Diversification, ownership structure and firm performance: A South African Case Study

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ABSTRACT

The purpose of this study is to examine the impact of diversification (both industrial and geographical) on the performance of non-financial South African firms listed on the Johannesburg Stock Exchange (JSE). The study goes further to examine the impact of ownership structure (managerial ownership and ownership concentration) in the context of diversification on firm performance. This is done in an effort to determine if diversification is an effective strategy in enhancing firm performance (which is measured by Tobin's Q) in South African firms. Fixed effect regression analysis is used on a sample of 164 firms during the period 2010 to 2019. For comparison purposes, the study also conducts; ordinary least squares (OLS) and random effect analyses. The study finds that industrial diversification has no significant effect on firm performance, geographical diversification reduces firm performance and overall specialized firms perform better than diversified firms do. These results support the argument that the costs of diversification surpass its benefits. The study also finds that managerial ownership reduces firm performance contradicting the agency theory. Furthermore, ownership concentration has no significant effect on performance of South African firms.

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CHAPTER 1: INTRODUCTION

1.1 Background and Problem Statement

1.1.1 Diversification and Firm Performance

Global financial and economic crises, recessions and pandemics have revealed Africa and the rest of the world's vulnerability to external economic shocks (Organization for Economic Co-operation and Development. Secretariat [OECD], 2011:3; Usman & Landry, 2021). In times of uncertainty like when the 2008 global financial crisis hit or 2019 covid pandemic, managers, directors and chief executive officers are faced with the challenge of figuring out how to be profitable and valuable whilst withstanding these economic shocks (Phung, 2015:17). Therefore, they are required to interrogate their strategic plans and focus of their firms devising effective growth strategies in the process. Corporate strategy theory proposes diversification as one growth strategy to sustain financial performance of a firm during uncertain times (Salma & Hussain, 2018:1). Diversification maximizes shareholders wealth and mitigates risk by lessening a firms' exposure to external shocks and acting as a hedge (Fox & Hamilton, 1994). If one division is affected, another division may be able to compensate for the losses of that division (Haberberg & Rieple, 2001).

Implications of diversification on firm performance and value creation have been the center of research and discussions in the areas of finance, business, economics, industrial organization and strategic management since the early 1950s (Rushin, 2006). Jensen (2010:39) and Denis, Denis and Sarin (1997) argues that this has made diversification one of the most debatable strategic decisions firms have had to make as they work to maximize shareholders value and mitigate risk, therein has arisen an argument about its true role in enhancement or reduction of firm performance.

On an international level, the topic has received significant exposure and has been explored over time, however, there has been no consensus as to whether diversification actually enhances or reduces firm performance. Findings have been inconclusive, mixed and inconsistent implying diversification and its impact on firm performance may be affected by several factors such as endogeneity, measurement problems, methods of variable measurement, environment, differences in samples, firm specific characteristics, industry specific characteristics and database limitation (Lins & Servaes (2002); Park, 2012; Setianto, 2020; Thang, 2013). Several studies on diversification whose focus is on American firms suggest that there is significant evidence to show that diversified firms, on average, perform worse than specialized firms do (see Ammann, Hoechle & Schmid, 2011; Berger & Ofek, 1995; Denis, Denis & Sarin, 1997; Goranova et al., 2007; and Rudolph & Schwetzler, 2014). Whilst a few other studies suggest that American diversified firms perform better than specialized ones (e.g Campa & Kedia, 2002; Click & Harrison, 2000; Morck & Yeung, 1991; Santarelli & Tran, 2016; and Villalonga, 2004).

On the other hand, some global based studies focused on other parts of the world other than America report that whether a firm performs well or badly due to diversification is reliant on the institutional setting of a country (see Fauver, Houston & Naranjo, 2003:136; Mazur & Zhang, 2015:94; and Rudolph & Schwetzler, 2014:420). Khanna and Palepu (1997:41) argue that emerging countries are opening up to global competition and foreign investors' pressure them to conform to Western practices but firms must acclimate their activities in alignment with the institutional context of their particular country. According to Fauver, Houston and Naranjo (2003) emerging markets have inefficient and imperfect markets. These are characterized by unavailability of reliable information to market participants to evaluate the value of products, misguided regulations, which result from political goals rather than economic efficiency and lack of effective judicial systems that produces unreliable and unpredictable enforcements of contract. According to this argument, it is expected that diversification reduces performance in emerging economies. Berg (2016:16) suggests that faced with these challenges, firms in emerging markets may find it beneficial to improve internal institutions that can help deal with market deficiencies, and this tends to lead to better performance of diversified firms in emerging economies compared to those in developed economies, with well-integrated capital markets.

1.1.2 Ownership Structure and Firm Performance

Many studies have attempted to understand the nature and determinants of diversification, with some studies attributing the decision to diversify, regardless of whether it enhances or reduces firm performance to agency issues (see Chandler, 1969; Hautz, Mayar, & Stadler, 2013; Montgomery, 1994; Peng et al., 2009; and Rumelt, Shendel & Teece, 1994). Some studies have found that executives, directors and managers have used diversification as a tool to establish themselves, increase their compensation, status and power rather than earn shareholders more value (Aggarwal & Samwick, 2003; Fox & Hamilton, 1994; Shleifer & Vishny, 1997; and Thomsen & Pedersen, 2000). Ownership structure if used properly has the ability to offset costs of diversification, if any and gain shareholders more value (Jensen & Meckling, 1976). Managers may not be willing to reverse diversification if it is costing the firm unless pressured or obligated to by owners in order to follow owners' interests. According to the agency theory, keeping all things constant, managers' inclination to increase firm performance depends on the ownership structure (Alimehmeti & Paletta, 2010).

Fauver, Houston and Naranjo (2004:751) and Jensen (1986:328) found that agency costs affect the firm value derived from diversification negatively after controlling for ownership structure variables, thereby concluding that managers diversify for personal interests rather than company interests. Hoechle et. al. (2011) found that 16% to 21% of the diversification discount is as a result of ownership structure after including ownership variables in their analysis between diversification and firm performance. These findings motivated this study to investigate further, the impact of ownership structure on firm performance, in the

context of (with inclusion of) diversification in South African firms. Ownership structure consists of mainly two aspects, ownership concentration and identity of owners (Madhani, 2016); therefore, the core focus of this study is on managerial ownership also known as insider ownership and ownership concentration, which measures the powers of shareholders to influence management respectively. Ownership structure is likely to affect a firms' performance by the influence owners have on the decisions a firm makes such as undertaking diversification strategies (Phung, 2015). Ownership structure is a significant part of corporate governance and contributes significantly to reducing conflicts between controlling shareholders, minority shareholders and managers (Abdullah, Ali & Haron, 2017; and Shleifer & Vishny, 1986).

Agency theory by Jensen and Meckling (1976) argues that agency problems are a result of managers making decisions as agents of shareholders that are not particularly in the shareholders best interests due to their risk and utility functions. This agency theory argues that diversification is a managerial incentive and suggests that firms choose to diversify, despite the strategy being a value destroyer (Aggarwal & Samwick, 2003; Schoar, 2002; Santarelli & Tran, 2016). A solution proposed for these agency problems is the alignment of shareholders and managers interests through high insider ownership and ownership concentration (Agrawal & Mandelker, 1987). This has made ownership structure and its impact on firm performance a topic of extensive research. The impact of ownership structure on firm performance has been researched over a number of years, dating back to as early as Berle and Means (1932), who were among the first to investigate ownership structure and its relationship to firm performance and report that ownership separation and control reduces managers incentives to maximize firms efficiency (Fazlzadeh, Hendi & Mahboubi, 2011).

Findings of the impact of ownership structure on firm performance have been mixed and inconclusive. Servaes (1996:1203) argues that ownership characteristics explains the behaviour of firms, stating that when diversified firms performed poorly compared to specialized firms, they also had lower managerial ownership than specialized firms. Shleifer and Vishny (1986) argue that concentrated ownership leads to shareholders controlling managers' activities easily, avoiding inefficiency and thereby improving firm performance while Jenson and Meckling (1976) argue that high concentration instantaneously leads to major shareholders giving priority to their own interests, thereby reducing firm performance.

Some studies find ownership structure has no effect on firm performance (see Demsetz & Lehn, 1985; Demsetz & Villalonga, 2001; and McConnell & Servaes, 1990). Some studies find a positive relationship (see Barclay & Holderness, 1989; and Shleifer & Vishny, 1997) while Wruck (1989), Morck, Shleifer, and Vishny's (1988) find a non-linear relationship, that is it is positive up to a certain point, then begins to decline and increases at higher levels. Gedajlovic and Shapiro (1998) study the effect of ownership concentration on firm performance across five countries; America, Canada, France, Germany and the

United Kingdom. They argue that the ownership concentration and firm performance relationship is different across countries in a systematic way determined by the corporate governance national system and their results are consistent with their argument. Their results show statistically significant differences across the countries.

Shleifer and Vishny (1997) argue that ownership concentration is high in emerging economies because of poor regulations and laws that would protect investors' rights, acting as a tool and alternative to corporate governance. South Africa unlike most African countries has a sound financial structure, sound regulatory structure, fairly advanced equity culture, is the home for some of the largest multinational firms thereby attracting significant foreign direct investment and has high institutional ownership. While it possesses all these positive attributes, shareholder activism and implementation of laws such as the insider-trading act of 1998 remain weak (Malherbe & Segal, 2003). Ntim, Opong and Danbolt (2012) argue that South African firms are relatively concentrated, therefore monitoring by managers should be effective but can lead to requisition of minority wealth and less activity in the market for managerial control, which can impact firm performance negatively. The South African market is more developed than its other African counterparts but still remains smaller than American and European markets, having fewer listed firms, lower liquidity and concentrated market capitalization, implying the impact of ownership structure may be different compared to America and Europe and the rest of Africa, making it a unique and interesting case to study (Malherbe & Segal, 2003).

1.1.3 Problem Statement

The majority of the existing literature is primarily focused on developed countries; like America and European countries. Gonzalez (2014:172) concludes that most of the existing research from developed countries suggests that diversification leads to poor firm performance thereby destroying firm value. It would be assuming to generalize these results because characteristics of developed markets and developing markets differ, for example, developing markets have capital markets that are less liquid and integrated than developed markets (Malherbe & Segal, 2003). A few studies such as Lins and Servaes (2002:28) have examined diversification and firm performance in Asian emerging markets such as Hong Kong, India, Indonesia, Malaysia and South Korea, and they yielded the same surprising results as those in developed countries. However, there is little known research and empirical evidence on the impact of diversification on performance of African firms, specifically South African firms, especially after the 2008 financial crisis (see Rushin, 2006 and Bhana, 2004).

The gap in this information/knowledge is what motivates this study, which seeks to examine the impact of diversification as a corporate strategy on performance of South African firms, thereby adding to the

literature using South Africa, an emerging economy as a case study. This study attempts to use fixed effects on Tobin's Q as a proxy for firm performance, which has not yet been done in the context of South African firms to the authors' knowledge.

Previous studies (see Berger & Ofek, 1995; Campa & Kedia, 1999; Kim & Marthur, 2008; Lang & Stulz, 1994; and Servaes, 1996) have focused on studying either industrial or geographical diversification only, treating each one as an independent strategy. Bodnar, Tang and Weintrop (1999) who study the effect of both geographic and industrial diversification on American firm performance from 1987 to 1993 argue that, previous studies produced biased results because they focused only on industrial diversification. They further argue that failure to control for geographical diversification has a 40% overestimate effect on industrial diversifications effect on firm performance. Meyer (2006:1110) also argued that managerial choices concerning industrial and geographic market scope are interdependent, suggesting that the investigation of both industrial and geographical diversification should be done simultaneously; to take into consideration their independence and possible causality and endogeneity, but one should not be studied without consideration of the other. Consequently, this study goes on to separate diversification into industrial and geographical diversification and study the impact of each one separately on firm performance. In conclusion, this study investigates if diversification has an impact on the performance of South African firms, to draw a conclusion on whether diversification is a strategy worth pursuing to add shareholder value and mitigate risk by enhancing firm performance.

Furthermore, with regard to ownership, high managerial ownership and concentrated ownership ensures effective decision making and monitoring of decisions made by management by warranting they do not make detrimental decisions thereby enhancing firm performance. Fazlzadeh, Hendi and Mahboubi (2011) have further argued that concentrated ownership might cause shareholders to use their power for personal benefits at the cost of minority shareholders, although they found that ownership structure negatively affected firm performance as companies became more diverse because diversifying resulted in shareholders losing power to control managers. The role and effects of ownership structure may be different in countries like South Africa because of different institutional, cultural and legal settings (La Porta, Lopez-de-Silanes & Shleifer. 1999). Therefore, this study investigates the impact of ownership structure on firm performance in South African firms in the context of diversification to grasp a better understanding of the diversification – performance relationship.

1.2 Research Objectives

The main objective of this study is to investigate the impact of diversification and ownership structure by establishing how industrial diversification, geographical diversification, managerial ownership and ownership concentration affect performance of South African firms.

1.3 Research Question

From the above discussion, this paper aims to answer the following questions:

1.3.1 How does industrial diversification affect performance of South African firms?

1.3.2 How does geographical diversification affect performance of South African firms?

1.3.3 How do diversified firms perform compared to specialized firms in South Africa?

1.3.4 How does managerial ownership affect performance of South African firms, in the context of diversification?

1.3.5 How does ownership concentration affect performance of South African firms, in the context of diversification?

1.4 Contributions of the Study

This study serves to add to existing literature of diversification-firm performance relationship, using South Africa as the sample case study, widely ignored by previous studies. A different sample period from previous studies and a different methodology is used as well. Furthermore, the study does not only investigate diversification but expands the investigation to include the impact of ownership structure on firm performance in the context of diversification in South Africa, as previous research has not yet analyzed diversification and ownership structure simultaneously in the South African context to the authors' knowledge. The study follows and modifies Berger and Ofek (1995); Fauver, Houston and Naranjo (2004); and Lins and Servaes (1999) models to achieve its objectives.

1.5 Structure of the Study

Chapter 2 follows presenting the literature review. It provides a brief background on diversification and ownership structure in the South African context, the literature review surrounding diversification and ownership structure and develops the hypotheses. Chapter 3 presents the methodology and data. Chapter 4 presents the results and analysis; and finally chapter 5 draws a conclusion, highlighting summary of the findings, implications, limitations and recommendations.

CHAPTER 2: LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

This chapter presents the literature surrounding diversification and firm performance and ownership structure and firm performance. The chapter is divided in to three sections; the first section presents a brief background and history about diversification and ownership structure in South African context highlighting why South Africa makes for a good case for this study. Given the country's political and social history, which affected the business environment, it is worth looking at in order to see the evolution of diversification and ownership structure. The second section focuses on diversification and the third section ownership structure, providing firstly the definitions of the variables, then the theoretical background (theories) and empirical evidence (prior studies) are presented in order to assess each variable and their relationship with firm performance. The theory is then used to develop hypotheses in the second and third sections.

2.1 South African Context

2.1.1 Diversification

South Africa, Nigeria and Angola are the three largest economies in sub-Saharan Africa (The World Bank, 2021). South Africa dominates over 70% of African continental market capitalization. Although South Africa's economy has been declining and slumped into another recession as load shedding increased in 2019 reducing productivity of firms and reducing investors business confidence (Roberts, 2018). South Africa recorded an average rate of economic growth from 1994 to 2012 of 3.3% per year, an improvement over the 1.4% annual average rate from 1980 to 1993. It grew by 0.25% in 2019, the least since the global financial crisis. Its GDP has grown steadily over the years (from 1993) declining in 1998 (as the East Asian crisis hit), 2001 (as the dotcom bubble burst and 9/11 attacks) and 2009 (as the global financial crisis hit) as the growth has been strongly correlated to global performance (Industrial Development Corporation, 2013).

South Africa continues to lead the way in Africa in business sophistication and financial market, technology, market size, and innovation. Its' key economic sectors include finance, wholesale and retail trade, manufacturing (vehicle assembly and food processing), transport and communication, mining, construction, agriculture and fisheries, tourism, clothing and textiles, energy and real estate. South Africa moved from an economy that only provided primary goods, like most African countries still do to a secondary economy. It has comparative advantage in production in the agriculture, mining and manufacturing sectors. The manufacturing sector is the key driver of economic growth and diversification. It was developed and established in the early 2000's and is strongly associated with traditional sectors such as agriculture and

mining. Its development can be seen in agro-processing, construction, engineering, geological projects, mining, metals, leather and financial services that often specialize in local sectors. Tourism also drives diversification, because of its spillover effects in developing infrastructure (through development of roads, airports, hotel construction and other facilities) (Organization for Economic Co-operation and Development. Secretariat [OECD], 2011:29).

Firm diversification in South Africa was prompted by political isolation due to apartheid, as this forced the economy to be inward focused and dependent on themselves. During this era, South African firms were restricted within their border by these sanctions imposed by the international community (Confronting Apartheid/Early Apartheid: 1948-1970, n.d). Due to their inability to expand abroad, a few large firms were then forced to invest in each other in the South African economy. This meant that South African firms could only invest within South Africa, which led to firms industrially diversifying and becoming large corporations (Rossouw, 1997:1020).

In the 1970s, the South African economy was dominated by six firms that made up 80% of the Johannesburg Securities Exchange (JSE) based on market capitalization, namely, DRD Gold Limited, SAB Miller, PPC Company Limited, Sappi Limited, Barloworld Limited and Tiger Brands. After the 1994 democratic elections and gaining of independence of the country, signifying the end of the apartheid era, which was followed by the removal of the economic sanctions; South African firms began to diversify within the region, moving into the rest of Africa and beyond. Many, such as South African Breweries, had divested non-core assets. Other companies such as Bidvest Limited stayed diversified (The Economist, 2006).

While many began to diversify, several diversified firms that dominated the economy reorganized their activities to change themselves from South African multinationals into transnational companies by placing some of their assets outside the grasp of the future democratic state. Multinational organizations have one parent country but operate in many countries; transnational organizations cannot be linked to a parent company (national home) but they operate worldwide (Rustomjee, 1991:89).

Rundell (2010:42) state that as South African firms begun to invest in other African countries post-apartheid and diversify geographically in the 1990s, they performed poorly due to market and cultural ignorance, but from 2000 onward, South African companies have performed well and experienced great success. Companies such as MTN, SAB Miller and Standard Bank have made the expansion into Africa. South African companies have not been scared to expand into sectors traditionally dominated by companies from America, Asia and Europe such as construction, extraction, telecommunications, tourism, agriculture and financial services (Grobbelaar, 2004:73). Around the same period, South Africa begun reporting a

decline in local industrial diversification in the form of mergers and acquisitions of the existing firms. This was accompanied by spin-offs that required corporate restructuring resulting in many diversified companies downscaling and specializing by refocusing on their core capabilities and business. Bhana (2004:5) identified 47 companies that were downsized to 19 parent organizations during the period 1988 to 1999.

Roberts (2018) reports that research undertaken by the Industrial Development Corporation (IDC) found that between 1994 to 2016 South Africa regressed, failing to produce new products thereby becoming less diverse. Sixty percent of its export basket comprised of minerals and resource based industries, at the expense of other industries, which are more likely to create jobs such as plastic products and manufacturing. This is poor compared to other upper middle-income countries like Thailand. In 2016, for example, high technology exports accounted for 6% of South Africa's manufacturing exports while it accounted for 21% of Thailand's and 43% of Malaysia's. Roberts (2018) argues that South Africa should aim to increase diversification to create employment, in order to increase the inclusion of population.

2.1.2 Ownership Structure

The South African economy has not changed much since 1994 with regard to diversity in ownership structures of firms, openness, productivity, inclusivity due to continued bias towards low productivity activities and high levels of concentration in key sectors (Roberts, 2018). Before 2004, the JSE only consisted of South African firms, and a few South African firms listed on international stock exchanges and have today evolved into much larger multinationals, but after 2004 foreign companies were allowed to list on the JSE allowing them to raise capital in South Africa and allowing South African investors to diversify internationally. Most firms listed on the JSE have one or more shareholders that influence the company through voting power affiliated to shares, therefore the Companies Act of 2008 requires listed firms to release information on beneficial holdings of 5% or more, as 5% is the threshold of a company required by disclosure requirements of the Companies Act (National Treasury, 2017).

Ownership structure often acts as an alternative to corporate governance in developing economies due to poor regulation and protection of investors' rights, as corporate governance is still developing in emerging economies (Shleifer & Vishny, 1997). In South Africa, corporate governance was introduced formally in 1994 (King I), when apartheid ended, revised in 2002 (King II) and later revised in 2009 (King III). Corporate Governance practiced by South Africa is similar to Anglo-American countries, with companies expected to serve shareholder interests, but it is also unique in that it promotes inclusivity to address historical socio-economic inequalities through policies like black economic empowerment, employment equity, environment, HIV/Aids, and Health and Safety. This may affect the shareholding and stake holding

thereby affecting composition of ownership structure. This makes South Africa a crossbreed and unique within the Anglo-America (Andreasson, 2013).

