CORPORATE CONTROL MECHANISMS AND INVESTMENT EFFICIENCY IN DEVELOPED EUROPEAN COUNTRIES

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- this thesis contains no material that has been submitted or accepted for a degree or diploma in any other educational institution;
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ABSTRACT

Corporate Control Mechanisms and Investment Efficiency

in Developed European Countries

The objective of this dissertation is to examine the effect of corporate control mechanisms on firm investment policy, providing evidence from the developed European countries over the period 2000-2016. Leverage, debt maturity, institutional investors are the internal mechanisms while the product market competition is the external control mechanism. Besides providing evidence for the external validity of previous findings which mostly rest on the US market, this dissertation uses firm-level and industry-level product market competition measures and investment efficiency instead of using simple investment level to provide more reliable and comprehensive results for the investment policy of European firms. Classifying firms according to the deviations from their expected investment level allows us to figure out why control mechanisms work differently when a firm over- or underinvests. In the second part of the study, we analyze how each of the internal mechanisms affects investment efficiency under product market competition. This dissertation provides evidence that banks, through both lending and ownership, are the main controlling mechanisms for European firms. Besides leverage, institutional investors and competition are other control mechanisms mitigating the overinvestment problem by reducing the deviations from expected investment level. Moreover, our results demonstrate that leverage and institutional ownership reduce overinvestment when competition in the industry is low, which is consistent with the hypothesis that product market competition acts as a substitute governance mechanism.

ÖZET

Gelişmiş Avrupa Ülkelerinde Kurumsal Kontrol Mekanizmaları ve Verimli Yatırım

Bu çalışmanın amacı, kontrol mekanizmalarının firma yatırım politikasına olan etkilerini gelişmiş Avrupa piyasasında 2000-2016 yılları arasında incelemektir. Banka borçlanması, borç vade yapısı, ve kurumsal yatırımcılar içsel, ürün piyasasındaki rekabet ise dışsal kontrol mekanizmalarıdır. Bu tez, çoğunlukla ABD piyasasına dayandırılan önceki bulguların dışsal geçerliliği için gelişmiş Avrupa piyasasında çalışmanın yanında, firmaların yatırım politikasına daha güvenilir ve kapsamlı sonuçlar sağlamak için ürün piyasa rekabetini hem firma düzeyinde hem de sektör düzeyinde ele almış ve ayrıca basit yatırım harcamaları düzeyini kullanmak yerine firmanın yatırım verimliliğini kullanmıştır. Şirketleri beklenen yatırım düzeyinden sapmalarına göre aşırı yatırım yapmış veya az yatırım yapmış olarak sınıflandırmak, kontrol mekanizmalarının bu iki firma türü için farklı çalışıp çalışmadığını anlamamızı sağlamıştır. Tezin ikinci bölümünde, içsel kontrol mekanizmalarının piyasadaki rekabet altında nasıl çalıştığı incelenmiştir. Bu tez bankaların, hem kredilendirme hem de sahiplik yoluyla Avrupa şirkeleri için etkin bir kontrol mekanizması olduğu üzerine kanıtlar sunmaktadır. Banka borçlanmasının yanı sıra, kurumsal yatırımcılar ve ürün piyasasındaki rekabet beklenen yatırım düzeyindeki sapmaları azaltarak aşırı yatırım yapma sorununu azaltan diğer kontrol mekanizmalarıdır. Ayrıca, rekabetin düşük olduğu durumlarda banka borçlanması ve kurumsal yatırımcıların, şirketlerin aşırı yatırım yapma sorununu azaltığı görülmektedir. Bu durum, piyasadaki rekabetin içsel yönetişim mekanizmaları için alternatif bir mekanizma olduğu hipotezi ile uyumludur.

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TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION 1
CHAPTER 2: LITERATURE REVIEW 10
2.1 Institutional investors as a control mechanism 11
2.2 Leverage as a control mechanism 16
2.3 Product market competition as a control mechanism 21
2.4 Corporate control mechanisms and corporate investment policy 28
2.5 Investment efficiency 35
CHAPTER 3: METHODOLOGY 38
3.1 Data 39
3.2 Variables 40
3.3 Descriptive statistics and correlation matrix 49
3.4 Method 52
CHAPTER 4: EMPIRICAL FINDINGS 56
4.1 Determinants of corporate investment policy 56
4.2 Corporate control mechanisms and investment efficiency 61
4.3 Internal control mechanisms and investment efficiency under competition 65
4.4 Findings 69
CHAPTER 5: CONCLUSION 75
APPENDIX A: LITERATURE ON INVESTMENT EFFICIENCY 80
APPENDIX B: VARIABLES 82
APPENDIX C: MULTICOLLINEARITY DIAGNOSTICS 83
REFERENCES 85

LIST OF TABLES

Table 1. Comparison of Europe and the US Economies.....6

Table 2. Descriptive Statistics.....49

Table 3. Correlation Matrix.....51

Table 4. Multiple Regression Analysis with Investment Dependent.....58

Table 5. Corporate Control Mechanisms and Expected Effects on Investment.....60

Table 6. Estimation Results for Overinvestment.....62

Table 7. Estimation Results for Underinvestment.....64

Table 8. Estimation Results for Overinvestment with Competition Dummies.....66

Table 9. Estimation Results for Underinvestment with Competition Dummies.....68

ABBREVIATIONS

COGS	Cost of Goods Sold
D_NEG	Negative Sales Growth Dummy
EBIT	Earnings before Interest and Taxes
FCF	Free-Cash Flow
FINSLACK	Financial Slack
HHI	Herfindahl-Hirschman Index
INSTOWN	Institutional Ownership
LI	Lerner Index
MSCI	Morgan Stanley Capital Index
OLS	Ordinary Least Squares
PCM	Price-Cost Margin
R&D	Research and Development
SG&A	Selling, General and Administrative Expenses
SIC	Standard Industrial Classification
STD	Short-Term Debt
STD.DEV.	Standard Deviation
TD	Total Debt
UK	United Kingdom
US	United States
VIF	Variance-Inflation Factor

CHAPTER 1

INTRODUCTION

The objective of this thesis is to examine the relationship between corporate control mechanisms and corporate investment policy in a sample of 12 developed European economies. Besides providing supporting evidence for the previous findings mostly rest on the US market with a sample of 12 developed European countries, this thesis uses firm-level and industry-level product market competition measures and investment efficiency instead of using simple investment level to provide more reliable and comprehensive results for the investment policy of European firms.

With the collapse of large corporations in the early 2000s as a consequence of corporate scandals which affected not only the stakeholders but the other investors in the market, the importance, and the necessity of corporate governance have surged up, which ultimately improved corporate governance standards all around the world. Corporate governance is a set of factors that provide boundaries for corporate activities and satisfy a sure return on the investment of suppliers (Gillan & Starks, 1998; Shleifer & Vishny, 1997).

The agency conflicts among the stakeholders lead management to act in their interest which can be hidden from outsiders when there is much information asymmetry between management and investors. The corporate scandals in the early 2000s have shown that such kind of management activities can even cause companies to collapse which makes the monitoring one of the most crucial requirements of a healthy business environment.

Despite the fact that monitoring reduces information asymmetry and controls managerial activities, not all the investors have an intent to bear the cost of

monitoring which enhances the importance of corporate control mechanism. Corporate control mechanisms, enforce pressure on management, and this way, provide boundaries to the firm's operations. Effective monitoring imposes pressure on management to follow value-added policies for their companies.

Given the considerable impact embedded in corporate governance, the effects of control mechanisms on firm performance and corporate policies have attracted researchers. Despite the fact that the impact of control mechanisms on firm performance is analyzed in a great extent to understand the effects of different governance mechanisms on different kinds of performance measures in various governance regimes, the impact of control mechanisms on corporate investment efficiency has not been analyzed to a great extent in the academic world. Given the extent of the advantages associated with good governance, it is essential to apprehending the control mechanisms that impact the corporate investment efficiency.

With the ultimate aim of filling the gap in the literature regarding the relationship between control mechanisms and investment efficiency, the objective of the thesis is to explore the effect of some of the corporate control mechanisms on investment efficiency of European firms. Estimating investment policy with the change in investment level does not give accurate results regarding understanding whether the company invests efficiently or not. An increase in investment expenditure level does not always mean that firm is investing in value-increasing projects. The agency conflicts between managers and shareholders can lead management to spend more or less than their expected investment level, causing over-investment or under-investment problems, respectively. In fact, we expect firms to invest closer to their expected investment level as the control mechanisms act as a

monitor and discipline the management which diminishes agency conflicts and information asymmetry between insiders and outsiders.

Institutional investors, the amount, and the maturity of debt are the internal mechanisms and product market competition is the external corporate control mechanism used in this study. Many studies in the literature demonstrate that good governance, mitigating the agency conflicts among stakeholders through monitoring and decreasing information asymmetry, enhance firm value (e.g., Cremers & Nair, 2005; Gompers, Ishii, & Metrick; 2003; Yermack, 1996). Despite the fact that good governance appreciates firms regarding value, some recent studies document that not all the firms benefit equally from good governance (e.g., Ammann, Oesch, & Schmid, 2013; Chou, Ng, Sibilkov, & Wang, 2011; Giroud & Mueller, 2010, 2011). The impact of control mechanisms on firm value or performance depends on whether corporate control mechanisms and product market competition are complements or substitutes. In the light of literature showing that the internal governance mechanism can work differently under the influence of external mechanisms, we analyze how each of the internal mechanisms affects investment policy under product market competition as well.

A large body of the literature uses Herfindahl Hirschman Index (HHI) to estimate product market measure. The calculation of HHI for the US is done for all the firms in the COMPUSTAT database or with the US Economic Census HHI measure, which includes the largest 50 companies in an industry. These two estimation methods reveal questionable results for the validity of product market competition proxy, HHI. For this reason, in addition to HHI, we use the firm-level product market competition measure, Lerner Index as well. The Lerner Index

measures the pricing power of a firm in the market. Firms with higher pricing power have monopoly power, and thus, face less product market pressure.

We study the relationship between control mechanisms and corporate investment policy in an international setting of developed European markets covering 12 countries: UK, Germany, France, Spain, Italy, Switzerland, Sweden, Norway, Finland, the Netherlands, Belgium, and Denmark over the period 2000 to 2016. As far as we know, this will be the first study examining the effect control mechanisms on investment efficiency for the developed European markets.

Continental Europe is generally accepted as a bank-based system which is characterized by the substantial involvement of large banks in financing corporations with concentrated ownership and less developed financial markets. In a bank-based system, the strength of legal rights for minority shareholders is lower than the one in market-based systems is. An Anglo-Saxon market-based system is characterized with more developed financial markets and with companies having more dispersed ownership structure. According to La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000), protection of minority shareholders is one of the essential requirements of good governance systems. Despite the fact that the European Union does not enforce pressure on countries to develop a pan-European governance code, with the aim of enhancing the convergence of national corporate governance codes among European Union countries, in 2004 European Corporate Governance Forum was established. In fact, the recent World Bank study on the protection of minority shareholders (see Table 1) shows that the distances to the best performance frontier are nearly same for the continental Europe countries and Anglo-Saxon countries: the UK and the US. With this respect, it is convenient to use a pooled sample of 12 European countries. Although European developed economies have many similar characteristics, we use

the country fixed effect in our analysis in order not to ignore the variables that vary from country to country.

This thesis takes into account the control mechanisms mostly used in studies for the US market and investigates whether these control mechanisms also work for European economies and influence positively the corporate investment policy, in particular, investment efficiency. This thesis has four main contributions to literature. First, to the best of our knowledge, this will be the first study for developed European countries, analyzing the effect of control mechanisms on corporate investment efficiency. Second, this study will guide us to understand whether the governance mechanisms which are commonly accepted as a control mechanism in the US economy, do also work for European countries. Moreover, this study will provide a full examination of the internal control mechanisms and product market competition to figure out whether they are alternate or complement governance mechanisms for the European market. Finally, for the developed European countries, to the best of our knowledge for the first time, this study will comprehend a full examination of the effect of corporate controls on investment policy by estimating it through the deviations from the expected investment level of each company, which allows us to figure out whether the control mechanisms affect over- and under-investing firms differently.

Table 1. Comparison of Europe and the US Economies

Economy	Getting Credit DTF	Strength of legal rights index (0-12)	GDP growth 2016	Bank concentration (%)	5-bank asset concentration	Stock market cap to GDP (%)	Stock market turnover ratio (%)	Protecting Minority Investors DTF
Belgium	45	4	1.47	70.86	90.73	80.37	39.30	60
Denmark	70	8	1.96	82.71	93.55	-	53.52	66.67
Finland	65	7	1.93	87.21	95.25	-	86.09	58.33
France	50	4	1.19	57.95	72.89	79.24	66.18	66.67
Germany	70	6	1.94	74.81	83.77	47.12	96.83	58.33
Italy	45	2	0.94	66.41	75.99	-	176.93	58.33
Netherlands	45	2	2.21	88.01	92.67	92.92	69.16	58.33
Norway	55	5	1.09	93.3	95.74	47.34	52.58	75
Spain	60	5	3.27	77.29	90.49	67.26	89.10	70
Sweden	55	6	3.24	94.28	96.26	-	74.52	68.33
Switzerland	60	6	1.38	79.65	89.23	219.31	52.15	50
UK	75	7	1.79	48.37	71.42	-	84.89	75
US	95	11	1.49	34.92	46.53	146.86	187.1	64.67

Source: World Bank

Counties all around the world show significant differences regarding their corporate systems regarding their ownership structure, control and governance mechanisms (Moerland, 1995). In literature, countries are grouped mainly into two groups concerning their historical origin as market-based systems and bank-based systems (Demirgüç-Kunt & Levine, 1999; Levine, 2002; Moerland, 1995). A market-based system represents Anglo-Saxon economies where financial markets are well-developed with widely dispersed ownership structures and the active takeover market. On the other hand, bank-based systems are economies where banks have a substantial role in controlling and financing companies. In a bank-based system, corporations mostly have concentrated ownership. America, United Kingdom, Australia and Canada are accepted as market-based economies whereas Germanic countries (such as Germany, Australia, Switzerland, and the Netherlands), Latinic countries (such as Italy, France, Spain, and Belgium) and Japan are bank-based (Moerland, 1995). Most of the European developed economies are in the bank-based system, except the UK.

The first column in Table 1 gives the Getting Credit Indicator, which includes both "the strength of credit reporting systems and the effectiveness of collateral and bankruptcy laws in facilitating lending." The distance of an economy to the frontier representing the best performance across all economies indicates Getting Credit DTF measures. The distance scale is from 0 to 100 and as the score approaches 0 the performance decreases. In other words, when distance measure is close to 100, the economy is closer to the best-performing economy. (www.doingbusiness.org/data).

