Ownership Structure and Firm Performance: Evidence from Belgium

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Abstract

In this study, the relationship between ownership structure and firm performance is examined in a Belgian context. Ownership structure is divided into ownership concentration and ownership identity, of which the latter consists of managerial ownership, family ownership, corporate ownership, institutional ownership, and government ownership. Based on a sample of 102 Belgian listed firms, most listed on the Euronext Brussel, for the year 2017, ordinary least squares (OLS) regression analysis is conducted. The results show a consistent negative relationship between ownership concentration and market/hybrid – based performance measures, which implies that as Belgian firms already have high concentrated ownership, giving more control to already powerful controlling shareholders may further enhance their ability to expropriate and cause firm performance to deteriorate. However, this result is not robust for stock return. This study finds a consistently positive impact of family ownership on accounting-based performance measures, especially for small firms. In addition, the linear relationships of the other ownership identities were not found. The curvilinear relationships that are found are driven by firms that do not have that specific ownership at all, because when performing analyses without these firms the significance disappears. Further research is needed to assess the validity and consistency of these results. This study mainly contributes to the scarce relational research that has been conducted in a Belgian context on this topic, especially after the transparency law in 2007.

Keywords: *ownership structure, ownership concentration, ownership identity, managerial ownership, family ownership, corporate ownership, institutional ownership and government ownership, Belgium*

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1. Introduction

This thesis focuses on the impact of ownership concentration and ownership identity (together known as ownership structure) on firm performance in Belgium. This first chapter introduces the background of these concepts in general but also in Belgium and their relation to firm performance. Moreover, it discusses the theoretical and practical relevance and it introduces the research objective and research question of this study. The last section of this chapter gives a preview of this thesis.

1.1 Background information

Nowadays, corporate governance is one of the most discussed topics by academics, regulators and practitioners. The corporate governance function is intended to ensure that managers behave ethically and make decisions that benefit shareholders (Fauzi & Locke, 2012). This can be done by external and internal corporate governance mechanisms. One important theory of corporate governance is the institutional theory. This theory argues that corporate governance is depending on the institutional environment, which is in this study Belgium. Another important theory is the agency theory, which involves that different parties (managers and shareholders) have different interest, which leads to agency problems. One party, therefore, needs to monitor the other party and find ways to align interests. This separation of ownership and control has been considered as one of the most important issues in the financial, management and accounting literature (Alabdullah, 2018). Hence, the focus on the quality of monitoring of management decisions is growing (Cornett, Marcus, Saunders, & Tehranian, 2007).

One of the main corporate governance mechanisms that are available to constrain these management activities is ownership structure. The relationship between corporate ownership structure and firm performance has been subject to considerable debate. The issue of a conflict of interest between a firm's managers and owners can be traced at least back to the classic study of Berle and Means (1932) documenting the existence of a separation of ownership and control. Since their book appeared numerous studies have hypothesized about the nature of the conflict between managers and owners and attempted to measure the impact on firm performance. Since then, there has been a lot of research done in the field of ownership structure. Shareholders have started to realize the importance of dealing with good practices of corporate governance to protect their interest, which has an effect on the firm performance (Alabdullah, 2018). Thus, good corporate governance leads to better firm performance. However, findings of the influence of ownership structure on firm performance remain inconclusive. Some authors (Alabdullah, 2018; Beatson & Chen, 2018; Berķe-Berga, Dovladbekova, & Ābula, 2017; Lin & Fu, 2017; Zraiq & Fadzil, 2018) find a positive effect and others (Cheng, 2011; Cronqvist & Nilsson, 2003; Ongore, 2011; Schiehll, 2006; Wahla, Shah, & Hussain, 2012) find a negative effect on firm performance. These differences exist both for ownership concentration and ownership identities. These studies, among others, have contradictory findings, which makes the empirical evidence inconclusive.

In Belgium, the first corporate governance code was published on 9 December 2004. In that time, the Belgian companies faced a challenging environment characterized by significant change. The idea was that in such an environment, the companies should benefit from a regulatory framework that encourages

efficiency and competitiveness while fostering sound and transparent corporate governance practices. That is when in 2003 the European Commission launched its Action Plan on Modernizing Company Law and Enhancing Corporate Governance in the European Union. In Belgium, there were three separate sets of rules drawn up by different authorities, in need of updating and consolidation. In this context, the Corporate Governance Committee, consisting of the Financial Services and Markets Authority (FSMA), Euronext Brussels and Federation of Belgian Enterprises (FEB), combined the three separate sets of rules into one single code of best practices on corporate governance for all listed companies which was aligned with international practice and EU recommendations. After consultation, the final text was published on 9 December 2004, which became known as the "Code-Lippens". The code has been revised in the following years, which resulted in 2009 in the new version "Code 2009", also known as "Code Daems". Since 2010, this code has been recognized by Royal Degree as the reference code for Belgian listed companies (Corporate Governance Committee, 2004, 2009).

Since 2007, article 14 of the Belgian law of 2 May 2007, the Belgian "Transparency Law", is active. This transparency legislation aims to achieve transparency of the ownership structure of Belgian listed companies. In this way, it wants to provide insight into the voting power relationships in these companies and to prevent meaningful changes in the ownership structure from occurring without the required transparency. Through the pursued market transparency and information to the public investor, this regulation also aims to promote the efficient and correct functioning of the financial markets. In order to achieve the set of objectives, the transparency regulation requires the holders of participations in listed companies to inform the FSMA. This is done through notifications whose content is laid down in the aforementioned legislation. The companies involved are then obliged to disclose the information contained in the notifications received by them to the public. The legal thresholds are set at 5% of the total voting rights, 10%, 15%, etc., each time by 5 percentage points. However, the statutes of issuers under Belgian Law may introduce lower threshold and thresholds between statutory rates. In addition, the thresholds 1%, 2%, 3%, 4% and 7,5% can be included. This implies that since then, Belgian listed firms disclosed more ownership data, which is a positive sign for researchers.

1.2 Theoretical and practical relevance

Ownership structure is part of the internal corporate governance mechanisms. Other examples of internal corporate governance mechanisms are board characteristics and executive compensation (Tian & Twite, 2011). The impact of different forms of ownership on firm performance is an often-studied phenomenon in academic research. Common research topics that focus on the impact of a specific form of ownership on firm performance are managerial ownership (Berķe-Berga et al., 2017; Coles, Lemmon, & Meschke, 2012; Core & Larcker, 2002; Cui & Mak, 2002; Florackis, Kostakis, & Ozkan, 2009; Mandaci & Gumus, 2010), family ownership (Anderson, Mansi, & Reeb, 2003; Arosa, Iturralde, & Maseda, 2010b; Bhaumik & Gregoriou, 2010; Ng, Ong, Teh, & Soh, 2015), corporate ownership (Clayton & Jorgensen, 2011; Colpan, Yoshikawa, Hikino, & Del Brio, 2011; Drees, Mietzner, & Schiereck, 2013), institutional ownership (Elyasiani & Jia, 2010; Ferreira & Matos, 2008; Lin & Fu, 2017; Thanatawee, 2014) and government ownership (Huang & Xiao, 2012; Tian & Estrin, 2008; Ting & Lean, 2015; Tran, Nonneman,

& Jorissen, 2014). However, these studies often focus only on one specific form of ownership while all these forms together are less frequently investigated.

In addition, Klein, Shaprio and Young (2005) argue that there is no overwhelming evidence to suggest that governance practices improve firm performance within developed markets. However, most studies have focused on the US or the UK and there still exist limited evidence for other markets (Frijns, Gilbert, & Reumers, 2008; Schiehll, 2006). The literature distinguishes between two models: the Anglo-American model and the Continental European model. The Anglo-American model is typical for countries as US and UK and is also called the shareholder model, whereas the Continental European model adopts the characteristics of the German and the Latin countries and is also known as the stakeholder model (Ooghe & de Langhe, 2002). The two models differ in their business context and as the way in which corporate governance is organized differs between business context, this could have an effect on the relationship between ownership structure and firm performance. For example, the ownership concentration of firms in the Continental European countries is higher than of firms in the Anglo-American countries. Only a few articles focused on the ownership structure of Belgian companies (Almeida & Wolfenzon, 2006; Becht, Chapelle, & Renneboog, 2002; Buysschaert, Deloof, Jegers, & Rommens, 2008; Dehaene, De Vuyst, & Ooghe, 2001; Dherment-Ferere, Köke, & Renneboog, 2001; Renneboog, 1998; Van der Elst, 2008; Van der Elst & Aslan, 2009). However, all these studies conduct their analyses before the introduction of the transparency law in 2007, which forces Belgian listed firms to disclose major holdings in their company. Since Belgian firms are typically still controlled by a variety of family-based holding companies which directly and indirectly hold concentrated control block of shares through pyramids and cross-holdings (Ghemawat & Hout, 2011), this disclosure development will make Belgium's highly complex ownership and control patterns somewhat more understandable. In addition, most of these studies in the ownership structure in Belgium are more of a descriptive than relational basis. Therefore, this research is the first, to the best of my knowledge, that examines the impact of ownership concentration and all ownership identities mentioned above in one study, after the transparency law of Belgian listed firms in 2007.

1.3 Research objective and question

Previous research is still inconclusive about the effect of ownership structure on firm performance. Therefore, the main objective of this study is to examine the effect of ownership structure on firm performance of Belgian listed firms in the year 2017 using ordinary least squares (OLS) regression. Following previous literature (e.g. Ongore, 2011), this study operationalizes ownership structure in terms of ownership concentration and ownership identity. Ownership identity is categorized by insider ownership (manager- and family ownership) and outsider ownership (corporate-, institutional- and government ownership). Accordingly, it will test the impact of both ownership concentration and the various ownership identities on firm performance. Therefore, the following research question is formulated:

"What is the impact of ownership structure on the performance of listed firms in Belgium?"

This study contributes to the literature in several ways. Firstly, this study helps shed some light on the inconclusive evidence regarding the relationship between ownership structure and firm performance. Especially because this research examines concentration ownership, managerial ownership, family ownership, corporate ownership, institutional ownership and government ownership in one study. Secondly, as Frijns et al. (2008) argue that previous studies have focused on the US and UK, this study focuses on Belgium, which is a country within the Continental European model. Especially the studies concerning ownership structure in Belgium are more of a descriptive than relational basis. Thirdly, this study examines the ownership structure of Belgian listed firms after the introduction of the Belgian Transparency Law of 2 May 2007, after which to the best of my knowledge only scarce research has been conducted in Belgium about this topic.

1.4 Study structure

The remainder of this paper is structured as follows. Chapter 2 covers the review of the literature on corporate governance mechanisms to get a better understanding of the concepts that are examined in this study. This is followed by chapter 3 where the hypotheses that are being tested are developed. Chapter 4 focuses on the research methodology, where the research design, models and the measurement of the variables are explained. In chapter 5 the sample and data collection are discussed. Chapter 6 presents the results and examines the robustness of the findings. Finally, chapter 7 gives the conclusions and limitations of this study and recommendations for future research.

2 Literature review

This chapter reviews the existing academic literature concerning ownership structure and firm performance. The databases Web of Science, Scopus and Google Scholar have been employed for the most relevant articles. In addition, studies from Belgian researcher such as M. Deloof, M. Becht, and L. Renneboog are examined. The emphasize is on recent articles, but also older articles are used for the comprehensiveness and history of a theory. Firstly, corporate governance is explained including the code of Belgian, the underlying theories and the different models. Secondly, the corporate governance mechanisms, such as board structure and ownership structure in relation to firm performance are discussed. The main topic ownership structure, including ownership concentration and ownership identity, is discussed most comprehensive.

2.1 Corporate governance

Corporate governance is an emerging phenomenon and its development is based on different complex disciplines. It is a very broad term and it can be defined in many ways. Since Belgium is a member of the OECD since 13 September 1961, it seems appropriate to mention their definition (OECD, 2018). The literal definition of the OECD is: "Corporate governance involves a set of relationships between a company's management, its board, its shareholders and other stakeholders. Corporate governance also provides the structure through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined. Good corporate governance should provide proper incentives for the board and management to pursue objectives that are in the interests of the company and its shareholders and should facilitate effective monitoring. The presence of an effective corporate governance system, within an individual company and across an economy as a whole, helps to provide a degree of confidence that is necessary for the proper functioning of a market economy. As a result, the cost of capital is lower and firms are encouraged to use resources more efficiently, thereby underpinning growth" (OECD, 2004, p. 11). The Belgian code describes corporate governance as follows: "Corporate governance is a set of rules and behaviors which determine how companies are managed and controlled. A good corporate governance model will achieve its goal by setting a proper balance between leadership, entrepreneurship and performance on the one hand, and control as well as conformity with this set of rules on the other hand. Good governance must be embedded in a company's values. It provides mechanisms to ensure leadership, integrity and transparency in the decision-making process. It should help determine a company's objectives, the means through which these objectives are achieved and how performance is to be evaluated. These objectives should be in the interest of the company, its shareholders and other stakeholders. Corporate governance also requires control, i.e. effective evaluation of performance, careful management of potential risks, and proper supervision of conformity through agreed procedures and processes. The emphasis lies on monitoring the effective operation of control systems, managing potential conflicts of interest and implementing sufficient checks to prevent any abuse of power" (Corporate Governance Committee, 2009, p. 7).

In 2003, the European Commission launched its Action Plan on Modernizing Company Law and Enhancing Corporate Governance in the European Union. This was the result of the challenging

environment that was characterized by significant change, such as globalization of markets, the modernization of communication technologies and the enlargement of the EU. This was also the case for Belgium, where companies should benefit from a regulatory framework that encourages efficiency and competitiveness while fostering sound and transparent corporate governance practices. In Belgium, there was a need of updating and consolidation, because at that time there were three sets of rules drawn up by different authorities. In this context, a Committee was established to draft a single code of best practice aligned with international practice and EU recommendations on corporate governance for all listed firms. In 2004, the first code was a fact and the Belgian code had a high degree of built-in flexibility which was based on the comply or explain system (Corporate Governance Committee, 2004). Hence, the corporate governance in Belgium is regulated in the Belgian Code of Corporate Governance. This code applies to companies incorporated in Belgium whose shares are admitted to trading on a regulated market, so listed companies. The first edition of the corporate governance code in Belgium was issued in 2004. However, the companies have reviewed their governance and the Belgian Code of Corporate Governance has been adapted in 2009, which is referred to as "Code 2009". This Code 2009 (as Code 2004) included nine principles (see table 1). Looking at the principles, it can be seen that only principle 8 has been changed. However, the code introduced some other important changes. Two examples are the separation of the role of the chairman of the board of directors and the CEO and the emphasis on the role of the board of directors. Moreover, the recommendations that are made concerning executive remunerations received the most attention. The code is in favor of complete transparency about remuneration and severance pay towards shareholders and the outside world in which the committee hopes to achieve a major breakthrough (Corporate Governance Committee, 2009).

The Belgian corporate governance committee cited five reasons why the Belgian Corporate Governance Code can be effective and efficient in achieving better corporate governance. The first reason is that this code is a formal expression by the representatives of the corporate leaders in Belgium of their commitment to create standards and benchmarks against which corporate behaviors and structures can be judged by insiders and outsiders, which is not possible without a code. Secondly, this code is likely to create more and faster transparency. Thirdly, if corporate leaders and society see the code as representing the best practice to organize good governance, it is harder and harder to justify deviations from the code. Hence, there will be more compliance with the code due to the transparency. The fourth reason the corporate governance committee had written down is that the code can be more flexible than hard law. The code can swiftly anticipate and register changes and formulate recommendations for appropriate actions. Fifthly, the code should be seen as complementing existing legislation and it should go hand in hand to form a framework for the best corporate governance for listed companies (Corporate Governance Committee, 2009).

This development of corporate governance in Belgium implies that firms are not only more transparent, but that also is being thought about the ownership structure of these firms. Principle 8 has been changed into that companies shall enter into a dialogue with shareholders and potential shareholders based on a mutual understanding of objectives and concerns, which directly designates the agency problem firms (managers) and shareholders have. Therefore, the ownership structure of firms is important in how firms

Table 1. Belgian Corporate Governance Code Principles 2004 and 2009

Principles 2004 (Corporate Governance Committee, 2004, p. 3)	Principles 2009 (Corporate Governance Committee, 2009, p. 3)
1. "the company shall adopt a clear governance structure;	1. "the company shall adopt a clear governance structure;
2. the company shall have an effective and efficient board taking decisions in the corporate interest;	2. the company shall have an effective and efficient board that takes decisions in the corporate interest;
3. all directors shall demonstrate integrity and commitment principle;	3. all directors shall demonstrate integrity and commitment;
4. the company shall have a rigorous and transparent procedure for the appointment and evaluation of the board and its members;	4. the company shall have a rigorous and transparent procedure for the appointment and evaluation of the board and its members;
5. the board shall set up specialized committees;	5. the board shall set up specialized committees;
6. the company shall define a clear executive management structure;	6. the company shall define a clear executive management structure;
7. the company shall remunerate directors and executive managers fairly and responsibly;	7. the company shall remunerate directors and executive managers fairly and responsibly;
8. the company shall respect the rights of all shareholders and encourage their participation;	8. the company shall enter into a dialogue with shareholders and potential shareholders based on a mutual understanding of objectives and concerns
9. the company shall ensure adequate disclosure of its corporate governance"	9. the company shall ensure adequate disclosure of its corporate governance"

Notes: this table presents the Belgian Corporate Governance Code Principles of both 2004 and 2009.

operate and in relation to their performance. In addition, Belgium firms are in application of the Belgian law of 2 May 2007 on the disclosure of significant shareholdings in issuers whose securities are admitted to trading on a regulated market; any shareholder holding, directly or indirectly, voting rights equal to 3% or more of the existing voting rights have to declare this shareholding to the company and to the Belgian Financial Services and Market Authority (FSMA). Any rise or fall below the first threshold of 3% and thereafter the threshold of 5%, 7.5%, or any multiple of 5% is subject to this notification (fsma.be, 2018). This implies that more and more firms have to disclose their ownership data, which is a positive sign for the researchers, especially in the pyramidal ownership structures.

2.2 Theoretical perspective of corporate governance

Corporate Governance has been affected by different theories from different domains, including management, finance, and law. The main theory is the agency theory, however, there are more theories that influence the development of corporate governance (Abid, Khan, Rafiq, & Ahmed, 2014). Five of

those theories are agency theory, stakeholder theory, stewardship theory, resource dependency theory, and transaction cost economics theory (see table 5 for differences). These theories facilitate to interpret the role that directors may play in achieving the performance goals of the firm and help to understand the role and preferences of the different stakeholders (Abid et al., 2014). Furthermore, institutional theory will be discussed in the context of Belgium.

2.2.1 Agency theory

The organization and business research field consists of several leading theories. The dominant paradigm and most widely used conceptual framework to analyze corporate governance is the agency theory (Fama & Jensen, 1983; C. Jensen & Meckling, 1976; Paniagua, Rivelles, & Sapena, 2018). This theory is concerned with the agency problem which describes the problems that arise when the desires of the principal and the agent conflict with each other and when it is difficult or expensive for the principal to verify what the agent is actually doing (Eisenhardt, 1989; Madison, Holt, Kellermanns, & Ranft, 2016). This allows the agents (managers of the firm) to pursue their own interest at the expense of the shareholders. Monitoring the behavior of the management could reduce the agency problem, however, not all shareholders are the same with respect to incentives to spend resources on monitoring (Douma, George, & Kabir, 2006). Minimizing the agency problem can be done by a set of mechanisms, processes and relations by which firms are controlled and directed, which is referred to as corporate governance (Basyith, Fauzi, & Idris, 2015).

The relationship between ownership structure and firm performance in most research is rooted in the agency framework (Farooque, Van Zijl, Dunstan, & Karim, 2007; Tsegba & Achua, 2011). In this case, the principals are the shareholders of the companies, whereas the agents are the managers. The agency problem that arises from the separation of ownership and control is that the two parties have different interests and asymmetric information (Jensen & Meckling, 1976; Madison et al., 2016). The first study that documented the consequence of the separation of ownership and control on firm performance is the one of Berle and Means (1932). The agency theory is used to explain the behaviors of the principal and agents. The initial assumption of managing contractual relations is that this theory assumes that there is a goal difference between the principal and the agent (Van Slyke, 2007). The managers are interested in acting in favor of their own interest instead of in the interest of the shareholders. Consequently, the value of the firm cannot be maximized when managers expropriate value to themselves (Tsegba & Achua, 2011). The purpose of the shareholders is to maximize the value of the firm to maximize their personal wealth, however, the purpose of the managers is sometimes not aligned with that of the shareholders. Managers sometimes attempt to fill their personal needs and do not put high efforts to increase the value of the firm. Hence, agents do not always act in the shareholders' best interest, particularly when activities that are useful to the shareholders only are costly for the managers (Basyith et al., 2015). Corporate governance has the focus to minimize these costs and enhance firm performance. Agency costs can be distinguished in monitoring costs (costs of the principal to constrain the activities of the agent), bonding costs (costs of the agent in an attempt to convince the principal of commitment) and residual loss (welfare loss as compared to complete utility alignment) (van Puyvelde, Caers, du Bois, & Jegers, 2012). Principals can

resolve the conflict of interest through a collection of strictly self-interested actors as incentives, monitoring or regulatory action (Cohen & Holder-Webb, 2006). The management has to be constantly monitored to ensure it does not pursue policies that are inimical to the prosperity of the firm. The monitoring tasks rest by the board which reflects the ownership structure of the firm (Tsegba & Achua, 2011). Therefore, the shareholders of the firm may have a high concern at the possibility that the managers do not enter into a transaction at all when it turns out that this deal would have been profitable for both parties (Basyith et al., 2015).

2.2.2 Stakeholder theory

The stakeholder theory argues that in a firm there are other parties involved than only the shareholders. Abid et al. (2014) distinguish between three groups of stakeholders: Capital Market stakeholders (shareholders and major suppliers of capital), Product Market stakeholders (primary customers, suppliers and unions) and Organizational stakeholders (employees, managers and non-managers). In addition, Donaldson and Preston (1995) showed their stakeholder model, including investors, political groups, customers, communities, employees, trade associations, suppliers and governments. Another categorization of stakeholders is the one of van Puyvelde et al. (2012) who distinguish between internal stakeholders (managers and employees), external stakeholders (customers, competitors and suppliers), and interface stakeholders (board of directors). To understand the stakeholder theory, it is important to know what the definition of stakeholder is. Hörisch, Freeman and Schaltegger (2014) use two definitions to define the term stakeholder by using a broader, the most common and general definition provided by Freeman and a narrower definition. The most common and general definition is that stakeholders are groups and individuals who can affect or be affected by the firm, whereas the narrower definition is that stakeholders are groups and individuals on whom the firm is depending for its existence and who are depending on the firm in order to achieve their personal goals. Furthermore, the actual use of stakeholder theory is not depending on this definition. It is important to know that the unit of analysis is not the firm itself, however, it is the relationship between the firm and the stakeholders (Hörisch et al., 2014). The essence of the traditional stakeholder theory is how the decisions that are made in the firm will affect the stakeholders and which trade-offs should be made between the different demands of the different stakeholders. However, one core element of the stakeholder theory is generating mutual interests between different stakeholders rather as focusing on trade-offs. Based on these interests the stakeholder theory wants to create value for all stakeholders (Hörisch et al., 2014).

Review of the large and evolving literature of the stakeholder concept reveals that stakeholder theory is explained and used by various authors in different ways. Donaldson and Preston (1995) label these different versions as descriptive/empirical stakeholder theory, instrumental stakeholder theory and normative stakeholder theory (see table 2). The descriptive/empirical stakeholder theory is used to describe and explain specific corporate characteristics and behaviors. The instrumental stakeholder theory is used to identify the connections, or lack of connections, between stakeholder management and the achievement of traditional corporate objectives. The normative stakeholder theory is used to interpret the function of the corporation, including the identification of moral or philosophical guidelines for the operation and

management of corporations. In addition, Hörisch et al., (2014) (brought forward by Freeman) combined the three different versions of Donaldson and Preston (1995) into an integrative stakeholder theory which considers the descriptive, instrumental and normative aspects of stakeholder theory to be inextricably linked. Furthermore, Steurer (2006) shows that the issue of stakeholder management can be approached from a corporate, a stakeholder or a conceptual point of view by using a triple-perspective typology of stakeholder theory. In his triple-perspective typology of stakeholder theory, he shows that business-stakeholder interactions can be approached from three different perspectives, each consisting of three heuristic approaches (descriptive, instrumental and normative). The importance of these heuristic approaches varies from perspective to perspective. All in all, stakeholder theory is broader in scope than it has ever been before, with three distinct perspectives so far.

Table 2. Different types of stakeholder theory

	Focus	Exemplary literature
Descriptive/empirical stakeholder theory	Description of how companies are managed; identification of relevant stakeholders	Agle, Mitchell, and Sonnenfeld (1999); Jawahar and McLaughlin (2001); Sangle and Ram Babu (2007); Wallis (2006)
Instrumental stakeholder theory	Effects of stakeholder management on the achievement of corporate objectives	Berman, Wicks, Kotha, and Jones (1999); Johnson and Greening (1999); Jones (1995); Mathur, Price, and Austin (2008)
Normative stakeholder theory	Discussion of the purpose of business; moral justifications of stakeholder theory	Argandoña (1998); Freeman and Gilbert (1988); Goodpaster (1991); Reed (1999)
Integrative stakeholder theory	Considers the descriptive, instrumental and normative aspects of stakeholder theory to be inextricably linked	Freeman (1999); Freeman, Harrison, Wicks, Parmar, and Colle (2010); Jones and Wicks (1999); Schaltegger, Burritt, and Petersen (2003)

Notes: this table presents different types of stakeholder theory. Source: Hörisch et al., 2014, p. 12.

2.2.3 Stewardship theory

Stewardship is an alternative to agency theory in terms of managerial motivation (Abid et al., 2014). Where the agency theory argues that in the modern corporation, in which share ownership is widely held, managerial actions depart from those required to maximize shareholder returns, the stewardship theory argues that there is no inherent, general problem of executive motivation and that the corporate performance is depending on the structural situation in which the manager is in (Donaldson & Davis, 1991). In addition, in the agency theory the managers show opportunistic behavior which is at the expense of shareholder interests, whereas in the stewardship theory the executive manager is far from being an opportunistic shirker, and essentially wants to do a good job and to be a good steward of the corporate assets (see table 3 and 4 for comparison and differences between the agency theory and the stewardship theory). Stewardship has its roots in sociology and psychology, which resulted in that this theory describes a more humanistic model compared to the economic view of the agency theory (Madison et al., 2016). The stewardship theory can be divided into two branches. In the first branch, the goals of the principal and that of the agent are in conflict. However, this branch assumes that the agent will be motivated to act in the interest of the principals because this might lead to opportunities for desired personal outcomes. So, even

when the interest of the agent and the principal are not aligned, the agent acts according to the interest of the principal (van Puyvelde et al., 2012). The second branch assumes that the goals of the agents are perfectly aligned with those of the principal (van Puyvelde et al., 2012). The stewardship theory portrays managers as stewards who are intrinsically motivated to serve the firm and are collectively oriented (Madison et al., 2016; van Puyvelde et al., 2012). Governance mechanisms that empower steward behavior facilitate alignment of interest, which in turn result in pro-organizational behavior and will increase firm performance (Davis, David, & Donaldson, 1997; Madison et al., 2016).

Table 3. Comparison agency theory and stewardship theory

	Agency theory	Stewardship theory
Foundational work	Jensen and Meckling (1976)	Davis et al. (1997)
Relationship	Based on the principal-manager relationship: describes the individual-level agent behaviors and the firm-level agency governance mechanisms that are implemented in response	Based on the principal-manager relationship: Describes the individual-level steward behaviors and the firm-level stewardship governance mechanisms that are implemented in response
Assumption	Economic model of man	Humanistic model of man
Behavior	Opportunistic: Individual/self-serving	Pro-organizational: Collective/other-serving
Governance	Monitoring and incentive systems: mechanisms to curb opportunistic behavior by aligning the interests of the manager with those of the principal	Trust systems: Mechanisms to encourage cooperation and involvement to facilitate the natural alignment of interests between the manager and principal
Outcome	Pro-organizational outcomes; Firm performance by way of cost minimization	Pro-organizational outcomes; Firm performance by way of wealth maximization

Notes: this table compares the agency theory and the stewardship theory. Source: Madison et al., 2016, p. 67.

Table 4. Differences between agency theory and stewardship theory

Dimension	Agency theory	Stewardship theory
Theoretical basis	Economics	Psychology and sociology
Approach	Control (distrust)	Collaboration (trust)
Principal–agent relationship	Goal conflict	Compatible or aligned goals
Agent's motivation	Mainly extrinsic	Intrinsic
Organizational identification	Low identification	High identification
Human behavior	Individualist	Collectivist
Governance mechanisms	Monitoring and incentives	Empowering structures

Notes: this table presents differences between the agency theory and the stewardship theory. Source: van Puyvelde et al., 2012, p. 437.

2.2.4 Resource dependency theory

Understanding the relationship between the strategy, structure, and performance of an organization and their external environment is often tried by examining resources. Resources could be gathered in an environment which consists of other firms, which implies that firms depend on each other when it comes to exchanging resources. This means that firms with resources can be considered more powerful than those without access to resources. Hence, access to resources implies power (Abid et al., 2014). Rooted in the

belief that organizations respond to their environments, the resource dependency theory assumes that organizations make decisions based on the scarcity of necessary external resources. Even more emphasizing, the theory states that the survival of the organization is based on the harmony between the external environment and the internal decisions and processes of the firm (Yeager et al., 2014). Resource dependency theory draws from both the sociology and management and takes a strategic view of corporate governance, because it states how the external resources of the firm affect the behavior of the firm (Abid et al., 2014). Caused by the external environment, resource dependency theory is often examined along with uncertainty. Scarce resources, lack of information or uncertainty about the external environment motivate managers to act in ways to reduce uncertainty and to secure resources. Resource dependency theory considers three dimensions that encompass resources and uncertainty: munificence, dynamism, and complexity (Yeager et al., 2014). Munificence is about the availability and accessibility of resources that are necessary to a particular firm. For instance, when a firm has limited financial resources or a short supply of skilled professionals, then the firm has a low munificent environment. The resource dependency theory predicts that managers of successful firms develop strategies that take advantage of munificence in their environment (Yeager et al., 2014). The other two resource dependency theory dimensions, dynamism, and complexity, both involve the level of uncertainty of information in the external environment (market) (Kreiser & Marino, 2002; Yeager et al., 2014). A dynamic environment is constantly changing. Quickly changing important components of the environment results in information uncertainty for the managers and making decisions more difficult. The complexity of the environment is also related to the availability of information and makes it more difficult for managers to predict the future and the outcome of decisions. All in all, the resource dependency theory predicts that decreasing munificence and increasing dynamism and complexity of the external environment will decision-making become harder for managers and influence organizational strategies and therefore the performance of the organization (Yeager et al., 2014).

2.2.5 Transaction cost economics theory

Transaction cost economics regards the transaction as the basic unit of analysis and states that the firm's economic activity is to be understood in terms of transaction costs economics (Verbeke & Kano, 2012). Governance structures should be aligned with the attributes of a transaction in a discriminating way to serve economic efficiency (Riordan & Williamson, 1985; Verbeke & Kano, 2012). The theory is about that firms can save costs by performing tasks within the firm, instead of focusing entirely on externals. In this theory, the managers are self-interest seeking instead of enhancing shareholder's wealth. The focus is entirely on transaction costs and not on production costs (Abid et al., 2014). According to Nyrhinen and Dahlberg (2007), Coase developed the transaction cost economics theory, whereas Williamson, among others, popularized and expanded it. A firm has to choose between hierarchical governance (in-source, internally) and market governance (outsource, externally), whereby hierarchical governance has higher production costs and market governance higher transaction costs. In order for a firm to be as efficient as possible, the governance structure must be matched to the attributes of the transaction (Nyrhinen & Dahlberg, 2007). Since the transaction cost economics theory focuses on transaction costs and has the objective to reduce these transaction costs, it has a long-term view. Therefore, this theory supports

shareholders that affirm this long-term view. In addition, shareholder that are risk averse and use contracts to reduce the risk and reduce the transaction costs are preferred. The transaction attributes are divided into behavioral and transactional attributes. There are three transactional attributes: asset specificity, frequency, and uncertainty. Asset specificity is that particular assets, involved in a transaction cannot be easily redeployed elsewhere without significant loss of economic value. Asset specificity is considered the most important attribute of a transaction because it is largely responsible for observable differences in transaction costs. Greater physical, organizational and human assets specificity increases transaction costs which leads to more complex, longer-term contracting schemes (Verbeke & Kano, 2012). Frequency is the frequency of the transaction. It is to balance the transaction costs. When the product is rarely used, there is no reason to spend too much time in contract negotiations (Abid et al., 2014; Nyrhinen & Dahlberg, 2007). Uncertainty can be defined as a lack of information and may emerge from technological development or unpredictable business needs. It affects the contracts because the future contingencies are difficult to define. It also affects the behavioral attributes (Nyrhinen & Dahlberg, 2007). There are two behavioral attributes: bounded rationality and opportunism. Bounded rationality means that human actors have limited capacity to process information, address complexity, and make optimal choices, which creates problems in the incomplete contracts when assets specificity is involved. Opportunism is about guiling by making calculated efforts to mislead, distort, disguise, obfuscate or otherwise confuse for your own interest. It is the ultimate behavioral driver of both market failure and the rise of hierarchy and it is important when asset specificity is involved because one party cannot walk away from a transaction without incurring high costs (Verbeke & Kano, 2012). People tend to make rational decisions to maximize their utility, however, uncertainty (scarcity and cost of information and the limited human information processing capacity) can settle humans for bounded rationality. Opportunism will increase with high uncertainty. Therefore, signing appropriate contracts can reduce the threat of opportunism (Nyrhinen & Dahlberg, 2007).

In table 5, the five different corporate governance theories are distinguished on several characteristics. The agency theory focuses on reciprocity, whereas stewardship focuses on shareholder's interest. Furthermore, the objective of the agency theory is to minimize agency cost, whereas the stewardship maximizes productivity and transaction cost economics theory reduces transaction cost. The agency theory is the only theory with a short-term view and low level of commitment, whereas stewardship theory is the only theory that is only intrinsic based in terms of motivation. The relationships of stewardship theory and stakeholder theory are trust-based, whereas the other three are contract based. The agency theory and resource dependency theory are based on goal congruence, whereas transaction cost economics theory, stewardship theory and stakeholder theory are based on goal alignment. Theoretically, while agency theory is the basis of monitoring and control role, resource dependence and stewardship theories are the bases of strategy roles and stakeholder theory is the basis of service role (Gaur, Bathula, & Singh, 2015).

