within industry is the major source of variation. Thus, within a certain business sector, firms show very different capital structure from each other. Moreover, consistent with the finding of Graham and Leary (2011), gearing ratio varies more cross-sectionally than within firms: 80% of leverage variation is cross-sectional while only 20% depend on within firms changes. Most part of the cross-sectional variation derives from within industry (74%) rather than between industries variation (6%). Therefore, according to this analysis, capital structure shows greater dispersion inside the industry rather than across different industries. Since between industries variation account only for 6% of total variation, industry characteristics do not influence firm's capital structure choices.

Comparing our study to that of Graham and Leary (2011), we note different results. The percentage weight of within industry variation in our sample is twice the outcome of Graham and Leary (2011) while both within firms and between industry variation are half the previous research's results. However, there are significant difference between the two sample. First, we are analysing a shorter period of time, this can justify why we have a small within firm variation respect to Graham and

Leary (2011). Second, our time horizon spans from 2008 to 2016 while sample of Graham and Leary (2011) stop in 2009, thus we are considering the consequences of financial crisis and this can explain the diverse outcomes of the two studies.

Table 19 – Breakdown of total leverage variation

	Absolute variation	% of total variation
Within firm	2,100	20%
Within industry	7,822	74%
Between industries	676	6%
Total variation	10,598	100%

The analysis focuses the attention on how leverage variation changes over time from 2008 to 2016. We apply the methodology employed by Graham and Leary (2011) to study the cross-sectional gearing variation. For each year we compute the within-industry standard deviation and the between-industry standard deviation as follows:

$$within - industry\ standard\ deviation = \sqrt{\frac{\sum_i \sum_j \left(L_{ij} - \bar{L}_{.j}\right)^2}{N-1}} \qquad (3)$$

$$between - industry\ standard\ deviation = \sqrt{\frac{\sum_j \left(\bar{L}_{.j} - \bar{\bar{L}}\right)^2}{J-1}} \qquad (4)$$

Where:

- L_{ij} is the leverage ratio for firm *i* belonging to the industry *j*;
- $\bar{L}_{.j}$ is the industry mean for industry *j*;
- $\bar{\bar{L}}$ is the grand mean.

Figure 20 shows the within-industry, between-industries and total leverage standard deviation over time, while Figure 21 displays the percentage change for each component on previous year. Total standard deviation and within-industry variation experience the same pattern over time: after a first increase in 2009, both variables slightly decline year over year. Total standard deviation declined by 5.72% from 2008 to 2016 reaching 0.195 while within industry variation passed from 0.20 in 2008 to 0.19 in 2016, decreasing by 5.27%. Between industries variation shows

a down trend over time except in 2010 and in 2014 where we record an increase of 6.45% and 1.90%, respectively. Variation between industries declined by 5.84% passing from 0.051 in 2008 to 0.048 in 2016.

Overall, the financial crisis has had no remarkable impact on leverage variation since all three-leverage variations decline lightly over time. We can only remark that within industry variation is always greater than between industries variation, thus we can confirm our previous finding in Table 19.

