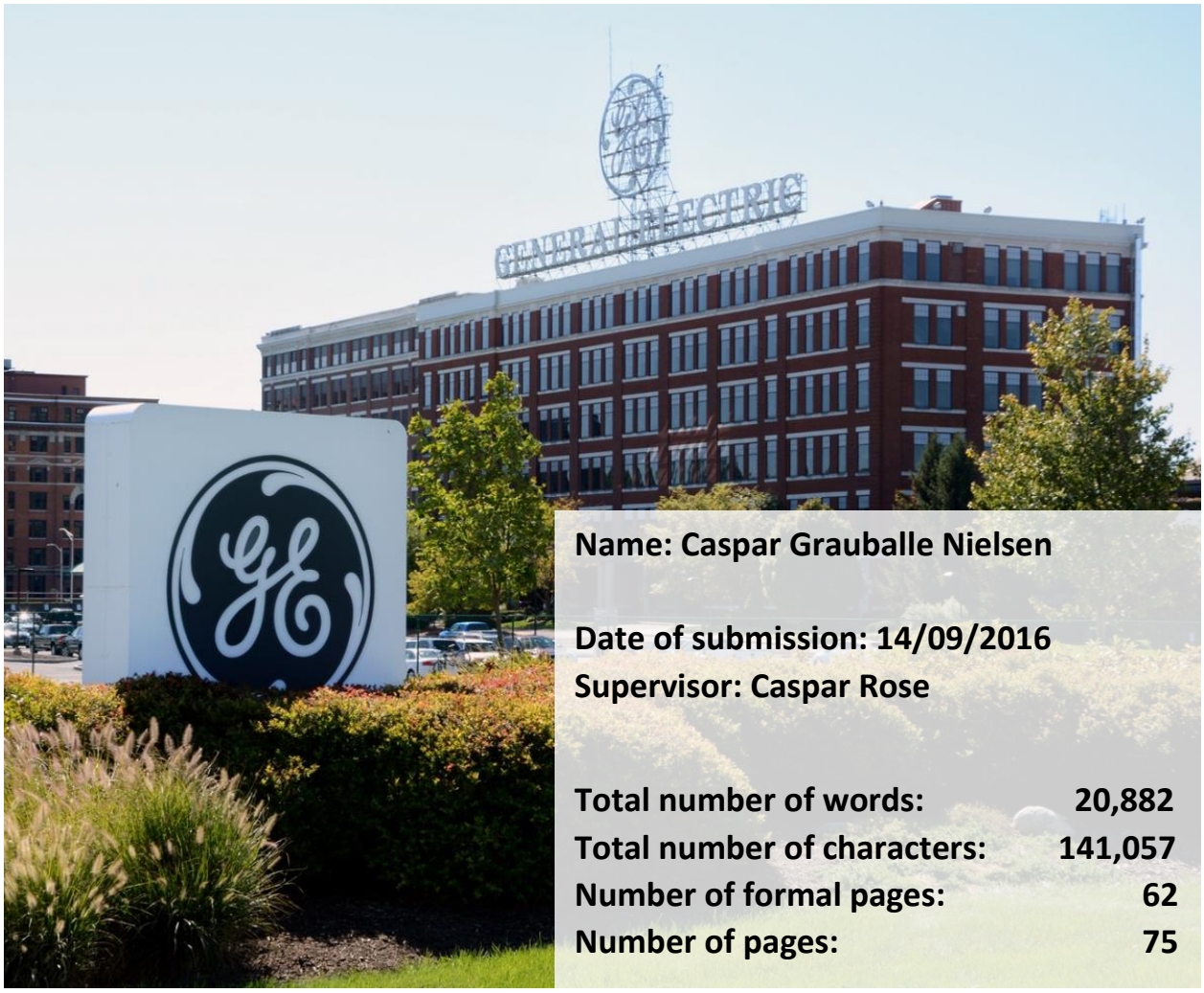
Are Conglomerates an Ancient Thinking

- Should companies diversify or be undiversified

MSc. Advanced Economics & Finance Copenhagen Business School



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Contents

Abstract

Conglomerates has historically been forged due to ownership type and antitrust legislations – combined with a historic limitation of benchmark and peer-group assessment data. Using the panel data models pooled OLS, random effect, and between effect on the most recent data, with regional diversification, this study addresses the conglomerate discount phenomenon. Based on data of 450 of the largest companies in the world, over the last eleven years, and 4950 variables in total, the thesis finds that there is a slight conglomerate discount in total shareholder return, as well as return on invested capital. The thesis finds four significant findings being 1) the rejection of the hypothesis that return on invested capital distribution for diversified and undiversified companies is the same, 2) that the conglomerate discount in the dataset is below recent literature findings on the topic, but indeed present, 3) that contrary to theory, conglomerates do not perform better in financial crisis' and 4) that Asian conglomerates do not thrive better than European and North American conglomerates. These findings indicate that the pros of conglomerates, such as internal capital markets, economies of scale -and scope and diversification is outweighed by the cons such as agency costs, increasing complexity and lack of transparency. Companies should pursue divestment of non-core assets/businesses in order to obtain its full potential not only in the market, but also in terms of financial performance. Conglomerates are an ancient thinking belonging within history books.

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Chapter I: Introduction & Motivation

Some of the most prominent corporate finance papers about the conglomerate discount concludes that it exists, and that companies should not pursue diversification. The level of studies rejecting this theory is limited, and it seems that the well-received studies by Lang and Stulz (1994) as well as Berger and Ofek (1995) are both widely accepted as the current standing on the research area.

History shows that the formation of conglomerates has largely been driven by three reasons. Antitrust legislations, ownership type, and cost of borrowing. Since the United States congress passed the Sherman Antitrust Act in the late part of the 1800, many companies has had difficulties optimizing producer surplus and to deploy its cash flow within the industry. Many, (especially private) companies has thus been forced to diversify and acquire companies operating within completely unrelated industries. Ownership is furthermore a clear influential factor on the level of diversification. The majority of the diversified companies initiated the diversified acquisitions when the company was private. Private owners in the 1900's were more focused on the absolute return, than on the relative return (compared to benchmark), largely driven by the less sophisticated data available, compared to today. Finally, the cost of borrowing has a clear impact on whether or not diversification is pursued by the company. Low interest rates lower the cost of borrowing, which increases the amount of capital which the company has available for acquisitions. This is especially seen in the conglomerate boom period from the 1950's until 1970's, were there was a clear negative correlation between interest rates and number of conglomerates.

Theory shows that despite there being various strategic advantages for conglomerates, such as economies of scale, economies of scope, the internal capital markets and the diversification aspect, it is outweighed by the number of disadvantages. The disadvantages include the increasing complexity and lack of transparency, the increasing c-level expansion costs, and very importantly, the agency costs that might arise due to different incentives for the business unit managers. This is also reflected in the positive stock market when companies divest

non-core business units, as well as the negative stock market response to diversified investments. The most important factor influencing the conglomerate discount is the fact that investors can diversify themselves, and can do so much cheaper, and on a continuously basis. Investors thus prefer to perform diversification themselves, in order to increase the Sharp ratio of the portfolio.

The historic development combined with the theory on the topic are the main motivation drivers for the thesis. Furthermore, the research on the topic has been focused around measuring the actual conglomerate discount and not on the regional aspect. Accounting for regions could have a significant impact due to a negative investor response, in especially Europe, towards diversification. In North America and Asia, conglomerates are perceived more positive among investors, and has been so for many years.

These observation makes it interesting to understand and measure perception differences among investors, depending on their geography. It is furthermore interesting to understand, given the general attitude of a conglomerate discount, the theoretical rationale for why they exist and why firms continue to be diversified if this is the case. A diversified company has the possibility to do a divestiture/spin-off/carve-out etc. of non-core assets, making the company a traditional single industry focused firm. If the conglomerate discount phenomenon is true, is it then more value creating for the shareholders to do a carve out/spin off, and thus create separate entities in order to create value for the shareholders?

This thesis focus on the 150 largest companies from North America, Europe and Asia, comprising a total dataset of 450 companies and a total number of variables of 4950. The dataset thus accounts for regional differences, making it possible to measure any regional performance consequences. The thesis will use data from the last 11 years and will determine not only the total shareholder return distributions for diversified and non-diversified company, but also if conglomerates performs better on just some parameters.

The thesis is structured as follows. The first part of the thesis covers the problem statement as well as the hypothesis' which will be researched in the thesis. This chapter is followed by *scope*

and limitations of the thesis, which will guide the reader in terms of what this thesis is and covers, and what this thesis is not and does not cover. Chapter 4 covers the *existing theory on the topic* in order to determine what the current standings and findings are on the conglomerate discount phenomenon. Chapter 5 covers the history of conglomerates. Chapter 5 will be followed by *The Pros of The "Firm as Portfolio Strategy"* which covers the rationale for corporate diversification. Chapter 7 cover *The Cons of The "Firm as Portfolio Strategy"* in order to cover the theory behind the conglomerate discount phenomenon. Chapter 8 covers conglomerates under financial crisis, which should theoretically outperform single industry focused companies. Chapter 8 is followed by chapter 9 covering Asian culture and conglomerates, which is distinctly different from the rest of the world. Chapter 10 covers the *Divestment* Options, which covers the divestment option the conglomerate has. Chapter 10 ends the theoretical part of the thesis and is followed by the analysis.

The analysis starts with chapter 11 covering the *Methodology* applied, in order to conduct the analysis. The methodology is of high importance due to the many different classification systems of a conglomerate, as well as the geographical and time focus of the thesis. The methodology part also includes the performance measurements used in the thesis. Chapter 12 covers the analysis, which is a descriptive statistic chapter. Chapter 13 covers the model used to determine the problem statement as well as the results. Chapter 14 presents the results and conclusion of the findings.

Chapter II: Problem Statement & Hypothesis

Based on the historical development of conglomerates, theory, and empirical findings, the purpose of this thesis will be to assess the following hypothesis.

"Diversified companies creates lower total shareholder return and financial performance, compared to undiversified companies."

The problem statement furthermore raises some underlying sub-questions and hypothesis;

I. Conglomerates in Asia are performing better than conglomerates in Europe and North America in terms of total shareholder return

II. Conglomerates are performing better than undiversified companies in financial crisis situations

III. The stock price, despite underperforming, tends to be less volatile for conglomerates.

IV. Economic performance, despite lower, tends to be less volatile for conglomerates

The intention with the different hypothesis is to research the path of which conglomerates should choose, as well as what drives the increase and decrease in conglomerates

Chapter III: Scope and limitations of the thesis

The thesis has looked at the various theories on the conglomerate discount phenomenon as well as the rationale behind it in terms of the pros and cons of the conglomerate strategy. The standpoint for conglomerates has been varying over time from a positive to a negative attitude in especially Europe and North America, while there still seem to be a positive response in Asia. The thesis will seek to put light on the topic with the newest data, and differentiate between regions.

The scope of the thesis will be to analyze the largest conglomerates of the major economic markets. The analysis will thus focus on conglomerates within North America, Europe and Asia and will solely focus on large cap.

The reason for dividing the analysis in the three areas, instead of extrapolating it to an overall view is the large difference in the investor conglomerate prevalence between the regions, which will be described later in the thesis. The large cap focus is solely due to data limitations.

Because of the focus, the thesis will not have a focus on the conglomerate performance overall (for all company sizes) and in general. The thesis will have an empirical approach and not a theoretical one, meaning that the thesis will not seek to bring a new theoretical angle to if –and why there is a conglomerate discount. It will try to obtain an empirical answer to show if the hypothesis raised should be rejected or not rejected – in order to determine if companies should be diversified or undiversified.

Chapter IV: Existing theory on the topic

In this chapter the thesis will cover the main findings about the phenomenon, the conglomerate discount. There has been much research on the topic, with different findings and conclusions. The chapter will focus on the empirical findings and general methodology used to define conglomerates.

The broad understanding of a conglomerate is that the company must operate within two or more industries, where industries are primarily determined using the Standard Industry Classification system (SIC codes). The classification system has been prone to much critique since, as Sambharya (2000) and Fan and Lang (2000) concludes, the classification system does not account for either relatedness or vertical integration, which makes the revenue source difficult to determine. Some research applies the industry classification system developed by Rumelt (1974), but the majority of the research requires a diversified company to have no more than 90% of its revenue source coming from one business entity.

Lang and Stulz (1994) conducted one of the most influential conglomerate discount studies within contemporary corporate finance. In their paper ***"Tobin's q, corporate diversification and firm performance"*** they test the relation between Tobin's q and the level of diversification. More specifically they investigate the correlation between the market's valuation of the firm and the degree of diversification. In the study they find a negative correlation for Tobin's q and the level of diversification, which indicates that shareholder wealth would increase if the company divested and became a single industry focused firm.

Another influential study in the field of the conglomerate discount was conducted by Berger and Ofek (1994). The paper ***"Diversification's effect on firm value"*** also conclude that

shareholder wealth is obtainable through divestment for conglomerates, but whereas Lang and Stulz studied Tobin's Q, Berger and Ofek estimated the actual value loss from diversification in the 1986-1991 period. Based on the difference between the market value of the conglomerate and the imputed value, if the business units were individual entities, they conclude that the average value loss is between 13% to 15% for diversified companies. Whereas Lang and Stulz did Herfindahl as well as SIC code segmentation in order to account for any methodological differences there may be, Berger and Ofek used the more simple SIC code categorization, which is also applied in this thesis.

The negative correlation between value creation and the level of diversification was also supported prior to the Berger and Ofek paper in the important paper ***"Do managerial objectives drive bad acquisitions?"*** by Morck, Shleifer and Vishny (1990). The study investigates which types of acquisitions that creates shareholder wealth, and which does not. In a sample of 326 acquisitions in the US between 1975 and 1987 they conclude that "*…making acquisitions is a mixed blessing for shareholders of acquiring companies."* They find that acquisitions with the intention of diversifying, acquisitions of a rapidly growing target, and acquisitions where the manager was performing badly prior to the acquisition, all creates negative shareholder value. According to Morck, Shleifer and Vishny one of the reasons diversifying acquisitions in general creates negative shareholder wealth is that managers, given a low personal diversification level, would like to diversify their own human capital. Because of this, they might diversify the risk to their human capital even if the acquisition offers few, if any, benefits for the shareholders. Secondly, to ensure survival of the firm, managers might enter new business lines, despite no value creation. Finally, the manager might diversify into a business which he might think he has competences within, in order to secure his own job. Morck, Shleifer and Vishny measures the diversification level using the SIC code classification system.

Despite many influential papers and studies having a "negative" conclusion on the conglomerate discount, some studies conclude no effect, or in some cases, even a positive correlation between value creation and diversification level. As concluded by Williamson (1975) in ***"Markets and hierarchies"*** because of the superior inside information which conglomerates possess, they are able to allocate capital better than the market. Especially in the long run, since the market is often driven by an animalistic spirit, as Keynes said.

In ***"Internal capital markets and the competition for corporate resources"***, one of the more recent papers on the topic, Stein (1997) argues that conglomerates has the internal capital market advantage. In a normal single industry focused company, capital might be scarce and not all positive net present value projects will be undertaken. Stein argues that in a company with different business entities, the cash flow from one of the entities can be used within one of the other entities, in order to fund a more favorable, high return project. The assets of that entity might also work as collateral, in order to raise the necessary funding for the project. That means that the headquarter of the conglomerate can choose to fund the winners and abandon losers in a more efficient way than otherwise.

Whereas most studies and theories focus on determining if there is a conglomerate discount and the size of it, one study performed Campa and Kedia (2000) focused on explaining the discount, and show that corporate diversification is determined by endogenous variables. In the paper ***"Explaining the diversification discount"*** they find that when accounting for the endogenous aspect of the diversification strategy, the discount is non existing, and even in some cases, turn into a premium. They argue that previous studies in the field of conglomerate discount has failed to account for firm characteristics. The study uses a similar approach to Berger and Ofek where the SIC codes are used as a diversification measure. Similar to Berger and Ofek, they

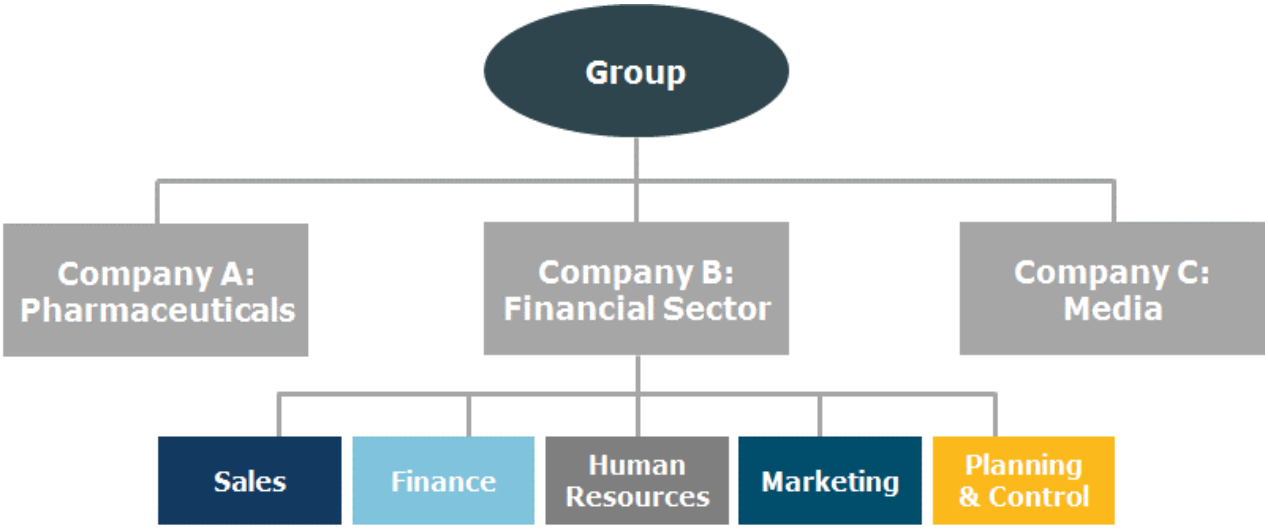
exclude financial conglomerates, the companies with SIC codes between 6000 and 6999, due to the valuation difficulties that arises when assessing the performance of financial companies.

