

**ERASMUS UNIVERSITY ROTTERDAM**  
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## **Owning Up to Ownership**

### **The Impact of Ownership Structure on Firm Performance and Firm Innovation in European Developed and Emerging Economies**

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## **ABSTRACT**

This study investigates the relationship between ownership structure and firm-specific outcomes. Using a sample of 38,786 unique firms from 10 European countries, the effects of ownership concentration and family ownership on firm performance and innovation are analyzed. Medium ownership concentration is found to have a positive effect on firm performance, increasing return on assets with 0.33% and 0.79%. Furthermore, the results show that family ownership positively impacts firm performance, with return on assets that is 0.94% to 0.97% higher for family-controlled firms. Moreover, firms with concentrated ownership establish 3.3% to 15.7% less patents compared to firms with non-concentrated ownership, indicating a negative relationship between ownership concentration and innovative output. Finally, the presence of a weak legal environment boosts the positive effects of ownership concentration and family ownership on firm performance.

**Keywords:** Corporate Ownership, Family Firms, Ownership, Ownership Structure

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## Table of Contents

ABSTRACT .....	ii
LIST OF TABLES .....	iv
CHAPTER 1 Introduction .....	1
1.1 Relevance .....	2
1.2 Main findings .....	3
1.3 Structure .....	3
CHAPTER 2 Theoretical Framework .....	4
2.1 Agency Theory .....	4
2.2 Corporate governance.....	6
2.3 Ownership structure .....	7
2.3.1 Ownership concentration .....	7
2.3.2 Family ownership.....	9
2.4 Effects of different legal systems .....	11
2.5 Determinants of firm performance and firm innovation .....	11
CHAPTER 3 Data & Methodology .....	13
3.1 Sample selection and data gathering .....	13
3.2 Variables.....	14
3.3 Models.....	16
3.4 Descriptive Statistics .....	19
CHAPTER 4 Results.....	21
4.1 Testing hypothesis 1 .....	21
5.2 Testing hypothesis 2.....	22
5.3 Testing Hypothesis 3 .....	25
5.4 Testing hypothesis 4.....	26
5.5 Testing hypothesis 5.....	28
CHAPTER 5 Conclusion .....	33
5.1 Answering the research question.....	33
5.2 Limitations and recommendations .....	34
REFERENCES.....	36

**LIST OF TABLES**

**Table 1** Distribution of Firms and Ownership Data by Country. ....20

**Table 2** Descriptive Statistics of Dependent and Control Variables. ....20

**Table 3** Correlation Matrix for the Variables. ....20

**Table 4** Ordinary Least Squares Models for Ownership Concentration and ROA. ....22

**Table 5** Ordinary Least Squares Models for B-Concentrated Ownership and ROA.....23

**Table 6** Ordinary Least Squares Models for Ownership Concentration and R&D-Expenditures. ....24

**Table 7** Negative binomial Regression Models for Ownership Concentration and PatentCount.....25

**Table 8** Ordinary Least Squares Models for Family Control and ROA.....26

**Table 9** Ordinary Least Squares models and Negative Binomial Regression model for Family Control and Firm Innovation. ....27

**Table 10** Ordinary Least Squares Models for the Effect of Legal Environment on the Relationship between Ownership Structure and ROA.....29

**Table 11** Ordinary Least Squares Models for the Effect of Legal Environment on the Relationship between Ownership Structure and R&D-Expenditures.....30

**Table 12** Negative Binomial Regression Models for the Effect of Legal Environment on the Relationship between Ownership Structure and PatentCount. ....30

## CHAPTER 1 Introduction

The work of Berle and Means (1932) has long been the foundation for the belief that corporate ownership in the United States is widely dispersed and managers have control over their firms. La Porta et al. (1999) investigate corporate ownership around the world and provide evidence that contradicts this view on a global level. They look at the ownership structure of the largest firms in the 27 wealthiest economies and find that widely held firms are more the exception than the rule worldwide. Although widely held firms are common in countries such as the United States, the United Kingdom, and Japan, large firms in other big economies tend to have a controlling shareholder. Moreover, they show that widely held firms are more common in those countries that are considered to have a legal environment wherein shareholder rights are well protected. The work of La Porta et al. can be regarded as the starting point for a wide range of literature on corporate ownership and its effects on firm-specific outcomes.

Research into corporate ownership typically investigates the effects of either ownership concentration or the type of owner that is present in the corporate governance structure of a firm. One relationship that has been widely researched is the one between ownership concentration and firm performance. There are theoretical arguments supporting both a positive and negative relationship between ownership concentration and firm performance. On the one hand, the presence of a large shareholder within the firm can be considered as an additional monitor for the firm's managers (Shleifer and Vishny, 1997). Jensen & Meckling (1976) argue that the presence of such a monitor can be very effective in mitigating the negative effects of the principal-agent problem, which can give rise to an increase in firm performance. On the other hand, ownership concentration can also lead to an agency conflict between a controlling shareholder and the minority shareholders. A controlling shareholder can use their position of power to extract private benefits from the firm at the cost of the minority shareholders (Barclay and Holderness, 1989). This extraction behavior by a controlling shareholder will ultimately harm firm performance.

A second relationship covered extensively in the literature is that of ownership concentration and firm innovation. The mechanism that establishes this relationship is also based on agency theory and there are theoretical arguments backing both a positive and negative relationship. On the one side, a controlling shareholder can use its positions as monitor to make sure that management divides enough attention towards generating innovative output (Jensen & Meckling, 1976). On the other side, the presence of a controlling shareholder can also lead to a decrease in innovation, depending on their risk appetite. A risk-averse controlling shareholder will be less inclined to promote innovative undertakings since there is a chance that the undertaking will be unsuccessful and resources will be lost (Bolton and Von-Thadden, 1998).

Another strain of academic literature is devoted to understanding the effects of family ownership on firm specific outcomes. There are several factors that make family owners unique as a type of corporate owner. Family owners have lifelong interpersonal relationships, typically hold a long-term

view with respect to the firm and their interests in the firm are not limited to just economic success (Pieper, 2003). These distinctive characteristics create the appeal to study the effect of family ownership on firm-specific outcomes. The most investigated relationship in this regard is that between family ownership and firm performance. Based on agency theory, both positive and negative relationships have been debated. In general, the net worth of family owners will be closely linked to firm performance, and this creates strong incentives for the family to closely monitor management and undertake actions that increase firm performance (Demsetz and Lehn, 1985). Alternatively, Schulze et al. (2001) suggest a negative relationship between family ownership and firm performance, based on the altruistic dynamics that play a role within families.

Another relationship that has been examined in the academic literature is that between family ownership and firm innovation. Decker and Günther (2017) argue that family owners tend to be more cautious and conservative with using the firm's resources for innovational endeavors, suggesting a negative relationship between family ownership and firm innovation when a family controls firm management. On the other side, James (1999) advocates a positive relationship between family ownership and firm innovation, due to the long-term view of family owners that creates a willingness to invest in the future profitability of the firm.

This study will examine the effect of ownership structure on firm performance and firm innovation. More specifically, the effects of both ownership concentration and family ownership on firm performance and firm innovation in Europe will be researched. The work of La Porta et al. (2000) shows that differences in legal environments give rise to cross-country differences in corporate governance. Since the relationships covered by this study are driven by mechanisms of corporate governance, it will be interesting to include the potential effect of legal environment in the analysis. The goal of this study is to answer the following research question:

*What is the effect of ownership concentration and family ownership on firm performance and firm innovation in Europe and does the legal environment play a role in the strength of these relationships?*

## **1.1 Relevance**

In academic literature, there is a consensus that ownership structure significantly influences both firm performance and innovation. However, the direction and magnitude of these effects remain subjects of debate among scholars. Firstly, the literature on the relationship between ownership structure and firm performance is not united. Authors who studied the relationship within emerging markets have provided conflicting empirical results. Wang and Shailer (2013) conducted a meta-analysis of the studies that investigated the relationship between ownership structure and firm performance in these markets. They find that the heterogeneity in the results can be explained by modeling choices and population differences. Therefore, they advocate for more research into this relationship, comparing emerging markets with similar corporate governance environments. Secondly, scholars have not agreed on a

conclusive relationship between ownership structure and firm innovation. Belloc (2012) analyses the literature on corporate governance and innovation and find that the literature on this topic is extremely heterogeneous. He concludes with a suggestion for future researchers to focus more on the interaction between various factors of corporate governance to establish their joint effect on levels of firm innovation.

This study aims to contribute to the ongoing academic debate by establishing a clear relationship between ownership structure and firm-specific outcomes, specifically focusing on firm performance and innovation. In addition, by integrating the analysis of the legal environment's potential impact, this research tries to establish a new perspective, thereby pioneering an exploration of new dynamics within the field.

Next to the scientific relevance of this study, a clear relationship is also desirable from a societal viewpoint. Performance and innovation are vital to a firm's capability to remain competitive and survive in the long run. For this reason, analyzing the relationship between these two factors and ownership structure is relevant for establishing best corporate governance practices. These practices can in turn be used by both firm management and shareholders to determine their desired arrangement of corporate governance. Furthermore, policymakers can use the results of this study when reviewing their countries corporate law regime.

## **1.2 Main findings**

This study uses a sample of 38,786 unique firms from 10 European countries, with a total of 682,897 firm-year observations. The analysis uncovers a significant positive effect of both medium ownership concentration and family ownership on firm performance, while high degrees of ownership concentration are found to have a negative effect on firm performance. Furthermore, a significant negative effect of ownership concentration on innovative output is established. The results provide no basis to claim a significant effect of ownership structure on innovative input. Finally, the presence of a relative weak legal environment, increases the positive effect of both ownership concentration and family ownership on firm performance.