Table 5. Comparing the Corporate Governance theories

Basis	Agency	TCE	Stewardship	Stakeholders	RDT
Focus	Reciprocity (Self-interest)	Transactional costs	Shareholder's interest	Stakeholder's interest and Relationship building	Firm resources and power
Objective	Minimize agency cost	Reduce transaction cost	Maximize Productivity	Long term relationship	Acquire & exploit resources
Base	Normative	Classical idea	Classical idea	Normative	Classical idea
Model	Individualistic	Individualistic	Collectivistic	Collectivistic	Collectivistic
Time horizon	Short term view	Long term view	Long term view	Long term view	Long term view
Rooted	Economics	Micro-Economics	Law	Management	Sociology and management
Behavior	Opportunistic	opportunistic	Pro-organizational	Pro-social	Pro-organizational
Approach	Economic	Economic	Sociological and psychological	Societal Level	Strategic
Main theme	Goal congruence	Goal alignment	Goal alignment	Goal alignment	Goal congruence
Cultural suitability	High power distance	Mixed	Low power distance	Low power distance	Mixed
Model of man	Economic man	Economic man	Self-Actualizing man	Self-Actualizing man	Economic man
Motivated by	Self-objectives	Self-objectives	Principal's objectives	Shareholder and other stakeholder's objectives	
Motivation	Extrinsic	Extrinsic	Intrinsic	Intrinsic as well as extrinsic	Intrinsic as well as extrinsic
Structure	Monitor and Control	Monitor and Control	Facilitation and empowerment	Facilitation and empowerment	Monitor and Control
Need	Economic need (lower order)	Economic need (lower order)	Growth, achievement (higher order)	Economic and long-term firm growth	Economic and long-term firm growth
Principal and agent interest	Diverge	Diverge	Converge	Converge-Liaison	Converge
Management philosophy	Control oriented	Control oriented	Involvement oriented	Involvement with all stakeholders	Control oriented
	Control mechanism	Control mechanism	Trust mechanism	Trust mechanism	Control mechanism
Attitude towards risk	Risk aversion	Risk aversion	Risk propensity	Risk propensity	Risk aversion
Power	Institutional base	Institutional base	Personal base	Institutional base	Institutional base
Commitment	Low level commitment	High level (shared) commitment	High level (shared) commitment	High level (shared) commitment	High level (shared) commitment
Relationship	Contract base relationship	Contract base relationship	Trust base relationship	Trust base relationship	Contract base relationship

Notes: this table compares different corporate governance theories. Source: Abid et al., 2014, p. 172-173.

2.2.6 Institutional theory

Corporate governance mechanisms as ownership structure are influenced by firm-specific, industry-specific and institutional factors. Institutional theory examines the social context within which the firm's activities are embedded, so this theory introduces the social and regulatory context in influencing organizational structure and firm behavior (Douma et al., 2006). Ownership concentration and identity are embedded in national institutions and these have to be taken into account when accessing implications for corporate strategy and performance.

From a historical perspective, the stock exchange in Belgium (was Brussels stock exchange) is particularly interesting since it was one of the most important stock exchanges in the world during the late nineteenth and early twentieth century. Belgium was the first country to take part in the industrial revolution on the European continent (Buysschaert et al., 2008). Hence, in the late 19th and early 20th century, Belgian capital markets were among the most developed capital markets in the world. As a reaction to the worldwide financial crisis at the beginning of the 1930s, in 1934, a new law forced the universal banks to separate their banking and investment activities. This led to the establishing of holding companies, which owned diversified portfolio investments in a wide range of industrial and commercial activities and were the largest shareholders in Belgium throughout the 20th century (Annaert, Buelens, & Deloof, 2014).

A notable institutional context in Belgium is that the ownership of publicly traded firms is highly concentrated, and families are the major players in controlling the business. With respect to corporate governance, Belgium is considered to be a typical Latin country. In these countries, corporate ownership is characterized by family control, business groups, financial holding companies, cross-holdings, and state control (Buysschaert et al., 2008). Belgian companies are typically controlled by families, often via business groups and financial holding companies. For example, Faccio and Lang (2002) find that families are the ultimate controlling shareholders in more than half of Belgian publicly traded companies. The ownership structure of Belgian companies is characterized by complex pyramidal structures, interlocking ownership, and voting pacts. These structures allow the ultimate owner to maintain control over a large group of companies through cascades of holding companies, while owning only a fraction of their cash flow rights. Belgium has one of the highest presence of pyramids and controlling shareholders. Most Belgian companies have a single controlling shareholder, and families are actively involved in the management of the company (Buysschaert et al., 2008). Since the transparency law in 2007, these pyramidal structures are more transparent, and make it less complex to discover shareholdings of the ultimate owner.

These business groups are particularly well suited to provide the necessary welfare-enhancing functions because of their superior ability to raise capital, train, and rotate managerial talent among groups of firms and use common brand names in marketing their products. On the downside, ineffective protection of minority shareholder and creditor rights lead to greater entrenchment by controlling shareholders, resulting in conditions ideally suited for expropriation (Douma et al., 2006). While the separation of ownership and control in pyramidal structures generates a strong incentive for the controlling shareholders

to divert resources between companies in the group, there is still no proof of expropriation of minority shareholders in Belgian business groups (Buysschaert et al., 2008).

2.3 Continental European model versus Anglo-American model

The quality of the institutional environment is an important factor in firm value (La Porta, Lopez-de-SIlanes, Shleifer, & Vishny, 1998), which means that country-specific aspects will have an impact on the corporate governance and the relationship with firm value and performance (see also institutional theory). This is in line with Mandaci and Gumus (2010) who argue that this relationship depends on location, special local laws and governance practices. Particularly, Khan, Mather and Balachandran (2014) state that the ownership-performance relationship is context-specific, with wider corporate governance conditions impacting on the theorized incentive effects. There are different corporate governance models since firms operate in different business contexts. The nature of the ownership structure depends on the setting within the country (La Porta et al., 1998) which affects the relationship between ownership structure and firm performance (Frijns et al., 2008).

Previous literature contrast two dichotomous models of Anglo-American and Continental European corporate governance. The Anglo-American model is also labeled the outsider, common law, market-oriented, shareholder-centered or liberal model, and the Continental European model the insider, civil law, blockholder, stakeholder-centered or coordinated model (Aguilera & Jackson, 2003). The Anglo-American model is typical for the countries as US and UK (Colpan et al., 2011; Ooghe & de Langhe, 2002), whereas the Continental European model is found in the German and the Latin countries. There is a difference between how the two corporate governance models use the discipline mechanisms. Internal mechanisms, which are introduced from inside the firm, are more often used in the Continental European model, whereas external mechanisms, which are introduced from outside the firm, are more often used by the Anglo-American model (Ooghe & de Langhe, 2002). The ownership structure, which is an internal mechanism, is therefore very interesting for firms in the Continental European model, including Belgium.

The Anglo-American countries have a lower ownership concentration than the countries with the Continental European countries. Blockholdings in Europe are much higher than in the USA, which results in that in the Continental European countries the degree of concentration of shareholding voting power is higher relative to the Anglo-American model. This is caused by the fact that countries with the Anglo-American model have a greater number of firms which are listed and publicly traded with the consequence that shareholders spread their money over more firms. Another reason is that firms in countries with the Anglo-American model tend to be larger, which means that a large percentage is an enormous amount of capital (Halaoua, Hamdi, & Mejri, 2017; Ooghe & de Langhe, 2002). This means that also the relationship between large controlling shareholders and the minority shareholders is important. The minority shareholders protection is, therefore, an important issue.

The Continental European countries are not as transparent as the countries with the Anglo-American model when it comes to information disclosure of ownership structure. Where the controlling shareholders in the first-mentioned often have control via difficult pyramidal structures, regulations in the

Anglo-American countries have ensured that the complexity of the ownership structure is limited (Bai, Liu, Lu, Song, & Zhang, 2004; Enriques & Volpin, 2007; Ooghe & de Langhe, 2002).

In addition, low concentration of shareholders in Anglo-American countries means that the shareholders do not have significant power and that the managers have the power to decide on many problems that arise in the firm. This decision-making power may give rise to over-investment since managers prefer to enlarge the firm for their own interest. This implies that investments will be made, even if the profitability is low, which ultimately has negative consequences for the profitability of the shareholders. The Anglo-American model has an outsider system of corporate control, which means that the ultimate authority to determine corporate strategy and to appoint members of the board is in the hands of a large number of anonymous investors. In contrast, a few shareholders in countries with the Continental European model hold a large percentage of shares and use this to control the firm. This is also called the insider system, where a small number of shareholders with different interest appoint members to the board (Bai et al., 2004; Ooghe & de Langhe, 2002; Othman & Zeghal, 2006).

The ownership identity is also different between the two corporate governance models. In the Anglo-American countries, financial institutions are not allowed to hold shares in publicly listed companies on behalf of their own, they mainly act as agents. Therefore, in these countries, most of the shares are owned by the agents of the financial institutions, whereas less is in the hands of the private persons. In these countries, many companies are listed, and institutional investors provide many financial resources through the pension system, so there is not much personal contact between managers and shareholders. This in contrast with the Continental European model where private persons and companies act directly and do not make use of agents to control their shareholdings. In these countries, the shares are held by private companies, financial institutions, and private persons. Particularly, in Belgium are the families the most important shareholders of the public companies (Faccio & Lang, 2002a; Halaoua et al., 2017; Ooghe & de Langhe, 2002; Van der Elst & Aslan, 2009). This implies that the Continental European countries with fewer listed companies invest their personal savings on an individual basis and a strong relationship exists between the managers and the shareholders. These two functions are even not always separated.

These different models with different separation of ownership and control lead to different solutions of the agency problems. While in the Anglo-American model countries the main agency problem is the conflict of interest between managers and dispersed shareholders, in the Continental European countries the main potential conflict of interest is between the large controlling shareholders and the minority shareholders (Ooghe & de Langhe, 2002). Moreover, the liquidity of the market in countries of the Anglo-American model has the advantage that when investors receive negative information about the firm, the investors can unload their investments. In the Continental European model is this not possible. In these countries, investors may use their voting power to influence the performance of the firm (Enriques & Volpin, 2007). In addition, dispersed voting power, as is the case in Anglo-American countries, could lead to the free-rider problem. The costs of control will exceed the benefits, which results in that shareholders will not take action. In turn, this gives managers more power. More power in the hands of the management may lead to a short-term orientation. In contrast, in the Continental European countries, the

power is in the hands of the shareholders, which leads to a more long-term orientation. At last, the Continental European model has a few financial resources that are available, because the ownership is concentrated, which implies that only a few owners are equity suppliers (see table 6) (Bai et al., 2004; Ooghe & de Langhe, 2002).

Table 6. Differences between Anglo-Saxon (Anglo-American) model and Continental European model

Anglo-Saxon model	Continental European model
Great management power	Great shareholder power
Free-riding problem	Conflicts of interest
Over-investments	Limited financial resources
Problem of control	Movement of cash flows
Short-term problem	

Notes: this table presents differences between the Anglo-American model and the Continental European model. Source: Ooghe and de Langhe, 2002, p. 440.

2.4 Corporate governance mechanisms

The separation of owners and managers creates the need for corporate governance, which includes the mechanisms that ensure efficient decision-making and maximizes the firm performance. The mechanisms can be divided into internal mechanisms as executive remuneration (compensation), board structure and ownership structure and external mechanisms as market for corporate control (takeover market), product market competition, legal infrastructure, and the market actors (stakeholders) (Cuervo, 2002; Ooghe & de Langhe, 2002; Tian & Twite, 2011; Weir, Laing, & Mcknight, 2003). There are more examples of these mechanisms, but only the main governance mechanisms are being discussed, one more extensively than the other.

2.4.1 Internal mechanisms

Internal governance mechanisms monitor the progress and activities of the firm and take corrective actions when the business goes off track. The internal mechanism is required for the external mechanism to function, which leads to a complementary relationship between these mechanisms (Cremers & Nair, 2005; Jensen, 1993). The most important internal mechanisms are executive remuneration (compensation), board structure and ownership structure (Cuervo, 2002; Ooghe & de Langhe, 2002; Tian & Twite, 2011; Weir et al., 2003).

2.4.1.1 Executive remuneration/compensation

Executive remuneration is an important internal governance mechanism that intends to solve the agency problem. Carr and Valinezhad (1994) state that researchers have claimed that the relationship between executive compensation and firm performance is either nonexistent or of a very weak nature. They argue that it is unrelated, or if related, then it is only related to short-term performance. They also state that other studies claim that executive compensation is more closely related to the size of the firm than to the

performance, but that the main issue in the studies is whether the executives are excessively overpaid, or whether their compensation reflects rewards for their performance (Carr & Valinezhad, 1994). Two theories of the executive compensation decision contracts are proposed: optimal contract theory and managerial power theory (Liu, Peng, & Chen, 2014). The optimal contract theory argues that it is effective to motivate the managers by contractual link their salary with the shareholder's wealth closely, which implies that an effective compensation contract binding executive compensation with corporate performance contributes to the convergence of the two objectives of both the managers and the shareholders (Liu et al., 2014). Therefore, executive compensation and firm performance should be positively related. The managerial power theory argues that executive compensation does not solve the agency problem necessarily, because itself is a part of the agency problem (Liu et al., 2014). This theory emphasizes that due to the managerial power, the board cannot completely control the design and implementation of the executive compensation contract, on the contrary, the executives themselves are likely to affect or customize their own compensation contract to a large extent (Liu et al., 2014).

2.4.1.2 Board Structure

Board structure is also an important internal corporate governance mechanism. The umbrella concept is wide and different underlying concepts could be mentioned, such as board size, the proportion of outside, independent, non-executive directors, chief executive officer (CEO) duality, CEO tenure, board committees, and two-tier and one-tier board.

2.4.1.2.1 Board size

Board size is the number of directors the board has. The two most important functions of the board of directors are advising and monitoring (Guest, 2009). According to Oba, Tigrel and Sener (2014), most researchers agree that smaller board size can be more beneficial in monitoring top management and improving firm performance. This was already in the earliest literature, where Lipton and Lorsh in 1992 and Jensen in 1993 recommended that the number of directors should not be too large, because it will become difficult for directors to express their opinions and ideas and it would be more difficult to control (as cited in Kalsie & Shrivastav, 2016). Thus, coordination and communication problems arise when the board size is larger, due to the rising difficulty to arrange board meetings, reach consensus, which leads to slower and less-efficient decision-making (Guest, 2009). In addition, when the board size is larger, board members will be less likely to share a common purpose, communicate with each other clearly and reach a consensus that builds on the director's different points of view, which will undermine the board cohesiveness. Furthermore, the free-riding problem increases, which makes the board of directors less diligence (Guest, 2009). However, the advantage of a larger board size is the greater collective information that the board subsequently possesses, which will lead to higher performance. This argument supports the resource dependency theory, which argues that larger boards have directors from diverse background possessing different skills (Kalsie & Shrivastav, 2016). Both the advising and the monitoring function predict an initial improvement in performance as board size increases (Guest, 2009). It may be that as board size increases beyond a certain point, the inefficiencies outweigh the initial advantages from having

directors to draw on, which leads to lower firm performance. Moreover, the impact of board size on performance is depending on both the firm-specific characteristics and the country-specific characteristics (Guest, 2009). Hence, the optimal board size should be determined based on the specific institutional and legal environment.

2.4.1.2.2 Proportion of outside, independent, non-executive directors versus affiliated directors

Outside, independent or non-executive directors are individuals whose business relationships to the firm is their directorship. The agency theory and the steward theory have both a different view on these independent directors. According to the agency theory, the main contribution of independent directors is their ability to remain independent while overseeing operating matters, protecting the assets of the firm and holding the managers accountable to the firm's various key stakeholders to ensure the future survival and success of the enterprise (Arosa, Iturralde, & Maseda, 2010a). According to this theory, the main goal of the board is to discipline and monitor the managers, while the main goal of the steward theory is to serve and advise. According to the stewardship theory, the independent directors exert a positive relationship with firm performance by counseling and advising rather than their monitoring and control activities (Arosa et al., 2010a). Hence, both theories suggest a positive relationship between independent or outside directors and firm performance, while the role of the directors is different: monitoring and controlling versus valuable outside advice and counsel to the firm.

This is in contrast to affiliated directors, who are non-employee individuals with potential or existing business relationships with the firm (Arosa et al., 2010a). The agency perspective suggests that affiliated directors are less objective and less effective monitors because they seek to protect or enhance their business relationship with the firm. This results in conflicts of interests and has a negative impact on their ability to monitor and discipline. The stewardship theory suggests a different perspective: this theory suggests that both affiliated directors and independent directors exert a similar positive effect on firm performance, because affiliated often offer skills in knowledge-based fields, such as law, finance, accounting, and consulting (Arosa et al., 2010a). Hence, agency and stewardship theory lend different perspectives on the role of affiliated directors: the agency theory indicates that affiliated directors are less effective monitors, while the stewardship theory indicates that affiliated directors provide alternative perspectives and expertise, similar to independent directors (Arosa et al., 2010a). This is in line with Guest (2009) who argues that outsiders are more independent, provide better monitoring, but are less informed about the firm activities than insiders. Guest (2009) also suggest that the number of non-executives is expected to have a more positive impact than increases in the number of executive directors.

2.4.1.2.3 CEO Duality

CEO duality debate is about if the two most powerful roles of the board, those of the chairman and CEO, should be separated or not. While some argue that separation improves the board's ability to monitor and be more transparent and accountable, others argue that CEO duality brings more focus on objectives, operations and decision making (Guest, 2009). This is again the different perspective of the agency and stewardship theory. While the agency theory argues that duality encourages potential entrenchment; it

allows the CEO to act freely in personal best interest, the stewardship theory suggest that duality encourages CEO's to serve their firms more vigorously; it can improve organizational efficiency in corporate leadership and maximize shareholder value (Guillet, Seo, Kucukusta, & Lee, 2013). The existing literature provided no definitive evaluation of the effect of CEO duality on firm performance.

2.4.1.2.4 CEO Tenure

CEO tenure is another aspect of board structure. The literature addresses the idea that the longer the CEO tenure, the more power the CEO has because the risk of termination decreases. Specifically, with lowered risk of termination, a longer-tenured CEO can influence board decision-making by affecting the board composition and the nomination of incoming board members (Kim, Yang, & Lee, 2017). According to Guest (2009), there are two perspectives on CEO tenure. On the one hand, long tenure in CEO position may lead to more entrenchment, failure to meet the changing needs of the environment, lack of reluctance for change, and having an influential role in the selection and the composition of boards of directors. On the other hand, long-tenured CEO's accumulate unique and non-transferable industry and firm-specific knowledge and are more committed to the firm.

2.4.1.2.5 Board committees

In line with the provisions of the corporate governance code, the boards of directors are increasingly delegating duties to board committees. There are three main board committees: audit, compensation, and nomination (Kaczmarek & Nyuur, 2016). The audit committee provides accurate and high-quality financial information, the compensation committee generates well-designed incentive plans for managers and the nomination committee is responsible for the optimization of the director nomination and selection process. All these committees are meant for the further delegation and specialization of processes for which the board is responsible (Kaczmarek & Nyuur, 2016). Each committee is composed of at least three members (Corporate Governance Committee, 2009).

The audit committees are the most established and mature out of all the board committees. This board committee is entrusted with the task of ensuring high standards in financial reporting. Specifically, in Belgium, the audit committee should be composed exclusively of non-executive directors and at least one of them shall have accounting and auditing expertise. Audit committees should monitor the financial reporting process. Moreover, they are meant to monitor the effectiveness of and review the firm's internal financial controls, as well as risk management systems. Finally, their duties also encompass monitoring and review of the firm's internal audit function, monitoring the statutory audit of the annual and consolidated accounts, including any follow-up on any questions and recommendations made by the external audit, recommendations to shareholders regarding the external auditor, review and monitoring of the external auditor's independence and objectivity, and identify any matters in respect of which it considers that action or improvement is needed (Corporate Governance Committee, 2009; Kaczmarek & Nyuur, 2016).

The compensation committee, also called remuneration committee, is designed to review the terms and conditions of employment of senior management. In other words, they are originated to manage

corporate executive annual incentive compensation plans (Kaczmarek & Nyuur, 2016). The committee has a responsibility for setting remuneration, including variable remuneration and long-term incentives, whether or not stock-related, in the form of stock options or other financial instruments, of all non-executive directors and executive managers (Corporate Governance Committee, 2009). The nomination committee should assist the board on the nomination and succession planning of the CEO and the other members of the executive management, unless otherwise decided by the board. This committee should recommend suitable candidates to the board and should recommend with regard to the appointment of directors, the CEO and the other members of the executive management. The role of the nomination committee is to ensure that the appointment and re-election process is organized objectively and professionally. Moreover, the committee should draft appointments procedures, periodically assess the size and composition of the board and make recommendations with regard to any changes, identify and nominate candidates, advise on proposals for appointments originating from the shareholders, and properly consider issues related to succession planning (Corporate Governance Committee, 2009).

2.4.1.2.6 One-tier and Two-tier board model

Different countries around the world have one-tier or two-tier board models. More specifically within Europe, the UK has the one-tier model and Germany the two-tier model (Pellegrini & Sironi, 2017). In countries as the Netherlands and Belgium, both the one-tier and two-tier board system exists (Jungmann, 2006). However, in Belgium, the corporate governance code has been drawn up with the one-tier board model in mind (Corporate Governance Committee, 2009; Pellegrini & Sironi, 2017).

The one-tier board is a single board system, comprised of both executive directors (internal) and non-executive directors (external) (Jungmann, 2006). In this model, the shareholders' meeting appoints the board of directors, which manages the firm, while the management control committee performs a monitoring role. However, the members of this committee are selected among and appointed by the directors who sit on the board. This implies that in the one-tier model of corporate governance, the monitoring and managing bodies of the firm are combined within the board of directors. The board has a dual role to play: to support the entrepreneurship and to ensure effective monitoring and control. Thus, the one-tier board model gathers both types of directors in one unified group, hence all members have direct access to the same information, however, they fulfill both a managerial and a supervisory role. The closeness between the controller and the controlled undermines the independence of the body (Corporate Governance Committee, 2009; Pellegrini & Sironi, 2017).

In contrast, the two-tier board model separates the management and monitoring functions in two separate bodies by entailing a pyramidal structure: the shareholders' meeting appoints the members of the supervisory board, which is the monitoring body. The supervisory board then appoints the management board, who manages the firm (Pellegrini & Sironi, 2017). In this model, both bodies act autonomously (Jungmann, 2006). The supervisory board is mainly concerned with supervision, this board oversees management, appoints, monitor and dismisses members of the management board and approves the financial accounts. Moreover, the supervisory board may also fulfill some soft functions, such as networking with stakeholders (Jungmann, 2006). The management board is concerned with all

management and operational issues, they manage the company affairs, but also set up long term goals and guidelines (Jungmann, 2006). The management board is comprised of executive directors (inside directors) only, while the supervisory board consists exclusively of non-executive directors. This implies that there is a formal separation between executive directors and non-executive directors and their tasks and responsibilities (Jungmann, 2006). The CEO is the head of the management board, while the chairman is the head of the supervisory board. In this model, the chairman may not be the same person as the CEO (Jungmann, 2006). Furthermore, simultaneous membership of the management board and the supervisory board is prohibited (Jungmann, 2006).

2.4.1.3 Ownership structure

One of the main corporate governance mechanisms is the ownership structure. The relationship between ownership structure and firm performance is an important area of the field of corporate governance from the last two decades (Wahla et al., 2012). According to Ongore (2011), the choice of the measures for ownership structure in relation to firm performance depends on the availability of information and their appropriateness for specific research questions, because there is no well-established tradition of selecting specific measures. However, in line with previous literature, this paper analyzes ownership structure in two dimensions: ownership concentration and ownership identity.

2.4.1.3.1 Ownership concentration versus ownership dispersion

Good corporate governance depends on the combination of proper ownership concentration and the protection of the rights of the investors (Mandaci & Gumus, 2010). According to Mandaci and Gumus (2010), ownership concentration is high in less developed countries, where the rights of the investors are not protected by relevant laws. As stated before, Continental European countries as Belgium also have higher concentrated ownership. Previous literature presents several measures for ownership concentration, such as the percentage of shares owned by the top five shareholders and by the percentage of shares owned by blockholders (shareholders who own 5% or more of the total shares).

According to the agency theory is ownership concentration an effective monitoring technique by which shareholders can ensure that managers behave in line with their interests (El-Masry, 2010). If the ownership is widely dispersed, there is no shareholder that has the voting power and adequate incentives to closely monitor the management, because this gain is too small to cover the costs. Therefore, the concentration of ownership provides large shareholders with both the incentive and the ability to monitor and control the management (Jafarinejad, Jory, & Ngo, 2015; Muller-Kahle, 2015; Xu & Wang, 1999). Monitoring becomes applicable only if a single shareholder becomes large enough to bear to costs of control (El-Masry, 2010). In other words, if the shareholding is too small, the shareholder has no incentive and capability to monitor and influence the management. Hence, a certain degree of ownership concentration is needed according to the agency theory. However, this may promote freeriding, which means that small shareholders benefit from the monitoring power of the larger shareholders without bearing any costs (El-Masry, 2010). Hoang, Nguyen and Hu (2017) reject this by suggesting that a highly concentrated ownership structure mitigate both the agency problem and the free rider problem as it aligns

the interest of managers and shareholders, which they call the convergence-of-interest hypothesis. In addition, they suggest that this concentration also increases the efficiency of monitoring mechanisms of the shareholders over the managers, which they call the monitoring hypothesis.

Conversely, the concentration of ownership has some limitations. Concentration of ownership may lead to lower firm performance due to greater exposure to the firm's risk (Demsetz & Lehn, 1985). Furthermore, a risk-averse shareholder with a diversified portfolio may sell his holding if the market value falls too much, which makes managers restrained from departing too far from profit-maximization by the need to maintain share price. In other words, greater concentration would mean that the market for the firm's shares would be less well developed and therefore this market discipline effect weaker (Leech & Leahy, 1991). Another limitation is that higher concentration could lead to potential expropriation of wealth from small shareholders in order to achieve the interest of the blockholders (Bhaumik & Gregoriou, 2010; Füerst & Kang, 2004). This is called tunneling of resources, which occurs when there is a systematic transfer of profits and assets for the benefit of majority shareholders. In this case, ownership concentration, while minimizing principal-agent conflict, creates a different type of agency problem known as principal-principal conflict. Principal-principal agency problem is a concern in institutional environments which lack minority shareholder protection and enforcement mechanisms (Bhaumik & Gregoriou, 2010; Dharwadkar, George, & Brandes, 2000).

Theories of corporate governance on ownership concentration

As agency problems are minimized, managers make strategic decisions which are in the best interest of the firm rather than in their own interests. Such decision making is likely to result in better utilization of resources and capabilities that a firm has and should, therefore, result in higher firm performance. According to the resources dependency theory, concentrated owners can use their knowledge and resources to enhance the resource base of firms (Carney & Gedajlovic, 2001). The resources of concentrated owners may be particularly useful to firms which operate in less munificent environments (Gugler, Ivanova, & Zechner, 2014), or to firms with a smaller firm size (Carney & Gedajlovic, 2001). In contrast to the agency theory and resource dependency theory, the stewardship theory suggests that ownership concentration will not have an effect or even a negative effect on firm performance because the interests of the shareholders and the managers are already aligned. Especially in Continental European countries such as Belgium where the ownership concentration is already high, the effect will be non-significant or negative. The stakeholder theory argues that a higher ownership concentration would mean that shareholders can influence the decision making such that their own interests are maximized, even if that comes at the loss of interests of other stakeholders. Hence, high ownership concentration limits a firm's inclination to accommodate the preferences of all stakeholders and thus has a negative impact on the performance. The transaction cost economics theory argues that the managers are self-interest seeking instead of enhancing shareholder's wealth and therefore the ownership concentration is positively related to firm performance (in line with the agency theory).

Empirical evidence on ownership concentration

The empirical results are inconclusive. Pivovarsky (2003) investigated empirically the relationship between ownership concentration and firm performance in 376 partially and fully privatized Ukrainian firms and find that ownership concentration is positively related with firm performance. Accordingly, Mandaci and Gumus (2010) find also a significantly positive effect of ownership concentration on both firm value (Tobin's Q) and profitability (return on assets), after controlling for investment intensity, leverage, growth, and size. Thomson and Pedersen (2000) controlled in their study for industry, capital structure, and nation effects and find a positive effect of ownership concentration on shareholder value (market-to-book value of equity) and profitability (return on assets). However, this effect levels off for high ownership shares (non-linear relationship). Furthermore, Kapopoulos and Lazaretou (2007) find a positive relationship between the ownership concentration of both inside and outside shareholders and firm performance Also, Frijns et al. (2008) find a positive relationship between the ownership concentration of several identities of ownership and firm performance. In addition, the recent study of Shahrier, Ho and Gaur (2018) also find a positive relationship. In contrast, Ongore (2011) used Pearson's product moment correlation and logistic regression in his study and find that ownership concentration has a significant negative relationship with firm performance. In addition, Tsegba and Achua (2011) obtained empirical results by carrying out an ordinary least squares analysis, which provided evidence that suggests that ownership concentration has no significant effect on firm performance. Another stream of evidence showed that the relationship depends on the situation (contingency). Arosa et al. (2010b) show empirical evidence that for family firms, the relationship between ownership concentration and firm performance depends on which generation of the family manages the firm. Schiehll (2006) suggests that large inside shareholders tend to be negatively associated to firm performance, whereas there is no association between large outside shareholders or combing the two in the ownership structure and the performance of the firm. In addition, Hoang et al. (2017) suggest in their introduction that high ownership concentration enhances both external pressure and internal motivation, which could positively affect firm performance. However, their findings showed that several ownership identities with ownership concentration had different effects on firm performance. Karaca and Eksi (2011) investigated panel data and find a positive relationship between ownership concentration and profit before tax, however, there was no positive effect on Tobin's Q. Therefore, the trade-off between the concentration and dispersion of ownership raises further questions that research needs to address (Gillan & Starks, 2003). The ownership concentration affects firm performance. However, it depends on the identity in which way the sign goes. Hence, the relationship between ownership concentration depends both on the country and the identity of the shareholder.

The relationship between ownership concentration and firm performance is different in countries. Beginning in the mid-1990s, studies of ownership concentration expanded to include countries others than the 'big four' (US, UK, Japan and Germany) (Denis & Mcconnell, 2003). Claessens and Djankov (1999) did a cross-section of 706 Czech firms over the period 1992 through 1997 and report that firm profitability and labor productivity are both positively related to ownership concentration. Faccio and Lang (2002) analyzed 5,232 corporations in 13 Western European countries and conclude that listed firms are generally either widely held, which is more common in the UK and Ireland, or family controlled, which is one

common in continental Europe. For instance, Gorton and Schmid (2000) find that ownership concentration in Germany is positively related to firm performance. Whereas, Leech and Leahy (1991) argue that ownership concentration has a negative effect on valuation ratio, trading profit margin and growth in net assets on UK firms. Cronqvist and Nilsson (2003) investigated a panel of 309 publicly traded Swedish firms between 1991 and 1997 and find a significant negative effect of vote ownership of controlling minority shareholders and firm value measured in Tobin's Q. They also find that return on assets is lower for firms with concentrated vote control.

2.4.1.3.2 Ownership identity

The literature on corporate governance pays much attention to the issue of ownership identity (El-Masry, 2010; Frijns et al., 2008; Hoang et al., 2017; Kapopoulos & Lazaretou, 2007; Ongore, 2011; Thomson & Pedersen, 2000). Ownership identity is the identity of the shareholders, so who the shareholder is, that is, managers, family, corporations, institutions or government. The standard assumption in economics and strategic management research that shareholders want the firm to maximize economic performance or shareholder value is not sufficient in all cases (Thomson & Pedersen, 2000). Shareholders differ in terms of wealth, priority of shareholder value and risk aversion. The preferences of the shareholders and their investment choices are influenced by their shareholder interest and their own interest. This results in a trade-off between shareholder value and other goals (Ongore, 2011). Similarly, Frijns et al. (2008) suggest it may be important to investigate differences between shareholders, given the possibility of conflicting motivations. The way of exercising control over managers vary substantially among the different types of shareholders (Ongore, 2011). Therefore, not only the amount of equity a shareholder owns is important, but also the identity of these shareholders.

Ownership identity can be divided into inside ownership and outside ownership (El-Masry, 2010; Fauzi & Locke, 2012; Frijns et al., 2008; Ongore, 2011). Inside ownership is first examined by McConnell and Servaes (1990) and Morck, Shleifer and Vishny (1988), who only focused on managerial ownership. Similarly, Schiehll (2006) defined inside ownership as shareholders who hold direct or indirect ownership and who is at the same time a member of the firm's management. Recently, family ownership has been seen as a special case of insider ownership and therefore also the family ownership is relevant for the insider ownership issue (Kaserer & Moldenhauer, 2008). Outside ownership is the percentage of shareholdings owned by the public or outside investors (El-Masry, 2010), for example corporate, institutional and government ownership (Kaserer & Moldenhauer, 2008).

2.4.1.3.2.1 Inside Ownership

Inside ownership represents both managerial ownership and family ownership.

2.4.1.3.2.1.1 Managerial Ownership

There are many contending results on the relationship between managerial ownership and firm performance. The empirical research on managerial ownership and firm performance started with the study of Jensen and Meckling (1976) when they hypothesized that managerial ownership is an important internal

control mechanism for the agency problem by aligning the interest of shareholders and managers, which reduces the agency costs. Therefore, it is argued that according to the agency theory there is a positive relationship between managerial ownership and firm performance (Arosa et al., 2010b; Core & Larcker, 2002; Cui & Mak, 2002). These alignment effects include that both shareholders and managers may have a strong incentive to pursue value-maximizing behavior (Mandaci & Gumus, 2010). For example, some empirical studies find that managerial ownership is positively associated with innovation and productivity of firms, which will contribute to the firms' performance and value in the long-term (Francis & Smith, 1995; Palia & Lichtenberg, 1999). Also, Choi, Lee and Williams (2011) argue that managerial shareholders are more likely to invest in long-term R&D projects that will increase the firm's stability and the profitability, rather than investing in short-term profit maximization. Berķe-Berga, Dovladbekova and Ābula (2017) conclude that managers mainly focus on firm fundamental factors and ratios, which result in that there is a positive relationship between managerial ownership and internal performance measure (ROA) and not with the market performance measure (Tobin's Q). Hanson and Song (2000) find a positive relation between managerial ownership and divesting firm's returns. Theory suggests that agency concerns affect the decision to divest assets and the gains that result, which is consistent with the views that divestitures create value by moving assets to the buyer's more efficient operating environment and that divestiture resolve agency problems. However, other studies find that managerial ownership is negatively related with firm performance, which is explained by managerial entrenchment; the decrease of firm performance by managers that pursue their own interest instead of those of the shareholders (Cui & Mak, 2002; Mandaci & Gumus, 2010). For instance, the empirical results of Cheng (2011) indicate that managerial ownership has a negative effect on firm performance.