It is clear that the conglomerate discount phenomenon has been widely discussed and studied over the years. Most of the theory investigated in relation to this thesis has shown a clear conclusion of a negative correlation between performance and the level of diversification. Few studies, like the study performed by Campa and Kedia, finds that performance is not necessarily related to the level of diversification. The majority of the studies excludes financial conglomerates do to the data messiness as well as the performance measurement obstacles. I have not located any studies performed in more recent times, or any academic studies differentiating between geographies, and thus this thesis will contribute to existing literature with the most recent data as well a geographical decomposition.

Chapter V: The History of the Rise and the Fall of Conglomerates

A conglomerate is a company consisting of two or more entities, operating within various industries. It is often structured with a parent company and multiple subsidiaries. The conglomerate organization is also referred to as M-form (Multidivisional form) and in the 1900's this type became one of the dominant business forms. Below figure illustrates a hypothetic conglomerate organization.

Figure I: Hypothetic conglomerate



Note: The organizational figure is only intended as an illustrative example and is not an illustration of a real company. A company may furthermore have additional divisions such as purchase, strategy, operation etc. and the underlying divisions can vary from entity to entity.

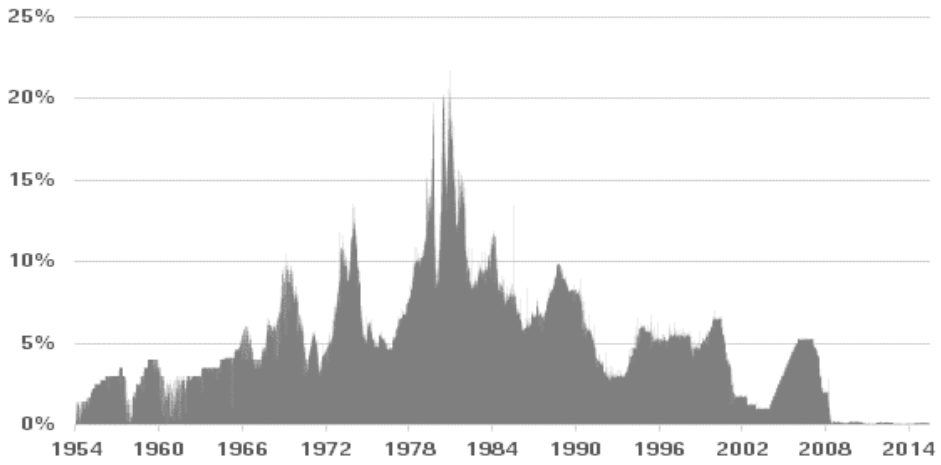
The rise of the antitrust legislations. In 1890, the United States congress passed the Sherman Antitrust Act, which prohibits business activities, which the federal government considered anti-competitive. More specifically, it prohibited companies from having monopoly on a product or service, as well as forming a cartel, which increased the economic competition. In 1914, the reform was strengthened with the Clayton Antitrust Act, which meant that it was even more difficult for companies to increase their dominance and market share. It addressed multiple

consumer damaging behavior by the company, such as, price discrimination, price fixing and the damaging effect of horizontal mergers. Finally, the Celler-Kafauver Act was implemented in 1950, which was a refinement of the previous antitrust legislations[1] and primarily dealing with mergers. Whereas the Clayton act primarily addressed the market competition damaging of horizontal mergers, the Celler-Kafuaver Act addressed the possible damaging by vertical mergers and conglomerate mergers, which meant that the acquisition of suppliers (its own as well as competitors) was prohibited, in the case of a significant competition reduction. In the United Kingdom the antitrust legislation was passed in 1965 under the Monopolies and Merger Act and has gone through various distinct phases in order to keep the competition effective. The European union had little antitrust legislations until September 1990 where the new merger control regulations were implemented. They now have a system with a hierarchy of merger regulations. Large mergers need approval by the European Commission, whereas smaller mergers only need approval by the individual state.

Low Interest Rates. The antitrust legislations created diversification incentives due to the difficulties of growing within the core business. Funding is necessary in order to perform acquisitions, which is often funded through leveraged buy-outs. In especially the 60's and part of the 70's interest rates were particularly low[2] as shown in below chart.

[1] Note: Additional minor antitrust legislations were passed by congress in this timeframe. The mentioned antitrust legislations were the major ones, having the most influence.
[2] Particularly low refers to that time, and cannot be compared to last 10 years interest rate levels, which is abnormal and unusual.

Chart I: Historic Effective Federal Funds Rate

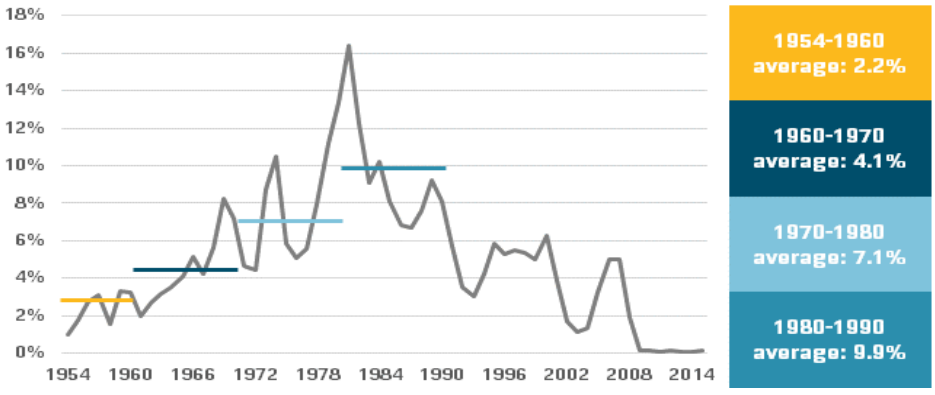


Source: Federal Reserve Bank of St. Louis

Note: 1954 data starts 01/07/1954. The effective federal funds rate is not the specific interest rate, which is used to fund acquisitions, but is the interest rate that determines the level of the other interest rates. The effective federal funds rate is only applicable to very creditworthy institutions for overnight loans and represents the interest rate charged by lending institutions.

As seen in below chart the 50's, 60's and 70's the average interest rates were well below the average of the 80's and thus gave a much more favorable and bull market, making acquisitions much more attractive.

Chart II: Yearly Interest Rate Averages for the period July 1954 to December 2015



Source: Federal Reserve Bank of St. Louis

An increasing number of conglomerates. The increasing level of antitrust legislations made vertical and horizontal acquisition growth difficult, and companies had to seek alternatives in order to grow and create value, thus the popularity of conglomerates rose in especially the 1960's and 1970's for primarily large corporations which was most exposed to the legislations. Funding were made possible due to low interest rates, which contributed to the trend. As a result, less than 25% of the S&P500 companies were operating within a 2-digit SIC industry defined as a single broad industry (Porter 1987). The strategy of acquiring companies within different unrelated industries, and structure them as a portfolio, was a diversification strategy similar to the Modern Portfolio Theory developed by Harry Markowitz (1952)[3]. The Modern Portfolio Theory says that an investor should not merely select assets based on the assets own merits, but should also consider how the assets change price relative to the other assets in the portfolio. In the case of the "firm as a portfolio" model, the parent company is the investor and thus diversify through acquiring assets, which are not perfectly correlated with the existing assets. This means that the systematic risk is diversified away to some degree, and negatively correlated with the number of subsidiaries. Besides the aggressive antitrust legislations forcing companies into diversified mergers, managerial incentives also rose in this period. Matsusaka (1990) reports that in the 60's and 70's the stock market would respond positively to especially two types of acquisitions; The acquisition of a diversified company and the acquisition of rapidly growing businesses. This gave clear incentives for corporate managers to navigate the company into being a conglomerate, with rapidly growing subsidiaries. Firstly, in order to create shareholder wealth, which increases the performance for him as a corporate manager and secondly, to increase his own wealth received through stock option[4]

The specialization period. After the conglomerate booming period in the 1960's and 1970s it all reverted in the end 1970's, early 1980's, and a "deconglomeration" phenomenon started to take place. Corporations started to focus on its "core business" and thus sold of its unnecessary

[3] Article on Modern Portfolio Theory was published in 1952. The book was published in 1959.
[4] Managers compensation package mostly consist of cash and stock options

entities. Furthermore, a "market" for bust up takeovers started to form, which made conglomerate assets liquid. Its main mechanism was to link buyers and sellers of conglomerates. The deal would be financed through post-deal asset sales.

The reason for the deconglomeration period can be summarized as follows:

I) Corporate managers realized, as stated by Amihud and Lev (1981), that investors should diversify and companies should not, due to the fact that diversification is not beneficial for stockholders. As explicitly defined by Markowitz Modern Portfolio Theory risk averse investors can hedge their portfolio and diversify the systematic risk away by holding the optimal position in each asset. Investors are thus able to obtain the preferred diversification of their portfolio, and thus the preferred level of risk.

II) Economists realized that the firm as a portfolio model was flawed (Levy and Sarnat 1970; Rumelt 1974; Mason and Goudzwaard 1976) due to poor post acquisition performance as well as having a slower response time than private investors, which contrary to corporate managers, can buy and sell stocks in a very short time frame.

III) Contrary to managerial and stock market expectations, Ravenscraft and Scherer (1987) documents that the profitability of the rapidly growing companies did not rose on average and thus the diversification acquisition strategy did not live up to the markets expectations.

IV) As stated by Bhagat et al (1990), the antitrust legislation, which started the diversification merger period, had been liberalized, and acquisitions was to some degree possible once again.

V) As showed by Lichhtenberg (1990) and Black (1992) diversified business was on average, performing worse than stand-alone businesses, within the same industry.

VI) The economic effect of extra layers of senior executives was critical.

VII) Accounting standards became opaque; what was creating value and what was not.

VIII) Different managerial incentives created agency problems; managers below group level became more concerned about the performance of the specific business unit which they were operating in, instead of the group as a whole.

IX) The combination of above findings started to make the stock market undervalue conglomerate businesses (LeBaron and Speidell 1987) and furthermore the stock market changed preferences and started to respond negatively to diversification acquisitions, and positive to core business acquisitions (Morch, Shleifer and Wishny 1990).

This meant that the managerial incentives to diversify, which had arisen in the 60's and 70's due to especially the aggressive antitrust legislations, was no longer existing and companies started to focus on divestiture programs. The reaction was that over fifty percent of the diversification acquisitions made by conglomerates in the 60's and 70's was divested later on (Porter 1987). Porters findings are supported by Ravenscraft and Scherer (1987) as well as Kaplan and Weisbach (1992). The radical change in the stock market perspective made asset acquisition within the same line of business rise drastically as showed by Bhagat (1990) and made asset acquisitions within different industries drop. The change in stockholders' preference can also be linked to the animalistic spirit of investors and corporate managers, as reported by Keynes. Human beings

often have an animalistic spirit approach to investing, which means that economic decisions are not based on rational behavior as economic analysis previously would indicate. Economic decisions are on the other hand made by intuition, emotions and are thus overall irrational. This means that the prevalence of the diversification strategy was self-reinforcing and because of this, firms and corporate managers was more likely to differentiate themselves, as they saw peers do so with success (Fligstein 1991). Investors would response positive to the news, due to previous success of diversification acquisitions. Once it was realized that the firm as portfolio was not a good idea, the animal spirit would again begin, again being self-reinforcing, and corporate managers and firms would divest. Investors would also realize this and respond negative to diversified acquisitions as seen with the Kodak acquisition of Sterling drug, where the market capitalization fell by $2 billion. In the end of the 80's, there was thus substantial evidence for the fact that diversified corporations were not an attractive organizational structure, and as documented by LeBaron and Speidell (1987) that there was even money to be made through the bust up market (buy conglomerates and bust them up). This meant that the specialization period continued for the coming decades.

Conglomerates today. Despite the clear negative consequences of the organizational M-shape, there is still many existing, and thriving, conglomerates such as General Electric and Du Pont, which has existed for more than 100 years. Many companies are also still pursuing the diversification way and moving over to being a conglomerate. Especially companies being located at the technological frontier seems to favor the firm as portfolio model. Examples includes Alphabet (previously Google) which has made 187 acquisitions since February 2001 under their portfolio companies Google Groups, Google Personalized Search, Blogger, Google Groups Gmail, AdSence, AdWords, YouTube, Google Maps and many more. The acquisitions have been within primarily the information technology industry, due to tech market synergies, but there has also been acquisitions within Travel, Social Gaming, Restaurant Reviews, Airborne Wind Turbines and Drone Making to name a few, thus overall, a diversified acquisition strategy. Amazon is another well-known diversified company with more than 40 subsidiaries. Industries includes the movie

database IMDb, the online grocer HomeGrocer.com (35%) and the financial services company Accept.com, as well as many more. There is also other well-known conglomerate companies, not located at the technological frontier, with great performance. Examples includes Berkshire Hathaway, which owns and operates (majority investment) more than 60 companies and has more than 47 minority investments. The types of industries go anywhere from Investment Banking to furniture making. Another thriving company is the Danish conglomerate Maersk[5], which has the subsidiaries Maersk Oil, an E&P company. Maersk Drilling, an oil drilling company. Maersk Line, the world largest shipping company[6] and Maersk Supply Service, which has multiple subsidiaries within supply service to the oil and shipping sector. While the business may be worth less than the combined value of the individual entities, the company has still been able to outperform its industries (Boston Consulting Group, *Value Creation For The Rest Of Us, 2015*).

A number of questions is raised based on the historic development of conglomerates. When history points towards a current negative correlation between performance and the number of industries of which the company operates in, then why are there still so many conglomerates today? Why do some companies still pursue the M-form? Why do some companies thrive whereas others do not? The Europeans are in general more critical towards conglomerates than Asia and the US, is it because of underperforming European conglomerates? These are just some of the questions which this chapter has raised and which the thesis, going forward, will seek answer and enlightenment to.

[5] Maersk has over recent years been divesting and sold of non-core businesses, such as: Dansk Supermarked, Esvagt and their large stake in the largest Danish bank, Danske Bank.
[6] At the time of writing

Chapter VI: The Pros of The *"Firm as Portfolio Strategy"*

While there are many investors and analysts preferring the single industry focus, there are several advantages to the firm as portfolio strategy. Economies of scale, economies of scope, administrative cost savings and internal capital markets, just to name a few. In this chapter the strategic rationale for the firm as portfolio strategy will be elaborated and explained.

Economies of scale. When the average cost of production falls as the volume increases, the company is exploited to economies of scale. This is one of the fundamental drivers of mergers and acquisitions in the corporate world. Companies wanting to expand its market share, and reducing the average costs, in order to be more competitive than its competitors. According to famous economist Alfred Marshall, economies of scale can be divided in to internal and external. Both types are exploited by conglomerates.

Internal economies of scale are when costs savings accrue to the firm, regardless of the industry and market of which it operates in. This could for example be increasing procurement buying power, which would lower the price of goods, due to the higher requirement. For a conglomerate, this synergy would be more easily obtainable. The reason is that a company operating in a single industry could have problems doing horizontal acquisitions (for a larger market share) because of antitrust legislations. A conglomerate doing vertical acquisitions would not face the same antitrust legislations, and could thus increase its buying power. One example of this is Maersk, which needs oil for Maersk Line (shipping), Svitzer (Towage and emergency response at sea), Maersk Tankers (crude oil carriers), Maersk Supply Service (offshore marine services), Damco (freight forwarding and supply chain management) and finally for Maersk Drilling (Drilling rigs). The large demand for oil increases the buying power of the company, making better contracts available, compared to if the business units where separate, individually operating entities.

Other internal economies of scales include combined Research & Development departments (the reason for many large mergers or acquisitions in the pharmaceutical world), combined logistic departments, combined credit facilities and many more.

External economies of scale are when cost savings arise because of external factors out of control of the company. External economies of scale are thus of control of a particular company, and is thus not a factor only available for the individual company, but is a productivity increase for the entire industry. Conglomerates are vaguely more able to draw on external economies of scale, due to the company operating within more industries and the often many synergies between the entities.

Economies of scope. Economies of scope is when the average cost curve declines, as the variety of goods produced increases. They can arise from the emphasis on a better utilization of overhead costs and common assets, they can arise from interrelationships elsewhere such as using one products output as another outputs input, or they can arise from cross selling one product with another.

Economies of scope was one of the fundamental catalyst for the formation of conglomerates in especially in the 1960's, 1970's and beginning of 1980's, due to especially technological progress. Cross selling is still today one of the main drivers of acquisition. In 1998 for example, the merger between the financial company Citicorp and the insurance company Travelers Group (Today knows as Citi Group) was based on cross selling, and the possibility of selling the financial products of Citicorp, by using the sales team of Travelers Group.

Another conglomerate exploiting economies of scope is Proctor & Gamble (often known as P&G). P&G is a worldwide American conglomerate with a focus on consumer goods. It is more than 170 years old and is thus a national trademark for the US. The company exploits the use of economies of scope in one of the best ways due to consumer goods focus and the many similar requirements in terms of sales operation and design. For example, is P&G able to use the same graphic designers, and the same marketing specialists for many products such as razorblades and toothpaste. This lowers the average total production cost of both products. Furthermore, the company is able to allocate sales persons where it is mostly needed. For example, it might be that razorblades are a well-functioning market, where the key account manager does not need to

allocate a lot of time and resources and can thus take on more brands. If the company were structured as separate entities for each brand, each entity would need to have key account managers.

Internal capital markets. Since a conglomerate has different business units with varying cash flow, it creates an internal capital market for the conglomerate, giving possibilities to business units where external capital market might not be available. This is a major benefit for especially conglomerates located in countries with undeveloped capital markets such as emerging markets. It furthermore gives possibilities for business units operating in a market where funding is difficult to obtain. For example, the Danish banks has been reluctant to lend money to the Danish agriculture market after the 2009 financial crisis, making it difficult for the Danish agriculture market to grow. For a conglomerate, with a business unit operating in agriculture, this issue could potentially be avoided.