## **1.3 Structure**

The structure of this study is as follows. Chapter 2 provides an overview of the current academic landscape in ownership structure and presents the hypothesis that will be tested in this study. Moving forward, chapter 3 will provide a description of the data and methods that will be used to conduct the analysis. Chapter 4 will delve into the interpretation of the results from the analysis per hypothesis. Finally, chapter 5 provides a conclusion to this study and discusses some limitations and avenues for future research.

## **CHAPTER 2 Theoretical Framework**

This section is devoted to presenting and discussing the theoretical mechanisms that will be analyzed in this study. Based on academic literature and empirical findings, several hypotheses will be formulated. First, the agency theory will be explained, since this theory provides the foundation upon which the following theories build. Thereafter, ownership structure, and more specifically ownership concentration and family ownership will be discussed. Next, the potential effects of the legal environment on the presented relationships will be considered. This section will conclude with a discussion of the general determinants of firm performance and firm innovation.

### ***2.1 Agency Theory***

The agency theory is one of the most prominent theories within the field of corporate finance. In general terms, this theory focuses on the relationship between an agent and a principal, where the former acts as a representative on behalf of the latter in a process of decision-making (Ross, 1973). Concerning corporate finance, agency theory is used to explain the problems that arise within a firm due to the separation of ownership and control and provides solutions to reduce these problems (Panda & Leepsa, 2017). Jensen and Meckling (1976) describe a firm as a set of contracts between the different production factors present within the sphere of the firm. Within these contractual relationships there are principals on the one side and agents on the other and within these relationships, agency problems can arise due to the separation between ownership and control. In their overview paper, Panda and Leepsa (2017) conclude that three main types of agency problems can exist within a firm, which will be discussed now.

#### *1. Ownership and management*

The paper of Jensen and Meckling (1976) is one of the foundational works in agency theory in relation to corporate finance. They apply agency theory to the contractual relationship between a firm's owner (the stockholders) and a firm's ultimate decision-maker (management) and create a theoretical framework that explains how agency problems can arise within this relationship. The main interest of shareholders is to maximize the value of the firm and they rely on the manager to pursue this interest for them. A firm's management, however, will not necessarily act in the interest of the firm's shareholders, since this might not align with its own interests. Therefore, if both the principal and the agent are utility maximizers, the misalignment of interests between shareholders and managers can lead to suboptimal decision-making by the manager from the shareholder's perspective, especially when there is information asymmetry present between shareholders and management (Jensen & Meckling, 1976). This is the essence of the agency problem within the relationship of ownership and management.

Next to a misalignment in interest between shareholders and managers, agency problems can also arise when there is a misalignment between the risk preference of the manager and the owners. When a risk-averse manager is faced with a high-risk investment opportunity, they might prefer to not invest because of the risk of potential losses, whereas the owner would rather see the investment being



made. In this way, a misalignment of risk preferences will lead to managers and owners preferring different actions and the owner missing out on potential increases in shareholder value (Eisenhardt, 1983).

Jensen and Meckling (1976) identify three types of costs that are associated with the principal-agent relationship between a firm's owners and firm management, the so-called agency costs. The first type is monitoring costs, incurred by the firm's owners to ensure that the manager behaves accordingly. Both by monitoring the agent effectively and by putting incentive schemes in place, the owner can limit a manager's actions that are not in line with maximizing firm value. The second type is bonding costs, which are incurred by the manager. These are all the expenditures that a manager makes to prove to the principal that he is striving to maximize firm value and these costs are borne by the firm. The residual loss is the third type of agency costs. Regardless of the monitoring and bonding efforts made by the principal and the agent, there will still be some disparity between the agent's decisions and the decisions that would be most beneficial for firm value. The loss in welfare that stems from this disparity makes up the residual loss. The sum of monitoring costs, bonding costs, and the residual loss comprise the total agency costs.

## *2. Majority shareholder and minority shareholder*

The second type of agency problem relates to the dynamic between a firm's majority shareholders and its minority shareholders. A majority shareholder will have a high degree of voting power within the firm and can therefore influence the decision-making process within the firm in a way that benefits them, while simultaneously harming the interests of the minority shareholders (Holderness & Sheenan, 1988). This effectively leads to a separation of ownership and control, since the minority shareholders (principal) in practice have limited control over the firm, leaving them exposed to the decisions of the majority shareholder (agent).

An example of the manifestation of this agency problem can be constructed when considering dividends. Maury and Pajuste (2002) find that concentration of control and dividend payout ratio are negatively correlated and propose that the largest and second-largest shareholders might collude in generating private benefits from which the minority shareholders do not profit since they receive relatively low dividends. In this way, the majority shareholders extract private benefits from the firm, while the interests of the minority shareholders are being harmed. Another manifestation of this type of agency problem is known as tunnelling. Johnson et al. (2000) define this as "the transfer of assets and profits out of firms for the benefit of their controlling shareholders." This phenomenon occurs when a controlling shareholder moves assets or profits to another firm, in which the controlling shareholder holds higher cash flow rights.

### *3. Equity holders and bondholders*

The third type of agency problem occurs within the relationship between a firm's equity holders and its lenders. Since only the equity holders (agents) hold voting power, the bondholders (principals) rely on them to look after their interests. Smith and Warner (1979) discuss four sources that can lead to a conflict within this principal-agent relationship. The first source is the increase in dividend payments, which will reduce the value of the outstanding bonds. The second source is the dilution of a bondholder's claim when additional debt is being issued. The third source is the substitution of low-risk projects with high-risk projects, which will increase shareholder value and decrease the value of the bondholders' claim. The final source is underinvesting in projects with a positive net present value when the firm has incentives to not invest in these projects because the benefits would only cater to the firm's bondholders (Myers, 1977).

## **2.2 Corporate governance**

The dogma of corporate governance tries to solve questions regarding how investors can ensure that their investments are being put to good use and how they can control the managers of the corporations in which they invest (Shleifer and Vishny, 1998). Becht, Bolton and Röell (2003) describe corporate governance as a means to "resolve collective action problems among dispersed investors and the reconciliation of conflicts of interest between various corporate claimholders. In other words, corporate governance is useful in mitigating the negative effects of agency problems that occur within the different contractual relationships that exist within a firm as described by Jensen and Meckling (1976). Out of all contracting groups, the shareholders are the last in line to receive profits since they are the residual claimants to the firm's earnings. Efficient corporate governance should therefore focus on maximizing shareholder value because all other contractual obligations that exist in the firm will already have been settled when the shareholders receive their share of firm value (Becht, Bolton & Röell, 2003).

Good corporate governance can mitigate the negative effects of agency problems. In the academic literature, several authors have introduced frameworks for dealing with agency problems using corporate governance. One of the most pivotal works is that of Jensen and Meckling (1976) in which they argue that ownership structure can be used to solve the agency problem between the owners of a firm and the firm's management. They propose that the scale of the agency conflict can be reduced through managerial ownership since this will align the interests of management and the firm's owners. An effective way to achieve this is by granting stocks to management as part of the remuneration package. Core, Holthausen and Lacker (1999) emphasize the importance of this remuneration package in dealing with agency problems. Owners should regularly revise the level of executive compensation to ensure that it is still at an adequate level and provides the right incentives. By doing so, they can prevent managers from using firm property for their private benefit.

Next to providing management with the right incentives, the disciplining and monitoring of management is also an effective way to battle agency problems. One way to discipline firm management

is by increasing the debt-to-equity ratio of the firm. The higher amount of both interest payments and the settlement of the principal amount will force management to make decisions that will keep the profitability of the firm at a level that can sustain these payments (Frierman & Viswanath, 1994). Holderness (2003) discusses how the presence of a large shareholder within a firm can have monitoring effects on the firm's management. Large shareholders will control a significant share of a firm's voting rights and usually serve as firm directors or officers. From this position, they can influence management to make decisions that are in line with increasing firm value as this will be in the interest of large shareholders. Finally, the market for corporate control also works as a pressuring factor on managers to efficiently manage the firm. An inefficiently managed firm can become a takeover target and there is a reasonable possibility that the acquiring firm will remove the firm's management upon completing the takeover (Kini, Kraca & Mian, 2004).

## **2.3 Ownership structure**

One of the key aspects of a firm's corporate governance structure is the firm's ownership structure. The study of corporate ownership structure focuses on the implications of firm-specific characteristics such as the concentration of ownership, the type of owner, and the capital structure. For many years, the work of Berle and Means (1932) formed the basis of the conviction that corporate ownership is widely dispersed. This conviction was challenged by the study of La Porta et al. (1999). They showed that many large economies across the globe are characterized by the presence of firms with concentrated ownership. This change in perception on corporate ownership gave rise to a wide range of literature on corporate ownership and its effects on firm-specific outcomes.

### **2.3.1 Ownership concentration**

One of the most studied relationships in the context of ownership structure is the one between ownership concentration and corporate performance. As discussed in section 2.1, the negative effects of agency costs can be mitigated through the presence of a large shareholder. From their influential position, large shareholders can effectively control management and by doing so improve firm performance (Shleifer & Vishny, 1986). This theory is known as the monitoring hypothesis. On the other side, Denis and McConnell (2003) argue that large blockholders can profit from private benefits of control, moving their focus from maximizing shareholder value to maximizing their private benefits. This extraction of private benefits by large shareholders can ultimately harm firm performance.

Several studies have provided evidence in support of the monitoring hypothesis. Kaplan and Minton (1994) use a sample of Japanese firms to show that large shareholders fulfill an important role in monitoring the companies in which they hold a stake. Gorton and Schmid (2000) analyze German firms and find a positive relationship between the concentration of equity control rights and firm performance. Finally, Agrawal and Mandelker (1990) find support for the monitoring hypothesis when considering the role of large shareholders with respect to monitoring managers in the United States.