Figure 20 – Time series trend of leverage standard deviation

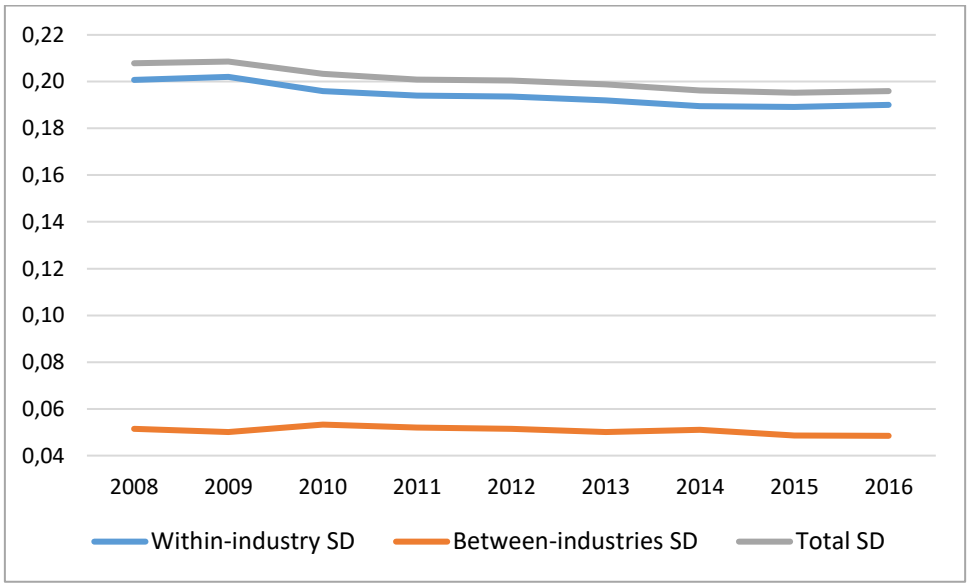
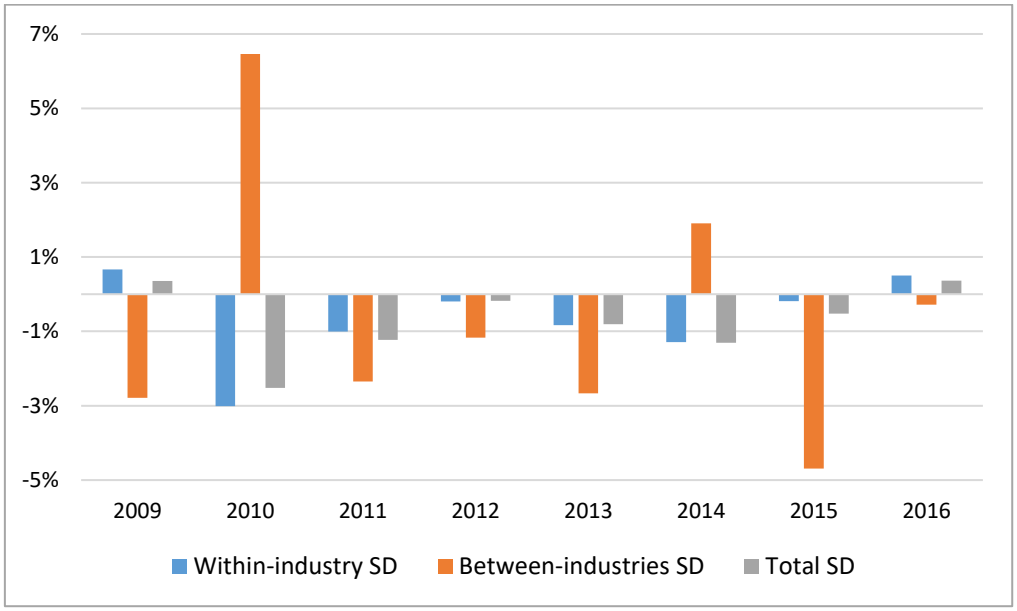


Figure 21 – Percentage change year over year in leverage standard deviation



4.2 Level and variability of within industry leverage dispersion

From the previous paragraph we analyse how leverage ratio varies across different industries, within-industry and within-firm. Overall, the analysis highlights that capital structure varies more within industry than across different industries and this pattern is constant over time. This means that capital structures differ significantly among peer firms within the same industry. However, the previous section does not distinguish whether and how leverage dispersion changes from an industry to another. Therefore, this section provides a deeper analysis on the within industry leverage dispersion to detect patterns in herd behaviour.

Measuring herd behaviour is empirically challenging. Christie and Huang (1995) conduct one of the first research on herd behaviour on the stock market. They measure herding based on the difference between the investors' stock returns and the market return. According to Christie and Huang (1995) herd behaviour on the stock markets can be detected by the cross sectional standard deviation (CSSD). They define CSSD as follows:

$$CSSD_t = \sqrt{\frac{\sum_{i=1}^{N}\left(R_{i,t} - R_{m,t}\right)^2}{N-1}} \qquad (5)$$

Where:

$R_{i,t}$ is the stock return of firm i at time t

$R_{m,t}$ is the cross sectional average return of the N stocks (i.e the market portfolio) at time t

According to Christie and Huang (1995) and Gleason et al. (2004) CSSD can reveal the presence of herd behaviour. The idea is that herding occurs when CSSD is low: investors trust the market portfolio and they tend to follow the mean of the market, thus the consequence of this herd behaviour is that investors' returns cluster near the market return and the CSSD lessens. Christie and Huang (1995) state that investors follow their own beliefs and opinions when markets do not experience great fluctuations while investors follow the herd in times of market stress. They regress CSSD against two dummy variables that refer to favourable and adverse market returns to detect how dispersion in investors' returns changes during

extreme market conditions. Both Christie and Huang (1995) and Gleason et al. (2004) find no evidence of herding: CSSD increases in presence of extreme market movements.