Economical aspect. A conglomerate has the economic benefit of (most of the times that is) having just one board of directors, having significant cost savings[7]. The 2014 average total Board of Directors costs for the top 19th largest companies in Denmark was DKK 6.7 million. If the different entities were operating as separate independent entities, there would be multiple Board of Directors, and thus the total Board of Directors costs would increase. The Board of Directors costs goes directly from total shareholder return in the form of lost dividends, meaning that the conglomerate ads value/return in this case.

Besides giving otherwise not available funding, the internal capital markets also saves the company funding costs through saved interest rates and foundation costs. For large conglomerates these costs can be very high and especially for the business units operating in non-core bank industries, such as agriculture and real estate. This is because of the post 2009 financial crisis lending reluctance towards theses industries, and the thus higher premium requirement.

[7] Source: FINANS.dk. See appendix for total overview

The diversification aspect. Despite one of the main arguments against conglomerates is the investor preference towards performing their own diversification, there are companies operating in industries were hedging is not possible. Futures, forwards, options, swaps etc. are only available in major commodities and developed markets, making it difficult for some companies to diverse. Diversifying can help these companies, and make them less vulnerable to losses in low conjuncture periods, within one industry. For example, a company operating within IT, can diversify by also operating in the Fast Moving Consumer Goods sector, making the company less vulnerable compared to its counterparts.

Limited growth opportunities. As briefly mentioned in the beginning of the thesis, one of the primary reason for the creation of conglomerates historically was the limited growth opportunities, due to antitrust legislations. Some industries might have the same growth obstacles, not because of the antitrust legislations, but because of their location in a "dying" industry. Tobacco farmers has for example seen declining revenue and profits over the last many years, and has been forced to diversify, in order to keep the company running. As a result, Phillip Morris (maker of Marlboro) now owns a minority stake in a brewing company, a real estate company and a food company. Tobacco thus only accounts for c. 50% of revenue.

Chapter VII: The Cons of The *"Firm as Portfolio Strategy"*

Investors can diversify themselves if they want to, and does not require the company to do it. There arise agency costs by having different divisions and the company may not focus enough where it needs to. These are just some of the theoretical arguments for the why a firm should not pursue the firm as portfolio model. In this chapter, this thesis will try to enlighten these arguments.

The organizational complexity aspect. When firms pursue the firm as portfolio strategy, the organizational requirements as well as size intends to increase. It becomes increasingly difficult to keep up with the decision workload and in many instances, it forces the company to change the organizational structure from the vertical u-form structure to the horizontal m-form structure, in order to adapt efficiently to the strategic requirements. This is, seen in Maersk with different business units and the Maersk Group operating as a holding company. Because of this, each business unit has its own C-level management despite the group having a group CEO as well as a group CFO. In Berkshire Hathaway they have similar organizational structure, but with a more "investment monitoring" approach. The company is composed with a board of directors, a CEO and multiple investment managers, which monitors the portfolio from an outside, influencing the strategy and decisions being taken, through board positions. Thus, the portfolio companies have their own C-level. In one of the big titans of conglomerates, GE, they have a similar organizational structure as Maersk. It consists of a C-level for the group, reporting to the board of directors (many C-level's also sits on the board of directors) and a C-level for each subsidiary, reporting to the group. There are thus many variating shapes for conglomerates.

The economical aspect. There is increasing costs due to the C-level expansion. Conglomerates is often major corporations, which means that the top level is very high paid. The C-level at the group level can be seen as an additional level of salaries, which goes directly from the bottom line. Talent is hard to come by and in order to attract the best, high salaries are needed. Each business unit in GE is very large and demands a high level of experience and talent, which means

that underpaying the top management at the business unit level is not feasible, despite having an experienced backup in the group. Not only will the C-level draw from the bottom line, so will the general back office costs. Companies often have additional Human Resource divisions, IT divisions and various others, within each business unit. This creates negative synergies due to especially the lost economies of scale opportunities.

Besides the C-level expansion, diversified acquisitions might also inforce other costs. The acquisition costs of diversifying can easily become very high, as stated by the Jensen's 'free cash flow' hypothesis (1986). The reason is that unless the company has a very low leverage level, it will need to go to the capital market in order to get funding for the acquisition. Since diversified acquisition in its nature is considered riskier (Rajagopalan and Harrigan, 1986; Lubatkin and O'Neill, 1987; Montgomery and Singh, 1984) the interest rate will be higher or even in worst case scenario, external capital is not available. Furthermore, the diversifying acquirer might not have experience within the target industry and hence, the chance of overpricing the target increases substantially.

The agency costs aspect. The M-shaped organization has positive effect due to its workload reduction as well as increasing the focus within each business unit. However, despite this, there is multiple disadvantages to the M-shaped organization.

Besides the economical aspect, there is also clear agency costs related to the organizational m-shape, over the u-shape, which indicates a positive correlation between the number of divisions and agency costs. The reason is that (as shown by Khoroshilov 2009) the lower enjoyment of cash flow by the business unit managers creates the principal agent conflict, leading to a capital misallocation as well as a cross subsidization in the conglomerates, often in the form of an underinvestment in good divisions and overinvestment in bad divisions. The main reason for the misallocation is to prevent the mangers of the underperforming divisions from resigning. Manager utility are assumed to derive from their level of capital under control, and divisional managers in conglomerates are assumed to derive less utility from its capital under control, due

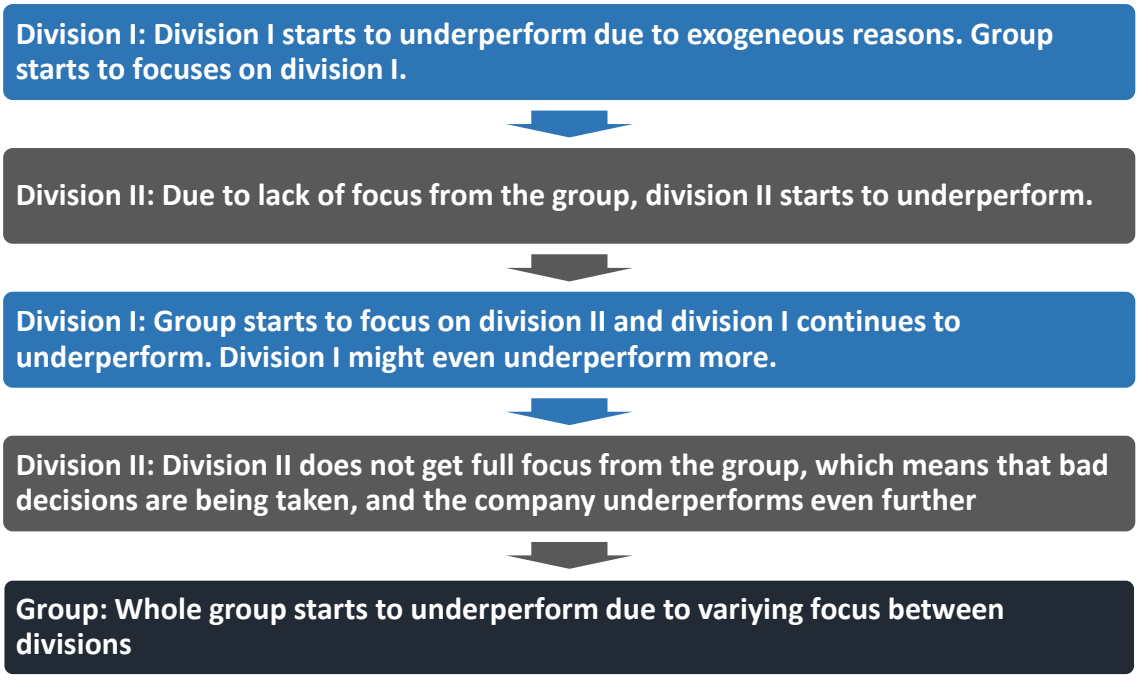
to the loss of control to the group. Because of this, the utility of managers of underperforming divisions should equal the expected utility of underperforming single segment firm managers, meaning that headquarters of a conglomerate needs to provide underperforming divisions with more capital than what optimal is. Over performing divisions will suffer from this misallocation and might not be able to pursue the investment opportunities, even if the outlook is positive. Another agency cost that arise is the managerial focus from the group (Jensen 1986 and Stulz 1990). There might arise incentives to not only diversify in a certain way, but to focus on especially some part of the conglomerates, due to managerial career focus. As an example, it might be that a CEO would like to move into a certain industry due to a potential future higher salary, but has no specific experience within the industry. Because of this, he might diversify the company into this specific industry, in order to improve his resume, get experience within the industry and "prepare" his exit plan, all in despite of the potential negative consequences for the shareholders. Another agency cost that arise is below the C-level, where directors, associates and similar may not act in the best interest for the group as a whole and thus not in the best interest for the shareholders. Many divisions are independent from each other, which means that employees are more focus towards their own career and performance, than how the group performs. Sometimes the two may overlap, other times they might not. In the Danish conglomerate Maersk, the business units are all functioning individually, which means that the oil division, Maersk Oil, might not award a tender to the drilling division, Maersk Drilling, just because the drilling division is in need of a contract. This means that the two divisions will not collaborate in the scenario where the price of the Maersk Drilling service is higher than what is obtainable in the market. Even if the total group profit is higher if they cooperate, compared to if Maersk Drilling goes on another contract, and Maersk Oil employees another drilling contractor.[8]

[8] Based on interviews with Maersk Drilling employees from Commercial department, and Strategy and M&A department. The employees wish to remain anonymous.

The lack of business focus aspect. One of the main reasons investors and analysts disvalue the conglomerate business model is the lack of business focus as well as the lack of industry experience. This is seen early in the companies' lifetime, where venture capitalist rarely invests in businesses, with multiple focuses. Investors and analysts prefer companies, which has one focus, where they are fully committed. This is because it becomes increasingly difficult to keep a long-term strategy, as well as executing in the short run.

Misallocation of internal capital. Underperforming divisions tend to attract more focus than the performing divisions. The increasing attention for the underperforming division might solve the problem, but the lack of attention for the performing division, might make that division underperform, and attract more attention from the already underperforming divisions. Potentially, this could turn into a vicious circle for the conglomerate. This point is illustrated in the next figure.

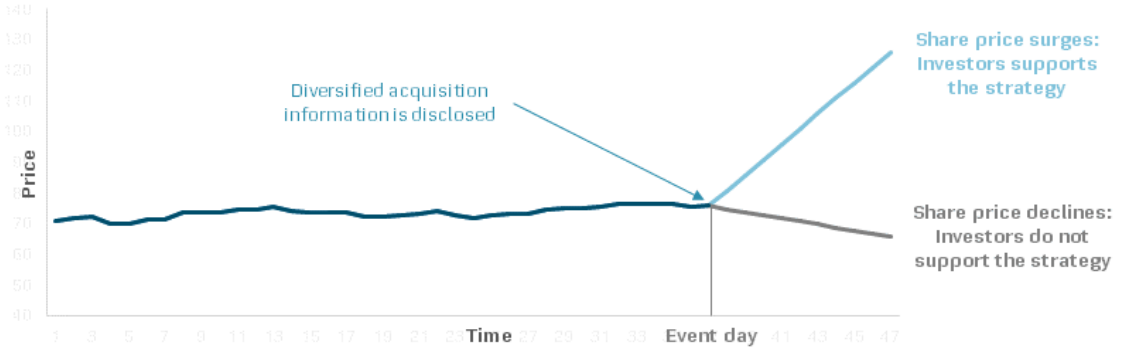
Figure II: Figure of the lack of business focus aspect



Lack of transparency. Conglomerates only need to disclose some parts of their financial statement and it is rare for them to disclose more. Because only the minimum statutory financial results are reported, it is difficult for investors as well as analysts to measure the performance of the business segments. This increases the uncertainty as well as the risk. For example, Maersk only reports the profit loss, part of the asset side and almost nothing from the liability side for each business unit, making it very difficult to measure the liabilities and thereby risk in the company. Furthermore, the mentioned potential misallocation of internal capital becomes very difficult to measure, creating uncertainty about the performance of the management and company as a whole.

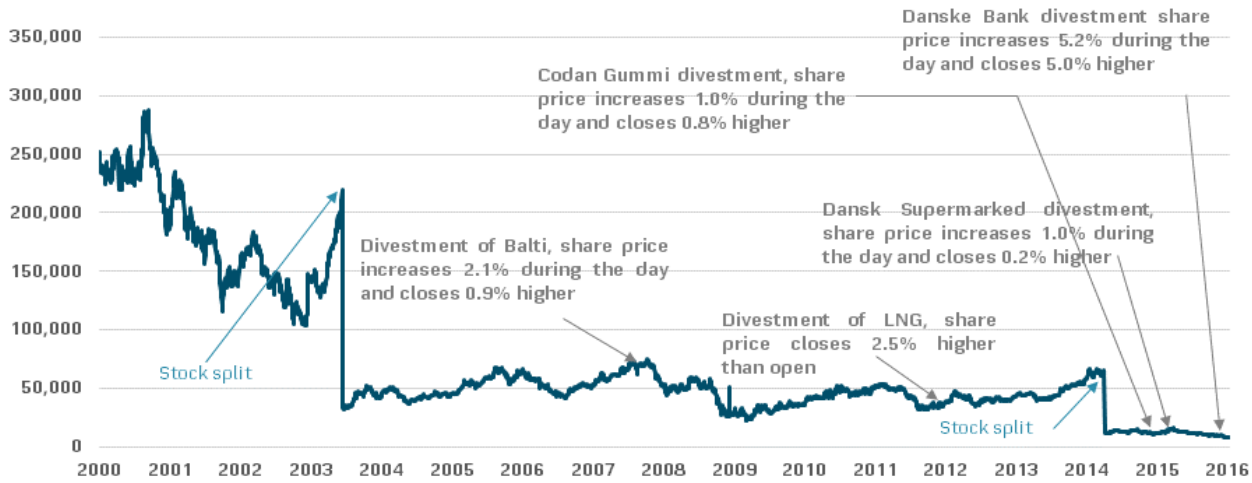
Stock market response. In recent times equity analysts has especially in Europe (Boston Consulting Group, *Managing for value, 2006*). been very negative towards the diversification strategy. They often state that they are very inefficient and that they squander shareholder value. One way to see the preferences of the investors and analysts is the response to divestments as well as investments categorized as diversified. If the share price increases post an acquisition in an unrelated industry, it must be an indication of investor preference towards the company's strategy (for that specific company). On the other hand, if the share price falls after the information is disclosed, it is an indication that the investors do not support the strategy. Below figure illustrates the event.

Figure III: Investor preference indication at time of acquisition disclosure



A divestment event study of the Danish conglomerate Maersk shows a clear preference towards divestment and business focusing. Below figure illustrates this point.

Chart III: Maersk share price (DKK) development and selected divestments



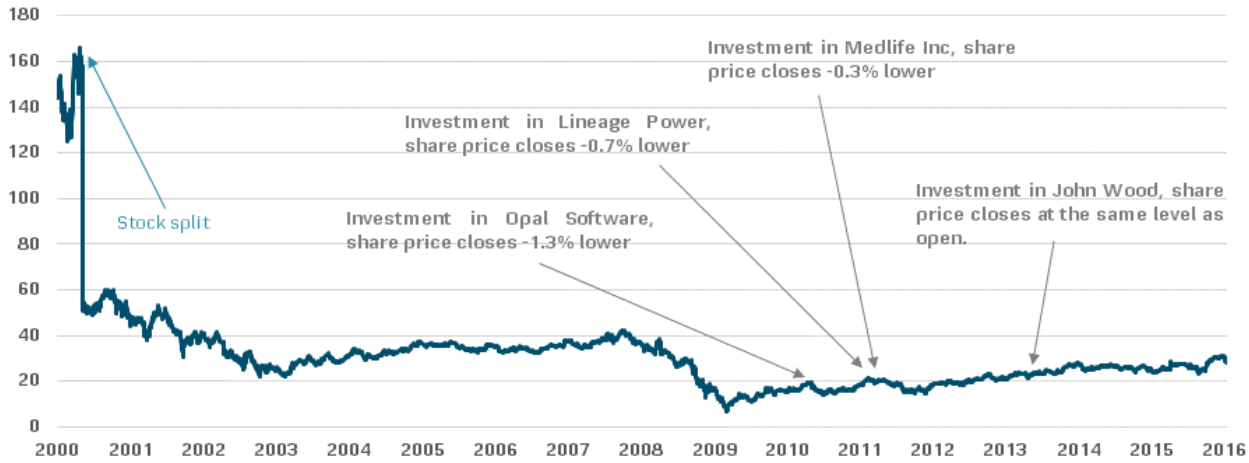
Source: Thomson Reuters, Maersk, Zephyr

The chart shows that the investors has responded positively to divestments done by the company Maersk. When Maersk started their "focus on core" program in 2007 and divested the metal component manufacturer Balti, the share price surged 2.1% during the day. When the company divested LNG and Danske Bank, the share price surged 2.5% and 5.2% during the day, respectively. The average share price increase from open to close was 1.9% for the selected divestments, a clear indicator of investor preference.

Another way to see the investor preference is to do an event study for the opposite possibility, diversified investments. One of the world biggest companies and conglomerate, measured by market capitalization is General Electric. The company has existed for more than 130 years and has multiple diversified business units. Until recent years, the company has always been focused towards the firm as portfolio strategy, meaning that it would do diversified investments. Recently, the company has revised its strategy and is now focused towards trimming its business by selling

off non-value-adding assets, plausibly due to investor preference. Below figure shows the share price development and stock market responses to diversified investments.

Chart IV: General Electric share price (USD) development and selected investments



Source: Thomson Reuters, General Electric, Zephyr,

As seen in the chart there is a clear investor preference towards a clear core business focus. When the company invested in the software company Opal Software, the share price closed 1.3% below open price. When the company invested in the energy company Lineage Power, the share price fell 0.7%. Overall, the average share price movement for the selected diversified investments was a 0.6% fall, well below the average 1.9% share price increase from the Maersk divestment case.

Naturally one can also find empirical results of a positive stock market response to diversification investments and negative stock market response to core focusing divestments. For example, the Swiss food and beverage company Nestlé acquired the cancer treatment health-science company Prometheus Laboratories for a wobbling USD 567 million 24 may 2011, making the share price increase 0.4% during the day, and increase for the next two consecutive days as well. Many more examples like this can be found.