According to the Getting Credit Distance to Frontier information given on the first column of Table 1, most of the European countries in our sample have similar distance scores to the best performance frontier, implying that corporations have

approximately the same ability to access to credit in these economies. Bank concentration column in Table 1 gives the percentage of the largest three banks in that country. Most of the continental Europe countries have high concentration percentage, indicating that the banking system is dominated by the three largest banks in these economies. Only for the UK, bank concentration is below 50 percent. On the other hand, the asset concentration of the largest five banks is almost same among the European countries. The main difference between the US and European economies is the influence of the largest banks in the market. According to the bank concentration information given in Table 1, the bank concentration for the largest three banks and the largest five banks in the US are below 50 percent, indicating that the banking system in the US economy is more dispersed than European countries. The other main difference between the US and Europe is scores for the strength of legal rights index evaluated by World Bank, measuring the protection of lenders and borrowers through laws and thus presents the lending facilitates. 0 indicates lowest while 12 indicates the strongest legal law protection for borrowers and lenders. The US has the highest strength of legal rights whereas Italy and Netherland have the lowest implying that the US economy facilitates lending more than European economies. Furthermore, legal laws protecting borrowers and lenders are similar among the European countries, except the two outliers Italy and Netherland.

The last column in Table 1 shows the "Protecting Minority Investors Distance to Frontier" scores which demonstrates "the average of the distance to frontier scores for the extent of conflict of interest regulation index and the extent of shareholder governance index" (World Bank Doing Business definition). The data for this index calculation comes from a questionnaire regarding the company laws, securities regulations, court rules of evidence and civil procedure codes. The highest score is

for both UK and Norway, indicating the lowest distance to the best performance frontier. Although it is generally accepted that the US has the strongest legal protection for the minority shareholders, the distance scores given in Table 1 demonstrate that the protection of minority investors are approximately same for most of the European countries and the US.

The rest of the paper is organized as follows: While, the literature on the corporate control mechanisms and investment efficiency will be analyzed in the second chapter, following which the methodology encompassing the data, variables, and the method specification will be explained. The empirical findings will be presented in chapter fourth, where the determinants of investment policy, the effect of corporate control mechanisms on investment efficiency and the relationship between internal corporate control mechanisms and investment efficiency under product market competition will be given. The dissertation will be finalized with a conclusion chapter.

CHAPTER 2

LITERATURE REVIEW

The potential agency conflicts among the stakeholders arise the necessity of corporate governance. Agency conflicts can result from the different goals or benefits of the stakeholders as well as the information asymmetry between insiders and outsiders (Myers & Majluf, 1984). The separation of corporate ownership and control may lead the managers to act in their interest rather than the interest of shareholders (Fama & Jensen, 1983; Jensen, 1993; Jensen & Meckling, 1976). The activities of management can be disciplined by some control mechanisms which constitute corporate governance. These governance factors can be thought as internal and external control mechanisms. Large shareholders, the board of directors, institutional investors, financing agreements, including the amount and maturity of debt, product market competition and the market for corporate control are some of the corporate control mechanisms (Gillan & Starks, 2003).

According to Gillan and Starks (1998), corporate governance is a set of factors including the participants of a company that provides boundaries for corporate activities. On the other hand, the economic interest of the participants is an essential determinant of the corporate governance (Shleifer & Vishny, 1997). In fact, corporate governance is a set of ways that satisfy a sure return on the investment of suppliers (Shleifer & Vishny, 1997).

Corporate control mechanisms are factors that provide boundaries to the firm's operations and discipline management (Gillan & Starks, 2003). External and internal control mechanisms can influence a firm's financing and investment decision not only through direct ownership but also through monitoring. Monitoring

mitigates the information asymmetry between management (i.e., insiders) and shareholders (i.e., outsiders).

Besides internal funds, companies use capital and debt market to finance their investments, creating the two different monitoring channel on a firm. One is large institutional shareholders as an investor, and the other one is financial institutions such as banks and other lenders who are interested in receiving future payments form the firm (Jensen, 1986).

The following sections cover the literature on corporate control mechanisms: Institutional investors, leverage, and product market competition.

2.1 Institutional investors as a control mechanism

Not only the separation of control and ownership but also the information asymmetry among the stakeholders cause agency problems in a firm. Publicly traded firms have a large number of small shareholders. Monitoring reduces information asymmetry, and hence, possible agency problems between insiders and outsiders (Pawlina & Renneboog, 2005). As the control mechanisms preserve the monitoring function efficiently, that will be a disciplining force for management which led managers to follow value-added policies for the firm.

When and if the benefits from the monitoring outweigh associated costs, investors prefer to monitor management. Moreover, when an investor takes the function of monitoring, all the other investors will benefit from this without incurring the cost of monitoring. For small shareholders, monitoring is costly. Therefore, minority shareholders do not prefer to monitor the firm. On the other hand, Edmans (2009) states that there is an incentive to gather information and discipline management for large shareholders which leads them to bear the cost of monitoring.

There are many empirical findings support the monitoring function of large shareholders (Edmans, 2009; Franks & Mayer, 2001; Shleifer & Vishny, 1986; Zeckhauser & Pound, 1990).

On the other hand, for large institutional shareholders, it will be much easier to access and convey inside information to the market (Gillan & Starks, 2003). Moreover, Kim, Miller, Wan, and Wang (2016) identify the three primary economic drivers of effective monitoring of institutional investors: proximity to monitor information, proclivity towards activism and superior monitoring technology. In a nutshell, institutional investors have an important function of decreasing information asymmetry between managers and shareholders (Chidambaran & John, 2001; Gillan & Starks, 2003).

Beatty, Liao, and Weber (2010), claim that the importance of accounting quality increases as the information asymmetry rises, and they show that banks' access to private information mitigates the importance of accounting quality, implying that banks preserve monitoring function. In fact, institutional investors, in particular banks, reduce agency costs of debt financing through monitoring (Fama, 1985).

In line with the findings supporting the monitoring role of institutional investors, Khurshed, Lin, and Wang (2011), show that institutional ownership and directors' ownership are negatively related whereas institutional ownership and board composition are positively related. Their findings support that institutional investors and directors are alternate control mechanisms whereas institutional holdings and board are complementary control mechanisms, indicating that the interest of board and institutional investors are aligned (Khurshed et al., 2011).

In their study on the relationship between institutional investors and executive compensation, Hartzell and Starks (2003) show that institutional investors mitigate agency conflicts between managers and investors through monitoring which is consistent with the monitoring function of institutional investors.

Ferreira and Matos (2008) analyze the equity holdings of institutional investors from 27 countries and document that independent institutions, which they defined as the institutions with fewer business ties with the firm, monitor the companies worldwide. Furthermore, Aggarwal, Erel, Ferreira, and Matos (2011), examine institutional holdings for 23 countries and demonstrate that firm-level governance and institutional ownership are positively related which supports the fact that institutional investors encourage firms to follow good governance practices around the world.

In addition to monitoring and information transmission function of institutional investors, the pressure of losing large institutional shareholders on managers make them act in the interest of shareholders. Losing large institutional shareholders is a treat for managers as it will be a negative signal to the market. In other words, institutional investors can affect managers' activities through two channels: ownership and trading activities in the market (Gillan & Starks, 2003). Consistent with the two channels that institutional investors can impact the managerial operations, Bricker and Markarian (2015) argue that not only through direct monitoring but also through trading, institutional investors, on average, reduce the profitability of insider trading. Moreover, Bushee (1998) shows that momentum strategy of institutional investors put pressure on management to earn in a short-term period.

Short and Keasey (1999) examine the managerial entrenchment using the UK market, and they claim that institutional investors have more influence on management than their counterparts in the US. Their results indicate that institutional investors' pressure on management make managers act in the interest of shareholders.

Notwithstanding the fact that there is a consensus on the monitoring function of institutional investors, there are also some studies arguing that not all the institutional owners bear the cost of monitoring which includes the cost of gathering and analyzing the information. For example, Chen, Harford, and Li (2007) claim that not all the institutions but the ones with long-term concentrated ownership have an incentive to monitor the firm. Supporting Chen et al. (2007), the findings of Attig, Clearly, Ghoul, and Guedhami (2012) indicate that institutional investors with long-term investment horizon have greater incentive to engage in effective monitoring. Furthermore, some studies argue that long-term investment horizon is important for institutions in terms of determining to monitor the firm (Attig et al., 2012, 2013; Chen et al., 2007; Cleary & Wang, 2017; Derrien, Kecskes, & Thesmar, 2013; Harford, Kecskes, & Mansi, 2012, 2017).

Despite the studies arguing that not all the institutions have an incentive to bear the cost of monitoring, several studies conducted to analyze the effect of institutional holdings on firm policies, such as long-term investments, R&D investments, dividend policy and merger and acquisitions, to figure out whether the institutional investors play the monitoring role and affect managerial activities. The findings of Bushee (1998) indicate that a firm's aggregate institutional holdings decrease the pressure on management to earn a high return on short-term and increases the long-term investment. Although high trading and momentum strategies

by institutions increase the likelihood of reducing R&D investments, high institutional ownership encourages long-term investments (Bushee, 1998). In fact, his findings indicate that institutional investors serve the monitoring function. Supporting Bushee's (1998) results, in their study Wahal and McConnell (2000) demonstrate a positive relationship between industry-adjusted expenditures for R&D and property, plant, and equipment and institutional ownership. Moreover, Eng and Shackell (2001) and Hansen and Hill (1991) demonstrate a positive influence of institutional holdings on R&D spending. Brossard, Lavigne, and Sakinç (2013) examine large European firms, and report a positive effect of institutional investors on R&D expenditures. On the other hand, in line with the findings of Bushee (1998), this positive impact turns to a negative effect when the institutions prefer short-term profits (Brossard et al., 2013). Aghion, Reenen, and Zingales (2013) model innovation to explore the source of the positive relationship between innovation and institutional ownership. Their findings support the career concern hypothesis which asserts that institutions encourage managers to take risky long-term investments through effective monitoring.

Supporting the monitoring function of institutions, by using the fraction of the institution's portfolio represented by firms, Fich, Harford, and Tran (2015) show that institutional investors enhance the gains to takeover targets by providing higher bid completion rates, higher premiums, and lower acquisition returns.

Crane, Michenaud, and Weston (2016) show that the positive relationship between institutional investors and dividend payout is stronger for firms with higher expected agency costs. Their findings support that even non-activist institutions are important regarding monitoring firm behavior. Supporting the results of Crane et al. (2016), Short, Zhang, and Keasey (2002) demonstrate that dividend payout policy is

positively affected by the institutional ownership in the UK market whereas negatively affected by managerial ownership. Furthermore, Firth, Gao, Shen, and Zhang (2016) analyze the Chinese market and demonstrate that firms pay more cash dividends when they have mutual funds as an institutional investor. On the other hand, the other institutional investors such as securities companies, insurance companies, and banks do not affect the firm's dividend policy.

In a nutshell, the empirical and theoretical literature on the institutional investors indicate that monitoring the firm, conveying inside information to the market, and hence, reducing the information asymmetry and influencing the management are some of the important functions of institutional investors. There is a consensus in the literature that institutional investors, both directly and indirectly, put pressure on the management and affect corporate policies. Based on the literature review conducted above, institutional ownership is one of the internal corporate control mechanisms in this thesis.

2.2 Leverage as a control mechanism

The agency conflicts between managers and shareholders are extensively investigated in the corporate literature. Managers are the agents of shareholders and have incentives to invest more than the optimal level of investment to increase their power with the growth of the firm, and thus, the resources under the managers' control (Jensen, 1986). In fact, a substantial amount of free-cash-flow in a firm increase the agency conflicts among stakeholders as managers can to invest in projects that are not value-increasing with the free-cash-flow in hand. (Jensen, 1986).

Jensen (1986, p.4) claim that debt can motivate managers and their organizations to be efficient and he called these benefits as the "control hypothesis

for debt creation." Instead of paying dividends, managers can use debt to signal the payment promise of future cash flows since a dividend cut is punished with a high stock price decline (Jensen, 1986). Given the fact that debt creation reduces the available cash flow to invest in worthless projects or to waste, it reduces the agency cost of free-cash-flow (Jensen, 1986). With the creation of debt, a firm makes a promise of future interest and debt payments. Furthermore, in their model, Grossman and Hart (1982) support the role of debt leading the recommitment of management to be more productive.

Capital suppliers start to monitor more effectively to make the company more efficient to guarantee future payments (Jensen, 1986). In fact, Diamond (1984) shows that financial intermediation is an effective monitoring mechanism. On the other hand, it is important to mention that the agency cost of debt rises with a leverage increase (Jensen, 1986; Jensen & Meckling, 1976). The point where the marginal costs offset the marginal benefits of debt is essential regarding determining the optimal capital structure of a firm (Jensen, 1986).

In addition to the monitoring and governance role of a bank as an institutional investor, holding firm's share, the governance role of a bank as a lender is also crucial in terms of disciplining managers (Ivashina, Nair, Saunders, Massoud, & Stover, 2009; Triantis & Daniels, 1995). Bank debt mitigates the agency conflicts associated with the informational asymmetry among stakeholders (Jensen, 1986; Ross, 1977; Stulz, 1990). The close relationship with banks makes firms to avoid or at least mitigate asymmetric information-based problems. For example, consistent with the argument that banks have a decisive information-based governance role, Ivashina et al. (2008) demonstrate that bank lending allows banks to gather information and transmit it to the market (it is the takeover market in this case), and

as a result, facilitate takeovers. In other words, through the lending-related information channel, banks affect the likelihood of acquisitions (Ivashina et al., 2008).

Not only disciplining management by deterring and detecting managerial slack through monitoring but also signaling to the market through their actions after recognizing managerial slack, make banks an effective governance mechanism (Triantis & Daniels, 1995). After detecting managerial slack, banks can scale down or terminate entirely the relations with the firm as well as enforcing pressure on managers to decrease the slack, all of which signals the bank's evaluation of the firm to the other stakeholders (Triantis & Daniels, 1995). Furthermore, as banks provide finance to the investments of small and medium-size firms, they have an advantage over other stakeholders regarding monitoring. As a result, debt is a strong and influential control mechanism on managerial decisions (Triantis & Daniels, 1997).