In South Africa, there are agency problems that need shareholder activism (Viviers, 2015). South Africa has relatively weak corporate governance mechanisms and therefore, relatively weaker shareholder activism compared to developed countries (King Committee on Corporate Governance & Institute of Directors, 2002; Ntim, Opong & Danbolt, 2012). The illiquidity on the JSE limits diversification for shareholders who are keen to implement an exit strategy from poorly managed firms (Majoni, 2019).

In conclusion, this section provides a brief discussion on the background of diversification and ownership structure in the South African context in order to provide an understanding of the South African environment concerning diversification and ownership structure. Having gone through political isolation and only being able to diversify locally in the earlier years and having to adhere to inclusive policies such as the black economic empowerment makes South Africa a unique case study in the context of diversification and ownership structure impact on firm performance.

2.2 Literature Review: Diversification

2.2.1 Definition of Diversification

"Diversification is the entry of a firm or business unit into new lines of activity, either by processes in internal business development or via acquisition" (Ramanujam & Varadarajan, 1989). Acquisitions involve changes in administrative structure, systems and managerial processes. Firms diversify in a number of ways; these include vertical integration, horizontal integration, concentric integration and conglomerate diversification (Ansoff, 1988). Furthermore, the degree to which a company chooses to diversify is dependent on a number of factors. Some of these are; availability of unused resources; competition in certain markets (market position, patent rights, barriers to entry); competence and technical knowledge in specialized industries; emerging opportunities (as a result of external shock in a market or company research and development (R&D)); and managerial experience (Penrose, 1959:77). A firm can be industrially diverse (producing at least two different products or operates in more than one industrial category) or/and geographically diverse (has at least two geographical segments/locations), otherwise it is a single activity firm or specialized firm (that is, it operates in a single geographic segment/location or produces one product) (Meyer, 2006:1110).

2.2.2 Theoretical Background of Diversification and Firm Performance:

2.2.2.1 How Diversification Enhances Firm Performance

Internal Capital Markets. An internal capital market is considered efficient if its allocation of funds across the firm maximize shareholder wealth (Shin & Stulz, 1998). This would mean that business divisions that perform well receive more funds than the poorer performing divisions do. Internal capital markets are meant to make it easier to transfer assets/resources of projects from underperforming segments to other profitable segments, which is expected to result in higher firm value by better firm performance (Shin & Stulz, 1998). Burch, Nanda and Narayanan (2004) argue that by the theory of internal capital markets, diversification improves the allocation of investment capital.

Various theorists have argued that efficiency of internal capital markets influences the value derived from diversification strategy (Datta, D'Mello & Iskandar-Datta, 2009; Ozbas & Scharfstein, 2010; and Sautner & Villalonga, 2010) and efficient capital allocation within internal capital markets justifies diversification (Alchian, 1969; Donaldson, 1984; Weston, 1970; and Williamson, 1975). Failure of diversified firms to take advantage of internal capital markets is the reason many firms specialized in the 1980s (Comment & Jarrell, 1995). De Motta (2003) finds that the relative value of a diversified firm to a specialized firm is negatively related to capital market development.

Firms diversify to overcome external capital market imperfections. For example, if asymmetric information is high between a firm and its potential investors, managers might make a decision to forego a positive NPV project, therefore, by diversifying, managers create internal capital markets where resource allocation is efficient and asymmetric information is low, consequently, reducing underinvestment problems (Williamson, 1970). Myers and Majluf (1984) argue that this predicts that diversified companies make more positive NPV investments than their segments would make as separate firms. According to internal market hypothesis, firms in less developed capital markets may be inclined to diversify because they rely on the internal capital markets as a source of funding (Gertner, Scharfstein & Stein, 1994). Diversified firms allot resources in a better-organized manner than specialized firms through internal capital markets, and in the process practice economies of scale (Penrose, 1959).

Economies of Scale/Scope. In order to put underused resources into full use, diversification places them into alternative businesses to provide economies of scale and scope (Galvin, Pindado & Torre, 2014; Penrose, 1959). Industrially diversified firms are producing, a variety of goods, it is thereby expected that the total cost of their production will reduce, supporting the internalization theory. As both geographically and industrially diversified firms are producing more output, they use less input and it costs less to produce more because of synergies, transfer of knowledge between departments and efficiency of resources. Some

functions are coordinated by sharing a value chain. Firms maximize value and market share by increasing the scope of markets and industries in which they operate (Santarelli & Tran, 2016). Teece (1980) found that diversification is favorable due to enhanced managerial economies of scale and reduction in the overall cost of production for an organization. If within the production process there is sharing, joint production costs will be lower than costs of producing each product independently (Riordan & Williamson, 1985).

Financial and Tax Advantages. Firms may diversify to make more profits from producing more goods and services, gain access to credit and gain access to tax benefits to lessen their costs (Delbufalo, Poggesi & Bora, 2016). Diversified firms experience internal capital markets and interest tax shields because of the simultaneous production of various goods and services. In addition, it is expected that if debt tax shields enhance the value of a firm then diversified firms should be more valuable than specialized firms (Panno, 2003).

Value Maximizing and Dynamic Models. Matsusaka (2001) made a model of firm diversification in which diversification is a search and match process. A firm searches for business activities that match their organizational abilities. Companies are collections of organizational capabilities transferable across industries/products, such as expertise in marketing and new-product development. Firms that may be approaching the end of their business cycle and experiencing a decline in their core business should not just shut down but instead search for a new industry that is a good match to their expertise and skills, by doing this they can maximize shareholder value. Even if careful analysis is applied to the search process, uncertainty about the match will be present, so it is a try and error method or experimentation, as you have to wait for results to know if it was a good or bad match. From this perspective, diversification marks a time of transition for a firm. Firms will reject a number of possible matches before refocusing in the industry that offers the closest fit. Matsusaka's theory gives a different perspective on the diversification discount or poor performance of diversified firms because diversified firms have begun the process of transferring underperforming assets but are yet to find a good match. However, Matsusaka remains practical in cautioning that diversification is not always the best strategy, nor will it always deliver positive outcomes.

Growth Advantages/Market Power. Firms may diversify to take advantage of growth opportunities in order to extend their business life cycle, increase market share and prevent competitors from gaining entrance in to a specific market by influencing prices and suppliers by backward or forward integration. Companies might recognize opportunities for growth in other businesses that are not available in their own core businesses capturing value and profits for the organization (Haberberg & Rieple, 2001). Market share power may produce lower input costs and higher prices for clients (Becerra, 2009). Firms have three anti-competitive intentions for diversification: to use profits generated by one business unit to support hostile pricing in

another unit, multi-market competition mutual forbearance hypothesis and lastly, to engage in mutual buying with other large firms to drive small competing firms out of business (Cuervo & Villalonga, 2000).

Debt Co-Insurance Effect and Capacity. Diversified firms have more access to debt than specialized firms do (Lewellen, 1971). Merging businesses with imperfectly associated earnings streams, reduces unpredictability of earnings, reducing overall firm volatility and risk and thereby reducing the probability of deficient debt service (Doukas & Kan, 2006). This is known as debt coinsurance effect, which leads to larger potential debt capacity and, lower probability of a firm foregoing positive NPV projects, which contributes to an increase in firm value. It also leads to an increase in firm value, through an increased tax shield, brought about by replacement of equity with debt capital (Rudolph & Schwetzler, 2014). Furthermore, diversified firms are expected to have multi streams of income, therefore enabling them to manage higher levels of debt. Shleifer and Vishny (1992) also predicted that firms with many business units have a higher optimal debt level at the same level of cash flow volatility because in emerging economies firms can sell assets in the industries that do not experience a lot of liquidity problems. Despite this advantage, Nguyen (2013) found that diversified firms pay out more dividends and issue less debt compared to specialized firms.

Risk Reduction. Firms may diversify to reduce risk (Schommer, Richter & Karna, 2019). Firms want to lessen their exposure to external shocks, such that if one division is affected, another division may be able to compensate for the losses of that division. Firms may want to spread their risk and diversify (Haberberg & Rieple, 2001). Erunza and Senbet (1981) report that diversified firms benefit by controlling systematic risk.

The Modigliani-Miller Theorem. The Modigliani-Miller theorem states that in the "perfect world" with well-functioning capital markets and rational investors, the market value or performance of the firm depends only on the revenue generated from its assets (Modigliani & Miller, 1958). By this theory, the market value or performance of a firm should not be affected by changes in its financial structure or structure overall (where it obtains its retained earnings), therefore diversification should not affect firm value (Berg, 2016).

2.2.2.2 How Diversification Reduces Firm Performance:

Inefficient Internal Capital Markets. From the theory of Internal Capital Markets, inefficient internal capital markets hypothesis states that diversified firms are low in value or perform poorly because they allocate resources inefficiently across their different segments (Lamont & Polk, 2002; Schommer, Richter & Karna, 2019). Firms may find themselves overinvesting in departments with low prospects and underinvesting in departments with higher growth opportunities (Erdorf et. al, 2012). Lamont and Polk (2002) found that diversification destroys firm value consistent with the inefficient internal capital markets hypothesis. They find that, actual segment investment is better than the investment by specialized firms in the same industry.

"The inefficient internal capital markets hypothesis implies that within-firm diversity, segment investment rates should be lower than measures of diversity based on focused firm investment rates, since diversified firms socialistically smooth investments across segments" (Lamont & Polk, 2002:69).

Rajan, Servaes and Zingales, (2000) report a positive relationship between investment efficiency and firm value. They find that internal capital allocations are more effective when differences in the resources and investment opportunities of segments are not so distinct. This model also predicts a negative relationship between the value of diversified firms and the diversity of their segments' resources and investment opportunities. This shows that less valuable firms with inefficient investment allocations are a result of increased diversity. Other studies such as Datta, D'Mello and Iskandar-Datta (2009); Ozbas and Scharfstein (2010); and Sautner and Villalonga (2010) reported similar results. Billet and Mauer (2003) find no evidence of a relationship between the value of a firms internal capital markets and the firms' value.

Dimitrov and Tice (2006) examined the effect of diversification on firm value and concluded that diversification becomes more efficient when external capital markets are moderately inefficient (especially during recessions or economic shocks) and when the various segments of a diversified firm are financially constrained as single-segment firms, similar to Hovakimian (2011). Rudolph and Schwetzler (2014) examined the relationship between the value of corporate diversification and capital market development, integration and the legal systems. They reported that the value of diversification reduces in developed markets where firms can obtain external capital on the capital market without difficulty. Contrary, it is more valuable in emerging countries with weak capital markets, as they cannot raise capital externally easily and legal systems and investor protection (La Porta, Lopez-de-Silanes & Shleifer. 1999).

Higher Costs. More resources have to be spent investing in human capital, capital, coordination, infrastructure and monitoring of information which results to agency problems throughout the diversification process, counteracting the possible benefits of the strategy. If the economies of scope do not work out as expected, it may cause more resources to be used than expected. Performance of an activity may be shared but if the performance of that activity affects the activity's effectiveness negatively, then sharing may decrease rather than increase competitive advantage (Porter, 1987). Furthermore, monitoring of information in diversified firms is more costly because the information is highly dispersed and may have to go through many channels (Phung and Mishra, 2016). Information asymmetry costs come up between central management and divisional managers in diversified firms, as they are higher in diversified firms than they are in specialized firms (Harris, Kriebel & Raviv, 1982). Lastly, but not least, the process of diversifying a firm can be long, taxing and time consuming. Some maybe long term projects that require government commitment and political will (Thomsen & Pedersen, 2002).

Over-investing. Managers tend to over invest when a firm has surplus cash flow (Martin & Sayrak, 2003). The marginal amount spent by diversified firms is invested in fairly poorer performing projects than the marginal amount invested by specialized firms (Hadlock, 2001). Berger and Ofek (1995) find that diversified firms overinvest in business divisions with reduced investment opportunities, and not spending enough on good segments. This translates to a lower value for a firm, the bigger the overinvestment and cross-subsidization within internal capital markets, the higher the loss of value for diversified firms. This indicates that diversifying destroys firm value, since it creates a situation in which the firm inefficiently transfers funds from good to bad business divisions. Furthermore, they find that excess values are lower in diversified firms with unrelated business segments consistent with inefficient internal capital markets hypothesis.

2.2.3 Discussion of Empirical Evidence on Diversification and Firm Performance

Findings using market based measure, Tobin's Q to measure diversification over different sample periods of American firms, tends to find that diversification reduces firm performance. These include, Lang and Stultz (1994) who observed 1,449 American firms from 1978 to 1990 and found that diversified firms have lower Tobin's Q than equivalent portfolios of specialized firms and that firms that increase their number of segments have lower Tobin's Q than firms that kept their number of segments constant. They find that firms that were previously performing poorly seek growth through diversification when they have exhausted internal growth opportunities. Their control variables included R&D, firm size and access to financial markets. Click and Harrison (2000) show using 42,529 firm-year observations for American non-financial corporations over the period 1984 to 1997, that diversification leads to firm value destruction, due to disproportionate high levels of assets in comparison to generated earnings implying inefficient use of the extensive assets required by diversified firms. They further attribute the value destruction to personal interest of managers consistent with Denis, Denis and Sarin (1997) and Lang, Poulsen, and Stulz (1995), who conclude that management, is hesitant to sell underperforming assets because they give significance to firm size.

Other studies opted to use the market-based measure of excess value created by Berger and Ofek (1995), where they assess the value of a diversified firm's segments as if they were separate entities/firms. These studies conducted on American firms also find that diversification reduces firm value. These studies include Berger and Ofek (1995), who find evidence that segments of diversified firms have lower operating profitability than specialized firms, in a sample of 3,659 American firms during the period 1986 to 1999. The average value loss from diversification is 13% to 15%. They attribute this loss to overinvestment and cross-subsidization and say it is substantiated by tax benefits from the diversification. Similarly, Lamont and Polk (2002) find that exogenous increases in the diversity of a firm's investment opportunities reduces firm

relative value therefore diversification destroys value consistent with the inefficient internal capital markets hypothesis in American firms reporting data from 1979 to 1997 using pooled OLS regressions. Denis, Denis and Yost (2002) using OLS regressions on a sample of 44,288 American firm-year observations for the period between 1984 and 1997, find geographically and industrially diversified firms' trade at a similar discount compared to specialized domestic firms operating in the same industries. They controlled for debt, profitability, R&D, Capital expenditure (Capex) and advertising.

Graham, Lemmon and Wolf (2002) also investigate 2,457 acquisitions undertaken between 1980 and 1995 in America using excess value as a measure of firm performance. They report that performance of firms that acquire other firms declines after diversification due to the fact that they acquire already poor performing firms, and not because diversifying reduces their performance similar to Burch, Nanda and Narayanan (2004) and Campa and Kedia (2002).

Several studies conducted using Asian markets find similar results such as Lins and Servaes (2002). Using a sample of over 1,000 firms from seven emerging Asian markets for the year 1995, they run OLS regressions on excess value while controlling for firm size, investment and profitability and found that diversified firms performed poorly compared to specialized firms and were less profitable than specialized firms were. Their results were contrary to the internal capital market efficiency theory, as these are markets with many capital market imperfections.

Shyu and Chen (2009) examined firms in the Asian market. They examine diversification on 214 Taiwanese firms from 1996 to 2004 using managerial ownership, director ownership, firm size, growth and leverage as control variables. They perform fixed effects regressions. They argue that it depends on the life cycle of a firm. They find that firms in their growing stages experience a significant diversification discount, while mature firms seem not to be affected by diversification. They also find that unrelated diversification lowers firm value in all growing and mature firms, and mature firms that practice related diversification trade at a premium.

Similarly, Phung and Mishra (2017) found diversification negatively affects firm performance of Vietnamese firms. Using fixed effects estimations on Tobin's Q when controlling for firm size, leverage, growth, firm age, profitability, investment and access to markets. They attribute this negative impact to a weak corporate governance system because of weak shareholder protection in emerging markets, which encourages firms to diversify and eventually impacts the firms' financial performance negatively. These results were robust, after controlling for self-selection biases and endogeneity. Consistent with Tsai, Ren and Eisingerich (2020) who study 366 listed Taiwanese firms that invested in China. They find that inter-regional geographical diversification has a negative effect on firm performance for the period 2005-2014. Rasyid et, al. (2020)

found that geographical diversification reduces performance of firms listed on the Indonesia Stock Exchange from 2010-2016. They measured firm performance using Return on Assets (ROA) and Market based values (MBV).

Kim and Mathur (2008) observed a sample of 28,050 American firm-year observations from 1990 to 1998 to investigate the effects of both industrial and geographic diversifications on firm value. They find that both industrial and geographic diversification are associated with reduction of firm value. They find that geographically diversified firms have higher R&D, advertising and operating expenses than industrially diversified firms. These create value for geographically diversified firms. They also find that unrelated segment diversification and higher foreign involvement reduce firm value. They use firm size, leverage, profitability, investment, R&D and advertising as control variables. Contrary to Bodnar, Tang and Weintrop (1999) who also study the effect of both geographic and industrial diversifications on both excess value and Tobin's Q as proxies for firm value for a sample of 6,693 American corporations from 1987 to 1993. They find that geographically diversified firms have a higher value than specialized domestic firms do, while industrially diversified or firms with multiple activity have a lower value than specialized domestic firms do. They also suggest that previous studies maybe biased due to the omission of a variable for geographic diversification.

Oyewobi, Windapo and Cattell (2013) investigate the effect of industrial and geographical diversification on performance of South African construction companies from 2006 to 2010. They find that geographical diversification has a positive impact on the firm performance measured by ROA on a sample of four firms. Similarly, Eukeria and Favourate (2014) who studied diversification in the food and beverage sector of Zimbabwean firms find that it had a positive impact on firm performance. Gyan, Brahmana and Bakri (2017) investigate impact of both industrial and geographical diversification on performance of 319 Malaysian firms using Tobin's Q as a proxy and find that geographical conglomerates have a negative impact on firm performance whilst industrial diversification has a positive impact.

Morck and Yeung (1991) use OLS regressions on a sample of 1,644 American firms. They find that globally diversified firms are valued more than specialized firms, as measured by Tobin's Q; driven by a firm's R&D and advertising spending and not by the diversification itself, providing support for the internalization theory. They found that geographical diversification is insignificant on its own therefore conclude that it does not reduce firm value and that managers' decisions may be more challenging to monitor in large complex international firms and that shareholders may be neglected.

Kogut and Kulatilaka (1994) who use a stochastic dynamic programming model find that diversified firms are more profitable than specialized firms are because they have more financial and operational flexibility,

in uncertain periods like change in government policies, market competition and new technologies in some other parts of worlds. Similarly, Servaes (1996) who does a cross-sectional regression using the exact variables as Lang and Stulz (1994) on a sample of 518 American firms from 1961 to 1976, finds that diversified firms are valued at a discount during the 1960s, but this discount declined to zero during the 1970s. Campa and Kedia (2002) expand their sample and examine 4,152 American firms during the period 1978 to 1996 using fixed effect estimation. They argued that the value of diversification is misinterpreted because of endogeneity. They use a panel data and instrumental variables to control for the endogeneity of the diversification and found that the diversification discount always disappears and sometimes even turns into a premium. They have excess value as a measurement of firm value with size, profitability and investment as control variables.

Using the same data sample as Campa and Kedia (2002), Villalonga (2004) who examined 8, 937 American firms from 1978 to 1997 used three different treatment effects estimators to address the diversification question and compare firm performance. Using business units that were consistently constructed than segments codes. All three methods result in the diversification discount disappearing. The study attributes diversification discount found by others to sample selection biases. Kuppuswamy and Villalonga (2010) later examined 5,727 American firms from 2005 to 2009, and show that during the financial crisis of 2007 to 2009 relative value of diversified firms increased significantly compared to specialized firms. This was a result of better access to credit markets because of debt coinsurance and efficient use of internal capital markets, as external capital markets were more costly. Indicating financial constraints and the state of the capital market play an important role in determining the value of diversification. Diversified firms were more leveraged than corporate firms were. They conclude that diversification can provide insurance for investors against crisis or economic shocks. They measured value by excess value, and controlled for cash flow, leverage, dividends, cash volatility, investment, operating income and firm size using OLS regressions.

Rasyid et, al. (2020) found that industrial diversification enhances performance of firms listed on the Indonesia Stock Exchange from 2010-2016. Similarly, Mota and Santos (2020) find that unrelated and related diversification have a positive effect on Tobin's Q and ROA of 2,396 diversified European firms for the period 2010 to 2017.