As shown by Morck R., Shleifer A., and Vishny R. (1990), there is a clear tendency towards a lower return to the bidding shareholder, when the acquisition is categorized as a rapidly growing

company, when the manager pre-investment has been performing badly, or, more importantly, when the acquisition is categorized as a diversification acquisition. So why do managers pursue the diversification strategy one might ask. According to Amihud and Lev (1981) corporate manager often have incentives to think about own capital, meaning that if they are undiversified themselves, they have incentives to diversify the company holding, to reduce the risk to its own human capital, even in the case of no shareholder benefit what so ever. Donaldson and Lorsch (1983) argues that it is simply due to a survival assurance of the company.

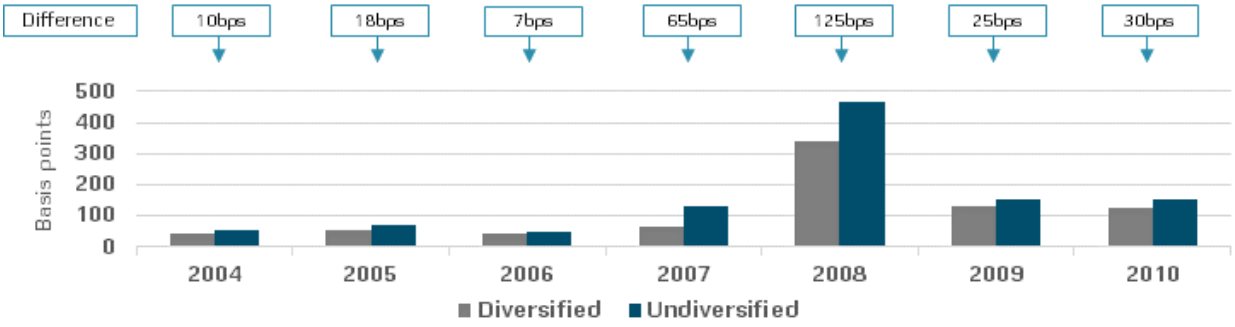
Probably the most reasonable argument to the investor preference towards a single focus company is, that investors, if they desire, can hedge themselves. Investors are able to change their risk of their portfolio from day to day, and do not require the company to do it for them. For example, if an investor would like to hedge the portfolio buy buying real estate assets and financial services assets, he could do so by buying stocks within these industries and would not require General Electric to diversify its business into these areas. The investors are able to expand their portfolio much quicker, much cheaper and much more efficiently than the company would ever be able to.

Chapter VIII: Conglomerates in Financial Crises

Diversified companies should according to Modern Portfolio Theory, be more resilient to financial crises, due to the diversification aspect. Being exposed to one single industry will naturally increase the exposure and risk in low conjuncture periods, whereas diversification with low business unit correlation will minimize risk and default probability.

In a study performed by the Boston Consulting Group and Leipzig Graduate School of Management (*The Power of Diversified Companies During Crises, 2012*) they shows that not only does diversified companies have a better credit rating over undiversified companies across regions (BBB+ relative to BBB), but were also less volatile in terms of total shareholder return. It is furthermore shown that post the financial crisis outbreak in 2008 were the economy contracted, and syndicated corporate loans fell sharply, the credit-default-spread for diversified companies were 125 basis points lower than undiversified companies, indicating a lower risk premium. The finding is illustrated in below chart.

Chart V: Credit-default-swaps spread for diversified and undiversified companies



Source: Capital IQ, Boston Consulting Group, Leipzig Graduate School of Management

Note: Data from paper by Leipzig Graduate School of Management and Boston Consulting Group (The Power of Diversified Companies During Crises, 2012)

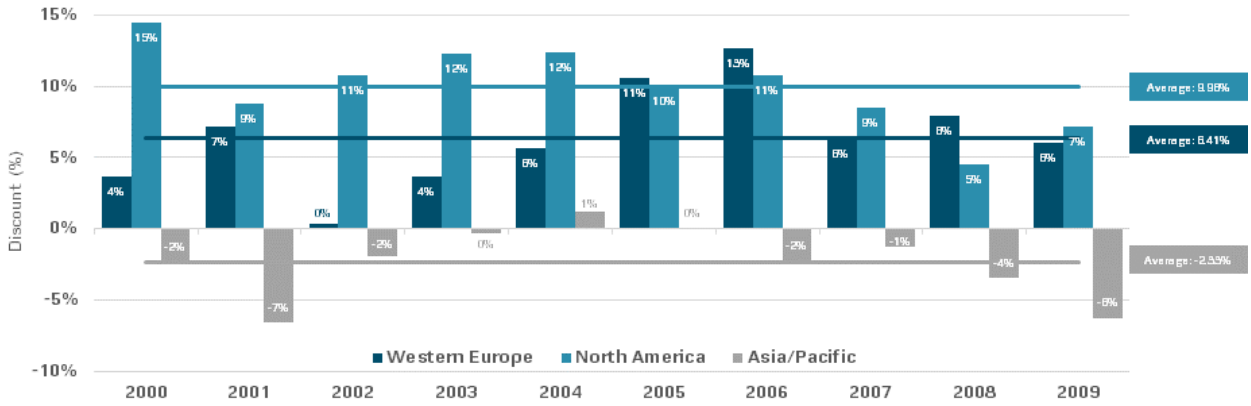
The credit-default-spread combined with the better credit rating indicates a more favorable debt market for conglomerates, making investments more accessible. Furthermore, the internal

capital market of a conglomerate allows the diversified company to reduce its investments minimally in the crisis, preparing the company for a post crises rebound.

A crisis often forces a price drop, which allows the internal markets to serve for cheap acquisitions. Undiversified companies may not have the necessary cash flow to pursue this strategy and could thus be forced to pursue M&A activities at high trend periods, where prices are likewise high, and shareholder value creation are lower (Boston Consulting Group, *Bee Daring When Others Are Fearful: Seizing M&A Opportunities While They Last*, *2009*).

The multiple advantages for diversified companies during financial crisis is reflected in the paper by Boston Consulting Group and Leipzig Graduate School of Management, which finds that the conglomerate discount decreased during the most recent financial crisis. The conglomerate discount was in Western Europe 12.7% in 2006, whereas it was only 6.0% in 2009, a 6.7%-point decrease. For North America the Conglomerate discount was at its highest in 2000, with a discount of 14.5%. In 2008 the discount was only 4.5%. For Asia/Pacific, where equity analysts are fonder of diversified companies, had a conglomerate discount of 1.2% in 2004, but a negative discount of 6.3% in 2009, meaning that diversified companies were actually trading above undiversified companies. Below figure illustrates the findings.

Chart VI: Conglomerate discount development in the 2000-2009 period



Source: Boston Consulting Group, Leipzig Graduate School of Management

Note: Data from paper by Leipzig Graduate School of Management and Boston Consulting Group (The Power of Diversified Companies During Crises, 2012). Discounts and premiums calculated as difference in the mean excess values of diversified and focused companies, this is known as the Berger and Ofek excess-value model

As seen in the chart, the conglomerate discount is significantly lower for the Asia/Pacific region, where the discount is actually negative, meaning that there is a conglomerate premium. The chart furthermore shows the discount is lower in the financial crisis, indicating a positive prevalence towards internal diversification.

Chapter IX: Conglomerates and Asian Culture

It is by now clear that there has been a western conglomerate preference towards divesting in recent years. Asian companies do not share this divestment preference according to previous findings and an analysis conducted by McKinsey (one of the top management consulting companies). In its 2013 "*Understanding Asia's Conglomerates*" market report, they show that the m-shape business model continues to remain a competitive and growing business model. The largest conglomerates in China and India has performed impressively with a +20 percent revenue increase annually over the last decade, and has on average made completely diversified acquisitions every 18 months. In India, more than 90 percent of the largest fifty companies in the country is conglomerates, in china its 40 percent of the largest fifty companies.

The conglomerate preference over the shareholder-driven preferred European and American model can be explained through the ownership structure and the stage of the economy. Most of the conglomerates in Asia is owned by a single shareholder[9], meaning that the objectives are different from what are seen in the shareholder-driven European and American model. Focus is on the overall cash flow generation and not the relative return[10]. Because of this, companies are looking to expand where there is possible profit, in order to increase the profit.

Another key driver of the Asian preference is the current stage of the economy. Asia has undergone a massive industrial change in recent years, driven by a demand from the west, as well as an, especially in China, increase in the governmental spending level. The economic development can partly be explained by the following factors.

I. The falling transportation costs and the increase in transportation possibilities. Making it profitable to buy Asian goods, increasing demand for Asian goods.

[9] A single shareholder may be one person or a family holding company
[10] Relative return refers to return on invested capital for the investment

II. The Asian economies has been very successful in catching up with the technology of the more developed western countries (Amsden 1993, Balassa 1988, Wade 1990 and Krueger 1990), increasing demand for goods such as cars, telephones etc.

III. An increase in productivity levels has increased the level of output.

IV. A liberalization of the economy. For example, India reformed in 1991, liberating the economy in order to make the economy market oriented as well as make private and foreign investments possible in a greater way – inspired from the Chinese development, where the liberalization was a big part of the development.

V. A massive growth in the construction industry due to infrastructure requirements and an urban centralization. High returns on investments has been easy to achieve because of the continuing high growth rates. This has increased the incentives for businesses being diverse and thus the conglomerates has been, and still is, a preferred model.

Because of the current state of the economy, positive net present value projects are also much easier obtainable, making diversification attractive and profitable.

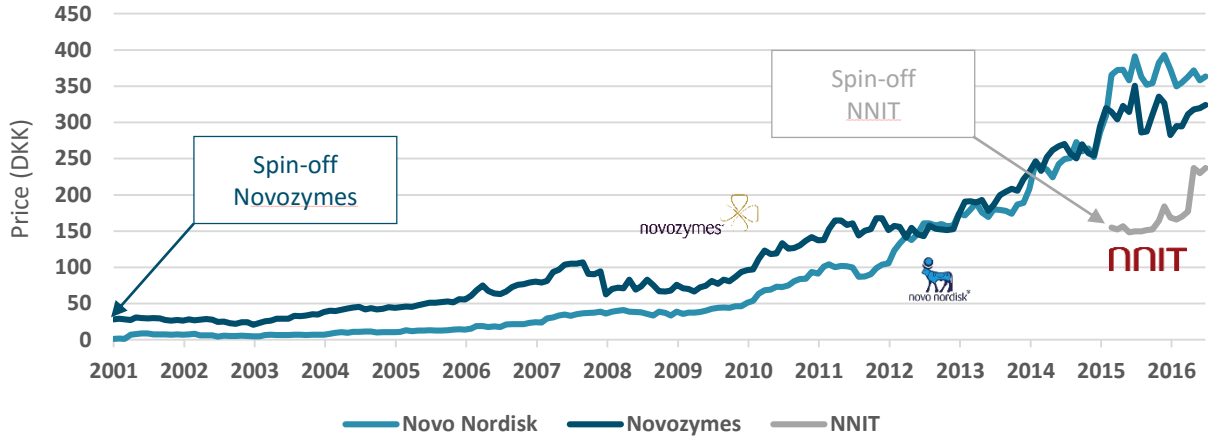
Chapter X: Divestment Options

If the analysis shows that additional shareholder value creation is obtainable, if a company is single focused and sell additional non-core business units, different divestiture methods are possible. A divestiture is a sale of stocks, sale of assets or sale of portions of a business. This chapter will briefly cover the main forms of divestiture methods.

Asset divestiture. Asset divestiture or asset sale is the sale of a business unit, subsidiary, product line etc. The divestment can be performed due to a number of reasons. The business unit might be underperforming, the industry of which the unit operates in might be a dying industry or the company might be facing liquidity constraints, just to name a few. An asset divestiture involves three parties, being 1) the acquiring company, 2) the company divesting (the vendor) and 3) the business unit being sold (the target). When an asset divestiture takes place, the vendor will receive stocks or cash as payment from the acquiring company, with the latter being used most frequently.

Spin-offs. In a spin off, the business unit which are spun off will become an independent business. It is created through a sale or distribution of new or existing shares of the business unit. The reason for a spin-off is often due to the business unit either over performing or underperforming. If a business unit is underperforming, it might be spun-off in order not to have a bad influence on the share price of the parent company. Reversely, if the core business of the company is underperforming, an up and coming business unit might be spun-off in order to realize its full market value. In practical, the spin-off is most frequently conducted with a stock dividend in the spun off business unit, to the existing shareholders. One of the best executors of the spin-off strategy is the Danish pharmaceuticals and life science company Novo Nordisk. In the year 2000, Novo Nordisk divested Novozymes, in order to focus on Insulin and in order for Novozymes to focus on enzymes. In 2015 the company again divested a non-core asset, the Danish IT company NNIT. Both divestments have performed well on the stock market.

Chart VII: Market performance of Novo Nordisk, Novozymes and NNIT



Source: Thomson Reuters

Carve-out. The carve-out (or partial IPO) is very similar to the spin-off, with the difference of a cash inflow to the parent company. This is because shares are sold to the public. The strategic rationale is similar to what is seen in the spin-off, but where the spin-off is mostly due to the business unit being undervalued, the carve-out is mainly driven by liquidity requirements.

It is documented by several studies that the market responds positively to the different divestment option (Schipper and Smith, 1993 & 1986; Hite and Owers, 1983; Miles and Rosenfeld, 1983), but the company needs to consider the reason for to divest. If it is to generate cash flow in order to grow or meet liquidity constraints, the company would need to do either a spinoff or a carve-out. The asset divestiture and carve-out has higher costs associated with the transaction, and are furthermore not able to generate the same post transaction total shareholder value, 2.41% versus 6.41%, as the spin-off is (Michaely and Shaw, 1995).

The divestment options show that divestment of non-core business units is highly possible, and are able to generate positive results.

Chapter XI: Methodology

The choice of the analysis is an important factor in order to obtain valid and reliable answers for the raised problem statement as well as the raised sup-questions. The following chapter will explain the selected methodology, the rationale for the decided performance measurements, and a detailed description of the chosen data.

The stated problem statement as well as the sub-questions will overall seek to enlighten if the conglomerate discount phenomenon exists, and the analysis should thus be clear and allow for a holistic conclusion. The following chapters will focus solely on the empirical part using data analysis. It will be divided into two parts;

I. **Summary/descriptive statistics: Method I**

   The first way to enlighten the problem statement and hypothesis' is to use summary statistics, in order to determine especially the hypothesis'

II. **Statistics: Method II**

   The second way to enlighten the problem statement is to model the relationship between diversification and performance

The summary statistics seeks to explore the conglomerate discount phenomenon in a general way, summarizing the set of observations in a simple and precise way. It will allow the thesis to present the quantitative data in a more manageable form. The quantitative statistics will through modeling describe the relationship among the multivariate, if there is a statistic relationship for the conglomerate discount phenomenon. Thus, the two parts of the analysis seeks to 1) answer the hypothesis through summary statistics and 2) answer the problem statement through statistics

The dataset. In this thesis the dataset will follow and extend the method used in the Boston Consulting Report: "*Managing for Value. How the World's Top Diversified Companies Produce*

Superior Shareholder Returns". It analyzes how the worlds' largest industrial diversified companies has performed over the last 10 years, relative to undiversified companies. In this thesis the dataset will be expanded with 50% in terms of number of companies and the analysis will cover all non-financial sectors. The reason for excluding companies operating in the financial sector is due to the overweight of the number of financial companies within the dataset, as well as the valuation and diversification measurement difficulties. The analysis will furthermore cover the period 2006 to 2016.

The companies will be divided into the following categories;

- **Diversified:** Non-financial companies operating within three or more unrelated industries. These companies are referred to as conglomerates. Each business segment should have fundamentally different products/customers and be unrelated to the other segments, in order for the company to be a truly diversified company.

- **Slightly diversified company:** Categorized as companies operating in two business segments. Each of the two business segment should have fundamentally different products/customers and be unrelated to the other segments.

- **Undiversified companies:** Traditional companies operating within one industry. This means that revenue needs to come from a single business segment in order for the company to be undiversified and focused.

The number of industries which the company operates in can be found by using the SIC codes of the companies. The SIC codes stands for Standard Industrial Classification, and is used to classify industry areas with a four-digit code.

Due to the fact that most large companies operates within multiple SIC codes, this thesis will use the overall SIC code classification (see appendix for full overview). That means that in order for the company to be diversified, it needs to operate within three of these sectors. For the company to be slightly diversified, it needs to operate within two of these sectors and if the company operates within one sector, it is categorized as undiversified. The diversification level was found through an extensive and complete walk through of the industries which the companies operated in, in order to account for any relatedness among the reported SIC codes. Unfortunately, a yearly assessment of operating industries for the individual companies was not possible to obtain, thus the dataset reflects the most recent, static status of the companies.