Agrawal and Knoeber (1996) use leverage as a mechanism that controls the agency problems between insiders and investors. Use of outside directors, insider ownership, large blockholders, institutional investors, the market for corporate control, and the managerial labor market are the other control mechanism used in Agrawal and Knoeber's (1996) paper. They claim that debt is a control mechanism as it induces monitoring by lenders (Agrawal & Knoeber, 1996). Moreover, the disciplinary effect implied by the monitoring activity of lenders is more effective when there is greater internal monitoring (Agrawal & Knoeber, 1996). Agrawal and Knoeber (1996) investigate the effect of seven corporate control mechanisms on firm performance, firstly by using them separately in regressions and later by using the control mechanisms simultaneously. Despite the finding that there is a negative relationship between leverage and firm performance in the single mechanism

ordinary least squares (OLS) regressions, and in the expanded OLS regressions, in simultaneous equations, there is a positive relationship between and performance, but it is insignificant (Agrawal & Knoeber, 1996).

In their theoretical model of comparative corporate governance, John and Kedia (2006) interact governance mechanisms such as managerial ownership, the market for corporate control and monitoring by banks. Although, Agrawal and Knoeber (1996) find an insignificant effect of leverage on performance when it interacts with other control mechanisms, the optimal system for banks to monitor firms is possible only under concentrated ownership (John & Kedia, 2006). Moreover, this optimal system is available just in economies where the banking sector is quite efficient, but the capital markets are not well developed (John & Kedia, 2006). The optimal corporate governance system for a firm is not independent of the economy characterized by the development of financial institutions and markets in which the firm operates (John & Kedia, 2006)

In addition to the market firm operates, the investment opportunity set of the firm also affects how the corporate control mechanisms impact the managers' decisions. Following McConnell and Servaes (1995), Florackis (2008) argues that the effectiveness of the corporate control mechanisms depends on the investment opportunity set of a firm as the source of the agency conflicts is different for high and low growth firms. Greater information asymmetry is the main reason of the agency problems for high-growth firms whereas the usage of free-cash-flow is the main reason for low-growth firms. (Gaver & Gaver, 1993; Jensen, 1986; Smith & Watts, 1992). Thus, in high growth firms the control mechanisms mitigating the information asymmetry problems are more effective (Florackis, 2008). On the other hand, the effectiveness of control mechanisms which reduce the agency problems

associated with a free-cash-flow, increases, mainly, in low-growth firms (Florackis, 2008).

Not only the amount of debt but also the maturity of debt is essential regarding controlling the possible agency conflicts among stakeholders. In fact, having debt with shorter maturity reduces the information asymmetry problems as it signals that the firm is in good condition and can get better terms in loan renewals (Berger & Udell, 1998; Flannery, 1986; Ortiz-Molina & Penas, 2008). Also, shorter maturities make firms to go to the debt market more frequently to finance their projects which enables banks to control and monitor the management better (Diamond, 1991). Furthermore, given the fact that financial reporting quality mitigates the information asymmetry, Gomariz and Ballesta (2014) provide evidence that short-term debt is a substitute for financial reporting quality, implying that information asymmetry decreases with the use of short-term debt.

Supporting the hypothesis that debt maturity structure plays an important role in controlling agency costs, Florackis and Ozkan (2009) and Florackis (2008) demonstrate that short-term debt, as well as bank debt, is a critical governance mechanism for the UK companies. In fact, these two control mechanisms are the most critical governance tools for the UK companies (Florackis, 2008). Consistent with the fact that shorter debt maturities are disciplining mechanism on management, the findings of Gomariz and Ballesta (2014) indicate that debt with shorter maturity mitigates both underinvestment and overinvestment problems for Spanish firms. Another supporting example for the monitoring and governance role of short-term debt is the paper of Gul and Goodwin (2010) in which they report that short-term debt and audit fees are negatively related. Furthermore, to minimize frequent external monitoring, firms having weak shareholder rights avoid using debt with shorter

maturity (Jiraporn & Kitsabunnarat, 2007). The monitoring and the disciplining role of debt and short-term debt maturity are not only valid in developed economies but also in emerging markets. Using survey data on Korean listed firms, Kim (2015) demonstrate that debt and especially, short-term debt financing are monitoring mechanisms mitigating the agency conflicts as the banks monitor the managers of their borrowers.

Based on the literature review conducted above, it can be stated that both leverage and debt maturity are monitoring and disciplining mechanisms for the managers. Therefore, in addition to institutional investors, the amount and maturity of debt are the other two internal corporate control mechanisms in this study.

2.3 Product market competition as a control mechanism

The external factors that enforce pressure on management have been extensively investigated by researchers in the corporate governance literature. The market for corporate control is generally accepted as an external corporate governance mechanism, and its effect on firm's financial and investment policy is widely investigated (e.g., Cremers & Nair, 2005; Kini, Kracaw, & Mian, 2005; Mikkelson & Partch, 1997; Walsh & Seward, 1990). Recently, many studies conducted on corporate governance start to use another external factor as a corporate control mechanism: product market competition (e.g., Ammann et al., 2013; Beiner, Schmid, & Wanzenried, 2011; Giroud & Mueller, 2011; Tian & Twite, 2011)

Allen and Gale (2000) claim that product market competition plays the same role of takeovers and market for corporate control. Moreover, product market competition itself serves as a monitoring mechanism and reduces agency conflicts (Allen & Gale, 2000; Griffith, 2001). In fact, the product market competition is a

more effective governance mechanism than institutional investors and the market for corporate control (Allen & Gale, 2000). Futhermore, Fama (1980) claim that competition disciplines management as it provides effective monitoring of the performance of the individual members as well as the entire team.

By reducing managerial slack, product market competition decreases the agency problems which cause managers to deviate from value-maximizing policies (Giroud & Mueller, 2010). Moreover, competition in the market puts pressure on managers and thus, provides a disciplinary force on management (Fresard & Valta, 2015). Morck, Shleifer, and Vishny (1989) claim that complete turnover of the top management team is a signal of successful monitoring. Their findings indicate that when firms underperform its industry, the likelihood of top management turnover increases. Furthermore, in highly competitive industries, the performance of a manager can easily be compared with the managers of competitors which discourages managers to undertake non-value adding operations (Grullon & Michaely, 2007). In fact, in highly competitive industries, CEO turnover is higher than non-competitive industries (DeFonda & Park, 1999; Fee & Hadlock, 2000, Raith, 2003). Competitive pressure enforces discipline on management which keeps them aligned in the interest of shareholders instead of enjoying their "quite life" (Bertrand & Mullainathan, 2003; Giroud & Mueller, 2010). Supporting the argument stated above, even after controlling for size, book-to-market and momentum, lower returns are earned by the firms in highly concentrated industries (Hou & Robinson, 2006).

A strong competitive market makes it easier for capital suppliers and investors to assess the performance of a firm by comparing it to the performance of its competitors. In fact, the performance of the rivals is information that signals the

success of management which causes capital suppliers to monitor a firm better (Defond & Park, 1999; Fama, 1980).

Supporting the external governance function of the product market competition, Giroud and Mueller (2011) demonstrate that good governance is more beneficial for firms in industries where competition low. In other words, as an external governance mechanism, product market competition enforces discipline on managers to reduce managerial slack and undertake value-maximizing projects (Giroud & Mueller, 2010, 2011).

Notwithstanding the fact that there is a consensus on the disciplining and the controlling role of product market competition on management, there are contradictory findings on whether competition and internal corporate control mechanisms are substitutes or complements. Substitution hypothesis implies that when internal control mechanisms are weak than the competition in the market becomes a critical disciplining mechanism that enforces pressure on management to improve firm performance. On the other side, complementary hypothesis implies that product market competition enhances the impact of internal control mechanisms regarding corporate governance.

Supporting the hypothesis that competition in the market is an alternate for corporate control, Giroud and Mueller (2011) document that in highly competitive industries good governance does not affect firm value, whereas in highly concentrated industries good governance enhances firm value. Another example supporting the substitution hypothesis is the paper of Ammann et al. (2013) on the value effect of corporate governance under competition. They use a sample of 14 European Union countries to endorse their claim that competitive pressure enforce discipline on management to maximize firm value. Consistent with the substitution

hypothesis of competition and governance, firm value appreciates with good corporate governance, but only in weakly competitive industries (Ammann et al., 2013). Moreover, the performance of a firm is affected by the quality of corporate governance only in industries where competition is low (Chou et al., 2011). Also, in their study, Giroud and Mueller (2010) demonstrate that poor governance causes a significant stock price decline in non-competitive industries. On the other hand, the reduction in stock price is small and even insignificant when competition in the market is high. In fact, Chou et al. (2011) show that weak corporate governance structures appear for firms in highly competitive industries.

Kim and Lu (2011) examine the interactive effects of product market competition, and managerial ownership, used as a proxy for internal governance mechanism, on firm value. Their findings indicate that strong product market competition mitigates the entrenchment of management for a very high level of CEO ownership which is consistent with the substitution hypothesis of competition and corporate governance. Furthermore, Byun, Lee, and Park (2012) demonstrate that the negative effect of corporate governance on investment expenditures and corporate payout under low competition decreases and even disappears under high competition.

Tian and Twite (2011) study the Australian firms to explore the interaction effect of internal and external corporate control mechanisms on firm productivity. They use both product market competition and the market for corporate control as external corporate control mechanisms. Consistent with the substitution hypothesis of product market competition and corporate governance, internal corporate control mechanisms are less effective in highly competitive industries (Tian & Twite, 2011).

Recently, using non-financial US firms between 1992 and 2009, Chang, Chen, Chou, and Huang (2015) document that, for weakly governed firms, product

market competition increases the incentive to maximize shareholder wealth. In their study, Liao and Lin (2017) argue that, mainly for well-governed firms, the announcement of R&D spendings has a positive effect on shareholder wealth. Supporting the substitution of external and internal governance mechanisms, the positive wealth effect of the announcement of R&D spendings are stronger for good governed firms in non-competitive industries than in competitive industries.

Despite the findings stated above, there are also studies supporting the complementary relationship between competition and governance. For example, using a panel data of German manufacturing firms for the period 1986 to 1994, Januszewski, Köke, and Winter (2002) demonstrate that the positive effect of competition on productivity growth is enhanced under good governance which is estimated by the presence of a strong ultimate owner.

Köke and Renneboog (2005) study the two European Union countries: UK and Germany in which the market structure and corporate governance regimes are different, with the aim of exploring the effect of corporate control mechanisms and product market competition on firm's productivity. Germany is accepted as a continental European blockholder-based system whereas the UK is accepted as an Anglo-American market-oriented system (Köke & Renneboog, 2005). In other words, Köke and Renneboog (2005) study the interaction effect of competition and corporate governance on productivity under two different corporate governance regimes. Despite the fact that the impact of competition on productivity can differ under different market structures, weak competition has a negative effect on the firm's productivity growth. Furthermore, the different market structures in the UK and Germany led different corporate control devices: bank debt concentration for Germany and blockholder control for UK (Köke & Renneboog, 2005). Their findings

indicate that, although under intense competition, the presence of a blockholder has no impact on productivity growth, the presence of large shareholders mitigates the negative effect of weak product market competition on productivity growth in the UK. Also, strong blockholders, in particular banks, insurance companies, and government holdings, decrease the negative impact of weak competition in Germany (Köke & Renneboog, 2005).

Consistent with the complementary hypothesis of corporate governance and product market competition, Grosfeld and Tressel (2002) demonstrate that competition has no significant effect on firm performance for poorly governed firms whereas competition has a significant positive effect on performance for well-governed firms in the Warsaw Stock Exchange. In other words, the impact of corporate goveranance on firm performance enhances under high product market competition (Grosfeld & Tressel, 2002).

Similarly, supporting the complementary relation, Bozec (2005) examines 25 large Canadian firms and reports that the internal governance mechanism measured by the characteristic of the board of directors is effective under a competitive environment. Also, he shows that product market competition improves both profitability and productivity.

Contrary to the studies of Giroud and Mueller (2011) and Ammann et al. (2013), examining Chinese-listed firms for the period 2003-2013, Yu, Li, and Yang (2017) demonstrate that firm value is increased by good governance only in competitive industries, which is consistent with the complementary hypothesis.

Pant and Pattanayak (2010) study on the Indian market for the period 2000-2003 and find a complementary relationship between corporate governance, estimated by insider ownership, and product market competition. Their results

indicate that higher insider ownership leads to higher productivity in highly competitive industries.

Cosset, Some, and Valery (2016) investigate the effect of country characteristics on the relationship between corporate governance and product market competition which demonstrates that only in developing countries product market competition and corporate governance are positively associated. Moreover, Cosset et al.'s (2016) results indicate that in emerging economies, corporate governance is valuable in competitive industries which also supports the complementary hypothesis. On the contrary, in developed markets, firm value is increased by good governance only in less competitive industries, supporting the substitutional hypothesis (Cosset et al., 2016).

Based on the literature review conducted above, despite the contradictory findings on the complementary and substitutional relationship between internal control mechanisms and product market competition, there is a consensus that competition in the market is a control mechanism for a firm which affects firm financial and investment policies. Therefore, in this thesis, the external control mechanism is competition in the market.

Before proceeding to the hypothesis development section, it is necessary to review the studies on the relationship between corporate control mechanisms (institutional investors, leverage, and maturity of debt and product market competition) and corporate policies, in particular, investment policy.

2.4 Corporate control mechanisms and corporate investment policy

2.4.1 Institutional investors and corporate investment policy

Monitoring and disciplining function of institutional investors can act as an important mechanism regarding improving firm investment policy.

Contrary to the view that institutional investors enforce pressure on management to earn a short-term profit, studying with 129 firms in four research-intensive industries over 10 years, Hansen and Hill (1991) support that large institutional ownership leads greater R&D expenditures. Consistent with the findings of Hansen and Hill (1991), Bushee (1998) document that managers are less likely to decrease the level of R&D when institutional ownership is high. On the other hand, when institutional investors have high portfolio turnover and prefer momentum trading, then high institutional ownership reduces R&D investments in a firm (Bushee, 1998).

Aghion et al. (2013) provide empirical evidence for the hypothesis that institutional investors and firm's innovation are positively related by using a panel data of 803 US firms between 1991 and 1999 in their econometric model. Another study supporting the positive relationship between institutions and R&D investments is the paper of Eng and Shackell (2001) on the long-term performance plans, institutional investors, and R&D spending. On the other hand, contrary to the findings of Aghion et al. (2013), studying with a panel data of the US firms for the period 1981 to 2014, Cleary and Wang (2017) document that long-term institutional investors lead lower investment levels.

Brossard et al. (2013) examine the European market with 324 innovative companies over eight years and conclude that institutional investors have a positive effect on R&D expenditures, but not impatient institutional investors.