The above-stated studies assume that managerial ownership is exogeneous determined (Tong, 2008). The question of whether (managerial) ownership is related to firm performance or endogenous to the firm is a very relevant question since Netter, Poulsen and Stegemoller (2009) suggest a trend toward an increase in the relative importance of internal governance mechanisms compared to the discipline from the market from corporate control. Gains will depend on the effectiveness of the firm's internal control mechanisms (Hanson & Song, 2000). Demsetz and Villalonga (2001), Demsetz and Lehn (1985) and Himmelberg, Hubard and Palia (1999) find no significant relation between managerial ownership and firm performance and argue that this is consistent with the interpretation that firms optimally choose managerial ownership to maximize their value. In addition, Cheung and Wei (2006) and Palia (2001) also did not find evidence that managerial ownership and firm performance affect each other. They all assume that managerial ownership is endogenous determined and that no empirical relation between managerial ownership and firm performance reflects the equilibrium outcome (Tong, 2008).

Another stream of studies reveals that there is a non-linear relationship between managerial ownership and firm performance. These findings are consistent with the existence of the two countervailing effects of interest alignment and managerial entrenchment, although the optimal level of managerial ownership and the actual nature of this non-linearity differs across studies (Berķe-Berga et al., 2017; Cui & Mak, 2002). Two caveats are distinguished by Palia and Lichtenberg (1999), namely, there are differences as to when the relationship becomes positive or negative and differences exist about which

dependent variable is being explained. This first caveat seems most important since the optimum ownership level for maximum firm performance cannot be uniquely determined. Morck et al. (1988) were the first who found a non-monotonic relationship by examining 371 Fortune 500 firms for the year 1980, the so-called humped-shaped or inverted-U relationship. Correspondingly, the relation increases between 0% and 5%, decreases between 5% and 25% and increases beyond 25%. These results were only significant when using Tobin's Q as a performance measure and not significant when accounting profit rates were used. Similarly, McConnell & Servaes (1990) examined 1173 firms for 1976 and 1093 firms for 1986 and also reported the humped-shaped or inverted-U relation (curvilinear) between managerial ownership and Tobin's Q , with a strongly positive relationship at low levels of managerial ownership and negative with the downward pull relatively muted at high levels of managerial ownership and an inflection point between 40% and 50%. McConnell, Servaes and Lins (2008) examined a sample with 4141 different purchases by insiders representing 1700 companies and find a curvilinear relationship where firm performance or value first increases and then decreases. Accordingly, Beyer, Czarnitzki and Kraft (2011) examined a sample of 1406 Belgium firms and find an inverse U-shaped relationship between the degree of managerial ownership and R&D, which means that managers do not fear detrimental effects of risky innovation projects and therefore tend to over-invest into innovation. Pukthuanthong, Roll and Walker (2007) find that new public companies perform better when managers receive a balanced combination of managerial shares and stock option grants and that unbalanced compensation with one of the two larger than the other results in lower firm performance. This is consistent with the managerial risk aversion and the alignment of managerial and owner incentives. Coles, Lemmon and Meschke (2012) find that the maximum point of the inverted-U relationship between Tobin's Q and managerial (CEO) ownership is 21.2% (20%). Benson and Davidson (2009) find a significant inverted U-shaped relation between managerial ownership and Tobin's Q in fixed effects regressions and after controlling for endogeneity with both two-stage and three-stage least squares regressions. In addition, Khan, Mather and Balachandran (2014) examined the relationship between managerial ownership and Australian firm performance of the 300 largest Australian firms between 2000 and 2006 and find a non-monotonic curvilinear relationship and that a negative ownership-performance relationship dominates at lower levels of managerial ownership. They find that at these levels, the entrenchment effects are likely to dominate alignment effects and that at 20% - 30% of managerial ownership level, the relation is consistent with the alignment effects.

Several other studies show even more complicated functional forms to describe the relationship between managerial ownership and firm performance. Florackis, Kostakis and Ozkan (2009) find a positive significant relationship between managerial ownership and firm performance by using a semi-parametric approach, however, only for low levels of managerial ownership (lower than 15%) and their results suggest four turning points: 13%, 25%, 49% and 72%. Hermalin and Weisbach (1991) examined 142 NYSE firms for the years 1971, 1974, 1977, 1980 and 1983 and found an inverse W-shaped relationship, with an increase in firm performance when the managerial ownership increases at lower levels (less than one percent), a decrease when the managerial ownership increases at higher levels in the range of 1% to 5%, turns positive again in the ownership range of 5% to 20%, and then turns negative for ownership level beyond 20%. Furthermore, Cui and Mak (2002) find that managerial ownership is

negatively and significantly related to Tobin's Q, and that squared managerial ownership is positively and significantly related to Tobin's Q. They find a W-shaped relationship with initial declines of firm performance as managerial ownership increases from 0% to 10%, increases between 10% and 30%, declines again between 30% and 50% and another increase above 50%. Davies, Hillier and McColgan (2005) find four turning points at 7%, 26%, 51% and 76% and argue that at high levels of managerial ownership when the external market discipline becomes ineffective, there will be a resurgence of entrenchment behavior. Shareholdings around 50% will give managers implicit control of the company, however, they do not have objectives completely aligned with the shareholders. This will only be the case at very high levels of managerial holdings. This can explain the additional turning points in the curve (Davies et al., 2005; Florackis et al., 2009). In sum, previous studies have shown different relationships between managerial ownership and firm performance. Therefore, managerial ownership has no clear-cut impact on firm performance.

2.4.1.3.2.1.2 Family Ownership

At first sight, family shareholders are just one among the other different types of shareholders. However, several characteristics may give reason to think otherwise (Andres, 2008). For family ownership is the agency theory applicable; the incentive or alignment of interest effect and the entrenchment effect (Ng et al., 2015). Previous literature is inconclusive about the influence of family ownership on firm performance.

Recent research has indicated that family ownership enhances firm performance (Anderson & Reeb, 2003; Bhaumik & Gregoriou, 2010; Morck et al., 1988; Ng et al., 2015; Thomson & Pedersen, 2000). Concentrated family ownership is able to alleviate the agency problems, reduces agency conflicts by converging the interest of the managers with the shareholders and it also provides the controlling families with both the power and incentive to improve firm efficiency and performance (Ng et al., 2015). This may bring significant benefits or advantages to firms, which could again be enhanced by increasing the level of family ownership (Anderson & Reeb, 2003; Andres, 2008). In addition, Family ownership as the largest shareholder also exhibit unique attributes which could not be found in other shareholder identities and that gives a competitive advantage to firms with family ownership and improves the firms performance (Habbershon, Williams, & MacMillan, 2003). Family shareholders have exceptional concerns over firm survival and strong incentives to monitor the management closely, since families usually have invested most of their private wealth in the company (Andres, 2008). Family shareholders are more inclined to contribute, because they have a deep emotional investment in their companies, such as family fortune, personal satisfaction, and public reputation (Miller & Le Breton-Miller, 2006). Another advantage of family ownership is the long-term presence in the firm, which is an advantage if the monitoring requires the knowledge of a firm- or market specific technology (Andres, 2008). This long-term presence is also favorable for developing long-term relationships with loyalty and trust and builds a reputation with the employees, customers, external suppliers of capital and other stakeholders, which in turn may create a working environment with lower costs, particularly lower costs of debt financing. This is in line with Ng et al. (2015), who argue that family shareholders are more likely to have strategic interest rather than financial interest, which means that they also have longer-term non-financial goals, such as

sustainable competitive advantages and capabilities. This suggests that family ownership increases the firm's credibility to commit to implicit contracts (Anderson et al., 2003; Andres, 2008). Andres (2008) argues that family shareholders base their investment decisions on a long-term profit maximization since most families regard their company as an asset that should be passed on from generation to generation, rather than consumed during a lifetime. According to Aguilera and Jackson (2003), family shareholders do protect managerial autonomy which ensures the possibility to make tough decisions more effectively. Furthermore, Ng et al. (2015) refer to the resource-based view of Carney (2005) with three dominant perspectives: parsimony, personalism, and particularism. These perspectives give family ownership advantages in scarce environments, increases social capital and begets opportunistic investment processes. Family ownership is therefore associated with superior firm performance when compared to wildly-held companies (Anderson & Reeb, 2003; Andres, 2008; Barontini & Caprio, 2006; Villalonga & Amit, 2006). For instance, Anderson and Reeb (2003) examined the S&P 500 firms in 1992 and found that family ownership is positively related to firm performance.

However, it will have a negative effect once expropriation is existence and the family shareholders become entrenched (Anderson & Reeb, 2003; Bhaumik & Gregoriou, 2010; Morck et al., 1988; Ng et al., 2015; Thomson & Pedersen, 2000). When family ownership is the largest shareholding, the families can carry out activities as expropriation of firm resources that may only extract private benefits at the cost of the minority shareholders, which could be detrimental to the firm's efficiency and performance (Bloom & Reenen, 2007; Claessens, Djankov, & Lang, 2000; Young, Peng, Ahlstrom, Bruton, & Jiang, 2008). For instance, unqualified family members could be appointed to key positions in the firm (Carney, 1998; Young et al., 2008). This family contracting is more based on emotions and sentiments than on economic rationality, which could lead to sibling rivalry, generational envy, non-merit-based compensation, power based on ascribed rather than achieved status and difficulties regarding the objectivity criticize family members, which in turn can negatively influence the firm performance (Gomez-Mejia, Nuñez-Nickel, & Gutierrez, 2001; Young et al., 2008). It can lead the company into risky decisions or strategic stagnations with both hazardous spillovers. These emotional relations make the agency conflicts more difficult to resolve, which results in less effective monitoring (Schulze, Lubatkin, Dino, & Buchholtz, 2001; Young et al., 2008). As family shareholders have a deep emotional investment in their companies, managers might be driven to adopt financial conservatism, which could lead to missing growth opportunities (Miller & Le Breton-Miller, 2006). Hence, family ownership has an informal yet powerful influence on the way that firms are run, with both positive and negative outcomes (Schulze et al., 2001), and whether family ownership ultimately is positive for performance depends on an multitude of factors, such as whether these owners are willing to recruit managers from outside to develop a broader arrangement of capabilities (Young et al., 2008).

2.4.1.3.2.2 Outside ownership

Outside ownership represents corporate ownership, institutional ownership, and government ownership.

2.4.1.3.2.2.1 Corporate Ownership

Corporations frequently acquire minority-level blocks of stock in other corporations, also called 'target' firms (Bogert, 1996; Drees et al., 2013). In fact, corporations as shareholders are even among the largest group of blockholders (Claessens et al., 2000). These blockholders usually have a long investment horizon (Douma et al., 2006). However, it may also be used to establish a toehold, as a prelude to a takeover, or to otherwise exert control over a target firm (Clayton & Jorgensen, 2011). Corporate ownership is quite different from other ownership identities. However, little is known about equity holdings by these non-financial corporations (Drees et al., 2013). The academic literature has not specifically examined the long-term role of this type of ownership in relation to firm performance, but rather the institutional, private and other types of ownership (Allen & Phillips, 2000). The motivation for corporations for becoming a shareholder of another firm varies, but more often it precedes either a takeover or complete sale of the stock within a short period of time (Connelly, Hoskisson, Tihanyi, & Certo, 2010). Accordingly, Douma et al. (2006) argue that provided the institutional context in terms of legal regulations is favorable, the presence of large corporate shareholders increases the likelihood that a firm is taken over. In fact, Bogert (1996) claims that only about a third are maintained for more than three years.

The corporate shareholder is a mixed blessing for the firm. The arrival of corporate shareholders provides fresh capital that the firm may use to facilitate growth. However, this capital comes at a price, since the firm has to transfer some level of control to the corporate shareholder (Connelly et al., 2010). Allen and Phillips (2000) find evidence that supports the argument that corporate ownership has significant benefits for firms involved in certain business agreements by reducing the transaction costs and costs of monitoring the alliances or ventures between firms and their corporate shareholders. In other words, corporate blockholders tend to monitor the target firm's management more effectively than other types of blockholder. Moreover, without an ownership stake or another type of credible commitment, firms may hold incentives to change or break off the terms of an agreement or relationship (Allen & Phillips, 2000). Fee, Hadlock and Thomas (2006) investigated the customer-supplier relationship and appoint the foregoing problem as the 'contract friction' or the 'incomplete contracts motivation', which is the motivation for the use of corporate equity. According to them, the equity ownership and explicit contracts are often used together to govern potential incentive conflicts. Therefore, corporate ownership may help ease inefficiencies arising from incomplete contracts, help to align incentives and mitigate information problems. Furthermore, Douma et al. (2006) suggest that corporate shareholders have both the incentives and the skills to act as good monitors according to the agency, resource-based, and institutional perspectives. Colpan, Yoshikawa, Hikino, and Del Brio (2011) investigated the difference between domestic corporate investors, foreign portfolio investors and domestic financial investors and conclude that corporate investors remain indifferent to performance, while they aim to maintain relational business ties with invested firms. Corporate investors have easier access to strategic and organizational information and also promote expansive strategies as product diversification and capital investment because they

benefit from growing transactional opportunities and are therefore less sensitive to performance fluctuations than the other two types. They support capital spending even when the financial performance remains less than satisfactory. Hence, corporate shareholders are characterized as long-term relational investors, play an important role in maintaining continuity of the firm, and it is expected that their preference over strategies would not vary much by performance fluctuation (Colpan et al., 2011). A special form of corporate ownership is cross-investment, which occurs when two firms invest in each other's stock. This is a measure to protect each other from a takeover and it may also serve to establish trust between the firms by providing access to the other firm's board and shareholders meeting, which in turn, may facilitate more effective management decisions in both firms (Bogert, 1996).

In contrast, as noted above, firms have to transfer some level of control to the corporate shareholder (Connelly et al., 2010). In the case of complete vertical integration, corporate ownership could be hazardous for firms that seek efficiency, since it makes them less able to adapt to a dynamic and competitive environment (Bogert, 1996). Moreover, when the corporate blockholders exact private benefits from the target firm, then corporate ownership may have a negative effect on firm performance. For instance, private benefits such as access to the distribution channel, proprietary technology, and goods and services exchanged at preferential prices, could lead to diminishing of distinctive competencies and wealth transfer, which reduces the target firm's economic performance (Bogert, 1996; Drees et al., 2013).

2.4.1.3.2.2.2 Institutional Ownership

The literature is inconclusive about the relationship between institutional ownership and firm performance. When consulting previous studies three perspectives can be distinguished: active monitoring, passive monitoring and exploitation monitoring (Elyasiani & Jia, 2010; Lin & Fu, 2017). According to the active monitoring perspective, institutional investors have a positive effect on firm performance caused by actively monitoring the management, minimizing information asymmetry and agency problems and applying their professional knowledge, highly developed managerial skills and voting rights to influence the managers and improve firm efficiency and corporate governance. In addition, the institutional investors can also provide funding or network for the financing when needed (Lin & Fu, 2017). Cornett et al. (2007) find a positive relationship between institutional ownership and operating cash flow returns for a subset of institutional investors, those with no business relationship with the firm. Similarly, Lin and Fu (2017) examined a dataset of firms listed on the Shanghai Stock Exchange (SHSE) and Shenzhen Stock Exchange (SZSE) for the 2004–2014 period and find a positive relationship between institutional ownership and Tobin's Q and ROA. Ferreira and Matos (2008) find that institutional ownership is positively related with firm value and firm operating performance with a sample that consists of 11,224 unique non-U.S. firms and a total of 38,064 firm-year observation. Moreover, Tsai and Gu (2007) find that institutional ownership was significantly and positively related to the firm performance as measured by a proxy for Tobin's Q of both casinos and restaurants in the US. Clay (2002) finds that institutional ownership and firm value were associated positively. Hence, the active monitoring perspective predicts a positive relationship between institutional ownership and firm performance (Thanatawee, 2014).

According to the passive monitoring perspective, institutional investors have no or a weak relationship with firm performance due to the idea that these institutional investors are less likely to monitor the management and improve corporate governance and firm performance caused by the short-term thinking to satisfy the portfolio needs (Elyasiani & Jia, 2010). Katan and Mat Nor (2015) used a panel data from 2002 to 2006 of firms listed on the Bursa Malaysia's Kuala Lumpur Composite Index (KLCI) and find that institutional ownership and firm performance have no significant relationship. Similarly, Craswell, Taylor and Saywell (1997) find no evidence that supports that institutional ownership has a positive relationship with the performance of Australian firms. Further, Lin (2010) examined a panel of 221 listed Taiwanese companies for the 1997-2006 period to determine whether or not institutional ownership affects firm value, and find that there is no relationship between institutional ownership and Tobin's Q until a threshold has been reached. Agrawal and Knoeber (1996) find an insignificant effect of institutional ownership on firm performance when examining 800 firms of 383 Forbes in 1987. Duggal and Millar (1999) did not find any evidence that active institutional investors as a group enhance the efficiency of the firm, which results in doubt about the monitoring abilities of institutional investors. Hence, the passive monitoring perspective predicts no relationship between institutional ownership and firm performance.

According to the exploitation perspective, institutional investors have a negative effect on firm performance caused by management activity that diminishes firm value and the institutional investors not intervening because they benefit from it (Elyasiani & Jia, 2010; Lin & Fu, 2017). Charfeddine and Elmarzougui (2010) examines the relationship between institutional ownership and firm performance for 35 companies listed on the French financial market from 2002 to 2005 and find a negative relationship. Similarly, Zouari and Taktak (2014) empirically investigated a panel data of 53 Islamic Banks scattered over 15 countries for a five-year period and find a negative relationship between institutional ownership and bank performance in both the ROA and ROE measures. Thanatawee (2014) calls this perspective the expropriation hypothesis where institutional investors may be inactive or conspire with managers to expropriate resources at the expense of minority shareholders, which predicts a negative relation between institutional ownership and firm performance.

Different institutional investors

Most of the previous research on institutional ownership have rested on the assumption that all institutional investors have the same investment goals and therefore behave the same when it comes to corporate decision-making (Katan & Mat Nor, 2015). However, several studies suggest that not all institutional investors are the same (see Almazan et al., 2005; Bhattacharya & Graham, 2009; Chen et al., 2007; Cornett et al., 2007; Elyasiani & Jia, 2010; Ferreira & Matos, 2008; Lin & Fu, 2017). These papers categorize institutional ownership in pressure-sensitive and pressure-insensitive institutional investors. Pressure-sensitive institutional investors (e.g. insurance companies and banks) have existing or potential business relations with the firm, which results in that in order to protect these relations, they might be less willing to challenge management decisions. This category of institutional investors may act according to the passive or exploitation monitoring perspective. In contrast, pressure-insensitive institutional investors (e.g.

investment companies, public pension funds, mutual funds, endowments, foundations, and independent investments advisors) may be less subject to pressure from firms in which they invest and will act according to the active monitoring perspective.

Using this classification, Elyasiani and Jia (2010) show that stable shareholding of each group has a positive impact on firm performance, with the pressure-insensitive group exerting a larger effect. Cornett et al. (2007) examined the impact of institutional investor ownership on firm performance of US firms, using the same classification, and find a significant relationship between a firm's operating cash flow returns and both the percent of institutional stock ownership and the number of institutional stockholders. However, this relation was only found for the pressure-insensitive investors. Also using this classification, the results of Lin and Fu (2017) indicate that pressure-insensitive have a greater positive effect on firm performance than pressure-sensitive institutional investors. In addition, Bhattacharya and Graham (2009) analyzed the institutional ownership and its potential interaction with firm performance for publicly listed firms in Finland, using the terms pressure-resistant and pressure-sensitive. Their results suggest a statistically significant difference among firm performances and equity ownership between pressure-resistant and pressure-sensitive firms. Furthermore, Almazan et al. (2005) and Chen et al. (2007) both used this classification, however, not to distinguish with regard to firm performance. Therefore, categorizing institutional ownership into various groups is useful in predicting their impact on overall firm performance.

Geographic origin of institutional investor

The geographic origin of institutional investors may influence the impact on firm performance. Ferreira and Matos (2008), Gillan and Starks (2003) and Lin and Fu (2017) argue that foreign institutional investors are generally more involved in active monitoring and are more likely to demand changes in the corporate governance of the firm than domestic institutional investors. The latter has stronger business relations, which make them more subject to pressure and more likely to act according to the passive monitoring perspective. According to Lin and Fu (2017), foreign institutional investors have greater positive effects on firm performance than domestic institutional investors. In addition, Ferreira and Matos (2008) suggest that the presence of foreign institutional investors has the potential to enhance firm value through direct or indirect monitoring and they find that foreign institutional investors improve firm value and operating performance, whereas domestic institutional investors had insignificant or negative results. They also find that ownership by foreign institutional investors reduces capital expenditures, which suggests that their ownership limits the manager's incentive to (over)invest. They did not find a similar relation for domestic institutional investors. In contrast, Thanatawee (2014) examines the relationship between institutional shareholdings and firm value in Thailand and find evidence which indicates that domestic institutional investors have a positive impact on firm value, while foreign institutional ownership resulted in a lower value. This finding suggests that domestic institutional investors provide more effective monitoring, whereas foreign institutional investors are inactive in monitoring the management. Similarly, Rhee and Wang (2009) find a negative relation between foreign institutional ownership and stock market liquidity in Indonesia, implying that foreign institutional ownership increases information asymmetry. This could be explained by Douma et al. (2006), who claim that a distinction between the two most important

categories of foreign shareholders, foreign financial institutions and foreign industrial corporations has to be made. They find that foreign ownership positively affects firm performance, which is consistent with that of prior studies, however, this positive effect is substantially attributable to foreign corporations that have, on average, larger shareholding, higher commitment, and longer-term involvement.

2.4.1.3.2.2.3 Government Ownership

There has been much debate on government ownership or state ownership as a corporate governance mechanism and specifically the effect of this type of ownership on the performance of firms. Government ownership is the opposite of privatization, which makes the distinction between public firms, which are government owned, and private firms. Traditionally, the conventional view is that public firms are efficient and charge prices that more accurately reflect social marginal costs. Public firms were seen as curing market failures and they improve the decisions of private firms when there is a divergence between private and social objectives; they were expected to correct for market failure by acting differently from private firms. The agency problems could be more reduced through government ownership who are more intensely involved in monitoring and by solving the information asymmetric, since government is better able to obtain information from other sources and be more likely to gain easier access to different channels of financing than non-government firms (Dewenter & Malatesta, 2001; Eng & Mak, 2003; Najid & Rahman, 2011). The openness of an economy to intense foreign competition and well-functioning markets due to government decisions may be the reason for increasing firm performance.

However, empirical evidence does not always give evidence for this, rather for that public firms are inefficient, which is the result of political pressures from the politicians who control them (Shleifer & Vishney, 1994). Besides the political benefits of employment excess and higher wages, also the goods which are produced are often more desired by the politicians rather than by the consumers. Government ownership makes the agency problem rather more complicated because the government is not the ultimate owner of a firm, because it is the agent of the public. This type of ownership is likely to be less active than private investors in monitoring, has weaker accountability for financial performance, has easier access to financing and has lack of exposure to a market for corporate control, which results in fewer incentives for strong governance practices (Mak & Li, 2001). Lin and Su (2009) argue that government control reduces the effectiveness of internal governance mechanisms. In addition, the public firms are frequently being asked to locate the firm in politically desirable locations rather than economically attractive regions (Shleifer & Vishney, 1994). This implies that there is misalignment between the normal shareholders trying to maximize their profit and the state trying to maximize social and political goals. Furthermore, a substantial body of empirical evidence documented that private firms are superior in efficiency relative to their comparable public firms and also improvement of the efficiency after privatization (Shleifer & Vishney, 1994). Most researchers agree that the presence of government ownership gives rise to inefficiencies, risk-aversion, lack sufficient entrepreneurial drive and consequently poor performance, and that governments are likely to pay special attention to political and social goals such as low output prices, enhance national welfare and employment excess, with recruitment based on political connections rather

than the ability to perform, instead of wealth- or profit-maximizing goals (Najid & Rahman, 2011; Razak et al., 2011; Sun et al., 2002; Tian & Estrin, 2008; Xu & Wang, 1999).

Therefore, on the one hand, the government could be a 'helping hand', which means that when a firm has a higher proportion of government ownership, this firm will be more likely get more capital subsidy provided by the government. On the other hand, government ownership could bring a 'grabbing hand', which means that when the government has ownership in a firm, this government will extract more of this firm's profit to the benefit of politicians and bureaucrats (Tian & Estrin, 2008; Tran, Nonneman, & Jorissen, 2014).

Consecutive studies on government ownership

Several studies present a game-theoretical model of privatization. Shleifer and Vishney (1994) represent one of the first efforts to analyze the effects of privatization through this kind of model. This model assumes the existence of subsidies and bribes between the government and firms. They argue that regulation by politicians, using the power of control to pursue political objectives, may damage the firm performance. Huang and Xiao (2012) improve the game-theoretical model by establishing a more realistic theoretical model whose results are testable, so without the unobservable bribes, and robust across different parameter. Their model evaluates the net effect of government ownership on firm performance after considering the costs and benefits of government ownership for transition economies. They propose that less government ownership will lead to an improvement of firm performance in words of productivity and profitability, which is a negative relationship between government ownership and firm performance. On top of that, Tran et al. (2014) expand the theoretical predictions of Huang and Xiao (2012) by empirically test the propositions derived from the theoretical model by using panel data of the Vietnamese firms who have partial government ownership in the period of 2004-2012. They propose that there is a negative relationship between government ownership and firm performance and find that this is indeed the case, however, there is a moderating role of firm size. More specifically, they find that increased government ownership in larger firms seems to enhance the firm performance. Hence, the grabbing hand of government tends to outweigh the helping hand, however, in larger firms, the opposite seems to hold. Furthermore, Tian and Estrin (2008) examined a dataset containing 9594 firm-year observations of the period 1994-2004 and find that the effect of government ownership on firm value is non-monotonic: U-shaped. The relationship is negative up to a certain threshold when it turns positive.

Empirical evidence on government ownership

Empirically, the existing evidence is inconclusive and shows no specific pattern in the effects of government ownership on firm performance (Ting & Lean, 2015; Tran et al., 2014). However, most recent empirical research is slightly shifting the traditional view of 'helping hang' to the view of 'grabbing hand', which makes this the new conventional view. Dewenter and Malatesta (2001) show that government-owned firms are significantly less profitable than privately owned firms by examining firms listed in the Fortune magazine's Global 500. According to them, this is due to the likelihood of governments paying special attention to social and political goals as excess employment rather than profit-maximization and

assigning politically connected individuals instead of experts to run the firms (Boycko, Shleifer, & Vishney, 1996). In China, Xu et al., (1999) examined pooled firm-level data of publicly listed firms in China for 1993-1995 and find a significant negative relationship between government ownership and firm performance. Xu, Pan, Wu, and Yim (2006) find that non-government-owned firms perform better than government-owned firms by examining Chinese firms based on two nation-wide surveys conducted by the National Bureau of Statistics in 1998 and 2002. Sun and Tong (2003) evaluated the change in performance of 634 government-owned firms listed on China's two exchanges upon share issuing privatization in the period 1994-1998 and find that government ownership has a negative impact on firm performance. Bai, Liu, Lu, Song, and Zhang (2004) investigated publicly listed firms on the two stock markets in China by using a three-year panel between 1999 and 2001 and also find a negative relationship between government ownership and firm performance. Using Malaysian data, Razak, Ahmad and Jober (2011) examined 210 Malaysian firms which are listed in Main Board over an 11 year period from 1995 to 2005 and find that the financial performance and market performance of non-government owned firms are better than that of government-owned firms. Wei, Xie, and Zhang (2005) examined a sample of 5284 firm-years of Chinese firms between 1991 and 2001 and find a negative relationship between government ownership and firm performance measured by Tobin's Q. According to Sun, Tong and Tong (2002) this negative effect is due to the greater information asymmetry and higher transaction costs in the government, the government's employment recruitment policy based political connections rather than the ability to perform, the government's choice of preferring social and political goals over profit-maximization or the government's lack of transferable residual claims. Surprisingly, they find that government ownership is actually positively related with firm performance for both the Shanghai Stock Exchange as the Shenzhen Stock Exchange. They find a nonlinear relationship: up to a certain threshold, the firm performance increases, but beyond this, it decreases. This can be marked as an inverted U-shaped relation. In Singapore, Feng, Sun and Tong (2004) investigated 30 Singapore government-linked companies covering the period 1964 to 1998 and argue that in Singapore the government-owned firms are comparable to privately run firms in terms of efficiency, profitability, and market performance.

However, Ang and Ding (2006) find that Singaporean government-owned firms have higher valuations and better corporate governance than non-government owned firms. They argue that in these countries (transitional and emerging economies) government ownership can fill the gap of the monitoring role of institutional investors because these are not yet available or developed. Using data on Indian government-owned firms, Gupta (2005) find that partial (when the government retains controlling ownership) privatization has a positive impact on profitability, productivity and investment of firms. In addition, Uddin, Halbouni and Raj (2014) examined 114 companies in the United Arab Emirates and find that government-linked companies have better accounting results than do the companies that are not linked to the government. They also find that the best accounting results were for the companies where the government had an ownership percentage between 20 and 50 percent. Najid and Rahman (2011) find that although the government-owned firms have weaker firm performance than the non-government owned firms, the government involvement had a positive significant relationship on the value of the government-owned firms. They argue that investors believe that the government-owned firms are backed by the

government which will not let them down in time of trouble. This is in line with Tian and Estrin (2008), who argue that large government ownership reduces the firm's risk, which in turn increases the firm's value. The government's effort will contribute towards equality and stability of the economy, which is in contrast with the argument that the economic problems in most East Asian countries have been caused by government intervention (Najid & Rahman, 2011).

Government ownership in European countries

Belgium is a European country, hence the effect of government ownership on firm performance could be different according to the institutional theory. Beuselinck, Cao, Deloof and Xia (2017) examined 4737 listed firms in 28 European countries over the period 2005-2009 and find that firms with government ownership experienced a smaller reduction in firm value than firms without government ownership. However, this was during the global financial crisis, which was an exogenous shock for European firms. In contrast, Borisova, Brockman, Salas and Zagorchev (2012) examined 373 companies from 14 EU countries for the period 2003-2008 and find that government ownership is harmful to the corporate governance of the firm, which suggests that firm value maximization is not always the goal of the government owners. In addition, Orden and Garmendia (2008) examined Spanish firms and find that government-owned firms showed the worst performance.

2.4.2 External mechanisms

Various scandals have highlighted the limitations of overreliance on internal governance (Jensen, 1993), hence the external mechanisms are also important. The primary external mechanism is the market for corporate control, often referred to as the takeover market (Cremers & Nair, 2005; Qiu & Yu, 2009; Siddiqui, 2015). In addition, product market competition and the legal infrastructure (regulation) are also important mechanisms (Bai et al., 2004). Moreover, researchers have turned to the role of market actors as external governance mechanisms, such as financial analysts, the media, auditors and other firms through the market for corporate control (Chang, Chang, Chang, & Wei, 2008; Heyden, Kavadis, & Neuman, 2017; Siddiqui, 2015).

2.4.2.1 Market for corporate control, product market competition and legal infrastructure

The market for corporate control can be an effective governance mechanism to discipline the managers and reduce agency costs. This mechanism allows inefficient managers to be removed and replaced by competent managers. However, Qiu and Yu (2009) argue that antitakeover provisions and government-level anti-takeover laws can deteriorate the effectiveness of this mechanism. These barriers could weak the market for corporate control and hurt the shareholders, while an active takeover market could raise career concerns and reduce managerial slack (Qiu & Yu, 2009). The market for corporate control only has effect in competitive industries, because in competitive markets the managerial slack cannot survive. This product market competition also limits the tunneling effect of shareholders. Therefore, Qiu and Yu (2009) argue that an open market for corporate control reduces managerial slack, increases profitability and firm value. In addition, the legal infrastructure is also an effective external mechanism. This mechanism plays

a role in disciplining managers and controlling shareholder's opportunistic behavior (La Porta et al., 1998) The difference is in the legal origin. Countries with common law have generally higher governance standards and minority shareholders are relatively better protected. In contrast, countries with civil law normally have lower governance standards and poor minority shareholder protection (La Porta et al., 1998).

2.4.2.2 The market actors

The market actors are also external governance mechanisms. The financial analysts are security specialists who analyze the performance and future prospects of a company by gathering and processing information about the firm from published reports as well as directly from management through quarterly earnings conference calls (Wiersema & Zhang, 2011) They are typically employed by investment banks and brokerage firms. These analysts provide the board with an independent assessment of the CEO's past performance as well as the CEO's ability to positively impact the firm's future performance, which makes that the analysts play a critical role in the board's decision to dismiss the firm's CEO. These financial analysts are considered prominent information intermediaries in the financial markets (Jensen & Meckling, 1976), while they share their expert opinions about a firm with the investment community through their research reports and recommendations of the firm's stock (Wiersema & Zhang, 2011). Their recommendations have a significant impact on the investors' decisions and the firm's stock price. Wiersema and Zhang (2011) argue that these financial analysts' recommendations can affect the board's decision to dismiss the firm's CEO, both through the financial analysts' expertise and through the effect it has on the investors.

In the finance and accounting literature, scholars have suggested that the media may act as a type of corporate governance mechanism, to motivate firms and managers to act in the interest of the shareholders (Bednar, Boivie, & Prince, 2013). The media may serve as a stakeholder and has the potential to disseminate information to a wide audience, which gives them an important external constituent that not only reflects firm actions but also influences firms. According to Bednar et al. (2013), the media has three major functions or roles that they serve as they report issues of firms: the media will provide a platform to publicize the views of external stakeholders that relate to or affect the firm, the media is simply to report on and cover the events that occur within the corporate landscape and the media has the role of independent investigator. All these roles will affect firms.