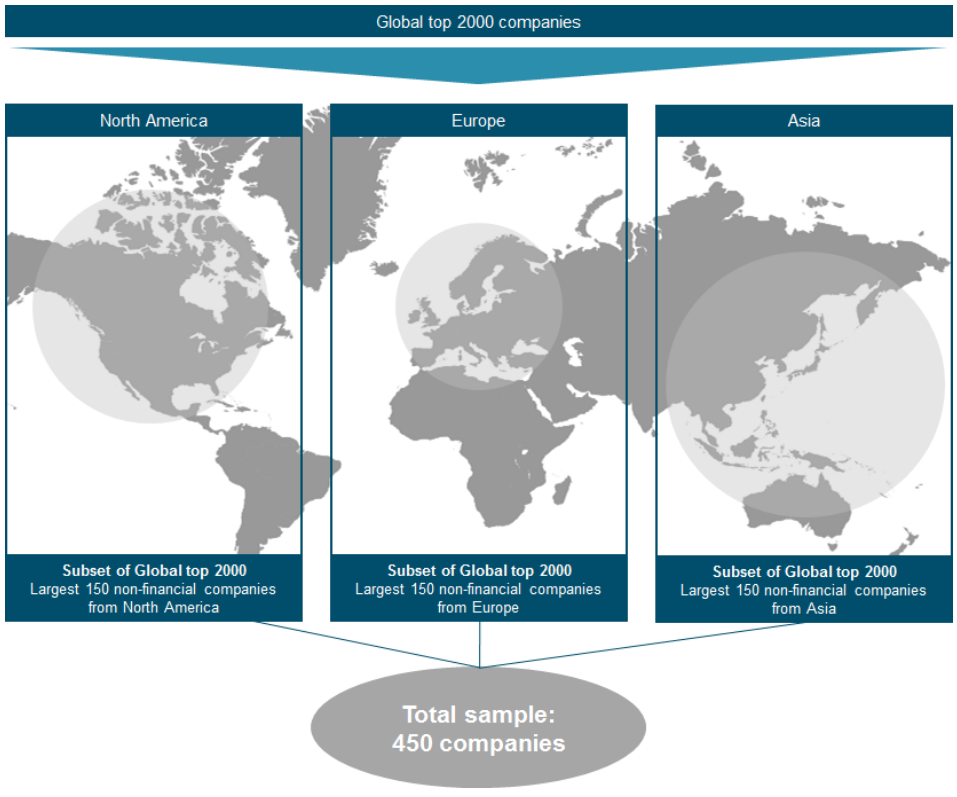
The Companies. The dataset will consist of the 150 largest non-financial public companies from the United States, Europe and Asia, a total of 450 companies. The reason for the geographical split is the investor prevalence of conglomerates. In order to determine the largest companies, the thesis will use the methodology as used by Forbes in its 2015 global 2000, which consists of the largest 2000 companies in the world. The list is based upon four lists of the largest 2000 public companies around the world, in each of the metrics: sales, profits, assets and market capitalization as of April 6 2015, based on last twelve months' performance. Each of the list has a minimum value in order to qualify for the lists. Approximately 3,400 companies were needed to fill the four different lists of 2000 companies and the companies were then given a score for all four metrics with equal weight, and were given a zero score if it ranked below the cutoff value. The companies were then sorted in descending order by highest composite score, which gave the top 2000 largest global companies.

Figure IV: Global top 2000 method

Note: Companies where subsidiaries are consolidated in parent figures are excluded from the list. That is when the parent's ownership of the subsidiaries is more than 50%.

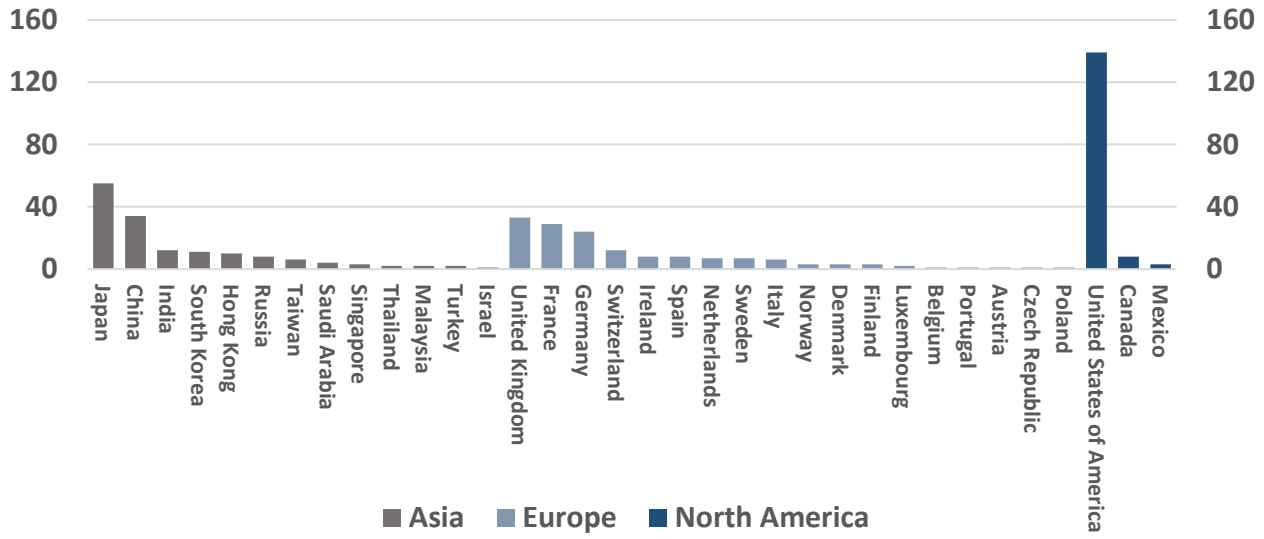
The largest 150 non-financial public companies from North America, Europe and Asia will then be extracted from the overall dataset to conduct the dataset of the 450 companies.

Figure V: Dataset overview



The Unites States is the country represented the most in the dataset with 139 companies, accounting for approximately 93% of the North American region and 31% of the overall sample. The Unites States was furthermore the country with the lowest overall average ranking of 195, in terms of size. Europe and Asia had an overall average ranking of 259 and 268, respectively, illustrating a data skewness towards larger companies being locating in The United States. In Europe and Asia, the distribution was more equally weighted with the largest representatives, United Kingdom and Japan, accounting for 21% and 37% of their regions, respectively. Below figure illustrates the country distribution of the sample.

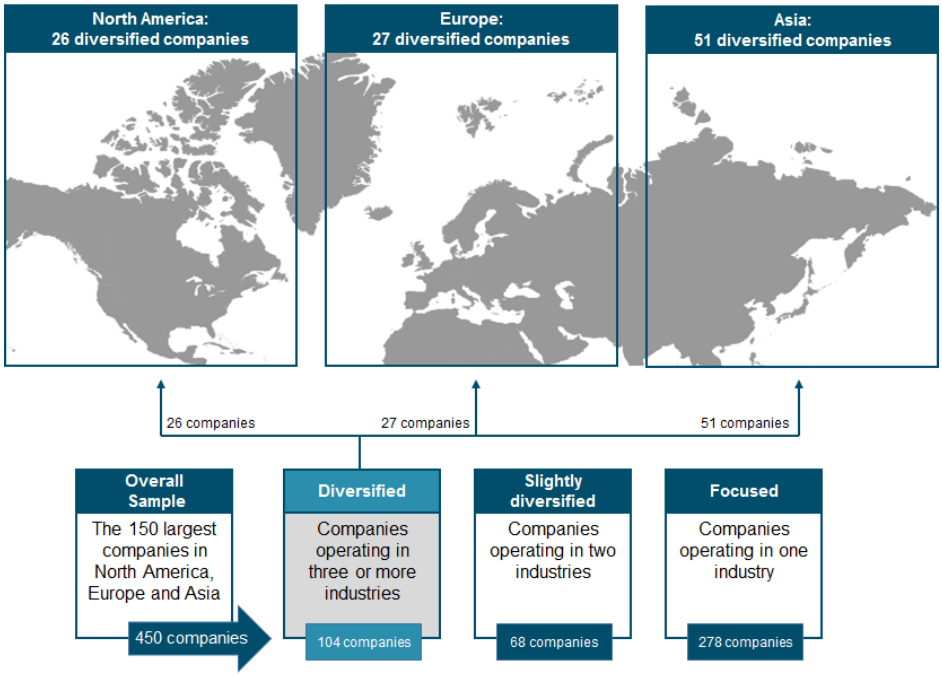
Chart VIII: Country distribution of total sample



Once the sample was extracted, the companies could be divided into the various categories: Diversified, slightly diversified and undiversified. As previously explained, the SIC codes of the companies was used to determine the level of diversification. A case-by-case analysis was conducted in order to secure the reliability of the SIC code.

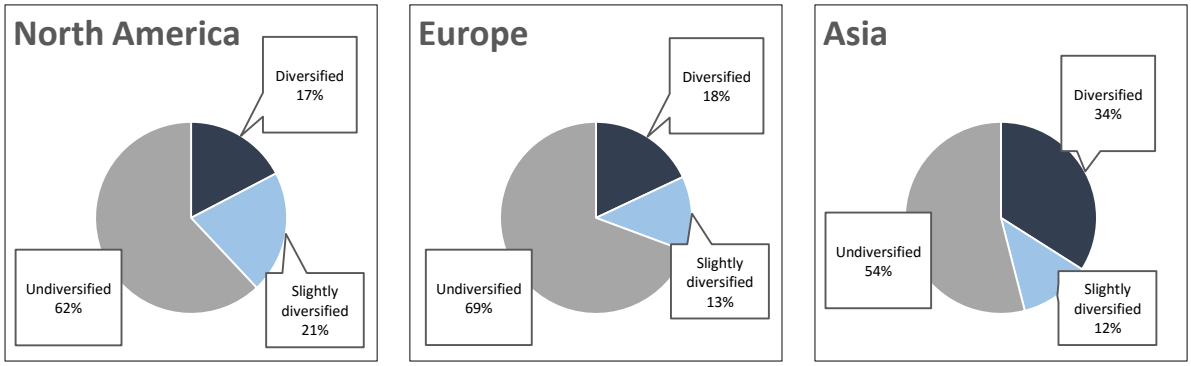
Of the dataset with 450 companies, 150 companies from each region, a total of 104 companies was diversified and a total of 68 companies was slightly diversified, meaning that 278 companies was undiversified. Below figure illustrates the findings.

Figure VI: Categorization of companies



Asia was the region with the highest percentage of diversified companies (completely diversified and slightly diversified) with 46%. North America had 38% and Europe had 31% of diversified companies.

Chart IX: Regional overview of company distribution



Overall there was 23% of the companies which was categorized as diversified, 15% was categorized as slightly diversified and 62% was categorized as focused.

Performance measures. In order to determine the performance of the companies, various performance measures will be used. For method one the following performance measurements will be used:

Total shareholder return. The measure is defined as annual stock price percentage change (dividends included). Total shareholder return is determined by the following formula.

Equation 1: Total shareholder return (TSR)

$$Total\ shareholder\ return = \frac{dividends + share\ price\ increase}{share\ price\ at\ point\ of\ investment}$$

Total shareholder return is a measurement indicating the market valuation of the company (reflected in stock price capital gains), as well as dividends.

Return on assets. The measure is defined as net income relative to the total asset base of the company:

Equation 2: Return on assets (ROA)

$$Return\ on\ assets = \frac{net\ income}{total\ assets}$$

The return on assets (ROA) performance measurement is an indicator of the profitability of the company, relative to the asset base of the company. It is an important measurement since conglomerates often have a relatively larger asset base, due to the diversification. That also means the performance measure is more relevant for companies with similar asset intensity.

Return on equity. Return on equity measures the net income as a percentage of the shareholders' equity. It shows how much profit the company is able to generate with what shareholders have invested. Return on equity is mainly relevant for benchmarking companies with similar capital structure.

Equation 3: Return on equity (ROE)

$$Return\ on\ equity = \frac{net\ income}{shareholders'equity}$$

Return on invested capital. A related measure to ROA is return on invested capital, defined as operating profit after tax, relative to the capital invested in the company:

Equation 4: Return on invested capital (ROIC)

$$Return\ on\ invested\ capital = \frac{net\ operating\ profit\ after\ tax\ (NOPAT)}{stockholders'equity + LT\ and\ ST\ debt}$$

Return on invested capital is an important measurement of the profitability of especially a conglomerate. It tells how profitable the company is at investing its capital. If the company is able to diversify in a profitable way, it will be able to increase ROIC

Dividend yield. Dividend yield measures the cash payout of the company, relative to the share price

Equation 5: Dividend yield (DY)

$$Dividend\ yield = \frac{annual\ dividends\ per\ share}{shareprice}$$

The reason for including dividend yield in the performance metrics is to analyze for any dividend yield differences between the company categories. Hypothetically the internal capital markets advantages for the diversified companies could increase the dividend yield for the company.

The reason for including various performance measurement in order to determine if conglomerates should diversify and if conglomerates are performing better or worse in terms of total shareholder return, is the various advantages and disadvantages of the performance

measurements. The advantage of using the total shareholder return performance measurement is that any differences in capital structure will not affect the measure, as seen in for example return on equity. On the other hand, total shareholder return might be driven by current market speculations and expectations, as seen in the Dot-com bubble, where profitability was not a requirement for shareholder capital gains.

A number of t-tests will furthermore be performed in order to determine the performance distribution differences between the diversification categories, under different situations.

1. The first t-test is to test whether or not the performance distribution of diversified and undiversified companies, are the same over the full period
2. The second t-test will test if the performance distribution for Asian conglomerates are compared to the performance distribution of European -and North American companies

In order to account for outliers, a number of adjustment was made to the calculation of performance:

1. Total shareholder return performance below -100% and above 200% was excluded
2. Return on asset performance below -100% and above 200% was excluded
3. Return on invested capital performance below -100% and above 200% was excluded
4. Return on equity performance below -100% and above 200% was excluded
5. Leverage levels (NIBD/EBITDA) below -30 and above 30 was excluded
6. Capex, as percentage of total asset base, above 200% was excluded

Statistical model. Part II, the statistical method, will use the panel data set described in the beginning of the chapter. The dataset consists of company information and financials on 450 companies, over the past ten years. The total dataset consists of 4950 variables and is categorized as short panel data, because of the relatively few time periods, but high number of companies. The following general models will be used[11]:

[11] Depends on the specifc model used

Model 1: Total shareholder return and diversification

$$TSR_{it} = a_i + b_2D(1)_{it} + b_3D(2)_{it} + b_3D(3)_{it} + b_4D(4)_{it} + b_5D(5)_{it} + \in$$

Where TSR equals total shareholder return for the specific company i in the time period t.

Model 2: Return on invested capital and diversification

$$ROIC_{it} = a_i + b_2D(1)_{it} + b_3D(2)_{it} + b_3D(3)_{it} + b_4D(4)_{it} + b_5D(5)_{it} + \in$$

Where ROIC equals return on invested capital for the specific company i in the time period t.

Model 3: Dividend yield and diversification

$$ROIC_{it} = a_i + b_2D(1)_{it} + b_3D(2)_{it} + b_3D(3)_{it} + b_4D(4)_{it} + b_5D(5)_{it} + \in$$

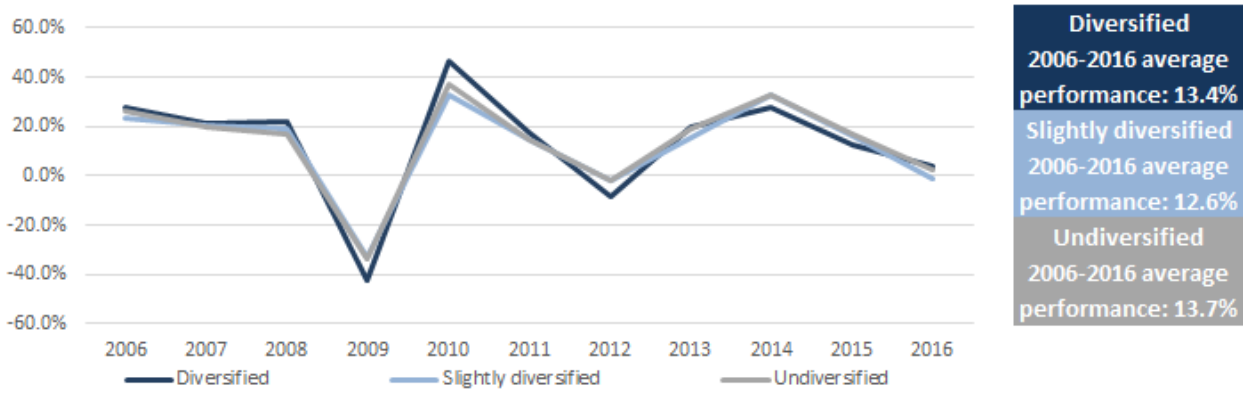
Where DY equals dividend yield for the specific company i in the time period t.

D(1) is a dummy variable equal to one if the company is slightly diversified, meaning the company operates within two SIC codes, and 0 otherwise. D(2) is a dummy variable equal to one if the company is diversified, meaning the company operates within three SIC codes, and zero otherwise. If both D(1) and D(2) is zero, the company is undiversified, and thus operates within one SIC codes. D(3) is a dummy variable equal to one if the company is from North America for that year and zero otherwise. D(4) is a dummy variable equal to one if the company is from Europe in that year and zero otherwise. If both D(3) and D(4) is zero, then the company is from Asia in that year. D(5) is a variable equal to the natural logarithm of the market size, defined as market capitalization. The natural logarithm is used in order to account for the demand differences between small cap and large cap companies. Generally speaking, small cap companies experiencing a market size increase of USD 1 billion will experience a further equity demand increase significantly higher than large cap companies experiencing a market size increase of USD 1 billion.

Chapter XII: Descriptive Statistics Analysis

Overall performance diversified, slightly diversified and undiversified. When looking at the total performance of the three categories it is clear that the total shareholder return performance is very similar.

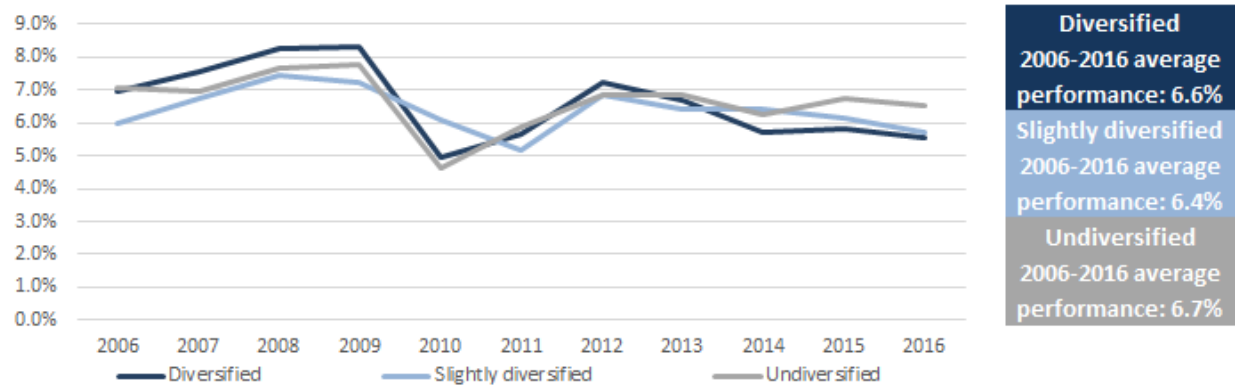
Chart X: Total shareholder return



Slightly diversified companies have a negative one percentage point difference in performance over the period, whereas diversified companies and undiversified companies have more or less the same performance. The standard deviation is slightly higher for diversified companies with a standard deviation of 0.22, relative to 0.18 and 0.19 for slightly diversified and undiversified companies, respectively.