Furthermore, several studies conducted outside America find a U-shaped relationship between diversification and firm performance, these include; Grant, Jammine and Thomas (1988) who study 304 British manufacturing firms and used ROA as a proxy for firm performance. The study state that diversification increases managerial, structural, and organizational complexity; coordination and integration costs; and stresses top management resources. They found that diversification improved firm performance but once the firm reached encountered complexities performance began to drop. Similarly, Palich, Cardinal

and Miller (2000) reported a curvilinear relationship between corporate diversification and financial performance after performing a correlation relationship test, meaning performance of a firm increases as a firm practice related diversification but performance decreases when they undertake unrelated diversification. Further, they find that modest levels of diversification produce higher levels of performance than either restricted or extensive diversification.

This finding supports Varandarajan and Ramanujam's (1987) finding that firm that undertakes related diversification perform better than those that undertake unrelated diversification. The study used Return on Equity (ROE), Return on Capital (ROC), Sustainable Growth Rate (SGR) and Earnings per share Growth Rate (EPSGR) as proxies for firm performance, similarly Deonanan (2011) who studied the effect of diversification on performance of 98 South African industrial firms from 2003 – 2010. The study found that moderately diversified firms performed better than highly or focused firms using ROE, ROA and Market Return as a measure of firm performance after conducting an Analysis of Variance Statistical Technique (ANOVA) test.

Mazur and Zhang (2015) study the excess value and internal capital allocation of diversified firms from 1976 to 2013. They find that a diversification discount exists reduced after 2008, turning into a premium during the bubble burst and becoming zero during the financial crisis. They conclude that shocks in external financial markets affect diversified firms minimally because of efficient internal capital markets. Similar to Santarelli and Tran (2016) who study Vietnamese firms for the period 2002 to 2010 after controlling for industry fixed-effects, Tsai, Ren and Eisingerich (2020) who study listed Taiwanese firms that invested in China found that intra-regional geographical diversification had a U-shaped relationship with firm performance.

2.2.4 Hypothesis Development

Given the various arguments presented from theoretical and empirical evidence, there is no clear indication on whether diversification enhances or reduces firm performance. Diversification is a strategy that was initially undertaken by managers to improve firm performance (Pandya & Rao, 1998). Diversification has been one of the most popular strategic methods often applied by corporate strategy theory used in order to grow and sustain financial performance, especially through difficult economic times (Deonanan, 2011).
Bodnar, Tang and Weintrop (1999:1) who study the effect of geographic and industrial diversification on firm value of American firms from 1987 to 1993, attribute the inconsistent findings on this topic to omission of geographical diversification as a variable as most studies only analyzed industrial diversification. They further argue that failure to control for geographical diversification has a 40% overestimate effect on industrial diversifications effect on firm value. Bowen and Wiersema (2009:9) suggest that internal

transaction and governance costs and opportunities for resource leveraging indicate that the degree of industrial diversification is impacted by the degree of geographical diversification and vice versa. This is justified in that some studies that have studied industrial and geographical diversification separately and find different results. Jiraporn et al. (2006) find that industrial and geographical diversification have different degrees of agency issues as industrial diversification reduces firm performance more than geographical diversification does. As a result, this study investigates both industrial and geographical diversification independently, to capture each one's effects and to eliminate any bias created by just observing one variable. Therefore, the study hypothesizes;

H1: a positive relationship between industrial diversification and firm performance and;

H2: a positive relationship between geographical diversification and firm performance.

Internal capital market theory states that diversified firms have an advantage over specialized firms because diversified firms get to use resources generated from one business unit into other business unit within the company efficiently (Rudolph & Schwetzler, 2014; and Weston, 1970). Therefore, the study proposes the following hypothesis;

H3: Diversified firms perform better than specialized firms do.

2.3 Literature Review: Ownership Structure

2.3.1 Definition of Ownership Structure

Ownership structure is a concept or mechanism within corporate governance, on management of corporates processes and structures that facilitates creation of shareholder wealth whilst ensuring protection of individuals and stakeholders interests (Hasan & Butt, 2009). It is defined as the pattern and type of structure the ownership of a firm takes characterized by concentration (Mollah, Farooque & Karim, 2012). The resource dependence theory argues that ownership structure can be used to reinforce or contradict management depending on how concentrated it is and how it is applied, therefore, it plays a critical role in corporate governance and is a source of valuable insights to firm owners to improve their corporate governance system (Zhou, 2001).

2.3.2 Theoretical Background of Ownership Structure and Firm Performance:

2.3.2.1 How Ownership Structure Enhances Firm Performance

Corporate Governance. Corporate governance is believed to be able to lessen agency problems within firms by reducing optimal diversifying decisions on the part of managers as they become more accountable, so they cannot make decisions that simply benefit them. Corporate governance may also improve effectiveness and efficiency of internal capital allocation. According to various studies, (see Himmelberg, Hubbard & Palia,

1999; Hoechle et al, 2012; and Scharfstein, 1998) efficiency of corporate governance influences the effect of diversification positively. Scharfstein (1998) finds that sensitivity of a business unit's capital expenditure to its industry value is higher in a diversified firm where top management are part owners or hold more equity.

Ownership concentration and managerial ownership can be used to represent corporate governance amongst other variables such as board structure. Sautner and Villalonga (2010) report a positive relationship between the efficiency of the internal capital market, the value of diversified firms and ownership concentration. Showing that internal capital markets are more efficient and the value of firms enhances when ownership by other corporations, governments and insiders increases. Furthermore, given that in emerging economies, the regulatory framework is considered weak, corporate governance plays a significant role in ensuring efficiency of a firm.

La Porta, et al. (2001) suggests that protection of minority shareholders is weak in emerging markets, it may be easier for insiders to operate diversified firms in a way that fulfils their own personal interests through corruption (like dispensing patronage in form of jobs and favors) and lack of contract enforcement rather than maximizing firm performance. In such instances, discipline of management must then come from internal monitoring mechanisms.

2.3.2.2 How Ownership Structure Reduces Firm Performance:

Agency Theory. Several studies have pointed to agency problems as the cause of reduced performance of diversified firms, and have used it to answer the question of why firms continue to diversify, despite reduction in firm performance. Agency theory is used to explain and resolve issues regarding the relationship between business principals and their agents. The agent would be the executives/manager(s) of a firm and the principal would be the owner/shareholder(s) or others affiliated that have a financial interest in the firm. The agent represents the principle and has been hired to perform a service on their behalf (Kopp, 2020).

Agency theory aims to resolve two main problems in an agency relationship, between the agent and the principal of the agent. The first problem occurs when the objectives/goals of the principal and agent, where owners are not managers, are not aligned and results in conflicts. This may cause firms to depart from profit maximizing activities as managers engage in strategies and activities that do not prioritize shareholder value maximization. The second problem is the approach towards risk of the principal and the agent, which might be different and therefore lead to further conflict (Eisenhardt, 1989). Managers take into account their personal risk when making decisions, which have an impact on a firms risk (May, 1995). Diversification

satisfies the managerial utility function by reducing firm risk and increasing firm size. Agency theories also propose that managers make acquisitions that destroy value and wealth when their firms are mature because their cash flows grow at a faster rate than their internal growth opportunities and managers pursue growth at the expense of shareholders (Jensen, 1986).

Some studies have attributed the diversification discount to inefficient financial management by diversified firms' managers. Inderst and Muller (2003) state that managers of diversified firms tend to overinvest and to allocate funds inefficiently among segments (Rajan, Servaes & Zingales, 2000; and Shin & Stulz, 1998). Managers may also simply choose to diversify for face value as they may be rewarded for the size of the firm rather than financial performance. Global diversification may provide personal benefits to managers by giving them greater power, prestige and compensation.

Monsen and Downs (1965) argue that firms with low managerial ownership and diffused ownership (low ownership concentration) may be in strong favor of diversification of products, especially through merger, as a way of reducing risks taken on any one product. Although diversification tends to reduce the rate of return on capital, hence reducing firm performance; therefore, firms with owners who are also managers would be less likely to adopt such policies. This argument and finding is consistent with Amihud and Lev (1981); Clicks and Harrison (2000); Denis, Denis and Sarin (1997); Jensen (1986); Morck, Shleifer, and Vishny (1988); Servaes (1996) and Shleifer and Vishny (1992) who all conclude that managers who do not have stake in a firm diversify for personal interests whilst reducing shareholder value. Aggarwal and Samwick (2003); Jensen and Meckling (1976); and Nguyen (2013) find that diversification is a result of self-motivated managers who want to secure private benefits (compensation, prestige or career prospects).

2.3.3 Discussion of Empirical Evidence on Ownership Structure and Firm Performance

Ownership structure has been used to explain poor performance of diversified firms, suggesting that low managerial ownership and ownership concentration lead to poor firm performance. Studies such as Amihud and Lev (1981) explain poor firm performance by low managerial ownership as they found that firms that had low managerial ownership diversified more than firms with high managerial ownership in American firms for the period 1961-1970. Consistent with Earle, Kucsera and Telegdy (2005) who examine firms listed on the Budapest Stock Exchange from 1996 to 2000 and find that the more ownership concentration a firm has of a single large block holder, the better a firm performs.

Espinosa-Mendez et.al. (2020) analyzed 47 Chilean firms on the Santiago Stock Exchange during the period 2003 to 2013 using Generalized Method of Moments (GMM) estimator and Tobin's Q as a measure of firm

performance and found that ownership concentration has a negative relationship with firm performance of industrially diversified firms, but had a positive relationship with firm performance of geographically diversified. Denis, Denis and Sarin (1997) found in 933 American firms from 1984, that managerial ownership is negatively related to diversification and positively related to firm performance measured by excess value. Lins and Servaes (2002) found that poor performance of Asian firms in 1995 were part of industrial groups and for diversified firms with management ownership concentration between 10% and 30%. Implying insiders use diversification to expropriate minority shareholders for personal benefits.

To the contrary, studies that used accounting measures to measure firm performance rather than market-based measures like the above studies find that managerial ownership and ownership concentration enhance firm performance, for example, Barclay and Holderness (1989). They analyze pricing of 63 block trades in 1978 to 1982 and find that the blocks perform better because of higher voting power from higher managerial ownership. The better the firm performance the better the price. Similarly, Thomsen and Pedersen (2000) investigate the impact of ownership structure on firm performance in 435 European firms and find a positive effect of ownership concentration on firm performance measured by market-to- book value of equity and profitability measured by asset returns.

Similarly, Alimehmeti and Paletta (2012) who measure firm value by ROA and use OLS estimations investigate ownership concentration as a governance mechanism, and its effect on the value of Italian firms from 2006 to 2009. They find a positive relationship between ownership concentration and firm value except for 2008, when there is a non-linear relationship, suggesting that expropriation effects were enhanced during the financial crisis. Lloyd, Hand and Modani (1987) found that firms that had higher ownership concentration had greater firm value (which was measured by market value-to-sales ratio); and Zeckhouser and Pound (1990) found that firms with higher ownership concentration had an increasing price/earnings ratio. Al-Matari and Al_arussi (2016) found a positive relationship between ownership concentration and managerial ownership and firm performance in 81 firms in Oman from 2012 to 2014.

Studies that used a larger sample found evidence that ownership structure has a non-linear relationship with firm performance. These include, Fama and Jensen (1983) who find a curvilinear between ownership structure and firm performance, McConnell and Servaes (1990) who find that Tobin's Q increases until managerial ownership reaches 40% to 50% where it drops for a sample of 1,173 American firms from 1976 to 1986. Simarly, Morck, Shleifer, and Vishny's (1988) and Wruck (1989) find a non-linear relationship between ownership structure (managerial ownership) and firm value (measured by Tobin's Q) examining American firms. Tobin's Q increases then declines then increases as managerial ownership increases.

Certain studies that deviate and use different methodologies or different sample other than America find evidence that ownership structure has no effect on firm performance. Demsetz and Lehn (1985) who use OLS estimation find that there is no significant relationship between ownership concentration and firm performance using a sample of 511 American firms. Consistent with Demsetz and Villalonga (2001) who made ownership as a multi-dimensional and endogenous variable. Abdullah, Ali and Haron (2017) examine a sample of 240 firms listed on the main board of Bursa Malaysia in 2013 and find that, ownership measured by managerial and institutional ownership has no significance in relation to firm value measured by Tobin's Q. Rasvid et, al. (2020) find that managerial ownership has no effect on ROA of Indonesian firms but at low levels of managerial ownership, industrial diversification increases firm performance significantly and geographical diversification reduces firm performance significantly.

Barr, Gerson and Kanto (1995); and Ntim, Opong and Danbolt (2012) report relatively concentrated ownership, high institutional ownership and weak compliance with regulations and shareholder activism in South Africa, compared to UK counterparts. In the UK, firms that have dispersed ownership, implying unlike the UK, when managers are not performing well, the channels through which they are expected to be self-controlled may not be effective in South Africa.

2.3.4 Hypothesis Development

Shareholders that own high percentages of the firm are more likely to monitor their investment closely and it is therefore expected that they have an impact on the performance of the firm (Zondi & Sibanda, 2015). Managers are in charge of the daily running and decision making of a firm and have some significant impact on firms' strategy decision towards diversification. Many studies have attributed the reduction in firm performance during diversification to managers. According to agency theory, higher managerial ownership leads to managers making less destructive decisions hence increases performance of a firm, therefore, to determine whether ownership is related to managerial agency problems, following Amihud and Lev (1981); Denis, Denis and Sarin (1997); Earle, Kucsera and Telegdy (2005); Espinosa-Mendez et.al. (2020) who find a positive relationship between managerial ownership and firm performance, this study examines the impact of managers on firm performance, and therefore proposes the following hypothesis;
H4: a positive relationship between managerial ownership and firm performance.

Firms with diffused ownership (or low ownership concentration) may be in strong favor of diversification of products, as a way of reducing risks taken on any one product. Therefore, firms with owners who are also managers would be less likely to diversify and increase firm performance (Monsen & Downs, 1965). Ownership concentration can be both beneficial and detrimental to the performance of a firm. Shleifer and Vishny (1986) argue that increasing ownership should influence firm performance positively as shareholders

play a role in increasing price of shares. Claessens et al. (2002) argue that a large ownership concentration might counterbalance agency costs, as the large number of shareholders are able to put necessary pressure on managers. Under this assumption, to see if monitoring is effective, the study proposes the following hypothesis;

H5: a positive relationship between ownership concentration and firm performance.

In conclusion, this section analyzed the theoretical background and empirical evidence of diversification and ownership structure in relation to firm performance in order to gain an understanding of the topics, to develop hypotheses.

CHAPTER 3: METHODOLOGY

This chapter presents the research design, variables and methodology used in order to obtain the results. The chapter helps understand further the research data, sample, variables and procedures used to test the hypotheses.

3.1 Data and Sample

The financial, accounting and ownership data used in this study was collected from Bloomberg financial database. Criteria for firms that were in the sample of this study included;

Ten-year consecutively functioning firms. Firms that have been operating in the market consecutively for ten years (2010 to 2019) or more in order to avoid improper calculations due to the short time-series data. They must have had complete data on market value of equity, sales, profit, debt, investment, sales growth, assets and capital stock of each of their segments per year;

Non-financial firms. Financial firms have different accounting standards and regulatory environment. For example, financial firms do not report information on earnings before interest and taxes (EBIT) and total capital (market value of equity plus book value of debt), because such earnings are not meaningful for them and financial firms debt liabilities are not directly comparable to the debt of non-financial firms. Further, some variables may not be comparable between financial and non-financial firms. This is done similar to Berger and Ofek (1994); and

Firms listed on the JSE. These firms have financial reports that follow the International Financial Reporting Standards (IFRS).

The sample of the current research originally consisted of 339 firms listed on the JSE for the period of 2010 to 2019. The study covers a recent time-period as possible to ensure it reflects the current situation and is relevant. In respect of the above criteria, 174 firms were excluded from the sample, which consisted of 74 financial and insurance firms, and 101 firms whose data was not complete, resulting in a final sample of a balanced panel of 164 firms (1,640 firm year observations). Panel data has advantages compared to historical series or cross sectional data analysis, as inference of model parameters is more accurate, able to better control the impact of omitted variables and basic computation and statistical inference.

3.2 Measurement of Variables

3.2.1 Dependent Variable

Firm Performance; Measured by the natural log of Tobin's Q. Tobin's Q is defined as the ratio of the firm's market value to the replacement cost of assets (Brainard & Tobin, 1968). This study adopts the use of natural log of Tobin's Q used by Lamont and Polk (2002), Lang and Stulz (1994), and Phung (2015) among others, as it is an improvement over accounting measures such as ROA or ROE. It integrates forward-looking market valuations, accounts for risk and is not subject to managerial manipulations like accounting measures are (Kim, Hoskisson & Wan, 2004; and Palich, Cardinal & Miller, 2000). Furthermore, it is a preferred measure over excess value, computed by Berger and Ofek (1995) as it is a better measure of competitive advantage than accounting-based measures (Lin & Su, 2008; Karthik, George & Singla., 2015). It is also not restricted to the industry within which it competes as excess value is, allowing for comparisons across industries and large markets as emerging markets have fewer matching and listed firms (LeBaron & Speidell, 1987; and Lins & Servaes, 2002). Furthermore, it has the capability to assess the value of long-term investments and there is no theoretical reason to adjust for risk or leverage to compare firms. Rudolph and Schwetzler (2014) also criticize excess value for distorting the value of diversified firms relative to specialized firms and it requires application of personal objectivity.

Tobin's Q is calculated as the sum of the market value of common equity, the book value of preferred shares and the book value of total debt divided by the book value of total assets. Tobin's Q is designed to measure the present value of future cash flows divided by the replacement cost of tangible assets (Lang & Stulz, 1994).

$$\text{Tobin's Q} = \frac{\text{Market Enterprise Value}}{\text{Total Asset Replacement Value}} = \frac{\text{(Market Value of Equity + Book Value of Debt)}}{\text{Book Value of Total Assets}}$$

3.2.2 Independent Variables

Diversification; Measured using three methods, dummy variable, number of segments and complement of Herfindahl index (HHI) for robustness. Both industrial and geographical diversification are measured using the three measures. In industrial diversification, the separate products a firm produces or separate industries a firm operates in classify as different segments and in geographical diversification, the separate locations (countries) a firm operates in classify as different segments.

The first measure is a dummy variable. A dummy of 1 is assigned if a firm has more than one segment to indicate it is diversified, and 0 to indicate it has only one segment and is not diversified, in line with Anderson, et al. (2000); Berger and Ofek (1995); Comment and Jarrell (1995); Denis, Denis and Sarin (1997); and Rose and Shepard (1997). The dummy variable only captures a firm's change from one industry to the other; therefore, to capture relatedness, the study adopts the use of continuous measures; segment numbers and HHI (which has been criticized because it may understate the effect of a new segment because new entrants' sales are generally smaller).

The second measure is the segment variable, which is the number of segments a firm has in line with Lang and Stulz (1994). The more segments a firm has the more diversified it is. The third measure is the complement of HHI as modified by Berry (1971) and used by Schoar (2002); and Villalonga (2004). It is used, to provide consistency, ease of interpretation and comparison of results with the dummy variable and segment number. It is the sum of the squared values of sales per segment as a fraction of total firm sales, similar to Comment and Jarrell (1993) and Lang and Stulz (1994) subtracted from one. Therefore, if a firm is specialized (only has one segment), the index is 0, and if a firm has ten segments, that each contribute 10% of sales, the index is 0.9. Therefore, the more segments contribute to sales, the higher the index.

$HHI = \sum_{i=1}^{n} Si2$ where Si is the ith segment's revenue proportion of the firm's total revenues and n is the number of segments of the firm.

HHIc = 1 - HHI.

Managerial Ownership (MO); Measured using the percentage of shares held by executive directors, non-executive directors and officers following previous studies by Agrawal and Mandelker (1987); Denis, Denis and Sarin (1997); Goranova et al. (2007); Morck, Shleifer and Vishny (1988); and Mugobo, Mutize and Aspeling (2016) among others.

Ownership concentration (OC); Measured by the percentage of shares owned by the largest shareholder (OC1), top three shareholders (OC3) and the top five shareholders (OC5) in order to capture the curvilinear relationship, allowing expropriation effects to be monitored and tested. This is in line with Denis, Denis and Sarin (1997); Earle, Kucsera and Telegdy (2005); La Porta, Lopez-de-Silanes and Shleifer (1999); McConnell and Servaes (1990) and Mugobo, Mutize and Aspeling (2016); Singal and Singal (2011); and Thomsen and Pedersen (2000). These studies assumed a linear relationship between ownership concentration and firm performance. OC1, OC3 and OC5 act as a proxy for the shares of the controlling owners, under the assumption that all the largest shareholders have the potential to divert profits (Parigi & Pelizzon, 2005). Types of owners as presented by Bloomberg included institutional, government, individual, insider (manager), corporate, company, sovereign wealth fund and banks.