Starting for this measure of herding we investigate the level and variability of within industry leverage dispersion to detect pattern in herd behaviour. With the term "level" we refer to the degree of leverage dispersion within an industry while "variability" concerns the amount of change that this "level" experiences over years. Both level and variability of within industry leverage dispersion allow us to understand whether a low (high) level of capital structure dispersion is associated with a low (high) variability of this "level". In other words, an industry with a low level and variability of leverage dispersion means that firms within the industry show similar leverage ratio and this pattern is constant throughout years.

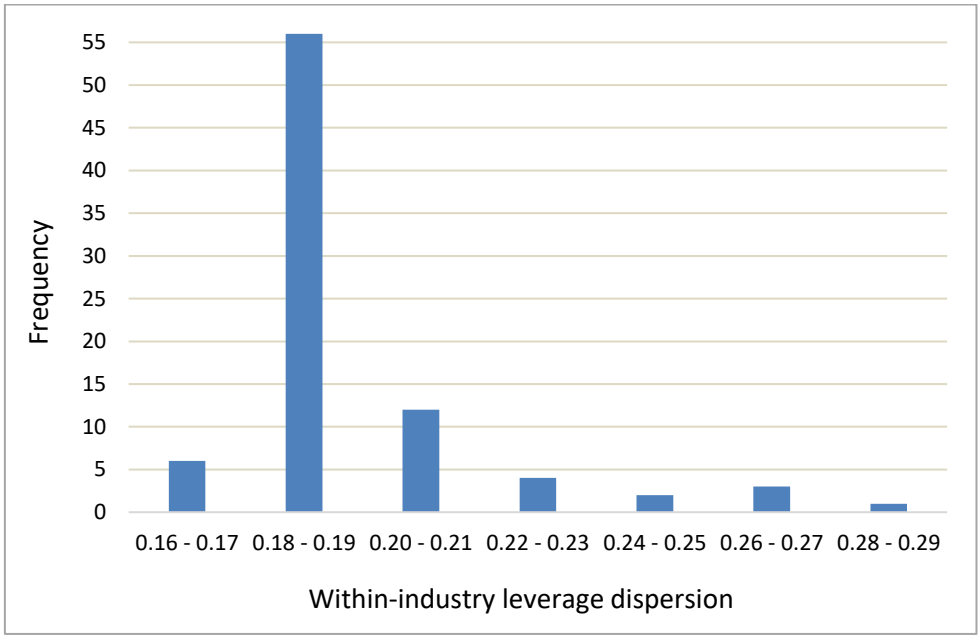
We apply the method of Christie and Huang (1995) to detect herding in financing decision making. First, for each industry-year combination we define within industry leverage dispersion as the standard deviation of leverage ratio. Starting from the cross sectional standard deviation of leverage ratio, for each industry, we define the level of within industry leverage dispersion as the time series mean while variability of within industry leverage dispersion is computed as the standard deviation. Thus, the time series mean measures the level of capital structure dispersion among firms within an industry and the standard deviation provides us an indication of the variability of this dispersion across time.

Both level and variability of within industry dispersion can provide us a signal of herd behaviour. For each industry, the level of leverage dispersion suggests us indication of how firms determine their leverage ratio compared to the industry average. A low level of leverage dispersion is a proxy of herd behaviour because it means that firms define their leverage ratio near those of their peers. The variability of leverage dispersion describes how the level of herd behaviour changes over time. A low amount of variability in leverage dispersion signals that, within an industry, firms do not experience great changes in their leverage ratios, thus the level of herd behaviour is constant over time. In other word, level and variability of within industry leverage dispersion provides us an indication of how firms behave within their industry. If we observe both a low level and variability of leverage dispersion,

we can infer that firms within the industry have similar capital structures among them and this situation does not change over time.

To begin with our analysis, we cluster the industries based on their level of herd behaviour (i.e. the time series mean of the cross-sectional leverage standard deviation). The histogram, represented by Figure 22, shows a right skewed distribution: mean (0.19) is greater than median (0.18). The graph presents in the horizontal axis seven clusters that relate to within industry leverage dispersion while, in the vertical axis, it displays the number of industries for each cluster. As we can see, within-industry leverage dispersion ranges from 0.16 to 0.29. According to the figure, 55 industries have a level of herd behaviour between 0.18 and 0.19 while only 6 industries show a lower level of leverage dispersion, thus a stronger herd behaviour. Overall, 22 industries show a leverage dispersion greater than median, thus within these industries firms have significantly different capital structure from each other. Since the within leverage dispersion is high, we do not expect a strong herd behaviour.

Figure 22 – Distribution of within-industry leverage dispersion: we compute for each industry-year combination the leverage's cross sectional standard deviation (CSSD), the within-industry leverage dispersion is defined as the time series mean of CSSD.