The return on asset performance for the three categories are, similar to total shareholder return, very much aligned.

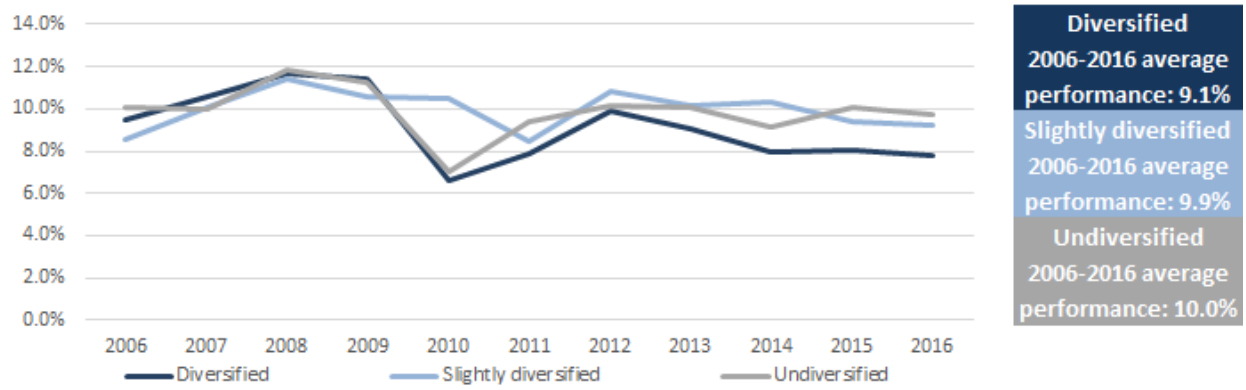
Chart XI: Return on assets



The average return on asset for diversified companies was until 2010 above the return on assets for undiversified companies. For the period 2006 to 2016 undiversified companies had the highest average performance of 6.7%, 0.1%-point higher than diversified companies. One would assume that the asset base for conglomerates was relatively higher than the asset base for undiversified companies, meaning that the return on assets potentially could be lower, unless the conglomerate is able to perform in all of its business units.

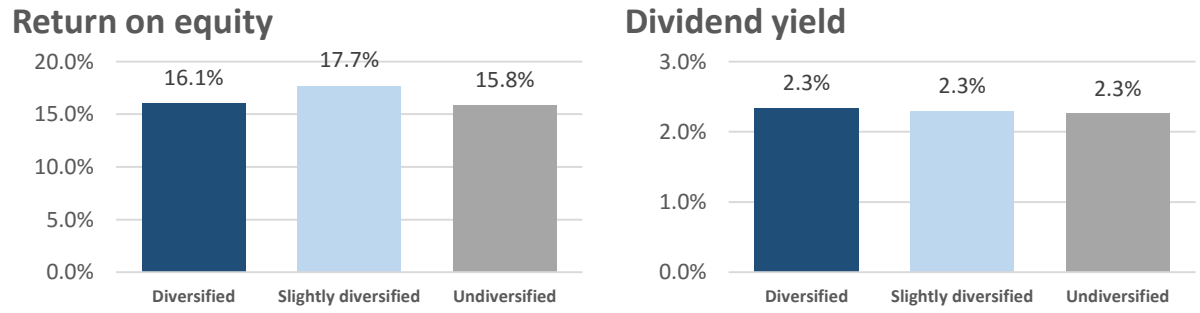
Return on invested capital does not account for market expectations and thus the performance should be a clear true indicator of whether or not diversified companies perform better or worse than undiversified companies.

Chart XII: Return on Invested Capital



When evaluating the return on invested capital for the different categorizes is seems that the performance is similar, but has more variation within it, when comparing it to the other performance measurements. Overall the average returns are very similar with 9.1% for diversified companies, 9.9% for slightly diversified companies and 10% for undiversified companies. The standard deviation is very close with 0.02 for diversified companies and 0.01 for slightly diversified companies and undiversified companies

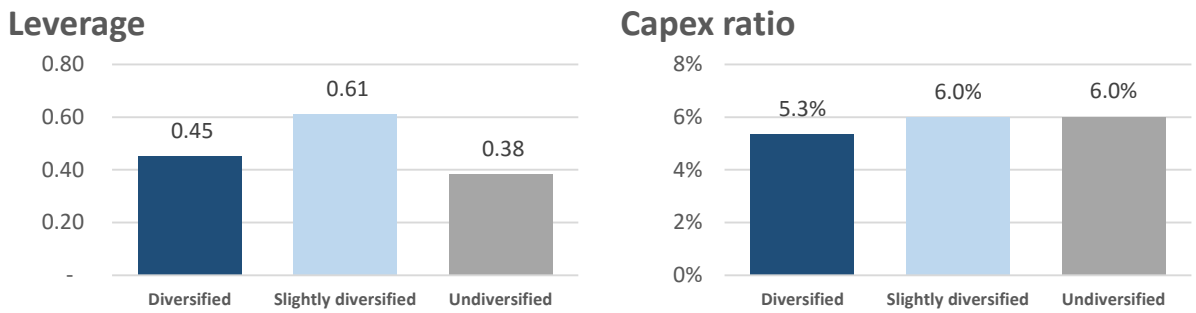
Chart XIII: Average Return on equity and dividend yield performance 2006-2016



The return on equity and the dividend yield for the period is almost the same for the three categories. Interestingly the dividend yield is only different at the third decimal point. One could argue that a conglomerate, due to the performance differences between the entities and internal capital markets, should be able to generate average more cash, and thus be able to have a higher dividend yield. Another interesting observation is the return on equity for slightly diversified

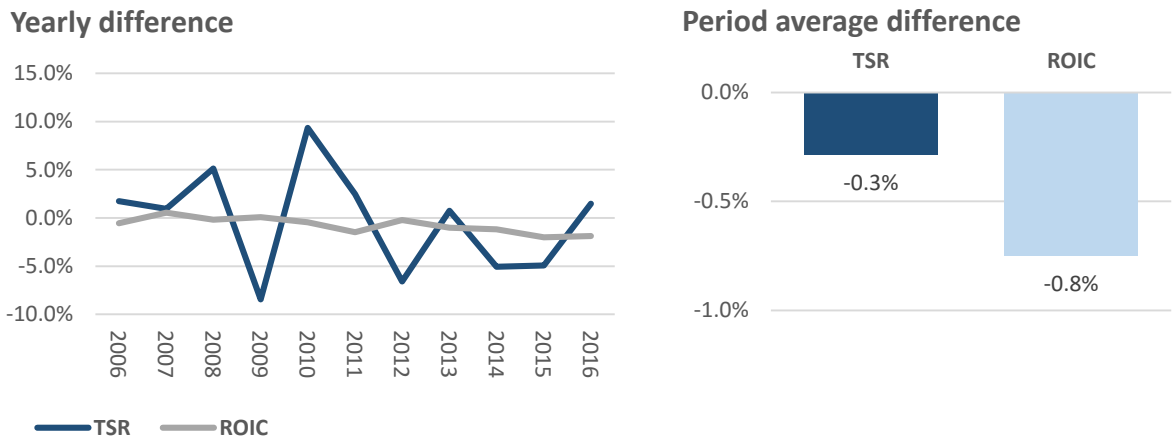
companies are the highest for the three groups. The reason for that is hard to explain, especially since total shareholder return was the lowest of the three.

Chart XIV: Leverage average and capex ratio average for 2006-2016



The leverage level for diversified and undiversified companies are similar, but undiversified companies in general has a lower leverage level. This is most likely due to the higher required asset base of conglomerates, forcing the company to obtain more debt. Interestingly enough slightly diversified companies have a higher leverage level. One rationale for this could be that one other revenue and income source is not enough to utilize the advantages of diversification, but still requires a significant investment, influencing debt and cash. The capex levels for the three categories are more or less the same, with diversified companies a bit below the other two categories. One argument for this observation could be the higher asset base for conglomerates. Since the internal capital market is one of the fundamental pros of conglomerates, one would have assumed a higher capex ratio, in terms of revenue.

Chart XV: Overall TSR and ROIC average yearly performance difference between completely diversified companies and undiversified companies for 2006-2016



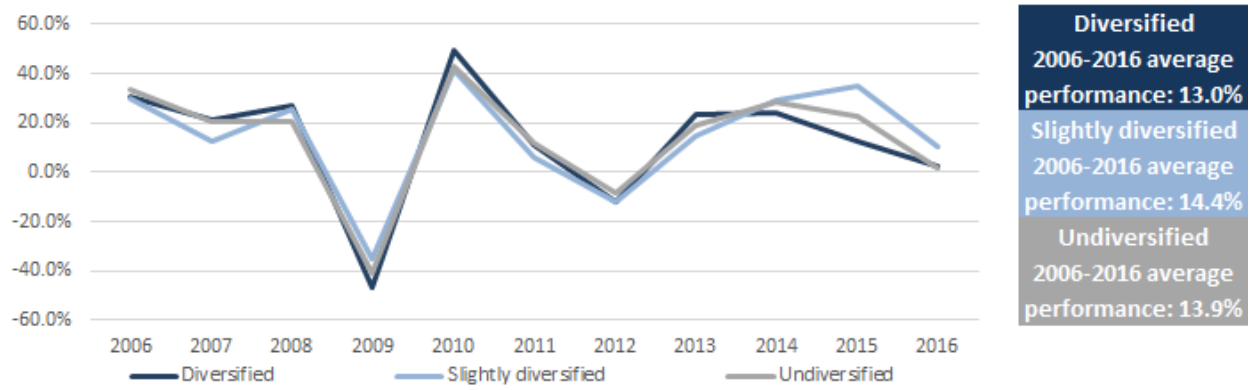
The two charts above indicate that total shareholder return for completely diversified companies has performed better and worse than undiversified companies in the 2006 to 2016 period. In 2009 for example the performance was 10%-point lower than for undiversified companies, whereas it was almost 10% point higher the year after. The average difference over the period was -0.3%, indicating that the performance over a longer period is very similar.

Return on invested capital difference over the period was much less volatile and consistently negatively increasing, year over year. The average difference over the period was -0.8% showing an underperformance of diversified companies, compared to undiversified companies.

Regional performance diversified, slightly diversified and undiversified. The overall performance analysis indicates little difference between the performance of diversified companies and undiversified companies, despite for a small average difference in return on invested capital. This part will focus on the regional total shareholder return and return on invested capital performance, in order to determine any regional differences.

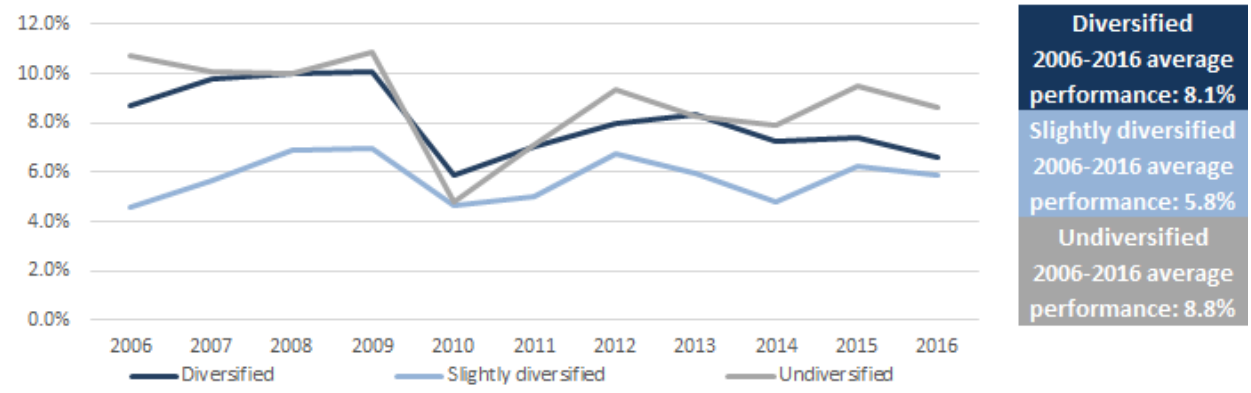
Asia region.

Chart XVI: Total shareholder return performance in Asia



Asia, which has the highest percentage of conglomerates in the dataset, has very similar performances for the three categories. The performance is between 13.0% and 14.4%, with the performance of undiversified companies a bit higher than the performance of diversified companies in recent years.

Chart XVII: Return on invested capital performance in Asia

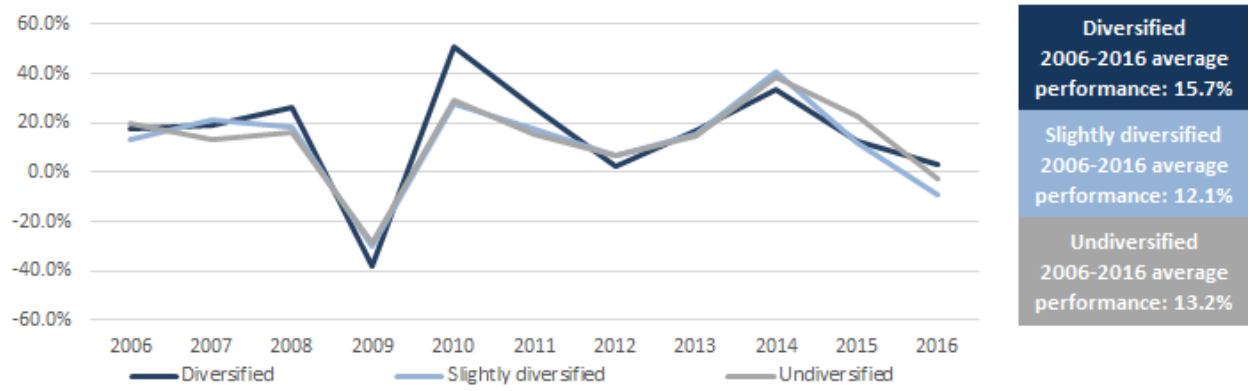


The return on invested capital performance for Asian companies is approximately 3%-points lower for slightly diversified companies. This finding indicates that companies must consider to be either completely diversified with revenue and income sources from three different industries,

or to be single industry focused, in order to perform to the full potential. Undiversified companies are the best performing company in the region

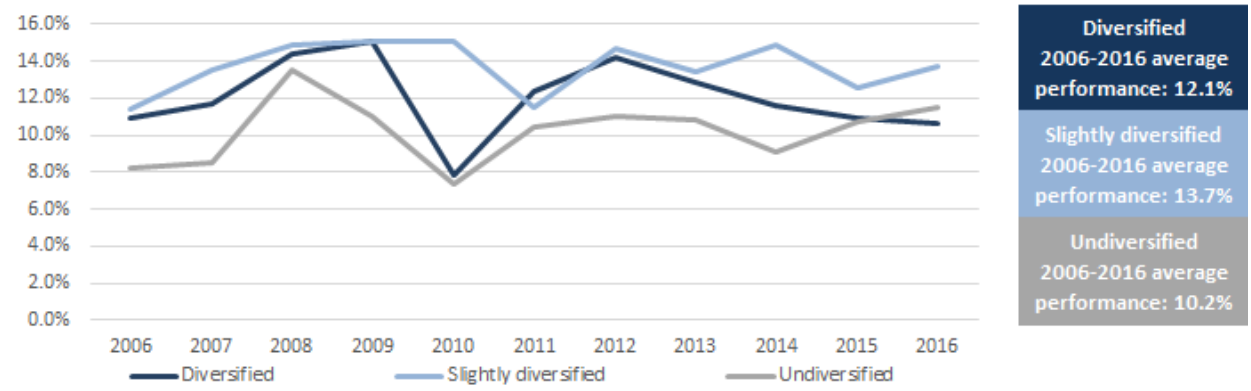
North America region.

Chart XVIII: Total shareholder return performance in North America



The total shareholder returns in North America show that diversified companies has on average performed better than undiversified companies and especially better than slightly diversified companies. Diversified companies especially performed better in the post financial crisis, supporting the theory in chapter 8.

Chart XIX: Return on invested capital performance in North America

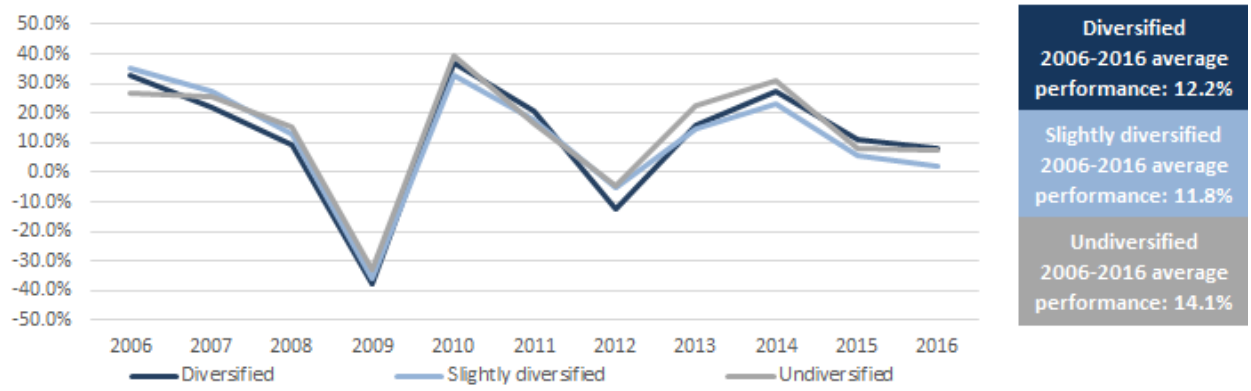


The return on invested capital performance shows that, interestingly enough, the best performing category in North America is the slightly diversified companies, with an average performance over

the period of 13.7%. Diversified companies performed with an average return on invested capital of 12.1% and undiversified companies, the worst performing category had an average return of 10.2%. This finding indicates that despite the market undervaluing slightly diversified companies, they actually, on average over the period, deployed their capital better. The result furthermore shows that diversified companies performs better in North America, and given the majority of companies being of United States origin, especially in the United states.