These empirical findings create the expectation that firm performance will be higher when ownership is concentrated. Therefore, the following hypothesis will be tested in this study:

*Hypothesis 1: Ownership concentration has a positive effect on firm performance.*

Another relationship that has been covered quite extensively in the literature is that between ownership concentration and firm innovation. Before moving on to considering this relationship, it is essential to briefly discuss the properties of innovation. Firstly, innovation is associated with high levels of initial investment and uncertainty over its output (Hall, 2005). Goodacre and Tonks (1995) point out how there generally exists a long period between the initial investment in a new research and development (R&D) project and its completion. Furthermore, a firm's potential to capitalize on innovational success significantly depends on the human capital of its employees and will thus be lost if they leave the firm (Hall, 2005).

Overall, it can be concluded that firm innovation is risky due to the high costs and uncertainty regarding the output. For risk-averse managers, this could be a reason to abstain from innovation as much as possible, because an expensive innovational project that fails might lead to them losing their position (Minetti, Murro & Paiella, 2015). Next to this, Manso (2011) argues that managers might be more inclined to underinvest in innovation to protect shareholders. This argument is based on the notion that the market is not always able to adequately value the potential proceedings of innovation and high levels of investment in innovation could therefore lead to a decrease in share price, making the company an attractive target for hostile takeovers (Stein, 1988). In these cases, the presence of a large shareholder can reduce the agency conflict that arises due to the different risk preferences between shareholders and management. According to Zeckhauser and Pound (1990), large shareholders are more inclined to focus on the long-term profitability of the firm and from their position they can effectively influence managers to invest in innovation.

Others have advocated a negative relationship between ownership concentration and firm innovation. Shareholders become more risk-averse towards a firm's activities once their ownership stake in that firm increases (Denis et al., 1997). Asensio-López et al. (2019) argue that this higher level of risk-aversity makes large shareholders more conservative and therefore less willing to invest in innovative undertakings. Moreover, they argue that large shareholders can opt for extracting private benefits from the firm over investing in the long-term success of the firm through innovation.

Empirical findings in the academic literature have provided support for a positive relationship between ownership concentration and firm innovation. For example, firms in South Korea with concentrated ownership have higher innovative output compared to firms with diffuse ownership (Chang et al., 2006; Mahmood & Mitchell, 2004). Francis and Smith (1995) investigate the relationship between agency costs and innovation in the United States and find that firms with a higher degree of

ownership concentration are more innovative. Based on these empirical findings and the mechanism discussed above, the following hypothesis will be tested:

Hypothesis 2: *Ownership concentration has a positive effect on firm innovation.*

### **2.3.2 Family ownership**

Family-owned businesses are a common organizational form in most countries, making them an important contributor to economies across the globe. There is a wide strain of academic literature that has been conducted on these types of firms. Sharma (2004) concludes that the conceptualization and sophistication of research into family-owned firms are increasing over time, based on the review of 217 studies. Through the mechanisms of agency theory, family ownership can have several effects on firm-specific outcomes.

The first effect that will be analyzed in this context is that of family ownership on firm performance. Fama and Jensen (1983) propose that the sizeable presence of a family within the ownership structure of the firm can lead to a reduction of the agency conflict, in case the family has a position within management. This would mean that the separation between ownership and control is no longer strictly present. On the other side, Schulze et al. (2001) argue that family ownership makes it harder to resolve agency problems, due to the altruistic dynamics that play a role within families. Altruistic individuals find their welfare positively linked to the welfare of other individuals (Simon, 1993). This trait is naturally present within families and therefore also affects the behavior of family members in a family-owned firm. Their position enables members from a controlling family to be generous to one another when it comes to for example providing job security or granting privileges. While this generosity can improve the welfare of individual family members, it will generally harm firm performance (Schulze et al., 2001). In conclusion, multiple mechanisms at play can cause family-owned firms to perform both better and worse compared to firms with different ownership structures.

Empirical research has provided mixed results with respect to the effect of family ownership on firm performance. Maury (2006) investigates the effect of family ownership on firm performance in Western Europe and finds that active family ownership is associated with higher profitability and both active and passive family ownership lead to a higher firm valuation. Anderson and Reeb (2003a) find a positive relationship between family ownership and firm performance within firms from the United States, both for firm valuation and return on assets. However, they do conclude that the effect becomes weaker once the stake of family ownership surpasses 30%. These findings could be driven by family owners that expropriate firm assets for their private benefits, resulting from the agency problem between majority and minority shareholders. Ng (2005) uses a sample of listed firms in Hong Kong and finds that family ownership improves firm performance, but high levels of family ownership are associated with lower firm performance.

Based on these empirical findings, it seems that family ownership can positively affect firm performance, but this effect becomes negative when the family's ownership becomes too concentrated. Therefore, the following hypothesis will be tested:

Hypothesis 3: Family control has a negative effect on firm performance.

Another relationship debated in the academic literature is that of family ownership and firm innovation. As discussed in the previous section, investments in innovation are accompanied by uncertainty and high costs. These propositions make investing in innovation less attractive for risk-averse agents. According to Anderson and Reeb (2003b), the portfolio of family owners is usually less diversified compared to other shareholders, making them more exposed to risks in the firms that they hold. This could lead to family owners preferring more conservative corporate decisions, making them opt for secure investments in ongoing business activities over more risky investments in new innovative projects (Anderson, Duru & Reeb, 2012). Next to this, families may prefer an increase in their private wealth over firm growth. This could result in them using their position to increase dividends, leaving less room to invest in innovation (Morck & Yeung, 2003).

On the other hand, family ownership could lead to higher levels of innovation. Family owners are generally committed to the long-term success of the firm and hold a long-term perspective, making them more willing to invest in the future of the firm through innovation (James, 1999). Furthermore, family owners have usually been with the firm for a relatively long time and have a thorough understanding of the business and its underlying process. This helps reduce the information asymmetry between the family and the managers, making it easier for the family to monitor management and advocate making necessary investments in innovation to keep the business going (Anderson & Reeb, 2003b; Miller & Le Breton-Miller, 2005).

Empirical research has mostly provided evidence for a negative relationship between family ownership and firm innovation. Block (2012) investigates family-owned firms in the United States and finds that family firms invest less in innovation compared to other firms. Sciascia et al. (2015) analyze the innovational practices of 240 small- and medium-sized Italian firms and find that family ownership leads to less innovation, but only if the socioeconomic wealth of the family depends highly on the firm's success. This result supports the theory that low investment portfolio diversification leads to families being more risk averse. Finally, Choi et al. (2015) find a negative relationship between family ownership and R&D spending, using a sample of Korean firms.

Based on the empirical findings discussed above, it appears that the negative aspects of family ownership outweigh the positive aspects with respect to firm innovation. Therefore, the following hypothesis will be tested:

Hypothesis 4: Family control has a negative effect on firm innovation.

## **2.4 Effects of different legal systems**

The foregoing sections have presented several mechanisms surrounding ownership structure on both firm performance and firm innovation. La Porta et al. (2000) show that there are cross-country differences in corporate governance and that these differences can be explained by the differences in the legal environments of those countries. Differences in the protection of shareholder rights and transparency requirements can lead to different country-specific outcomes in the field of corporate governance.

Managerial incentives to pursue personal benefits are reduced when they are governed by a developed legal environment, with stronger shareholder protection and higher levels of transparency (Burkart & Panunzi, 2006). This decrease in incentives can in turn lower the monitoring effects that the presence of a large shareholder has on both the improvement of firm performance and firm innovation. This follows from the fact that there is no need to monitor a manager that behaves accordingly. Simultaneously, shareholders in weaker legal environments could benefit more from the concentration of ownership, since effective monitoring can have a bigger impact on disciplining management and thereby improving firm performance and firm innovation.

The lack of good investor protection laws allows controlling families to more easily divert corporate resources to their private wealth (Burkart, Panunzi & Shleifer, 2003). This could incentivize a controlling family to extract private benefits from the firm thereby harming firm performance. The absence of investor protection laws will make it harder for minority shareholders to intervene in the firm's decision-making process, leaving them practically helpless to counter the negative effects of family control on firm performance and innovation.

Based on the potential effects of the legal environment, the following hypothesis will be tested:

Hypothesis 5: Legal environment has an effect on the strength of the relationships with ownership concentration and family control on the one side and firm performance and innovation on the other side.

## **2.5 Determinants of firm performance and firm innovation**

The goal of this study is to measure the effect of ownership structure on firm performance and firm innovation. In order to do so, it is crucial to identify other determinants of firm performance and firm innovation, so that these can be included in the analysis. Leaving these other factors out of the analysis could lead to a result that is subject to omitted variable bias. This section will therefore briefly discuss the other determinants of firm performance and firm innovation.

Next to ownership structure, several other firm-specific factors have a proven influence on firm performance. Firstly, firm size can affect firm performance, since larger firms might suffer from an increase in agency problems, harming firm performance (Conheady et al., 2015). The cash ratio of a firm can also influence firm performance. On the one hand, sufficient cash holdings put the company in

a comfortable position of financial flexibility, decreasing the chances of financial distress (Fresard, 2010). On the other hand, Jensen (1986) argues that excessively large cash holdings can incentivize managers to make decisions that do not contribute to increasing firm value. Notwithstanding the sign of the relationship, a firm's cash ratio has been proven to affect firm performance (Hatem, 2014). Another factor that can influence firm performance is the age of a firm. According to Coad et al. (2018) this relationship works through "mechanisms such as routinization, accumulated reputation and organizational rigidity", increasing the performance of a firm. Finally, a firm's debt ratio can influence firm performance. Including debt in the capital structure can work as a disciplinary measure for management and enables firms to benefit from the tax shield. High levels of debt can however decrease firm performance due to costs of financial distress (Zeitun & Tian, 2014). Through these mechanisms, the debt level of a firm can affect firm performance.