3.2.3 Control Variables

Similar to prior studies such as Berger and Ofek (1994); Bodnar, Tang and Weintrop (1999); Denis, Denis and Yost (2002); Fauver, Houston and Naranjo (2004); Mackey, Barney and Dotson (2017), this study includes firm-level control variables that are likely to affect firm performance to account for their differences. It is important to control for firm-specific characteristics that could affect firm performance for a result that is as unbiased as possible. These characteristics can also affect firm performance, by causing a reduction or enhancement in firm performance, and therefore have to be controlled (Campa & Kedia, 2002).

Size; Measured by the logarithm of a firm's total assets. Due to skewness, this study used the logarithm of total assets to achieve a normal distribution (Gedajlovic & Shapiro, 1998; Lu & Beamish, 2004). It is expected that larger firms perform better than the smaller ones. Grant, Jammine and Thomas (1988) report a positive relationship between firm size and performance. They argue that size affects performance of a firm because larger firms benefit from economies of scope and have more market power and access to more resources than smaller firms have. To the contrary, Lewellen (1971) reports that larger firms are more likely to have synergy issues due to diversification, which in turn ramps up their costs in an effort to coordinate better, so this may cause a negative relationship between size and performance.

Age; Measured as the number of the years a firm has been in continuous operation since it's founding (Guest & Sutherland, 2010; and Santarelli & Tran, 2016). Firm age was included because it speaks to experience level and managerial competencies, essential innovations, international operations of a firm and its ability to access finance. Older firms have more experience, learning and managerial competencies so it is expected they will perform better. Bernardo and Chowdhry (2002) found that younger firms tend to have fewer prospects and less competency to enter new industries. To the contrary, Santarelli and Tran (2016) state that in an emerging economy, firm age may hinder the firm's ability to be alert and able to capture profit opportunities in timely manner.

Ability to access financial markets (AAFM)/Dividend; Measured by the dummy variable one, for the years a firm pays dividends and zero when it does not, similar to Lang and Stulz (1994). A firm that pays out dividends retains less cash for re-investment compared to firms that do not pay dividends and have an expectation of profitability in the future (Phung, 2015). The argument is firms that pay dividends do not reinvest in activities such as diversification and are expected to have a negative relationship to firm performance. Aggarwal and Samwick (2003), Lang and Stulz (1994) and Phung and Mishra (2016) report a negative relationship between dividend payment and firm performance. Lang and Stulz (1994) argue that this is due

to firms using excess cash to diversify rather than pay dividends. To the contrary, Thomsen and Pedersen (2000) report a positive relationship between dividend payment and firm performance.

Profitability; Measured by return on sales that is earnings before interest and tax (EBIT)/sales. A firm with higher profitability is preferred by investors and can therefore affect the performance of a firm. Firms with higher profitability are more likely to perform better than firms with lower profitability are. Therefore, the performance of a firm and profitability are positively related. Campa and Kedia (2002) argue that firms with weak profitability may lead them to diversify in order to seek new sources of profits. Fauver, Houston and Naranjo (2004); Himmelberg, Hubbard, Lins and Servaes (2002) and Palia (1999) and Rudolph and Schwetzler (2014) report a positive relationship between profitability and firm performance.

Leverage; Measured by total debt/shareholders' equity (Hall, 1995). Leverage presents capital structure of a firm, which can affect diversification. Debt is advantageous in that it is the cheapest and easiest source of finance but carries the risk of leading to bankruptcy. According to trade-off theory, leverage can enhance firm performance because of the tax benefits of debt. On the other hand, higher levels of leverage lead to higher likelihood of bankruptcy and low profitability therefore leading to a negative relationship between leverage and firm performance. Views on the relationship between leverage and diversification and firm performance are mixed. Phung (2015), McConnell and Servaes (1990) and Morck (1991) find a positive relationship between leverage and firm performance. Lang, Poulsen and Stulz (1995) and Fauver, Houston and Naranjo (2004) find a negative relationship.

Investment; Measured by capital expenditure (capex)/sales. Also used to measure growth opportunities as an increase in capital expenditure signifies growth opportunities (Phung, 2015). Companies need to invest in long term assets to grow or be sustainable otherwise, if they are not able to or have relatively low capital expenditures, they are perceived as unsustainable by investors. It is assumed that investment affects firm performance positively. If a firm has many investments opportunities, it means the firm has the capability to generate more cash flows. Although, they are maybe a negative effect on firm performance by investment intensity if interests of managers and shareholders are not aligned because this may lead to inefficiency (caused by over-investment or under-investment). Fauver, Houston and Naranjo (2004); Lins and Servaes (2002) and Rudolph and Schwetzler (2014) report a positive relationship between investment and firm performance. Phung (2015) reports a negative relationship.

Research and Development (R&D); Measured by R&D expenditure/sales. This study chose to include R&D because R&D expenditure is an indicator of profitability, growth of a firm and the ability of a firm to utilize technological knowledge. Denis, Denis and Sarin (1997) argue that investment intensity shows firms' production capabilities and firm-specific knowledge, which affect its willingness to invest in R&D.

Generally, firms with less growth opportunity might want to pursue new sources of income through diversification. Denis, Denis and Sarin (1997); Johnson and Pazderka (1993); McConnell and Servaes (1990) and Morck (1991) found that R&D expenditure is positively related to firm performance.

3.3 Model Estimation

This study used Stata to apply fixed effects (FE) regressions, which are used when observing the same sample of individual variables (like countries, cities, and in this case, firms). Fixed effects control for endogeneity caused by unobservable firm characteristics, which may affect the diversification decision, in line with Bhatia and Thakur (2017); Campa and Kedia (2002); and Phung (2015). Fixed effects tests improve accuracy of average effects by removing heterogeneity between firms (Hansen, Perry & Reese, 2004). Although fixed effects does not control for endogeneity when independent variables are correlated to the error terms (Abdallah, Goergen & O'Sullivan, 2015). Therefore, to deal with this, this study goes further to run the cross sectional and heteroskedastic test, which represents the two-tailed test. By default Stata assumes homoscedasticity standard errors, so to adjust the model to account for homoscedasticity, the option robust was applied in the regressions. Separate dummy variables for each year and each firm were included in the regressions (although the variables are not reported) to ensure time effect was captured and to control for firm level heterogeneity similar to Gompers, Lerner and Scharfstein (2005).

For comparison purposes, the study also ran OLS and random effect (RE) tests similar to Aggarwal and Samwick (2003). Several studies have used OLS, which is ideal when you select a different sample for each period of the panel data but it has a shortfall in that there is omitted variable bias that may cause unobservable firm characteristics to correlate with the error term, leading to possible spurious statistical significance.

3.3.1 Diversification

The study conducts a multivariate analysis in order to answer research questions 1 and 2, using multivariate analysis, the study separates diversification into industrial and geographical diversification, examining the synergy effect and relatedness, to verify the relationship between diversification and firm performance:

$$\textbf{Tobin's Qit} = \alpha + \beta 1\textbf{HHIcinddivit} + \beta 2\textbf{HHIcgeodivit} + \beta 3\textbf{Sizeit} + \beta 4\textbf{Ageit} + \beta 5\textbf{Diviit} + \beta 6\textbf{Profit} + \beta 7\textbf{Levit} + \beta 8\textbf{Invit} + \beta 9\textbf{R\&Dit} + \varepsilon it \qquad (1a)$$

Where: (***i***=each firm, ***t*=1**,,…,, where N is the number of the year being observed); α is the constant; β1 is industrial diversification (using HHI complement); β2 is geographical diversification (using HHI complement); β3 is firm size; β4 is firm age; β5 is dividend (access to financial markets); β6 is profitability; β7 is leverage; β8 is investment; β9 is R&D; and εit is error term.

To answer the third research question and determine if specialized firms perform better than diversified firms do. The firms are split into two separate groups, those that diversify and those that specialize and a distinct comparison is made between the two groups to see which ones perform better. A test of the firm performance as given by Tobin's Q is conducted to make this comparison, controlling for all variables. The following regression models are used to test to see if diversified firms perform better than specialized firms.

Tobin's Qit = α + β1Specializedit +β2sizeit + β3Ageit + β4Diviit + β5Profit + β6Levit + β7Invit + β8R&Dit + εit (2)

Where: (***i***=each firm, ***t*=1**,,…,, where N is the number of the year being observed); α is the constant coefficient; β1 is specialized firms; β2 is firm size; β3 is firm age; β4 is dividend (access to financial markets); β5 is profitability; β6 is leverage; β7 is investment; β8 is R&D; and εit is error term.

Tobin's Qit = α + β1Diversifiedit +β2sizeit + β3Ageit + β4Diviit + β5Profit + β6Levit + β7Invit + β8R&Dit + εit (3)

Where all the variables are the same as equation 1 except β1 is diversified firms.

3.3.2 Robustness Checks Models

Tobin's Qit = α + β1Seginddivit + β2Seggeodivit + β3Sizeit + β4Ageit + β5Diviit + β6Profit + β7Levit + β8Invit + β9R&Dit + εit (1b)

Where all the variables are the same as equation 1a except β1 is industrial diversification (using industrial segment number); and β2 is geographical diversification (using geographical segment number).

Tobin's Qit = α + β1Duminddivit + β2Dumgeodivit + β3Sizeit + β4Ageit + β5Diviit + β6Profit + β7Levit + β8Invit + β9R&Dit + εit (1c)

Where all the variables are the same as equation 1a except β1 is industrial diversification (using industrial dummy variable); and β2 is geographical diversification (using geographical dummy variable).

3.3.3 Ownership Structure

Lastly, to answer research questions 4 and 5, building on the initial model equation 1a, a multivariate analysis is done to examine whether there is a relationship between ownership structure and firm performance in the context of diversification identified by value theories such as the agency theory by including managerial ownership and ownership concentration as independent variables. This is in line with the study done by Fauver, Houston and Naranjo (2004). Equation 4 does not include diversification variables whilst equation 5 does, in order to make a distinct comparison between the results when diversification is included and when it is not. This is done to see the effect that ownership structure has on firm performance in the context of diversification (equation 5).

Tobin's Qit = α + β1MOit + β2OC1it + β3OC3it + β4OC5it + β5Sizeit + β6Ageit + β7Diviit + β8Profit + β9Levit + β10Invit + β11R&Dit + + εit (4)

Where β1 is managerial ownership; β2 is ownership concentration of largest shareholder; β3 is ownership concentration of top three shareholders; and β4 is ownership concentration of top five shareholders.

Finally, we have this model that examines the impact of both diversification and ownership structure on firm performance.

Tobin's Qit = α + β1Inddivit + β2Geodivit + β3MOit + β4OC1it + β5OC3it + β6OC5it + β7Sizeit + β8Ageit + β9Diviit + β10Profit + β11Levit + β12Invit + β13R&Dit + εi (5)

CHAPTER 4: RESULTS AND ANALYSIS

4.1 Descriptive Statistics

Table 1: Descriptive Statistics for All Firms

		Minimum	Maximum	Mean	Median	Standard Deviation
Performance (ZARmillion)		-1.3322	1.9099	-0.0449	-0.0715	0.3261
Industrial Diversification	**HHIc (ZARmillion)**	-0.6475	0.8319	0.2083	0.0676	0.2541
	Segment (no.)	1	8	2.1281	2	1.3751
	Dummy	0	1	0.5598	1	0.4966
Geographical Diversification	**HHIc (ZARmillion)**	0	0.7883	0.2019	0	0.2533
	Segment (no.)	1	8	2.4109	2	1.8836
	Dummy	0	1	0.5067	1	0.5001
Size (ZARmillion)		0.0792	6.5501	3.6342	3.6879	1.0032
Age (Years.)		1	159	48.4878	39.5	34.9902
Dividend Dummy		0	1	0.6299	1	0.4829
Profitability (ZARmillion)		-389	17.1596	-1.1027	0.0808	14.0279
Leverage (ZARmillion)		0	18,230.65	64.6899	2.66	475.7015
Investment (ZARmillion)		0	125,540	163.6883	3.305	4,058.9248
R&D (ZARmillion)		0	2	0.0018	0	0.0495
MO (%)		0	1.003	0.0371	0.0017	0.1038
OC1 (%)		0	1.6913	0.4927	0.4906	0.3103
OC3 (%)		0	2.3043	0.8224	0.8481	0.5015
OC5 (%)		0	2.2567	0.8679	0.9044	0.5239

The average Tobin's Q of South African firms is ZAR1.2837million. The highest number of segments that South African companies have both industrially and geographically is 8. The companies range in size from ZAR0.0792million to ZAR6.5501million, which in actual assets translates to ZAR1.2million to ZAR3, 548, 700million with an average of ZAR60, 632.92million. On average South African firms have been in existence about 48 years. At the end of the sample period, the oldest firm from establishment is 159 years and the youngest is 11 years. On average 63% of the firms, pay dividends. The sample firms have a ZAR-1.1million profitability with the lowest firm raking in profitability of ZAR-389million and the highest ZAR17.1596million. The average leverage of South African sample firms is ZAR64.6899million and average investment is ZAR163.6899million. R&D is very low in South African firms with an average of ZAR0.0018million.

Managers on average have 3.71% ownership stake in the sample firms, which when compared to Malaysia as reported by Abduallah and Mohdali (2017) is relatively low. They report 34% managerial ownership on average. Ownership concentration of the largest shareholder holding is an average of 49% of the firms' shares, the 3 largest shareholders having 82% of the companies' shares and 5 largest shareholders 87%.

Table 2 below provides comparison between the descriptive statistics of specialized and diversified firms. There are 443 completely specialized firm year observations (approximately 44 specialized firms) and 1,195 diversified firm year observations (approximately 120 diversified firms).

Table 2: Descriptive Statistics for Specialized Firms and Diversified Firms

	Specialized Minimum	Maximum	Mean	Median	Standard Deviation	Diversified Minimum	Maximum	Mean	Median	Standard Deviation
Performance (ZARmillion)	-1.1158	1.9089	-0.0988	-0.1048	0.3287	-1.3322	1.2934	-0.0256	-0.0546	0.3229
Industrial HHIc	0	0.4338	0.0009	0	0.0206	-0.6475	0.8319	0.2854	0.2721	0.2578
Diversification segment	1	2	1.0023	1	0.0475	1	8	2.5473	2	1.3952
dummy	0	0	0	0	0	0	1	0.7682	1	0.4222
Geographical HHIc	0	0	0	0	0	0	0.7883	0.2772	0.2394	0.2592
Diversification segment	1	1	1	1	0	1	8	2.9364	2	1.9626
dummy	0	0	0	0	0	0	1	0.6954	1	0.4604
Size (ZARmillion)	0.0792	4.8487	2.9595	3.0259	0.8443	1.5145	6.5501	3.8836	3.8667	0.9414
Age (Years)	1	156	36.7472	23	32.2822	1	159	52.8485	45	34.9944
Dividend Dummy	0	1	0.4695	0	0.4996	0	1	0.6887	1	0.4632
Profitability (ZARmillion)	-389	17.1596	-4.2713	0.0411	26.5828	-56.1111	12.1828	0.0702	0.0892	1.8516
Leverage (ZARmillion)	0	519.1	29.6344	8.79	52.1531	0	18,230.65	77.6952	33.39	555.8759
Investment (ZARmillion)	0	125,540	579.3556	1.95	7,800.2872	0	1,937.14	9.8655	3.68	59.1917
R&D (ZARmillion)	0	2	0.0047	0	0.0951	0	0.0859	0.0007	0	0.0035
MO (%)	0	0.6718	0.0395	0.0022	0.0945	0	1.003	0.0362	0.0015	0.1072
OC1 (%)	0	1.6902	0.3949	0.3232	0.3091	0	1.6913	0.3839	0.3169	0.2866
OC3 (%)	0	2.4012	0.6434	0.5741	0.4961	0	2.3043	0.6349	0.5538	0.4694
OC5 (%)	0	2.4043	0.6742	0.6175	0.5126	0	2.2567	0.6695	0.6004	0.4873

On average specialized firms perform better than diversified firms by 4.51%, (which have a Tobin's Q of ZAR-0.0256million compared to ZAR-0.0988million of specialized firms). This is similar to Bodnar, Tang and Weintrop (1999) and Denis, Denis and Yost (2002) who find the value of specialized American firms' is 5.4% higher than diverse firms are. Lang and Stulz (1994), show that specialized American firms through the late 1970s and the 1980s perform better in capital markets than diversified firms do. Similarly, Manyuru (2017) found that specialized Kenyan firms had a higher Tobin's Q than diversified firms. Kim and Mathur (2008) had similar findings as they show interaction between industrial and geographic diversification and that firms that are diversified in unrelated segments with high level of foreign involvement have lower value.

Diversified firms are larger by 27% (with total assets amounting to an average of ZAR3.8836million compared to ZAR2.595million of specialized firms); are older by 16 years on average; pay more dividends on average by 21.92% (ZAR0.6887million compared to ZAR0.4695million of specialized firms). Diversified firms are also more levered by 89.56% (ZAR77.6952million compared to ZAR29.6344million) similar to Kuppusamy and Villalonga (2010); and Sambharya (1995) who shows that the combination of geographical and industrial diversification reduces the operating risk of geographical diverse firms leading to an increase in leverage. Diversified firms are more profitable than specialized ones contrary to Berger and Ofek (1995) who found that specialized American firms are significantly more profitable than specialized firms are. Specialized firms have more investment and spend more on R&D by over 100% similar to Campa and Kedia (2002); and Hyland and Diltz (2002) who found companies with high R&D are less likely to be diversified.

Managerial ownership is about the same for both specialized and diversified firms with a minimal difference of 0.33%. Specialized firms are more concentrated in terms of ownership than diversified firms are (1.1%, 0.85% and 0.47% respectively) similar to Kim and Mathur (2008) who found firms with higher insider ownership had higher excess value.

Table 3 below provides comparison between the descriptive statistics of industrially diverse firms and geographically diverse firms. There are 918 firm year observations (approximately 92 firms) that are industrially diverse and 831 firm year observations (approximately 83 firms) are geographically diverse.

Table 3: Descriptive Statistics for Industrially and Geographically Diverse Firms

		Industrially Diversified					Geographically Diversified				
		Minimum	Maximum	Mean	Median	Standard Deviation	Minimum	Maximum	Mean	Median	Standard Deviation
Performance (ZARmillion)		-1.3322	1.2934	-0.0289	-0.0601	0.3217	-0.8828	1.2934	0.0015	-0.0276	0.3263
Industrial	**HHI**	0.1681	1.6475	0.6284	0.5903	0.2334	0.1681	1	0.7352	0.8152	0.2651
Diversification	**HHIc**	-0.6475	0.8321	0.3716	0.4097	0.2334	0	0.8319	0.2648	0.1848	0.2651
	Segment	2	8	3.0141	3	1.2623	1	8	2.4404	2	1.5417
	Dummy	1	1	1	1	0	0	1	0.6667	1	0.4717
Geographical	**HHI**	0.2287	1	0.7611	0.8403	0.2552	0.2117	1	0.6014	0.5951	0.2195
Diversification	**HHIc**	0	0.7713	0.2389	0.1597	0.2552	0	0.7883	0.3986	0.4049	0.2195
	Segment	1	8	2.7963	2	2.0402	2	8	3.7846	3	1.7823
	Dummy	0	1	0.6035	1	0.4894	1	1	1	1	0
Size (ZARmillion)		1.5145	6.5501	3.8362	3.8591	0.9628	1.5145	6.5501	4.2009	4.2394	0.8739
Age (Years)		1	159	53.8965	45	35.9504	3	159	56.099	47	36.7932
Dividend Dummy		0	1	0.6786	1	0.4672	0	1	0.7316	1	0.4434
Profitability (ZARmillion)		-56.1111	12.1828	0.0711	0.0882	1.9252	-25.4095	12.1828	0.1265	0.0941	1.0209
Leverage (ZARmillion)		0	18,230.65	80.7001	33.47	629.8836	0	18,230.65	92.5219	36.8	664.8395
Investment (ZARmillion)		0	308.62	7.3978	3.565	18.2641	0	1,937.14	11.7686	4.15	69.9891
R&D (ZARmillion)		0	0.0859	0.0007	0	0.0039	0	0.0859	0.0009	0	0.0041
MO (%)		0	1.003	0.0419	0.0018	0.1189	0	0.7171	0.0229	0.0011	0.0831
OC1 (%)		0	1.6902	0.5199	0.5175	0.3727	0	1.6913	0.6135	0.6324	0.4258
OC3 (%)		0	2.0786	0.8712	0.9239	0.5456	0	2.3043	1.0257	1.0822	0.5633
OC5 (%)		0	2.1829	0.9189	0.9897	0.5662	0	2.2567	1.0818	1.1507	0.5799

Geographically diverse firms perform 7.92% better than industrially diverse firms do on average (with a Tobin's Q of ZAR0.0015million compared to ZAR-0.0289million of industrially diverse firms). 60% of industrially diverse firms are also geographically diverse and 67% of geographically diverse firms are industrially diverse. On average geographically diverse firms are larger than industrially diverse firms by 9.08% (with ZAR4.2009million in assets compared to ZAR3.8362million of specialized firms). On average geographical diverse firms, pay out 5.3% more dividends more than industrially diversified firms do (with ZAR0.7316million compared to ZAR0.6786million). Geographically diverse firms are more profitable by 56.07% (ZAR0.1265million compared to ZAR0.0711million of industrially diverse firms), are more levered by 13.65% (with ZAR80.7001million in leverage compared to ZAR92.5219million of industrially diverse firms). Geographically diverse firms have more investment by 45.82% (ZAR11.7686million compared to ZAR7.3978million of industrially diverse firms), invest more in R&D by 25% (with ZAR0.0009million compared to ZAR0.0007million of industrially diverse firms) consistent with Kim and Mathur (2008) findings who study the effects of both industrial and geographic diversification. Industrially diverse firms have a 1.9% higher managerial ownership than geographically diverse firms do. Geographically diverse firms

have a higher ownership concentration than industrially diverse firms do (9.36%, 15.45% and 16.29% respectively).