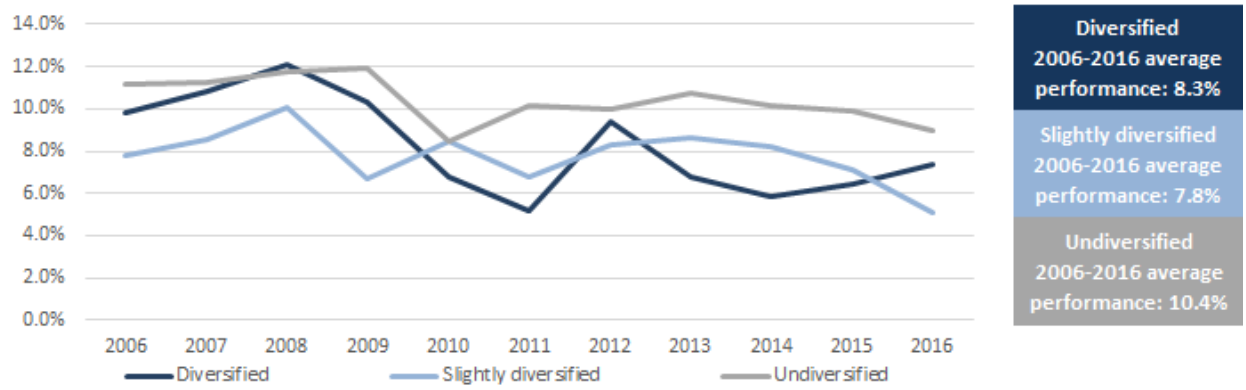
Europe region.

Chart XX: Total shareholder return performance in Europe



The above chart shows the total shareholder return performance for European companies. It shows, which supports the hypothesis, that European companies which diversify either little, or much, performs worse than undiversified companies. This is a clear indicator of investor preference towards single industry focused companies.

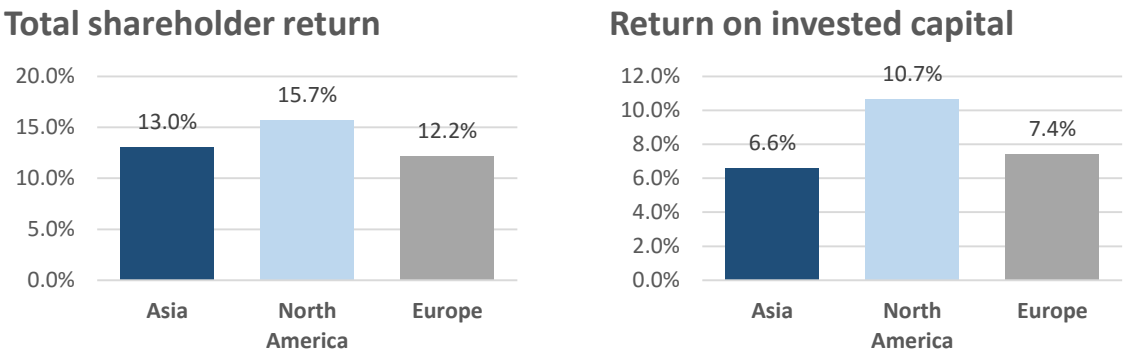
Chart XXI: Return on invested capital performance in Europe



The above chart shows that the lower total shareholder return could be a reflection of a lower performance of diversified companies, when compared to undiversified companies. The average return on invested capital was 8.3%, 7.8% and 10.4% for diversified companies, slightly diversified companies and undiversified companies, respectively. Contrary to the findings in the Asian region and North American region, the return on invested capital performance is reflected in the total shareholder return in Europe.

Region summary.

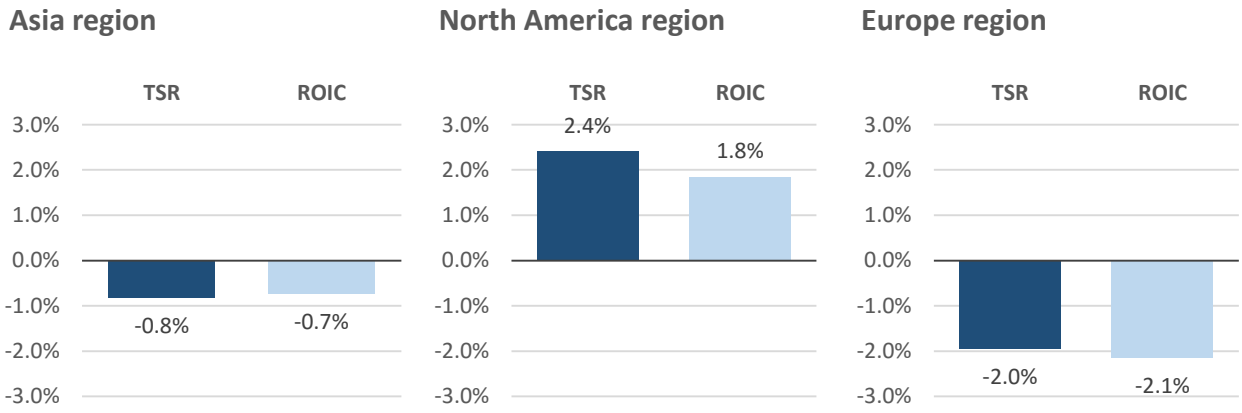
Chart XXII: Total shareholder return and return on invested capital for diversified companies



The North America region was the best performing region over the period in terms of both the total shareholder return and return on invested capital. On average the diversified companies

within North America performed 2.7%-points and 3.5%-points better than Asian and European companies, respectively, in terms of total shareholder return. When looking at economic performance the diversified North American companies were significantly outperforming the Asian companies with more than 4%-points and the European diversified companies with more than 3%-points.

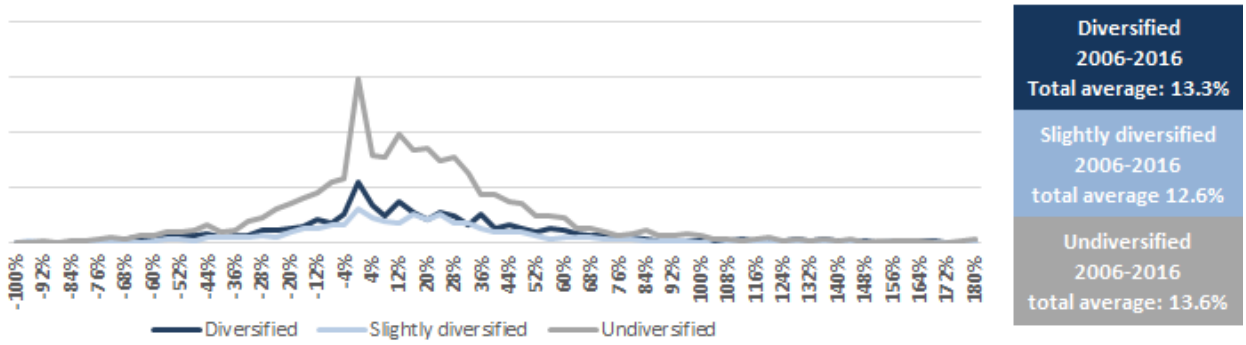
Chart XXIII: Regional TSR and ROIC average yearly performance difference between completely diversified companies and undiversified companies for 2006-2016



Above chart shows the average return difference between diversified companies and undiversified companies. As seen the North American region is the only region where conglomerates thrive and are performing return above undiversified companies. In both the Asian and European region, the lower return on invested capital by diversified companies are directly reflected in the total shareholder return, a clear indicator of the market power in the capital markets.

Return distributions. The total shareholder return distribution is shown in below histogram. It shows a very similar distribution centered around -4% to 0% returns. The mean is well above this, due to the many high performers of the categories. After all, companies are only able to have negative returns of -100%, whereas higher returns are endless.

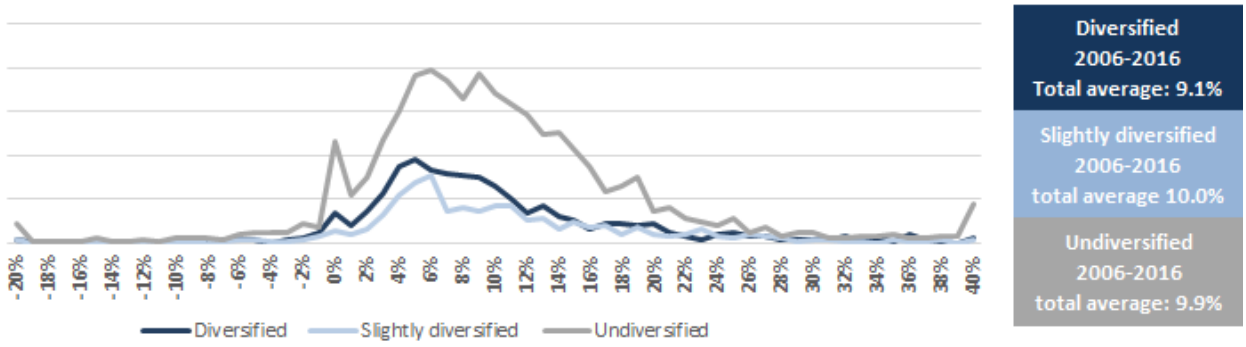
Chart XXIV: Total shareholder return distribution for 2006-2016



Please note that x-axis indicates the number of returns within that specific time interval. -100% is the total number of returns below -100% and 180% is the total number of returns above 180%.

When looking at all the yearly total shareholder returns for the period, undiversified companies are slightly outperforming the undiversified companies with 0.3 percentage point. Undiversified companies are outperforming slightly diversified companies with almost one percentage points, indicating that over the period, the market has had an opinion that companies should either be undiversified or completely diversified. Thus the market is negative towards companies operating in "only" two industries.

Chart XXV: Return on invested capital distribution for 2006-2016



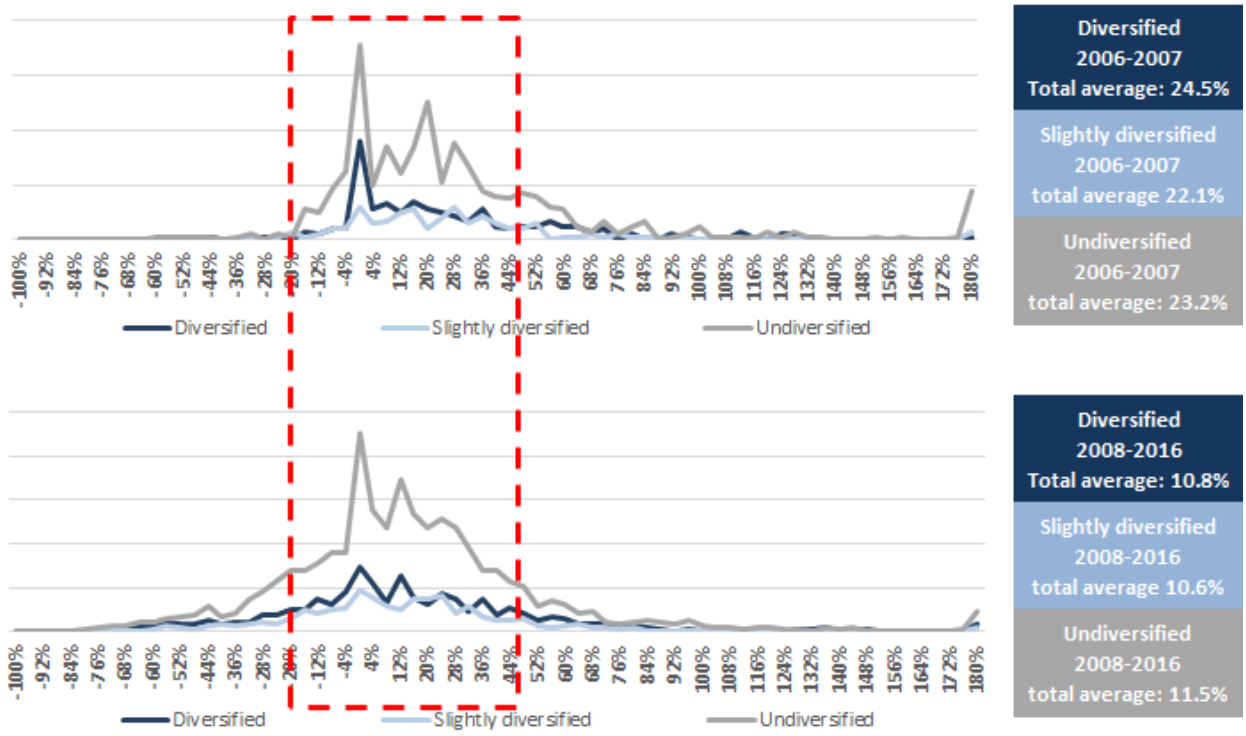
Please note that x-axis indicates the number of returns within that specific time interval. -20% is the total number of returns below -20% and 40% is the total number of returns above 40%.

When doing the same analysis for return on invested capital a difference picture emerges. Overall the companies, of all categories, has performed better in terms of distribution, but worse in terms of average. The returns are mainly centered around 0% to 20%, well above the 0% to -4% distribution of total shareholder return. Contrary to total shareholder return, the best performing group is slightly diversified, marginally better than undiversified companies and almost one percentage point better than diversified companies. One could thus argue that despite the market preference towards either single industry focus or complete diversification, higher economical value is created within a slightly diversified strategy.

Return distributions pre and post the financial crisis.

One of the fundamental pros of conglomerates is the stability and diversification aspect, allowing the company to whether crisis more optimally. Below chart illustrates the return distributions in the 2006-2007, the pre financial crisis period, and the return distribution in the 2008-2016 period, the post financial crisis period. The reason for including the financial crisis in the period fragmentation is the uncertainty of when the crisis hit the different industries. Some industries were hit end 2007 and some were hit 2008.

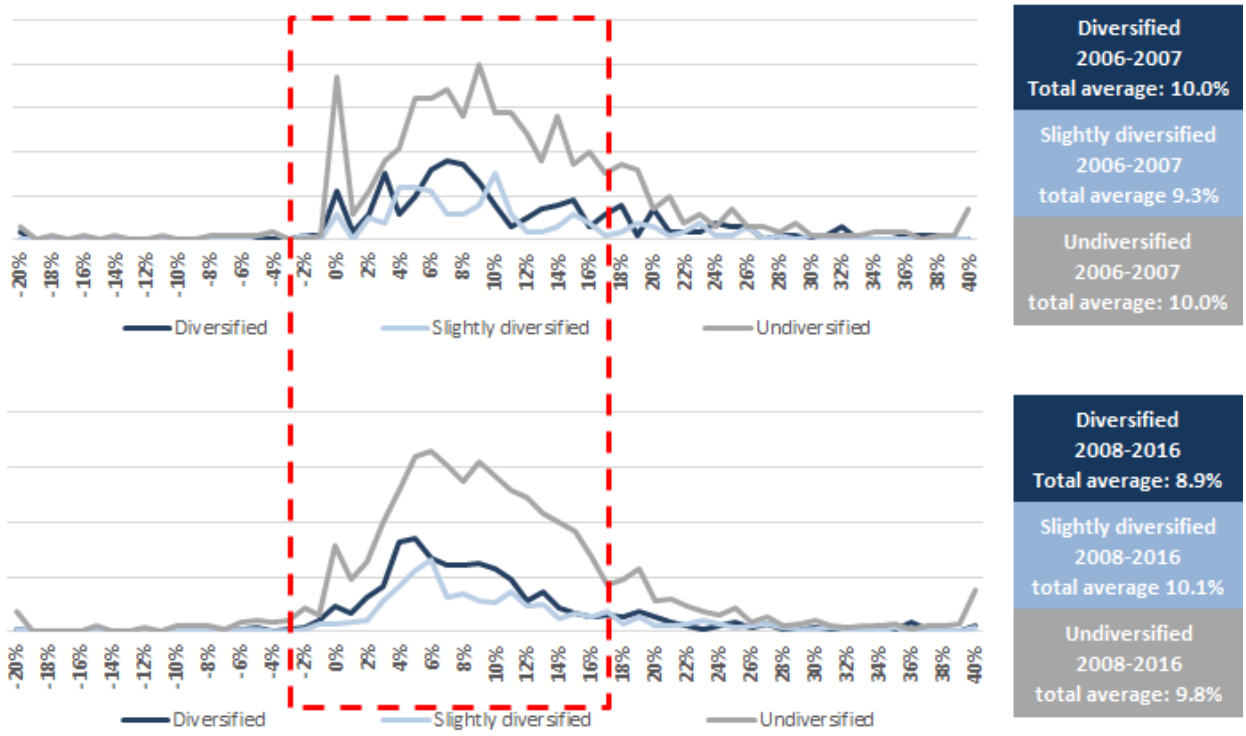
Chart XXVI: Total shareholder return distribution pre and post the financial crisis



Please note that x-axis indicates the number of returns within that specific time interval. -100% is the total number of returns below -100% and 180% is the total number of returns above 180%.

Above chart illustrates that despite a shifting of the average return of the categories, the distribution is very similar and centered around especially -12% to 30%. One observation is the shifting of average performance. The pre financial crisis had diversified company as the best performing category, with undiversified second. But, the post financial crisis period had undiversified companies as the best performing category and diversified companies as the second best. The average return is significantly lower in the post financial crisis period with more than ten percentage points, a clear indicator of the bubble in 2006-2007.

Chart XXVII: Return on invested capital distribution pre and post the financial crisis



Please note that x-axis indicates the number of returns within that specific time interval. -20% is the total number of returns below -20% and 40% is the total number of returns above 40%.