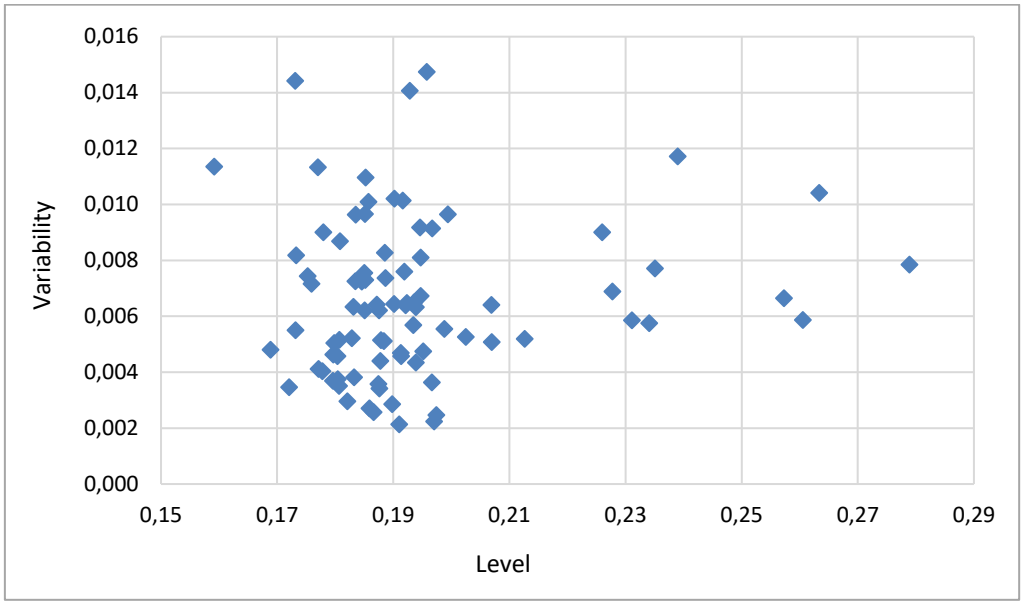


Next, we analysis both level and variability of within-industry leverage dispersion to detect whether a high (low) level of leverage dispersion is associated with a high (low) variability of this level. Figure 23 represents a scatterplot where the dimension "level of leverage dispersion" is is represented in the horizontal axis and "variability of leverage dispersion" is illustrated in the vertical axis. Each point represents an industry, thus the graph represents all 84 industries.

Overall, from 2008 to 2016 the level of within-industry leverage dispersion remains quite stable for all industries, in fact variability range from 0.002 to 0.015. In other words, within each industry the level of herd behavior, measured by the standard deviation of leverage, does not experience great changes over time. Moreover, from the scatterplot, we find no strong relationship between the level and variability of herd behavior. As we can see, variability of within-industry leverage dispersion varies more among industries with a low level of capital structure dispersion than among industries with a high level of gearing dispersion. Figure 23 highlights that industries with a level of leverage dispersion between 0.16 and 0.21 have a variability's range between 0.002 and 0.015 while industries with a level of leverage dispersion between 0.22 and 0.28 have closer variability's level among them (from 0.006 to 0.012).

To conclude, we study level of within industry leverage dispersion and its variability to detect pattern in herd behavior. Overall, Figure 23 do not show any linear or U-shaped relationship between the two variables. From 2008 to 2016 industries do not experience great changes in their level of capital structure dispersion as variability ranges from 0.002 to 0.015. The analysis does not evidence any clear relationship between the level of herd behavior and its pattern over time. Overall, all industries show low variability in their leverage dispersion from 2008 to 2016, thus we can infer that the level of within-industry leverage dispersion (i.e. the time series mean of the leverage's cross sectional standard deviation) is a good proxy of how firms behave within their industry.

Figure 23 – Level and variability of within-industry leverage dispersion: we compute for each industry-year combination the leverage's cross sectional standard deviation (CSSD), the level of within-industry leverage dispersion is defined as the time series while variability is computed as the standard deviation.



Level and variability of within-industry leverage dispersion provide us an indication of how firms set their gearing ratio compared to their peers and whether firms' behaviour vary over time, respectively. Variability suggests that within-industry leverage dispersion changes slightly over years, however we cannot understand the magnitude of this change. Therefore, for each industry, we compute the percentage change of leverage dispersion on previous year and then we compute the time series mean to understand how leverage dispersion changes, on average, year over year. Table 20 shows the average yearly percentage change of within-industry leverage dispersion. As confirmed by Figure 23, leverage dispersion does not show great fluctuations year over year from 2008 to 2016. Most industries show a slight annual decline in their leverage dispersion, as witnessed by both mean and third quartile. This result confirms the downward trend in within-industry leverage dispersion shown by Figure 21. Only twelve industries display, on average, a yearly increase in their within-industry leverage dispersion. However, the magnitude of this increase is tiny: it reaches a maximum of 0.94%.