Besides ownership structure, there exist other determinants that can influence firm innovation. Possibly the biggest determinant in levels of firm innovation is the industry that the firm operates in. Industry characteristics determine the innovative process of firms operating in that industry and to what extent firms can innovate (Malerba, 2002). The size of a firm can also affect firm innovation. Some believe that firm size and innovation are positively related because larger firms have more resources at their disposal to invest in innovation. On top of this, they can reduce risk by diversifying R&D investments, and they have the scale to monetize their investments in innovation (Acs & Audretsch, 1988; Cohen & Levin, 1989). Others believe however that smaller firms can outperform larger firms in innovation because smaller firms do not suffer from bureaucratic procedures, making them more flexible in investing in innovation (Cooper, 1964). Empirical studies into this matter have been inconclusive, but the explanatory power of firm size on innovation has been established. Another determinant of firm innovation is the debt level of a firm. Manso (2011) argues that high debt levels can have a limiting effect on firm innovation because firms are pressured to meet debt obligations and therefore have less funds available to invest in innovation. Aghion et al. (2004) find that firms that innovate more tend to have lower levels of leverage compared to firms that innovate less. Finally, the profitability of a firm can influence its innovative practices. Profitable firms wanting to invest in innovation rely less on external financing, making it easier for them to allocate funds to R&D investments. This increases their ability to remain innovative compared to less profitable firms. (Aghion, Van Reenen & Zingales, 2013; Hall, 1992).



## CHAPTER 3 Data & Methodology

This section describes the data and methods that will be used to conduct the analysis of this study. Firstly, the process of sample selection and data gathering will be described. Thereafter, the different variables used in the analysis will be presented. Consequently, the estimation models that will be used to test the hypothesis will be discussed. The section will conclude with the presentation of some descriptive statistics of the data sample.

### ***3.1 Sample selection and data gathering***

This analysis of this study will focus on the market of the European Union, by using firm panel data from 10 European countries. All data is retrieved from the Bureau Van Dijk (BvD) Orbis database. This database provides financial data of a total of 489 million companies worldwide, including both listed and private firms. The sample selection is based on the following criteria to create a sample of medium to large-sized European firms from developed and emerging markets:

- The firm must be headquartered in one of the following countries: Bulgaria, Croatia, Finland, Germany, Hungary, Italy, Poland, Romania, Spain or Sweden;
- The firm has a value for the BvD Independence Indicator with a high confidence interval;
- The total assets of the firm must have a minimum value of 20 million USD based on the last known value provided by Orbis;
- The yearly operating revenue of the firm must have a minimum value of 50 million USD based on the last known value provided by Orbis;
- Following Fama and French (1992) firms from the financial and insurance industry are excluded from the sample since these industries are highly regulated and characterized by high levels of leverage and including firms from these industries could therefore lead to biased results.

Based on these search criteria, a total of 38,786 firms are included in the sample. The next step in the data-gathering process is to collect financial information for these firms. The following financial variables are obtained from the Orbis database: earnings before interest and tax (EBIT), total assets, operating profit, current liabilities, loans and short term debt, long term debt, cash holdings, and R&D-expenses scaled by operating revenue. For all these variables, data from the last available year up until 9 years prior relative to that year are obtained for each firm.

Next to the financial information, there is also data retrieved concerning the ownership structure of the firms in the sample. Firstly, for each firm, there is a value present for the BvD Independence Indicator. For those firms that have a global ultimate owner, Orbis provides an ownership classification to which the GUO belongs. Furthermore, the total number of patent publications, date of incorporation, the SIC industry code, country of origin and a BvD Identification number are also added to the dataset for each firm.

To enlarge the data sample, older data for the same firms is added to the sample from the Orbis historical database. The older and newer financial data are matched on the BvD identification numbers, that are assigned to each unique firm. By using these identification numbers, the firm ownership data, patent data, date of incorporation, SIC code and country of origin are also added to the older financial data. By doing this, the assumption is made that the ownership data from the most recent year is representable for all firm-year observations for the entire sample period. The total sample period runs from 1984 to 2023 and consists of 682,897 firm-year observations.

### **3.2 Variables**

This section will present and briefly describe all variables that will be used in the analysis of this study. These variables have been generated by making use of the collected data that is described in the previous section.

#### *dConcentrated*

The first main independent variable is the dummy variable *dConcentrated*, which takes the value ‘0’ for firms with low ownership concentration and the value ‘1’ for firms with high ownership concentration. For each firm, the allocation to one of these categories is based on the value of the BvD Independence Indicator for that firm. This indicator is created by BvD and provides information on the degree of ownership concentration for a specific firm, taking values from A to D. The most independent companies are assigned a letter A, with the criteria that all recorded shareholders hold less than 25% of the shares in the company. The letter B is assigned to companies in which all individual shareholders hold less than 50% of the shares, while one shareholder holds at least 25%. Next comes the letter C, that is assigned to companies that have multiple shareholders, where one shareholder must hold at least 50% of the shares in the company. Finally, the letter D gets assigned to those companies that only have one shareholder, so that ownership is completely concentrated. Within the scope of this study, those companies that have a value equal to ‘A’ are considered to have low ownership concentration and will therefore be assigned the value ‘0’ for the variable *dConcentrated*. Firms with other values are understood to have higher degrees of ownership concentration and will thus be assigned a value ‘1’. As a robustness check, an additional dummy variable, *dConcentrated2*, is created. For this variable, firms with an Independence value A or B will be assigned the value ‘0’, and firms with an Independence value of C or D will be assigned the value ‘1’. This additional dummy variable thus increases the number of firms that are considered independent within the sample.

#### *dFamilyControlled*

The second main independent variable is the dummy variable *dFamilyControlled*, which relates to the strong presence of a family in the ownership structure of a firm. The variable takes on the value ‘1’ when two criteria are met. Firstly, the global ultimate owner of a firm must be typed as ‘One or more

named individuals or family', based on the data provided by Orbis. Secondly, the firm must be considered to have concentrated ownership, based on the value of *dConcentrated*. For firms with dispersed ownership or another type of global ultimate owner, the variable takes on the value '0'.

#### *dEmerging*

The final main independent variable is the dummy variable *dEmerging*. This dummy variable is based on the country code for each firm and takes the value '1' if a firm originates from Bulgaria, Croatia, Hungary, Poland or Romania, following Hermann and Winkler (2009). Firms that originate from Finland, Germany, Italy, Spain or Sweden get assigned the value '0'.

#### *ROA*

The first main dependent variable is the return on assets (ROA), which is used as a proxy for firm performance. The same variable will also be used as a control variable in the analysis of firm innovation. For each firm-year the variable is calculated as shown in equation 1:

$$ROA = EBIT/Total\ Assets * 100\% \quad (1)$$

#### *R&D/OR*

The second main dependent variable is expenditures on research and development, scaled by operating revenue (R&D/OR). For the more recent part of the data sample, this variable was directly available in Orbis. For the older part of the data sample, this variable was computed for each firm-year as shown in equation 2:

$$R\&D/OR = R\&D\ Expenditures/Operating\ Revenue \quad (2)$$

For the observations for which data on R&D/OR is missing, it is assumed that the expenditures on R&D were equal to 0 and because of this the value for those observations for this variable will be equal to 0.

#### *PatentCount*

The third main dependent variable is the number of patent's that a firm has successfully applied for. This number is provided by Orbis based on the latest available year with data and is considered to be constant for each firm over the full sample period.

#### *Size*

The first control variable that will be used is the size of each firm. This variable is created for each firm-year observation by taking the logarithmic value of a firm's total assets for that year.

### *Leverage*

The second control variable is firm leverage. This variable is used as a measure of a firm's debt level compared to its assets and is computed as shown in equation 3:

$$\text{Leverage} = (\text{Short Term Debt} + \text{Long Term Debt}) / \text{Total Assets} \quad (3)$$

Since it is not possible for Leverage to take negative values, all observations with a negative value for this variable will be eliminated from the sample.

### *Age*

The third control variable is the firm's age. This variable is constructed for each firm-year observation by taking the year of incorporation of a firm and subtracting this from the year of that observation. Therefore, the age variable grows throughout the sample period for each unique firm.

### *CashRatio*

The final control variable is the cash ratio of a firm. For each firm-year, the cash ratio is computed as shown in equation 4:

$$\text{Cash Ratio} = (\text{Cash \& Cash Equivalents} / \text{Current Liabilities}) * 100\% \quad (4)$$

Since it is not possible for this ratio to be negative, all observations with a negative value for the variable CashRatio will be dropped from the sample.

## **3.3 Models**

To test the hypotheses presented in the previous chapter, this study will use either ordinary least squares firm-year panel regressions or negative binomial firm-year regressions. These regression models will be created and run in Stata, a statistical software package for data analysis. Some models will include industry and country fixed effects. For each firm, the industry fixed effects are generated using the firm's SIC code and the country fixed effects are generated using the firm's country of origin. Firm fixed effects are not applied, since the explanatory variables hold constant values for each firm over the full sample period. Finally, all regression models will include robust standard errors since there is heteroscedasticity observed in the sample. The 15 statistical models that will be used to test the five hypotheses from the previous chapter will now be presented.

### *Hypothesis 1*

To test the first hypothesis related to ownership concentration and firm performance, the following models will be used:

$$ROA_{it} = \alpha_{it} + \beta_1 dConcentrated + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 Age_{it} + \beta_5 CashRatio_{it} + fixed\ effects + \varepsilon_{it} \quad (1)$$

$$ROA_{it} = \alpha_{it} + \beta_1 dConcentrated2 + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 Age_{it} + \beta_5 CashRatio_{it} + fixed\ effects + \varepsilon_{it} \quad (2)$$

Model 1 is the main model, using the dummy variable *dConcentrated*. Model 2 functions as a robustness check and therefore uses the dummy variable *dConcentrated2*. Both models will be run as an ordinary least squares regression, once with fixed effects and once without.