Although the relationship between corporate investment level and institutional investors have been extensively investigated in the literature, the most important thing is not to have a positive or negative effect on investment level, but to make the company approach its expected investment level. In a study conducted for the US firms over the period 1995-2015, defining institutions as high motivate to monitor if their holding value is in the top 10% of institutional portfolios, Ward, Yin, and Zeng (2018), demonstrate that "firms with highly motivated monitoring institutional ownership deviate less from the predicted investment level" (p.1) and make a conclusion that institutions with incentive to monitor mitigate over- and underinvestment problems.

Garcia-Marco and Ocana (1999) study Spanish manufacturing firms over the years 1991 to 1994 and provide evidence that a close relationship with banks via shareholding makes firms invest nearer to optimum investment level than firms without this kind of relation.

David, Hitt, and Gimeno (2001) argue that, although, the large shareholding of institutional investors is not sufficient to impact the R&D spendings, active institutions influence firm R&D investments.

Recently, in their study on Chinese-listed companies for the period 2001-2011, Rong, Wu, and Boeing (2017) demonstrate that the institutional ownership appreciates firm's innovation and in fact, this relation is stronger under high product market competition.

2.4.2 Leverage and corporate investment policy

Many studies have been conducted to figure out whether debt affects firm investment policy. Myers (1977) argue that when a firm has a debt overhang, it can forego some

positive net present value projects due to the difficulty of financing investments. In fact, studying with only the US manufacturing firms over the period 1972 to 1986, Whited (1992, p.1425) provide evidence supporting the fact that information asymmetry in the debt market affects the firms' resource allocation for investments over time since the ability to obtain outside finance will be harder for unhealthy firms.

In his theoretical model, Stulz (1990) show that debt alleviates the overinvestment problem of firms with poor investment opportunities, in which the managers are more likely to invest in negative net present value projects with an increase in the level of managerial discretion.

In addition to debt, the debt maturity can also affect corporate investments (Myers, 1977). According to Myers (1977), if a firm's investment opportunity expires before debt maturity, this can create a conflict between managers and shareholders on the decision of investing in positive net present value projects since the benefits are not adequately captured by the shareholders but are shared with debtholders as well. Therefore, firms having debt with shorter maturity are less likely to pass up value increasing projects than firms having debt with a longer maturity (Aivazian, Ge & Qui, 2005b).

Given the fact that debt financing influences the investment policy of a company, there are also studies arguing that the direction of the effect depends on the investment opportunity set of the firm. Myers (1977) states that managers acting in the interest of shareholders may forego some positive net present value projects in firms with too much debt, which in fact, leads underinvestment problem in firms with high growth opportunities. On the other hand, managers can payout the funds

instead of investing in negative net present value projects when there is enough internal financing, in addition to the debt financing, to finance the investment opportunities (Jensen, 1986). But, managers' willingness to expand the firms' resources which are under their control, make them invest in negative net present value projects. In this case, for low growth firms, debt in the capital structure leads overinvestment problem.

Despite the fact that both positive and negative effect of debt present for all firms, the negative impact predominates for firms with high growth opportunities whereas positive impact predominates for firms with low growth opportunities (McConnell & Servaes, 1995, p.134). The underlying reason is that for firms with high growth opportunities, the presence of debt forces managers to forego some positive net present value projects whereas, for firms with fewer growth opportunities, debt prevents managers to undertake negative net present value projects (McConnell & Servaes, 1995). Also, studying large industrial US firms over the period 1970 to 1989, Lang, Ofek, and Stulz (1996) document that future growth is negatively related to leverage for firms having low growth opportunities but not for firms having high growth opportunities. Thus, for firms with good investment opportunity set, leverage does not decrease the growth of a firm, implying that leverage encourages investment for high growth opportunity firms (Lang et al., 1996). On the other hand, for firms with growth opportunities that are not good enough or not recognized by the market, leverage discourages investment. (Lang et al., 1996). Supporting Lang et al.'s results, Ahn, Denis, and Denis (2005) document that investment level is negatively associated with leverage. This negative relation is more significant for high-q segments than low-q segments for a sample of large non-financial, non-regulated US firms over the period 1982 to 1997. Furthermore, Singh

and Faircloth (2005) show that for a large sample of US manufacturing firms, R&D spendings are negatively related to financial leverage.

Supporting the disciplinary effect of leverage for firms with limited investment opportunities, Dang (2011) finds that investment level is negatively associated with leverage for UK firms over the period 1996 to 2003. On the other hand, for firms with high growth opportunities, leverage is the main control mechanism, not short-term debt, to prevent managers from underinvestment (Dang, 2011). Another supporting example of the negative relation between leverage and investment level for a market other than the US is the study of Firth, Lin, and Wong (2008) which is conducted with a sample of the Chinese firms over the period 1991 to 2004. Their results indicate that leverage negatively affects investment level. However, this negative relation is weaker for low-q firms with poor operating performance and weaker for highly state-owned firms. Supporting Firth et al. (2008)'s findings, in their study conducted with Chinese non-financial-listed companies over the period 2001 to 2004, Chen, Sun, and Xu (2016) document that leverage and tradable shares mitigate both over- and underinvestment problems. On the other hand, other governance mechanisms such as state-ownership, board size, and board independence, work differently for firms having overinvestment and underinvestment problems in China (Chen et al., 2016).

Aivazian et al. (2005a) examine Canadian publicly traded firms for the period 1982 to 1999 and demonstrate that for firms with higher growth opportunities, higher long-term debt usage decreases the investment level of a firm. On the other hand, they find an insignificant effect of long-term debt on the investment level for firms with low-growth opportunities (Aivazian et al., 2005a). Aivazian et al. (2005b) also study the US market over the period 1982 to 2002 and conclude that debt maturity

affects the firm's investment decision. Their results indicate that higher the percentage of long-term debt significantly decreases the level of investment for high growth firms whereas it is insignificant for low growth firms (Aivazian et al., 2005b).

D'Mello and Miranda (2010) examine the US non-financial and non-regulated firms over the period 1965-2004 to investigate the relationship between long-term debt and overinvestment. They classify firms as levered and unlevered to accurately analyze the overinvestments around new debt issues by unlevered firms which enable to present a direct test of overinvestment control by long-term debt. Their findings indicate that overinvesting firms reduce their abnormal capital expenditures when they issue debt (D'Mello & Miranda, 2010).

In their study conducted on Spanish companies, Gomariz and Ballesta (2014) use debt maturity and financial reporting quality as the mechanisms decreasing information asymmetry. For the period 1998-2008, the investment efficiency of Spanish-listed firms is influenced by the financial reporting quality and having debt with a shorter maturity. Consistent with the disciplining and monitoring role of debt maturity, their findings indicate that having debt with shorter maturity mitigates both over- and underinvestment problems and indeed, debt maturity and financial reporting quality are substitutes. (Gomariz & Ballesta, 2014).

On the other hand, Fernandez (2011) conducts his research with three developing countries: Chile, Brazil, and Mexico for the period 1997 to 2006 and concludes that investment level of a firm is negatively related to the long-term debt.

2.4.3 Product market competition and corporate investment policy

The external dynamics enforce pressure on managers to increase efficiency (Jensen, 1986). Competitive pressure on management is essential regarding determining the allocation of resources within the firm (Fresard & Valta, 2015). Estimating product market competition with the changes in import tariff rates, Fresard and Valta (2015) provide evidence that competition has a significant impact on corporate policies, implying that firms adjust their investment and financing policies with an increase in competition. For instance, increased competitive pressure leads a reduction in capital expenditures (Fresard & Valta, 2015).

Laksmana and Yang (2015) argue that managers are disciplined by the product market competition on the usage of free-cash-flow and are encouraged to undertake risky projects.

Using a sample of Chinese manufacturing firms over the period 1999-2010, Jiang, Kim, Nofsinger, and Zhu (2015) document a positive relation between competition and corporate investments. Furthermore, they provide evidence that in highly competitive industries, high investment is value enhancing for firms. With their cross-country analysis on the wireless industry, Houngbonon and Jeanjean (2016) document an inverted-U shaped relationship between competition and investment. Estimating competition by using Lerner Index, Houngbonon and Jeanjean (2016) show that competition increases investment up to a threshold level and after this level, competition starts to decrease investment level in the wireless industry all around the world.

Recently, Stoughton, Wong, and Yi (2017) model a two-stage Bayesian game in product market competition and then empirically support their claim that investment is more efficient in concentrated industries.

In their cross-country analysis with 38 developed and developing countries, using S&P Transparency and Disclosure ratings for estimating corporate governance, Cosset et al. (2016) show that corporate governance increases investment in developing countries for competitive industries. They demonstrate that in developing countries competition and governance are complements regarding firm value whereas in developed countries competition and governance are substitutes.

2.5 Investment efficiency

In a perfect world, companies allocate their funds in such a way that the marginal benefit of capital for each project will be equated (Modigliani & Miller, 1958). Unfortunately, in the real world, many market frictions such as information asymmetries among market participants, transactions costs (such as taxes), irrational investors and agency costs prevent firms to allocate their sources optimally. Information asymmetry and agency conflicts are the most critical factors that cause firms to deviate from their optimal investment level (Stein, 2003). In fact, information asymmetry of adverse selection and moral hazards due to agency conflicts between managers and shareholders predict underinvestment and overinvestment, respectively (Jensen, 1986; Lang et al., 1996; Myers &Majluf, 1984; Stulz, 1990).

Recently many studies attempt to investigate how investment efficiency of a firm is affected by the financial reporting quality. Financial reporting quality is an important mechanism that mitigates information asymmetry between investors and managers. Supporting the fact that greater transparency leads to higher investment efficiency, Biddle, Hillary, and Verdi (2009), Chen, Hope, Li, and Wang (2011), Cheng, Dhaliwal, and Zhang (2013) and in their model Dutta and Nezlobin (2017)

demonstrate that firms with high quality of financial reporting deviate less from their expected investment level resulting from the reduction of frictions such as moral hazard and adverse selection.

Social responsibility disclosure improves investment efficiency for the Chinese and European market as well by providing incremental information to financial reporting quality (Samet & Jarboui, 2017; Zhong & Gao, 2017). Furthermore, consistent with the fact that greater transparency improves investment efficiency, Chen, Xie, and Zhang (2017) examine non-financial US firms for 1983 to 2011 and document that high quality of analysts' forecast make firms to approach their expected investment level.

Stoughton and Wong (2017) take product market competition as a mechanism leading a more informative environment and conclude that competition enhances investment efficiency.

Chen, Ghoul, Guedhami, and Wang (2017) analyze newly privatized firms from 64 countries to examine the effect of information asymmetry and agency problems on investment efficiency which is estimated by the investment-Q sensitivity. They use foreign (and government) ownership as mechanisms that reduce (increase) information asymmetry and agency problems. Consistent with the argument that information asymmetry and agency conflicts cause investment inefficiencies, their results indicate that foreign ownership increases investment efficiency, whereas government ownership reduces efficiency (Chen et al., 2017).

The empirical analysis conducted with a dataset of 100000 Chinese firms for period 2000 to 2007 by Ding, Knight, and Zhang (2016) demonstrate that in the state sector due to the lack of screening and monitoring of firms by banks, Chinese firms suffer from overinvestment problem. On the other hand, Ma and Jin (2016) show that

firms overinvest in China since investment scale rather than investment efficiency is the driving performance enhancement force for Chinese companies.

With the aim of testing overinvestment and underinvestment hypotheses, Morgado and Pindado (2003) investigate the relationship between investment and firm value for non-financial-listed firms in the Spanish market. Their results indicate that there is a quadratic relation between investment and firm value which is consistent with over- and underinvestment hypothesis (Mordago & Pindado, 2003). In other words, there is an optimal investment level for firms and firms investing less than their optimal level have an underinvestment problem while firms investing more than their optimal level of investment have an overinvestment problem. Furthermore, according to Mordago and Pindada's (2003) findings the expected level of investment is higher for firms with better investment opportunities set than fır firms with poor investment opportunities set.

Estimating investment efficiency is the most crucial part of the studies mentioned above as without deciding whether firms suffer from overinvestment or underinvestment problems, the implications of studies will be invalid. There are many different approaches to determine the optimal or expected investment level of firms (see Appendix A).

CHAPTER 3

METHODOLOGY

The objective of this thesis is to explore the effect of corporate control mechanisms on investment policy of European firms. To fully understand the monitoring and the disciplining role of control mechanisms, it is crucially important to figure out whether firms are investing above or below their expected investment level. Examining the change in investment level regarding investment policy is not enough to figure out whether firms are investing efficiently.

Based on the literature review conducted in the previous chapter, information asymmetry of adverse selection and moral hazards due to agency conflicts among the stakeholders predict underinvestment and overinvestment (Jensen, 1986; Lang et al., 1996; Myers &Majluf, 1984; Stulz, 1990). Firms investing below (above) the expected investment level suffer underinvestment (overinvestment) problem. The impact of control mechanisms is supposed to be different for under- and overinvesting firms. Corporate investment level is expected to approach its expected level as the control mechanisms act as a monitor and discipline management. It will be an increase in investment level for underinvesting and a decrease for overinvesting firms.

The chapter is organized as follows: While the data and sample construction will be examined in the next, following which the variable descriptions will be presented. The descriptive statistics and correlation matrix will be analyzed in the third section. The chapter is finalized with method specification to investigate the relationship between corporate control mechanisms and investment efficiency, as

well as the effect of internal control mechanisms on investment efficiency under competition.

3.1 Data

For empirical analysis, we collect data from Thomson Reuters Eikon and Datastream covering the period 2000 to 2016. We select 12 European countries from the MSCI Europe & Middle East Developed Markets Index: Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom (UK). We eliminate Austria, Ireland, and Portugal which have an insufficient number of publicly listed companies.

All non-financial-listed companies, having positive sales value with more than three years available data are included in the sample. We exclude companies whose primary business is the financial sector due to their specific nature of financial statements (SIC codes between 6000 and 6999). In addition to financial companies, we eliminate firms in utility sector as well due to their regulatory environment in the industry. Moreover, we exclude firms with negative sales or no sales information. The final sample includes 1164 companies from the UK, 636 from France, 582 from Germany, 364 from Sweden, 221 from Italy, 178 from Norway, 158 from Switzerland, 132 from Spain, 117 from Finland, 105 from Denmark, 92 from Belgium and 80 from the Netherlands. There are 3828 firms in total with 65892 firm-year observation over the period 2000 to 2016.