The audit function plays a particularly important role as part of the corporate governance mechanism, which is why this issue has been studied many times and became the topic of numerous studies and analyses (Nedelcu, Siminică, & Ţurlea, 2015). Auditors reduce the asymmetric information risk by attesting the reliability of a firm's published financial information, thereby allowing current and prospective equity stakeholders to assess a firm's profitability and develop expectations for the distribution of its profits (Ashbaugh & Warfield, 2003). The external auditor increases the credibility of the information provided by financial reporting by making it as transparent as possible. Therefore, the external auditor has a crucial role in enhancing the efficiency of the corporate governance process. They are sometimes seen as gatekeepers who monitor the managerial behavior on behalf of all stakeholders, while in their absence

maintaining the appropriate corporate governance structures could be endangered (Nedelcu et al., 2015). Audits serve to monitor management, contributing to the firm's overall corporate governance and protects the shareholders (Ashbaugh & Warfield, 2003). In sum, based on the agency theory, external auditors act as mechanisms for reducing the information asymmetry and agency costs, they limit opportunistic behavior of the managers through monitoring and they contribute to the improvement of disclosed information quality, which ensures the protection of the investors (Nedelcu et al., 2015).

Other firms can also be used as external mechanisms through the market of corporate control in different forms, such as competitors or creditors. A competitor is a firm that offers a similar product or service in the same industry as your firm. This may result in lower prices due to gain larger market share. However, this may also result in more efficient firms in order to reduce the costs. The use of competitors as external mechanisms is mostly through the threat of hostile takeovers, which serves as governance mechanism by keeping managers alert or disciplining underperforming target managers through dismissal; firms in markets with higher takeover activity tend to produce better financial results (Cremers & Nair, 2005; Siddiqui, 2015). Creditors are firms (or a person), such as banks or suppliers, that have provided credit to the firm. Creditors are superior monitors of management because they have leverage over borrowers and can exercise this power (Mehrotra, Van Schaik, Spronk, & Steenbeek, 2011). Traditionally, the emphasis in the finance literature has been on the powers of creditors during bankruptcy or during periods of financial distress. However, recent researches show that creditors use their power in many instances where financial distress is not the case, for example in dividend decisions (Seifert & Gonenc, 2016). Creditors may have a significant influence on corporate policies. Firms with private credit agreements (for example with banks) even more than firms that use the public bond markets, because when private credit agreement is violated, the agreement will be renegotiated with additional restrictions for the firm (Seifert & Gonenc, 2016).

3 Hypotheses

The hypotheses of this research are presented in this chapter. The first hypothesis tests the impact of concentration ownership on firm performance. Hypotheses 2a, 2b, 3a, 3b and 3c test the impact of managerial, family, corporate, institutional, and government ownership on firm performance, respectively. The hypotheses will be based on both the theory, institutional differences, and previous empirical evidence, which are presented in the previous chapter. The empirical evidence that previous researchers find is for all the hypothesis inconclusive, as can be read in the literature review.

3.1 Ownership concentration

The agency theory states that ownership concentration is an effective monitoring technique by which shareholders can ensure that managers behave in line with their interests (El-Masry, 2010). If the ownership is widely dispersed, there is no shareholder that has the voting power and adequate incentives to closely monitor the management, because this gain is too small to cover the costs. Monitoring becomes applicable only if a single shareholder becomes large enough to bear to costs of control (El-Masry, 2010). In other words, if the shareholding is too small, the shareholder has no incentive and capability to monitor and influence the management. Hence, a certain degree of ownership concentration is needed according to the agency theory. However, Continental European countries are known for their high ownership concentration, especially Belgian companies (Kim, Kitsabunnarat-Chatjuthamard, & Nofsinger, 2007; Van der Elst, 2010). While it is efficient to have some ownership concentration, giving more control to already powerful controlling shareholders may further enhance their ability to expropriate and cause firm performance to deteriorate (Ng et al., 2015). This suggests that higher ownership concentration leads to potential tunneling of resources, which is expropriation of wealth from small shareholders in order to achieve the interest of the blockholders (Bhaumik & Gregoriou, 2010; Francis, Schipper, & Vincent, 2005; Füerst & Kang, 2004). In this case, ownership concentration, while minimizing principal-agent conflict, creates a different type of agency problem known as principal-principal conflict. Principal-principal agency problem is a concern in institutional environments which lack minority shareholder protection and enforcement mechanisms, which is a characteristic of countries (as Belgian) with French-civil-law (Bhaumik & Gregoriou, 2010; Dharwadkar et al., 2000; La Porta et al., 1998). Although empirical research is inconclusive, Ongore (2011) found a negative relationship between ownership concentration and firm performance.

Hence, the limitations of concentrated ownership, such as the free-riding problem, greater exposure to firm's risk and expropriation of wealth are present in already concentrated companies. A too concentrated ownership in companies should result in lower firm performance in Belgium. Therefore, the following hypothesis is formulated:

H1. Ownership concentration has a negative impact on firm performance

3.2 Managerial ownership

Some empirical studies find that managerial ownership is positively associated with innovation and productivity of firms, which will contribute to the firm's performance and value in the long-term (Francis & Smith, 1995; Palia & Lichtenberg, 1999). This is in line with Beyer, Czarnitzki and Kraft (2011), who argue that managers holding no company shares under-invest into innovation when compared to owners giving rise to the risk argument. These managers seem to have insufficient incentives to invest in R&D, as they fear that project failure could negatively affect their careers. The stewardship theory suggests that managerial owners are presumed to have a better understanding of the business and hence, make better business decisions and bringing forth a better firm performance. It also decreases the chances of conflict and makes the decision-making process more efficient as managers have sound knowledge on the strength and weaknesses of the firm to provide strategic directions for the firm (Gaur et al., 2015). Higher concentration of managerial ownership would imply that with fewer agency problems, the managers can concentrate in developing the strategic direction for the firm, consistent with the stewardship theory, which should result in higher firm performance. The stakeholder theory postulates that in addition to profit maximization, managers also consider the social purpose of its stakeholders (Singh & Delios, 2017), and good stakeholder management positively impacts firm performance (Gaur et al., 2015). Also, Choi, Lee and Williams (2011) argue that managerial shareholders are more likely to invest in long-term R&D projects that will increase the firm's stability and the profitability, rather than investing in short-term profit maximization.

According to the agency theory, there should be a positive relationship between managerial ownership and firm performance (Core & Larcker, 2002; Cui & Mak, 2002). Managerial ownership is, after all, an important internal control mechanism for the agency problem by aligning the interest of shareholders and managers (incentive effects), which reduces the agency costs. However, these alignment effects include that both shareholders and managers may have a strong incentive to pursue value-maximizing behavior (Mandaci & Gumus, 2010). Therefore, the supporters of the agency theory argue against managerial ownership as this is a less effective form of monitoring firm performance and dissuaded managerial entrenchment since they are not free from management influence (Gaur et al., 2015). Hence, studies find that managerial ownership is negatively related with firm performance, which is explained by managerial entrenchment; the decrease of firm performance by managers that pursue their own interest instead of those of the shareholders (Cui & Mak, 2002; Mandaci & Gumus, 2010; Ongore, 2011). For instance, the empirical results of Cheng (2011) indicates that managerial ownership has a negative effect on firm performance. Ownership shares result in higher job security for the manager and, hence, make him powerful enough to pursue own goals and disregard owners' interests (Beyer et al., 2011). Beyer et al. (2011) investigated Belgian firms and find that managers become entrenched when holding a sufficient amount of company shares. Higher job security allows the managers to pursue their own interests, i.e. to over-invest into innovation for reasons of growth. Due to their ownership shares, these managers of the Belgian firms do not have to fear detrimental effects on their career in case of project failure. This reduces the risk tied to R&D investments while the positive aspects remain. Further, excessive managerial ownership may allow managerial consumption of perquisites and reduce the probability of bidding by

outside agents, thus reducing the firm value (Basyith et al., 2015). As this could happen when managers are able to entrench themselves, a non-linear effect is possible. However, in Belgium most firms are owned by a family, and assuming that managers are solely appointed in accord with family's ties or kinship, and not on performance, it is predicted that additional managerial ownership will only hamper firm performance (Basyith et al., 2015). Otherwise managers and family members could have conflicting ideas. Therefore, the following hypothesis is formulated:

H2a. Managerial ownership has a negative impact on firm performance

3.3 Family ownership

At first sight, family shareholders are just one among the other different types of shareholders, however, several characteristics may give reason to think otherwise (Andres, 2008). Concentrated family ownership is able to alleviate the agency problems, reduces agency conflicts by converging the interest of the managers with the shareholders and it also provides the controlling families with both the power and incentive to improve firm efficiency and performance (Ng et al., 2015). This may bring significant benefits or advantages to firms, which could again be enhanced by increasing the level of family ownership (Anderson & Reeb, 2003; Andres, 2008). In addition, family ownership as the largest shareholder also exhibits unique attributes which could not be found in other shareholder identities and that gives a competitive advantage to firms with family ownership and improves the firms' performance (Habbershon et al., 2003). Family shareholders have exceptional concerns over firm survival and strong incentives to monitor the management closely since families usually have invested most of their private wealth in the company (Andres, 2008). Another advantage of family ownership is the long-term presence in the firm, which is an advantage if the monitoring requires the knowledge of a firm- or market specific technology (Andres, 2008). This long-term presence is also favorable for developing long-term relationships with loyalty and trust and builds a reputation with the employees, customers, external suppliers of capital and other stakeholders, which in turn may create a working environment with lower costs, particularly lower costs of debt financing. This is in line with Ng et al. (2015), who argue that family shareholders are more likely to have strategic interest rather than financial interest, which means that they also have longer-term non-financial goals, such as sustainable competitive advantages and capabilities. This suggests that family ownership increases the firm's credibility to commit to implicit contracts (Anderson et al., 2003; Andres, 2008). Andres (2008) argues that family shareholders base their investment decisions on long-term profit maximization since most families regard their company as an asset that should be passed on from generation to generation, rather than consumed during a lifetime. According to Aguilera and Jackson (2003), family shareholders do protect managerial autonomy which ensures the possibility to make tough decisions more effectively. Family ownership is therefore associated with superior firm performance when compared to wildly-held companies (Anderson & Reeb, 2003; Andres, 2008; Barontini & Caprio, 2006; Villalonga & Amit, 2006).

However, according to the agency theory, as family ownership is the largest shareholding, the families can carry out activities as expropriation of firm resources that may only extract private benefits at

the cost of the minority shareholders, which could be detrimental to the firm's efficiency and performance (Bloom & Reenen, 2007; Claessens et al., 2000; Young et al., 2008). For instance, unqualified family members could be appointed to key positions in the firm (Carney, 1998; Young et al., 2008). This family contracting is more based on emotions and sentiments than on economic rationality, which could lead to sibling rivalry, generational envy, non-merit-based compensation, power based on ascribed rather than achieved status and difficulties regarding the objectivity criticize family members, which in turn can negatively influence the firm performance (Gomez-Mejia et al., 2001; Young et al., 2008). Family shareholders are more inclined to contribute because they have a deep emotional investment in their companies, such as family fortune, personal satisfaction, and public reputation (Miller & Le Breton-Miller, 2006). This might drive managers to adopt financial conservatism and therefore could lead to missing growth opportunities. According to the agency theory and stewardship theory, first the family ownership will increase the firm performance as there is knowledge and incentive to monitor managers, but when family ownership grows the effects of entrenchment (power and incentive to exploit minority managers and shareholders) will increase, which results in lower firm performance. This is in line with Maury (2006) who studied a sample of 1672 non-financial Western European firms and found that a decrease of the benefits at high family control. This is also in line with Arosa et al. (2010b) studied 586 non-listed firms from Spain and found a positive relationship at low concentration level, due to the monitoring effect, and a negative relationship at high concentration, due to the expropriation effect. The reversed U-shape relationship is due to the fact that family opportunism canceled out the decrease in agency problems at high levels of family control. If a family has enough power to not need to consent of other shareholders, they might try to increase their own profit at the expense of the stakeholders. Therefore, the following hypothesis is proposed:

H2b. Family ownership has an inverted U-shape relationship with firm performance

3.4 Corporate ownership

When the corporate shareholders exact private benefits from the target firm, then corporate ownership may have a negative effect on firm performance (Drees et al., 2013). It may also be used to establish a toehold, as a prelude to a takeover, or to otherwise exert control over a target firm (Clayton & Jorgensen, 2011). A special form of corporate ownership is cross-investment, which occurs when two firms invest in each other's stock. This is a measure to protect each other from a takeover and it may even serve to establish trust between the firms by providing access to the other firm's board and shareholders meeting, which in turn, may facilitate more effective management decisions in both firms (Bogert, 1996).

Corporate shareholders usually have a long investment horizon (Douma et al., 2006). Allen and Phillips (2000) find evidence that supports the argument that corporate ownership has significant benefits for firms involved in certain business agreements by reducing the transaction costs and costs of monitoring the alliances or ventures between firms and their corporate shareholders. In other words, without an ownership stake or another type of credible commitment, firms may hold incentives to change or break off the terms of an agreement or relationship and corporate shareholders tend to monitor the target firm's

management more effectively than other types of shareholders. Accordingly, Douma et al. (2006) suggest that corporate shareholders have both the incentives and the skills to act as good monitors according to the agency, resource-based, and institutional perspectives.

Moreover, corporate ownership may help ease inefficiencies arising from incomplete contracts, help to align incentives and mitigate information problems (Fee et al., 2006). Furthermore, corporate investors have easier access to strategic and organizational information and also promote expansive strategies as product diversification and capital investment, because they benefit from growing transactional opportunities and are therefore less sensitive to performance fluctuations. Hence, corporate shareholders are characterized as long-term relational investors, play an important role in maintaining continuity of the firm, and it is expected that their preference over strategies would not vary much by performance fluctuation (Colpan et al., 2011). Therefore, the following hypothesis is formulated:

H3a. Corporate ownership has a positive impact on firm performance

3.5 Institutional ownership

Katan and Mat Nor (2015) claim that institutional investors increasingly resorted to activism by confronting poorly managed firms with public criticism of their policies, initiation of shareholder proposals, and negotiations with managers. The primary objective of institutional shareholders is maximizing shareholder value (Lin, 2010), and have a strong interest in the strategies, activities, and other stakeholders of those firms and are perceived as having relevant information regarding the firms in which they invest (Katan & Mat Nor, 2015). Institutional investors are usually major shareholders with the capabilities of professional investors and therefore they have the capability to monitor the managers of their portfolio companies (Katan & Mat Nor, 2015). They have the ability and the resources to discipline managers and to keep them away from opportunistic behaviors (Zouari & Taktak, 2014). This great incentive to monitor managers to guarantee sufficient benefits is called the efficient monitoring hypothesis. Institutional shareholders play an important role in reducing agency problems by taking a greater interest in the long-term value of their portfolio firms. They take a significant stake in the target company so that they are able to have access to the management, to obtain privileged information, to influence and to improve management performance (Katan & Mat Nor, 2015). This also implies that they should be more active in monitoring investee firms because they will lose more money if the business goes bad (Lin & Fu, 2017).

However, according to Becht, Chapelle and Renneboog (2002) in Belgium the institutional shareholder usually holds small share stakes (of under 5%), but own in aggregate about 18% of the shares in Belgian listed companies. As stated, one of the main criterium of the positive impact is that institutional investors have a significant stake at the target companies, which seems not the case in Belgium. Therefore, the institutional investors in Belgium are less likely to monitor the management and improve corporate governance and firm performance caused by the short-term thinking to satisfy the portfolio needs (Elyasiani & Jia, 2010). In addition, there are differences among institutions (Elyasiani & Jia, 2010; Lin & Fu, 2017). Pressure-sensitive institutional investors (e.g. insurance companies and banks) have existing

or potential business relations with the firm, which results in that in order to protect these relations, they might be less willing to challenge management decisions. In contrast, pressure-insensitive institutional investors (e.g. investment companies, public pension funds, mutual funds, endowments, foundations, and independent investments advisors) may be less subject to pressure from firms in which they invest and will act according to the active monitoring perspective. Therefore, the pressure-insensitive institutional investors will have a more positive impact.

So, theoretically, concentrated shareholdings by institutions represent a method of reducing agency problems between shareholder and managers and increase firm value. On the one hand, institutional investors apply their highly developed managerial skills, professional knowledge, and voting rights to influence managers to improve both firm efficiency and corporate governance, in addition to helping the firm make business decisions. On the other hand, when the firm needs funding to expand, these institutional investors can provide funding or use their relationships to help the firm source financing (Lin & Fu, 2017). However, this only exists when these institutions have high individual stakes, which seems not the case in Belgium. Moreover, the pressure-insensitive institutional investors are the ones with the positive impact and as this study does not use this categorization but instead takes both types together, it is expected that there is no significant relationship. As Katan and Mat Nor (2015) explain, if the institutional investors is treated as homogeneous, total institutional ownership shall have no significant effect towards firm performance. Therefore, the following hypothesis is formulated:

H3b. Institutional ownership has no significant impact on firm performance

3.6 Government ownership

On the one hand, the government could be a 'helping hand', which means that when a firm has a higher proportion of government ownership, this firm will be more likely get more capital subsidy provided by the government. On the other hand, government ownership could bring a 'grabbing hand', which means that when the government has ownership in a firm, this government will extract more of this firm's profit to the benefit of politicians and bureaucrats (Tian & Estrin, 2008; Tran et al., 2014).

In developing countries, government ownership can fill the gap of the monitoring role of institutional investors (Ang & Ding, 2006). However, this is not the case in Belgium. In Belgium, government ownership makes the agency problem rather more complicated because the government is not the ultimate owner of a firm, it is the agent of the public. This type of ownership is likely to be less active than private investors in monitoring, has weaker accountability for financial performance, has easier access to financing and has lack of exposure to a market for corporate control, which results in fewer incentives for strong governance practices (Mak & Li, 2001). In addition, the government has greater information asymmetry and higher transaction costs, the government's employment recruitment policy is based on political connections rather than the ability to perform, and the government prefers social and political goals over profit-maximization (Najid & Rahman, 2011; Razak et al., 2011). Further, besides the political benefits of employment excess and higher wages, also the goods which are produced are often more desired by the politicians rather than by the consumers. In addition, public firms are frequently being asked to

locate the firm in politically desirable locations rather than economically attractive regions (Shleifer & Vishney, 1994). This implies that there is misalignment between the normal shareholders trying to maximize their profit and the state trying to maximize social and political goals. Hence, firm value maximization is not always the goal of the government shareholders.

Moreover. most researchers agree that the presence of government ownership gives rise to inefficiencies, risk-aversion, lack sufficient entrepreneurial drive and consequently poor performance (Najid & Rahman, 2011). Lin and Su (2009) argue that government control reduces the effectiveness of internal governance mechanisms. Huang, Kabir and Zhang (2018) mention that government ownership can induce firms to borrow more through preferential loan policies and loan guarantees, while Khwaja and Mian (2005) observe that politically connected firms can borrow more than other firms and that they have higher default rates, which has a negative influence on firm performance. Government ownership is less efficient than non-government owned, and privatization and economic liberalization have improved firms over time. Therefore, the following hypothesis is proposed:

H3c. Government ownership has a negative impact on firm performance

4 Research Method

In this chapter, the research method of the study is discussed. Firstly, the univariate and bivariate analysis are explained. Secondly, the different research methods used in prior studies to analyze the impact of ownership structure on firm performance are presented. After that, the model to test the hypotheses is explained. Finally, the measurements of the variables that are included in this study are described.

4.1 Methodology

4.1.1 Univariate analysis

The univariate analysis is the simplest form of analyzing data. The data has only one variable and the main purpose is to describe. It does not deal with relationships or causes. It describes individual variables and provides descriptive statistics about the measures of central tendency (mean and median) and measures of dispersion (standard deviation, quartiles, and interquartile range). In this analysis, outliers are adjusted or removed, and variables are transformed. In addition, outcomes are compared with those of other studies.

4.1.2 Bivariate analysis

The bivariate analysis determines if there is a relationship between two variables. It shows whether there exists an association between the variables and the strength of this association. It could also show whether there are differences between the two variables and the significance of these differences. A way to do a bivariate analysis is via the correlation analysis. This analysis shows a correlation between -1 and 1. The – and + indicate whether there is a positive or negative relationship. The closer to 1 or -1 the stronger the relationship. A high correlation could also indicate multicollinearity. As multicollinearity increases, it complicates the interpretation of the variate, because it is more difficult to ascertain the effect of any single variable, owing to their interrelationships (Hair et al., 2014). This could be tested with the variance inflation factor (VIF). Large VIF values indicate a high degree of multicollinearity among the independent variables. Multicollinearity is one assumption of the multivariate analysis and will be checked for. Since the correlation analysis only measures linear relationships and it only determines the direction and strength of the relationship and not the causation, this analysis is only to give a first impression of the relationship between the variables used in this study.

4.1.3 Multivariate analysis

This empirical research examines the effect of ownership structure on firm performance. Prior studies on this topic used different research methods. Regression analysis is the most common method used in studies investigating the relationship between ownership structure and firm performance (Alabdullah, 2018; Basyith et al., 2015; El-Masry, 2010; Fauzi & Locke, 2012; Frijns et al., 2008; Hoang et al., 2017; Ongore, 2011; Paniagua et al., 2018; Tsegba & Achua, 2011). On top of that, studies examining specific ownership identities also performed regression: managerial ownership (Benson & Davidson, 2009; Berķe-Berga et al., 2017; Coles et al., 2012; Khan et al., 2014), family ownership (Andres, 2008; Bhaumik & Gregoriou, 2010; Ng et al., 2015), government ownership (Beuselinck et al., 2017; Borisova et al., 2012; Ting & Lean, 2015; Tran et al., 2014; Uddin et al., 2014), corporate ownership (Bogert, 1996; Drees et al., 2013), and

institutional ownership (Katan & Mat Nor, 2015; Lin, 2010; Lin & Fu, 2017; Thanatawee, 2014; Zouari & Taktak, 2014). In order to be consistent with prior studies, regression analysis seems the most appropriate method for this study.

4.1.3.1 Regression analysis

Regression analysis is a dependence technique that can be used to analyze the relationship between a single dependent variable and one (simple regression) or several (multiple regression) independent variables. The objective of the regression analysis is to predict changes in the dependent variable in response to changes in the independent variable(s). Regression analysis is by far the most widely used and versatile dependence technique, applicable in every facet of business decision making. It is also used to solve important research problems, particularly in business (e.g. business forecasting models and customer decision-making) (Hair, Black, Babin & Anderson, 2014). Hence, regression analysis is a powerful analytical tool designed to explore all types of dependency relationships.

There are different types of regression models that can be used to predict a dependent variable. Four main regression models are probit, logistic, non-linear and linear regression. Probit and logistic regression are used when there is a non-metric dependent variable. Probit is used when the dependent variable is dichotomous (variable has only two values), whereas logistic is used when the dependent variable is multichomous (variable has more than two values). For instance, Borisova et al. (2012) use these kinds of regression by having a dummy variable as the dependent variable. However, in this study, the dependent variable is firm performance, a metric variable, which makes these models less appropriate. Non-linear regression is a form of regression analysis in which observational data are modeled by a function which is non-linear. While a linear equation has one basic form, non-linear equations can take many different forms (e.g. quadratic or cubic). Barth, Gulbrandsen and Schoø (2005) used in their study a probit model which is non-linear. Also, Coles et al. (2012) used a non-linear equation to replicate the relationship between Tobin's Q (firm performance) and ownership. Linear regression attempts to model a relationship between variables by fitting a linear equation to observed data. A linear regression model follows a particular form where the linearity is in the parameters. The most common (linear) method for fitting a regression line is the method of least-square, often called ordinary least square (OLS). This method calculates the best-fitting line for the observed data by minimizing the sum of squares of the vertical deviations from each data point to the line. These deviations are first squared and then summed, which makes that there are no cancellations between positive and negative values. Most studies regarding ownership structure and firm performance used the OLS as regression analysis (Berķe-Berga et al., 2017; Bhaumik & Gregoriou, 2010; Bogert, 1996; El-Masry, 2010; Fauzi & Locke, 2012; Ng et al., 2015; Paniagua et al., 2018; Thanatawee, 2014; Tsegba & Achua, 2011). Therefore, the OLS regression model seems appropriate for this study.

There are researchers who used the two-stage least squares (2SLS) and three-stage least squares (3SLS) to investigate the relationship between ownership structure and firm performance (Elyasiani & Jia, 2010; Ferreira & Matos, 2008; Frijns et al., 2008; Jafarinejad et al., 2015; Lin & Fu, 2017). These methods are an extension of the OLS method. The OLS is estimating equation-by-equation, which is not always as

efficient as other methods. 2SLS is used when the explanatory variable correlates with the error term, so when endogeneity occurs. These methods are useful when there are feedback loops in the model. 3SLS is the combination of the two-stage least squares regression (2SLS) and the seemingly unrelated regressions (SUR) and provides more efficient estimates for linear regression models (Jafarinejad et al., 2015; Zellner & Theil, 1962). A SUR model is used when there is cross-equation error correlation, so the error terms in the regression equations are correlated. The SUR model is equivalent to the OLS in two cases: when the error terms are uncorrelated and when the equation contains exactly the same set of regressors on the right-hand side. 3SLS goes one step further than 2SLS: unlike the 2SLS, where the coefficients of each equation are estimated separately, the 3SLS estimates all coefficients simultaneously (Zellner & Theil, 1962). Where the 2SLS only allows for correlation between the right-hand side variables and the error terms, the 3SLS allows for heteroskedasticity and contemporaneous correlation in the residuals in addition to the correlation between the right-hand side variables and the error terms (Lin & Fu, 2017). The researchers using the 3SLS model explain that the significant advantage it has over OLS is that it allows the researcher to control for endogeneity due to possible feedback from firm performance to ownership structure. Endogeneity is the greatest disadvantage of the OLS model. Performance can cause changes in ownership structure as a result of phenomena such as insider information and performance-based compensation. Since the study is interested in the effect of ownership structure on firm performance, this potential feedback needs to be controlled for (Ferreira & Matos, 2008; Frijns et al., 2008; Jafarinejad et al., 2015). However, the most important advantages of the OLS model is that it is a familiar analysis that is relatively fast and easy to compute and implement. The parametric form makes it relatively easy to interpret and when the assumptions are met, it can be more powerful than other regression models.

Other regression analyses that prior studies used are fixed-effect regression (Uddin et al., 2014), random effects regression (Borisova et al., 2012; Tran et al., 2014), pooled regression (Tran et al., 2014; Xu & Wang, 1999), panel regression (Lin, 2010; Tran et al., 2014; Zouari & Taktak, 2014), Poisson regression (Paniagua et al., 2018), Tobit regression (Basyith et al., 2015), cross-sectional regression (Drees et al., 2013), time-series regression, and hierarchical regression (Katan & Mat Nor, 2015). In the fixed effects model the parameters are fixed or non-random quantities. This means that variables are constant across individuals. This is in contrast with the random effects model in which all or some of the parameters are considered random variables. These variables are unpredictable. The difference between pooled and panel regression is not in the regression but in the data collection. Pooled data are collected from different individuals in different time periods, whereas panel data is collected from the same individuals over time. Poisson regression is used to model count data and contingency tables and it assumes that the logarithm of its expected value can be modeled by a linear combination of unknown parameters. Tobit regression, also called the censored regression model, is designed to estimate linear relationships between variables when there is either left- or right-censoring in the dependent variable, so the model describes, for example, the relationship between a non-negative dependent variable and an independent variable. Cross-sectional regression is a type of regression in which the dependent and independent variable are associated with one period or point in time, which is in contrast with time-series regression or longitudinal regression in which variables are considered to be associated with a sequence of points in time. Hierarchical regression is a

way to show if variables explain a significant amount of variance of the dependent variable after controlling for other variables. It is more a comparing framework than a statistical model and it builds several models by adding variables to a previous model at each step. Later models determine whether newly added variables show a significant improvement in R^2.

4.1.3.2 Method applied in this study

The method used in this study is OLS regression. One of the reasons to choose for this method is that OLS regression is suitable when the dependent variable is metric and measured on an interval or ratio scale. In this study, the dependent variable firm performance is ratio scale, which makes the OLS regression most appropriate. The most important advantages of the OLS model is that it is a familiar analysis that is relatively fast and easy to compute and implement. The parametric form makes it relatively easy to interpret and when the assumptions are met, it can be more powerful than other regression models. It is known that it is better to use easier models that are more useful than complicated models that are not clear to interpret (also known as the KISS-principle). Another reason for this regression type is that other researchers that examined the relationship between ownership structure and firm performance also used the OLS regression technique and that proves the appropriateness of the technique. This also implies that the results can be better compared.

There are two elements to choose between OLS, 2SLS, and 3SLS: statistical efficiency and computational cost. OLS and 2SLS have less computational cost than 3SLS. However, 3SLS can be more efficient, a relative advantage that increases with the strength of the interrelations among the error terms. The 2SLS has some drawbacks: (1) lack of transparency of the population to which the estimate applies, (2) lack of blinding of the analyst/researcher and (3) dependence on parametric assumptions (Kang, Kreuels, May, & Small, 2016). The greatest difference between OLS on the one hand and 2SLS and 3SLS, on the other hand, is the endogeneity. This study will use lagged control variables to discourage this problem and does not use the 2SLS and 3SLS models, because OLS is used most often in other literature and it is a familiar analysis that is relatively fast and easy to compute and implement, which gives advantages when interpreting the results. Thus, caused by the appropriateness of the technique and to be in line with prior research, the OLS regression model is used in this study to examine the impact of ownership structure on firm performance.

4.1.3.3 Model

In this study, the Ordinary Least Square Model is used to examine the relationship between ownership structure and firm performance. This model is commonly used in prior studies examining a similar research question (Barako & Tower, 2007; El-Masry, 2010; Fauzi & Locke, 2012; Tsegba & Achua, 2011). OLS is appropriate as it is the most straightforward regression technique and the estimation is reliable as long as common regression problems are accounted for. All issues commonly associated with regression such as normality, multicollinearity, and heteroscedasticity are addressed in the study using appropriate steps or measures. To discourage the greatest disadvantage of the OLS model, endogeneity, the control variables are lagged. However, the ownership variables are invariant in time (von Eije & Megginson, 2008), which

means that there is not much different in ownership structure over time. In addition, Benson and Davidson (2009) and Zhou (2001) argue that ownership changes slowly from year to year within a firm, while it is substantially different across firms. Apparently, there is not much difference over time, but there is much difference between firms. Anderson and Reeb (2003), Andres (2008) and Maury and Pajuste (2005) also cast doubt on the reverse causality of ownership structure and firm performance and assert that ownership structures tend to be stable of time. To be in line with these studies and other previous studies (such as Mandaci & Gumus, 2010; McConnell & Servaes, 1990; Ng et al., 2015), this study focuses on most recent data by taking into consideration the fact that ownership structure of the firm does not vary frequently. This is also checked for the firms in the sample when the data was collected; the ownership data did not change much over time. Hence, as ownership data is almost the same for 2017 and 2018 and this study only focuses on one year, this study did not consider the endogeneity problem (only the firm-specific control variables are lagged).

The following model is used: $Y = ß_0 + ß_1X_1 + ß_2X_2 + ..ß_nX_n + e_i$, where Y is the dependent variable or firm performance, X_1, X_2, … X_n are the independent variables or ownership structures, $ß_0$, $ß_1$, $ß_2$ … $ß_n$ are the correlation coefficients, and e_i is the epsilon term (i.e. an error term that accounts for the variability in the dependent variable which cannot be explained by the linear effect of the independent variables). To test the hypotheses in this study, one regression model are used with interchangeable ownership structure variables. The OLS regression is similar to recent studies, such as Li, McMurray, Sy and Xue (2018), Zraiq and Fadzil (2018) and Al-Sa'eed (2018).

For all hypotheses the following model is derived:

$$FirmPerf_{i,t} = ß_0 + \beta_1 OWNERSHIP_{i,t} + \beta_2 FirmSize_{i,t-1} + \beta_3 LEV_{i,t-1} + \beta_4 Industry_{i,t} + e_{i,t}$$

Where

$ß_0$	Constant
$FirmPerf_{i,t}$	Firm performance of firm i in year t
$OWNERSHIP_{i,t}$	Ownership structure of firm i in year t
$FirmSize_{i,t-1}$	Firm size of firm i in year t - 1
$LEV_{i,t-1}$	Leverage of firm i in year t - 1
$Industry_{i,t}$	Industry of firm i in year t
$e_{i,t}$	Error term of firm i in year t

For hypothesis 1, ownership structure is ownership concentration (CONOWN). The hierarchical regression analysis will be used by first performing an analysis with only the control variables which is called the basic model. This is in line with Katan and Mat Nor (2015). This is a more advanced form of simple linear regression and multiple linear regressions. Each model (hierarchy) can be compared using functions such as to ascertain the overall variance explained (R^2) and statistical significance (F-test) of each individual model, as well as the significance of each predictor to each model (t-test). The coefficient of determination

(R^2) provides a measure of how well future outcomes are likely to be predicted by the model. This hierarchical analysis can be used for the estimation of all models in order to compare successive regression models and to determine the significance that each one has above and beyond the others. In addition, robustness test will be done by using different calculations of ownership concentration.

For hypotheses hypothesis 2a, 2b, 3a, 3b and 3c, ownership structure is ownership identity. The first analysis of ownership identity separates first each ownership identity variable (MO, FO, CO, IO and GO) into different regressions analyses and then in the last model all together into one OLS regression where the other ownership identity variables function as control variables.

Since the first analysis can be driven by firms that do not have that specific ownership, the second analysis conducts for each ownership identity variable a separate test with only the firms in the sample where the specific identity is present. In other words, the zeros in the analyses will be excluded and the study, therefore, looks within the ownership identity and zooms in to investigate if there is an effect on firm performance when conducting an analysis on only the firms where that specific identity is present. For example, for family ownership, the analysis only uses the firms that have family ownership. This is in line with Van der Elst (2008) who also performs an analysis with the firms where the specific identity of the shareholder is present. It is also in line with Ting and Lean (2015) and Huang et al. (2018) who investigate government ownership. In this analysis, each ownership identity is separated into different models.