Table 20 – Descriptive statistics for average yearly percentage change of within-industry leverage dispersion.

Variable	Avg. yearly pct. change of within-industry leverage dispersion
Min.	-2.40%
Q_1	-0.96%
Mean	-0.62%
Median	-0.66%
Q_3	-0.21%
Max.	0.94%
Std. Dev.	0.66%

4.3 Characteristics of industries with high and low herd behaviour

The previous section highlights that industries differ significantly with respect to their average leverage dispersion, but all industries show a small variability in their gearing dispersion over time. Thus, the within-industry average leverage dispersion is representative of how firms choose their level of leverage ratio compared to the industry peers; hence it provides us an indication of how firms behave within their industry and it can be used as proxy of herd behaviour.

Therefore, this section focuses the attention on the top ten industries with the highest and lowest capital structure dispersion values to understand which industry features diverge the most between industries with low and high herd behaviour. First, we report the industries with the highest and lowest leverage dispersion values to compare these two groups with the top ten industries reported from Table 9 to Table 18. Then, we report the descriptive statistics for the industries with the higher and lower leverage dispersion to understand the main difference between the two groups.

Table 21 and Table 22 report the top ten industries with the highest and lower within-industry leverage dispersion values, respectively. As we can see, most of industries with high capital structure dispersion belong to the service industry while industry with low leverage dispersion belong to the manufacturing sector.

Table 21 suggest four relationships between level of within-industry leverage dispersion and industry characteristics.

First, seven out of ten industries with the highest leverage dispersion ratios are also the industries with the highest leverage ratios (see Table 9). In particular, the accommodation industry (sector code 551, 552, 553), food and beverage service activities (sector code 561 and 563) the manufacture of vegetable and animal oils and fats and renting and leasing of motor vehicles classify in the top ten list with respect to both industries with the highest leverage ratio and industries with the highest leverage dispersion. In other word, firms within these industries show, on average, a high weight of financial debt on total assets and, at the same time, they show a low level of herd behaviour since the within-industry leverage dispersion is high.

Second, eight industries among the top ten industries with the highest leverage ratios (sector code 552, 771, 553, 551, 561, 563, 773 and 591) classify within the top ten industries with the lowest size values. Therefore, within these industries, firms show a low level of herd behaviour and a low size values.

Third, six industries reported in Table 21 classify among the top ten industries with the high tangibility values. Hence, firms within these industries present both a low level of herd behaviour and a high weight on PPE on total assets.

Finally, Table 21 suggests also a link between within-industry leverage dispersion and profitability: four out of ten industries reported in Table 21 (sector code 771, 553, 773 and 591) classify in the top ten industries with the highest profitability ratio. Thus, these industries show, on average, a low level of herd behaviour and high profitability ratios.

We now compare the top ten industries with the lowest leverage dispersion values with the descriptive statistics reported from Table 9 to Table 18.

With regard to the inverse link between level of herd behaviour and gearing ratio, we notice that only two out of ten industries with the lowest leverage dispersion (sector code 212 and 289) are among the top ten industries with the lowest leverage ratios. Thus, firms within these industries show a strong herd behaviour and a low leverage ratio.

Concerning the linear relationship between level of herd behaviour and average industry size values, we find that two out of ten industries with the lowest leverage

dispersion (sector code 212 and 171) classify in the top ten industries with the highest size values.

In relation to the inverse link between level of herd behaviour and tangibility values within an industry we find that three industries (sector code: 262, 332 and 289) classify in the top ten industry list with regard to both lowest leverage dispersion values and lowest tangibility values.

Finally, Table 21 confirms the inverse relationship between level herd behaviour and average profitability value between an industry: three industries (code 233, 292, 236) within the top ten sectors with the lowest leverage dispersion values rank among the top ten industries with the lowest profitability ratios.