We winsorize all the continuous variables at 1 and 99 percent level to mitigate the influence of outliers. Also, we make inflation adjustment for sales, capital expenditures, and total asset variables.

3.2 Variables

3.2.1 Dependent variables

To fully understand the impact of corporate control mechanisms on firm investment policy, we use two investment measures as dependent variables: overinvestment, and underinvestment. Using the deviations from the expected investment level instead of firm investment level make us better grasp how the control mechanisms influence the investment policy of a firm. In fact, the direction of the relation can be different for over and under-investing firms.

Following Biddle et al. (2009), Chen et al. (2011), Verdi (2006) and Gomariz and Ballesta (2014) efficient investment is defined as the deviation from the expected investment level of a firm. Based on the literature on efficient investment, to estimate the expected investment level, we use a model in which investment is predicted as a function of growth opportunities of a firm.

In their study, Biddle et al. (2009) model expected investment level as a function of sales growth which is a proxy for growth opportunities. Chen et al. (2011) include an additional variable to take into consideration of predictability differences for revenue increases and revenue decreases.

Following Biddle et al. and Chen et al. (2011), we model investment as a function of growth opportunities, which is estimated by sales growth. Also, we add a dummy variable to capture the possible differential predictability for positive sales growth and negative sales growth. In other words, we expect the relationship between sales growth and investment differs when sales growth is positive or negative. Following Chen et al. (2011), we include additional firm control variables such as size, leverage, financial slack, firm age, tangibility, and profitability as well

as sales growth. All these control variables are introduced with one period lag in the efficiency model.

The expected investment model is,

$$
\begin{aligned}
Investment_{i,c,t+1} \\
&= \beta_0 + \beta_1 Sales\ Growth_{i,c,t} + \beta_2 D_NEG_{i,c,t} \\
&+ \beta_3 Sales\ Growth_{i,c,t} D_NEG_{i,c,t} + \beta_4 Size_{i,c,t} \\
&+ \beta_5 Leverage_{i,c,t} + \beta_6 FinancialSlack_{i,c,t} \\
&+ \beta_7 Age_{i,c,t} + \beta_8 Profitability_{i,c,t} \\
&+ \beta_9 Tangibility_{i,c,t} + \varepsilon_{i,t+1}
\end{aligned}
\tag{1}
$$

where i, c, t represents firm, industry, country and year, respectively.

$Investment_{i,c,t+1}$ is the inflation-adjusted capital expenditures scaled by lagged total assets for firm i in year t which is also inflation adjusted.

$Sales\ Growth_{i,c,t}$ is the annual sales growth rate for firm i in year t.

$D_NEG_{i,c,t}$ is the dummy variable which is equal to 1 when sales growth is negative and 0, otherwise. $Size_{i,c,t}$ is the natural logarithm of total assets of firm i in year t.

$Leverage_{i,c,t}$ is the total debt of firm I in year t scaled by total asset of the firm.

$Financial\ Slack_{i,c,t}$ is the ratio of cash and short-term investment to total assets of firm i in year t. $Age_{i,c,t}$ is the natural logarithm of firm age

$Tangibility_{i,c,t}$ of assets is estimated by the ratio of plant, property and equipment to total assets.

$Profitability_{i,c,t}$ is estimated by earnings before interest and taxes (EBIT) scaled by total assets.

Estimating the model cross-sectionally for all industries in each country is not statistically possible since the additional explanatory variables in the model increase the minimum sample size requirement for the estimation of the model. Therefore, we regress the equation for each country with industry-adjusted variables which allows us to incorporate the industry impact in the model. In other words, we estimate the model cross-sectionally by country-specific industry-adjusted dependent and independent variables, which requires 168 regressions (12 countries * 14 years=168).

To estimate industry-adjusted variables, we first calculate the median of each variable for every industry for each country in year t. Then, for example, to calculate the industry-adjusted size of firm i, we use the median size of the industry that firm i belongs to and take the difference with the industry median and firm size which gives the industry-adjusted size variable for firm i. We take into account the industry effect for the investment equation by using industry-adjusted variables.

We classify industries according to Fama-French industry classification for 10 industry portfolios. These industries are manufacturing, durables, non-durables, telecom, energy, shops, health, business equipment, utilities and others. Finance and utilities are not included due to our sample selection procedure.

The fitted values of the investment equation give the expected investment level for a firm whereas the residuals will be the deviations from this expected investment level. Negative deviations from the predicted level indicate underinvestment while positive deviations specify overinvestment.

We define Overinvestment as the positive deviations from the expected investment level. This variable reports how much more a firm invests than its expected level. Similarly, we define Underinvestment as the negative deviations

from the predicted investment level. Underinvestment gives how much less a firm invest then its optimal level.

3.2.2 Independent variables

3.2.2.1 Corporate control mechanism variables

The main aim of this thesis is to explore the relationship between corporate control mechanisms and corporate investment policy. The corporate investment policy is the dependent variable, which is estimated by two different variables: Overinvestment, and underinvestment.

Corporate control mechanisms, including external and internal mechanisms, are the primary independent variables in this study. Based on the literature review, institutional investors, debt financing, maturity of debt and product market competition are important regarding monitoring and controlling management and as a result, corporate financing and investment policies. Therefore, institutional investors, the amount and the maturity of debt are the internal corporate control mechanisms and product market competition is the external control mechanism.

In the light of studies indicating that large shareholders have an incentive to monitor and control management, institutions holding 5% or more are counted as strategic investors and we take the sum of the percentage of strategic holdings of 5% or more owned by investment banks, institutions, pension funds and endowment funds as Institutional Ownership (InstOwn).

Based on the literature, debt financing and maturity of debt are the other internal corporate control mechanisms. Debt is defined as the ratio of total debt to total assets. In order to explore the relationship between debt maturity and

investment efficiency, we define the debt maturity variable as the percentage of short-term debt in total debt and label it as STD/TD.

Finally, our last control mechanism is product market competition which is an external disciplinary factor that motivates and controls management. As far as the literature on product market competition is concerned, competition is assessed in many different ways, such as market concentration ratios, Herfindahl-Hirschman Index (HHI) (e.g. Ammann et al., 2013; Beiner et al., 2011; Byun et al., 2012; Giroud & Mueller, 2010, 2011; Hou & Robinson, 2006; Tian & Twite, 2011), reductions in import tariff rates (e.g. Fresard &Valta, 2012; 2016), Lerner Index (consider as the market pricing power of a firm) (Lerner, 1934), firm's rents from production (considered as an ex post measure of market power) (e.g. Beiner et al., 2011; Januszewski et al., 2002; Köke & Renneboog, 2005).

We use two different product market competition measures: Herfindahl-Hirschman Index (HHI) and Lerner Index. HHI is defined as the sum of squared market shares of firms in the industry. HHI can be expressed as,

$$HHI_{j,t,c} = \sum_{i=1}^{n_j} s_{i,j,t,c}^2 \qquad (2)$$

where $s_{i,j,t}$ is the market share of firm i in industry j for year t in country c. Market share of a firm is computed using firm's sales. We include all non-financial-listed companies in Thomson Reuters Eikon database which have positive sales value. We exclude firms having either missing sales information or negative sales since negative sales cause miscalculation of HHI due to the square of market share term in the formulation.

We use 3-digit SIC code to classify industries to avoid both too coarse a partition and too narrow a partition. For instance, with 2-digit SIC code, under SIC

code 37, motorcycle, bicycle, and parts manufacturing (with 3-digit SIC code classification 375) and ship building and repairing (with 3-digit SIC code classification 373) industries are in the same class whereas they will be in different industries with 3-digit SIC code. On the other hand, 4-digit SIC code classification is too narrow a partition regarding the product market competition since many related industries will be in different classes, although they may be in the same competitive environment. On the other hand, 2-digit SIC code classification is too coarse a partition regarding the competition since many unrelated industries will be in the same class; however, they are unlikely to compete with each other. As a result, 3-digit SIC code classification seems to be the one that makes most sense.

We compute HHI for each 3-digit SIC industry within each country for every year which allows competition of an industry to vary yearly within each country. Taking the squares of market share of each company gives the priory importance to the largest companies within an industry. HHI ranges from zero to one. HHI is close to one in highly concentrated industries in which large firms have the market power, and it is difficult to enter and survive in that industry for other firms due to high entry costs. On the other hand, for industries with low entry costs and which have many small firms, HHI is close to zero. In other words, in highly competitive industries HHI is close to zero, whereas it is close to one in industries with low competition.

The other product market competition measure is the product market pricing power of a firm. We use price-cost margin, usually referred as Lerner Index (LI), to estimate the market power of a firm. Following Datta, Iskandar-Datta, and Sharma (2011) and Datta, Iskandar-Datta, and Singh (2013), we use price-cost margin to measure the pricing power of a company which is estimated as the difference of sales

from cost of goods sold (COGS) and selling, general and administrative expenses (SG&A) scaled by sales. That is,

$$Price - Cost\ Margin\ (PCM) = \frac{Sales - COGS - SG\&A}{Sales} \quad (3)$$

Following Datta et al. (2011), in the case of missing data, we use operating income for the numerator of the formula. Also, to capture the industry-specific factors affecting the pricing power of a firm, we take the industry-adjusted price-cost margin. We follow the method of Datta et al.'s (2011) and estimate the industry adjusted pricing power as the difference of firm's price-cost margin from the weighted price-cost margin of all firms within the industry that firm belongs. Industry adjusted Lerner Index (LI) can be expressed as,

$$LI(ind\ adj)_{i,t} = PCM_{i,t} - \sum_{j=1}^{n} w_{j,t} LI_{j,t} \quad (4)$$

where, w_i is the sales weight of firm i calculated as the ratio of sales of firm i to the total industry sales for year t. We use 3-digit SIC code for industry classification and make the industry adjustment within a county for each year. Using industry adjusted Lerner Index allows us to capture the intra-industry market power of firm which is important regarding the differences in price-cost margin structures within each industry.

A firm with high market pricing power has a competitive advantage over the other firms in the same product market which implies a high monopoly power. In other words, having little or no pricing power makes firm to face strong product market competition. Therefore, similar to HHI competition measure, high Lerner Index indicates lower product market competition. In fact, HHI is an industry level competition measure while Lerner Index is a firm level competition measure.

3.2.2.2 Control variables

Following the finance literature, we include firm size, profitability, financial slack, firm age, firm riskiness and free-cash-flow as control variables as well as industry fixed effects and country fixed effects. Including the country fixed effects allow us not only control country-specific effects but also handle country level omitted variable problems (Doidge, Andrewkarolyi, Stulz, 2007). Despite including all these control variables as well as country and industry fixed effects, it is always possible to have omitted variables that may be related to the analysis, nonetheless, adding more variables for model completeness come with a drawback of decreasing sample size (Chen et al., 2011). Thus, due to the trade-off between model completeness and small sample size, following the literature, we pick the most critical control variables for our empirical analyses.

Size is estimated by the natural logarithm of inflation-adjusted total assets. Larger firms have a competitive advantage regarding the economies of scale, however increasing firm's assets unnecessarily can cause inefficient use of the firm's resources. Although small firms may have higher transaction costs and difficulty to access external capital markets, the tendency to grow fast make small firms invest more than their expected level. On the other hand, as firms get larger, their growth appetite may decrease. Therefore, the expected sign for size can be positive or negative.

Profitability (Profitability) is one of the other control variable estimated by earnings before interest and taxes (EBIT) scaled by total assets. Despite the common belief that profitable firms increase their investment level due to the increase in internal funds, firms with higher operating profit may lose their tendency to invest

more than the expected level. Thus, the expected sign of profitability can be either positive or negative.

Motivated by the previous studies, financial slack (FinSlack), is included as a firm-specific control variable in the investment equation (Richardson, 2006; Chen et al. 2011). It is estimated by cash and short-term investment scaled by total assets and represents the most liquid assets of the company. It is expected to have a positive effect of financial slack on the investment level since manager with a high amount of financial slack may have an incentive to use it for their pecuniary benefits or investments, causing agency problems between managers and shareholders.

Similarly, a high amount of free-cash-flow (FCF) creates agency problem (Jensen, 1986). Thus, FCF is another variable controlling managers' incentives of empire building and is estimated by cash from operating activities minus common and preferred dividends scaled by total assets.

Sales volatility of a company not only makes it difficult to obtain external finance for projects but also discourages management to undertake new projects. But on the other hand, the uncertainty about the future sales make optimistic managers invest more to capture the opportunity of high demand. We estimate Sales Volatility by the standard deviation of the last five years sales with at least three non-missing observations.

Asset structure is also essential regarding estimating the expected investment level as firms without enough plant, property, and equipment can miss an opportunity to invest in a value-increasing project on time. Therefore, asset structure estimated by the tangibility of a firm is expected to increase its investment level. Tangibility is evaluated by plant, property, and equipment scaled by total assets.

Motivated by prior research, firm age (Age) is included as a control variable in the investment equation which we use to estimate the overinvestment and underinvestment variables. Age is measured by the natural logarithm of the difference of year t and incorporation year (e.g., Biddle et al., 2009; Chen et al. 2011; Richardson, 2006; Samet & Jarboui, 2017). Age is expected to have a negative effect on investment level as young firms have a tendency to invest more due to their eagerness to grow fast.

The variables used in the empirical analyses are summarized in Appendix B.

3.3 Descriptive statistics and correlation matrix

We estimate the investment efficiency for 12 European developed markets. The descriptive statistics for the dependent and independent variables are given in Table 2.

Table 2. Descriptive Statistics

variable	N	min	median	max	mean	Std.dev.
Overinvest	39,686	0.0000	0.0298	0.4020	0.0479	0.0577
Underinvest	6,943	0.0000	0.0105	5.3029	0.0154	0.0772
Leverage	50850	-0.0374	0.1762	0.9273	0.2115	0.1976
STD_TD	43167	0.0000	0.3335	1.0000	0.4200	0.3331
InstOwn	40269	0.0000	0.0000	0.4900	0.0641	0.1058
HHI	62245	0.0988	0.5395	1.0000	0.6005	0.3007
LI	65076	-15.5200	-0.0010	0.5712	-0.3260	1.7965
Size	51259	6.3767	11.8525	18.0978	11.9890	2.5398
Profitability	50192	-1.4370	0.0540	0.3947	-0.0050	0.2544
FinSlack	51184	0.0001	0.1034	0.8806	0.1691	0.1858
FCF	47775	-0.9971	0.0461	0.3237	0.0089	0.1836
SalesVolatility	44492	0.0214	0.1893	2.4706	0.3361	0.4223
Tangibility	50729	0.0000	0.1564	0.8931	0.2272	0.2234

There are 46,943 firm-year observations in total for firms investing more or less from their expected investment level. 39,686 firm-year observations belong to the overinvesting group whereas 6,943 belong to underinvesting firms group. We lost 18,447 firm-year observations due to missing data for investment expenditures.