Furthermore, a comparison was done between industrially specialized firms and geographically specialized firms (see appendix 2). Industrially specialized firms perform better (have a higher Tobin's Q) than geographically specialized firms do by 8.92%. 38% of industrially specialized firms are geographically diverse, and 45% of geographically specialized firms are industrialized diverse. As more geographically specialized firms are industrially diverse and perform worse than industrially specialized firms confirms the finding that geographically diverse firms perform better than industrially diverse firms do. Industrially specialized firms are bigger than geographically specialized firms by 10.12% with an average of ZAR37, 964.35million in assets compared to ZAR3, 988.53million of geographically specialized firms. Industrially specialized firms pay out more dividends than geographically specialized firms do by 3%. Geographically specialized firms are more profitable by 9.27%. Industrially specialized firms are more levered (by 20.47%); have more investment (by 12.51%); and spend more on R&D (by 20.69%) than geographically specialized firms do. Geographically specialized firms have more managerial ownership at 2.06% than industrially specialized firms. Industrially specialized firms are more concentrated than geographically specialized firms are, increasing in their concentration at 8.43%, 13.4% and 14.21% respectively.

Industrially specialized firms perform better than industrially diverse firms by 3.01%. Industrially diverse firms are larger by 12.72% and older by an average of 12 years than industrially specialized firms. Industrially diverse firms pay more dividends than specialized firms do by 11%. Industrially diverse firms are more profitable, have more leverage (by 58.17%); have more managerial ownership (by 1%); and are more concentrated than industrially specialized firms are by 5.17%, 10.23% and 10.73 respectively. Industrially specialized firms have more investment and spend more on R&D than diverse firms by over 100%.

Geographically diverse firms perform 13.83% better than geographically specialized firms similar to Bodnar, Tang and Weintrop (1999) who find that the value of geographically diverse firms' performance is 2.2% higher than specialized firms. Geographically diverse firms are larger in size by 31.68%, are older by 15 years, pay more dividends by 20.63%, are more profitable, are more levered by 87.73% and have a higher ownership concentration by 22.96%, 39.08% and 41.23% respectively, than geographically specialized firms. Geographically specialized firms have more investment, spend more on R&D (97%) and have higher managerial ownership by 2.86% than diverse firms.

Table 4: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) Performance	1.000																	
(2) HHIcIndustrial	0.070	1.000																
(3) SegmentIndustiral	0.121	0.791	1.000															
(4) DummyIndustrial	0.055	0.725	0.727	1.000														
(5) HHIcGeographical	0.046	0.165	0.180	0.164	1.000													
(6) SegmentGeographical	0.051	0.241	0.312	0.231	0.787	1.000												
(7) DummyGeographical	0.145	0.226	0.230	0.218	0.787	0.739	1.000											
(8) Size	0.127	0.237	0.273	0.227	0.635	0.533	0.573	1.000										
(9) Age	0.023	0.145	0.178	0.174	0.225	0.234	0.221	0.330	1.000									
(10) Dividend	0.172	0.069	0.079	0.114	0.173	0.172	0.214	0.240	0.233	1.000								
(11) Profitability	0.039	0.070	0.068	0.094	0.073	0.066	0.089	0.070	0.073	0.111	1.000							
(12) Leverage	0.019	0.005	0.000	0.038	0.060	0.060	0.059	0.067	0.060	0.014	0.011	1.000						
(13) Investment	-0.010	-0.025	-0.025	-0.034	-0.023	-0.022	-0.029	-0.021	-0.026	-0.039	-0.259	-0.004	1.000					
(14) R&D	-0.002	-0.013	-0.013	-0.024	-0.010	-0.012	-0.017	-0.016	-0.016	-0.030	-0.246	-0.004	0.988	1.000				
(15) MO	-0.102	0.039	0.004	0.056	-0.142	-0.054	-0.140	-0.227	-0.139	-0.021	0.002	-0.018	0.009	0.008	1.000			
(16) OC1	0.071	0.115	0.101	0.059	0.238	0.236	0.301	0.337	0.179	0.065	0.032	0.010	-0.018	-0.014	0.088	1.000		
(17) OC3	0.087	0.151	0.130	0.079	0.292	0.280	0.352	0.423	0.221	0.089	0.032	0.017	-0.016	-0.011	0.110	0.931	1.000	
(18) OC5	0.093	0.153	0.129	0.080	0.299	0.284	0.359	0.432	0.217	0.096	0.030	0.016	-0.014	-0.009	0.111	0.917	0.995	1.000

There are no close correlations except for the proxies of diversification. Therefore, there is no multicollinearity. The results show that both industrial and geographical diversification are positively related to firm performance similar with the findings of Denis, Denis and Yost (2002). All other variables are positively related to firm performance except investment, R&D and managerial ownership, which are negative.

4.2 Multivariate Analysis

In displaying results, the study labels the columns as follows:

FE_1 - Fits regression models to panel data, fits fixed-effects models (using the regression estimator within).

FE_2 - Cross sectional and heteroskedastic test, which represents the two-tailed test. Driscoll and Kraay's covariance estimator/standard errors. "It produces Driscoll and Kraay (1998) standard errors for coefficients estimated by fixed-effects (within) regression. The error structure is assumed to be heteroskedastic, auto correlated up to some lag, and possibly correlated between the groups (panels). Driscoll-Kraay standard errors are robust to very general forms of cross-sectional ("spatial") and temporal dependence when the time dimension becomes large" (Hoechle, 2020).

(Note: Results for original HHI will be displayed in appendix to show that the results are consistent despite using HHIc.)

4.2.1 Impact of Diversification on Firm Performance

Table 5: Regression Test Results for Specialized Firms and Diversified Firms

	Specialized Firms						Diversified Firms					
	HHIc Variable		Segment Variable		Dummy Variable		HHIc Variable		Segment Variable		Dummy Variable	
VARIABLES	FE_1	FE_2	FE_1	FE_2	FE_1	FE_2	FE_1	FE_2	FE_1	FE_2	FE_1	FE_2
Industrial Diversification	0.114*	0.138*	0.0493*	0.0601*	-	-	-0.00626	-0.00979	0.0174	0.0117	0.0365	0.0301
	(0.0620)	(0.0675)	(0.0269)	(0.0293)			(0.0655)	(0.0403)	(0.0201)	(0.00659)	(0.0464)	(0.0201)
Geographical Diversification	-	-	-	-	-	-	-0.0498*	-0.0422*	-0.00831*	-0.00978*	0.0173	0.0103*
							(0.0794)	(0.0561)	(0.0101)	(0.00469)	(0.0449)	(0.0242)
Size	-0.0870***	-0.0864***	-0.0870***	-0.0864***	-0.0869***	-0.0862***	-0.0385	-0.0645	-0.0468	-0.0720	-0.0485	-0.0726
	(0.0259)	(0.0254)	(0.0259)	(0.0254)	(0.0258)	(0.0254)	(0.0614)	(0.0727)	(0.0595)	(0.0704)	(0.0598)	(0.0700)
Age	0.000351	0.000384	0.000351	0.000384	0.000346	0.000378	-0.0166***	-0.0152***	-0.0164***	-0.0150***	-0.0166***	-0.0151***
	(0.000414)	(0.000448)	(0.000414)	(0.000448)	(0.000411)	(0.000444)	(0.00370)	(0.00303)	(0.00377)	(0.00288)	(0.00374)	(0.00288)
Dividend	0.110***	0.106**	0.110***	0.106**	0.111***	0.107**	0.0305	0.0349*	0.0306	0.0351*	0.0292	0.0340*
	(0.0303)	(0.0329)	(0.0303)	(0.0329)	(0.0303)	(0.0330)	(0.0270)	(0.0182)	(0.0269)	(0.0176)	(0.0266)	(0.0168)
Leverage	0.000400***	0.000392***	0.000400***	0.000392***	0.000399***	0.000391***	1.00e-05***	1.11e-05***	9.62e-06***	1.08e-05***	9.51e-06***	1.07e-05***
	(0.000122)	(0.000116)	(0.000122)	(0.000116)	(0.000121)	(0.000115)	(3.42e-06)	(1.59e-06)	(3.35e-06)	(1.45e-06)	(3.53e-06)	(1.56e-06)
Profitability	0.000883*	0.000862*	0.000883*	0.000862*	0.000882*	0.000861*	0.00335*	0.00311*	0.00333*	0.00308*	0.00331*	0.00305*
	(0.000392)	(0.000397)	(0.000392)	(0.000397)	(0.000392)	(0.000396)	(0.00184)	(0.00290)	(0.00182)	(0.00292)	(0.00181)	(0.00290)
Investment	4.24e-06**	4.12e-06**	4.24e-06**	4.12e-06**	4.24e-06**	4.12e-06**	-4.83e-06	-4.48e-05	-2.48e-06	-4.29e-05	-3.31e-06	-4.37e-05
	(1.34e-06)	(1.34e-06)	(1.34e-06)	(1.34e-06)	(1.33e-06)	(1.34e-06)	(4.02e-05)	(3.19e-05)	(3.95e-05)	(3.31e-05)	(3.88e-05)	(3.27e-05)
R&D	-0.168***	-0.167***	-0.168***	-0.167***	-0.168***	-0.167***	1.382*	1.359*	1.366*	1.344*	1.375*	1.350*
	(0.0470)	(0.0476)	(0.0470)	(0.0476)	(0.0469)	(0.0475)	(0.721)	(0.734)	(0.733)	(0.720)	(0.744)	(0.722)
Constant	0.0842	18.44	0.0349	18.38	0.0841	17.83	0.994***	0	0.980***	0	0.976***	0
	(0.0747)	(74.64)	(0.0500)	(74.63)	(0.0747)	(74.18)	(0.166)	(0)	(0.173)	(0)	(0.170)	(0)
Observations	443	443	443	443	443	443	1,197	1,197	1,197	1,197	1,197	1,197
R-squared	0.075	0.078	0.075	0.078	0.075	0.078	0.135		0.135		0.136	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Geographical diversification in specialized firms is omitted because of collinearity. Using the dummy variable in specialized firms, both industrial and geographical diversification are omitted because of collinearity.

In specialized firms, industrial diversification is significant at 10% with fixed effects and 5% with random effects. Size is negative and significant at 1%. Age is positive and insignificant. Dividend is positive and significant at 1% with FE_1, OLS and random effects and 5% with FE_2. Leverage is positive and significant at 5% with OLS and 1% with fixed and random effects. Profitability is positive and significant at 5% with OLS and random effects and 10% with fixed effects. Investment is positive and significant at 1% with OLS and random effects and 5% with fixed effects. R&D is negative and significant at 1%. Industrial diversification has a positive effect on specialized firms. Size and R&D affect specialized firms performance negatively. Dividend, leverage, profitability and investment affect performance of specialized firms positively. Age has no significant effect.

In diversified firms, industrial diversification is not significant (negative using HHIc but positive with the segment and dummy variable as proxies). Geographical diversification is negative and significant using fixed effects, OLS and random effects at 1% using HHIc and segment variables. Size negative and insignificant. Age is negative and significant at 1% using OLS and fixed effects and 5% using random effects. Dividend is positive and significant at 1% using OLS, and 10% using FE_2 and RE_2 and not significant using FE_1 and RE_1. Leverage is positive and significant at 1% using OLS, fixed effects and RE_2 and significant at 10% using RE_1. Profitability is positive and significant at 1% using OLS, at 10% using FE_1 and 5% using RE_1 and not significant using FE_2 and RE_2. Investment is negative and insignificant using fixed and random effects. R&D is positive and significant at 10% using OLS, fixed effects and RE_2 and significant at 5% using RE_1. Diversification has no significance using fixed effects. Age affects firm performance of diversified firms negatively. Dividend, profitability, leverage and R&D affect firm performance of diversified firms positively. Size and investment have no significant effect.

From the regression results of specialized firms, diversification is positive and significant with fixed and random effects. Size is negative and significant. Age is positive and insignificant. Dividend is positive and significant. Leverage is positive and significant. Profitability is positive and significant. Investment is positive and significant. R&D is negative and significant.

For specialized South African firms the study concludes that specialization, dividend, leverage, profitability and investment affects firm performance positively, implying that the more specialized a firm is, if it pays dividends, the more leveraged it is, the more profitable it is and the more it invests the better the performance of the firm. Profitability enhances performance of specialized firms similar to Denis, Denis and Yost (2002), Himmelberg, Hubbard and Palia (1999) and Phung (2015). Profitable firms create more income therefore improving performance as a result the more profitable firms perform better. Firms that invest more perform better, this finding is similar to Denis, Denis and Yost (2002). Size and R&D affects firm performance of specialized firms negatively implying the bigger the firm and the more it spends on

R&D the worse the performance. Age is not significant implying that how long a firm has been in existence has no effect on firm performance, this is similar to Delbufalo, Poggesi & Borra (2016) who found no significance in Italian firms, Denis, Denis and Yost (1997) and Patrick (2012) who found that age had no significance on Nigerian manufacturing firms.

From the regression results of diversified firms, industrial diversification using segment and dummy is positive but negative with HHIc. Geographical diversification is negative with HHIc and Segment but positive with the dummy variable. It is significant using FE_2 for HHIc and segment variables. Size is negative and insignificant using fixed effects and RE_2. Age is negative and significant. Dividend is positive and significant using FE_2, OLS and RE_2 but positive and insignificant using FE_1 and FE_1. Leverage is positive and significant. Profitability is positive and significant with FE_1, OLS and RE_1, and insignificant with FE_2 and RE_2. Investment is negative and insignificant with fixed effects and RE_2. R&D is positive and significant with fixed and random effects.

For diversified firms, the study concludes that industrial diversification has no effect on the performance of South African firms. Geographical diversification reduces performance of diversified South African firms. This is consistent with Al-Maskati, Bate and Bhabra (2015), who find a discount in New Zealand firms. Berger and Ofek (1995) and Cho (2017) who examined the effect of industrial and geographical diversification on performance of Korean firms, Click and Harrison (2000) and Denis, Denis and Yost (2002) who found evidence that diversification reduces value in American firms. Kim and Mathur (2008) also investigate the effects of both industrial and geographic diversifications on firm value using fixed effects find that both industrial and geographic diversification reduce firm value. Lins and Servaes (2002) find diversified firms trade at a discount compared to specialized firms in sample of seven Asian countries. Lang and Stulz (1994) find a discount but could not conclude that diversification affects frim performance because, in their sample, firms that diversified performed poorly before becoming diversified.

Harris, Kriebel and Raviv (1982) argue that geographical diversification could destroy firm value because of the inefficient cross-subsidization of less profitable divisions. The complexity of globally diversifying a firm can lead to higher costs of synchronizing corporate functions and policies due to information asymmetry between the headquarters and divisions. Edorf et al. (2013) found that unrelated segment diversification and higher foreign involvement reduce firm value. This could indicate that South African firms have a high degree of unrelatedness when it comes to geographically diverse firms and the foreign involvement possibly reduces firm performance. Furthermore, the results of geographical diversification could be affected by the performance of the Rand and exchange rates during the sample period, as good performance of the Rand lowers Tobin's Q and vice versa. The findings of this study on geographical diversification of diverse firms are consistent with inefficient internal capital markets hypothesis that

suggests that resources are not being allocated efficiently across the different segments. The idea of having to start a parallel company means rather than using economies of scope they may be acquiring more costs because they have to pay for more human resources, assets, plants in order to open up new operations in other locations.

Size reduces the performance of specialized firms but has no effect on diversified firms. Age has no effect on the performance of specialized firms but reduces the performance of diversified firms meaning younger diversified firms perform better than older ones. This is similar to Chakrabarti, Singh and Mamood (2007) for East Asian firms,

Santarelli and Tran (2016) who found age negatively affects performance of Taiwanese firms. This finding can be justified by Santarelli and Trans (2016) argument that in an emerging economy, firm age may hinder the firms ability to be alert and able to capture profit opportunities in a timely manner. Older firms are probably slower at catching up in the use of technology as well.

Dividend has a positive effect on the performance of both specialized and diversified firms. Leverage enhances the performance of both specialized and diversified firms. Profitability enhances the performance of specialized firms and it also has a positive effect on diversified firms but the significance can not be clearly concluded. It is not significant in diversified firms similar to Lins and Servaes (1999) and Fauver, Houston and Naranjo (2004) in the multivariate test. Lins and Servaes (1999) state that the profitability level of firms may not be reflective of the market's expectations of future performance because reorganisations and short-term earnings decline during the time period.

Investment enhances performance of specialized firms but has no effect on diversified firms, contrary to Phung (2015), Phung and Mishra (2017), Maquieira, Espinosa and Vieito (2011). Phung accredits this to overinvestment caused by conflict between managers and shareholders that damages firm performance. Overinvestment caused by managerial competencies can lead to firms investing in projects that are not worthwhile hence not contributing to firm performance which in turn also affects profitability of diverse firms.

R&D reduces performance of specialized firms but enhances performance of diversified firms, this could be because in a specialized firm R&D is simply another cost which raises the spending of the firm whilst in a diverse firm it serves as an effective tool for growth and growth opportunities. This is contrary to Click and Harrison (2000); Denis, Denis and Yost (2002); and Hyland and Diltz (2002) who found R&D to be positive and significant. Hyland and Diltz (2002) who state that extremely diversified companies

notwithstanding opening new market shares, invest less in R&D, therefore, they have lower levels of growth opportunities in their core business in comparison to specialized firms.

From the regression results of all the firms, industrial diversification affects firm performance positively but is insignificant but is significant using segment as a variable. Using HHIc and segment variables geographical diversification is negative and significant. Using the dummy variable it is positive and insignificant using fixed and random effects. Size is negative and significant using fixed and random effects. Age is negative and significant at 5% and 10% with fixed effects and OLS respectively. Dividend is positive and significant at 5% with fixed effects, 1% with OLS and random effects. Leverage is positive and significant at 1%. Profitability is negative and insignificant with fixed and random effects. Investment is negative and insignificant. R&D is positive and insignificant.

Table 6: Diversification Regression Test Results for All Firms

	HHIc Variable		**Segment Variable**		**Dummy Variable**	
VARIABLES	FE_1	FE_2	FE_1	FE_2	FE_1	FE_2
Industrial	0.0324	0.0228	0.0179	0.0107	0.0395	0.0309
Diversification	(0.0663)	(0.0198)	(0.0216)	(0.0139)	(0.0287)	(0.0174)
Geographical	-0.0381*	-0.0383*	-0.00864*	-0.0101*	0.0126	0.00897
Diversification	(0.0716)	(0.0606)	(0.0190)	(0.00728)	(0.0415)	(0.0303)
Size	-0.186***	-0.206***	-0.187***	-0.208***	-0.189***	-0.209***
	(0.0736)	(0.0320)	(0.0715)	(0.0302)	(0.0718)	(0.0317)
Age	-0.00944**	-0.00967**	-0.00950**	-0.00970**	-0.00975**	-0.00987***
	(0.00375)	(0.00104)	(0.00382)	(0.00110)	(0.00378)	(0.00107)
Dividend	0.0714**	0.0727**	0.0714**	0.0728**	0.0699**	0.0714**
	(0.0284)	(0.0238)	(0.0284)	(0.0235)	(0.0284)	(0.0222)
Leverage	9.56e-06***	1.05e-05***	9.25e-06***	1.02e-05***	9.12e-06***	1.01e-05***
	(2.88e-06)	(1.57e-06)	(2.80e-06)	(1.34e-06)	(2.95e-06)	(1.46e-06)
Profitability	-0.000256	-0.000240	-0.000247	-0.000234	-0.000240	-0.000226
	(0.000440)	(0.000387)	(0.000446)	(0.000391)	(0.000447)	(0.000391)
Investment	-1.14e-05	-1.23e-05	-1.13e-05	-1.22e-05	-1.15e-05	-1.23e-05
	(1.37e-05)	(1.34e-05)	(1.36e-05)	(1.33e-05)	(1.37e-05)	(1.34e-05)
R&D	0.610	0.673	0.604	0.667	0.611	0.674
	(0.711)	(0.676)	(0.708)	(0.672)	(0.710)	(0.675)
Constant	1.043***	0	1.032***	0	1.040***	0
	(0.169)	(0)	(0.165)	(0)	(0.165)	(0)
Observations	1,640	1,640	1,640	1,640	1,640	1,640
R-squared	0.140		0.140		0.141	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

From these results, concerning all South African firms, the study concludes industrial diversification has a positive effect on firm performance but there is no significance. The results on industrial diversification confirm the findings of Rashin (2006) who used a different methodology but drew a similar conclusion about South African firms. The study used a quasi-experimental approach on industrial sector of South African firms listed on the JSE, dividing the firm into two groups, those that are diversified and specialized, based on the calculation of the Specialization Ratio of each organisation. The study used ROE, ROA, market return & earnings per share to make comparisons and reported no significant differences in

performance between diversified and specialized firms. Similarly, Manyuru, Wachira and Amata (2017) find that geographical and industrial diversification have no effect on the performance of Kenyan firms except the results show that the value of firms in the agricultural sector is improved by industrial diversification only. Fauver, Houston and Naranjo (2004) apply the valuation methodology by Bodnar, Tang and Weintrop (1999) and Denis, Denis and Yost (2002) to a similar sample and period and find a non-significant positive result for industrial diversification and firm value. Lins and Servaes (1999) use excess value as a proxy for firm performance, to examine German firms in the early 1990s, and find no significant relationship between industrial diversification and firm value. Fauver, Houston and Naranjo (2004) and Lins and Servaes (1999) measure industrial diversification with a dummy variable which they set to one when a firm reports at least two segments in different two-digit SIC industries.