### *Hypothesis 2*

To test the second hypothesis, related to ownership concentration and firm innovation, the following models will be used:

$$R\&D/OR_{it} = \alpha_{it} + \beta_1 dConcentrated + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 CashRatio_{it} + \beta_5 ROA_{it} + fixed\ effects + \varepsilon_{it} \quad (3)$$

$$R\&D/OR_{it} = \alpha_{it} + \beta_1 dConcentrated2 + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 CashRatio_{it} + \beta_5 ROA_{it} + fixed\ effects + \varepsilon_{it} \quad (4)$$

$$PatentCount_{it} = \alpha_{it} + \beta_1 dConcentrated + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 CashRatio_{it} + \beta_5 ROA_{it} + \beta_6 Age_{it} + \varepsilon_{it} \quad (5)$$

$$PatentCount_{it} = \alpha_{it} + \beta_1 dConcentrated2 + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 CashRatio_{it} + \beta_5 ROA_{it} + \beta_6 Age_{it} + \varepsilon_{it} \quad (6)$$

Models 3 and 4 will be run as an ordinary least squares regression, once with fixed effects and once without. Models 5 and 6 will be executed as a negative binomial regression without fixed effects.

### *Hypothesis 3*

To test the third hypothesis, related to family control and firm performance, the following model will be used:

$$ROA_{it} = \alpha_{it} + \beta_1 dFamilyControlled + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 Age_{it} + \beta_5 CashRatio_{it} + fixed\ effects + \varepsilon_{it} \quad (7)$$

Model 7 will be run as an ordinary least squares regression, once with fixed effects and once without.

#### *Hypothesis 4*

To test the fourth hypothesis, related to family control and firm innovation, the following models will be used:

$$R\&D/OR_{it} = \alpha_{it} + \beta_1 dFamilyControlled + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 CashRatio_{it} + \beta_5 ROA_{it} + fixed\ effects + \varepsilon_{it} \quad (8)$$

$$PatentCount_{it} = \alpha_{it} + \beta_1 dFamilyControlled + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 CashRatio_{it} + \beta_5 ROA_{it} + \beta_6 Age_{it} + \varepsilon_{it} \quad (9)$$

Model 8 will be run as an ordinary least squares regression, once with fixed effects and once without.

Model 9 will be executed as a negative binomial regression without fixed effects.

#### *Hypothesis 5*

To test the final hypothesis, related to the effects of the legal environment on the previous relationship, the following models will be used:

$$ROA_{it} = \alpha_{it} + \beta_1 dConcentrated\#\#\#dEmerging + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 Age_{it} + \beta_5 CashRatio_{it} + fixed\ effects + \varepsilon_{it} \quad (10)$$

$$R\&D/OR_{it} = \alpha_{it} + \beta_1 dConcentrated\#\#\#dEmerging + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 CashRatio_{it} + \beta_5 ROA_{it} + fixed\ effects + \varepsilon_{it} \quad (11)$$

$$PatentCount_{it} = \alpha_{it} + \beta_1 dConcentrated\#\#\#dEmerging + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 CashRatio_{it} + \beta_5 ROA_{it} + \beta_6 Age_{it} + \varepsilon_{it} \quad (12)$$

$$ROA_{it} = \alpha_{it} + \beta_1 dFamilyControlled\#\#\#dEmerging + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 Age_{it} + \beta_5 CashRatio_{it} + fixed\ effects + \varepsilon_{it} \quad (13)$$

$$R\&D/OR_{it} = \alpha_{it} + \beta_1 dFamilyControlled_{it} + \beta_2 dEmerging_{it} + \beta_3 Size_{it} + \beta_4 Leverage_{it} + \beta_5 CashRatio_{it} + \beta_6 ROA_{it} + fixed\ effects + \varepsilon_{it} \quad (14)$$

$$PatentCount_{it} = \alpha_{it} + \beta_1 dFamilyControlled_{it} + \beta_2 dEmerging_{it} + \beta_3 Size_{it} + \beta_4 Leverage_{it} + \beta_5 CashRatio_{it} + \beta_6 ROA_{it} + \beta_7 Age_{it} + \varepsilon_{it} \quad (15)$$

These models all contain an interaction term with either *dConcentrated* or *dFamilyControlled* on the one side and *dEmerging* on the other side. Models 10, 11, 13, and 14 will be run as an ordinary least squares regression, once with fixed effects and once without. Models 12 and 15 will be executed as a negative binomial regression without fixed effects.

### 3.4 Descriptive Statistics

Table 1 shows the distribution of the unique firms across the different countries and the data on ownership structure for each country and the full sample. In total the groups of developed countries and emerging countries are made up of 33,146 and 5,640 unique firms respectively. Over the whole sample, 95.5% of firms are considered to have concentrated ownership based on the allocation of the *dConcentrated* variable. When considering the allocation criteria of the *dConcentrated2* variable, this percentage drops to 81,6%. When the allocation method changes, Italy shows the highest decline with a drop in concentrated ownership of almost 18%. Hungary has the highest degree of firms with concentrated ownership under both allocation methods.

The firms that have a controlling family in their corporate governance structure make up a total of 23,5% of the sample. Firms that are controlled by families are most rare in the Scandinavian countries Finland and Sweden. Hungary and Spain also have relatively low levels of family-controlled firms, while Bulgaria shows the highest level of firms with a family as a controlling shareholder.

Table 2 provides descriptive statistics of the three dependent variables and the control variables for the full sample. Due to the extreme values present in the variables ROA, R&D/OR, Leverage and CashRatio, these variables are winsorized in Stata to reduce the effect of outliers on the outcome of the analysis. The descriptive statistics for the variables ROA\_w, R&D/OR\_w, Leverage\_w and CashRatio\_w show that winsorizing has strongly reduced the presence of extreme values.

The correlation matrix in table 3 displays the correlation between all variables that are used in the analysis. The highest correlation is present between the two independent variables *dConcentrated* and *dConcentrated2*, which can be explained by the similar way in which these variables were created. There is a moderate correlation present between some control variables, for example between size and leverage and between size and age. However, the matrix shows that the correlation between variables is mainly low.

**Table 1**

Distribution of Firms and Ownership Data by Country.

	Full sample	dConcentrated		dConcentrated2		dFamily-Controlled	
	N	N	%	N	%	N	%
Bulgaria	507	500	98,6	460	90,7	198	39,1
Croatia	260	251	96,5	227	87,3	83	31,9
Finland	1,298	1,190	91,7	1,040	80,1	174	13,4
Germany	12,526	11,991	95,7	10,057	80,3	2,923	23,3
Hungary	502	496	98,8	468	93,2	89	17,7
Poland	3,357	3,288	97,9	2,865	85,3	835	24,9
Italy	10,593	9,954	94,0	8,061	76,1	3,098	29,2
Romania	1,014	1.000	98,6	897	88,5	316	31,2
Spain	6,027	5,814	96,5	5,165	85,7	1,129	18,7
Sweden	2,702	2,554	94,5	2,393	88,6	267	9,9
Full sample	38,786	37,038	95,5	31,633	81,6	9,112	23,5

**Table 2**

Descriptive Statistics of Dependent and Control Variables.

	N	Mean	Standard Deviation	Min	Max	Skewness	Kurtosis
ROA	660,215	8.82	490.09	-389,556.1	38,025.04	-760.11	604,837.4
ROA_w	660,215	9.31	10.61	-47.36	107.21	0.77	5.83
R&D/OR	681,588	0.17	40.90	-5.27	31,403.34	689.43	515,097.2
R&D/OR_w	681,588	0.03	0.27	0	13.20	9.55	108.36
PatentCount	277,347	659.55	8,183.03	1	583,214	44.38	2,541.47
Size	660,215	14.69	3.56	-6.82	26.38	-0.00	1.92
Leverage	660,215	475.57	241,183.3	0	1.77e+08	650.96	455,069,1
Leverage_w	660,215	0.58	2.84	0	41.75	9.65	108.40
CashRatio	650,898	21,218.79	1.41e+07	0	1.13e+10	796.19	638,910.8
CashRatio_w	650,898	49.60	258.07	0	9,379.17	23.08	656.22
Age	681,588	34,51	28,71	1	783	3.81	48.73

**Table 3**

Correlation Matrix for the Variables.

Variable	1	2	3	4	5	6	7	8	9	10
1. dConcentrated	-									
2. dConcentrated2	47	-								
3. dFamilyControlled	12	26	-							
4. dEmerging	05	08	-02	-						
5. ROA_w	01	-01	03	-01	-					
6. R&D/OR_w	-03	-01	-02	-07	01	-				
7. PatentCount	-07	-04	-01	-03	00	13	-			
8. Size	-04	-02	-06	-04	17	02	09	-		
9. Leverage_w	01	01	01	-01	-05	08	-01	-20	-	
10. CashRatio_w	-01	-01	-01	-03	01	00	00	02	-00	-
11. Age	-07	-07	-03	-12	06	05	11	20	-03	02

Notes: Decimal points omitted.



## CHAPTER 4 Results

This chapter presents and analyses the results following from the ordinary least squares and negative binomial regression models. In order of the five hypotheses, the tables with the results of the relevant regression models will be presented and discussed.

### 4.1 Testing hypothesis 1

This section provides an analysis of hypothesis 1: *Ownership concentration has a positive effect on firm performance*. Table 4 contains the results of the regression models capturing the relationship between ownership concentration and ROA. The coefficients for *dConcentrated* in models 1 and 2 are both positive and significant, indicating that concentration of ownership increases ROA with respectively 0.74% and 0.33%. These findings show that firms with medium to high levels of ownership concentration obtain higher firm performance, which is in line with hypothesis 1.