Table 3 provides the correlation matrix for the independent variables. The highest correlation is between free-cash-flow and Lerner Index which is equal to 0.404. The correlation between leverage and financial slack is the second largest correlation, which is -0.359. The correlation between size and free-cash-flow is 0.356. The other correlations do not exceed 0.340. Although the correlations between the independent variables are low enough to continue to empirical analysis, to check the lack of multicollinearity, we also control the collinearity diagnostics which includes variance inflation factor (VIF), squared root of VIF, and tolerance. All the VIF values are below 1.5, and all the tolerance values are higher than 0.67 (see Appendix C, Table C1). According to Hair, Black, Babin, and Anderson (2010), the threshold values for VIF is 10 and for tolerance, it is 0.10. In other words, to conclude the lack of multicollinearity, tolerance should be higher than 0.1 and VIF should be lower than 10. All the VIF and tolerance values satisfy these conditions. But to ensure the lack of multicollinearity, we also control the correlation matrix of coefficients of regression analysis, which is accepted as the main multicollinearity diagnostics. The highest correlation is between the coefficients of free-cash-flow and the coefficient of profitability, which is -0.4902 (see Appendix C, Table C2). The other correlation values between the coefficients of regression analysis do not exceed 0.2957. Therefore, we can conclude that multicollinearity is not the case in the empirical analysis.

Table 3. Correlation Matrix

	Leverage	STD_TD	InstOwn	HHI	LI	Size	Profit	FinSlack	FCF	SalesVol	Tan
Leverage	1										
STD_TD	-0.239*	1									
InstOwn	-0.028*	-0.061*	1								
HHI	0.097*	-0.026*	-0.047*	1							
LI	0.078*	-0.032*	-0.006	0.05*	1						
Size	0.243*	-0.306*	0.032*	0.150*	0.189*	1					
Profitability	-0.013*	-0.059*	0.008	0.007	0.087*	0.096*	1				
FinSlack	-0.359*	0.051*	0.002	-0.119*	-0.264*	-0.286*	-0.050*	1			
FCF	0.008	-0.093*	0.014*	0.036*	0.404*	0.356*	0.229*	-0.276*	1		
SalesVolatility	-0.056*	0.048*	-0.013*	-0.033*	-0.332*	-0.258*	-0.201*	0.234*	-0.315*	1	
Tangibility	0.327*	-0.227*	-0.029*	0.178*	0.097*	0.273*	0.030*	-0.315*	0.168*	-0.087*	1

Note: * p<0.1

3.4 Method

We use panel data regression with country-fixed effects and industry-fixed effects as well as year-fixed effects to handle the possible omitted country and industry-specific variables problem. Also, the independent variables are introduced with their one period lag in the model to mitigate possible endogeneity problems.

The model is,

$$\begin{aligned} Investment\ Policy_{i,j,t+1} &= \beta_0 \\ &+ \sum_{k=1}^{4} \beta_{k,1} Corporate\ Control\ Mechanism_{i,j,k,t} \\ &+ \sum_{k=1}^{5} \beta_{k,2} Firm\ Control\ Variables_{k,i,j,t} \\ &+ \sum_{k=1}^{12} \beta_{k,3} Countries_k + \sum_{k=1}^{10} \beta_{k,4} Industries_k \\ &+ \sum_{k=1}^{15} \beta_k Years_k + \varepsilon_{i,t+1} \end{aligned} \tag{5}$$

where i, j, t denote firm, country and year, respectively.

Investment Policy represents the three investment dependent variables of the firm i for year t+1: Overinvestment, or Underinvestment.

Corporate Control Mechanisms represent Institutional ownership, leverage, maturity of debt (STD/TD) and Product market competition of firm i for year t by HHI or industry-adjusted Lerner Index.

Control Variables represents the firm control variables: Size, Profitability, Financial Slack (FinSlack), Free-Cash-Flow (FCF), Tangibility and Sales Volatility of firm i for year t.

Countries represents the dummy variables for 12 countries: the UK, Germany, France, Spain, Italy, Switzerland, Belgium, Sweden, Finland, Norway, Denmark, and the Netherlands.

Industries represents the dummy variables for 10 Fama-French industry classification.

Years represents the dummy variables for the years included in the analysis.

ε_{it} is the error term including both the individual effect component and time-invariant component.

For the second part of the analysis, to explore the effect of internal corporate control mechanisms on firm investment efficiency under product market competition, we use dummy variables instead of continuous competition variables which make the interpretation easier. There are three dummy variables: competition (high), competition (medium) and competition (low). Competition (high), competition (medium) and competition (low) dummy variables are equal to 1 if HHI or LI values lie in the bottom, medium or top tercile, respectively and equal to 0 otherwise. In other words, competition (low), competition (medium) and competition (high) dummy variables indicate whether HHI or LI lies in the top, medium and bottom tercile.

The second model can be expressed as,

$$
\begin{aligned}
&Investment\ Policy_{i,j,t+1} \\
&= \beta_0 \\
&+ \sum_{k=1}^{3} \sum_{m=1}^{3} \beta_{k,m,1}\ Internal\ Control\ Mechanism_{i,j,k,t} \\
&* Competition(dummy)_{i,j,m,t} \\
&+ \sum_{k=1}^{2} \beta_{k,2} Competition(dummy)_{k,i,j,t} \\
&+ \sum_{k=1}^{6} \beta_{k,3} Control\ Variables_{k,i,j,t} + \sum_{k=1}^{12} \beta_{k,4} Countries_k \\
&+ \sum_{k=1}^{10} \beta_{k,5} Industries_k + \sum_{k=1}^{15} \beta_{k,6} Years_k + \varepsilon_{i,t+1}
\end{aligned}
\tag{6}
$$

where; i, j, t denote firm, country and year, respectively.

Investment Policy represents the three investment dependent variables of the firm i for year t+1: Overinvestment or Underinvestment.

Internal Control Mechanisms represent internal corporate control mechanisms: Institutional ownership, leverage, maturity of debt (STD/TD) of firm i for year t.

Competition (dummy) represents dummy variables for HHI or LI terciles. Competition (high), Competition (medium) and Competition (low) dummy variables are equal to 1 if HHI (LI) lies in the bottom, medium and top terciles.

Control Variables represents the control variables: Size, Profitability, Financial Slack, FCF, Sales Volatility and Tangibility of firm i for year t.

Countries represents the dummy variables for 12 countries

Industries represents the dummy variables for 10 Fama-French industry classification.

The model includes interaction terms between product market competition dummies, and internal control mechanisms to explore whether competition mediates the impact of control mechanisms on corporate investment policy. We include all the interaction terms with competition dummies but drop one of the competition dummies in order not to have perfect multicollinearity. We also drop the main effect of internal corporate control mechanisms in the model which does not change the overall F statistic, degrees of freedom and R-square of the full model. In fact, it will be just a reparametrization of the full model. Moreover, the interactions will be the simple slopes of investment inefficiency (depending on which investment inefficiency variable is the dependent variable) on internal control mechanisms (leverage, debt maturity, institutional ownership) for each of the three levels of competition: competition (high), competition (medium), competition (low).

CHAPTER 4

EMPIRICAL FINDINGS

The primary aim of this thesis is to explore the relationship between corporate investment policy and various corporate control mechanisms in 12 European developed markets: the UK, France, Germany, Sweden, Norway, Switzerland, Spain, Italy, Denmark, the Netherlands, Finland and Belgium. To fully understand the effect of control mechanisms on corporate investment policy, first we need to estimate the expected investment level of each company in the sample and then we classify them according to their distortions from the expected investment level as overinvesting or underinvesting.

4.1 Determinants of corporate investment policy

Following Richardson (2006), Biddle et al. (2009), Chen, et al. (2011), Samet and Jarboui (2017), we model investment as a function of growth opportunities. Firms having higher growth opportunities are expected to invest more than other firms (Biddle et al., 2009; Chen et al. 2011; Richardson, 2006; Samet & Jarboui, 2017). Following Chen et al. (2011), the growth opportunity is proxied by sales growth and it is expected to have an increase in investment level of a firm as its sales growth rises. In addition to sales growth, following Chen et al. (2011), to capture the possible differential predictability for positive and negative sales growth, we include a dummy variable which is equal to 1 when a firm has negative sales growth. The interaction term of sales

growth and dummy variable is included in the model as well to take into consideration of different firm behavior when sales growth is negative.

We also include additional firm-specific control variables in the expected investment level equation such as size, leverage, profitability, financial slack, age, and asset structure of a firm. In Table 4, the regression analysis results for the expected investment level equation is given for pooled sample. First and second extended investment equations on the second and third columns of Table 4 are the results for expected investment level equation with corporate control mechanisms.

Supporting the fact that firms with higher growth opportunities increase their investment level, growth opportunities variable which is proxied by sales growth has a statistically significant positive effect on investment level. Consistent with our expectation to have a different impact of sales growth on investment when a firm has negative sales growth, negative sales growth dummy and the interaction term of negative sales growth dummy and sales growth have a statistically significant negative effect on investment level. In other word, sales growth enhances firm investment level only when it is positive.

Table 4. Multiple Regression Analysis with Investment Dependent

VARIABLES	Prediction	(1) investment	(1st Extended) investment	(2nd Extended) investment
Leverage	-	-0.0084**	-0.0067	-0.0077*
		(-2.2939)	(-1.5855)	(-1.7800)
STD/TD	-		-0.0013	-0.0013
			(-0.9765)	(-0.9369)
InstOwn	-		-0.0036	-0.0038
			(-1.0557)	(-1.1195)
HHI	+		0.0054	
			(1.6298)	
Lerner Index	+			0.0024
				(1.4217)
SalesGrowth	+	0.0025***	0.0030***	0.0026***
		(3.3811)	(3.2965)	(2.7324)
NEG	-	-0.0051***	-0.0039***	-0.0038***
		(-6.9459)	(-5.1768)	(-4.8284)
NEG*SalesGrowth	-	-0.0079**	-0.0022	-0.0003
		(-2.0054)	(-0.5077)	(-0.0701)
Size	+/-	-0.0020***	-0.0014***	-0.0015***
		(-5.3076)	(-3.6443)	(-3.8562)
Profitability	+/-	-0.0046***	-0.0020	-0.0017
		(-3.2227)	(-0.7452)	(-0.5383)
FinSlack	+	0.0027	0.0121***	0.0124***
		(0.8245)	(2.9639)	(2.9718)
Age	-	-0.0036***	-0.0036***	-0.0036***
		(-5.0476)	(-4.3875)	(-4.3767)
Tangibility	+	0.1215***	0.1126***	0.1117***
		(23.0133)	(20.7444)	(20.8107)
Constant		0.0695***	0.0431***	0.0491***
		(10.4370)	(5.6882)	(6.8213)
R-sqr		0.3892	0.3864	0.3925
Observations		26,346	19,479	19,375
Number of firms		2,445	2,206	2,186

Note: We use 1 and 99 percent level winsorized variables with their one-period lagged values in the regression. Country, industry and year fixed effects are used. Huber-White standard errors are used to deal with possible heteroscedasticity. Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The findings indicate that leverage, size, profitability, and age have a statistically significant negative effect on firm investment level. On the other hand, tangibility has a statistically significant positive impact on investment expenditures level, indicating that firms having a higher amount of plant, property, and equipment tend to increase their investment level. Although financial slack does not have a significant effect in the first regression, it has a statistically significant positive impact on investment expenditure level in the second and third regressions which is consistent with the fact that firms with a higher amount of cash increase their investments.

Following the related literature on corporate investment policy, expected investment level is estimated by the equation 1. The results given in Table 4 is for the regression analysis of equation 1 but for the pooled sample with country, industry and year fixed effects to figure out how the variables used in the equation affect corporate investment level. On the other hand, the overinvestment and underinvestment dependent variables are estimated with the model given in Equation 1 which is estimated by using cross-sectional regression for each country with industry-adjusted variables to incorporate the industry impact in the model.

Table 5 gives the expected effect of corporate control mechanisms on investment inefficiencies: over- and under-investment.

Table 5. Corporate Control Mechanisms and Expected Effects on Investment Inefficiencies

Panel A: Internal Corporate Control Mechanisms			
Variables	Proxy	Predicted Sign	Reason
Leverage	Total Debt/Total Asset	Negative	Debt creation reduces the available cash flow to invest in worthless projects or to waste, it reduces the agency cost of FCF (Jensen, 1986) and leads management to recommit to be more productive for their future payments (Grossman & Hart, 1982)
Debt Maturity	STD/TD	Negative	Having debt with shorter maturity make firm to go to the debt market more frequently to finance their projects which enables banks to control and monitor management better (Diamond, 1991), which reduces the tendency of a firm to invest in value-destroying projects.
Institutional Ownership	Ownership of investment banks, institutions, pension funds and endowment funds	Negative	Act as a monitoring mechanism disciplining management to invest in value increasing projects. Ward, Yin, and Zeng (2018, p.1), demonstrate that firms having highly motivated monitoring institutional ownership deviate less from predicted investment level.
Panel B: External Corporate Control Mechanisms			
Product Market Competition	Herfindahl-Hirschman Index (HHI) Industry-adjusted Lerner Index	Positive Positive	Competitive environment disciplines management not to invest more than its expected investment level. In fact, increased competitive pressure leads a reduction in capital expenditures (Fresard & Valta, 2016).

4.2 Corporate control mechanisms and investment efficiency

Table 6 shows the multiple regression analysis results for overinvestment dependent variable. The panel data generalized least squares regressions include country, industry and year fixed effects with firm control variables: size, profitability, financial slack, tangibility, free-cash-flow and sales volatility of a firm. Corporate control mechanisms are the amount of debt, the maturity of debt, institutional ownership and, at last, as an external control mechanism, product market competition. One-period lagged values of independent variables are used to decrease possible endogeneity. Also, to control for possible heteroscedasticity, Huber-White robust standard errors are used. The first regression uses Herfindahl-Hirschman Index as product market competition measure whereas, the second regression uses industry-adjusted pricing power of firm.

The results indicate that the two internal control mechanisms, leverage, and institutional ownership have a significant negative effect on the overinvestment of a firm whereas the other internal control mechanism, debt maturity, has an insignificant negative effect. The findings demonstrate that firms having a higher amount of debt decreases their overinvestment level. Similarly, firms with higher institutional ownership reduce the overinvestment level implying that institutional investors put pressure on management to mitigate overinvestment.