Geographical diversification affects firm performance negatively. This study's results are contrary to Bhatia and Thakur (2017) who found diversification is positively related to firm performance, suggesting that diversification creates firm value in Indian firms, similar to Campa and Kedia (2002) and Villalonga (2002) who found diversification enhances performance of American firms.

Specialization has a positive effect on firm performance whilst industrial diversification has no effect on firm performance and geographical diversification has a negative effect on firm performance therefore the study rejects H1, the hypothesis that diversified firms perform better than specialized firms. The study also rejects hypothesis H2 that there's a positive relationship between industrial diversification and performance of South African firms and rejects H3, the hypothesis that geographical diversification has a positive relationship with firm performance of South African firms.

Size affects performance of firms negatively implying the bigger the firm the lower the performance, therefore smaller firms perform better. This according to Lewellens (1971) argument happens because larger firms are more likely to have synergy issues due to diversification, increasing their costs in an effort to coordinate better. These findings are consistent with Al-Maskati, Bate and Bhabra (2015); Fauver, Houston and Naranjo l (2004); Lins, and Servaes (1999) who find that firm size is negatively related to firm value of German firms and UK firms. Manyuru, Wachira and Amata (2017) reported a negative impact of size on performance in Kenyan firms; and Shyu and Chen (2009) in Taiwan firms. Although Zondi and Sibanda (2015) found size of South African firms to be positive using OLS similar to this study's findings. These finding are contrary to Ammann, Hoechle and Schmid (2011a); Andres Fuente and Velasco (2014); Denis, Denis and Yost (2002) who recommended that large sized firms in American are more profitable than smaller sized firms are and Patrick (2012) found that size of firms is positive and significant in Nigerian manufacturing firms.

Age affects performance of South African firms negatively. Shyu and Chen (2009) find the diversification discount on Taiwanese firms occurs in growing firms and is a result of unrelated diversification. Older firms exhibit a significant discount in unrelated diversification and a significant premium in related diversification strategies. They draw a conclusion that the life cycle of a firm, related or unrelated diversification have an effect on the diversification-performance relationship. Moreover, that unrelated diversification is the cause of the discount confirming the work of Berger and Ofek (1995). This is contrary to Phung (2015) who finds age has a positive significant effect on performance of Vietnamese firms and Claessens et al. (2002).

Dividends enhance performance of firms implying firms that pay dividends perform better than those that do not, this finding is contrary to Click and Harrison (2000); and Lang and Stulz (2004) who find a negative relationship. Phung and Mishra (2017) find negative results and say listed firms are likely to pay more dividends in Vietnamese firms and Shyu and Chen (2009) find a negative relationship as well for Taiwanese firms stating that this is because as a firm grows, it reduces dividend payout.

Leverage enhances performance of firms implying firms that have more leverage perform better than low leverage firms possibly because of good financial management. This finding is consistent with Andres, Fuente and Velasco

(2014), Campa and Kedia (2002), Hall (1995) and He (2009), Patrick (2012) and Zondi and Sibanda (2015) who reported a positive relationship between leverage and performance. To the contrary Al-Maskati, Bate and Bhabra (2015); Ammann, Hoechle and Schmid (2011a), Denis, Denis and Yost (2002), He (2012) and to Santarelli and Tran (2016) find a negative and significant relation of leverage with firm performance. Bhatia and Thakur 2017 found leverage to be negative but turned positive and significant in 2006 that depicted a boom year possibly indicating that firms get more leveraged and perform better during a boom phase compared to post-recessionary phases. This could imply that the South African market operates in good conditions and can be considered as boom phase. Fauver, Houston and Naranjo (2004) find no significant relationship between leverage and firm value of German firms. Profitability, investment and R&D have no effect on firm performance of all South African firms generally.

4.2.2 Impact of Ownership Structure on Firm Performance

Table 7: Ownership Structure Regression Test Results

VARIABLES	FE_1	FE_2
Managerial Ownership	-0.227**	-0.192*
	(0.110)	(0.0960)
Ownership Concentration 1	0.0376	0.00723
	(0.0435)	(0.0320)
Ownership Concentration 3	-0.00617	-0.0774
	(0.111)	(0.0798)
Ownership Concentration 5	-0.00406	-0.0715
	(0.100)	(0.0647)
Size	-0.187***	-0.207***
	(0.0702)	(0.0275)
Age	-0.0111***	-0.0110***
	(0.00386)	(0.000652)
Dividend	0.0716**	0.0732**
	(0.0282)	(0.0229)
Leverage	9.50e-06***	1.00e-05***
	(2.87e-06)	(1.61e-06)
Profitability	-0.000265	-0.000248
	(0.000437)	(0.000389)
Investment	-1.14e-05	-1.22e-05
	(1.34e-05)	(1.31e-05)
R&D	0.614	0.671
	(0.695)	(0.661)
Constant	1.124***	0
	(0.168)	(0)
Observations	1,640	1,640
R-squared	0.149	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Managerial Ownership is negative and significant at 5% using fixed effects, 1% using OLS and 10% using random effects. OC1 is positive and insignificant with fixed and random effects. OC3 is negative and insignificant using fixed and random effects. OC5 is negative and insignificant using fixed and random effects. All other variables remain the same as table 6.

4.2.3 Impact of Ownership Structure and Diversification on Firm Performance

Table 8: Diversification and Ownership Structure Regression Test Results

	HHIc Variable		Segment Variable		Dummy Variable	
VARIABLES	FE_1	FE_2	FE_1	FE_2	FE_1	FE_2
Industrial	0.0328	0.0226	0.0162	0.00898	0.0397	0.0306
Diversification	(0.0671)	(0.0188)	(0.0216)	(0.0146)	(0.0287)	(0.0191)
Geographical	-0.0460*	-0.0440*	-0.0127*	-0.0133*	0.00199	0.00135
Diversification	(0.0719)	(0.0565)	(0.0191)	(0.00617)	(0.0435)	(0.0272)
Managerial	-0.227**	-0.193**	-0.230**	-0.196**	-0.227**	-0.192**
Ownership	(0.111)	(0.0949)	(0.111)	(0.0940)	(0.111)	(0.0917)
Ownership	0.0405	0.00994	0.0373	0.00670	0.0382	0.00797
Concentration1	(0.0437)	(0.0312)	(0.0434)	(0.0329)	(0.0437)	(0.0326)
Ownership	0.00835	0.0756	0.00488	0.0793	0.00954	0.0735
Concentration3	(0.110)	(0.0796)	(0.110)	(0.0825)	(0.111)	(0.0807)
Ownership	-0.00416	-0.0718	-0.00387	-0.0715	-0.000957	-0.0677
Concentration5	(0.0995)	(0.0651)	(0.0994)	(0.0666)	(0.0998)	(0.0652)
Size	-0.186**	-0.205***	-0.187***	-0.207***	-0.188***	-0.208***
	(0.0724)	(0.0299)	(0.0703)	(0.0281)	(0.0708)	(0.0296)
Age	-0.0109***	-0.0109***	-0.0110***	-0.0109***	-0.0112***	-0.0111***
	(0.00382)	(0.000542)	(0.00388)	(0.000611)	(0.00385)	(0.000595)
Dividend	0.0714**	0.0732**	0.0717**	0.0734**	0.0703**	0.0722***
	(0.0281)	(0.0232)	(0.0281)	(0.0229)	(0.0281)	(0.0217)
Leverage	9.97e-06***	1.05e-05***	9.64e-06***	1.02e-05***	9.54e-06***	1.01e-05***
	(2.83e-06)	(1.73e-06)	(2.72e-06)	(1.53e-06)	(2.86e-06)	(1.62e-06)
Profitability	-0.000271	-0.000254	-0.000266	-0.000251	-0.000259	-0.000242
	(0.000437)	(0.000382)	(0.000442)	(0.000384)	(0.000444)	(0.000385)
Investment	-1.15e-05	-1.23e-05	-1.13e-05	-1.20e-05	-1.14e-05	-1.22e-05
	(1.34e-05)	(1.31e-05)	(1.33e-05)	(1.30e-05)	(1.33e-05)	(1.31e-05)
R&D	0.619	0.674	0.605	0.660	0.612	0.668
	(0.697)	(0.662)	(0.691)	(0.655)	(0.693)	(0.658)
Constant	1.113***	0	1.114***	0	1.111***	0
	(0.170)	(0)	(0.168)	(0)	(0.167)	(0)
Observations	1,640	1,640	1,640	1,640	1,640	1,640
R-squared	0.150		0.150		0.151	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.

Industrial Diversification is positive and insignificant. Geographical diversification is negative and significant using Fixed effects and OLS at 1% (for HHIc and segment variables) and insignificant using the dummy variable. It is positive and insignificant with the dummy variable. Managerial Ownership is negative and significant at 5% using fixed effects, 1% using OLS and 10% using random effects. OC1 is positive and insignificant with fixed and random effects. OC3 turns positive and insignificant using fixed and random effects. OC5 is negative and insignificant using fixed and random effects. All other variables remain the same as table 6.

4.2.3.1 Managerial Ownership

For the regression results of specialized firms, managerial ownership is negative and insignificant (shown in appendix 6). For diversified firms, managerial ownership is negative and insignificant with fixed and random effects (shown in appendix 7). Diversification is positive and insignificant. This study concludes managerial ownership does not affect performance of specialized and diversified firms.

For the regression results for all firms, managerial ownership is negative and significant implying that firms with less managerial ownership perform better than firms with more managerial ownership do. Managerial ownership reduces the performance of South African firms. Agency theory proposes that when managerial ownership increases, the conflict of interest between managers and owners reduces and firm performance should increase. However, this is contrary to the findings of this study consistent with Demsetz and Villalonga (2001); and Mcconnell and Servaes (1990) who find at high levels of insider ownership, the relationship between Tobin's Q and insider ownership is negative and Stulz (1981), who records value first increasing, then decreasing, as insider ownership increases.

Demsetz (1983) might explain the negative relationship between managerial ownership and firm performance. The study argued that a lot of managerial ownership could potentially lead owners to worry more about their own interests, and not those of outside shareholders, therefore reducing firm value. Ownership is simply not related to diversification and maybe reducing firm performance for other reasons. Industrial diversification is positive and insignificant. Geographical diversification is negative. Furthermore, Shyu and Chen (2009) also explain this negative relationship as managers engaging in related diversification to reduce their exposure to professional risk, and not to for personal benefits.

To the contrary, Kim and Marthur (2008) and Mandacı and Gumus (2010) found insider ownership and firm performance to be positive, implying that as managerial ownership increases, managers are less likely to diversify as they find it to be a value reducing strategy, the value would increase. Many previous studies focused on large industrialized countries, with complete institutionalization processes and therefore, their results might not be relevant and necessarily comparable to developing countries. Shyu and Chen (2009) find director ownership has a significant and positive relationship with performance, in firms who are both at a growing and mature stage. They explain this with Williamson's (1983) substitution hypothesis, which suggests that markets with weak takeover mechanisms have a stronger board of directors. Taiwan being an emerging market whose capital market is not as mature as those of developed markets are. Approximately 68% of the sample have more than half of firms' board seats occupied by family members. Family members who play an important positive role in Taiwan's firm performance control two-thirds of the board of

directors. The study rejects H4, the hypothesis that there is a positive relationship between managerial ownership and firm performance of South African firms.

4.2.3.2 Ownership Concentration

Regression results for specialized firms, OC1 is positive and insignificant with fixed effects and OLS. OC3 is negative and insignificant with fixed effects and OLS. OC5 is positive and insignificant (shown in appendix 6). Regression results for diversified firms show OC1 is positive and significant with FE_1 and RE_1 and insignificant with FE_2 and RE_2. OC 3 is positive and insignificant with fixed and random effects. OC5 is negative and insignificant with fixed and random effects (shown in appendix 7).

This study concludes ownership concentration does not affect performance of specialized firms. OC1 affects performance of diverse firms positively. OC3 and OC5 do not affect performance of diverse firms. OC1 for specialized firms is positive then OC3 is negative and OC5 is positive implying ownership concentration affects performance positively before a certain point and after a certain point. For diverse firms OC1 positive, OC3 is positive and OC5 is negative, implying the more ownership concentration, the worse the performance.

The results for all firms show that OC1 is positive and significant with FE_1 and RE_1. OC3 is positive and insignificant with fixed and random effects. OC5 is negative and insignificant using fixed and random effects. Ownership concentration has no effect on performance of South African firms with the exception of OC1 the largest shareholder, who affects firm performance positively. Although OC1 and OC3 are positive and OC5 is negative. Implying the more concentrated the ownership is, the worse the performance of South African firms providing a non-linear relationship. Consistent with this study's' findings are Barclay and Holderness (1990), who find no relationship between firm value and block ownership. Similarly, Holderness and Sheehan (1988) who do not find a significant relationship between firm performance and single dominant shareholder, McConnell and Servaes (1990) who find no significant relationship between Tobin's Q and several alternative specifications of blockholder ownership and Mikkelson and Ruback (1985).

Even if not significant, the relationship between Ownership concentration and firm performance is similar to the findings of Morck, Shleifer, and Vishny (1988) and Thomsen and Pedersen (2000) who found a non-linear relationship so that ownership concentration beyond a certain point leads to entrenchment and has adverse effects on performance. Alimehmeti and Paletta (2012) find that ownership concentration had a positive relationship with firm performance. Maquieira, Espinosa and Vieito (2011) find in Chilean firms

had better performance when it is more diversified and had a lower level of ownership concentration held by the three largest shareholders. Patrick (2012) finds that ownership structure is negatively related to performance of manufacturing firms in Nigeria.

The positive relationship between ownership concentration and performance is also supported by the study by Shleifer and Vishny (1997) who state that in developing economies, investor protection is low, ownership concentration is considered as alternative corporate governance tool in developing countries. Similar to previous studies conducted on developing countries (see Barberis et al., 1996; Mandacı & Gumus, 2010; and Yammeesri,

Lodh & Herath, 2006) and consistent with the results found for the United States by Demsetz (1983), Demsetz and Lehn (1985) and Demsetz and Villalonga (2001).

The relationship between ownership concentration and firm performance refutes the agency theory that expects higher ownership concentration aligns managers and shareholders objectives as shareholder control and power is enhanced, and consequently increases firm performance. The finding is although consistent with the efficient internal capital market theory, which expects that too much ownership concentration might lead to a decline in the value of the firm. *The study rejects the hypothesis h5, that ownership concentration has a positive relationship with the performance of South African firms*.

Results for the OLS and random effects regressions are reported in the appendix. Fixed and random effects give fairly similar results but there is significant differences presented between OLS and fixed effects. This may show how previous studies have produced inconsistent results.

CHAPTER 5: CONCLUSION

5.1 Conclusion

This study investigated the impact of diversification on firm performance of South African firms listed on the JSE measured by Tobin's Q for the period of 2010 to 2019. The study adds to the present body of knowledge, extending research to South African firms on the consequences of diversification on firm performance and further looking at the relationship between ownership structure and firm performance. The study uses panel data, variables and fixed effects to control for random characteristics that affect the performance of a firm to answer the question of whether diversification and ownership structure have an impact on firm performance. This study finds that industrial diversification does not affect performance of South African firms but geographical diversification reduces the performance of diversified South African firms, and specialization enhances firm performance.

A plausible explanation for these results is that South African firms use diversification as a growth strategy in search for growth opportunities in order to maximize un-used resources. Unfortunately, not enough research is being conducted in other geographical locations in order to understand their markets better, leading to a bad performance once operations avail in new geographical locations due to lack of understanding/knowledge of other markets, as in the earlier years just as they began diversifying just after 1994.

The results further suggest that South African firms can increase firm performance of diversified firms by reducing managerial ownership and keeping ownership concentration of the largest shareholder high. South African Managers possibly diversify to reduce exposure to risk and not for private benefit as prior studies suggests. The results also indicate that the reduction in performance of the firm from managerial ownership maybe due to other reasons other than diversifying. These results are not consistent with studies done in developed countries and Asian countries implying when it comes to the strategy of diversifying, managers need to carefully assess and consider market and economy characteristics and levels of development. Developing markets deal with inefficient institutions and internalizing governance functions. Bhatia and Thakur 2017 also state that managers should also have knowledge of the relationship between the extent of diversification and firm performance and know that both the variables affect each other simultaneously.

From the results, this study is also able to conclude that bigger firms are more likely to diversify and this reduces firm performance. Firm age has no bearing on whether a firm will diversify but older firms perform worse. The more dividends a firm pays the more diversified it is and the better it performs. The more levered a firm is the less industrially diversified it is, the more geographically diversified it is the better it

performs. The more profitable a firm is the less diversified it is, the better it performs. The amount of investment has no bearing on whether a firm will diversify but affects the performance of specialized firms positively and has no effect on diversified firms. R&D has no effect of the level of diversification but it enhances the performance of diversified firms and reduces performance of specialized firms. The results of size and profitability are consistent with the argument that diversification reduces value.

5.2 Challenges/Limitations

Reporting of data for industrial diversification was inconsistent in regard to sales for different segments/departments for different firms on the Bloomberg platform, therefore extra careful consideration had to be applied when collecting and organizing this data in order to ensure results were not affected or biased.

5.3 Recommendations

Future studies could consider;

- Using a larger sample by selecting a longer period for a more dynamic analysis, just to verify these results.
- Distinguishing types of owners in ownership concentration and examining each owner as a separate variable and their effect on firm performance just as previous studies (like Edmans, 2014; Hautz, Mayer & Stadler, 2013; Ismail, 2013; McConnell, Servaes & Lins, 2008 among others) have done. This can be done in order to get a clearer understanding on whether any specific type of owner has any influence on a firms performance and did not get overshadowed by being placed in one block of ownership. Different types of owners/shareholders include institutional investors (hedge, mutual, investment and pensions funds, banks), governments, individuals, companies, families (Edmans, 2014). This study investigated the impact of ownership concentration without differentiating types of owners, assuming the same relationship between ownership concentration and firm performance for all types of owners.