Table 21 – Top ten industries with the highest within-industry leverage dispersion values

Three-digit ATECO 2007 code	Leverage dispersion
552 Holiday and other short-stay accommodation	0.2789
771 Renting and leasing of motor vehicles	0.2633
553 Camping grounds, recreational vehicle parks and trailer parks	0.2605
551 Hotels	0.2573
561 Restaurants and mobile food service activities	0.2390
563 Coffee bar and other similar activities without kitchen	0.2351
773 Renting and leasing of other machinery, equipment and tangible goods	0.2341
591 Motion picture, video and television programme activities	0.2311
104 Manufacture of vegetable and animal oils and fats	0.2277
301 Building of ships and boats	0.2260

Table 22 – Top ten industries with the lowest within-industry leverage dispersion values

Three-digit ATECO 2007 code	Leverage dispersion
171 Manufacture of pulp, paper and paperboard	0.1592
172 Manufacture of articles of paper and paperboard	0.1689
233 Manufacture of clay building materials	0.1721
133 Finishing of textiles	0.1731
212 Manufacture of pharmaceutical preparations	0.1732
262 Manufacture of computers and peripheral equipment	0.1733

289 Manufacture of other special-purpose machinery	0.1753
292 Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	0.1759
332 Installation of industrial machinery and equipment	0.1771
236 Manufacture of articles of concrete, cement and plaster	0.1771

We now investigate which industry characteristics diverge the most between the top ten industries with the lowest and higher leverage dispersion values.

We find that industries with the highest leverage dispersion shows significantly higher leverage ratios compared to industries with low leverage dispersion. This strong link is confirmed by the correlation matrix (Table 25): leverage ratio and average leverage dispersion show the most significant relationship (0.8471).

Average industry size is higher within the industries with the lowest capital structure dispersion, however size is more dispersed between these industries. From Table 25, we observe a negative and significant correlation (-0.7836) between within-industry gearing dispersion and average size.

As regards profitability, both mean and median among industries with high leverage dispersion exceed by 2% the mean and median of bottom industries. The correlation matrix highlights a positive and significant relationship (0.3892).

In term of tangibility, we observe that industries with greater leverage dispersion show a significantly higher ratio of PPE on total assets compared to industries with low capital structure dispersion. This strong relationship is confirmed by Table 25, the correlation between leverage dispersion and tangibility is significant and equal to 0.7262.

With regard to growth opportunities, the two group of industries do not differ greatly. However, we can remark that industries with high leverage dispersion show, on average, higher growth opportunities. The correlation matrix reports a positive but not significant relationship between within-industry dispersion and growth opportunities (0.1732).

Finally, industries with high leverage dispersion are those with a higher number of firms per industry. As it can be expected, industries with a great number of companies are inclined to show high heterogeneity in how those companies finance their activities. From Table 25, we find evidence of the positive correlation (0.1484), however it is not significant.

Table 23 – Characteristics of the top ten industries with the lowest leverage dispersion

	Mean	Median	Std. Dev.	Min	Max
Leverage dispersion	0.173	0.173	0.005	0.159	0.177
Leverage	0.237	0.242	0.030	0.172	0.273
Size	8.554	8.360	0.840	7.493	10.121
Profitability	0.075	0.079	0.023	0.043	0.117
Tangibility	0.264	0.283	0.086	0.153	0.367
Growth opportunities	0.034	0.030	0.018	0.006	0.060
No. Of firms per industry	287.50	163	243.15	88	840

Table 24 – Characteristics of the top ten industries with the highest leverage dispersion

	Mean	Median	Std. Dev.	Min	Max
Leverage dispersion	0.245	0.237	0.018	0.226	0.279
Leverage	0.347	0.356	0.068	0.238	0.458
Size	6.998	7.040	0.671	5.984	8.189
Profitability	0.096	0.100	0.030	0.050	0.138
Tangibility	0.439	0.402	0.154	0.239	0.662
Growth opportunities	0.038	0.034	0.010	0.025	0.054
No. Of firms per industry	362.30	216.50	381.89	93	1,205

Table 25 – Correlation matrix between within industry leverage dispersion and industry characteristics

	Within industry leverage dispersion
Leverage	0.8471***
Size	-0.7836***
Profitability	0.3892***
Tangibility	0.7262***
Growth opportunities	0.1732
No. of firms per industry	0.1484

4.4 Model estimation

4.4.1 Model selection

Before to apply the empirical model developed by Leary and Roberts (2014), we need to choose the best specification for our regression. The starting point of any analysis with panel data concerns the regression's choice between pool, fixed or

random models. To detect the most adequate model, we carry out the following statistic tests: F-test, Breusch-Pagan test and Hausman test (Table 26).

F-test allows us to select between pool or fixed effect model. As shown below, we reject the null hypothesis that the pooled OLS model is adequate. Then, Breush-Pagan test compares pooled OLS with random effects, the outcome supports random effect model. Finally, we perform Hausman test in order to select between random and fixed effect model. The result rejects random effect, thus, for our regression, we apply a fixed effect model.