The findings demonstrate that corporate control mechanisms mitigate overinvestment problem, except debt maturity. The R-squared values are 0.3451 for the first regression and 0.3532 for the second regression.

Table 6. Estimation Results for Overinvestment

VARIABLES	Predicted	Actual	(1) overinvest	(2) overinvest
Leverage	-	-	-0.0130***	-0.0127***
			(-3.8342)	(-3.7348)
STD_TD	-	insig	-0.0012	-0.0014
			(-0.9889)	(-1.1589)
InstOwn	-	-	-0.0068**	-0.0070**
			(-2.2703)	(-2.3862)
HHI	+	+	0.0048**	-0.0026
			(1.9489)	(-1.4554)
LI	+	insig		-0.0026
				(-1.4554)
Size	+/-	-	-0.0018***	-0.0017***
			(-5.8338)	(-5.6433)
Profitability	+/-	-	-0.0047**	-0.0042*
			(-2.0693)	(-1.8810)
FinSlack	+	+	0.0088**	0.0065*
			(2.5305)	(1.8391)
FCF	+	+	0.0271***	0.0299***
			(6.6539)	(7.0902)
SalesVolatility	+	+	0.0096***	0.0104***
			(5.2285)	(5.5827)
Tangibility	+	+	0.0995***	0.0985***
			(22.6235)	(22.5241)
Constant			0.0392***	0.0415***
			(6.0660)	(6.7335)
R-sqr			0.3451	0.3532
Observations			23,459	23,512
Number of firms			3,085	3,068

Note: We use 1 and 99 percent level winsorized variables with their one-period lagged values in the regression. Country, industry and year fixed effects are used. Huber-White standard errors are used to deal with possible heteroscedasticity. Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The external control mechanism, product market competition is statistically significant for the first regression with HHI measure while it is insignificant for the second regression with industry-adjusted Lerner Index. The positive sign of the HHI variable indicates a negative effect of product market competition on overinvestment since as HHI approaches to one, the competition in the industry gets lower.

As shown in Table 6 among the firm control variables, size, and profitability have a negative and statistically significant impact on the overinvestment level of a firm, meaning that larger profitability firms have lower overinvestment problem. On the other hand, financial slack, free-cash flow, sales volatility, and tangibility of firm have a statistically significant positive effect on overinvestment. The findings indicate that firms with a high amount of plant, property, and equipment having a higher amount of financial slack, free-cash-flow and uncertainty about future sales suffer more overinvestment problem than other firms.

The multiple regression analysis with underinvestment dependent variable is given in Table 7. None of the corporate control mechanisms have a statistically significant effect on underinvestment. In fact, among the firm-specific control variables, only free-cash flow and sales volatility have a statistically significant impact on underinvestment level. Firms with higher sales volatility increase their underinvestment level. On the other hand, firms having a higher amount of free-cash flow reduce their underinvestment level.

The R-squared value for the regressions with underinvestment is too low to indicate a meaningful result, which is 0.0429 for the first regression and 0.0442 for the second regression. The sample size for underinvestment is lower than the sample size for overinvestment which may cause the small R-square values.

Table 7. Estimation Results for Underinvestment

VARIABLES	Predicted	(1) underinvest	(2) underinvest
Leverage	-	0.0073	0.0068
		(1.3451)	(1.0942)
STD_TD	-	0.0040	0.0038
		(1.1782)	(1.1287)
InstOwn	-	0.0131	0.0137
		(0.8812)	(0.9079)
HHI	+	-0.0007	
		(-0.3621)	
LI	+		-0.0003
			(-0.1574)
Size	-	-0.0002	-0.0001
		(-0.4867)	(-0.1452)
Profitability	-	-0.0009	-0.0039
		(-0.6305)	(-0.9047)
FinSlack	-	0.0140	0.0143
		(0.8807)	(0.7735)
FCF	-	-0.0067**	-0.0041
		(-2.0267)	(-1.1544)
SalesVolatility	+	0.0022*	0.0027**
		(1.8493)	(2.1081)
Tangibility	-	0.0007	0.0005
		(0.2551)	(0.1600)
Constant		0.0275***	0.0256***
		(3.8515)	(4.4380)
R-sqr		0.0429	0.0442
Observations		4,447	4,395
Number of firms		1,298	1,279

Note: We use 1 and 99 percent level winsorized variables with their one-period lagged values in the regression. Country, industry and year fixed effects are used. Huber-White standard errors are used to deal with possible heteroscedasticity. Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0

4.3 Internal control mechanisms and investment efficiency under competition

Table 8 presents the results of multiple regression analyses for overinvestment dependent variable. The regression analysis includes competition dummy interaction terms for both HHI and industry-adjusted LI dummies.

According to the multiple regression analysis results for overinvestment with HHI dummy variables given as the first regression in Table 8, leverage and institutional ownership have a statistically significant effect on overinvestment when competition in the industry is low, indicating that leverage and institutional investors are alternate governance mechanisms with product market competition. Leverage and competition are substitute governance mechanisms meaning that leverage act as a disciplinary force for management when product market competition is low. Similarly, institutional investors and competition are substitute governance mechanisms, implying that institutional investors act as monitors when competition in the industry is weak.

Table 8. Estimation Results for Overinvestment with Competition Dummies

VARIABLES	overinvest (HHI dummies)	overinvest (LI dummies)
Leverage*Competition(high)	-0.0033	-0.0059
	(-0.7222)	(-1.1050)
Leverage*Competition(medium)	0.0009	-0.0155***
	(0.1896)	(-3.9601)
Leverage*Competition(low)	-0.0075***	-0.0183***
	(-2.6463)	(-3.2552)
STD/TD*Competition(high)	-0.0022	-0.0035
	(-1.2785)	(-1.5112)
STD/TD* Competition (medium)	0.0005	-0.0005
	(0.2554)	(-0.2738)
STD/TD* Competition (low)	-0.0006	-0.0002
	(-0.2463)	(-0.1147)
InstOwn* Competition (high)	-0.0060	-0.0057
	(-1.1532)	(-0.9619)
InstOwn* Competition (medium)	-0.0060	-0.0074**
	(-1.3038)	(-2.0558)
InstOwn* Competition (low)	-0.0091**	-0.0071
	(-1.9824)	(-1.5299)
Competition (high)	-0.0033*	-0.0028
	(-1.8446)	(-1.1980)
Competition (medium)	-0.0050**	-0.0021
	(-2.1565)	(-1.1132)
Size	-0.0019***	-0.0018***
	(-6.2521)	(-5.7440)
Profitability	-0.0044**	-0.0046**
	(-2.0367)	(-2.0712)
FinSlack	0.0103***	0.0083**
	(2.9271)	(2.3949)
FCF	0.0280***	0.0258***
	(6.9075)	(6.3479)
Sales Volatility	0.0098***	0.0101***
	(5.4558)	(5.6306)
Tangibility	0.0974***	0.0993***
	(22.1848)	(22.7590)
Constant	0.0438***	0.0449***
	(6.7369)	(7.0127)
R-sqr	0.3523	0.3500
Observations	23,678	23,688
Number of firms	3,097	3,097

Note: We use 1 and 99 percent level winsorized variables with their one-period lagged values in the regression. Country, industry and year fixed effects are used. Huber-White standard errors are used to deal with possible heteroscedasticity. Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The second regression given in Table 8, for overinvestment with industry-adjusted Lerner Index competition measure dummies, leverage is statistically significant for competition (medium) dummy as well as competition (low) dummy. The results indicate that leverage acts as a governance mechanism when competition in the industry is not high enough to discipline management. The other internal control mechanism institutional ownership is statistically significant when the competition is in the medium tercile, implying that institutional investors act as a monitor when product market competition is not so high or not so low in the industry.

Consistent with the previous findings of this thesis, size and profitability have a statistically significant negative effect on overinvestment level, whereas financial slack, free-cash-flow, tangibility, and sales volatility have a statistically significant positive impact. The findings demonstrate that large, profitable firms have less overinvestment problem. On the other hand, firms with a high amount of financial slack, free-cash-flow and plant, property and equipment have more overinvestment problem.

Table 9 gives the empirical analysis results for underinvestment. Leverage has a statistically significant positive effect on underinvestment level when competition in the market is low. In fact, when product market competition is estimated by industry-adjusted Lerner Index, the positive impact of leverage is significant when competition is in the medium and bottom terciles. However, the R-squared values are too small to interpret meaningful results.

Table 9. Estimation Results for Underinvestment with Competition Dummies

VARIABLES	underinvest (HHI dummies)	underinvest (LI dummies)
Leverage*Competition(high)	0.0028	0.0006
	(0.3177)	(0.0812)
Leverage*Competition(medium)	0.0058	0.0090***
	(1.3505)	(2.9960)
Leverage*Competition(low)	0.0078*	0.0112***
	(1.9528)	(3.3321)
STD/TD*Competition(high)	0.0073	0.0089
	(1.0358)	(1.0654)
STD/TD* Competition (medium)	0.0010	0.0001
	(0.7136)	(0.0702)
STD/TD* Competition (low)	-0.0006	-0.0009
	(-0.3561)	(-0.5177)
InstOwn* Competition (high)	0.0276	0.0413
	(0.8818)	(0.9652)
InstOwn* Competition (medium)	0.0042	-0.0002
	(0.9089)	(-0.0598)
InstOwn* Competition (low)	-0.0056	0.0005
	(-1.4358)	(0.0970)
Competition (high)	-0.0041	-0.0036
	(-1.2645)	(-0.8241)
Competition (medium)	-0.0012	-0.0011
	(-0.6191)	(-0.8260)
Size	-0.0002	-0.0002
	(-0.6413)	(-0.7144)
Profitability	-0.0008	-0.0004
	(-0.4836)	(-0.3413)
FinSlack	0.0126	0.0124
	(0.8064)	(0.7969)
FCF	-0.0070**	-0.0058*
	(-2.0285)	(-1.9513)
Sales Volatility	0.0023	0.0022
	(1.6065)	(1.5458)
Tangibility	0.0014	0.0001
	(0.4510)	(0.0305)
Constant	0.0303***	0.0311***
	(3.7541)	(3.5180)
R-sqr	0.0427	0.0446
Observations	4,457	4,461
Number of firms	1,300	1,300

Note: We use 1 and 99 percent level winsorized variables with their one-period lagged values in the regression. Country, industry and year fixed effects are used. Huber-White standard errors are used to deal with possible heteroscedasticity. Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

4.4 Findings

Bank debt, which is commonly accepted as an internal control mechanism for the US firms, is expected to monitor and discipline management. The agency perspective predicts a negative effect of leverage on the investment inefficiencies. With a sample of developed European economies covering 12 countries and 4,397 firms over many different kinds of industries, the empirical analysis results support the controlling mechanism function of bank debt.

Statistically significant negative effect of leverage on overinvestment level of a firm is -0.013. The negative impact indicates that leverage is a governance mechanism for companies in European countries which are mainly bank-based economies. Supporting the 'control hypothesis for debt creation' of Jensen (1986), leverage motivates managers and their organizations to be efficient and productive to meet its future payment promises. Leverage mitigates the overinvestment problem implying that leverage acts as a monitoring and disciplining mechanism for firms and prevents investment distortions from the expected investment level.

Not only for the underinvestment dependent variable, but also for the overinvestment dependent variable, all the regressions with main effects of corporate control mechanisms or with interaction variables with competition and control mechanisms, have an insignificant impact. Although debt maturity is a control mechanism for the US firms, it appears that short-term debt is not an effective controlling device for the European firms. In other words, contradictory to the hypothesis that debt maturity structure is a control mechanism, our findings demonstrate that debt with shorter maturity is not a governance mechanism for European companies.

Institutional ownership is an important monitoring mechanism in the US economy. Although recently, studies are stating that not all the institutional investors bear the cost of monitoring, it is a generally accepted fact that institutional investors act as a monitor and discipline management in the US. For the overinvestment dependent variable, institutional ownership has a statistically significant negative effect which is equal to -0.0068. This significant negative effect implies that institutional investors are effective governance mechanisms for the European firms. Consistent with monitoring and disciplining role of institutional investors, higher institutional ownership mitigates overinvestment.

Product market competition is the external corporate control mechanism used in this thesis. Competition in the market is essential because it reduces the monopoly power of firms and disciplines managers regarding efficient use of resources. Similar to market for corporate control, product market competition is an effective governance mechanism for the US firms. The significant positive sign of HHI indicates a negative impact of competition on overinvestment. The negative effect of competition in the market is -0.0048, implying that product market competition is an effective governance mechanism for European firms as well.

Firms operating in a highly competitive product market have to discipline their management to mitigate overinvestment problem. One possible explanation is that firms preserve some of their resources in order not to lose the ability to take a position against its competitors in the market. Another explanation is that, in highly competitive industries, the performance of a manager can easily be compared with the managers of competitors which discourages managers to undertake non-value adding operations (Grullon & Michaely, 2007).

The analysis results for underinvestment dependent variable show that the control mechanisms have an insignificant effect on the absolute value of underinvestment level. The insignificant impact of corporate control mechanisms indicates that bank debt, institutional investors, short-term debt and product market competition do not work for underinvestment problem of European firms. Moreover, among the firm-specific control variables, only free-cash-flow has a significant negative effect on overinvestment. The findings for underinvestment demonstrate that only firms with a high amount of free-cash-flow decrease their underinvestment level. In fact, the R-square is very small for the regression with underinvestment dependent variable. One possible reason can be the sample size for underinvesting firms in developed European countries is not enough to give accurate results.

The empirical analysis conducted to investigate the effect of internal corporate control mechanisms on both overinvestment and underinvestment under product market competition demonstrate that leverage and institutional ownership have a significant negative impact on overinvestment when competition in the market is low. When competition in the market is weak, the negative effect of leverage on overinvestment is equal to -0.0075 when HHI is used as product market competition measure and is equal to -0.0183 when industry-adjusted Lerner Index is used as competition measure. The negative impact of institutional ownership on overinvestment is equal to -0.0091 when product market competition (which is estimated by HHI) is low. On the other hand, when .industry adjusted Lerner Index is used as a measure for competition in the market, the negative effect of institutional investor is equal to -0.0074 but under average level competition.

Contrary to the negative effect of leverage and institutional investors on overinvestment, leverage has a statistically positive impact on underinvestment level

when competition in the market is low. Although, when HHI is used for the estimation of product market competition, the positive impact is slightly significant and equals to 0.0078 when industry-adjusted Lerner Index is used for the evaluation of competition in the market, the positive effect of leverage is significant at 0.01 percent level. On the other hand, the R-square for the regressions with underinvestment dependent variable including the interaction terms of competition and control mechanisms are too small to interpret a meaningful result.