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APPENDICES

Appendix 1: List of variables and how they are measured

Variable	Proxy		Calculation
Dependent Variables			
Firm Performance	Tobin's Q		(MVE+Debt)/Total Assets
Independent Variables			
Diversification	Industrial Diversification	Herfindahl index complement	$H_c = 1 - \sum_{i=1}^{n} \text{Segment revenue proportion}_i^2$
		Segment Number	Number of segments firm has that produce different products
		Dummy	1 if firm is diversified; 0 otherwise
	Geographical Diversification	Herfindahl index complement	$H_c = 1 - \sum_{i=1}^{n} \text{Segment revenue proportion}_i^2$
		Segment Number	Number of segments firm has that produce in different locations (countries)
		Dummy	1 if firm is diversified; 0 otherwise
Ownership Structure	Managerial Ownership		Percentage of shares held by managers
	Ownership Concentration 1		Percentage of shares held by the largest shareholder
	Ownership Concentration 3		Sum of percentage of shares held by the top 3 largest shareholders
	Ownership Concentration 5		Sum of percentage of shares held by the top 5 largest shareholders
Control Variables			
Firm Size	Size		Log (Total Assets)
Firm Age	Age		Number of years firm has been operating since establishment
Access to Financial Markets	Dividend Dummy		1 if company gives dividend; 0 otherwise
Profitability	Profit		EBIT/Total Sales
Leverage	Capital Structure		Total debt/Shareholders Equity
Investment	Expenditure spent on capital		Capex/Total Sales
Research and Development	Expenditure spent on R&D		R&D Expenditure/Total Sales

Appendix 2: Descriptive Statistics for Industrially and Geographically Specialized Firms

		Industrially Specialized					Geographically Specialized				
		Minimum	Maximum	Mean	Median	Standard Deviation	Minimum	Maximum	Mean	Median	Standard Deviation
Performance		0.0766	81.0952	1.3054	0.8282	3.5915	0.0465	81.0952	1.1939	0.7992	3.3834
Log of Performance		-1.1158	1.9089	-0.0653	-0.0819	0.3305	-1.3321	1.9089	-0.0927	-0.0974	0.3189
Industrial Diversification	**HHIc**	0	0.4338	0.0006	0	0.0161	-0.6475	0.7199	0.1501	0	0.2281
	Segment	1	2	1.0014	1	0.0372	1	6	1.8072	1	1.0911
	Dummy	0	0	0	0	0	0	1	0.4499	0	0.4978
Geographical Diversification	**HHIc**	0	0.7883	0.1551	0	0.2431	0	0	0	0	0
	Segment	1	7	1.9211	1	1.5303	1	1	1	1	0
	Dummy	0	1	0.3837	0	0.4866	0	0	0	0	0
Size		0.0792	6.5268	3.3774	3.3845	0.9955	0.0792	4.8487	3.0521	3.0755	0.7665
Age		1	157	41.6108	31	32.4772	1	156	40.6687	31	31.1781
Dividend		0	1	0.5679	1	0.4957	0	1	0.5253	1	0.4997
Profitability		-389	17.1596	-2.5951	0.0582	20.9435	-389	17.1596	-2.3652	0.0608	19.8732
Leverage		0	1,620.9	44.3334	15.59	95.2051	0	747.03	36.1011	16.33	57.9983
Investment		0	125,540	362.4066	2.695	6113.9289	0	125,540	319.7391	2.32	5,776.2923
R&D		0	2	0.0032	0	0.0744	0	2	0.0026	0	0.0703
MO		0	0.6718	0.0309	0.0016	0.0804	0	1.003	0.0515	0.0039	0.1199
OC1		0	1.6913	0.4682	0.4409	0.3983	0	1.6902	0.3839	0.3169	0.2866
OC3		0	2.0244	0.7689	0.7612	0.5034	0	2.4012	0.6349	0.5538	0.4694
OC5		0	2.0981	0.8116	0.8163	0.5249	0	2.4043	0.6695	0.6004	0.4873

In displaying results, the study labels the columns as follows:
OLS – Ordinary Least Square.
RE_1- fits regression models to panel data, it fits random-effects models by using the GLS estimator (producing a matrix-weighted average of the between and within results).
RE_2 - It produces Driscoll and Kraay (1998) standard errors for coefficients estimated by random-effects (within) regression. Cross sectional and heteroskedastic test, which represents the two-tailed test.

Appendix 3: Robustness Models: Regression Test Results for Specialized and Diversified Firms Using OLS & RE

	Specialized Firms								**Diversified Firms**								
	HHIc Variable		**Segment Variable**			**Dummy Variable**			**HHIc Variable**			**Segment Variable**			**Dummy Variable**		
VARIABLES	OLS	RE_1	OLS	RE_1	RE_2	OLS	RE_1	RE_2	OLS	RE_1	RE_2	OLS	RE_1	RE_2	OLS	RE_1	RE_2
Industrial Diversification	0.131	0.0740**	0.0567	0.0321**	0.0567**	-	-	-	-0.0118	-0.0104	-0.0162	0.0219***	0.0322	0.0164	0.00644	0.0376	0.0180
	(0.127)	(0.0295)	(0.0550)	(0.0128)	(0.0274)				(0.0395)	(0.0671)	(0.0528)	(0.00826)	(0.0215)	(0.0137)	(0.0231)	(0.0506)	(0.0181)
Geographical Diversification	-	-	-	-	-	-	-	-	-0.270***	-0.0756	-0.0685*	-0.0220***	-0.000521	-0.00594*	0.0148	0.0308	0.0198
									(0.0427)	(0.0761)	(0.0360)	(0.00460)	(0.0154)	(0.0137)	(0.0223)	(0.0424)	(0.0201)
Size	-0.0864***	-0.0958***	-0.0864***	-0.0958***	-0.0864***	-0.0863***	-0.0957***	-0.0863***	0.117***	-0.0556**	-0.0171	0.0889***	-0.0696**	-0.00664	0.0670***	-0.0740**	-0.000439
	(0.0254)	(0.0259)	(0.0254)	(0.0259)	(0.0261)	(0.0254)	(0.0258)	(0.0261)	(0.0133)	(0.0294)	(0.0379)	(0.0106)	(0.0309)	(0.0360)	(0.0118)	(0.0311)	(0.0355)
Age	0.000381	0.000263	0.000381	0.000263	0.000381	0.000375	0.000259	0.000375	-0.000688***	-0.00236**	-3.05e-05**	-0.000682***	-0.00245***	-4.94e-05***	-0.000674**	-0.00248***	-5.03e-05***
	(0.000404)	(0.000414)	(0.000404)	(0.000414)	(0.000414)	(0.000402)	(0.000413)	(0.000411)	(0.000261)	(0.000919)	(0.00118)	(0.000258)	(0.000894)	(0.00119)	(0.000270)	(0.000933)	(0.00121)
Dividend	0.107***	0.117***	0.107***	0.117***	0.107***	0.108***	0.117***	0.108***	0.0816***	0.0358	0.0374*	0.0896***	0.0361	0.0375*	0.0842***	0.0341	0.0362*
	(0.0320)	(0.0309)	(0.0320)	(0.0309)	(0.0312)	(0.0318)	(0.0309)	(0.0313)	(0.0192)	(0.0283)	(0.0206)	(0.0192)	(0.0281)	(0.0201)	(0.0190)	(0.0279)	(0.0192)
Leverage	0.000394**	0.000366***	0.000394**	0.000366***	0.000394***	0.000392**	0.000365***	0.000392***	1.29e-05***	6.88e-06*	1.19e-05***	1.47e-05***	6.31e-06*	1.14e-05***	1.12e-05***	6.07e-06*	1.12e-05***
	(0.000189)	(0.000120)	(0.000189)	(0.000120)	(0.000116)	(0.000188)	(0.000120)	(0.000115)	(3.68e-06)	(3.97e-06)	(1.45e-06)	(3.85e-06)	(4.00e-06)	(1.47e-06)	(3.57e-06)	(4.19e-06)	(1.51e-06)
Profitability	0.000866**	0.001000**	0.000866**	0.001000**	0.000866**	0.000865**	0.000998**	0.000865**	0.0139***	0.00499**	0.00346	0.0133***	0.00501**	0.00339	0.0123***	0.00495**	0.00333
	(0.000400)	(0.000447)	(0.000400)	(0.000447)	(0.000390)	(0.000399)	(0.000446)	(0.000389)	(0.00482)	(0.00243)	(0.00207)	(0.00444)	(0.00240)	(0.00212)	(0.00430)	(0.00238)	(0.00215)
Investment	4.19e-06***	5.18e-06***	4.19e-06***	5.18e-06***	4.19e-06***	4.19e-06***	5.17e-06***	4.19e-06***	0.000129*	-1.81e-05	-3.13e-05	0.000166*	-2.57e-05	-2.63e-05	0.000124*	-2.17e-05	-2.95e-05
	(1.45e-06)	(1.50e-06)	(1.45e-06)	(1.50e-06)	(1.32e-06)	(1.45e-06)	(1.50e-06)	(1.32e-06)	(7.08e-05)	(5.43e-05)	(2.54e-05)	(6.65e-05)	(5.35e-05)	(2.62e-05)	(6.36e-05)	(5.24e-05)	(2.63e-05)
R&D	-0.170***	-0.172***	-0.170***	-0.172***	-0.170***	-0.170***	-0.172***	-0.170***	3.120*	1.416**	1.376*	0.895*	1.314**	1.317*	0.616*	1.356**	1.326*
	(0.0622)	(0.0599)	(0.0622)	(0.0599)	(0.0464)	(0.0620)	(0.0597)	(0.0463)	(1.693)	(0.568)	(0.774)	(1.858)	(0.553)	(0.727)	(1.919)	(0.553)	(0.725)
Constant	33.65*	0.112	33.59*	0.0795	33.59***	33.64*	0.111	33.64***	38.33***	0.298***	0	38.69***	0.258**	0	37.66***	0.310***	0
	(17.53)	(0.0931)	(17.53)	(0.0821)	(6.908)	(17.51)	(0.0930)	(6.874)	(8.520)	(0.107)	(0)	(8.645)	(0.125)	(0)	(8.652)	(0.119)	(0)
Observations	443	443	443	443	443	443	443	443	1,197	1,197	1,197	1,197	1,197	1,197	1,197	1,197	1,197
R-squared	0.114		0.114			0.114			0.129			0.122			0.101		

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results for the RE_2 test were the same as that of RE_1 because the time values within the panel were the same.

Appendix 4: Robustness Models: Regression Test Results for All Firms Using OLS & RE

	HHIc Variable			Segment Variable			Dummy Variable		
VARIABLES	OLS	RE_1	RE_2	OLS	RE_1	RE_2	OLS	RE_1	RE_2
Industrial Diversification	0.0456	0.0606	0.0355	0.0235***	0.0353***	0.0260***	0.00631	0.0421	0.0337
	(0.0320)	(0.0635)	(0.0309)	(0.00695)	(0.0177)	(0.00704)	(0.0157)	(0.0258)	(0.0203)
Geographical Diversification	-0.0928**	-0.00821	-0.0160	-0.0114**	-0.0144	-0.00968	0.0526***	0.0491	0.0459
	(0.0382)	(0.0812)	(0.0853)	(0.00459)	(0.0182)	(0.0135)	(0.0194)	(0.0431)	(0.0342)
Size	0.0520***	-0.125***	-0.0862**	0.0428***	-0.134***	-0.0922**	0.0249***	-0.134***	-0.0938**
	(0.0131)	(0.0490)	(0.0445)	(0.0110)	(0.0467)	(0.0414)	(0.0118)	(0.0466)	(0.0426)
Age	-0.000422*	-0.000767	-0.000820	-0.000461**	-0.000978	-0.000634	-0.000428*	-0.000879	-0.000734
	(0.000226)	(0.000852)	(0.00140)	(0.000220)	(0.000808)	(0.00131)	(0.000229)	(0.000853)	(0.00134)
Dividend	0.104***	0.0769***	0.0735***	0.105***	0.0767***	0.0734***	0.0985***	0.0744***	0.0711***
	(0.0165)	(0.0283)	(0.0171)	(0.0165)	(0.0284)	(0.0175)	(0.0163)	(0.0283)	(0.0157)
Leverage	1.51e-05***	6.86e-06*	1.10e-05***	1.64e-05***	6.79e-06*	1.10e-05***	1.26e-05***	6.48e-06*	1.07e-05***
	(3.48e-06)	(3.60e-06)	(1.74e-06)	(3.68e-06)	(3.62e-06)	(1.26e-06)	(3.57e-06)	(3.84e-06)	(1.40e-06)
Profitability	0.000412	-0.000262	-0.000196	0.000352	-0.000258	-0.000195	0.000332	-0.000257	-0.000191
	(0.000537)	(0.000500)	(0.000381)	(0.000525)	(0.000508)	(0.000396)	(0.000520)	(0.000507)	(0.000391)
Investment	-3.35e-05	-1.41e-05	-1.30e-05	-2.91e-05	-1.38e-05	-1.28e-05	-2.77e-05	-1.42e-05	-1.31e-05
	(2.13e-05)	(1.43e-05)	(1.18e-05)	(1.96e-05)	(1.43e-05)	(1.19e-05)	(1.92e-05)	(1.44e-05)	(1.18e-05)
R&D	1.779	0.778	0.715	1.549	0.760	0.706	1.476	0.780	0.720
	(1.114)	(0.746)	(0.595)	(1.024)	(0.743)	(0.598)	(1.004)	(0.751)	(0.595)
Constant	40.06***	0.385***	0	39.94***	0.330**	0	39.29***	0.389***	0
	(7.757)	(0.147)	(0)	(7.760)	(0.134)	(0)	(7.763)	(0.140)	(0)
Observations	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640
R-squared	0.080			0.086			0.080		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

As noted in page 27, results for Herfindahl index (HHI) are displayed in appendix 10, table 11 and table 14 to show that they are consistent with the results of HHIc variable.

Appendix 5: Regression Test Results for All Firms using original Herfindahl index (HHI)

	Specialized Firms (HHI Variable)					Diversified Firms (HHI Variable)					All Firms (HHI Variable)				
VARIABLES	OLS	FE_1	FE_2	RE_1	RE_2	OLS	FE_1	FE_2	RE_1	RE_2					
Industrial Diversification	-0.131 (0.127)	-0.114* (0.0620)	-0.138* (0.0675)	-0.0740** (0.0295)	-0.131** (0.0632)	0.0118 (0.0395)	0.00626 (0.0655)	0.00979 (0.0403)	0.0104 (0.0671)	0.0162 (0.0528)	-0.0456 (0.0320)	-0.0324 (0.0663)	-0.0228 (0.0198)	-0.0606 (0.0635)	-0.0355 (0.0309)
Geographical Diversification	- 	- 	- 	- 	- 	0.270*** (0.0427)	0.0498 (0.0794)	0.0422 (0.0561)	0.0756 (0.0761)	0.0685* (0.0360)	0.0928** (0.0382)	0.0381 (0.0716)	0.0383 (0.0606)	0.00821 (0.0812)	0.0160 (0.0853)
Size	-0.0864*** (0.0254)	-0.0870*** (0.0259)	-0.0864*** (0.0254)	-0.0958*** (0.0259)	-0.0864*** (0.0261)	0.117*** (0.0133)	-0.0385 (0.0614)	-0.0645 (0.0727)	-0.0556* (0.0294)	0.0171 (0.0379)	0.0520*** (0.0131)	-0.186** (0.0736)	-0.206*** (0.0320)	-0.125** (0.0490)	-0.0862* (0.0445)
age	0.000381 (0.000404)	0.000351 (0.000414)	0.000384 (0.000448)	0.000263 (0.000414)	0.000381 (0.000414)	-0.000688*** (0.000261)	-0.0166*** (0.00370)	-0.0152*** (0.00302)	-0.00236** (0.000919)	-3.05e-05 (0.00118)	-0.000422* (0.000226)	-0.00944** (0.00375)	-0.00966*** (0.00102)	-0.000767 (0.000852)	0.000820 (0.00140)
dividend	0.107*** (0.0320)	0.110*** (0.0303)	0.106** (0.0329)	0.117*** (0.0309)	0.107*** (0.0312)	0.0816*** (0.0192)	0.0305 (0.0270)	0.0349* (0.0182)	0.0358 (0.0283)	0.0374 (0.0206)	0.104*** (0.0165)	0.0714** (0.0284)	0.0727** (0.0238)	0.0769*** (0.0283)	0.0735*** (0.0171)
Leverage	0.000394** (0.000189)	0.000400*** (0.000122)	0.000392*** (0.000116)	0.000366*** (0.000120)	0.000394*** (0.000116)	1.29e-05*** (3.68e-06)	1.00e-05*** (3.42e-06)	1.11e-05*** (1.59e-06)	6.88e-06* (3.97e-06)	1.19e-05*** (1.45e-06)	1.51e-05*** (3.48e-06)	9.56e-06*** (2.88e-06)	1.05e-05*** (1.57e-06)	6.86e-06* (3.60e-06)	1.10e-05*** (1.74e-06)
Profitability	0.000866** (0.000400)	0.000883* (0.000392)	0.000862* (0.000397)	0.001000** (0.000447)	0.000866** (0.000390)	0.0139*** (0.00482)	0.00335* (0.00184)	0.00311 (0.00290)	0.00499** (0.00243)	0.00346 (0.00207)	0.000412 (0.000537)	-0.000256 (0.000440)	-0.000240 (0.000387)	-0.000262 (0.000500)	-0.000196 (0.000381)
Investment	4.19e-06*** (1.45e-06)	4.24e-06** (1.34e-06)	4.12e-06** (1.34e-06)	5.18e-06*** (1.50e-06)	4.19e-06*** (1.32e-06)	0.000129* (7.08e-05)	-4.83e-06 (4.02e-05)	-4.48e-05 (3.19e-05)	1.81e-05 (5.43e-05)	-3.13e-05 (2.54e-05)	-3.35e-05 (2.13e-05)	-1.14e-05 (1.37e-05)	-1.23e-05 (1.34e-05)	-1.41e-05 (1.43e-05)	-1.30e-05 (1.18e-05)
R&D	-0.170*** (0.0622)	-0.168*** (0.0470)	-0.167*** (0.0476)	-0.172*** (0.0599)	-0.170*** (0.0464)	3.120* (1.693)	1.382* (0.721)	1.359* (0.734)	1.416** (0.568)	1.376 (0.774)	1.779 (1.114)	0.610 (0.711)	0.673 (0.676)	0.778 (0.746)	0.715 (0.595)
Constant	33.78* (17.54)	0.198 (0.135)	18.58 (74.67)	0.186 (0.120)	33.78*** (6.845)	38.04*** (8.521)	0.938*** (0.208)	0 (0)	0.233 (0.148)	0 (0)	40.01*** (7.761)	1.037*** (0.225)	0 (0)	0.453** (0.224)	0 (0)
Observations	443	443	443	443	443	1,197	1,197	1,197	1,197	1,197	1,640	1,640	1,640	1,640	1,640
R-squared	0.114	0.075	0.078			0.129	0.135				0.080	0.140			

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results are the same as table 5 & 6 expect industrial and geographical are opposite (are negative and positive respectively).