The third analysis is examining non-linear relationships. In this analysis, the squared of each identity are added into the models. The possibility of non-linearity (i.e. inverted U-shape) is examined by including, for example, FO^2 in the model, which is in line with Huang et al. (2018), Arosa, Iturralde and Maseda (2010b) and Ng et al. (2015). The last mentioned uses the hierarchical way to do this, with first a base model with only the control variables. After this, the same non-linear analysis is performed for the firms where the specific identity is present (zeros are excluded) to test if the non-linear results hold (these results are not reported). In addition, the scatterplots are consulted to see if the curvilinear relationships exist.

4.2 Variables definitions and measurement

The economic models in this study consist of three sets of variables: dependent, independent and control variables. An overview with the definitions of the variables is given in table 7.

4.2.1 Dependent variables

The dependent variables in this study represent the measures for firm performance. There are three categories of firm performance in the literature: accounting performance (accounting-based measure), market-related performance (market-based measure), and economic-efficiency performance. The accounting performance can be measured by return on equity (ROE), return on assets (ROA), net profit margin (NPM), and total asset turnover (TAT). The market-related performance can be measured by Tobin's Q, market-to-book ratio (MTB), stock return (RET), earnings-price ratio (EPR), price-to-book ratio (PBR), price-to-revenue ratio (PRR), and price-to-cash flow ratio (PCR). The economic-efficiency

performance can be measured by revenue per employee (RPE), net income per employee (NPE), and revenue-cost ratio (RCR) (Uddin et al., 2014).

Many studies researching listed companies concentrate on ratios including the firm's market value because the firm performance is reflected in its stock price (e.g. Tobin's Q). However, there are factors affecting share price, like economic environment, policy and indicators, market sentiment, industry performance and specifics, investor activity and other. This makes it useful to include other variables for firm performance measurement. According to Al-Matari, Al-Swidi and Fadzil (2014), accounting-based performance measures present the management actions outcome and are hence preferred over market-based measures when the relationship between corporate governance and firm performance is investigated. Many researchers use a combination of both the accounting-based measures and market-based measures (Berķe-Berga et al., 2017; Cornett et al., 2007; El-Masry, 2010; Elyasiani & Jia, 2010; Fauzi & Locke, 2012; Ferreira & Matos, 2008; Katan & Mat Nor, 2015; Lin & Fu, 2017; Mandaci & Gumus, 2010; Ting & Lean, 2015), therefore, in this study, the effect of ownership structure will be examined by both categories.

4.2.1.1 Accounting-based measures

Accounting-based measures represent the current profitability and past performance. One of the accounting-based measurements that is used in many studies is return on assets (ROA) (Basyith et al., 2015; Berķe-Berga et al., 2017; El-Masry, 2010; Fauzi & Locke, 2012; Katan & Mat Nor, 2015; Lin & Fu, 2017; Ng et al., 2015; Ongore, 2011; Ting & Lean, 2015; Tran et al., 2014). ROA is a financial ratio that shows the percentage of profit a company earns in relation to the overall resources. ROA is commonly calculated as net profits divided by the book value of total assets. However, a more representative calculation is earnings before interest and tax (EBIT) divided by total assets, because net income goes to the shareholders and EBIT also to banks (interest) and the government (tax). This better represents the total assets. In addition, return on equity (ROE) will be used. This is calculated as net income divided by equity (shareholders fund).

4.2.1.2 Market-based/Hybrid measures

Market-based measures refer to those measures, which incorporate the market value of the equity, it represents shareholder value, stock price (market performance) and future expectations. The advantage of using market-based measures is that these measures are less susceptible and not subject to manipulation (by management), which is a well know problem with accounting-based measures. This makes the market-based measures somewhat more robust. In addition, market-based measures are superior compared to accounting-based measures, since market-based measures are the reflection of the sentiments and the confidence of investors towards listed firms (Frijns et al., 2008; Katan & Mat Nor, 2015). In the mainstream finance literature, Tobin's Q is the most commonly used market-based or hybrid measure for firm performance in relation to ownership structure (Benson & Davidson, 2009; Coles et al., 2012; Frijns et al., 2008; Hoang et al., 2017; Thanatawee, 2014; Tsai & Gu, 2007; Wahla et al., 2012). Tobin's Q is forward-looking and reflects the shareholders' expectations regarding future performance of the firm, which is

based on past or current performance (Wahla et al., 2012). The traditional calculation of Tobin's Q is the ratio of the market value to the replacement value of the firm. However, since replacements costs of total assets is difficult to estimate, another version of the formula is often used: market value of equity plus book value of liabilities, all divided by book value of total assets. This can be rewritten as market value of equity at the end of the fiscal year plus the book value of assets minus the book value of equity, all divided by the book value of assets. This study measures Tobin's Q as market capitalization divided by book value of total assets. However, it is well known that Tobin's Q is an imperfect measure of firm performance (Ferreira & Matos, 2008), therefore also the market-to-book ratio (MTB) is examined. This measure is a widely accepted measure for firm performance (e.g. Kalsie & Shrivastav, 2016; Kaserer & Moldenhauer, 2008; Siddiqui, 2015) and is calculated as market capitalization divided by equity (shareholders fund). Since Tobin's Q and MTB are also known as hybrid forms of performance measures, (annual) stock return (RET) is used as robustness measure. This is a pure (capital) market-based performance measure and is used by studies such as Duffhues and Kabir (2008) and Ferreira and Matos (2008). It is calculated as stock price difference plus dividend, divided by stock price begin of the year.

4.2.2 Independent variables

The independent variables are the ownership structures under investigation. They include ownership concentration and ownership identity with insider ownership structure as managerial and family ownership and outsider ownership structure as corporate, institutional and government ownership.

4.2.2.1 Ownership concentration

Ownership concentration (CONOWN) is defined as the percentage of shares owned by blockholders, that is, who own 5% or more of total shares (Berķe-Berga et al., 2017; Hoang et al., 2017). For robustness, also other calculations will be checked: the percentage of shares held by the top 5 shareholders and ownership dispersion as the number of total shareholders (Frijns et al., 2008; Wahla et al., 2012; Zouari & Taktak, 2014).

4.2.2.2 Ownership identity

The ownership identity is measured as the percentage of common shares owned by the specific identity. Managerial ownership (MO) is defined as the percentage of common shares owned by the managers (Basyith et al., 2015; Fauzi & Locke, 2012; Hoang et al., 2017; Wahla et al., 2012). Family ownership (FO) is measured as the percentage of common shares owned by family and individuals (Ng et al., 2015; Villalonga & Amit, 2006). Managerial ownership and family ownership together can be defined as insider ownership (INSOWN). Corporate ownership (CO) is measured as the percentage of common shares owned by corporations (Douma et al., 2006). Institutional ownership (IO) is measured as the percentage of common shares owned by institutions (Benson & Davidson, 2009; Borisova et al., 2012; Katan & Mat Nor, 2015; Lin, 2010; Lin & Fu, 2017; Thanatawee, 2014). Government ownership (GO) is measured as the percentage of common shares owned by the government (Beuselinck et al., 2017; Borisova et al., 2012; Hoang et al., 2017; Ting & Lean, 2015; Tran et al., 2014). Corporate ownership, institutional ownership, and government ownership together can be measured as outsider ownership (OUTOWN).

4.2.3 Control variables

There are many variables that possibly can influence firm performance, but which are not analyzed in this study. However, for the possible influence, this study has to take them into account. The best control variables are those highly correlated with the dependent variables (firm performance) and unrelated to the independent variable (Angrist & Krueger, 2001). Following previous empirical studies, the following control variables are included to control for firm-specific factor: firm size and leverage (Karaca & Eksi, 2011; Moscu, Grigorescu, & Prodan, 2015; Tsegba & Achua, 2011). Furthermore, industry dummies are included to control for industry differences.

4.2.3.1 Firm size

Firm size is an important variable to control for because it has an influence on the firm performance through economies of scale and market power (Sun & Tong, 2003). It is also often been argued that firm size could be negatively related to ownership structure since it is harder to own the same percentage in a large firm as compared to a small firm (Bhattacharya & Graham, 2009). In the literature, firm size is defined in different ways. The two most used measures for firm size are (the natural logarithm of) total assets and (natural logarithm of) total sales (e.g. Ng et al., 2015). In line with this, both are used in this study (Alabdullah, 2018; Andres, 2008; Benson & Davidson, 2009; Colpan et al., 2011; Katan & Mat Nor, 2015; Lin, 2010; Lin & Fu, 2017; Thanatawee, 2014; Tran et al., 2014; Tsegba & Achua, 2011; Uddin et al., 2014). The natural logarithm is used to reduce the skewness. Whereas total assets are used in the regressions, total sales are used in the robustness tests.

4.2.3.2 Leverage

The pecking order theory suggests that leverage has a negative relationship with firm performance (Bhattacharya & Graham, 2009). On the other hand, owners with substantial controls may increase debt as a proportion of equity to maintain their ownership stake, which implies that high ownership may increase leverage (Bhattacharya & Graham, 2009). This suggests a multicollinearity problem, but after checking the VIF scores this seems not the case in this study since all VIF values are below 5. Therefore and to be in line with prior studies, leverage is used as a control variable (Beuselinck et al., 2017; Borisova et al., 2012; Hoang et al., 2017; Lin, 2010; Lin & Fu, 2017; Thanatawee, 2014; Ting & Lean, 2015). Leverage can be measured as the total liabilities divided by total assets, also known as the debt-to-assets ratio (LEV). Another measure is total long-term debt divided by total assets (e.g. Coles et al., 2012). This measure is used in the robustness tests.

4.2.3.3 Industry

Douma et al. (2006) suggest that differences in industries can influence the relative performance of firms. Hence, industry dummies are used to control for industry differences. Based on the NACE Revision 2 classification and the number of firms in each industry (Beyer et al., 2011), four industry dummies are formed: Manufacturing dummy, Real estate activities dummy, Information and communication dummy, and Other industry dummy. These dummy variables are included in each regression analysis.

Table 7. Variable definitions

Variables	Measurement	Sources
Performance variables		
Market-based performance		
Tobin's Q	(Market capitalization)/(Book value of total assets)	Benson & Davidson (2009); Coles et al. (2012); Frijns et al. (2008); Hoang et al. (2017); Thanatawee (2014); Tsai and Gu (2007); Wahla et al. (2012)
MTB (market-to-book ratio)	(Market capitalization)/(Shareholders funds)	
Accounting-based performance		
ROA (return on assets)	(Earnings Before Interest and Tax)/(Book value of total assets)	Basyith et al. (2015); Berķe-Berga et al. (2017); El-Masry (2010); Fauzi and Locke (2012); Katan and Mat Nor (2015); Lin and Fu (2017); Ng et al. (2015); Ongore (2011); Ting and Lean (2015); Tran et al. (2014)
ROE (return on equity)	(Net Income)/(Shareholders funds)	
Ownership variables		
CONOWN (ownership concentration)	Percentage of shares owned by blockholders, that is, who own ≥ 5% of total shares	Berķe-Berga et al. (2017); El-Masry (2010); Frijns et al. (2008); Hoang et al. (2017); Muller-Kahle (2015); Tsegba and Achua (2011); Wahla et al. (2012); Zouari and Taktak (2014)
MO (managerial ownership)	Percentage of common shares owned by managers	Basyith et al. (2015); Fauzi and Locke (2012); Hoang et al. (2017); Wahla et al. (2012)
FO (family ownership)	Percentage of common shares owned by family	Ng et al. (2015); Villalonga and Amit (2006)
CO (corporate ownership)	Percentage of common shares owned by corporations	Douma et al. (2006)
IO (institutional ownership)	Percentage of common shares owned by institutions	Benson and Davidson (2009); Borisova et al. (2012); Katan and Mat Nor (2015); Lin and Fu (2017); Lin (2010); Thanatawee (2014)
GO (government ownership)	Percentage of common shares owned by the government	Beuselinck et al. (2017); Borisova et al. (2012); Hoang et al. (2017); Ting and Lean (2015); Tran et al. (2014)

Control variables		
FirmSize (firm size)	Total assets of the firm (in millions of euros)	Alabdullah (2018); Andres (2008); Benson and Davidson (2009); Colpan et al. (2011); Ng et al. (2015); Katan and Mat Nor (2015); Lin and Fu (2017); Lin (2010); Thanatawee (2014); Tran et al. (2014); Tsegba and Achua (2011); Uddin et al. (2014);
FirmSizeTS	Total sales of the firm (in millions of euros)	
LEV (leverage)	(Total liabilities)/(Total assets)	Beuselinck et al. (2017); Borisova et al. (2012); Coles et al. (2012); Hoang et al. (2017); Lin and Fu (2017); Lin (2010); Ting and Lean (2015); Thanatawee (2014)
LEVLONG	(Total long-term debt)/(Total assets)	
Dummy Variables		
Industry	Industries are distinguished by NACE Revision 2 classification and the number of firms in each industry.	

Notes: this table presents the definitions of the variables used in this study. In the last column some examples of academic articles are mentioned for each variable which used the same kind measurement

5 Sample and data

This chapter gives an overview of the sample used and how the data is collected in this study.

5.1 Sample

The sample is drawn from listed Belgian companies. Most of these companies are listed on the Euronext Brussels. The ownership data are hand-collected from Orbis, annual reports and the Financial Services and Markets Authority (FSMA). Orbis is an international database with large and listed firms. As Orbis shows the most recent data, the data from November 2018 is collected. The annual reports of 2017 are used to compare. Though this process of data collection is time-consuming, it has a number of benefits as Ng, Ong, Teh, and Soh, (2015) describe. Cross-sectional studies are common in the previous studies related to this area. For example, Ng et al. (2015) use a sample of 314 firms for the fiscal year 2007, Mohd and Weetman (2006) utilize data from 2001 for 87 companies, Filatotchev, Lien and Piesse (2005) use a sample of 228 firms in 1999 to study the ownership structure on firm performance, Kim, Al-Shammari, Kim and Lee (2009) performed a cross-sectional study for 290 firms from the year 2002, and Mak and Kusnadi (2005) and Mak and Li (2001) both performed analysis on one year, 1995-1996 and 1999-2000 respectively. In addition, Benson and Davidson (2009) and Zhou (2001) argue that ownership changes slowly from year to year within a firm, while it is substantially different across firms. Therefore, and to be in line with previous studies (such as Mandaci and Gumus, 2010; McConnell and Servaes 1990), this study also focused on one year of data by taking into consideration the fact that ownership structure of the firm does not vary frequently.

Orbis has 1,903,908 active companies in their database (when no criteria are used). When the Belgium firms are selected, Orbis shows 15,363 search results. In addition to the Belgian criterium, the listed firm criterium in June 2018 gave 157 listed Belgian firms. 115 are listed on the Euronext Brussels, 10 are listed on the Euronext Access Brussels, and 6 are listed on the Euronext Growth Brussels. In addition to that, 2 are listed on the Euronext Paris, 6 are listed on the Euronext Access Paris, and 3 are listed on the Euronext Growth Paris. Furthermore, 5 were listed on both the Euronext Brussels and the Euronext Paris, 1 is listed on both the Euronext Growth Brussels and Euronext Growth Paris, 3 were listed on the Euronext Brussels and the Euronext Amsterdam, 3 were listed on the Euronext Brussels but are delisted now, 2 are listed on the European Expert Market, and 1 is listed on the Nasdaq. This study keeps firms in that are not listed at Euronext Brussel but are based in Belgium and have a country ISO code and ISIN code that is BE. Euronext is one of the largest exchange networks in the world, where listed companies are subject to a number of rules decreed by the European Union that are applicable to all regulated markets in the EU. Euronext Access has been established to target start-ups and small- and mid-sized companies (SME's) that wish to join a stock exchange to finance their development and to benefit from the reputation bestowed on listed companies, but who do not meet the criteria for admission on Euronext's regulated markets. Euronext Growth market offers an alternative route for SME's that may lack the necessary resources needed to satisfy the requirements of a regulated market, to join a reliable and profitable exchange. However, the same search criteria in August 2018

gives 153 listed companies, where Ablynx NV, Rue Colonel Bourg, Sapec SA, Tigenix NV, and Westland Shop are not listed anymore and FNG NV is added to the Euronext Brussels exchange. This implies that the ORBIS database is up-to-date all the time with the most recent data and companies. On 12 November 2018, the sample was 155 and this is the sample that is used before further criteria are added.

The third criterium (first is Belgium and second is listed) is that financial firms are excluded from the sample. Financial services firms (NACE 64, 65 and 66) are excluded because their financial statement information is not comparable to that of other non-financial firms and they are governed by a different set of rules and regulations and thus make them incomparable to firms in other sectors. The exclusion of the finance sector is also consistent with previous studies in this area (For example Klapper, Laeven, & Rajan, 2006; Mandaci & Gumus, 2010; Ng et al., 2015; Roosenboom, 2012). NACE classification is used instead of SIC classification because NACE is the European standard of industry classification. This is also used by Beyer et al. (2011) for Belgian firms. The NACE codes follow the NACE Revision 2 classification. 20 financial firms were excluded.

The fourth criterium is that the firm should be a company and not a holding company. This is in line with the study of Karaca and Eksi (2011) and Mandaci and Gumus (2010), in which holding companies are also excluded. Holding companies, according to the Brussels Stock Exchange (which is now the Euronext Brussels), are those companies whose purpose is to invest in other (quoted) companies, except financial institutions. Since Belgium is a particularly attractive location for holding companies, there are a lot of holding companies. Therefore, only the pure holding companies (the once which Orbis shows are holding companies under the heading "Products and services") are excluded from the sample. These are the holding companies that hold assets of other companies without engaging in any business activities or operations of their own. Therefore, 19 holding firms are excluded, which is in line with Buysschaert, Deloof, Jegers and Rommens (2008). Previously there were more listed holding companies in Belgium, because Becht, Chapelle and Renneboog (2002) found 64 holding companies and they argue that these structures were beginning to disappear.

Furthermore, to be in line with previous studies (Berķe-Berga et al., 2017; Beuselinck et al., 2017; Douma et al., 2006; Frijns et al., 2008; Guillet et al., 2013; Thanatawee, 2014; Zouari & Taktak, 2014), firms that did not disclose information regarding ownership or financial data, or there was a lack of information on some variables required for analysis, are excluded from the sample. 14 firms are excluded due to missing data caused by for example an initial public offering in 2017 or 2018, or merger and acquisition activities. Therefore, the final sample is 102 Belgian listed firms (see table 8). This is in line with Faccio and Lang (2002) who investigated, among others, 130 financial and non-financial companies. Figure 1 shows the number of listed companies in Belgium over time.

Table 8. Sample size

Criteria	Number of firms
Belgian Listed firms	155
(-) Financial firms	20
(-) Holding firms	19
(-) Missing data	14
Sample size	102

Notes: this table presents the sample size used in this study.

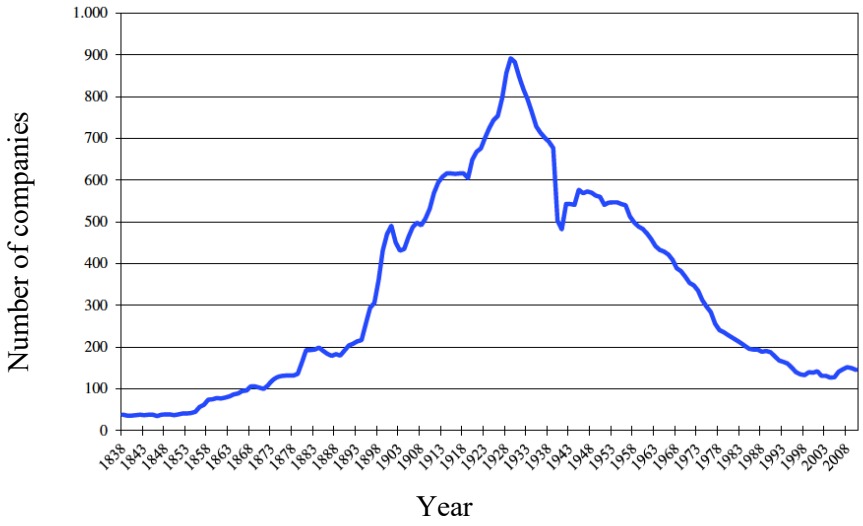

Figure 1. Belgian common stock listed on the Brussels Stock Exchange/Euronext Brussels 1838-2010. Source: Annaert, Buelens and Deloof, 2014, p. 81

Limitations sample

All the criteria portend possible bias, but the conjectures are that overcoming sample selection bias is empirically difficult for studies focusing on the impact of corporate governance mechanisms on firm financial performance measures. In addition, as this paper only uses the publicly listed Belgium companies, survivor bias can arise. Survivorship bias is the logical error of concentrating on the firms that made it past the selection process and overlooking those that did not, which is a form of selection bias. However, when selecting also the formally listed companies, the database shows the most recent shareholder information resulting in one shareholder: the company or holding itself. Due to this information problem only the current publicly listed companies will be selected. In addition, the choice for publicly traded firms is logic, because the reliability of data pertaining to performance and ownership is better with regard to listed firms (Douma et al., 2006). Another possible limitation is cross-listing which is the listing of a company's common shares on a different exchange than its primary and original stock exchange. For example, one firm in the sample is also listed on the Nasdaq. These firms are only deleted from the sample when the firm is not doing business (no establishment) in Belgium, because

Dodd and Frijns (2015) argue that recent research suggests that firms cross-list in foreign markets that share similarities with the home market. Accordingly, they find that managers prefer cross-listing in markets where the home market investors have a preference to invest into. This implies that the choice is made based on the shareholders' preferences and excluding these firms will create a selection bias. Moreover, the I in Orbis is one or more named individuals or families. This implies that the I can be an unrelated individual. However, in Belgium, 77% of all companies with personnel are family companies (fbnbelgium.be, 2018). For a listed company in Belgium, it suffices that the family owns 25 percent of the voting power and at least one representative of the family is active in the management or management of the company. Therefore, the I will most likely be family ownership. In addition, other studies in Belgian also use individual or family as one category (Almeida & Wolfenzon, 2006; Dherment-Ferere et al., 2001). Researchers must rely on what is available in the public domain, which is an indication of good corporate governance practices (Tsegba & Achua, 2011).

5.2 Data collection

First of all, Orbis is consulted for the ownership data. Orbis records ownership data even below 1%. However, this study only records 1% or higher t o be in line with other databases, SEX Edgar Filings, for example, stops at 1%. In addition, these are the shareholders that have influence in a firm. The total ownership is based on both direct and indirect shareholdings, that is, via other firms. The ownership data in Orbis intends to track control relationships rather than relationships that do not allow the shareholder to take a decision in the company (patrimonial relationship). This is why, when there are two categories of shares split into Voting/Non-voting shares, the percentages that are recorded are the ones attached to the voting shares category. Therefore, both direct and indirect (total) are recorded in this study. As noted by Bureau van Dijk, the Orbis ownership database might contain some unidentified overlaps between total ownership and direct ownership. In those cases, total ownership might exceed 100%. Suppose, for example, that firm A directly owns 100% of firm B, which directly owns 100% of firm C. If an information source also indicates that firm A holds total ownership (100%) of firm C, then the total ownership percentage in the database will be 200% (Beuselinck et al., 2017). However, this study controlled for this problem by comparing all ownership data of Orbis with the ownership data in the annual reports and FSMA.

Orbis shows the type of ownership with a letter. For each type in Orbis, the percentages are added together to get the cumulative percentages. As stated before, only the percentage above 1% are recorded. This database uses letters to classify the identity of the shareholders. A = insurance company, B = bank, C = industrial company, E = Mutual & Pension Fund/Nominee/Trust/Trustee, F = Financial company (investment company), I = One or more named individuals or families (- sign is added when the shareholder is also a manager), J = Foundation, and S = Public authority/State/Government. These ownership data will be divided according to the variables described in the previous section: Managerial = I with a sign, Family = I without a sign, Corporate = C, Institutional = A, B, E, and F and Government = S (see table 9).

Table 9. Orbis ownership structure classification

Ownership structure	Orbis classification
Managerial Ownership (MO)	I (with - sign)
Family Ownership or individual (FO)	I (without - sign)
Corporate Ownership (CO)	C
Institutional Ownership (IO)	A, B, E, F and J
Government Ownership (GO)	S

Notes: this table presents the ownership structure classification as the database Orbis uses it

After the ownership data in Orbis was collected, the data is checked by comparing it with the ownership data in the annual reports and FSMA. After checking all ownership data, it can be concluded that Orbis is not giving the information in the detailed form that is necessary for the analysis in this study. This is due to the fact that in Belgium, ownership pyramids or cascades are widely used (Dherment-Ferere et al., 2001; Van der Elst & Aslan, 2009). In Belgium, the firms are typically still controlled by a variety of family-based holding companies which directly and indirectly hold concentrated control blocks of shares through pyramids and cross-holdings. A substantial number of share stakes are held by other companies which in turn are held by other shareholders. Hence, it are the single individuals or families that control a large number of firms and not the holdings. The true owners of the Belgian sample companies are mostly not the direct shareholders, but that control is exercised by an ultimate shareholder on a higher ownership tier in the pyramid (Becht et al., 2002). Belgium's ownership and control patterns are therefore complex, with the groups and families themselves interlocked through reciprocal shareholdings and voting pacts (Almeida & Wolfenzon, 2006; Ghemawat & Hout, 2011). This implies that true control is not found at the direct ownership tier and therefore for each shareholding, this study has investigated the (ownership) pyramid structure until the ultimate shareholder (a family or individual, or a widely held (holding) company or an institutional investor or the government) was reached (see next section and appendix B for examples). The percentages of the first-level shareholders that are controlled by the same ultimate owner are aggregated into the investor identity of the ultimate owner. Hence, this study uses the same classification as previous studies that investigated the ownership in Belgium (but more aggregated), for example, Becht et al. (2002) and Van der Elst (2011). However, this study uses the fact that the transparency legislation does not only apply to natural and legal persons owning voting rights directly, but also to those investors who control voting rights indirectly via a pyramid structure of intermediate companies. In the end, the shareholdings that are counted are the sum of the direct shareholdings controlled by the same ultimate investor.

The firm performance measures and control variables are also collected from Orbis and are checked consulting the annual reports. These types of variables could be generated from the Orbis database more easily.

Examples of data collection problems

For holdings, Orbis often gave the letter C or J. This could be correct, however, in the annual reports and FSMA it can be seen that the holding is of a family, so it should be marked as family ownership. For example, Bekaert SA/NV has an owner called "stichting administratiekantoor Bekaert", which is recorded as a foundation (J). This foundation has the shares from the Bekaert family of the company Bekaert SA/NV. Hence, family ownership is recorded instead of institutional ownership (foundation). An example of C is the ownership of Deprez holding of the company Greenyard NV. Deprez Holding has the shares of the Deprez family and therefore it should be recorded as family ownership instead of company ownership. Another example is that of Sioen Industries NV. Orbis shows that Sihold, which is remarked as type C in Orbis, holds 65.25% of the shares. When consulting the annual report and FSMA, it can be concluded that it is the Sioen family that holds 65.25%. Accordingly, this is marked as family ownership.

It also occurs that managers use a holding for their shares. In this case, the shares are remarked as managerial ownership. For example, Melexis N.V. is held by Xtrion N.V., which is a corporation according to Orbis so then it would be corporate ownership. However, after some more research, it can be concluded that the shares of Xtrion NV are held by Stichting Administratiekantoor Xpeqt (1,013,000 shares), Roland Duchatelet (7,600 shares) and Rudi De Winter (7,400 shares). The Stichting Administratiekantoor Xpeqt is jointly controlled by Roland Duchatelet, Rudi De Winter and Françoise Chombar. Chombar is managing director and CEO, Duchatelet is Chairman. This ownership is remarked as managerial ownership. Same for government ownership. For example, FPIM is noted as a corporate shareholder in Orbis, however, this is a government holding, so it should be government ownership.

The distinction between family ownership and managerial ownership is in some cases not simple or clear. This study distinguishes between these types of ownership by the number of people in a family that own the shares; when it is one person that is a manager and owns the shares or when there are more people of the same family that are managers and owners. For example, when the shares are of a holding owned by the family, but one member of the family is CEO of the company, then the shares are marked as family ownership and not as managerial ownership. When the shares are owned by a holding which is owned by one person and that person is a director of the board, then it is marked as managerial ownership.

A special form that is used in Belgium is the Dutch "stichting administratiekantoor" (STAK). This is a holding that is used to maintain control and continuity within a family business. With this Dutch STAK, a division is made between legal ownership (control) and economic ownership (right to profit) of the shares of the company. In Belgium, they were already familiar with the mechanism of certification since the Act of 15 July 1998 concerning the certification of securities issued by trading companies. However, until before the V&S Act of 2 May 2002, the Dutch STAK always had to be called upon. Since this V&S Act, the Belgian families can also use a STAK.

In Belgium, the number of companies where a family is a shareholder increased significantly. This is due to the reorganization or even abolishment of some pyramid structures. Further, more information

became available which led to the disentanglement of familial pyramid structures for which the ultimate owners could not always be traced before. As these families are discovered behind chains of companies, these voting blocks are classified as family ownership. As a result of this information about the pyramids, the position of non-financial companies as large shareholders decreased in Belgium (Van der Elst, 2008; Van der Elst & Aslan, 2009). In this study, it is expected that family ownership increased even more due to the Belgian law of 2 May 2007 on the disclosure of significant shareholdings in issuers whose securities are admitted to trading on a regulated market. Any shareholder holding, directly or indirectly, voting rights equal to 3% or more of the existing voting rights have to declare this shareholding to the company and to the Belgian Financial Services and Market Authority (FSMA). This increases the disclosure on pyramid structures.

6 Results

This chapter discusses the results of this study. First, the univariate analysis, with the descriptive statistics, is presented. Second, the bivariate analysis with the correlation matrix is shown. Third, the multivariate analyses with the regression results are presented. Last, the robustness tests are shown.

6.1 Univariate analysis

6.1.1 Outliers

As outliers may exist in a multivariate context, and their existence often leads to Type I and Type II errors, it is necessary to identify outliers before statistical analysis (Tsai & Gu, 2007a). In order to detect and control for outliers, the interquartile range (IQR) method can be used next to the plotting boxplots. The IQR is the length of the box in the box-and-whisker plot. An outlier is any value that lies more than one and a half time the length of the box from either end of the box. That is, if a data point is below Q_1 – 1.5x IQR or above Q_3 + 1.5xIQR, it is viewed as being too far from the central values to be reasonable. This is defined as inner fences by Tukey (1997), while Q_1 – 3xIQR or above Q_3 + 3xIQR is defined as outer fences. The observations between the inner fence and outer fence are called outside or potential outliers, while data points beyond the outer fence are called far out or probable outliers.

There are two methods to deal with outliers: removing or replacing. Looking at previous studies, the following studies removed the outliers from the sample (Cui & Mak, 2002; Dehaene et al., 2001; Del Orden & Garmendia, 2008; J. J. McConnell & Servaes, 1990; Tran et al., 2014; Uddin et al., 2014; Xu & Wang, 1999; Zouari & Taktak, 2014), whereas these studies replaced them by trimming, truncating (Cornett et al., 2007; Cremers & Nair, 2005; Khan et al., 2014), or winsorizing the data (Barontini & Caprio, 2006; Benson & Davidson, 2009; Core & Larcker, 2002; Douma et al., 2006; Guest, 2009; Liu et al., 2014; Maury & Pajuste, 2005; Ng et al., 2015; Seifert & Gonenc, 2016; Van der Bauwhede, De Meyere, & Van Cauwenberge, 2015; Wei et al., 2005). However, removing the outliers will cause the number of observations to decrease, hence loss of information. Winsorization provides an alternative method of dealing with outliers and is common to an empirical analysis using financial statement data (Douma et al., 2006; Ng et al., 2015). Instead of removing outliers from the sample, this study winsorizes the performance variables at their 5th and 95th percentile values. This result in the descriptive statistics, see table 10.

6.1.2 Descriptive statistics

Table 10 reports the descriptive statistics of the performance variables (dependent variable), ownership variables (independent variables) and firm characteristics (control variables). The mean and/or median numbers will be compared with those from prior studies in Belgium and other (Western) European countries. When there are differences, possible explanations will be given by for example using Van der Elst (2008) who describes the evolution of ownership of a large sample of companies in five European countries (Belgium, France, Italy, Spain and the UK) between 1999 and 2008. Starting with the dependent variables, the mean and median of Tobin's Q are 1.07 and 0.75 respectively. Although it is

hard to compare this with Dherment-Ferere et al. (2001), because they study another period and therefore the market may be in a different conjuncture (economic situation), they show an average of 1.09 and a median of 0.74. This is somewhat lower than that Frijns et al. (2008) reported for the Netherlands: 1.40. The mean and median MTB in this study is 2.51 and 1.65 respectively. This is in line with Overfelt, Annaert, Ceuster and Deloof (2009) who report a mean MTB of 2.30 and a median of 1.70 for Belgian firms. This is somewhat lower than the mean market-to-book ratio that Frijns et al. (2008) find for The Netherlands: 2.96. The mean and median values of ROA in this study are 2.13 and 3.98 respectively. This is somewhat higher than that Buysschaert et al. (2008) find for Belgian firms; mean of 1.97 and a median of 2.04. The ROE values in this study are 1.27 for the mean and 7.09 for the median. This implies, first of all, that there are a lot of negative values. This is somewhat in line with Van der Elst and Aslan (2009) who reported a mean of 2.05 and a median of 9.55 as the average of firms in Belgium, France, Germany, UK, Italy, and Spain.

The independent variables show that concentration ownership (CONOWN) has a mean of 55.89 and a median of 60.09. This is in line with Dherment-Ferere et al. (2001) who show a mean of 52.2 and a median of 56.3 for Belgian firms. It is somewhat lower than Becht et al. (2002) and Renneboog (1998) who both report a mean of 65.4%. This could be due to the fact that the concentration of ownership in Belgium has been decreasing over time, according to Van der Elst (2008). However, it is somewhat higher than in The Netherlands, where Frijns et al. (2008) report a mean of 47.95%. This is in line with Barontini and Caprio (2006) who also show that ownership concentration in Belgium is higher than in the Netherlands. Moreover, La Porta et al. (1998) find a mean of 54 and a median of 62, which also correspondents. In addition, Florackis et al. (2009) show that for the UK, the ownership concentration is 34.60, which is lower and therefore in line with that Anglo-American countries have a lower concentration of ownership.