Studies are supporting both the substitution and complementary hypotheses of competition and internal governance mechanisms in literature. With a sample of 12 developed European countries covering 4,397 companies, the negative effect of leverage and institutional investors on overinvestment, when companies in the market have higher monopoly power, indicates that internal corporate control mechanisms and product market competition are substituting governance mechanisms for the European companies.

Leverage and competition are substitute governance mechanisms indicating that leverage act as a disciplinary force for management when product market competition is low. Similarly, institutional investors and competition are substitute governance mechanisms, implying that institutional investors act as monitors when competition in the industry is weak. That is, the impact of internal control mechanisms on investment policy is alleviated by product market competition since it acts as an alternative governance mechanism.

Among the firm-specific control variables, size has a negative effect which equals to -0.0018 on overinvestment level. The negative impact of size on overinvestment indicates that small firms tend to invest more than their expected investment level possibly due to their eagerness to grow fast.

Consistent with the view that a high amount of cash holdings create agency problems between managers and shareholders, financial slack (estimated by cash holdings and short-term investments) enhances the overinvestment problem.

Similarly, free-cash-flow, estimated by the difference between cash flow from operating activities and common and preferred dividends, has a significant positive effect on overinvestment which is equal to 0.0271 (when HHI is used as competition measure) and is equal to 0.0299 (when industry-adjusted Lerner Index is used as competition measure). The statistically significant positive effect of free-cash-flow on overinvestment supports the fact that managers with a high amount of free-cash-flow have an incentive to invest beyond the optimal size which is consistent with the study of Jensen (1986) on agency cost of free-cash-flow.

The other firm-specific control variable sales volatility has a significant positive effect on overinvestment. The positive impact is equal to 0.0096 when HHI is used as competition measure and is equal to 0.0104 when industry-adjusted Lerner Index is used to estimate competition in the market. The findings indicate that sales volatility enhances overinvestment problem for the European firms. Overall, sales volatility appears to increase uncertainty which leads managers to act in their interest and increase the resources under their control, causing inefficient investment.

Among the firm-specific control variables, asset structure of a firm, estimated by tangibility, has a statistically significant effect on overinvestment. The positive impact is equal to 0.0995 (0.0985) when HHI (industry-adjusted Lerner Index) is a used as a proxy for product market competition. Overall, tangibility appears to be a vital firm characteristic increasing overinvestment problem for the European firms.

Profitability estimated by the operating profit of a firm has a significant negative impact on overinvestment which is equal to -0.0047 (-0.0042) when HHI (industry-adjusted Lerner Index) is used.

To sum up, leverage, institutional ownership, and product market competition appears to be effective governance mechanisms mitigating overinvestment problem for the European firms. Among the firm-specific control variables, size and profitability have a negative impact on overinvestment and decrease overinvestment problem. On the other hand, cash holdings, free-cash-flow, sales volatility, and tangibility enhance overinvestment problem for companies in developed European countries. Although leverage, institutional investors, and product market competition mitigate the deviations from expected investment level when firms overinvest, they do not work when companies invest below their expected investment level.

CHAPTER 5

CONCLUSION

This dissertation aims to explore the relationship between corporate control mechanisms and investment efficiency. Following this purpose, first, we estimate investment efficiency. Following Richardson (2006) and Chen et al. (2011), we use an investment equation with growth opportunities and some firm-specific control variables to estimate the expected investment level. The residuals from the expected investment equation provide information whether firms invest more or less than their expected investment level. We, then, classify firms' investments as over- or underinvestment concerning the distortions from their expected investment level. After estimating over- and underinvestment level of firms, we analyze the relationship between investment inefficiencies and corporate control mechanisms, namely, leverage, debt maturity, institutional investors and product market competition. The second part of the analysis covers the effect of internal control mechanisms (leverage, debt maturity, and institutional investors) on over- and underinvestment under product market competition, to figure out whether internal and external governance mechanisms work as substitutes or complements.

This study rests on the European market which is, except the UK, mainly characterized as bank-based systems with substantial involvement of banks in the economy, where corporations have concentrated ownership structure (Moerland, 1995). Besides being an excellent laboratory for understanding the bank monitoring effect on firm investment policy, a sample covering 12 European countries is large enough to provide the external validity of previous corporate governance and investment policy studies that are mostly focused on the US market.

In this dissertation, we provide evidence on the influence of corporate control mechanisms, such as leverage, institutional investors, and product market competition on corporate investment efficiency in the European developed market. Consistent with the results of Köke and Renneboog (2005), our findings indicate that leverage is a control mechanism, and in fact, not only for Germany but also for 12 European developed economies. Leverage mitigates the overinvestment problem in European firms.

Contradicting the study of Januszewski et al. (2002) who find an insignificant effect of financial institutional ownership on firm's productivity, institutional ownership has a statistically significant negative effect on over-investment. Decreasing the deviations from expected investment level, institutional investors improve firm investment efficiency. This opposite result is probably due to the sample difference between these two studies. Januszewski et al. (2002) study with a sample of 500 German firms over the period 1986-1994. Moreover, as noted on the study of Börch-Supan (2001), the pension and investment funds have become increasingly important, and our institutional ownership data covers both pension and investment funds whereas Januszewski et al. (2002)'s financial institutions only cover banks and insurance companies.

In addition to leverage and institutional investors, the product market competition is a governance mechanism for European firms as well. Consistent with the fact that, product market competition disciplines management, companies operating in highly competitive industries reduce their overinvestment. Firms may preserve some of their resources in order not to lose the ability to take a position against its competitors in the market. Also, another explanation is that, in highly competitive industries, the performance of a manager can easily be compared with

the managers of competitors which discourages managers to undertake non-value adding operations (Grullon & Michaely, 2007).

With a sample of German firms, Januszewski et al. (2002) document a complementary relationship between product market competition and corporate control. On the contrary, with a sample of 14 EU countries for a more recent period, Ammann et al. (2013) demonstrate a substitutional relationship between corporate governance and competition. Supporting the findings of Ammann et al. (2013), our results indicate that leverage and institutional ownership have a significant negative effect on over-investment when competition in the market is low. These findings demonstrate that product market competition is an alternate governance mechanism for the internal control mechanisms, namely leverage and institutional investors. In other words, leverage and institutional investors act as monitors when competition in the market is low. These findings imply that product market competition mediates the impact of other control mechanisms on investment efficiency.

Contrary to the expectation that debt with shorter maturity disciplines management, short-term debt maturity is not a corporate control mechanism for European firms. After the loan origination, banks start to monitor its borrowers more closely. In fact, they do not wait for public disclosure and ask for financial statements through the private information channels. Therefore, leverage may have taken the function of short-term debt maturity.

The board of directors, commonly accepted as a corporate governance mechanism in the literature, has been included in this analysis. However, board size and independence have no significant relation with investment efficiency.

Firm size, commonly accepted as an information asymmetry proxy in the literature, has a significant negative effect on overinvestment, implying that small firms tend to overinvest which is not surprising as there is more information asymmetry surrounding small firms. The close lending relationship between small firms and banks become more critical in such a setting as banks reduce information asymmetry through private reporting channels instead of public disclosure (Diamond 1984, 1991; Fama, 1985; Rajan &Winton, 1995). In fact, in their study conducted on small US firms, Minnis and Sutherland (2017) document that banks request private reporting for half the loans after loan origination, indicating that banks highly monitor their small borrowers. In this manner, leverage gains importance, as a control mechanism in a developed European market setting, which is mainly composed of bank-based economies. Moreover, according to the unreported results of the further analysis, although for large firms, leverage, institutional ownership, and product market competition are effective governance mechanisms, for small firms, the main control mechanism is leverage.

Supporting the study of Jensen (1986), who claim that managers try to increase resources under their control by investing beyond the optimal size, free-cash-flow and cash holdings have a statistically significant positive impact on overinvestment. Furthermore, firms having a high amount of free-cash flow mitigate underinvestment. Also, consistent with the fact that firms having enough resources to sustain a project tend to invest more, the firm's tangible assets have a statistically significant positive effect on over investment.

In a nutshell, this dissertation supports previous findings mostly on US firms by investigating the relationship between control mechanisms and investment efficiency in a large international sample covering 12 European developed

economies. This study provides evidence that banks are the main controlling mechanism for European firms and they mitigate the overinvestment problem by reducing the deviations from expected investment level. Besides leverage, institutional investors and product market competition are other control mechanisms reducing the over-investment problem for European firms. Moreover, consistent with the hypothesis that product market competition acts as a substitute corporate governance mechanism that enforces discipline on management to invest efficiently, our results document that leverage, and institutional ownership are significantly negatively related to overinvestment when competition is low.

This thesis covers only publicly listed companies. Also, it would be interesting to figure out the differences between developed and emerging economies regarding the effect of control mechanisms on firm investment efficiency, which constitutes our future research topic. Moreover, this dissertation has started with the aim of examining the impact of institutional investors on investment policy by grouping institutions according to their investment strategy. Classifying institutions according to their investment horizon as long-term or short-term institutions and according to their investment frequency as institutions having a high-frequency trading strategy or a low-frequency trading strategy will provide a better understanding of the influence of institutions on corporate investment policy. Unfortunately, we cannot obtain the required data for this analysis. It would be interesting to analyze the effect of different institutional investors on investment efficiency.

APPENDIX A

LITERATURE ON INVESTMENT EFFICIENCY

Authors	Sample	Period	Investment Efficiency Measure
Richardson (2006)	US firms	1988-2002	Residuals from investment eq. including firm control variables. Positive residuals---overinvestment
Biddle, Hillary, & Verdi (2009)	US firms	1993-2005	1. Ranking firms according to their leverage and cash. Less leverage and more cash increases the likelihood of overinvestment. 2. Residuals from investment equation with only sales growth variable
Chen, Hope, Li, & Wang (2011)	21 low-income countries	2002-2005	1. Residuals from investment equation with sales growth and negative sales growth dummy interaction 2. Residuals from investment equation with firm control variables
Cheng, Dhaliwal ,& Zhang (2013)	US firms	2004-2007	Ranking firms according to their leverage and cash within industry and decile each industry (higher cash, lower leverage more likely to overinvest)---highest rank overinvest (Biddle et al's (2009) 1st method)

Authors	Sample	Period	Investment Efficiency Measure
Gomariz & Ballesta (2014)	Spain	1998-2008	1. Biddle et al.'s (2009) method residuals from investment eq. (only with sales growth) 2. Chen et al.'s (2011) method with negative sales growth dummy
Ding, Knight, & Zhang (2016)	China	2000-2007	1. Residuals from investment equation with sales growth and additional firm control variables. 2. Average revenue product of capital and marginal revenue product of capital (above median is accepted as overinvestment)
Chen, Sun, & Xu (2016)	China	2001-2001	Residuals from investment equation with firm control variables (Richardson's (2006) model)
Chen, Ghoul, Guedhami, & Wang (2017)	64 countries	1981-2008	investment-Q sensitivity
Chen, Xie, & Zhang (2017)	US firms	1983-2011	Ranking firms according to their leverage and cash within industry and decile each industry (higher cash, lower leverage more likely to overinvest)---highest rank overinvest (Biddle et al's (2009) 1st method)
Zhong & Gao (2017)	China	2010-2013	Residuals from investment equation with sales growth and negative sales growth dummy interaction (Chen et al.'s (2011) model)
Samet & Jarboui (2017)	398 European companies	2009-2014	Residuals from investment equation with sales growth and negative sales growth dummy interaction (Chen et al.(2011)'s model)

APPENDIX B

VARIABLES

Variable	Symbol	Definition
Overinvestment	Overinvest	Positive residuals from the investment equation
Underinvestment	Underinvest	Negative residuals from the investment equation
Institutional Ownership	InstOwn	Total institutional ownership percentage held by investment banks, institutions, pension funds and endowment funds
Leverage	Lev	Total Debt / Total Assets
Short-term debt	STD	Short-term Debt/Total Debt
Product Market Comp	HHI LI	$HHI_{j,t,c} = \sum_{i=1}^{n_j} s_{i,j,t,c}^2$ $LI(ind\ adj)_{i,t} = PCM_{i,t} - \sum_{j=1}^{n} w_{j,t} LI_{j,t}$
Size	Size	Natural logarithm of total assets
Profitability	Profit	EBIT/Total Assets
Financial Slack	FinSlack	(Cash+STI)/Total Assets
Firm Age	Age	log(year t -incorporation year)
Sales Volatility	SalesVol	Std(Sales of five years)
Free-Cash Flow	FCF	(Cash from operating activities – (common and preferred dividends))/Total assets

APPENDIX C

MULTICOLLINEARITY DIAGNOSTICS

Table C1. Collinearity Diagnostics

Variable	VIF	SQRT VIF	Tolerance	R-squared
Leverage	1.26	1.12	0.7949	0.2051
STD/TD	1.19	1.09	0.8413	0.1587
InstOwn	1.01	1.00	0.9916	0.0084
HHI	1.06	1.03	0.9743	0.0527
LI	1.25	1.12	0.7992	0.2008
Size	1.27	1.13	0.7852	0.2148
Profitability	1.27	1.13	0.7854	0.2146
FinSlack	1.18	1.09	0.8444	0.1556
FCF	1.47	1.21	0.6783	0.3217
Sales Volatility	1.13	1.06	0.8877	0.1123
Tangibility	1.24	1.11	0.8074	0.1926
Mean VIF	1.21			

Table C2. Correlation Matrix of Coefficients of xtreg Model

e(V)	Leverage	STD/TD	InstOwn	HHI	Size	Profitability	FinSlack	FCF	Risk
Leverage	1								
STD/TD	0.2297	1							
InstOwn	-0.0149	-0.0062	1						
HHI	-0.0157	0.0133	-0.0294	1					
Size	-0.2160	0.2204	0.0328	-0.0545	1				
Profitability	0.1775	0.0649	-0.0051	-0.0017	-0.1702	1			
FinSlack	0.1548	0.0073	0.0089	-0.0152	0.0495	0.0259	1		
FCF	0.1819	0.0750	-0.0108	0.1018	-0.1839	-0.4902	0.0307	1	
Sales Vol.	-0.0683	0.0187	-0.0091	0.0466	0.1080	0.0168	-0.1222	0.1554	1
Tangibility	-0.0476	-0.0179	0.0541	-0.0469	-0.0560	-0.0053	0.2957	-0.0528	0.0089

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