Appendix 6: Robustness Model: Diversification and Ownership Structure Results for Specialized Firms

	HHIc Variable					Segment Variable					Industrial Variable				
VARIABLES	**OLS**	**FE_1**	**FE_2**	**RE_1**	**RE_2**	**OLS**	**FE_1**	**FE_2**	**RE_1**	**RE_2**	**OLS**	**FE_1**	**FE_2**	**RE_1**	**RE_2**
Industrial Diversification	0.0940	0.0793	0.106	0.0505	0.0940	0.0408	0.0344	0.0460	0.0219	0.0408	-	-	-	-	-
	(0.140)	(0.0604)	(0.0650)	(0.0330)	(0.0588)	(0.0606)	(0.0262)	(0.0282)	(0.0143)	(0.0255)					
Geographical Diversification	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MO	-0.242	-0.239	-0.244	-0.104	-0.242	-0.242	-0.239	-0.244	-0.104	-0.242	-0.243	-0.240	-0.245	-0.104	-0.243
	(0.147)	(0.146)	(0.155)	(0.130)	(0.149)	(0.147)	(0.146)	(0.155)	(0.130)	(0.149)	(0.146)	(0.145)	(0.155)	(0.130)	(0.148)
OC1	0.232	0.232	0.264	0.272**	0.232*	0.232	0.232	0.264	0.272**	0.232*	0.232	0.232	0.264	0.272**	0.232*
	(0.186)	(0.130)	(0.146)	(0.118)	(0.128)	(0.186)	(0.130)	(0.146)	(0.118)	(0.128)	(0.186)	(0.130)	(0.145)	(0.118)	(0.128)
OC3	-0.465	-0.470	-0.506	-0.229	-0.465*	-0.465	-0.470	-0.506	-0.229	-0.465*	-0.464	-0.469	-0.506	-0.229	-0.464*
	(0.316)	(0.279)	(0.282)	(0.275)	(0.277)	(0.316)	(0.279)	(0.282)	(0.275)	(0.277)	(0.316)	(0.278)	(0.282)	(0.274)	(0.277)
OC5	0.334	0.337	0.359	0.0709	0.334	0.334	0.337	0.359	0.0709	0.334	0.334	0.337	0.359	0.0708	0.334
	(0.258)	(0.220)	(0.217)	(0.228)	(0.219)	(0.258)	(0.220)	(0.217)	(0.228)	(0.219)	(0.258)	(0.219)	(0.217)	(0.228)	(0.218)
Size	-0.0919***	-0.0922***	-0.0920***	-0.0956***	-0.0919***	-0.0919***	-0.0922***	-0.0920***	-0.0956***	-0.0919***	-0.0918***	-0.0922***	-0.0919***	-0.0956***	-0.0918***
	(0.0282)	(0.0274)	(0.0266)	(0.0286)	(0.0275)	(0.0282)	(0.0274)	(0.0266)	(0.0286)	(0.0275)	(0.0281)	(0.0273)	(0.0266)	(0.0285)	(0.0275)
Age	0.000148	0.000121	0.000102	0.000106	0.000148	0.000148	0.000121	0.000102	0.000106	0.000148	0.000143	0.000116	9.63e-05	0.000103	0.000143
	(0.000420)	(0.000415)	(0.000455)	(0.000412)	(0.000417)	(0.000420)	(0.000415)	(0.000455)	(0.000412)	(0.000417)	(0.000417)	(0.000412)	(0.000451)	(0.000411)	(0.000413)
Dividend	0.118***	0.121***	0.118***	0.126***	0.118***	0.118***	0.121***	0.118***	0.126***	0.118***	0.119***	0.122***	0.118***	0.126***	0.119***
	(0.0324)	(0.0278)	(0.0299)	(0.0288)	(0.0288)	(0.0324)	(0.0278)	(0.0299)	(0.0288)	(0.0288)	(0.0322)	(0.0277)	(0.0299)	(0.0288)	(0.0288)
Leverage	0.000369*	0.000374**	0.000364**	0.000351***	0.000369***	0.000369*	0.000374**	0.000364**	0.000351***	0.000369***	0.000368*	0.000373**	0.000363**	0.000350***	0.000368***
	(0.000189)	(0.000119)	(0.000114)	(0.000112)	(0.000113)	(0.000189)	(0.000119)	(0.000114)	(0.000112)	(0.000113)	(0.000188)	(0.000119)	(0.000114)	(0.000111)	(0.000113)
Profitability	0.000927**	0.000947*	0.000928*	0.000961*	0.000927**	0.000927**	0.000947*	0.000928*	0.000961*	0.000927**	0.000926**	0.000946*	0.000927*	0.000960*	0.000926**
	(0.000439)	(0.000465)	(0.000474)	(0.000534)	(0.000463)	(0.000439)	(0.000465)	(0.000474)	(0.000534)	(0.000463)	(0.000439)	(0.000464)	(0.000473)	(0.000532)	(0.000462)
Investment	4.39e-06***	4.43e-06**	4.32e-06**	5.15e-06***	4.39e-06***	4.39e-06***	4.43e-06**	4.32e-06**	5.15e-06***	4.39e-06***	4.38e-06***	4.43e-06**	4.32e-06**	5.15e-06***	4.38e-06***
	(1.57e-06)	(1.56e-06)	(1.58e-06)	(1.78e-06)	(1.54e-06)	(1.57e-06)	(1.56e-06)	(1.58e-06)	(1.78e-06)	(1.54e-06)	(1.57e-06)	(1.56e-06)	(1.58e-06)	(1.77e-06)	(1.54e-06)
R&D	-0.171***	-0.169**	-0.167**	-0.160**	-0.171***	-0.171***	-0.169**	-0.167**	-0.160**	-0.171***	-0.171***	-0.169**	-0.167**	-0.160**	-0.171***
	(0.0657)	(0.0553)	(0.0558)	(0.0686)	(0.0544)	(0.0657)	(0.0553)	(0.0558)	(0.0686)	(0.0544)	(0.0656)	(0.0552)	(0.0557)	(0.0684)	(0.0543)
Constant	34.84*	0.0966	-58.67	0.109	34.84***	34.80*	0.0622	-58.72	0.0870	34.80***	34.84*	0.0967	-59.16	0.109	34.84***
	(18.57)	(0.0752)	(92.39)	(0.0955)	(7.097)	(18.57)	(0.0596)	(92.39)	(0.0893)	(7.115)	(18.55)	(0.0751)	(91.96)	(0.0954)	(7.099)
Observations	443	443	443	443	443	443	443	443	443	443	443	443	443	443	443
R-squared	0.124	0.084	0.089			0.124	0.084	0.089			0.124	0.084	0.089		

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Diversification is positive and insignificant. Managerial ownership is negative but insignificant. OC1 is positive and insignificant except for random effects where it is significant at 5%. OC3 is negative and insignificant except for RE_2 where it is significant at 10%. OC5 is positive and insignificant.

Appendix 7: Robustness Model: Diversification and Ownership Structure Results for Diversified Firms

	HHIc Variab e					Segment Variable					Dummy Var able				
VARIABLES	**OLS**	**FE_1**	**FE_2**	**RE_1**	**RE_2**	**OLS**	**FE_1**	**FE_2**	**RE_1**	**RE_2**	**OLS**	**FE_1**	**FE_3**	**RE_1**	**RE_3**
Industrial Diversification	-0.00670	0.00260	-0.00337	0.0197	-0.0124	0.0244***	0.0168	0.0108	0.0320	0.0167	0.0200	0.0362	0.0292	0.0366	0.0180
	(0.0398)	(0.0676)	(0.0396)	(0.0679)	(0.0519)	(0.00823)	(0.0193)	(0.00709)	(0.0216)	(0.0134)	(0.0231)	(0.0439)	(0.0208)	(0.0488)	(0.0188)
Geographical Diversification	-0.274***	-0.0543	-0.0440	-0.0774	-0.0725*	-0.0211***	-0.00907	-0.0101	0.00152	-0.00682*	-0.00424	0.0123	0.00753	0.0306	0.0153
	(0.0425)	(0.0793)	(0.0555)	(0.0760)	(0.0321)	(0.00468)	(0.0101)	(0.00532)	(0.0152)	(0.0134)	(0.0218)	(0.0469)	(0.0235)	(0.0435)	(0.0162)
MO	-0.421***	-0.171	-0.117	-0.0846	-0.153	-0.409***	-0.173	-0.119	-0.0855	-0.154	-0.429***	-0.168	-0.115	-0.0798	-0.148
	(0.0854)	(0.114)	(0.0924)	(0.0951)	(0.112)	(0.0852)	(0.114)	(0.0924)	(0.0954)	(0.112)	(0.0877)	(0.114)	(0.0899)	(0.0961)	(0.108)
OC1	-0.116*	0.0827**	0.0363	0.0794**	0.0175	-0.118**	0.0806**	0.0341	0.0783*	0.0167	-0.128**	0.0827**	0.0366	0.0793**	0.0192
	(0.0595)	(0.0399)	(0.0207)	(0.0403)	(0.0261)	(0.0586)	(0.0402)	(0.0229)	(0.0406)	(0.0248)	(0.0594)	(0.0402)	(0.0232)	(0.0403)	(0.0263)
OC3	-0.314**	0.0332	0.0624	0.0315	0.0441	-0.302*	0.0302	0.0652	0.0308	0.0463	-0.275*	0.0340	0.0615	0.0302	0.0453
	(0.156)	(0.0954)	(0.0860)	(0.0856)	(0.0519)	(0.161)	(0.0950)	(0.0864)	(0.0857)	(0.0559)	(0.160)	(0.0947)	(0.0875)	(0.0850)	(0.0578)
OC5	0.452***	-0.0211	-0.0909	-0.0930	-0.0508	0.445***	-0.0219	-0.0914	-0.0909	-0.0520	0.423***	-0.0206	-0.0905	-0.0923	-0.0543
	(0.138)	(0.0927)	(0.0817)	(0.0741)	(0.0532)	(0.144)	(0.0924)	(0.0801)	(0.0741)	(0.0533)	(0.141)	(0.0921)	(0.0807)	(0.0736)	(0.0550)
Size	0.0835***	-0.0409	-0.0651	-0.0527*	0.0179	0.0530***	-0.0491	-0.0722	-0.0678**	0.00716	0.0373***	-0.0501	-0.0725	-0.0712**	0.00164
	(0.0142)	(0.0604)	(0.0757)	(0.0302)	(0.0355)	(0.0122)	(0.0586)	(0.0729)	(0.0317)	(0.0338)	(0.0127)	(0.0589)	(0.0728)	(0.0317)	(0.0340)
Age	-0.000818***	-0.0174***	-0.0160***	-0.00225**	-8.74e-05	-0.000828***	-0.0172***	-0.0158***	-0.00236***	0.000102	0.000830***	-0.0173***	-0.0159***	-0.00237**	-9.83e-05
	(0.000270)	(0.00368)	(0.00385)	(0.000907)	(0.00107)	(0.000267)	(0.00374)	(0.00370)	(0.000880)	(0.00109)	(0.000281)	(0.00372)	(0.00370)	(0.000920)	(0.00111)
Dividend	0.0822***	0.0286	0.0341*	0.0352	0.0367*	0.0907***	0.0288	0.0343*	0.0355	0.0369*	0.0862***	0.0276	0.0333*	0.0335	0.0357*
	(0.0193)	(0.0266)	(0.0168)	(0.0280)	(0.0200)	(0.0193)	(0.0264)	(0.0161)	(0.0279)	(0.0194)	(0.0192)	(0.0261)	(0.0154)	(0.0276)	(0.0186)
Leverage	1.58e-05***	1.03e-05***	1.08e-05***	6.75e-06*	1.18e-05***	1.77e-05***	9.90e-06***	1.05e-05***	6.14e-06	1.13e-05***	1.41e-05***	9.81e-06***	1.04e-05***	5.90e-06	1.10e-05***
	(3.11e-06)	(3.32e-06)	(1.70e-06)	(4.00e-06)	(1.42e-06)	(3.39e-06)	(3.25e-06)	(1.53e-06)	(4.03e-06)	(1.46e-06)	(3.50e-06)	(3.42e-06)	(1.62e-06)	(4.23e-06)	(1.48e-06)
Profitability	0.0149***	0.00339*	0.00314	0.00520**	0.00344	0.0144***	0.00339*	0.00313	0.00526**	0.00337	0.0137***	0.00339*	0.00311	0.00521**	0.00333
	(0.00493)	(0.00176)	(0.00282)	(0.00242)	(0.00200)	(0.00461)	(0.00174)	(0.00286)	(0.00239)	(0.00207)	(0.00446)	(0.00173)	(0.00284)	(0.00237)	(0.00209)
Investment	0.000115	-6.62e-06	-3.56e-05	2.06e-05	-2.79e-05	0.000153**	-3.59e-06	-3.37e-05	2.84e-05	-2.26e-05	0.000122*	-3.95e-06	-3.37e-05	2.47e-05	-2.48e-05
	(7.75e-05)	(3.84e-05)	(3.18e-05)	(5.32e-05)	(2.54e-05)	(7.24e-05)	(3.77e-05)	(3.24e-05)	(5.23e-05)	(2.47e-05)	(6.89e-05)	(3.71e-05)	(3.22e-05)	(5.12e-05)	(2.51e-05)
R&D	2.801	1.497**	1.390*	1.527**	1.370	0.476	1.473**	1.371*	1.418**	1.307	0.520	1.483**	1.378*	1.464**	1.320*
	(1.739)	(0.661)	(0.723)	(0.647)	(0.771)	(1.932)	(0.682)	(0.712)	(0.616)	(0.721)	(1.928)	(0.687)	(0.711)	(0.622)	(0.717)
Constant	40.97***	1.055***	0	0.300***	0	40.87***	1.047***	0	0.264**	0	40.36***	1.039***	0	0.315***	0
	(8.369)	(0.167)	(0)	(0.111)	(0)	(8.459)	(0.176)	(0)	(0.130)	(0)	(8.505)	(0.172)	(0)	(0.122)	(0)
Observations	1,197	1,197	1,197	1,197	1,197	1,197	1,197	1,197	1,197	1,197	1,197	1,197	1,197	1,197	1,197
R-Squared	0.159	0.150				0.153	0.150				0.132	0.151			

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Industrial diversification is positive and insignificant. Geographical diversification is negative and significant at 1% with OLS and 10% with RE_2 and insignificant throughout. MO is negative and significant with OLS at 1% and insignificant throughout. OC1 is negative and significant at 1% with OLS and positive and significant with FE_1 and RE_1 and insignificant with FE_2 and RE_2. OC3 is negative and significant at 5% and positive and insignificant with fixed and random effects. OC5 is positive and significant at 1% with OLS and negative and insignificant with fixed and random effects.

Appendix 8: Robustness Model: Ownership Structure Regression Test Results Using OLS & RE

VARIABLES	OLS	RE_1	RE_2
Managerial Ownership	-0.415***	-0.156*	-0.251*
	(0.0754)	(0.0874)	(0.126)
Ownership Concentration 1	-0.0468	0.0335	-0.0134
	(0.0540)	(0.0431)	(0.0237)
Ownership Concentration 3	-0.323**	0.0746	0.0270
	(0.137)	(0.0938)	(0.0599)
Ownership Concentration 5	0.401***	-0.0836	0.00809
	(0.124)	(0.0793)	(0.0561)
Size	0.0144	-0.126***	-0.0867**
	(0.0109)	(0.0446)	(0.0366)
Age	-0.000534**	-0.000865	0.000693
	(0.000234)	(0.000843)	(0.00133)
Dividend	0.105***	0.0793***	0.0749***
	(0.0166)	(0.0286)	(0.0166)
Leverage	1.65e-05***	6.61e-06*	1.14e-05***
	(4.33e-06)	(3.62e-06)	(1.30e-06)
Profitability	0.000564	-0.000259	-0.000226
	(0.000593)	(0.000509)	(0.000381)
Investment	-2.95e-05	-1.46e-05	-1.19e-05
	(1.98e-05)	(1.42e-05)	(1.14e-05)
R&D	1.573	0.810	0.662
	(1.032)	(0.742)	(0.575)
Constant	44.16***	0.405***	0
	(7.762)	(0.140)	(0)
Observations	1,640	1,640	1,640
R-squared	0.098		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 9: Robustness Model: Diversification and Ownership Structure Regression Test Results Using OLS & RE

	HHIc Variable			Segment Variable			Dummy Variable		
VARIABLES	**OLS**	**RE_1**	**RE_2**	**OLS**	**RE_1**	**RE_2**	**OLS**	**RE_1**	**RE_2**
Industrial	0.0558*	0.0639	0.0339	0.0260*	0.0355	0.0263	0.0203	0.0433	0.0361
Diversification	(0.0321)	(0.0638)	(0.0295)	(0.00697)	(0.0180)	(0.00669)	(0.0158)	(0.0261)	(0.0208)
Geographical	-0.101***	-0.00285	-0.00772	-0.0110***	-0.0134	-0.00695	0.0371*	0.0426	0.0358
Diversification	(0.0377)	(0.0809)	(0.0789)	(0.00461)	(0.0182)	(0.0135)	(0.0190)	(0.0439)	(0.0306)
Managerial	-0.429***	-0.156*	-0.250*	-0.429***	-0.154*	-0.248*	-0.419***	-0.149*	-0.245*
Ownership	(0.0755)	(0.0871)	(0.123)	(0.0753)	(0.0886)	(0.123)	(0.0764)	(0.0875)	(0.120)
Ownership	-0.0411	0.0371	0.0112	-0.0419	0.0355	0.0113	-0.0489	0.0329	0.0133
Concentration1	(0.0540)	(0.0432)	(0.0227)	(0.0534)	(0.0434)	(0.0245)	(0.0540)	(0.0436)	(0.0246)
Ownership	-0.338**	0.0702	0.0248	-0.340**	0.0621	0.0203	-0.312**	0.0660	0.0201
Concentration3	(0.137)	(0.0941)	(0.0581)	(0.137)	(0.0947)	(0.0577)	(0.135)	(0.0937)	(0.0607)
Ownership	0.413***	-0.0825	-0.00824	0.417***	-0.0739	-0.0125	0.388***	-0.0772	-0.0128
Concentration5	(0.124)	(0.0793)	(0.0559)	(0.124)	(0.0803)	(0.0533)	(0.121)	(0.0793)	(0.0549)
Size	0.0271*	-0.129***	-0.0887*	0.0153	-0.137***	-0.0944**	0.00336	-0.136***	-0.0956**
	(0.0140)	(0.0497)	(0.0440)	(0.0123)	(0.0474)	(0.0407)	(0.0126)	(0.0473)	(0.0420)
Age	-0.000557**	-0.000883	0.000668	-0.000604***	-0.00109	0.000498	-0.000569**	-0.000986	0.000593
	(0.000231)	(0.000828)	(0.00130)	(0.000225)	(0.000785)	(0.00122)	(0.000236)	(0.000832)	(0.00125)
Dividend	0.106***	0.0784***	0.0744***	0.107***	0.0781***	0.0742***	0.101***	0.0759***	0.0720***
	(0.0166)	(0.0284)	(0.0165)	(0.0166)	(0.0285)	(0.0168)	(0.0165)	(0.0284)	(0.0153)
Leverage	1.78e-05***	6.71e-06*	1.13e-05***	1.92e-05***	6.62e-06*	1.13e-05***	1.51e-05***	6.33e-06*	1.11e-05***
	(4.09e-06)	(3.64e-06)	(1.64e-06)	(4.45e-06)	(3.65e-06)	(1.35e-06)	(4.16e-06)	(3.84e-06)	(1.42e-06)
Profitability	0.000560	-0.000260	-0.000226	0.000496	-0.000257	-0.000225	0.000467	-0.000256	-0.000222
	(0.000593)	(0.000509)	(0.000376)	(0.000581)	(0.000517)	(0.000389)	(0.000571)	(0.000516)	(0.000384)

Investment	-3.11e-05	-1.47e-05	-1.19e-05	-2.62e-05	-1.43e-05	-1.17e-05	-2.59e-05	-1.46e-05	-1.19e-05
	(2.05e-05)	(1.43e-05)	(1.15e-05)	(1.87e-05)	(1.42e-05)	(1.15e-05)	(1.86e-05)	(1.43e-05)	(1.14e-05)
R&D	1.656	0.812	0.662	1.398	0.791	0.651	1.380	0.809	0.663
	(1.069)	(0.745)	(0.578)	(0.974)	(0.741)	(0.577)	(0.972)	(0.748)	(0.573)
Constant	44.47***	0.402***	0	44.19***	0.349**	0	43.77***	0.406***	0
	(7.741)	(0.149)	(0)	(7.731)	(0.136)	(0)	(7.762)	(0.142)	(0)
Observations	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640
R-squared	0.104			0.110			0.102		

Robust standard errors in parentheses

***p<0.01, **p<0.05, *p<0.1

Appendix 10: Diversification and Ownership Structure Regression Test Results using original Herfindahl index (HHI)

	HHI variable				
VARIABLES	**OLS**	**FE_1**	**FE_2**	**RE_1**	**RE_2**
Industrial	-0.0558*	-0.0328	-0.0226	-0.0639	-0.0339
Diversification	(0.0321)	(0.0671)	(0.0188)	(0.0638)	(0.0295)
Geographical	0.101***	0.0460	0.0440	0.00285	0.00772
Diversification	(0.0377)	(0.0719)	(0.0565)	(0.0809)	(0.0789)
Managerial	-0.429***	-0.227**	-0.193*	-0.156*	-0.250*
Ownership	(0.0755)	(0.111)	(0.0949)	(0.0871)	(0.123)
Ownership	-0.0411	0.0405	0.00994	0.0371	-0.0112
Concentration1	(0.0540)	(0.0437)	(0.0312)	(0.0432)	(0.0227)
Ownership	-0.338**	0.00835	0.0756	0.0702	0.0248
Concentration3	(0.137)	(0.110)	(0.0796)	(0.0941)	(0.0581)
Ownership	0.413***	-0.00416	-0.0718	-0.0825	-0.00824
Concentration5	(0.124)	(0.0995)	(0.0651)	(0.0793)	(0.0559)
Size	0.0271*	-0.186**	-0.205***	-0.129***	-0.0887*
	(0.0140)	(0.0724)	(0.0299)	(0.0497)	(0.0440)
Age	-0.000557**	-0.0109***	-0.0109***	-0.000883	0.000668
	(0.000231)	(0.00382)	(0.000533)	(0.000828)	(0.00130)
Dividend	0.106***	0.0714**	0.0732**	0.0784***	0.0744***
	(0.0166)	(0.0281)	(0.0232)	(0.0284)	(0.0165)
Leverage	1.78e-05***	9.97e-06***	1.05e-05***	6.71e-06*	1.13e-05***
	(4.09e-06)	(2.83e-06)	(1.73e-06)	(3.64e-06)	(1.64e-06)
Profitability	0.000560	-0.000271	-0.000254	-0.000260	-0.000226
	(0.000593)	(0.000437)	(0.000382)	(0.000509)	(0.000376)
Investment	-3.11e-05	-1.15e-05	-1.23e-05	-1.47e-05	-1.19e-05
	(2.05e-05)	(1.34e-05)	(1.31e-05)	(1.43e-05)	(1.15e-05)
R&D	1.656	0.619	0.674	0.812	0.662
	(1.069)	(0.697)	(0.662)	(0.745)	(0.578)
Constant	44.43***	1.100***	0	0.469**	0
	(7.745)	(0.224)	(0)	(0.223)	(0)
Observations	1,640	1,640	1,640	1,640	1,640
R-squared	0.104	0.150			

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results are the same as table 9 except industrial and geographical diversification have the opposite signs (are negative and positive respectively