Table 26 – Panel diagnostics

Joint significance of differing group means:
F(29066, 203460) = 29.1775 with p-value 0 (A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favor of the fixed effects alternative.)
Breusch-Pagan test statistic:
LM = 486676 with p-value = prob(chi-square(1) > 486676) = 0 (A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favor of the random effects alternative.)
Hausman test statistic:
H = 1049.45 with p-value = prob(chi-square(9) > 1049.45) = 3.73099e-220 (A low p-value counts against the null hypothesis that the random effects model is consistent, in favor of the fixed effects model.)

In fixed effect models, intercept varies for each cross-sectional unit, but it is constant over time. This specific intercept aims to capture all unobservable firm-specific aspects that impact on capital structure and vary from one firm to another. Examples of firm-specific variables are the following: managerial ability, industry-level shocks to demand, local economic environments conditions, relationship and reputation with banks and other financial actors, the cost of capital, the industry that a company operates in (Balgati, 2005; Brooks, 2008). The firm-fixed effect has shown to be an important variable in explaining changes in capital structure, thus models that do not control for firm-specific factors could be mis-specified (Lemmon et at., 2008; Hsiao, 2003).

4.4.2 Regression analysis

We apply the following empirical model developed by Leary and Roberts (2014):

$$\begin{aligned} LEV_{it} = \; & \alpha + \beta_1 SIZE_{it-1} + \beta_2 PROF_{it-1} + \beta_3 TANG_{it-1} + \beta_4 GROWTH_{it-1} \\ & + \beta_5 LEV\_AVG_{-it} + \beta_6 SIZE\_AVG_{-it-1} + \beta_7 PROF\_AVG_{-it-1} \\ & + \beta_8 TANG\_AVG_{-it-1} + \beta_5 GROWTH\_AVG_{-it-1} + \mu_i + v_t + \varepsilon_{it} \end{aligned} \quad (6)$$

Where:

- Size, Profitability, Tangibility and Growth are the firm-specific characteristics presented and discussed in section 3.1. They aim to explain the impact of firm-specific features on leverage ratio;
- Leverage_AVG, Size_AVG, Profitability_AVG, Tangibility_AVG and Growth_AVG are the industry characteristics presented and discussed in section 3.1. They capture the effect of peer companies on firm's financial policies;
- μ_i refers to the firm-fixed effects discussed above;
- v_t represents the year fixed effects. They include all macroeconomic shocks that impact on gearing (for example: interest rate changes), thus they are factors that vary over time, but they are constant across firms.

Table 27 reports the result of the equation (6), to validate the model, we perform the regression with heteroscedasticity and autocorrelation robust standard errors (HAC). We test the validity of peer firm variables: the low p-value (6,11443e-041) rejects the null hypothesis that the estimated coefficients for peer firms action and characteristics are equal to zero. Moreover, we perform the Wald test, the low p-value (4.56946e-009) rejects the null hypothesis of no time effect, thus year fixed effects are significant. Finally, we test the validity of firm fixed effect: the p-values is equal to 0, thus firm fixed effect are statistically significant.

*Table 27 – Regression results: table shows the regression results of equation (6); we report, under the coefficients, t-statistics robust to heteroskedasticity and autocorrelation; ***, ** and * represent 1%, 5% and 10% level of statistical significance, respectively.*

	Leverage
const	0.0047
Firm-Specific Features	
Size	0.0021*
	(1.805)
Profitability	−0.1933***
	(−26.76)
Tangibility	0.1286***
	(22.01)
Growth Opportunities	0.0156***
	(13.77)
Peer Firm Characteristics	
Leverage	0.6105***
	(14.53)
Size	0.0040
	(0.7622)
Profitability	0.0641***
	(5.546)
Tangibility	0.0631
	(0.8998)
Growth Opportunities	−0.0015
	−0.1745
Firm Fixed Effects	Included
Year Fixed Effect	Included
S.E. of regression	0.0878
LSDV R-squared	0.8317
Within R-squared	0.0524
rho	0.4127

From Table 27, we can assess how both firm-specific factors and peers' characteristics impact on firm's leverage.

Focusing on firm-determinants, all variables have a significant impact on leverage ratio. As revealed by the correlation matrix and the descriptive statistics, tangibility displays a positive and significant relationship with leverage. This result is in line with the trade-off theory and with previous empirical studies by Rajan and Zingales (1995), Frank and Goyal (2005), Antoniou et al. (2008) and Fan et al. (2012).