When analyzing the coefficients for *dConcentrated2* in models 3 and 4, another relationship between ownership concentration and ROA becomes visible. The statistically significant coefficient for *dConcentrated2* in model 4 shows that a higher concentration of ownership decreases ROA on a yearly basis with 0.53%. This is an indication that the positive effects of ownership concentration on ROA are limited to a medium degree of ownership concentration, whereas high degrees of ownership concentration appear to have a negative effect on ROA. To further investigate this indication, a new dummy-variable is introduced: *dConcentratedB*. This dummy variable takes on the value 1 only for those firms that are assigned a letter 'B' based on the allocation regime of the BvD Independence Indicator. This dummy variable is used as the main explanatory variable in two new regression models, from which the output is displayed in table 5. The significant coefficients for *dConcentratedB* in models 1 and 2 show that ROA is 0.33% to 0.79% higher for firms with medium ownership concentration, compared to all other firms in the sample. Based on these results, the positive relationship between ownership concentration and firm performance that is found based on models 1 and 2 of table 4 seems to be driven by firms with medium ownership concentration. The coefficients for *dConcentrated2* in models 3 and 4 of table 4 indicate that the positive effects of ownership concentration on firm performance disappear once ownership becomes too concentrated, i.e. with only one shareholder or a single shareholder that holds at least 50% of the firm's shares. This result could be explained by the extraction of private benefits from the firm by a large shareholder that faces no control by other large shareholders, while "B" firms will typically have multiple large blockholders present in the corporate governance structure. In summary, the first hypothesis seems to be correct when comparing firms with medium to high ownership concentration to firms with low ownership concentration. However, when considering only firms with high ownership concentration, the regression models show a negative effect of ownership concentration on firm performance. Thus, the relationship between ownership concentration and firm performance is positive in cases of medium

**Table 4**

Ordinary Least Squares Models for Ownership Concentration and ROA.

Variables	Dependent variable: ROA_w			
	(1)	(2)	(3)	(4)
dConcentrated	0.743*** (0.111)	0.331*** (0.074)		
dConcentrated2			-0.036 (0.068)	-0.533*** (0.060)
Size	0.111 (0.221)	0.213 (0.219)	0.106 (0.222)	0.214 (0.217)
Leverage_w	-0.064*** (0.019)	-0.052** (0.019)	-0.064*** (0.019)	-0.051** (0.019)
CashRatio_w	0.000*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Age	0.008** (0.003)	0.001 (0.003)	0.008** (0.003)	0.000 (0.003)
Constant	2.653 (0.125)	2.610 (3.138)	7.556** (3.189)	3.611 (3.072)
Observations	633,342	633,256	633,342	633,256
R-squared	0.025	0.074	0.025	0.074
Robust standard errors	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	No	Yes	No	Yes
Country fixed effects	No	Yes	No	Yes

Notes: Robust standard errors are reported in parentheses, \*p&lt;0.1, \*\* p&lt;0.05, \*\*\*p&lt;0.01.

ownership concentration, due to monitoring of firm management by shareholders. Once ownership becomes highly concentrated, the effects of monitoring appear to be outweighed by the effects of extraction of private benefits, resulting in a negative relationship between highly concentrated ownership and firm performance.

## 5.2 Testing hypothesis 2

This section provides the results used to analyze hypothesis 2: *Ownership concentration has a positive effect on firm innovation*. To test this hypothesis, two dependent variables are used: R&D/OR and PatentCount. The number of observations for the PatentCount variable is considerably smaller than for the R&D/OR variable, which causes a significant difference in the size of the sample that can be used to run the models that use these two variables as the dependent variable. This could potentially lead to different results due to a difference in the sample that is used. Therefore, the tables that contain R&D/OR as the dependent variable will consist of two panels. The first panel includes results that are based on the full sample size for R&D/OR, whereas the second panel contains results based on a sample size that is limited to those observations that also have a value for the PatentCount variable.

**Table 5**

Ordinary Least Squares Models for B-Concentrated Ownership and ROA.

Variables	Dependent variable: ROA_w	
	(1)	(2)
dConcentratedB	0.329*** (0.072)	0.787*** (0.071)
Size	0.109 (0.221)	0.217 (0.217)
Leverage_w	-0.064*** (0.019)	-0.051** (0.019)
CashRatio_w	0.000 (0.000)	0.000 (0.000)
Age	0.008** (0.003)	0.001 (0.003)
Constant	7.466** (3.170)	3.027 (3.078)
Observations	633,342	633,256
R-squared	0.025	0.075
Robust standard errors	Yes	Yes
Year fixed effects	Yes	Yes
Industry fixed effects	No	Yes
Country fixed effects	No	Yes

Notes: Robust standard errors are reported in parentheses, \*p&lt;0.1, \*\* p&lt;0.05, \*\*\*p&lt;0.01.

Table 6 provides the results of the regression models related to ownership concentration and R&D-expenditures. The results of model 1 and 2 in panel A show that the coefficient for *dConcentrated* takes on a significant negative value in both models. Models 1 and 2 show that investment in R&D scaled by operating revenue is respectively 0.04% and 0.03% lower for firms with concentrated ownership. The coefficients for *dConcentrated2* in models 3 and 4 show a similar relationship, both indicating a decrease in investments of 0.01%. Panel B of table 6 shows very similar results for the smaller sample size, with coefficients for *dConcentrated* and *dConcentrated2* that are only marginally higher. Although the sign of the coefficients is not in line with hypothesis 2, the absolute values of the coefficients is nearly zero and therefore it can be concluded that ownership concentration has no real effect on R&D-investments.

Table 7 displays the results of the negative binomial regression models capturing the relationship between ownership concentration and total patents. The table shows that both *dConcentrated* and *dConcentrated2* have significant negative coefficients. The exponentiated coefficient for *dConcentrated* is equal to 0.843 and the exponentiated coefficient for *dConcentrated2* is equal to 0.963. So, based on model 1, firm with concentrated ownership have a total expected number of patents that is 84.3% of the total expected patents of firms with non-concentrated ownership. Based on model 2 this percentage increases to 96.3%. These findings are again not in line with the hypothesis and

**Table 6**

Ordinary Least Squares Models for Ownership Concentration and R&amp;D-Expenditures.

Panel A				
Dependent variable: R&D/OR_w				
Variables	(1)	(2)	(3)	(4)
dConcentrated	-0.037*** (0.008)	-0.025*** (0.006)		
dConcentrated2			-0.009*** (0.003)	-0.012*** (0.002)
Size	0.009*** (0.002)	0.007*** (0.001)	0.009*** (0.002)	0.007*** (0.001)
Leverage_w	0.009*** (0.001)	0.008*** (0.001)	0.009*** (0.001)	0.008*** (0.001)
CashRatio_w	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ROA_w	0.001*** (0.000)	0.000*** (0.000)	0.001*** (0.000)	0.000*** (0.000)
Constant	-0.081*** (0.026)	-0.071*** (0.018)	-0.112*** (0.025)	-0.085*** (0.017)
Observations	633,342	633,256	633,342	633,256
R-squared	0.006	0.065	0.005	0.065
Robust standard errors	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	No	Yes	No	Yes
Country fixed effects	No	Yes	No	Yes
Panel B				
Dependent variable: R&D/OR_w				
Variables	(1)	(2)	(3)	(4)
dConcentrated	-0.059*** (0.013)	-0.035*** (0.008)		
dConcentrated2			-0.019*** (0.004)	-0.022*** (0.004)
Size	0.017*** (0.002)	0.016*** (0.002)	0.018*** (0.002)	0.016*** (0.002)
Leverage_w	0.013*** (0.001)	0.013*** (0.001)	0.013*** (0.001)	0.013*** (0.001)
CashRatio_w	0.000 (0.000)	0.000*** (0.000)	0.000 (0.000)	0.000*** (0.000)
ROA_w	0.001*** (0.000)	0.000*** (0.000)	0.001*** (0.000)	0.000*** (0.000)
Constant	-0.178*** (0.026)	-0.232*** (0.026)	-0.225*** (0.025)	-0.270*** (0.017)
Observations	256,595	256,546	256,595	256,546
R-squared	0.013	0.093	0.012	0.093
Robust standard errors	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	No	Yes	No	Yes
Country fixed effects	No	Yes	No	Yes

Notes: Robust standard errors are reported in parentheses, \*p&lt;0.1, \*\* p&lt;0.05, \*\*\*p&lt;0.01.

**Table 7**

Negative binomial Regression Models for Ownership Concentration and PatentCount.

Variables	Dependent Variable: PatentCount	
	(1)	(2)
dConcentrated	-0.171*** (0.008)	
dConcentrated2		-0.038*** (0.005)
Size	0.021*** (0.001)	0.021*** (0.001)
Leverage_w	-0.000 (0.001)	-0.000 (0.001)
CashRatio_w	0.000*** (0.000)	0.000*** (0.000)
ROA_w	-0.001*** (0.000)	-0.001*** (0.011)
Age	0.002*** (0.000)	0.002*** (0.000)
Constant	-1.753*** (0.012)	-1.889*** (0.011)
Observations	256,595	256,595
Robust standard errors	No	No
Year fixed effects	Yes	Yes
Industry fixed effects	No	No
Country fixed effects	No	No

Notes: Robust standard errors are reported in parentheses, \*p&lt;0.1, \*\* p&lt;0.05,\*\*\*p&lt;0.01.

especially the result of model 1 shows a clear difference between firms with non-concentrated ownerships and firms with concentrated ownership.

In conclusion, the results displayed in tables 6 and 7 show no support of hypothesis 2. On the one side, the results with respect to R&D-expenditures can be considered inconclusive due to the small absolute value of the coefficients for the main explanatory variables. On the other side, the results with respect to the number of patents lead to the conclusion that there is a negative relationship between ownership concentration and the number of patents. These results can be explained by the theory of misalignment of risk appetites between shareholders and management. Large shareholders hold a more conservative viewpoint on corporate spending and are less willing to invest in innovation compared to firm management. Based on these results, it can be concluded that ownership concentration is not positively related with firm innovation.

### 5.3 Testing Hypothesis 3

This section focuses on the results related to hypothesis 3: *Family control has a negative effect on firm performance*. Table 8 shows the results of the two regression models related to family control and ROA.

**Table 8**

Ordinary Least Squares Models for Family Control and ROA.