The managerial ownership (MO) in Belgium has a mean of 14.47 and a median of 0. Beyer et al. (2011) find a higher mean of 25.48 for Belgium companies. However, these are also non-listed companies. Another reason for this difference could be that in this study when there are managers from the same family, it is recorded as family ownership and not managerial ownership. When looking at the distribution of managerial ownership, Beyer et al. (2011) also find many firms with zero percent and therefore report a median of 0. Florackis et al. (2009) find a mean of 13.89 in the UK, while Davies et al. (2005) find 13.02 for a random sample of firms and Hoang et al. (2017) find 15% for manufacturing companies listed on the Ho Chi Minh Stock Exchange. The latter is not a Western European country, but the percentages are similar. In addition, Frijns et al. (2008) report a mean of 17.59 for The Netherlands. However, this is insider ownership, which also includes employee ownership (and family).

This study reports a mean of 22.45 and a median of 8.57 for family ownership (FO). This is higher than Dherment-Ferere et al. (2001), who find a mean of 12.1 and a median of 0. However, they report holding companies separate, which are mostly owned by families (ultimate owner). Van der Elst and Aslan (2009) claim that FO was around 10 – 15% before. However, they report that in Belgium the family ownership increased to 20%, due to the disentanglement of familial pyramid structures resulting

in direct ownership. Also Van der Elst (2008) argues that for Belgium the family ownership increased over time (from 1999 to 2007). This increase could be even more after the transparency legislation in 2007. As these families are "discovered" behind chains of companies, these voting blocks will be classified as family ownership. Accordingly, Faccio and Lang (2002) show that 51.53% of the firms are controlled by families who have 20% or more of the shares. Whereas Barontini and Caprio (2006) show that in Belgium 64.5% of the companies have a family as the largest shareholder. In addition, Praet (2013) reports that the mean and median value of family ownership in Belgium are 47.36 and 50.01. However, their sample consists of 48 family-owned Belgian listed company. That families and individuals are the most important class of shareholders in Belgium is in line with Van der Elst and Aslan (2009) who argue that this type is important in Continental European countries, especially in Belgium, France, and Spain.

This study reports a mean of 10.89 and a median of 3.80 for corporate ownership (CO). This is in line with Becht et al. (2002) who report a mean of 10.80 for corporate ultimate owner in Belgium. Dherment-Ferere et al. (2001) find a mean of 9.1 and a median of 1.80 for Belgium firms. In this study, the mean and median values for institutions ownership (IO) are 11.87 and 4.21, respectively. Dherment-Ferere et al. (2001) find a much lower percentage, namely a mean of 4.8 (0.8 for banks, 2.3 for investment funds and 1.7 for insurance companies) and a median of 0. This difference could be caused by the following reasons. The first one is that Dherment-Ferere et al. (2001) reported holding companies separated. The second reason is that in Belgium institutional investors usually hold small share stakes (of under 5%) (Becht et al., 2002). Dherment-Ferere et al. (2001) report only the stake of 5% and higher (for Belgium) while this study reports 1% or higher. According to Becht et al. (2002), institutional investors own in aggregate about 18% of the shares in Belgian listed companies.

This study finds for government ownership (GO) a mean of 4.72 and a median of 0. This is somewhat higher than Dherment-Ferere et al. (2001) who report a mean of 2.5 and a median of 0 for Belgium firms. In addition, Faccio and Lang (2002) find that 2.31% of Belgian firms have the government as largest shareholder (and 4.14 as average for all 13 Western European countries that they investigate). In Belgium, the regional government acquired via investment funds minority blocks in two Walloon companies, hence resulting in an increase in the number of Belgian companies with government ownership. Therefore, the mean value in this study is somewhat higher. In the past, government ownership has been even higher, however, the government which holds a limited number of large blocks in some large companies in Continental Europe continued its privatization process (Van der Elst 2008). As can be seen in Gugler et al. (2014), government ownership in Central and Eastern Europe are higher. Further, Barontini and Caprio (2006) find that in Belgium 3.2% of the firms have the state as the largest shareholder. In addition, Dherment-Ferere et al. (2001) report that the mean and median of government ownership for Germany, France, and the UK are 2.0, 12.6 and 0.1, and 0, 0 and 0, respectively. Furthermore, Mandaci and Gumus (2010) find a mean value of 1.49 for Turkey.

Considering the control variables, the average firm size (FirmSize) is €3,262 million with a median of €351 million, which is in line with Leuz, Nanda and Wysocki (2003) who find a median value of

$277 million for Belgian firms. Dherment-Ferere et al. (2001) find lower values: a mean of €384 million and a median of €52 million. Frijns et al. (2008) find a mean of €4,362 million for The Netherlands. In the sample of this study, there is one firm (Anheuser-Busch Inbev SA/NV) that is greater than all other firms with total assets of €205,225 million. As a result, the mean value is much higher than the mean and therefore skewed to the right. Hence, the natural logarithm of the total assets is used in the regression analyses. FirmSizeTS has a mean value of €1,281 million and a median value of €119 million. In the robustness tests, the natural logarithm of total sales is used. Leverage in this study has a mean of 0.53 and a median of 0.55. This is in line with De Vlaminck and Sarens (2013) who find a mean of 0.56 and a median of 0.58 for Belgian firms. Beyer et al. (2011) find a mean of 0.64 and 0.66 for 1,406 Belgian firms (so also not listed firms). It has to be noted that Telenet Group has a leverage of 1.20, which is caused by the negative total equity. In addition, LEVLONG has a mean of 0.20 with a median of 0.16.

6.1.2.1 Separation by industry

Table 11 separates the sample by industry and by the category of the largest shareholder. As can be seen, the sample is dominated by manufacturing firms, who collectively account for nearly half of the sample firms. The least represented industries are Education and Human health and social work activities at one apiece followed by Mining and quarrying at two. When looking at the identity of the largest shareholder it can be observed that families and individuals hold the most shares in about 40% of the sample. Managers hold the most shares in almost a quarter of the sample, while outside shareholders are the largest shareholder in roughly one-third of cases. This is divided into 16.67% CO, 11.76% IO and 7.84% GO. When the ownership structure is separated by industry and identity it can be seen that there is not one ownership type that only invests in one particular industry. However, insiders (families and managers) invest most in the manufacturing industry, while institutional owners invest more in real estate activities. This study uses four dummy variables to control for industry differences (see section 4.2.3.3).

Table 10. Descriptive statistics

Panel A: Performance measures

Performance measure	Obs.	Mean	St. Dev.	Min	1st quartile	Median	3th quartile	Max	IQR
Tobin's Q	92	1.07	0.89	0.09	0.49	0.75	1.37	3.49	0.89
MTB	92	2.51	2.28	0.45	1.11	1.65	2.96	9.67	1.86
ROA (%)	102	2.13	9.45	-24.67	0.17	3.98	6.75	15.76	6.58
ROE (%)	100	1.27	21.86	-70.90	-0.75	7.09	12.82	27.51	13.57

Panel B: Ownership variables

Ownership variables (%)	Obs.	Mean	St. Dev.	Min	1st quartile	Median	3th quartile	Max	IQR
CONOWN	102	55.89	25.16	0.00	36.04	60.09	76.37	96.85	40.33
MO	102	14.47	25.97	0.00	0.00	0.00	18.73	96.31	18.73
FO	102	22.45	27.59	0.00	0.00	8.57	44.04	94.14	44.04
CO	102	10.89	19.68	0.00	0.00	3.80	9.01	96.00	9.01
IO	102	11.87	16.03	0.00	0.00	4.21	21.54	76.08	21.54
GO	102	4.72	14.49	0.00	0.00	0.00	2.52	90.00	2.52

Panel C: Firm characteristics / Control variables

Firm variables	Obs.	Mean	St. Dev.	Min	1st quartile	Median	3th quartile	Max	IQR
FirmSize (millions of euros)	102	3,262.14	20,373.91	0.39	48.61	351.50	1,313.25	205,224.79	1,264.64
FirmSizeTS (millions of euros)	101	1,281.26	4,996.21	0.00	18.87	118.78	511.09	47,064.14	492.22
LEV	102	0.53	0.22	0.08	0.40	0.55	0.67	1.20	0.27
LEVLONG	102	0.20	0.18	0.00	0.0208	0.16	0.33	0.82	0.31

Notes: this table presents summary statistics of the variables used in this study. Obs. is the number of observations. 1st quartile, median and 3th quartile are the 25th, 50th and 75th percentile of the variables. IQR is the Inter Quartile Range for each variable. Variable definitions are described in Table 7.

Table 11. Sample companies by industry and identity of largest shareholder

Industry	Family Ownership	Managerial Ownership	Corporate Ownership	Institutional Ownership	Government Ownership	Number of cases
Mining and quarrying	1	0	1	0	0	2
Manufacturing	23	11	3	2	3	42
Electricity, gas, steam and air conditioning supply	1	0	1	0	1	3
Construction	2	2	1	0	0	5
Wholesale and retail trade; repair of motor vehicles and motorcycles	0	3	2	0	0	5
Transportation and storage	1	0	2	0	1	4
Information and communication	4	4	3	0	1	12
Real estate activities	5	3	1	5	1	15
Professional, scientific and technical activities	1	1	2	1	0	5
Education	1	0	0	0	0	1
Human health and social work activities	0	0	0	0	1	1
Other service activities	2	0	1	4	0	7
Frequency	41 (40.20%)	24 (23.53%)	17 (16.67%)	12 (11.76%)	8 (7.84%)	102

Notes: this table presents the sample companies by industry and identity of the largest shareholder. The largest shareholder is based on the one largest shareholder. The distribution consists of twelve different industries and five different ownership identities.

6.2 Bivariate analysis

Table 12 presents the Pearson correlations for the variables in this study. Regarding the market-based (Tobin's Q and MTB) and accounting based (ROA and ROE) performance measures, they are all correlated with each other. Surprisingly, the sign of the correlation between the market-based performance measures and the other accounting-based measures is negative. This is due to the fact that this is the case in 2017, because the correlation between the mean values of 2014, 2015, 2016 and 2017 of Tobin's Q and ROA is positive and significant at the 1% level (β=0.493***). In addition, this negative correlation only seems to be true for smaller firms. The correlation is positive for large firms. Despite these facts, this study does research in Belgium with data of 2017 and therefore research for other years has to be left for future research. In addition, the empirical findings are mixed about the relationship between accounting-based and market-based measures of financial performance; some studies show positive, others report negative or no relationship at all (Gentry & Shen, 2010). To check the robustness, a robustness test with stock return (RET) is performed in the next chapter. TOBIN'S Q and MTB are highly correlated, and ROA and ROE are highly correlated, therefore only the results of one of each is presented.

Another observable fact is that CONOWN is negatively correlated with nearly all performance measures, which is predicted by hypothesis 1. In addition, when looking at the correlations between FO and the performance measures, it can be observed that FO is positively correlated with the ROA and ROE (r=0.21 and r=0.20). Moreover, CONOWN is positively correlated with MO (r=0.30), which could imply that when managers have shares, it is in firms with high concentrated ownership or that managers have a lot of shares and are the dominant owner. This same correlation consists between FO and CO with CONOWN (r=0.35 and r=0.20). In contrast, IO has a negative correlation with CONOWN (r=-0.27), which could be caused by the fact that institutions in Belgium avoid companies with high ownership concentration and therefore invest only small proportions (less than 5%) in listed firms. GO shows no significant correlation with any of the variables, which could be the result of that the government in Belgium nowadays only invests in a few firms via their investment funds due to the fact of the privatization process. Furthermore, the correlations between all ownership identities are negative, not all significant, which implies that these ownership identities are substitutes. This could also be caused by the fact that in Belgium, as in other Continental European countries, the ownership concentration is high. So, when one identity has the shares, other identities will have fewer shares.

FirmSize (both total assets as total sales) is not significantly correlated with any other variable. This is due to the fact that it is skewed, which will be solved by using the natural logarithm of FirmSize. When that variable is transformed, Ln_FirmSize is positively correlated with ROA (r=0.35), ROE (r=0.40), IO (r=0.34) and LEV (r=0.35), and negatively correlated with CONOWN (r=-0.33) and MO (r=-0.42). In addition, both firm size measures are highly correlated with each other (r=0.96). Moreover, LEV is negatively related with TOBIN'S Q (r=-0.27; $p < 0.01$), which implies that firms with lower leverage have a higher market-based firm performance. LEV is positively correlated with CO (r=0.21), which could imply that the corporate shareholders do not lend money to these firms and therefore these

firms need to lend from banks. LEVLONG is negatively correlated with TOBIN'S Q (r=-0.24), but also with CONOWN and FO (r=-0.21 and r=-0.23). This could imply that family shareholders do not have long-term debt and instead utilize their own money instead of borrowing. LEVLONG is positively correlated with IO (r=0.22) and LEV (r=0.37).

Table 12. Correlation matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. TOBIN'S Q	1													
2. MTB	**0.73**	1												
3. ROA	**-0.27**	**-0.23**	1											
4. ROE	**-0.33**	**-0.36**	**0.91**	1										
5. CONOWN	-0.14	-0.09	0.06	-0.01	1									
6. MO	0.06	0.04	-0.09	-0.17	**0.30**	1								
7. FO	0.02	-0.01	**0.21**	**0.20**	**0.35**	**-0.40**	1							
8. CO	-0.12	-0.14	-0.11	-0.13	**0.20**	**-0.21**	**-0.20**	1						
9. IO	-0.05	-0.08	0.07	0.14	**-0.27**	**-0.23**	**-0.22**	-0.13	1					
10. GO	-0.03	0.19	-0.03	-0.04	0.08	-0.15	-0.18	-0.12	-0.13	1				
11. FirmSize	-0.05	-0.02	0.05	0.07	0.01	-0.08	0.03	0.13	-0.04	-0.01	1			
12. FirmSizeTS	-0.05	0.00	0.08	0.11	-0.05	-0.12	0.02	0.12	-0.01	0.01	**0.96**	1		
13. LEV	**-0.27**	0.19	-0.05	-0.11	0.07	-0.12	-0.08	**0.21**	0.02	**0.22**	0.09	0.14	1	
14. LEVLONG	**-0.24**	-0.19	0.07	0.07	**-0.21**	-0.13	**-0.23**	0.09	**0.22**	0.01	0.15	0.12	**0.37**	1

Notes: this table presents Pearson's correlation between variables used in this study. This cross-sectional study has a sample which consists of 102 Belgian firms in 2017. All values in bold print are significant ($p < 0.05$). Variable definitions are described in table 7.

6.3 Multivariate regression analysis

6.3.1 Assumptions for OLS Regression

Before the regression analysis can be performed, the following assumptions are checked: normality, linearity, homoscedasticity and absence of multicollinearity. Tables and figures of these analyses are reported in appendix C.

6.3.1.1 Normality

In order to make valid inferences from the regression, the residuals of the regression should follow a normal distribution. By examining a normal Predicted Probability (P-P) plot it can be determined if the residuals are normally distributed. If they are, they will conform to the diagonal normality line indicated in the plot. After controlling for outliers, the data is somewhat more following the line, which implies somewhat more normal distributed (not reported). However, when performing the Shapiro-Wilk test, both before and after controlling for outliers, it can be concluded that the data is not normally distributed (see appendix C table 1). Outliers are controlled for using censored regression specifications wherein the left and right censoring values are the relevant caps of the performance variables at the 5 percent and the 95 percent level. Using winsorizing at the 5th and 95th percentiles resulted in that the observations

are not lost. Since the Shapiro-Wilk test is designed for sample sizes between 3 and 50, and this study has a greater sample, the analyses are continued.

Furthermore, there is a non-linear pattern found for firm size, so the logarithm of firm size (Ln_FirmSize and Ln_FirmSizeTS) is used in the regression analyses (see appendix C figure 1). In addition, in further analysis (regression) the lagged values of both firm size and leverage will be used against endogeneity.

6.3.1.2 Homoscedasticity

Homoscedasticity refers to whether these residuals are equally distributed, or whether they tend to bunch together at some values, and at other values, spread far apart. The data is homoscedastic if it is randomly distributed data. The opposite is heteroscedasticity, where it is more a cone or fan shape. This assumption can be checked by plotting the predicted values and residuals on a scatterplot. Linearity means that the predictor variables in the regression have a straight-line relationship with the outcome variable. If the residuals are normally distributed and homoscedastic, then the linearity is no problem. Looking at the scatterplot, it can be seen that the data is more homoscedastic after controlling for outliers (see appendix C figure 2).

6.3.1.3 Multicollinearity

Multicollinearity refers to when the predictor variables are highly correlated with each other. This is an issue, as the regression model will not be able to accurately associate variance in the outcome variable with the correct predictor variable, leading to muddled results and incorrect inferences. This is only relevant for multiple linear regression, which has multiple predictor variables and is the case in this study. This assumption can be checked in two ways: correlation coefficients and variance inflation factor (VIF) values. The first way examining the correlation matrix is looking for coefficients with magnitudes of 0.80 or higher, which was seen for the two firm size measures (r=0.96). The second way is the VIF values, which of the values should be below 10.00 and better is even below 5.00. When looking at table 2 in appendix C, it can be seen that there exists some multicollinearity. Obviously, there exists some multicollinearity between the variables that try to proxy the same concept; the different measures for concentration ownership and the two proxies for firm size. Less obvious are the high VIF scores between concentration ownership and percentage of ownership of different ownership identities. Therefore, this study will not perform analyses with both ownership concentration and ownership identities together. In addition, both leverage variables will not be together in one analysis, because they proxy the same concept. When separating the concentration ownership and the ownership identities, and also use one proxy for each concept, the VIP scores are good (see table 2 in appendix C).

6.3.2 Regression analysis

The results of the regression analyses are shown in the next tables. As stated, only the firm performance measures TOBIN'S Q and ROA are presented because of the high correlation between TOBIN'S Q and MTB, and ROA and ROE (see table 12). The tables present standardized coefficients to describe the relative importance of the explanatory variables. The standardized coefficient adjusts the estimated parameter that represents the inclination by the ratio between the standard deviation of the explanatory variable and of the dependent variable. The interpretation of these standardized coefficients is the expected standard deviation change in the dependent variable given a one-standard deviation change in the independent variable. This is a commonly used practice by other articles, for example, Alabdullah (2018), Elyasiani and Jia (2010), Ferreira and Matos (2008), Orden and Garmendia (2008) and Ting and Lean (2015). Industry dummies are included to take into account any industry-specific factors that could affect firm performance. Table 13 shows the OLS regression models for hypothesis 1, while table 14, 15 and 16 present the OLS regressions for hypothesis 2a, 2b, 3a, 3b, and 3c.

The control variables firm size (Ln_FirmSize) and leverage (LEV) have most of the time a significant impact on firm performance. Firm size has a positive impact on accounting-based performance, while leverage has a negative impact on market-based performance. However, when excluding one of the control variables, the other becomes more significant, which suggests that these variables are sort of interchangeable. This suggests that larger firms perform better, and more leveraged firms perform worse than lowly leveraged firms.

6.3.2.1 Effect of ownership concentration on firm performance

The first hypothesis states that ownership concentration has a negative impact on firm performance. Table 13 presents the results of the OLS regression models with different measures of ownership concentration and firm performance (see definitions below table 13). In the first four models the regressions of TOBIN'S Q on ownership concentration can be observed. The first model shows the regression results with only the control variables. In model 2 and 3 it can be observed that the coefficients of concentration ownership (CONOWN and CONOWN1) are both negative at the 5% level when TOBIN'S Q is the dependent variable (β=-0.197**, t=-2.017 and β=-0.205**, t= -2.013). In model 4 of TOBIN'S Q it can be observed that dispersed ownership (DISOWN), which is the number of shareholders, is positively and significantly related at the 1% level (β=0.424***, t=3.442). Therefore, table 13 shows that concentration ownership is negatively related to market-based/hybrid performance measures, which is in line with hypothesis 1.

The next four models of table 13 present the results of the OLS regression models of ROA regressed on concentration ownership measures. It can be observed that when ROA is the dependent variable CONOWN is positive and significant at the 10% level (β=0.208*, t=1.978), CONOWN1 is positive and significant at the 5% level (β=0.238**, t=2.298), and DISOWN is negative and significant at the 5% level (β=-0.272**, t=-2.088). Hence, table 13 shows that ownership concentration is positively related to accounting-based performance, which contradicts hypothesis 1.

The hierarchical OLS regression shows that in all models the adjusted-R^2 increased compared to model 1, which is the base model. The findings suggest that concentration ownership affect firm performance. However, market-based/hybrid measures are affected negatively, while accounting-based measures are affected positively. These findings are in line with Karaca and Eksi (2011), who find a positive relationship between ownership concentration and profit before tax, however, there was no positive effect on Tobin's Q. The negative effect on market-based measures is in line with the argument that higher concentration could lead to potential expropriation of wealth from small shareholders in order to achieve the interest of the blockholders. This negative effect is in line with Ongore (2011), who also find a negative relationship with firm performance, while the positive effect is in line with the idea of Hoang et al. (2017), who suggest that high ownership concentration enhances both external pressure and internal motivation, which could positively affect firm performance. In addition, this positive relation supports the arguments of the agency theory that managers make strategic decisions which are in the best interest of the firm.

Furthermore, in table 13 it seems like that the control variables leverage and firm size interchange each other. However, when removing leverage from the analyses in the first four models (Tobin's Q), firm size becomes negatively significant and the ownership concentration variables become even more significant. When removing firm size (Ln_FirmSize) from the analyses in the second four models (ROA), LEV stays insignificant and the ownership concentration measures become insignificant. Therefore, only the negative effect holds in this table. Belgian is a continental European country and their law is known as the French-civil-law with low legal protection for minority shareholders, which both can be characterized by having highly concentrated ownership (Drees et al., 2013; Frijns et al., 2008; La Porta et al., 1998). This implies that Belgian firms already have high concentrated ownership. While it is efficient to have some ownership concentration, the findings in this table indicate that giving more control to already powerful controlling shareholders (e.g. when they have the majority ownership and control) may further enhance their ability to expropriate and cause firm performance to deteriorate (Ng et al., 2015). In addition, highly concentrated firms probably face difficulty raising equity finance, since minority investors fear expropriation by managers and concentrated owners and the core investors are not diversified (La Porta et al., 1998). Furthermore, in non-reported tests is checked for a curvilinear relationship between concentration ownership and firm performance, but no support was found. Therefore, hypothesis 1 is partially supported because ownership concentration is negatively related to market-based/hybrid performance measures. Robustness test will show if this relationship also holds.

Table 13. The relationship between ownership concentration and firm performance

Explanatory Variables	TOBIN'S Q				ROA			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Intercept	2.064***	2.698***	2.729***	3.253***	-16.811***	-24.633***	-26.016***	-23.544***
	(3.866)	(4.411)	(4.461)	(5.330)	(-3.132)	(-3.730)	(-3.939)	(-3.808)
CONOWN		-0.197**				0.208*		
		(-2.017)				(1.978)		
CONOWN1			-0.205**				0.238**	
			(-2.103)				(2.298)	
DISOWN				0.424***				-0.272**
				(3.442)				(-2.088)
Ln_FirmSize	0.037	-0.019	-0.009	-0.286**	0.347***	0.431***	0.432***	0.545***
	0.369	(-0.187)	(-0.086)	(-2.135)	(3.380)	(3.929)	(4.036)	(3.935)
LEV	-0.415***	-0.380***	-0.375***	-0.337***	-0.002	-0.051	-0.061	-0.044
	(-4.073)	-(3.731)	(-3.685)	(-3.414)	(-0.019)	(-0.485)	(-0.588)	(-0.425)
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.227	0.254	0.257	0.314	0.083	0.110	0.122	0.114
N	92	92	92	92	102	102	102	102
F-statistic	6.355***	6.163***	6.244***	7.939***	2.834**	3.085***	3.347***	3.171***

*Notes: this table presents the results of OLS regressions of firm performance on ownership concentration and firm-specific control variables. Annual data for the year 2017 are analyzed. All variables are defined in table 7 except for CONOWN1 and DISOWN. CONOWN1 is the cumulative percentage of common shares of the five largest shareholders, whereas DISOWN is the number of shareholders (the higher the number, the more dispersed ownership). LEV is the lagged value of leverage and Ln_FirmSize is the natural logarithm of the lagged value of the total assets. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*

6.3.2.2 Effect of ownership identity on firm performance

The effect of ownership identity on firm performance is tested by various analyses. Each analysis in the different tables will be conducted to present one result for each hypothesis. The first analysis can be seen in table 14. In this table, the firm performance measures are regressed on all ownership identities used in this study. In model 1-5 the ownership identities are taken separately, whereas model 6 shows all ownership identities together in one analysis. The second analysis is presented in table 15, which shows the relationship between ownership identity and firm performance using for each model only the firms where that specific identity is present. The last analysis is conducted in table 16, which presents the non-linear relationships between ownership identities and firm performance. As these non-linear relationships may be driven by firms that have not that specific ownership identity at all, also an analysis excluding these firms without that specific identity is performed but these are not reported for the sake of brevity.

Surprisingly, the effect of many ownership identities on accounting-based performance measures are in the opposite direction of the market-based performance measures. As stated in section 6.2, this is due to the fact that in 2017 in Belgium these different performance measures are negatively

related to each other. The correlation between the mean values of 2014, 2015, 2016 and 2017 of Tobin's Q and ROA is positive and significant at the 1% level (β=0.493***). Despite this fact, this study does research in Belgium with data of 2017 and therefore research for other years has to be left for future research.

6.3.2.2.1 Effect of managerial ownership on firm performance

Hypothesis 2a predicts that managerial ownership (MO) is negatively related to firm performance. MO can be observed in model 1 of table 14, which shows no significant result. Model 6 shows only a significant relationship with one performance measure; the relationship between MO and ROA in model 6 is significantly at the 5% level (β=0.296**, t=2.041). However, the sign is in the opposite way as predicted. Model 1 of table 15 shows that MO has a negative and marginally significant impact at the 10% level on TOBIN'S Q (β=-0.276*, t=-1.777), while MO has a positive and marginally significant impact at the 10% level on ROA (β=0.336*, t=1.860). Moreover, table 16 Panel A finds no significant relationship for MO. Panel B of this table presents the relationship between the ownership identities and ROA. As can be seen in model 1b, MO is negatively related to ROA, while MO^2 is positively related, both significant at the 5% level (β=-0.732** and β=0.818**). This suggests a U-shaped relationship between MO and ROA, which implies that with low managerial ownership, ROA decreases, but with high managerial ownership, ROA increases. which implies that in Belgium, small stakes of managerial ownership is negatively related whereas larger stakes owned by managers is positively related. This is in line with Khan, Mather and Balachandran (2014) who examined the relationship between managerial ownership and Australian firm performance of the 300 largest Australian firms between 2000 and 2006 and find a non-monotonic curvilinear relationship and that a negative ownership-performance relationship dominates at lower levels of managerial ownership. They find that at these levels, the entrenchment effects are likely to dominate alignment effects and that at 20% - 30% of managerial ownership level, the relation is consistent with the alignment effects. It is also in line with Florackis, Kostakis and Ozkan (2009), who find a negative relationship only for low levels of managerial ownership (with more turning points). However, when the zeros are excluded from the analysis, the significant relationship disappears and when consulting the scatterplot, it can be observed that there is no curvilinear (U-shaped) form. Therefore, this study does not find a consistently significantly negative impact of managerial ownership on firm performance and hence hypothesis 2a is rejected.

6.3.2.2.2 Effect of family ownership on firm performance

Hypothesis 2b predicts that family ownership (FO) has an inverted U-shaped relationship with firm performance. This means that FO influences firm performance up to a certain point when it decreases. In table 14 it can be observed that FO has a positive and significant impact at the 1% level when ROA is the dependent variable in both model 2 and 6 (β= 0.277***, t=2.894 and β= 0.423***, t=2.945). Accordingly, table 15 model 2 shows a positive and significant relationship at the 1% level on ROA (β= 0.473***, t=3.588), while there is no significant impact on Tobin's Q. Table 16 Panel A shows no

significant relationship for FO. Panel B model 2a shows that family ownership is positively related with ROA and significant at the 1% level (β=0.277***), this is in line with the other tables. FO^2 is not significant. However, when the zeros are excluded the regression shows a significant inverted U-shaped relationship with ROA (β=1.429*** and β=-1.002*) (not reported), which is in line with the hypothesis. When consulting the scatterplot between family ownership and ROA the form tends towards an inverted U-shaped (see Appendix D). So, family ownership in relationship with the accounting-based measures in table 14, 15 and 16 are all significantly at the 1% level. In contrast, for the market-based performance measures, not one coefficient is significant. The results of the accounting-based measures are in line with Anderson and Reeb (2003) in the US, Andres (2008) in Germany and Ng et al. (2015) in Malaysia. These results support the arguments that family shareholders have exceptional concerns over firm survival, strategic interest rather than financial interest, and strong incentives to monitor the management closely since families usually have invested most of their private wealth in the company. Also, the argument that family owners have the long-term presence in the firm is in line with the result between FO and ROA, which provides knowledge and is favorable for developing long-term relationships with loyalty and trust and builds a reputation with the employees, customers, external suppliers of capital and other stakeholders, which in turn may create a working environment with lower costs, particularly lower costs of debt financing. However, this study only finds a consistently significantly positive impact of family ownership on accounting-based performance measures and not for market-based/hybrid performance measures. According to Al-Matari, Al-Swidi and Fadzil (2014), accounting-based performance measures present the management actions outcome and are hence preferred over market-based measures when the relationship between corporate governance and firm performance is investigated. The positive impact does not decrease at a certain point (only tends towards) and therefore hypothesis 2b is not fully supported.

6.3.2.2.3 Effect of corporate ownership on firm performance

Hypothesis 3a predicts that corporate ownership (CO) positively influences firm performance. Table 14 model 3 shows a negative and marginally significant impact at the 10% level of CO on ROA and therefore no evidence for hypothesis 3a is found in table 14. Furthermore, table 15 model 3 shows that CO has no significant impact on firm performance. Table 15 Panel A model 3b suggests that CO has an inverted U-shape relationship with Tobin's Q: CO is positive and significant at the 10% level (β=0.492*), while CO^2 is negative and significant at the 10% level (β=-0.527*). However, when the zeros are excluded, this significant relationship disappears. In addition, when plotting the scatterplot, no curvilinear form can be seen. Therefore, this study does not find a consistently significantly positive impact of corporate ownership on firm performance and hence hypothesis 3a is rejected.

6.3.2.2.4 Effect of institutional ownership on firm performance

Hypothesis 3b predicts that institutional ownership (IO) has no significant impact on firm performance. Table 14 and 15 show results that support this hypothesis; no significant results were found for IO. This

is in line with Katan and Mat Nor (2015) who also found no significant relationship when all institutional investors are taken together. Moreover, table 16 Panel A model 4b suggests an inverted U-shaped relationship between IO and Tobin's Q: IO is positive and significant at the 5% level (β=0.612**), while IO^2 is negative and significant at the 5% level (β=-0.604**). However, when using MTB as the dependent variable (not reported) the relationship becomes less significant. When excluding the zeros this significant relationship disappears and the scatterplot of IO and Tobin's Q does not show an inverted U-shape form. That this study did not find many significant relationships for institutional ownership could be the result of that in Belgium the institutional investors do not have large stakes on individual basis. Another possible reason is that this study does not make a distinction between different categories of institutions. A third reason could be that institutional investors do not invest in companies that have a high ownership concentration. All in all, this study finds a consistently insignificant impact of institutional ownership on firm performance and therefore hypothesis 3b is supported.

6.3.2.2.5 Effect of government ownership on firm performance

Hypothesis 3c states that government ownership (GO) has a negative impact on firm performance. In table 14 and table 15 no significant relationship is found between GO and firm performance. Table 16 model 5b suggests a curvilinear relationship between GO and firm performance. GO is positive and significant at the 1% level (β=0.872***), while GO^2 is negative and significant at the 1% level (β=-0.881**) when Tobin's Q is the dependent variable. This relationship and significance stay when all variables are included in one analysis (β=1.897*** and β=-1.713***) or when MTB is the dependent variable (β=1.796*** and β=-1.696***). This is in line with Sun, Tong and Tong (2002) who found a non-linear relationship for government ownership in China. When ROA is the dependent variable, GO is negatively related (β=-0.762**), while GO^2 is positively related (β =0.709**), both at the 5% level. When ROE is regressed on GO and GO^2, the study finds an even more significant relationship (β=-1.232*** and β=1.166***) (not reported). This is also the case when all ownership identity variables are included in one analysis (β=-1.135*** and β=1.062***). This U-shaped relationship is in line with Tian and Estrin (2008) who find examined a dataset containing 9594 firm-year observations of the period 1994-2004 and found this non-monotonic relationship between government ownership and firm value in China. However, when excluding all zero's all significant relationships of GO disappear for all firm performance measures and when consulting the scatterplots, no curvilinear form can be discovered. The insignificant result could be a result of the privatization process in continental Europe, which means a decreasing government shareholding because governments only holds a limited number of large blocks in some large companies (Van der Elst 2008). In conclusion, this study does not find a consistently significantly negative impact of government ownership on firm performance and therefore hypothesis 3c is rejected.