Profitability is negatively linked with leverage: profitable firms finance their business via internal funds and, then external funds, thus they present a low leverage ratio. Our result confirms the pecking order theory and the researches by Rajan and Zingales (1995), Bevan and Danbolt (2002) and Frank and Goyal (2005). Results disclose a positive relationship between growth opportunities and leverage as predicted by the pecking order theory. Firms with high growth opportunities require external sources of funding to finance their investments, thus to avoid conflict between managers and shareholders because of information asymmetries, companies finance their activities first via debt and then via equity as a last resort. Finally, firm's size and leverage are also positively related, but at a 10% statistical significance level. This outcome supports the trade-off theory: large companies are more diversified, have more stable profit and present low probability of bankruptcy, thus they employ a high level of debt. Our results confirmed previous finding by Rajan and Zingales (1995), Frank and Goyal (2005) and Fan et al. (2012).

At peers' level, only two variables are statistically significant. The regression suggests that peer firm actions (i.e. gearing) have a positive and significant impact on firm's leverage, as found by Leary and Roberts (2014). However, the estimated coefficient (0.610) suffers from endogeneity problem, thus it may produce biased result. Within peer firm characteristics, only profitability is statistically significant.

Conclusions and research limits

The purpose of this research was to detect whether Italian firms are influenced by their industry peers in financing decision making. This field of research has started to be investigated recently and current studies show contradictory results.

The first and second chapter present a review of the literature concerning capital structure and peer effects, respectively. We observed that firm's capital structure decisions are linked to firm's size, profitability, tangibility and growth opportunities. However, diverse theories and empirical studies propose contrasting results about the relationship between firm's characteristics and gearing. From the second chapter, we note the presence of different triggering factors behind peer effect; current research on herding behaviour and capital structure has mainly investigated the reputational and learning theory.

As described in chapter three, we encountered several data cleaning and management problems. This research step has significantly reduced the sample size impacting on the reliability of industry peers. We performed univariate and bivariate analysis to understand the main firms' characteristics. Overall, the analysis highlights that firms differ significantly with respect to their leverage ratio and bank financing is the major source of funding. During the financial crisis firms have reduced their financial leverage and they have started to seek new sources of financing, as witnessed by the bonds' growth.

Chapter four presents the empirical results. First, through the breakdown of leverage variation, we understand that leverage varies more within-industry than between diverse industries. Thus, the analysis suggests great dispersion in leverage ratio among industry peers. We further examine this aspect since within-industry leverage dispersion provides us an indication of herd behaviour: a low (high) dispersion means that firms set their leverage ratios near to (away from) those of their industry peers. We find that industries differ significantly with respect to their average leverage dispersion, but all industries show a small variability in their gearing dispersion over time. Thus, we focus on the top ten industries with the lowest and highest capital structure dispersion values to investigate the main differences between the two groups. We find that sectors with the highest leverage

dispersion values belong to the service industry while the manufacturing industry have lower gearing dispersion values. Moreover, the analysis highlights that industries with low leverage dispersion (i.e. strong herd behavior) show, on average, higher size level but lower leverage, profitability and tangibility values compared to industries with greater capital structure dispersion (i.e. low herd behavior). To conclude, we apply the empirical model developed by Leary and Roberts (2014). The results confirm that all firm's characteristics discussed in the literature are statistically significant. At peer's level, both leverage and profitability seem to have a positive relation with firm's gearing.

To sum up, we proxy for herd behaviour by using the within-industry leverage dispersion and we find that peer effect is stronger between industries with high size values and low leverage, profitability and tangibility ratios. The empirical model provides evidence of peer effect.

However, we need to recognize that our research presents some limitations. First, the data cleaning process was necessary to obtain consistent and unbiased accounting data, but it has reduced both the number of firms and industries within our sample. Second, one of the most important issue in a research that tries to study how industry peers affect firm's financial policies is to identify the correct criteria to select the right peers. We adopt the industry classification based on three-digit ATECO 2007 code, however we should first discuss and find the most suitable way to define industry peers. For example, how can we classify multi-industry companies? Third, our results could be biased since our data refer only to a short period of time characterised by the financial crisis.

Future researches could follow several directions. First, they could investigate whether exist a most appropriate criterion to define industry peers. Then, future studies could include a larger time horizon to understand the impact of financial crisis on herd behaviour. Finally, future researches could study the impact of new IFRS 16 on both firm's capital structure and different types of leverage variation. The new standard will come into force starting from January 2019 and it provides a unique lessee accounting treatment, thus we expect to obtain more precise data on firm's capital structure.

Summary of Tables

Summary of Figures

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