Variables	Dependent variable: ROA_w	
	(1)	(2)
dFamily-Controlled	0.939*** (0.114)	0.965*** (0.091)
Size	0.126 (0.219)	0.227 (0.216)
Leverage_w	-0.063*** (0.019)	-0.051** (0.019)
CashRatio_w	0.000 (0.000)	0.000 (0.000)
Age	0.008** (0.003)	0.001 (0.002)
Constant	7.026** (3.151)	2.701 (3.070)
Observations	633,342	633,342
R-squared	0.025	0.076
Robust standard errors	Yes	Yes
Year fixed effects	Yes	Yes
Industry fixed effects	No	Yes
Country fixed effects	No	Yes

Notes: Robust standard errors are reported in parentheses, \*p<0.1, \*\* p<0.05, \*\*\*p<0.01.

In both models, the coefficient for *dFamily-Controlled* is significant and with nearly equal values of 0.939 in model 1 and 0.965 in model 2. So, based on the coefficients for models 1 and 2, family-controlled firms realize a ROA that is respectively 0.94% and 0.97% higher than firms that are not controlled by a family. These results indicate a positive relationship between family control and firm performance and are therefore not in line with the third hypothesis. In the sample, the effects of family ownership on monitoring firm management, possibly due to obtaining a management position, appear to outweigh the potential negative effects of family ownership on firm performance. Overall, the results of table 8 show that family control has a positive effect on firm performance. Therefore, the results provide a basis to claim the existence of a relationship that is opposite of the one hypothesized: family control has a positive effect on firm performance.

#### **5.4 Testing hypothesis 4**

This section provides an analysis of hypothesis 4: *Family control has a negative effect on firm innovation*. Panel A of table 9 displays the results of the two estimation models that capture the relationship between family control and R&D-investments by using the full sample of observations. The coefficients for *dFamily-controlled* indicate a negative relationship between family control and investments in R&D, although only the coefficient for model 1 is significant. Based on this model, the R&D-expenditures scaled by operating revenue is 0.01% lower for firms that are family-controlled

**Table 9**

Ordinary Least Squares models and Negative Binomial Regression model for Family Control and Firm Innovation.

Panel A			
Variables	Dependent variable: R&D/OR_w		Dependent variable: PatentCount
	(1)	(2)	(3)
dFamily-Controlled	-0.012*** (0.002)	-0.001 (0.001)	-0.028*** (0.005)
Size	0.009*** (0.002)	0.007*** (0.001)	0.021*** (0.001)
Leverage_w	0.009*** (0.000)	0.008*** (0.001)	-0.000 (0.001)
CashRatio_w	0.000 (0.000)	0.000 (0.000)	0.000*** (0.000)
ROA_w	0.001*** (0.000)	0.000*** (0.000)	-0.001*** (0.000)
Age			0.002*** (0.000)
Constant	-0.114*** (0.025)	-0.099*** (0.017)	-1.907*** (0.010)
Observations	633,342	633,256	256,595
R-squared	0.006	0.064	
Robust standard errors	Yes	Yes	No
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	No	Yes	No
Country fixed effects	No	Yes	No
Panel B			
Variables	Dependent Variable: R&D/OR_w		
	(1)	(2)	
dFamily-Controlled	-0.020*** (0.008)	-0.005*** (0.001)	
Size	0.018*** (0.002)	0.016*** (0.001)	
Leverage_w	0.013*** (0.001)	0.013*** (0.001)	
CashRatio_w	-0.000 (0.000)	-0.000*** (0.000)	
ROA_w	0.001*** (0.000)	0.000*** (0.000)	
Constant	-0.232*** (0.033)	-0.269*** (0.029)	
Observations	256,595	256,546	
R-squared	0.013	0.093	
Robust standard errors	No	No	
Year fixed effects	Yes	Yes	
Industry fixed effects	No	No	
Country fixed effects	No	No	

Notes: Robust standard errors are reported in parentheses, \*p<0.1, \*\* p<0.05, \*\*\*p<0.01.

compared to firms that are not controlled by a family. The sign of the relationship is thus in line with the fourth hypothesis, however the value of the coefficient is so low that no real conclusions can be drawn based on this result. As shown in panel B, the coefficients that result from using the smaller sample size are highly similar to the coefficients displayed in panel A, with the main difference being that the coefficient for  $d$ Family-controlled for the second model becomes statistically significant. Overall, the results of table 9 do not provide sufficient evidence to claim a negative relationship between family control and investments in R&D.

The third model in panel A of table 9 shows the results of the estimation equation related to family control and number of patents. The coefficient for  $d$ Family-control in model 3 is significant and equal to -0.028, with an exponentiated value of 0.972. Thus, the model shows that family-controlled firms have a total expected number of patents that is 97.2% of the total expected patents of firms that are not family-controlled. This difference between both groups is marginally small, so that this result does not provide sufficient evidence for a negative relationship between family control and number of patents.

In conclusion, the results of table 9 do not provide a basis to draw conclusions with respect to the relationship between family control and firm innovation. Although the coefficients for  $d$ Family-controlled are statistically significant across all models and align with the hypothesis, their magnitude is insufficient to indicate a meaningful effect of family control on firm innovation.

### **5.5 Testing hypothesis 5**

This final section provides an analysis of the fifth hypothesis: *Legal environment has an effect on the strength of the relationships with ownership concentration and family control on the one side and firm performance and innovation on the other side.* The first relationships to consider are that of concentrated ownership and family control on the one side and ROA on the other side. Table 10 displays the results of the regression models used to test the effect of legal environment on these two relationships. Consistent with previous results, both ownership concentration and family control are shown to have a significant positive effect on ROA in the developed markets. Furthermore, the negative significant coefficients for  $d$ Emerging show that firms with non-concentrated ownership from the emerging countries realize lower ROA compared to firms with non-concentrated ownership from the developed markets. When considering the relationship between ownership concentration and ROA, model 2 provides a significant positive coefficient for the interaction term, indicating that firms with concentrated ownership from the emerging markets realize ROA that is 0.37% higher than firms with concentrated ownerships from the developed countries. The interaction term of the models 3 and 4 are both significant and show a similar effect for the interaction between family control and emerging countries. Family-controlled firms in the emerging markets realize ROA that is 0.62% to 0.66% higher than family-controlled firms from the developed countries. In conclusion, the coefficients for the



**Table 10**

Ordinary Least Squares Models for the Effect of Legal Environment on the Relationship between Ownership Structure and ROA.

Variables	Dependent variable: ROA_w			
	(1)	(2)	(3)	(4)
dConcentrated	0.736*** (0.110)	0.536*** (0.081)		
dFamily-Controlled			0.747*** (0.128)	0.705*** (0.106)
dEmerging	-0.240 (0.199)	-0.577*** (0.174)	-0.238 (0.152)	-0.343** (0.146)
dConcentrated## dEmerging	0.101 (0.114)	0.371*** (0.127)		
dFamily-Controlled## dEmerging			0.619*** (0.088)	0.658*** (0.079)
Size	0.109 (0.222)	0.185 (0.218)	0.124 (0.219)	0.200 (0.215)
Leverage_w	-0.064*** (0.020)	-0.060*** (0.019)	-0.063*** (0.020)	-0.059*** (0.019)
CashRatio_w	0.000 (0.000)	0.000* (0.000)	0.000 (0.000)	0.000* (0.000)
Age	0.008** (0.003)	0.006** (0.003)	0.008** (0.003)	0.006** (0.003)
Constant	6.835** (3.271)	-0.648 (3.183)	7.130** (3.167)	-0.300* (3.119)
Observations	633,342	633,256	633,342	633,256
R-squared	0.024	0.062	0.024	0.065
Robust standard errors	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	No	Yes	No	Yes
Country fixed effects	No	Yes	No	Yes

Notes: Robust standard errors are reported in parentheses, \*p<0.1, \*\* p<0.05, \*\*\*p<0.01.

interaction terms show that the positive effects of ownership concentration and family control on ROA are stronger in the emerging economies. The positive effects resulting from the monitoring of firm management by a large shareholder or a controlling family appear to be stronger when firms operate in a weaker legal environment.

The next effect to consider is that of both concentrated ownership and family control on R&D-expenditures. Table 11 contains the results of the regression models used to test the effect of legal environment on these relationships, with the results for the full sample in panel A and the results for the limited sample in panel B. The coefficients for *dConcentrated* and *dFamily-controlled* in models 1 to 4 in panel A are consistent with the results that were presented before. Both ownership concentration and family control have a negative effect on investments in R&D in the developed economies, however the effect is extremely small. The significant coefficients for *dEmerging* indicate that firms from emerging

**Table 11**

Ordinary Least Squares Models for the Effect of Legal Environment on the Relationship between Ownership Structure and R&D-Expenditures.