Table 14. The relationship between ownership identity and firm performance

Explanatory Variables	TOBIN'S Q						ROA					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	2.154***	2.276***	2.056***	2.105***	2.079***	2.766***	-18.623***	-21.360***	17.864***	-17.452***	-17.329***	-31.779***
	(3.814)	(3.962)	(3.804)	(3.839)	(3.860)	(4.065)	(-3.024)***	(-3.940)***	(-3.346)***	(-3.165)***	(-3.024)***	(-4.497)
MO	-0.050					-0.198	0.064					0.296**
	(-0.509)					(-1.411)	(0.606)					(2.041)
FO		-0.098				-0.246		0.277***				0.423***
		(-1.002)				(-1.625)		(2.894)				(2.945)
CO			-0.012			-0.116			-0.180*			-0.037
			(-0.126)			(-0.909)			(-1.796)			(-0.298)
IO				0.037		-0.072				-0.057		0.041
				(0.365)		(-0.567)				(-0.546)		(0.344)
GO					0.032	-0.071					-0.084	0.016
					(0.332)	(-0.585)					(-0.860)	(0.145)
Ln_FirmSize	0.028	0.016	0.038	0.025	0.035	-0.013	0.374***	0.378***	0.362***	0.367***	0.357***	0.509***
	(0.274)	(0.151)	(0.376)	(0.236)	(0.342)	(-0116)	(3.324)	(3.799)	(3.561)	(3.352)	(3.453)	(4.400)
LEV	-0.422***	-0.413***	-0.412***	-0.413***	-0.420***	-0.404***	-0.003	0.04	0.039	-0.005	0.008	0.013
	(-4.087)	(-4.050)	(-3.923)	(-4.026)	(-4.058)	(-3.715)	(-0.025)	(0.042)	(0.376)	(-0.051)	(0.076)	(0.128)
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R2	0.221	0.227	0.218	0.219	0.219	0.210	0.077	0.140	0.104	0.076	0.081	0.173
N	92	92	92	92	92	92	102	102	102	102	102	102
F-statistic	5.294***	5.463***	5.238***	5.265***	5.260***	3.419***	2.407**	3.358***	2.954**	2.394**	2.479**	3.106***

*Notes: this table presents the results of OLS regressions of firm performance on the different ownership identities and firm-specific control variables. Ownership identities are measured by MO, FO, CO, IO and GO. Annual data for the year 2017 are analyzed. All variables are defined in table 7. LEV is the lagged value of leverage and Ln_FirmSize is the natural logarithm of the lagged value of the total assets. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*

Table 15. The relationship between ownership identity and firm performance using specific firms

	TOBIN'S Q					ROA				
Explanatory Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	1.821	2.742***	3.254***	4.109***	5.058***	-57.415***	-26.139***	-19.337**	-19.140**	-37.919**
	(1.065)	(3.407)	(4.451)	(5.683)	(4.452)	(-3.386)	(-3.064)	(-2.536)	(-2.341)	(-2.700)
MO	-0.276*					0.336*				
	(-1.777)					(1.860)				
FO		-0.133					0.473***			
		(-1.003)					(3.588)			
CO			-0.093					-0.137		
			(-0.792)					(-1.055)		
IO				-0.124					0.022	
				(-1.199)					(0.175)	
GO					-0.130					0.034
					(-0.907)					(0.200)
Ln_FirmSize	0.188	-0.034	-0.124	-0.167	-0.265	0.693***	0.346**	0.362***	0.286**	0.457**
	(0.622)	(-0.247)	(-1.032)	(-1.577)	(-1.655)	(3117)	(2.526)	(2.805)	(2.252)	(2.403)
LEV	-0.263	-0.439***	-0.363***	-0.460***	-0.488**	-0.100	0.035	-0.004	0.077	0.003
	(-1.300)	(-3.289)	(-2.766)	(-4.224)	(-2.648)	(-0.529)	(0.266)	(-0.029)	(0.597)	(0.014)
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.387	0.172	0.256	0.367	0.353	0.150	0.179	0.080	0.022	0.087
N	29	56	65	64	38	37	57	69	68	38
F-statistic	3.949***	2.901**	4.677***	7.086***	4.358***	2.061*	3.029**	1.981*	1.254	1.586

*Notes: this table presents the results of OLS regressions of firm performance on ownership identities and firm-specific control variables. The sample of each model consists of only the firms that have that specific ownership identity (zeros are excluded). Ownership identities are measured by MO, FO, CO, IO and GO. Annual data for the year 2017 are analyzed. All variables are defined in table 7. LEV is the lagged value of leverage and Ln_FirmSize is the natural logarithm of the lagged value of the total assets. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*

Table 16. Non-linear relationship between ownership identity and firm performance
Panel A: Firm performance measured by TOBIN'S Q

Explanatory Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b	Model 5a	Model 5b
Intercept	2.154***	2.043***	2.276***	2.295***	2.056***	2.201***	2.105***	2.311***	2.079***	2.035***
	(3.814)	(3.611)	(3.962)	(3.960)	(3.804)	(4.093)	(3.839)	(4.302)	(3.860)	(3.944)
MO	-0.050	0.428								
MO^2		-0.489								
FO			-0.098	0.009						
FO^2				-0.115						
CO					-0.012	0.492*				
CO^2						-0.527*				
IO							0.037	0.612**		
IO^2								-0.604**		
GO									0.032	0.872***
GO^2										-0.881***
Ln_FirmSize	0.028	0.042	0.016	0.011	0.038	-0.007	0.025	-0.028	0.035	0.021
LEV	-0.422***	-0.420***	-0.413***	-0.420***	-0.412***	-0.409***	-0.413***	-0.442***	-0.420***	-0.410***
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.221	0.231	0.227	0.219	0.218	0.242	0.219	0.268	0.219	0.284
N	92	92	92	92	92	92	92	92	92	92
F-statistic	5.294***	4.913***	5.463***	4.656***	5.238***	5.149***	5.265***	5.759***	5.260***	6.165***

Panel B: Firm performance measured by ROA

Explanatory Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b	Model 5a	Model 5b
Intercept	-18.623***	-17.126***	-21.360***	-21.572***	-17.864***	-18.515***	-17.452***	-18.532***	-17.329***	-17.157***
	(-3.024)	(-2.820)	(-3.940)	(-3.952)	(-3.346)	(-3.415)	(-3.165)	(-3.357)	(-3.024)	(-3.240)
MO	0.064	-0.732**								
MO^2		0.818**								
FO			0.277***	0.187						
FO^2				0.096						
CO					-0.180*	-0.397				
CO^2						0.226				
IO							-0.057	-0.417		
IO^2								0.376		
GO									-0.084	-0.762**
GO^2										0.709**
Ln_FirmSize	0.374***	0.375***	0.378***	0.383***	0.362*	0.384***	0.367***	0.399***	0.357***	
LEV	-0.003	-0.039	0.04	0.008	0.039	0.036	-0.005	0.015	0.008	
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.077	0.114	0.140	0.149	0.104	0.100	0.076	0.089	0.081	0.119
N	102	102	102	102	102	102	102	102	102	102
F-statistic	2.407**	2.856**	3.358***	3.940***	2.954**	2.600**	2.394**	2.416**	2.479**	2.944***

*Notes: this table presents the results of OLS regressions of firm performance on ownership identities and firm-specific control variables. Ownership identities are measured by MO, FO, CO, IO and GO. In addition, non-linearity is tested by including the quadratic variables MO^2, FO^2, CO^2, IO^2 and GO^2. Annual data for the year 2017 are analyzed. All variables are defined in table 7. LEV is the lagged value of leverage and Ln_FirmSize is the natural logarithm of the lagged value of the total assets. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*

6.3.3 Robustness test

Previous tables already show some robustness. In addition, several robustness tests are performed to test the robustness of this study. First, a regression without the lagged variables of firm size and leverage are conducted. Second, a subsample analysis is performed with a subsample of small firms versus a subsample of large firms. Finally, several regressions with alternative measures are performed.

6.3.3.1 Without lagged variables

This study used lagged variables for firm size and leverage to deal with the endogeneity problem. As stated, this study followed the idea that ownership structure variables do not change much over time and hence the normal values were used. To check whether the lagged variables made a difference in the analyses, a model without lagged variables ($FirmSize_t$ and LEV_t) is conducted. The results of the regression without lagged variables are presented in table 17 and appendix E.

As can be observed in table 17, the outcomes are consistent with the results in table 13. Concentration ownership is still negatively related with market-based measure TOBIN'S Q and positively related with accounting-based measure ROA. CONOWN and CONOWN1 hold their negative and significant impact at the 5% level with TOBIN'S Q (β=-0.236**, t=-2.356 and β=-0.244**, t=-2.437), while these variables are positively and significantly related at the 5% and 1% level with ROA (β=0.235**, t=2.381 and β=0.265 t=2.735). DISOWN is positively related with TOBIN'S Q and negatively related with ROA, both at the 1% level (β= 0.475*** t=3.822 and β=-0.388*** t=-2.780). In line with table 13, removing leverage from the analyses in the first four models (Tobin's Q), firm size becomes negatively significant and the ownership concentration variables become even more significant. However, when removing firm size ($Ln\_FirmSize_t$) from the analyses in the second four models (ROA), both LEV_t and the ownership concentration measure become insignificant. Therefore, only the negative relationship holds.

Appendix E presents the non-linear relationship between ownership identity and firm performance without lagged variables. This table shows almost similar results as table 16. Both IO and GO show an inverted U-shaped relationship with TOBIN'S Q. MO and GO show a U-shaped relationship with ROA, while family ownership has a positive relationship with ROA which is significant at the 1% level (β =0.273***). However, when the zeros are excluded this these non-linear significant relationships disappear. For FO there appears a non-linear relationship (inverted U-shaped) with ROA. As stated, the scatterplots of the different ownership identities and different performance measures shows no curvilinear relationships.

Since the directions of the relationships in the normal regression (without lagged variables) are the same as those of with the lagged variables it can be concluded that using the values of firm size and leverage without lag has not much impact on the results. It seems that endogeneity does not seem to play a role in this research which implies that the causality goes from the independent variables to the firm performance measures. However, this study did not use lagged ownership variables and only investigated a one-year period.

Table 17. The relationship between ownership concentration and firm performance without lagged variables

Explanatory Variables	TOBIN'S Q				ROA			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Intercept	2.319***	3.031***	3.062***	3.530***	-16.779***	-25.123***	-26.496***	-24.423***
	(4.189)	(4.901)	(4.949)	(5.843)	(-3.258)	(-4.098)	(-4.328)	(-4.294)
CONOWN		-0.236**				0.235**		
		(-2.356)				(2.381)		
CONOWN1			-0.244**				0.265***	
			(-2.437)				(2.735)	
DISOWN				0.475***				-0.338***
				(3.822)				(-2.780)
$Ln\_FirmSize_t$	-0.070	-0.123	-0.110	-0.411***	0.428***	0.509***	0.507***	0.664***
	(-0.688)	(-1.203)	(-1.089)	(-3.156)	(4.459)	(5.103)	(5.210)	(5.282)
LEV_t	-0.256**	-0.234**	-0.228	-0.186*	-0.175*	-0.213**	-0.223**	-0.220**
	(-2.496)	(-2.326)	(-2.272)	(-3.156)	(-1.821)	(-2.238)	(-2.355)	(-2.330)
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.145	0.188	0.192	0.262	0.141	0.181	0.195	0.197
N	92	92	92	92	102	102	102	102
F-statistic	4.095***	4.518***	4.598***	6.387***	4.317***	4.717***	5.087***	5.137***

*Notes: this table presents the results of OLS regressions of firm performance on ownership concentration and firm-specific control variables without lagged values. Annual data for the year 2017 are analyzed. All variables are defined in table 7 except for CONOWN1 and DISOWN. CONOWN1 is the cumulative percentage of common shares of the five largest shareholders, whereas DISOWN is the number of shareholders (the higher the number, the more dispersed ownership). LEV_t is leverage and $Ln\_FirmSize_t$ is the natural logarithm of the total assets. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*

6.3.3.2 Subsample Analysis

The result chapter already showed some robustness test when only the firms where that specific type of ownership is present were used. In this section, it is tested if the results are reobust when the sample is divided into small and large firms. There is no reason to expect that small firms with highly concentrated ownership structure perform better or worse than large firms with highly diffused ownership structures (Tsai & Gu, 2007). In addition, Faccio and Lang (2002) show that family ownership is less likely for larger firms, being particularly weak among the largest firms in the UK and Sweden, and that in Austria, Finland, Italy, Norway, and Portugal, government ownership is important for larger firms. This is in line with Tran et al. (2014) who also found a difference in the relationship between government ownership and firm performance for small and large firms. Therefore, the sample is divided into two groups based on the median value of firm size. Small firms are the firms that have fewer total assets than the median value and large firms are the firms that have more total assets. The control variable firm size is excluded, because the subsamples are based on this variable. Table 18 and appendix F show the results of this subsample analysis.

The results of table 18 are in the same direction as the main results in table 13. However, table 18 shows some interesting results. As can be observed in Panel A, the ownership concentration variables are all significant at the 1% level in relation to TOBIN'S Q for small firms (β=-0.387***, t=-2.933, β=-0.393***, t=-2.929, and β=0.595***, t=5.247). These significant relationships disappear for the large firms. When looking at panel B, it can be seen that all significant relationships are disappeared except for DISOWN in model 4 for large firms. When dividing the sample based on firm size, it can be concluded that the signs on relationships do not change. The results show that concentration ownership is especially important for smaller firms. This could be due to the fact that these firms are more concentrated.

Appendix F shows the non-linear relationships between ownership identity and firm performance for subsamples small firms and large firms. The results in this table are also in line with the main results in table 16. However, it can be seen that some ownership identities are more significant for small firms than for large and vice versa. For instance, panel D shows that for large firms IO has a negative impact on ROA at the 1% level (β =-1.012***), while IO^2 is positive and significant at the 5% level (β=0.935**). This relationship is not significant for small firms. In addition, also GO shows the same direction as in the main result (inverted U-shaped relation with market-based performance and U-shaped for accounting-based measures). However, this is especially significant for the smaller firms (at the 1% level). As stated, these significant relationships disappear when excluding the zeros and consulting the scatterplot does not show any curvilinear forms. In addition, as Faccio and Lang (2002) predicted, FO is especially important in smaller firms; panel C model 2a shows that FO is positive and significant at the 1% level (β=0.376***), while this is not significant for the larger firms.

Table 18. The relationship between ownership concentration and firm performance for subsamples small firms and large firms

Panel A: Firm performance measured by TOBIN'S Q

	Small firms				Large firms			
Explanatory Variables	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Intercept	2.350***	3.068***	3.189***	1.260***	2.273***	2.198***	2.215***	2.045***
	(6.296)	(7.313)	(7.164)	(3.560)	(6.404)	(5.005)	(4.639)	(5.144)
CONOWN		-0.387***				0.042		
		(-2.933)				(0.297)		
CONOWN1			-0.393***				0.027	
			(-2.929)				(0.186)	
DISOWN				0.595***				0.163
				(5.247)				(1.241)
LEV	-0.367**	-0.272**	-0.262*	-0.286**	-0.489***	-0.486***	-0.487***	-0.476**
	(-2.601)	(-2.050)	(-1.955)	(-2.610)	(-3.492)	(-3.431)	(-3.441)	(-3.411)
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.196	0.330	0.330	0.527	0.208	0.191	0.190	0.217
N	43	43	43	43	49	49	49	49
F-statistic	3.567**	5.145***	5.138***	10.352***	4.148***	3.267**	3.253**	3.668***

Panel B: Firm performance measured by ROA

Explanatory Variables	Small Firms				Large Firms			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Intercept	-4.607	-8.159	-9.668	-2.611	8.809***	7.217**	6.567**	11.065***
	(-1.060)	(-1.483)	(1.663)	(-0.484)	(3.905)	(2.579)	(2.174)	(4.512)
CONOWN		0.167				0.148		
		(1.051)				(0.963)		
CONOWN1			0.209				0.175	
			(1.298)				(1.112)	
DISOWN				-0.100				-0.280**
				(-0.633)				(-2.021)
LEV	0.096	0.048	0.030	0.087	-0.143	-0.130	-0.128	-0.171
	(0.642)	(0.305)	(0.189)	(0.570)	(-0.941)	(-0.853)	(-0.844)	(-1.160)
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	-0.051	-0.048	-0.035	-0.065	0.022	0.021	0.027	0.084
N	51	51	51	51	51	51	51	51
F-statistic	0.397	0.539	0.660	0.394	1.285	1.212	1.280	1.913

*Notes: this table presents the results of OLS regressions of firm performance on ownership concentration and firm-specific control variables for subsamples small firms and large firms. Annual data for the year 2017 are analyzed. All variables are defined in table 7 except for CONOWN1 and DISOWN. CONOWN1 is the cumulative percentage of common shares of the five largest shareholders, whereas DISOWN is the number of shareholders (the higher the number, the more dispersed ownership). LEV is the lagged value of leverage and Ln_FirmSize is the natural logarithm of the lagged value of the total assets. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*

6.3.3.3 Alternative measures

This section presents the third robustness test of this study. As the result chapter already showed alternative measures for concentration ownership (CONOWN, CONOWN1, and DISOWN), this section shows the results of alternative measures for firm performance (stock return), ownership identity (IDENT, INSOWN, and OUTOWN), and for firm size and leverage. The alternative measure for firm performance is stock return (RET). As Tobin's Q and MTB could also be seen as hybrid performance measures, this robustness test analyzes the relationship for a pure market-based performance measure stock return. This is calculated as stock price difference plus dividend, divided by stock price begin of the year. The alternative measures for ownership identity are the dummy variable of ownership identity (IDENT), insider ownership (INSOWN) and outsider ownership (OUTOWN). IDENT is 1 for insider ownership and 0 otherwise. INSOWN is MO plus FO, and OUTOWN is CO, IO, and GO added together. This robustness test is included to distinguish between insider and outsider ownership in a different way, which is also done by other studies such as El-Masry (2010). The alternative measure for firm size is Ln_FirmSizeTS, which is the natural logarithm of the lagged value of total sales. LEVLONG is the alternative measure for leverage, which is total long-term debt divided by total assets.

Stock return (RET) is a market-based performance measure. As stated, this is calculated as stock price difference plus dividend, divided by stock price begin of the year. RET has a mean value of 4.17%

and is positively correlated with ROA (0.172) and Tobin's Q (0.134). In table 19 it can be seen that ownership concentration has no significant relationship with RET. This implies that the negative relationship between ownership concentration and the market-based/hybrid performance measure are not robust when conducting an analysis with a pure market-based performance measure. Therefore, hypothesis 1 does not hold.

Appendix G presents the non-linear relationships between ownership identities and RET. The table shows only two significant results. FO is negatively related and significant at the 5% level (β=-0.682**), while FO^2 is positively related at the 1% level (0.889***). CO is negatively related and significant at the 1% level (β=-0.932***), while CO^2 is positively related at the 1% level (β=0.906***). Both significant relationships hold when the zeros are excluded from the analysis. Plotting the scatterplots shows that the relationship between corporate ownership and stock return has indeed a form that hinds towards a curvilinear relationship (U-shaped), see appendix D. However, more research should be done to confirm this, because previous tables did not find this. The linear relationship between FO and RET is positive, but insignificant.

Table 19. Ownership concentration and stock return

Explanatory Variables	Model 1	Model 2	Model 3	Model 4
Intercept	-18.485	-29.147*	-29.031*	-21.298
	(-1.245)	(-1.689)	(-1.678)	(-1.177)
CONOWN1		0.134		
		(1.201)		
CONOWN2			0.132	
			(1.179)	
DISOWN				-0.041
				(-0.275)
Ln_FirmSize	0.241**	0.279**	0.270**	0.272*
	(2.104)	(2.357)	(2.314)	(1.685)
LEV	-0.173	-0.197*	-0.199*	-0.181
	(-1.505)	(-1.694)	(-1.702)	(-1.520)
Industry Dummy	Included	Included	Included	Included
Adjusted R2	0.017	0.022	0.021	0.006
N	92	92	92	92
F-statistic	1.307	1.335	1.326	1.090

Notes: this table presents the results of OLS regressions of stock return (RET) on ownership concentration and firm-specific control variables. Annual data for the year 2017 are analyzed. All variables are defined in table 7 except for RET, which is calculated as stock price difference plus dividend, divided by stock price begin of the year. *LEV is the lagged value of leverage and Ln_FirmSize is the natural logarithm of the lagged value of the total assets. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*

Table 20 presents two models for each firm performance measure. Model 1 shows the relationship between the dummy variable of ownership identity (IDENT) and the performance measures, whereas model 2 shows the relationship between insider ownership (INSOWN) and outsider

ownership (OUTOWN) and the performance measures (see descriptions below table 20). In model 1 it can be observed that the coefficient of IDENT is positive and significant at the 1% level when ROA is the dependent variable (β=0.308***, t=3.000). When looking at model 2, it can be observed that the coefficient of INSOWN is positive and significant at the 1% level when ROA is the dependent variable (β=0.404***, t=2.804). Surprisingly, the table shows a negative influence of INSOWN on TOBIN'S Q at the 10% level (β=-0.254*, t=-1.731), so only marginally significant. OUTOWN does not show any significant results, which is in line with main results in table 14.

Table 20. The relationship between ownership identities and firm performance using IDENT, INSOWN and OUTOWN

	TOBIN'S Q		ROA	
Explanatory Variables	Model 1	Model 2	Model 1	Model 2
Intercept	2.246***	2.761***	-26.881***	-33.130***
	(3.729)	(4.155)	(-4.369)	(-4.816)
IDENT	-0.068		0.308***	
	(-0.510)		(3.000)	
INSOWN		-0.254*		0.404***
		(-1.731)		(2.804)
OUTOWN		-0.132		-0.002
		(-0.905)		(-0.015)
Ln_FirmSize	0.026	-0.009	0.431***	0.544***
	(0.256)	(-0.086)	(4.206)	(4.958)
LEV	-0.425***	-0.407***	0.026	0.003
	(-4.112)	(-3.884)	(0.265)	(0.032)
Industry Dummy	Included	Included	Included	Included
Adjusted R^2	0.222	0.238	0.154	0.188
N	92	92	102	102
F-statistic	5.334***	5.050***	4.058***	4.338***

*Notes: this table presents the results of OLS regressions of firm performance on ownership identities and firm-specific control variables. Annual data for the year 2017 are analyzed. All variables are defined in table 7 except for IDENT, INSOWN and OUTOWN. IDENT is a dummy variable which is 1 for insider ownership and 0 otherwise, INSOWN is MO + FO, and OUTOWN is CO + IO + GO. Ownership identities are measured by IDENT, INSOWN and OUTOWN. LEV is the lagged value of leverage and Ln_FirmSize is the natural logarithm of the lagged value of the total assets. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*

Table 21 and Appendix G show the regression result with the alternative measures. The first impression is that LEV (total liabilities divided by total assets) is a better predictor for firm performance than LEVLONG (long-term debt divided by total assets) as the significance is higher for the first-mentioned. As can be seen in table 21, the signs of the relationship are in line with the main result in table 13. The results of table 21 show that the measures of concentrated ownership only hold for the negative relationship with Tobin's Q. CONOWN and CONOWN1 have a negative and significant impact at the 5% level on TOBIN'S Q (β=-0.206**, t=-2.017) and β=-0.222**, t=-2.166). For DISOWN is this relationship positive and significant at the 1% level (β=0.428, t=3.737). When looking at the

relationship with ROA, it can be seen that only DISOWN is still significantly related at the 10% level (β=-0.206*, t=-1.741).

Appendix H presents the non-linear relationship between ownership identity and firm performance with alternative measures. The results in this table are in line with the main results in table 16. When TOBIN'S Q is the dependent variable, IO is positive and significant at the 5% level (β=0.679**), while IO^2 is negative and significant at the 5% level (β=-0.616**). GO and GO^2 are significant in all other regressions, while this table does not show significant results. However, when using ROE and MTB as the dependent variable (not reported), GO and GO^2 are both significant. Panel B shows that, again, MO is negatively related with ROA and significant at the 5% level (β=-0.945**). MO^2 shows a positive and significant impact on ROA at the 1% level (β=1.016***). However, when the zeros are excluded the significant relationships disappear and the scatterplots do not show any curvilinear forms. The most significant and robust result in this study is the relationship between family ownership and accounting-based performance measures. Panel B shows that FO has a positive and significant impact at the 1% level on ROA (β=0.209***).

Table 21. The relationship of ownership concentration on firm performance with alternative measures

	TOBIN'S Q				ROA			
Explanatory Variables	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Intercept	1.738***	2.201***	2.249***	2.428***	-12.094***	-13.824***	-14.731***	-14.957***
	(3.661)	(4.235)	(4.316)	(5.071)	(-2.894)	(-2.758)	(-2.911)	(-3.362)
CONOWN		-0.206**				0.064		
		(-2.017)				(0.630)		
CONOWN1			-0.222**				0.094	
			(-2,166)				(0.925)	
DISOWN				0.428***				-0.206*
				(3.737)				(-1.741)
Ln_FirmSizeTS	-0.069	-0.079	-0.062	-0.332***	0.389***	0.401***	0.401***	0.512***
	(-0.619)	(-0.725)	(-0.572)	(-2.658)	(3.704)	(3.744)	(3.790)	(4.073)
LEVLONG	-0.170	-0.194*	-0.194*	-0.174	-0.104	-0.100	-0.100	-0.094
	(-1.482)	(-1.713)	(-1.716)	(-1.633)	(-0.950)	(-0.913)	(-0.914)	(-0.870)
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.119	0.150	0.156	0.237	0.086	0.080	0.085	0.190
N	90	90	90	90	99	99	99	97
F-statistic	3.412***	3.625***	3.750***	5.609***	2.850**	2.426**	2.514**	4.757***

*Notes: this table presents the results of OLS regressions of firm performance on ownership concentration and firm-specific control variables. Annual data for the year 2017 are analyzed. All variables are defined in table 7 except for CONOWN1 and DISOWN. CONOWN1 is the cumulative percentage of common shares of the five largest shareholders, whereas DISOWN is the number of shareholders (the higher the number, the more dispersed ownership). LEVLONG is the lagged value of leverage based on long-term debt and Ln_FirmSizeTS is the natural logarithm of the lagged value of the total sales. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*

7 Conclusion

This chapter gives the conclusion of this study. First, the main findings based on the results of this study are summarized. After that, the limitations are discussed and the recommendations for future research are given.

7.1 Main findings

This study tests the impact of ownership structure on firm performance in a Belgian context. Both the effects of ownership concentration and ownership identity on firm performance are examined. To test the hypotheses, an ordinary least square (OLS) regression with industry control is conducted. Several tests are performed to test the robustness. The sample consists of 102 Belgian listed firms, most listed on the Euronext Brussels, for the year 2017.

In first instance and in line with the study of Karaca and Eksi (2011), a positive and significant relationship between ownership concentration is found in the main results of the accounting-based performance measures in this study. This suggests that managers make strategic decisions which are in the best interest of the firm and results in better accounting-based performance. However, this result is not robust. When the impact of ownership concentration is tested on the market-based performance measures, this study finds a negative and significant relationship, especially for small firms. When conducting the robustness test, only the tests on Tobin's Q and market-to-book ratio (MTB) remain constant. Suggesting that higher concentration ownership leads to potential tunneling of resources, which is expropriation of wealth from small shareholders in order to achieve the interest of the blockholders (Bhaumik & Gregoriou, 2010; Füerst & Kang, 2004). In this case, ownership concentration, while minimizing principal-agent conflict, creates a different type of agency problem known as principal-principal conflict. Principal-principal agency problem is a concern in institutional environments which lack minority shareholder protection and enforcement mechanisms, which is a characteristic of countries (as Belgian) with French-civil-law (Bhaumik & Gregoriou, 2010; Dharwadkar et al., 2000; La Porta et al., 1998). This implies that Belgian firms already have high concentrated ownership. While it is efficient to have some ownership concentration, the findings in the main results indicate that giving more control to already powerful controlling shareholders may further enhance their ability to expropriate and cause firm performance to deteriorate (Ng et al., 2015). However, the analysis of another market-based measure (stock return) shows that also this relationship is not robust. Therefore, this study did not find a consistent negative effect of concentration ownership on firm performance and hypothesis 1 is rejected.

Hypothesis 2a states that managerial ownership is negatively related to firm performance. In some regressions, the managerial ownership has a positive sign and in other a negative sign. However, these are not consistently significant. When the non-linearity of the relationship between managerial ownership and firm performance was examined, the results suggested a U-shaped relationship for ROA, which is in line with Khan, Mather and Balachandran (2014). This suggests that the impact of managerial ownership is negative up to a certain point when it turns positive. However, when the companies are excluded that have no managerial ownership, this relationship disappears. In addition, the scatterplot does not show a

curvilinear form. The relationship between managerial ownership and the firm performance measures are not consistent and therefore is hypothesis 2a rejected.

Hypothesis 2b argues that family ownership has an inverted U-shaped relationship with firm performance. This means that family ownership is positive up to a certain point and then turns negative in line with the idea of giving more control to already powerful controlling family shareholders may further enhance their ability to expropriate and cause firm performance to deteriorate. In line with Anderson and Reeb (2003) in the US, Andres (2008) in Germany and Ng et al. (2015) in Malaysia, the results of the accounting-based measures in this study show a positive and significant relationship. When the impact of family ownership is tested on market-based measures, there are no linear significant results. In addition, the non-linearity test shows that family ownership is linear positively related and does not turn negative. The non-linear results that are found (with stock return) are robust when excluding the firms that do not have family ownership at all, but consulting the scatterplots show that there is no clear curvilinear form. The relationship between family ownership and accounting-based performance measures is the most robust relationship of this study. This implies that family mainly focus on firm fundamental factors and ratios; the profitability ratios as ROA and ROE increase, while the market does not show an increased market value (investors do not pay a higher stock price or receive more dividend). Theoretically, this means that past or short-term financial performance is positive, while future and long-term financial performance is not (Al-Matari et al., 2014). Therefore, hypothesis 2b is partially confirmed, in a sense that it is positive (for accounting-based measures) but it does not decline at a certain point as predicted.

The impact of corporate ownership on firm performance gives no consistent results. The hypothesis states that corporate ownership is positively related to firm performance because these shareholders usually have a long investment horizon (Douma et al., 2006) and have easier access to strategic and organizational information (Colpan et al., 2011). However, results are not in line with this theory. The robustness test with stock return showed even a U-shaped relationship which implies that corporate owners become active monitors and share their knowledge when they have more voting power in the target company. However, this result is not consistent with the other performance measures. Therefore, hypothesis 3a is rejected.

Hypothesis 3b states that institutional ownership has an insignificant relationship with firm performance. This study did not find many significant coefficients for institutional ownership, which could be the result of that in Belgium the institutional investors do not have large stakes on individual basis (Becht et al., 2002) which may be caused by that they do not invest in firms with highly concentrated ownership. Some curvilinear relationships were found, but these results were not constant and were driven by firms that do not have institutional ownership at all. Therefore, hypothesis 3b is supported.

Hypothesis 3c argues that government ownership has a negative impact on firm performance. This study found in first instance a curvilinear relationship for both the accounting-based measure (U-shaped) and the market-based measure (inverted U-shape), which are in line with Tian and Estrin (2008) and Sun, Tong and Tong (2002), respectively. However, these results are driven by firms that do not have government ownership at all, because when performing analyses without these firms the significance disappears. Moreover, the scatterplots show no curvilinear form. Findings are not in line with the hypothesis and therefore is hypothesis 3c rejected.

Concluding to the results of this study, the research question can be answered. The research question of this study is: "What is the impact of ownership structure on the performance of listed firms in Belgium?". As stated, the ownership structure is split up in ownership concentration and ownership identity (e.g. Ongore, 2011). This study shows evidence that ownership concentration positively influences the accounting-based measures, while it negatively influences the market-based performance measures. However, these findings are not robust for all performance measures. Regarding the ownership identities, only family ownership shows a consistent positive linear relationship with accounting-based performance measures. This is not surprising, as families and individuals are the most important shareholders in Belgium. Since the transparency law in 2007, more information became available which led to the disentanglement of familial pyramid structures for which the ultimate owners could not always be traced before. As these families are discovered behind chains of companies, these voting blocks, which were classified as holding companies in previous research, are classified as family ownership in this study. As a result of this information about the pyramid structures, the position of non-financial companies as large shareholders decreased in Belgium (Van der Elst, 2008; Van der Elst & Aslan, 2009). Therefore, for the other ownership identities, this study did not find a consistent significant linear relationship with firm performance. Most non-linear relationships found in this study are driven by firms that do not have that specific ownership at all, because when performing analyses without these firms the significance disappears. Possible reasons for the inconclusive results can be found in the next section where the limitations of this study and the recommendations for future research are discussed.

7.2 Limitations and recommendations

This section discusses the limitations of this study and the recommendations for future research. The first limitation of the study is with regards to the sample and the low number of observations. After excluding missing values, only 102 Belgian listed firms remained in the study. This is less than other recent and noteworthy studies have (e.g. Paniagua et al., 2018 have 1207 firms from 59 countries, Beuselinck et al., 2017 have 4737 listed firms from 28 European countries, and Lin and Fu, 2017 have 2465 listed firms). When looking at studies that have the same number of firms, most of these studies cover more years in their analyses (e.g. Tsegba and Achua, 2011 have 73 companies and cover 2001 – 2007, Berķe-Berga et al., 2017 have only 52 companies but cover 2010 to 2015). This is the second limitation of this study: the data was only collected for one year. There exists the possibility that this particular year was unusual to other years, which leads to unreliable data. Although there is no reason to believe that the time period was unusual, it remains a limitation of the study. For example, in 2017 in Belgium, the accounting-based performance measure and the market-based performance measures are negatively correlated to each other, which led to difficulty in interpreting the results. The correlation between the mean values 2014 – 2017 of Tobin's Q and ROA is positive.

The third limitation is the generalizability of the results. This study focuses on Belgian listed firms only. It may be that there are institutional effects that have an influence on the relationship between ownership structure and firm performance in a Belgian context. In addition, it could be that the impact of the ownership structure is different for private firms.

Another limitation relates to the measurement of the ownership identities. As pyramid structures are well documented in Belgium, the classification of the shareholders is a particular difficulty. This study consulted FSMA, annual reports and Orbis to determine the ultimate owner and assigned the percentage to the identity of the largest shareholder. However, future research could calculate the percentage of ownership in a different manner as for example 0.40 x 0.40 is 0.16 and not 0.40.

Based on the results and the limitations of this study, several recommendations for future research are provided. Firstly, it would be interesting to conduct a similar study in different countries and with more years. Future research could test if the impact of ownership structure differs per country to assess the generalizability of the results. It would be interesting to do the tests with a larger sample size (by analyzing more years, more countries and also non-listed companies), as this will result in higher reliability, validity and more significant results. Using more years could prevent that one particular year that is used was unusual to other years, as in this study the correlation between the market-based and accounting-based performance measures. Therefore, a time-series study should be performed instead of a cross-sectional study.

Secondly, future research could analyze the impact of ownership structure on firm performance by using different models. In this study, OLS regression is used whereas other studies made use of structural equation modeling (SEM) or of other forms of regression analysis like 2SLS, 3SLS, fixed effects, random effects, and Poisson (count data) models. Different models could be tested to assess the consistency of the results.

Thirdly, future research could solve the endogeneity problem differently than in this study. The lag period could be other than one-year. There is even the possibility that the relationship is the other way around and that ownership structure should be treated as an endogenous variable. Therefore, future studies should also use lagged ownership variables instead of only lagged control variables.

Fourthly, as family ownership is the most important shareholder in Belgium, future research could conduct comprehensive research into the pyramid structures, focus on family ownership and calculate the exact percentage of ownership. Especially since the transparency law in 2007 makes it less complex to find the ultimate owner. In addition to that, distinction between generations of family could be made as Van der Elst and Aslan (2009) state that the definitions of family business is crucial and only families with lone founders outperform the market and that Arosa et al. (2010b) find that the relationship between ownership concentration and firm performance differs depending on which generation manages the firms. This is in line with the findings of Cacciotti and Ucbasaran (2018), who argue that the participation of multiple generations of family members in the firm's ownership leads to greater diversity in the perspectives that generates potential conflict over the distribution of resources.