Panel A				
Variables	Dependent variable: R&D/OR_w			
	(1)	(2)	(3)	(4)
dConcentrated	-0.040*** (0.010)	-0.023*** (0.006)		
dFamily-Controlled			-0.019*** (0.002)	-0.017*** (0.002)
dEmerging	-0.073*** (0.009)	-0.059*** (0.006)	-0.045*** (0.004)	-0.045*** (0.004)
dConcentrated##	0.035*** (0.008)	0.021*** (0.005)		
dEmerging			0.020*** (0.002)	0.019*** (0.002)
dFamily-Controlled##				
dEmerging				
Size	0.009*** (0.002)	0.007*** (0.002)	0.009*** (0.002)	0.007*** (0.002)
Leverage_w	0.009*** (0.001)	0.008*** (0.001)	0.009*** (0.001)	0.008*** (0.001)
CashRatio_w	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ROA_w	0.001*** (0.000)	0.000*** (0.000)	0.001*** (0.000)	0.000*** (0.000)
Constant	-0.055** (0.026)	-0.083*** (0.022)	-0.088*** (0.024)	-0.105*** (0.021)
Observations	633,342	633,256	633,342	633,256
R-squared	0.011	0.041	0.011	0.041
Robust standard errors	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	No	Yes	No	Yes
Country fixed effects	No	Yes	No	Yes
Panel B				
Variables	Dependent variable: R&D/OR_w			
	(1)	(2)	(3)	(4)
dConcentrated	-0.066*** (0.015)	-0.041*** (0.010)		
dFamily-Controlled			-0.028*** (0.005)	-0.024*** (0.004)
dEmerging	-0.115*** (0.016)	-0.094*** (0.012)	-0.065*** (0.007)	-0.062*** (0.007)
dConcentrated##	0.061*** (0.012)	0.039*** (0.008)		
dEmerging			0.031*** (0.006)	0.024*** (0.005)
dFamily-Controlled##				
dEmerging				
Size	0.017*** (0.002)	0.017*** (0.002)	0.017*** (0.002)	0.017*** (0.002)
Leverage_w	0.013*** (0.001)	0.013*** (0.001)	0.013*** (0.001)	0.013*** (0.001)
CashRatio_w	-0.000* (0.000)	-0.000** (0.000)	-0.000* (0.000)	0.000** (0.000)
ROA_w	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Constant	-0.156** (0.031)	-0.238*** (0.033)	-0.212*** (0.033)	-0.278*** (0.034)
Observations	256,595	256,546	256,595	256,546
R-squared	0.018	0.058	0.018	0.058
Robust standard errors	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	No	Yes	No	Yes
Country fixed effects	No	Yes	No	Yes

Notes: Robust standard errors are reported in parentheses, \*p<0.1, \*\* p<0.05, \*\*\*p<0.01.

**Table 12**

Negative Binomial Regression Models for the Effect of Legal Environment on the Relationship between Ownership Structure and PatentCount.

Variables	Dependent variable: PatentCount	
	(1)	(2)
dConcentrated	-0.162*** (0.008)	
dFamily-Controlled		-0.034*** (0.005)
dEmerging	-0.214*** (0.020)	-0.199*** (0.005)
dConcentrated## dEmerging	0.018 (0.021)	
dFamily-Controlled## dEmerging		-0.014 (0.012)
Size	0.022*** (0.001)	0.021*** (0.001)
Leverage_w	-0.001 (0.001)	-0.001 (0.001)
CashRatio_w	0.000 (0.000)	0.000 (0.000)
ROA_w	-0.001*** (0.000)	-0.001*** (0.000)
Age	0.002*** (0.000)	0.002*** (0.000)
Constant	-1.719*** (0.013)	-1.860*** (0.010)
Observations	256,595	256,595
Robust standard errors	No	No
Year fixed effects	Yes	Yes
Industry fixed effects	No	No
Country fixed effects	No	No

Notes: Robust standard errors are reported in parentheses, \*p<0.1, \*\* p<0.05,\*\*\*p<0.01.

markets, with non-concentrated ownership or that are not family-controlled, invest less in R&D compared to firms with a similar ownership structure from the developed markets. The interaction term between *dConcentrated* and *dEmerging* in models 1 and 2 has a significant coefficient equal to 0.035 and 0.021 respectively. Based on these coefficients, the investment level in R&D appears to be around 0.02% to 0.04% higher for firms with concentrated ownership from the emerging economies compared to firms with concentrated ownership from the developed markets. The results of models 3 and 4 indicate a similar result when considering the interaction term between *dFamily-controlled* and *dEmerging*. Based on the significant coefficients of the interaction term, family-controlled firms from the emerging countries appear to invest 0.02% more in R&D compared to family-controlled firms from the developed markets. Panel B of table 11 shows that the models provide very similar results when using the limited

sample size. In conclusion, the interaction terms of table 11 indicate a weaker effect of legal environment on the relationships between ownership structure and R&D-expenditures. However, as discussed before, the coefficients are of such a small magnitude that it precludes the assertion of a compelling relationship.

The final relationships to consider are that between ownership concentration and family control on the one side and number of patents on the other side. Table 12 shows the results of the models used to test the effect of legal environment on these two relationships. Consistent with previous results, the significant coefficient for *dConcentrated* in model 1 shows that firms with concentrated ownership from the developed markets realize lower number of patents compared to firms with non-concentrated ownership. The negative significant coefficient for *dEmerging* in the same model indicates that firms with non-concentrated ownership from the emerging markets obtain less patents than firms with non-concentrated ownership from the developed markets. The coefficient for the interaction term between *dConcentrated* and *dEmerging*, with an exponentiated value of 1.018, points to a weakening effect of the legal environment on these relationships, however this coefficient is not statistically significant.

Model 2 of table 12 displays the results relevant for the relationship between family control and number of patents. The coefficient for *dFamily-controlled* confirms the negative but inconclusive relationship between these two variables that was found before. The significant negative coefficient for *dEmerging* implies that non-family-controlled firms from emerging countries obtain less patents compared to similar firms from the developed markets. The coefficient for the interaction term between *dFamily-controlled* and *dEmerging*, with an exponentiated value of 0.986, is insignificant and small in magnitude. Therefore, the results of model 2 provide no evidence to claim an effect of legal environment on the relationship between family control and number of patents.

All in all, hypothesis 5 appears to be partly correct. The results displayed in table 10 provide evidence for a strengthening effect of relative weaker legal environment on the relationships between ownership concentration and firm performance and family control and firm performance. With respect to the other relationships that have been assessed in this study, there are no results that point to any effect of legal environment on these relationships.

## CHAPTER 5 Conclusion

This chapter concludes the analysis of this study by providing a summary of the most important results and answering the research question. Furthermore, the studies limitations and recommendations for future research will be discussed.

### 5.1 Answering the research question

The goal of this study is to answer the following research question: *What is the effect of ownership concentration and family ownership on firm performance and firm innovation in Europe and does the legal environment play a role in the strength of these relationships?*

The first analyzed effect is that of ownership concentration on firm performance. An analysis of the results shows a V-shaped effect of ownership concentration on firm performance. Compared to firms with low ownership concentration, firms with medium to high ownership concentration realize ROA that is between 0.33% and 0.74% higher. However, this effect is attributable to those firms with medium ownership concentration. Comparing firms with medium ownership concentration to all other firms shows that they generate ROA that is 0.33% to 0.79% higher. These results indicate that the presence of at least one large shareholder with less than 50% of the shares is most beneficial for firm performance, leveraging the positive effects of monitoring firm management.

The following effect that is analyzed is that of ownership concentration on firm innovation. Firstly, the analysis provided no conclusive results to claim an effect of ownership concentration on innovate input, measured through R&D-expenditures. When considering the effect on innovative output, measured through number of patents, a negative effect was found. Firms with concentrated ownership have an expected number of patents that is 3.3% to 15.7% lower than firms with non-concentrated ownership. These results can be explained by a difference in risk-appetite between firm management and the controlling shareholders.

The next analysis focused on the effect of family ownership on firm performance. The results showed that family ownership has a positive effect on firm performance, with family-owned firms realizing ROA that is 0.94% to 0.97% higher compared to firms that are not family-owned. Therefore, the positive effects of family ownership resulting from their long-term perspective and high engagement with the firm, appear to outweigh the negative effects resulting from the altruistic dynamics that play a role within families.

The fourth analyzed effect is that of family ownership on firm innovation. The analysis provided no conclusive results to establish a relationship between family ownership and innovative input or output. Although the statistical models produced significant coefficients for the explanatory variables, the magnitude of these coefficients was too small to claim any real effect.

The final part of the analysis focused on the effects of legal environment on all the relationships that were studied before. Based on the results, legal environment appears to play no role in the strength of the relationships between ownership structure and firm innovation. The results did

show a strengthening effect of legal environment on the effect of both ownership concentration and family ownership on firm performance. Firms with concentrated ownership from emerging markets realize ROA that is 0.37% higher than firms with concentrated ownership from developed markets. Furthermore, the statistical models show that family-controlled firms from emerging markets generate ROA that is 0.62% to 0.66% higher than ROA realized by family-controlled firms from developed markets. The monitoring effects of large shareholders and families tend to be more effective in those countries with a weaker legal environment.

In summary, this study contributes to the understanding of the effects of ownership structure on firm performance and firm innovation. It highlights the positive effects of both ownership concentration and family ownership on firm performance and finds a negative effect of ownership concentration on innovative output. Finally, it finds that the positive effects of ownership concentration and family ownership on firm performance is stronger in countries with a relative weak legal environment.

## ***5.2 Limitations and recommendations***

The most evident limitation of this study is that the dataset used for the analysis is constructed under the assumption that the ownership data for the final year of the sample period is representative for the entire sample period. This is a strong assumption, and it is certain that some firms will have experienced a significant change in their ownership structure, which renders the ownership data for those firms incorrect for those firm-year observations before the change. The presence of this faulty data in the sample can give rise to biased results. A first recommendation for future research is therefore to conduct a similar analysis as done in this study, using a database with ownership data that fluctuates over time for each unique firm based on real ownership data.

Another limitation regarding the data sample is the high number of missing observation for the R&D/OR variable. To deal with the high number of missing observations, the assumption was made that firms with missing values for R&D/OR made no investments in R&D, setting the missing values equal to 0. This is a strong assumption, which exerts a downward pressure on the mean of the R&D/OR variable. This could also explain the low magnitude of the coefficients that appeared for this variable in all models.

A final limitation is that the results of this study follow from the analysis of a sample that only includes firms from certain countries in Europe. This means that generalizing these results to other parts of the world is not self-evident. Future research could focus on repeating the analysis of this study with a sample that consists of firms from other parts of the world, such as the United States or Asia.

A final recommendation for future research is to delve deeper into the strengthening effect of weaker legal environments on the effects of ownership concentration and family ownership on firm performance. It would be interesting to differentiate between several aspects of legal environment, such as the number of shareholder protection laws, degree of corruption and the regulatory environment.

Separately analyzing the effect of these aspects on the strength of the relationships between ownership concentration and family ownership on firm performance can potentially uncover a variety in the strength of these aspects.

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