Lastly, since 2019 are Belgian family entrepreneurs able to arrange their succession in Belgium more easily due to the reform of company law. The reform project got the green light from the federal government on 25 May 2018. It is now possible to transfer the family business while retaining power (sequensis.be, 2019). This was previously done by creating a foundation under Dutch law (using STAK to preserve the reins and give the shares to the new generation). This new law may have an impact on the ownership disclosure and on the ownership structure itself. This could be interesting for future research.

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Appendices

Appendix A: Sample

Appendix B: Examples data collection to ultimate owner

Appendix C: OLS Assumptions

Appendix D: Scatterplots ownership identity and firm performance

Appendix E: Non-linear relationship between ownership identity and firm performance without lagged variables

Appendix F: Non-linear relationship between ownership identity and firm performance for subsamples small firms and large firms

Appendix G: Non-linear relationship between ownership identity and firm performance with alternative measures

Appendix A: Sample

1	ANHEUSER-BUSCH INBEV SA/NV	41	CAMPINE NV
2	SOLVAY SA	42	VAN DE VELDE NV
3	N.V. UMICORE S.A.	43	MIKO NV
4	PROXIMUS SA	44	ROSIER NV/SA
5	UCB S.A.	45	BEFIMMO SA
6	GREENYARD NV	46	WAREHOUSES DE PAUW
7	BEKAERT SA/NV	47	GALAPAGOS N.V.
8	NYRSTAR N.V.	48	COMPAGNIE IMMOBILIERE DE BELGIQUE SA
9	COMPAGNIE D'ENTREPRISES CFE SA	49	MATERIALISE NV
10	BPOST	50	CONNECT GROUP
11	ECONOCOM GROUP SA	51	EVS BROADCAST EQUIPMENT SA
12	ETEX SA/NV	52	BROUWERIJ HANDELSMAATSCHAPPIJ NV
13	TELENET GROUP NV	53	EXMAR NV
14	AGFA GEVAERT NV	54	MOURY CONSTRUCT
15	ONTEX GROUP	55	AEDIFICA
16	TESSENDERLO GROUP NV	56	RETAIL ESTATES NV/SA
17	ORANGE BELGIUM S.A.	57	EMAKINA GROUP
18	RECTICEL SA/NV	58	WERELDHAVE BELGIUM C.V.A./S.C.A.
19	BARCO NV	59	LEASINVEST REAL ESTATE SCA
20	ELIA SYSTEM OPERATOR S.A	60	ZENITEL NV
21	PCB SA	61	OXURION NV
22	DECEUNINCK NV	62	INTERVEST OFFICES & WAREHOUSES
23	PICANOL NV	63	MONTEA SCA
24	FLUXYS BELGIUM	64	MITHRA PHARMACEUTICALS SA
25	LOTUS BAKERIES NV	65	SMARTPHOTO GROUP
26	TER BEKE NV/SA	66	ASCENCIO S.A.
27	MELEXIS N.V.	67	SCHEERDERS VAN KERCHOVE'S VERENIGDE FABRIEKEN NV
28	FNG N.V.	68	MDXHEALTH SA
29	SIOEN INDUSTRIES NV	69	COIL
30	NV ROULARTA MEDIA GROUP	70	EMD MUSIC
31	EURONAV N.V.	71	FOUNTAIN
32	HAMON & CIE (INTERNATIONAL) S.A.	72	ECKERT-ZIEGLER BEBIG
33	KINEPOLIS GROUP SA/NV	73	CARE PROPERTY INVEST
34	JENSEN-GROUP N.V.	74	HOME INVEST BELGIUM
35	RESILUX NV	75	BIOCARTIS GROUP NV
36	SPADEL NV/SA	76	XIOR STUDENT HOUSING
37	ION BEAM APPLICATIONS SA	77	VASTNED RETAIL BELGIUM
38	COFINIMMO SA - SICAF IMMOBILIERE	78	2VALORISE
39	ATENOR S.A.	79	ACCENTIS NV
40	SOCIETE ANONYME BELGE DE CONSTRUCTIONS AERONAUTIQUES SA	80	KEYWARE TECHNOLOGIES N.V.
81	WAREHOUSES ESTATES BELGIUM S.C.A.	92	REIBEL

82 QRF SCA
83 BANIMMO NV/SA
84 GREEN ENERGY 4 SEASONS
85 REALCO
86 U & I LEARNING N.V.
87 CELYAD SA
88 TETRYS
89 LES VERANDAS 4 SAISONS SA
90 BONE THERAPEUTICS SA
91 GROWNERS
93 SOFTIMAT
94 IMMO MOURY SCA
95 CONDOR TECHNOLOGIES NV
96 COMPAGNIE FINANCIERE DE NEUFCOUR SA
97 ASIT BIOTECH SA
98 ALLIANCE DEVELOPPEMENT CAPITAL SIIC
99 ICE CONCEPT
100 EVADIX S.A.
101 FLEXOS SA
102 PHARCO

Appendix B: Two Examples of data collection ultimate owner

The first example is Connect Group. This company is owned by IPTE Factory Automation, which in turn is owned by Hubert Baren. In addition, Connect Group is also owned by the holding company "Huub Baren", which is in turn owned by Hubert Baren. Therefore, Hubert Baren is the Ultimate owner of Connect Group. This study added the percentages of IPTE Factory Automation (76.96%) and of the holding company Huub Baren (5.48%) together to calculate the cumulative percentage of 82.44%. Consulting FSMA it can be seen that Hubert Baren and Catherina Adems are the ultimate owners and therefore this is family ownership.

	Shareholder name	Country	Type	Ownership Direct (%)	Ownership Total (%)	Source Source ident.	Source Date of info.
1.	IPTE FACTORY AUTOMATION	BE	C	76.96	n.a.	RS	12/2017
2.	PUBLIC	-	Z	17.56	n.a.	RS	12/2017
3.	HUUB BAREN	BE	C	5.48	n.a.	RS	12/2017

Shareholder name	Country	Type	Ownership Direct (%)	Ownership Total (%)	Source Source ident.	Source Date of info.
HUUB BAREN (Domestic and Global UO)	BE	C	90.00	n.a.	RM	12/2017
IPTE FACTORY AUTOMATION	BE	C	76.96	n.a.	RS	12/2017
CONNECT GROUP	BE	C				

Notification of 24/07/2018		Denominator on 24/07/2018 : 26.754.062	
Holder(s) of voting rights		Number of voting rights	% of voting rights
1	Hubert Baren en Catharina Adams		
	Huub Baren BVBA	2.675.426	10,00%
	IPTE FA NV	19.753.086	73,83%
	TOTAL	22.428.512	83,83%

The second example is Solvay. Solvay is for 30.71% owned by Solvac SA. Solvac is a holding company, which can be seen when conducting "Products and services". When consulting Orbis, it can be seen that Solvac is for 77% owned by family members and for more than 5% by Patrick Solvay. Consulting FSMA shows that Solvay Stock Option Management is also part this pyramid structure of the Solvay family. Therefore, Solvay is for 30.71% plus 3% is 33.71% owned by family ownership. See also the picture for an overview (other percentages).

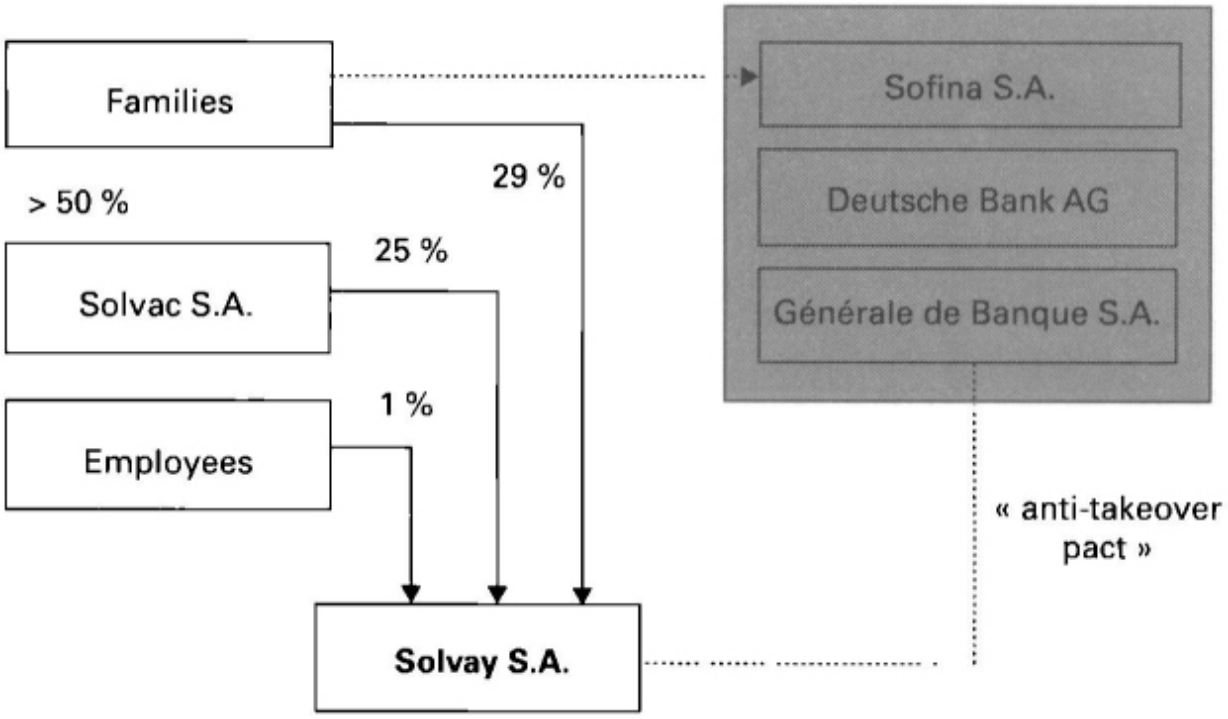
	Shareholder name	Country	Type	Ownership Direct (%)	Ownership Total (%)
1.	PUBLIC	-	Z	>55.00	n.a.
2.	SOLVAC SA	BE	C	30.71	n.a.
3.	SOLVAY STOCK OPTION MANAGEMENT	BE	F	3.00	n.a.
4.	BLACKROCK, INC via its funds	US	B	-	1.95
5.	VANGUARD GROUP INC via its funds	US	E	-	1.85
6.	SAS RUE LA BOETIE via its funds	FR	C	-	1.37

Products and services

Management activities of a holding company [source: Bureau van Dijk]

Notification of 22/03/2018		Denominator on 22/03/2018 : 105.876.416	
Voting rights			
Holder(s) of voting rights		Number of voting rights	% of voting rights
1	Solvac SA	32.511.125	30,71%
	Solay SA		
	Solvay Chemicals International SA		
	Solvay Stock Option SPRL	2.479.693	2,34%
	TOTAL voting rights	34.990.818	**33,05%**
Equivalent financial instruments			
Holder(s) of equivalent financial instruments		Number of voting rights	% of voting rights
1	Solvay Stock Option SPRL	709.874	0,67%
	SUBTOTAL		**0,67%**
	TOTAL voting rights that may be acquired by exercising the equivalent financial instruments	709.874	**0,67%**
	GRAND TOTAL	35.700.692	**33,72%**

				Ownership	
	Shareholder name	Country	Type	Direct (%)	Total (%)
1.	PLUS DE 2000 PERSONNES APPARENTÉES AUX FAMILLES FONDATRICES	-	D	77.00	n.a.
2.	GPCT	BE	C	10.00	10.00
3.	MR PATRICK SOLVAY	n.a.	I	>5.00	n.a.



Appendix C: OLS Assumptions

Table 1. Test of normality (Shapiro-Wilk test)

Variable	Statistic	df	Sig.
1. TOBIN'S Q 2	0,82	92	0,00
2. MTB	0,76	92	0,00
3. ROA2	0,83	102	0,00
4. ROE1	0,76	100	0,00
5. CONOWN	0,97	102	0,01
6. MO	0,62	102	0,00
7. FO	0,80	102	0,00
8. CO	0,59	102	0,00
9. IO	0,76	102	0,00
10. GO	0,36	102	0,00
11. FirmSize	0,13	102	0,00
12. FirmSizeTS	0,24	101	0,00
13. LEV	0,99	102	0,57
14. LEVLONG	0,91	102	0,00
15. IDENT	0,61	102	0,00

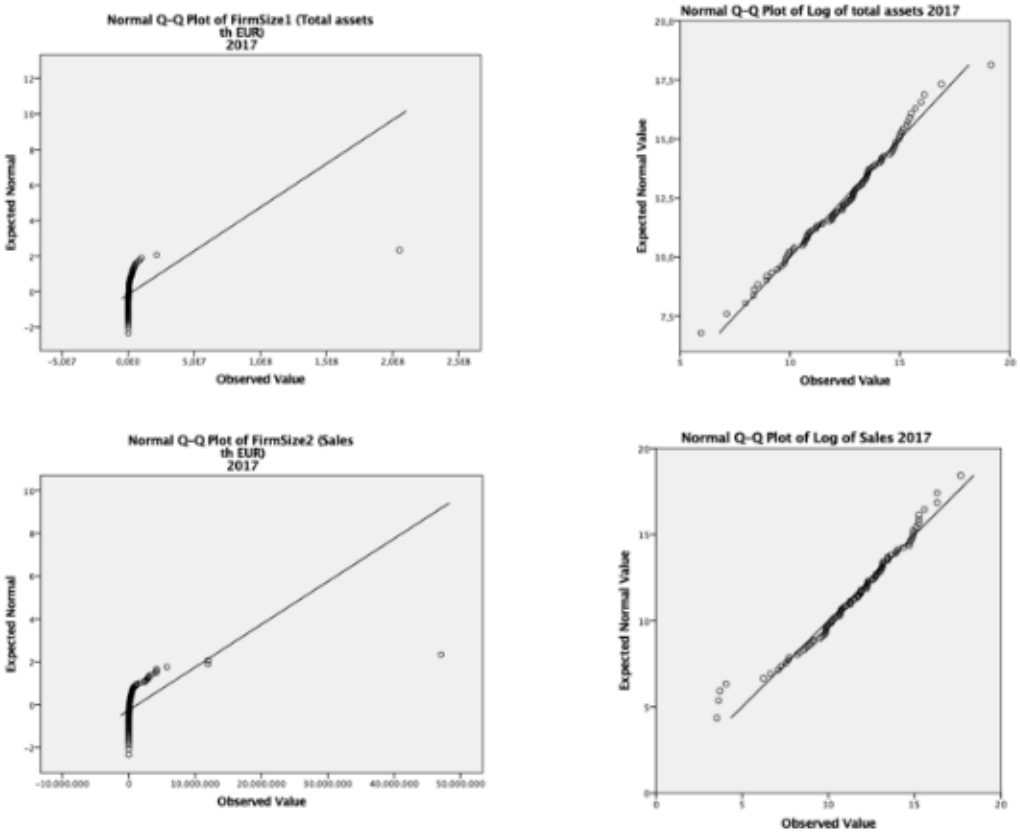


Figure 1. Firm size transformation to natural logarithm

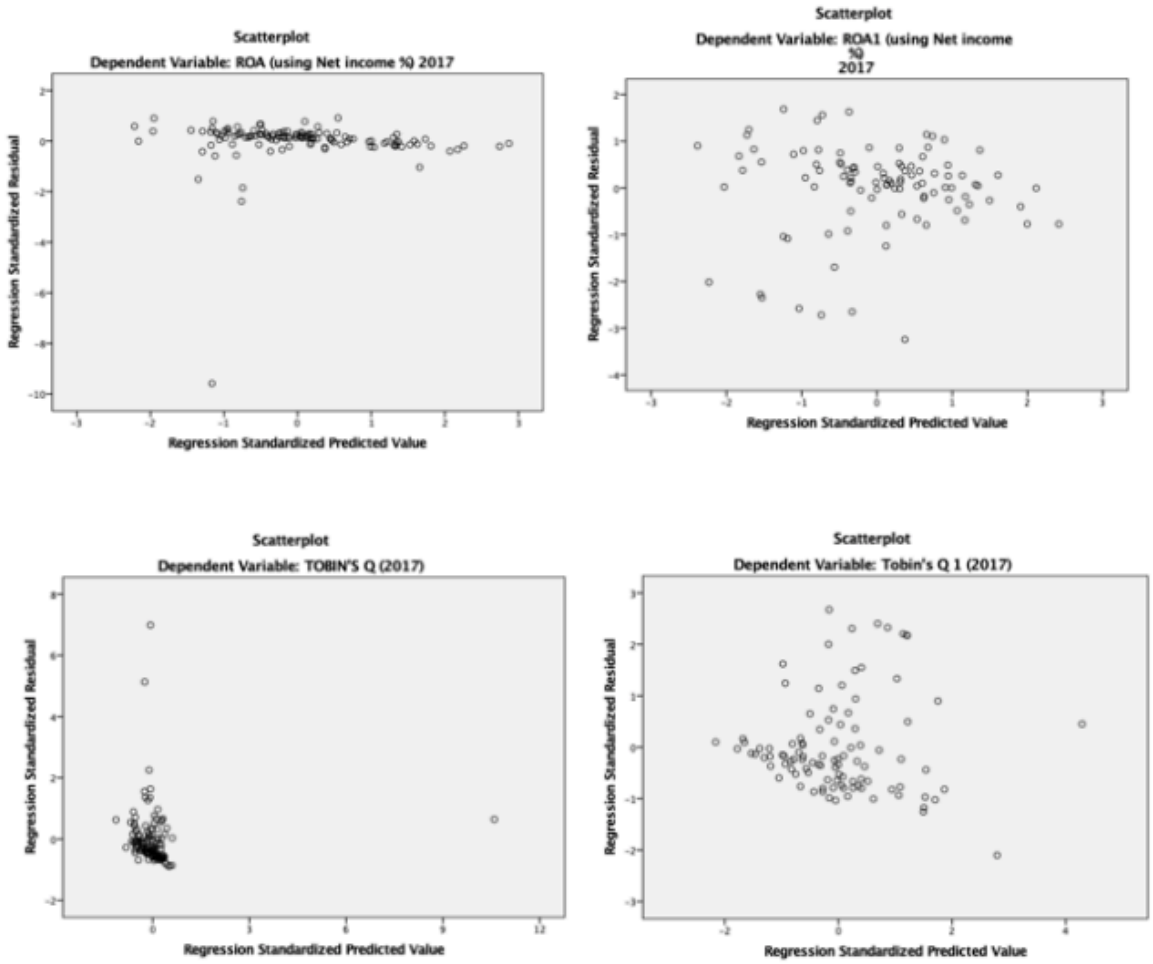


Figure 2. Scatterplots for homoscedasticity before and after controlling for outliers

Table 2. Variation Inflation Factor (VIF)

Variable	VIF
CONOWN	30.335
CONOWN1	38.529
DISOWN	3.378
MO	17.348
FO	20.444
CO	10.326
IO	5.265
GO	6.159
Ln_FirmSize	9.977
Ln_FirmSizeTS	8.159
LEV	2.218
LEVLONG	2.542

OLS regression with ROA as dependent variable

Variable	VIF
MO	2.722
FO	2.926
CO	1.828
IO	1.746
GO	1.535
Ln_FirmSize	8.614
Ln_FirmSizeTS	7.761
LEV	2.176
LEVLONG	2.491

OLS regression with ROA as dependent variable

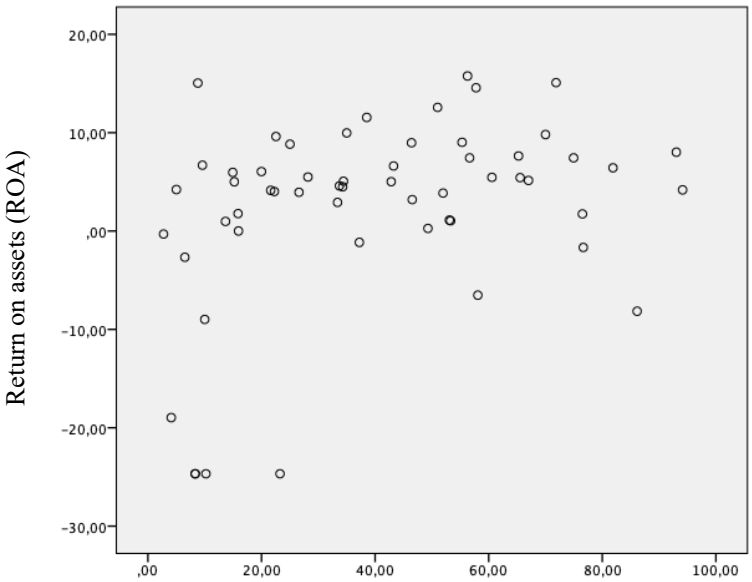
Variable	VIF
MO	2.430
FO	2.222
CO	1.684
IO	1.712
GO	1.492
Ln_FirmSize	1.566
LEV	1.243

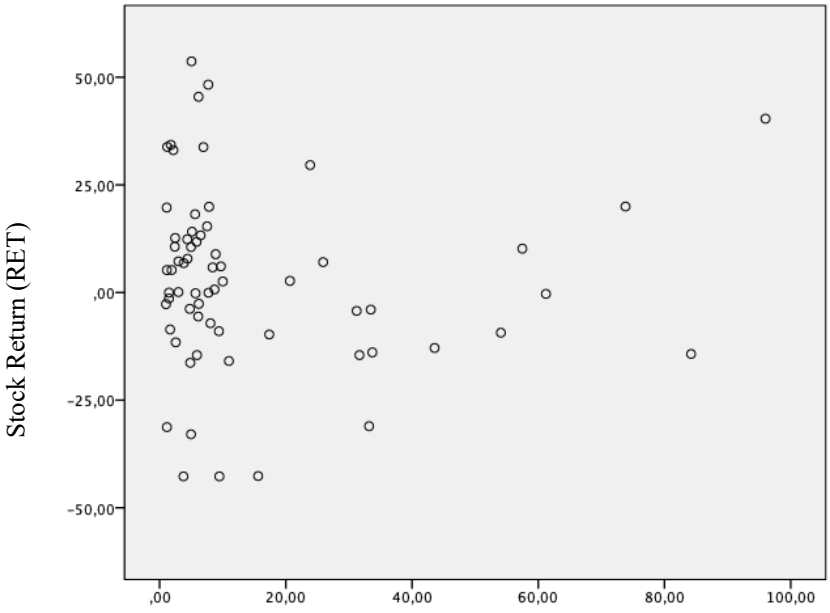
OLS regression with ROA as dependent variable

Variable	VIF
CONOWN	1.183
Ln_FirmSize	1.336
LEV	1.198

OLS regression with ROA as dependent variable

Appendix D: Scatterplots ownership identity and firm performance





Appendix E: Non-linear relationship between ownership identity and firm performance without lagged variables

Panel A: Firm performance measured by TOBIN'S Q

Explanatory Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b	Model 5a	Model 5b
Intercept	2.379***	2.265***	2.557***	2.557***	2.273***	2.380***	2.362***	2.560***	2.339***	2.262***
MO	-0.034	0.481								
MO^2		-0.528								
FO			-0.112	-0.112						
FO^2				0.000						
CO					-0.060	0.481				
CO^2						-0.564*				
IO							0.043	0.579**		
IO^2								-0.564**		
GO									0.038	1.068***
GO^2										-1.066***
Ln_FirmSizet	-0.076	-0.060	-0.093	-0.093	-0.061	-0.096	-0.084	-0.138	-0.072	-0.058
LEVt	-0.261**	-0.265**	-0.257**	-0.257**	-0.248**	-0.257**	-0.253**	-0.275***	-0.265**	-0.321***
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.193	0.149	0.147	0.137	0.139	0.167	0.137	0.177	0.137	0.233
N	92	92	92	92	92	92	92	92	92	92
F-statistic	3.395***	3.283***	3.619***	3.066***	3.442***	3.601***	3.407***	3.801***	3.402***	4.944***

Panel B: Firm performance measured by ROA

Explanatory Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b	Model 5a	Model 5b
Intercept	-18.745***	-16.971***	-21.232***	-21.304***	-17.826***	-18.313***	-17.659***	-18.741***	-17.134***	-16.972***
MO	0.072	-0.782**								
MO^2		0.878**								
FO			0.273***	0.236						
FO^2				0.040						
CO					-0.155	-0.372				
CO^2						0.226				
IO							-0.086	-0.426*		
IO^2								0.355		
GO									-0.053	-0.651**
GO^2										0.622**
$Ln\_FirmSize_t$	0.458***	0.452***	0.467***	0.459***	0.488***	0.467***	0.459***	0.492***	0.434***	0.434***
LEV_t	-0,179*	-0.203**	-0.164*	-0.163*	-0.148	-0.150	-0.182*	-0.166*	-0.164*	-0.139
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.137	0.182	0.205	0.196	0.155	0.151	0.139	0.150	0.135	0.162
N	102	102	102	102	102	102	102	102	102	102
F-statistic	3.663***	4.202***	5.333***	4.526***	4.086***	3.575***	3.709***	3.541***	3.621***	3.786***

*Notes: this table presents the results of OLS regressions of firm performance on ownership identities and firm-specific control variables without lagged values. Ownership identities are measured by MO, FO, CO, IO and GO. In addition, non-linearity is tested by including the quadratic variables MO^2, FO^2, CO^2, IO^2 and GO^2. Annual data for the year 2017 are analyzed. All variables are defined in table 7. LEV_t is leverage and $Ln\_FirmSize_t$ is the natural logarithm of the total assets. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*

Appendix F: Non-linear relationship between ownership identity and firm performance for subsamples small firms and large firms

Panel A: Firm performance measured by TOBIN'S Q (Small firms)

Explanatory Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b	Model 5a	Model 5b
Intercept	2.418***	2.242***	2.479***	2.468***	2.353***	2.202***	2.203***	1.998***	2.328***	1.913***
MO	-0.146	1.037*								
MO^2		-1.182**								
FO			-0.134	0.413						
FO^2				-0.565						
CO					-0.112	0.529				
CO^2						-0.675				
IO							0.387**	1.003**		
IO^2								-0.695*		
GO									0.044	1.539***
GO^2										-1.556***
LEV	-0.366**	-0.338**	-0.370**	-0.409***	-0.344**	-0.339**	-0.418***	-0.401***	-0.367**	-0.293**
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.196	0.266	0.193	0.197	0.188	0.210	0.301	0.336	0.177	0.418
N	43	43	43	43	43	43	43	43	43	43
F-statistic	3.052**	3.536***	3.010**	2.713**	2.947**	2.863**	4.622***	4.540***	2.804**	6.032***

Panel B: Firm performance measured by TOBIN'S Q (Large firms)

Explanatory Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b	Model 5a	Model 5b
Intercept	2.006***	2.014***	2.321***	2.339***	2.314***	2.270***	2.476***	2.435***	2.270***	2.257***
MO	0.211	0.313								
MO^2		-0.109								
FO			-0.040	-0.294						
FO^2				0.268						
CO					0.122	0.316				
CO^2						-0.202				
IO							-0.180	0.071		
IO^2								-0.272		
GO									-0.007	0.229
GO^2										-0.247
LEV	-0.416***	-0.422***	-0.491***	-0.473***	-0.522***	-0.519***	-0.526***	-0.538***	-0.486***	-0.490***
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.230	0.213	0.191	0.182	0.202	0.187	0.223	0.216	0.189	0.176
N	49	49	49	49	49	49	49	49	49	49
F-statistic	3.863***	3.161**	3.262**	2.784**	3.431**	2.843**	3.762***	3.203**	3.244**	2.708**

Panel C: Firm performance measured by ROA (Small firms)

Explanatory Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b	Model 5a	Model 5b
Intercept	-4.244	-1.473	-8.782**	-8.939**	-4.649	-4.684	-4.132	-3.959	-3.402	1.105
MO	-0.080	-1.049								
MO^2		0.991								
FO			0.376***	0.604						
FO^2				-0.238						
CO					-0.123	-0.110				
CO^2						-0.014				
IO							-0.093	-0.154		
IO^2								0.067		
GO									-0.200	-1.701***
GO^2										1.561***
LEV	0.100	0.035	0.111	0.100	0.124	0.125	0.108	0.109	0.099	0.033
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	-0.067	0.073	0.074	0.058	-0.058	-0.082	-0.067	-0.091	-0.032	0.209
N	51	51	51	51	51	51	51	51	51	51
F-statistic	0.368	0.712	1.802	1.509	0.448	0.365	0.371	0.307	0.691	3.205**

Panel D: Firm performance measured by ROA (Large firms)

Explanatory Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b	Model 5a	Model 5b
Intercept	7.897***	7.480***	9.257***	9.314***	8.537***	9.813***	9.877***	10.816***	9.521***	9.247***
MO	0.124	-0.702								
MO^2		0.873*								
FO			-0.067	-0.232						
FO^2				0.175						
CO					-0.176	-1.057**				
CO2						0.922**				
IO							-0.154	-1.012***		
IO^2								0.935**		
GO									0.269*	1.148**
GO^2										-0.919*
LEV	-0.104	-0.058	-0.148	-0.136	-0.099	-0.115	-0.178	-0.143	-0.212	-0.222
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.014	0.067	0.004	-0.014	0.028	0.093	0.025	0.136	0.072	0.131
N	51	51	51	51	51	51	51	51	51	51
F-statistic	1.147	1.598	1.043	0.887	1.284	1.854	1.259	2.315	1.781	2.253*

*Notes: this table presents the results of OLS regressions of firm performance on ownership identities and firm-specific control variables of subsamples small firms and large firms. Ownership identities are measured by MO, FO, CO, IO and GO. In addition, non-linearity is tested by including the quadratic variables MO^2, FO^2, CO^2, IO^2 and GO^2. Annual data for the year 2017 are analyzed. All variables are defined in table 7. LEV the lagged value of leverage and Ln_FirmSize is the natural logarithm of the lagged values of total assets. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*

Appendix G: Non-linear relationship between ownership identity and stock return

Firm performance measured by stock return (RET)

Explanatory Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b	Model 5a	Model 5b
Intercept	-23.162	-23.231	-26.523*	-30.053*	-19.483	-25.614*	-22.488	-21.354	-18.707	-18.098
MO	0.105	0.117								
MO2		-0.012								
FO			0.151	-0.682**						
FO2				0.889***						
CO					-0.065	-0.932***				
CO2						0.906***				
IO							-0.144	-0.015		
IO2								-0.135		
GO									-0.019	-0.490
GO2										0.494
Ln_FirmSize	0.259**	0.260**	0.274**	0.308***	0.246**	0.324***	0.288**	0.276**	0.242**	0.250**
LEV	-0.158	-0.158	-0.177	-0.124	-0.158	-0.164	-0.181	-0.188	-0.170	-0.176
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R2	0.016	0.004	0.027	0.094	0.009	0.094	0.024	0.015	0.005	0.017
N	92	92	92	92	92	92	92	92	92	92
F-statistic	1.239	1.050	1.413	2.351**	1.137	2.351**	1.371	1.200	1.082	1.224

*Notes: this table presents the results of OLS regressions of stock return (RET) on ownership identities and firm-specific control variables of subsamples small firms and large firms. RET is calculated as stock price difference plus dividend, divided by stock price begin of the year. Ownership identities are measured by MO, FO, CO, IO and GO. In addition, non-linearity is tested by including the quadratic variables MO^2, FO^2, CO^2, IO^2 and GO^2. Annual data for the year 2017 are analyzed. All variables are defined in table 7. LEV the lagged value of leverage and Ln_FirmSize is the natural logarithm of the lagged values of total assets. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*

Appendix H: Non-linear relationship between ownership identity and firm performance with alternative control variables

Panel A: Firm performance measured by TOBIN'S Q

Explanatory Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b	Model 5a	Model 5b
Intercept	1.741***	1.603***	1.851***	1.850***	1.699***	1.671***	1.756***	1.845***	1.714***	1.731***
MO	-0.003	0.522								
MO^2		-0.536								
FO			-0.080	-0.157						
FO^2				0.082						
CO					-0.076	0.492				
CO^2						-1.954*				
IO							0.093	0.679**		
IO^2								-0.616**		
GO									-0.056	0.512
GO^2										-0.592
Ln_FirmSizeTS	-0.069	-0.045	-0.076	-0.074	-0.054	-0.064	-0.083	-0.123	-0.060	-0.081
LEVLONG	-0.171	-0.167	-0.177	-0.170	-0.162	-0.224*	-0.186	-0.239**	-0.165	-0.143
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.109	0.122	0.115	0.105	0.114	0.143	0.117	0.166	0.112	0.129
N	90	90	90	90	90	90	90	90	90	90
F-statistic	2.809**	2.760**	2.926**	2.488**	2.913**	3.127***	2.965**	3.526***	2.869**	2,882***

Panel B: Firm performance measured by ROA

Explanatory Variables	ROA									
	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b	Model 5a	Model 5b
Intercept	-12.967***	-11.993***	-14.180***	-14.132***	-12.840***	-12.840***	-12.210***	-12.703***	-12.238***	-12.302***
MO	0.045	-0.945**								
MO^2		1.016***								
FO			0.209***	0.306						
FO^2				-0.102						
CO					-0.230**	-0.231				
CO^2						0.001				
IO							-0.042	-0.433		
IO^2								0.408		
GO									-0.033	-0.346
GO^2										0.325
Ln_FirmSizeTS	0.405***	0.411***	0.390***	0.386***	0.424***	0.424***	0.397***	0.430***	0.394***	0.405***
LEVLONG	-0.099	-0.157	-0.077	-0.085	-0.077	-0.077	-0.097	-0.059	-0.101	-0.112
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Adjusted R^2	0.078	0.142	0.119	0.110	0.127	0.118	0.078	0.094	0.077	0.076
N	99	99	99	99	99	99	99	99	99	99
F-statistic	2.385**	3.323***	3.207***	2.737**	3.383***	2.868***	2.381**	2.455**	2.371**	2.146**

*Notes: this table presents the results of OLS regressions of firm performance on ownership identities and firm-specific control variables. Ownership identities are measured by MO, FO, CO, IO and GO. In addition, non-linearity is tested by including the quadratic variables MO^2, FO^2, CO^2, IO^2 and GO^2. Annual data for the year 2017 are analyzed. All variables are defined in table 7. LEVLONG the lagged value of leverage based on long-term debt and Ln_FirmSizeTS is the natural logarithm of the lagged values of total sales. Industry dummies and intercept term are included in each regression, but their coefficients are not reported. Table reports standardized coefficients to describe the relative importance of the explanatory variables. The numbers in parenthesis represent the t-statistics. The asterisk ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.*