The return on invested capital distribution pre and post the financial crisis, similar to the total shareholder return findings, are very similar. Above chart shows that besides a spike of undiversified companies generating 0% return on invested capital in the pre financial crisis period, the majority of the returns are within 4% and 10% in both periods. The average returns of the two periods are very close, but with undiversified companies performing one percentage point better than diversified companies in the post financial crisis period, this, contrary to the hypothesis, indicates that undiversified companies performs better than diversified companies during financial crisis periods. An interesting observation is the slightly diversified companies shifting from the worst performer pre the financial crisis, to the best performer post the financial crisis, again an indicator that economical value creation is highest within two industries.

Concluding remarks on descriptive statistics. Based on the descriptive analysis part, there is no clear conclusion in relation to the conglomerate discount phenomenon. The hypothesis is that diversified companies performs worse than undiversified companies on total shareholder return and in financial performance. When assessing the overall performance, and not accounting for regional differences, there is a minimal difference in the performance of diversified and undiversified companies. Undiversified companies are performing slightly better than diversified companies on all the performance parameters, except for return on equity over the period, where diversified companies had an average of 16.1%, a little above the average of 15.8% for undiversified companies. When looking at the average difference between diversified and undiversified companies for the entire period, diversified companies were on average performing -0.3%-point worse in terms of total shareholder return and -0.8%-point worse in terms of return on invested capital. The findings show that diversified companies have on average taken on more leverage than undiversified companies, which to some degree can be explained by the higher investment capex required for conglomerates.

Contrary to the hypothesis in sub-question one the best performing region in terms of diversified companies was North America. The hypothesis stated that Asian conglomerates were performing better than North American and European conglomerates, in terms of total shareholder return. When looking at economic performance, the Asian conglomerates were the worst performing region with an average return on invested capital of only 6.6% in the period.

Hypothesis two stated that conglomerates were able to perform better during financial crisis', largely driven by the diversification aspect and internal capital markets. This hypothesis is not supported by the findings of the dataset, since the distributions are very similar when comparing the 2006-2007 period, the first period, to the 2008-2016 period, the second period. Diversified companies had an average total shareholder return of 25.5% in the first period, which dropped 13.7%-points in the second period, to 10.8% in average total shareholder return. Undiversified companies went from an average of 23.2% in the first period to a 11.5% average in the second period, "only" a 11.7%-point drop. The same result is found when analyzing the return

distributions for return on invested capital. Diversified companies had a 1.1%-point drop between the two periods, whereas undiversified companies only had a 0.2%-point drop.

The means of diversification is stability, and thus sub-question three is that the stock price, despite underperforming, tends to be less volatile for conglomerates. In this thesis the stock price movements are assumed, due to data limitations, to be reflected in the total shareholder return, the daily volatility of the stock price is thus not accounted for. Overall, contrary to the hypothesis, diversified companies have a higher standard deviation compared to undiversified companies. The standard deviation for diversified companies was for the overall average returns 0.22 and was for the undiversified companies 0.18. Especially the North American and European diversified companies had a higher standard deviation compared to undiversified companies.

The final sub-question hypothesis is that economic performance, despite lower, tends to be less volatile for conglomerates. When analyzing the data for return on invested capital, the finding is similar to what was found in sub-question three, that diversified companies have a slightly higher standard deviation of 0.016, relative to 0.012 of the undiversified companies. One significant finding is that the standard deviation for diversified companies, for each region, are all higher than the standard deviation of undiversified companies, for each region. This clearly indicates a rejection of the hypothesis, when accounting for the regional effect.

Chapter XIII: Model

The statistical approach to the conglomerate discount phenomenon uses panel data, also known as longitudinal or cross-sectional time series data. An extract of the dataset can be seen in the appendix. The following estimation methods has been applied:

- **Pooled OLS**, which is the simplest form of panel data analysis. Pooled OLS ignores the panel data structure and simply estimates the coefficients. The main assumptions in this model is that the individual-specific effect is uncorrelated with the coefficients. The model is given by:

$$y_{it} = \alpha + x'_{it}\beta + c_i + u_{it}$$

- **Random effects,** where it is assumed that the unobserved variables are uncorrelated/statistically independent with all the observed variables. That means that the company individual-specific effect is distributed independently of the regressors, thus included in the error term. Random effects allow to estimate effects for time invariant variables, which in this case is the diversification level of the company, and the region. The model is given by:

$$y_{it} = x'_{it}\beta + c_i + (\alpha_i + \varepsilon_{it)}$$

- **Between effects,** which is a model where only the cross sectional has been used and the time variation in the data has been discarded. This model averages out the time component of the panel data, using only the between variation across individuals, in this case the companies. The model is given by:

$$\bar{y}_l = a + x'_i\beta + (\alpha_i - a + \varepsilon_{i)}$$

- Furthermore, **fixed effects** and **first difference** was applied, but these results were inconsistent due to the region and diversification level being fixed and thus the time invariant regressors had zero within variation. These results are thus not

presented due to only market cap having influence, not of relevance to this study. The findings of these estimation models are shown in the appendix.

Total shareholder returns: Below figure illustrated the total shareholder return regression results for the chosen models.

Figure 7: Total shareholder return results

	Total shareholder return	Pooled OLS	Random Effect	Between Effect
Coefficients	Intercept	19.89	19.82	17.27
	ln(market cap)	-0.05	-0.04	0.00
	Slightly Diversified	-0.41	-0.39	0.21
	Diversified	-1.22	-1.22	-1.04
	American Company	-3.48	-3.47	-3.27
	European Company	-1.22	-1.24	-2.21
Standard Error	Intercept	1.37	1.34	1.45
	ln(market cap)	0.01	0.01	0.02
	Slightly Diversified	1.77	1.73	1.73
	Diversified	1.51	1.48	1.48
	American Company	1.52	1.49	1.49
	European Company	1.53	1.50	1.51
t-value	Intercept	14.50	14.73	11.88
	ln(market cap)	-3.86	-3.80	0.20
	Slightly Diversified	-0.23	-0.22	0.12
	Diversified	-0.80	-0.82	-0.70
	American Company	-2.28	-2.32	-2.19
	European Company	-0.79	-0.82	-1.45
Pr(>|t|)	Intercept	0.00	14.73	0.00
	ln(market cap)	0.00	-3.80	0.82
	Slightly Diversified	0.81	-0.22	0.90
	Diversified	0.41	-0.82	0.47
	American Company	0.02	0.02	0.02
	European Company	0.42	-0.82	0.14
Significance level	Intercept	***	***	***
	ln(market cap)	***	***	
	Slightly Diversified			
	Diversified			
	American Company	*	*	*
	European Company			

Please note the following significance levels which are applied: 0 = '***', 0.001 = '**', 0.01 = '*' 0.05, '.' = 0.1, ' ' = 1

The regression analysis show that for the pooled OLS -and random effects model, a negative relationship exists between the diversification level and the total shareholder return. The total shareholder returns in the pooled OLS and random effect model is estimated to be -0.41% and -0.39%-points lower, respectively, if the company diversified into two different industries. If the company diversified even further in too three industries or more, the total shareholder return is estimated to decrease even further with -1.22%-points for both models, relative to being single industry focused. The between effect model indicate that being slightly focused increases total shareholder return with 0.21%-points, whereas being completely diversified decreases the return with -1.04%-points. Contrary to expectation, there is a negative relationship between market size and return, for the pooled OLS and random effect model, and no effect for the between model. The estimates are low at -0.05%-points and -0.04%-points for the pooled OLS and random effect model, respectively, but nevertheless, the results are significant even at the lowest significance levels.

The result is the same for all the test when looking at the regional impact on the conglomerate discount. It shows that for the pooled OLS model American conglomerates generates a -3.48%-points lower return than companies with Asian origination. For the random effect and between effect models the result is slightly lower with -3.47%-points and -3.27%-points, respectively. European conglomerates, according to the data, is thriving slightly better than American conglomerates, but still performing worse than the American companies. The returns are -1.22%-points, -1.24%-points and -2.24%-points lower when compared to Asian conglomerates, for the pooled OLS, random effect and between effect models, respectively. Only the coefficients for the American companies are significant at the 0.05 level, whereas the European company coefficients are not significant at any level.

The above findings for total shareholder returns supports the problem statement, that diversified companies generate lower total shareholder return than undiversified companies. The difference is relatively small, but nevertheless existing for two of the models. The hypothesis that Asian companies are thriving better than European -and American companies are furthermore

supported by the findings. Especially American companies are generating lower returns than Asian companies according to the model.

In order to further test the problem statement of different returns for diversified and undiversified companies a t-test for the two samples can be conducted. Below figure illustrates the result.

Figure 8

t-Test: for diversified and undiversified overall total shareholder distributions		
	Diversified	*Undiversified*
Mean	0.15	0.16
Variance	0.19	0.17
Hypothesized Mean Difference	0.00	
df	1981	
t Stat	**-0.37**	
P(T<=t) one-tail	0.36	
t Critical one-tail	1.65	
P(T<=t) two-tail	0.71	
t Critical two-tail	1.96	

The t-test shows the result, given a 5% significance level and it shows that we fail to reject the 0-hypothesis, that the two distributions mean difference is equal to zero. Thus according to the t-test, there is no difference in the return distributions for diversified and undiversified companies.

A similar t-test can be conducted based on the returns for the diversified companies in Asia and diversified companies in the rest of the world.

Figure 9

t-Test: for diversified total shareholder distributions Asia compared to Europe & North America		
	Asia	*Europe & North America*
Mean	0.16	0.14
Variance	0.25	0.13
Hypothesized Mean Difference	0.00	
df	1017	
t Stat	**0.50**	
P(T<=t) one-tail	0.31	
t Critical one-tail	1.65	
P(T<=t) two-tail	0.61	
t Critical two-tail	1.96	

The t-test shows the result, given a 5% significance level, that we fail to reject the 0-hypothesis, that the two distributions mean difference is equal to zero. This means that the return distribution for conglomerates in Asia is not statistically different from the return distribution of Europe and North America combined.

Return on invested capital: Below figure illustrated the return on invested capital regression results for the chosen models.

	Return on invested capital	Pooled OLS	Random Effect	Between Effect
Coefficients	Intercept	10.01	9.37	10.79
	ln(market cap)	-0.03	-0.01	-0.04
	Slightly Diversified	-0.71	-0.55	-0.89
	Diversified	-0.56	-0.52	-0.62
	American Company	3.12	3.17	3.06
	European Company	2.00	1.75	2.29
Standard Error	Intercept	0.37	0.70	0.82
	ln(market cap)	0.00	0.00	0.00
	Slightly Diversified	0.48	0.97	0.98
	Diversified	0.41	0.83	0.83
	American Company	0.41	0.84	0.84
	European Company	0.41	0.84	0.85
t-value	Intercept	26.91	13.36	13.13
	ln(market cap)	-9.36	-4.97	-5.03
	Slightly Diversified	-1.48	-0.57	-0.91
	Diversified	-1.38	-0.62	-0.74
	American Company	7.54	3.76	3.63
	European Company	4.80	2.08	2.67
Pr(>|t|)	Intercept	0.00	0.00	0.00
	ln(market cap)	0.00	0.00	0.00
	Slightly Diversified	0.13	0.56	0.36
	Diversified	0.16	0.53	0.45
	American Company	0.00	0.00	0.00
	European Company	0.00	0.00	0.00
Significance level	Intercept	***	***	***
	ln(market cap)	***	***	***
	Slightly Diversified			
	Diversified			
	American Company	***	***	***
	European Company	***	*	**

Please note the following significance levels which are applied: 0 = '***', 0.001 = '**', 0.01 = '*' 0.05, '.' = 0.1, ' ' = 1

The regression analysis shows that for the pooled OLS and the random effects model, a negative relationship exists between the diversification level and the return on invested capital. The return

on invested capital is in the pooled OLS and random effect model estimated to be -0.71%-points and -0.55%-points lower, respectively, if the company diversified into two different industries. If the company diversified even further in to three industries or more, the return on invested capital is estimated to decrease with -0.56%-points for the pooled OLS model and -0.52%-points for the random effect model, relative to being single industry focused. The between effect model indicate that being slightly diversified will decrease return on invested capital with -0.89%-points, whereas being completely diversified decreases the return with -0.62%-points. The estimates indicate that diversified companies have lower financial performance, but if the company diversify, it is better for the company to completely diversify and operate within three or more industries. Similar to total shareholder return there is a negative relationship between market size and return. The estimates are low at -0.03%-points, -0.01%-points and -0.04%-points for the pooled OLS, random effect and between effect model, respectively. The results are significant even at the lowest level.

The result is the same for all the test when looking at the regional impact on the conglomerate discount. It shows that for the pooled OLS model American conglomerates generates 3.12%-points higher return than companies with Asian origination. For the Random effect and between effect models the result is 3.17%-points and 3.06%-points, respectively. European conglomerates, according to the data, is thriving slightly below American conglomerates, but still performing better than Asian conglomerates. The returns are 2.00%-points, 1.75%-points and 2.29%-points higher when compared to Asian conglomerates, for the pooled OLS, random effect and between effect models, respectively. The coefficients are significant at the lowest level for American companies in all models and for the pooled OLS model for European companies.

The above findings for return on invested capital supports the problem statement, that diversified companies generate lower return on invested capital than undiversified companies. The difference is relatively small, but nevertheless existing for all of the models.

In order to further test the problem statement of different returns for diversified and undiversified companies a t-test for the two samples can be conducted. Below figure illustrates the result.

Figure 10

t-Test: for diversified and undiversified overall return on invested capital		
	Diversified	*Undiversified*
Mean	0.09	0.10
Variance	0.01	0.02
Observations	1144	3047
Hypothesized Mean Difference	0.00	
df	3074	
t Stat	**-2.48**	
P(T<=t) one-tail	0.01	
t Critical one-tail	1.65	
P(T<=t) two-tail	0.01	
t Critical two-tail	1.96	

The t-test shows that the null-hypothesis is rejected, and thus the return on invested capital distributions are different for the diversified and undiversified distributions. Supporting the problem statement further.

A number of additional regressions were conducted, in order to test for other statistical relationship between returns, diversification level and region. These regressions included dummy variables specifying if the company was diversified or slightly diversified, as well as if it was operating within a specific region. The regressions did not produce any conclusive results for total shareholder return, and few results for return on invested capital. All the results are presented in the appendix.

Chapter XIV: Result & Conclusion

The problem statement raised in this thesis is that diversified companies performs worse than undiversified companies in terms of total shareholder return and financial performance.

In the descriptive analysis part there was no clear conclusion in relation to the conglomerate discount phenomenon, when only looking at performance. The result showed that undiversified companies had over the investigated period performed slightly better than diversified companies on all the performance parameters, except for return on equity, where diversified companies performed a little better. The findings of the models support the findings in the descriptive statistics chapter, despite a low significance level. The models indicate that a negative relationship exists between the diversification level and the total shareholder return. The total shareholder returns are in the model highest for undiversified companies, and lowest for diversified companies. The t-test performed on the performance distribution failed to reject the null-hypothesis, that the performance distributions for total shareholder returns are the same.

The descriptive statistics chapter concluded that the average return on invested capital was 0.8% lower for diversified companies in the period. This finding is supported by the model, finding that companies diversifying is performing worse than companies staying single industry focused. The model furthermore indicates that companies should pursue full diversification, given the desire to diversify, since slightly diversified companies are performing worse than completely diversified companies. Furthermore, the t-statistics for the return on invested capital distributions, for diversified -and undiversified companies, is rejected. This indicate that the return distribution for return on capital is better for undiversified companies.

One of the main hypothesis is that Asian conglomerates are performing better than North American and European conglomerates, in terms of total shareholder return. The Asian conglomerates have been performing better than European conglomerates, but worse than North American conglomerates, in terms of total shareholder return. In terms of return on

invested capital, the Asian diversified companies were the worst performers over the period - thus not supporting the theory presented in chapter 9. The t-statistics of the return distributions for conglomerates across the regions is rejected, and thus we fail to say that there is any statistical difference in the performance distribution between the regions. Even though the descriptive statistics and t-statistics does not support the hypothesis, the model does. It finds that the returns are highest for companies in Asia and lowest for companies in North America, quite contrary to the descriptive conclusion, indicating there might be omitted variables in the model.

One hypothesis not raised is the relationship between market size and return, but the model finds that an illiquidity premium exist for this dataset, since the size of the company has a negative impact on the total shareholder return. The impact is little, but significant on all levels. There are no findings supporting the hypothesis that conglomerates are able to perform better during financial crisis' - contrary to the theory presented in chapter 8. The distributions are very similar when comparing the 2006-2007 period, the first period, to the 2008-2016 period, the second period. In this thesis the stock price movements are assumed, due to data limitations, to be reflected in the total shareholder return, the daily volatility of the stock price is thus not accounted for. The thesis finds, given the dataset, that contrary to sub-question three, diversified companies have a higher standard deviation compared to undiversified companies. Especially the North American -and European diversified companies had a higher standard deviation compared to undiversified companies.

The final sub-question hypothesis is that economic performance, despite lower, tends to be less volatile for conglomerates. The findings are similar to what was found in sub-question three, that diversified companies is slightly more volatile with standard deviation of 0.016, relative to 0.012 of the undiversified companies. The finding is the same for all regions, where its higher for diversified companies compares to undiversified companies. This clearly indicates a rejection of the hypothesis, when accounting for the regional effect.

The findings in both the descriptive statistics chapter and the model indicates that companies should not pursue diversification and that the pros of the conglomerate strategy is outweighed by the cons. While there are many pros of diversifying, the investor preference towards diversifying themselves is reflected in all the findings for total shareholder return, not significantly, but though present. The return on invested capital distribution differences furthermore indicate that companies should build competences within one industry, in order to succeed and create value.

The analysis shows that companies being diversified should pursue divestment using one of the methods described in chapter 10. By doing so, the company is able to create not only higher stock market performance, but also overall financial performance.

This thesis argues that one of the main motivators for conglomerates is the type of ownership. Companies being family owned are more concerned about the absolute value of returns, and not on the relative value. That means companies will often pursue diversification if it makes sense in terms of absolute return value. Furthermore, the data availability has improved rapidly in recent years, making benchmarking and peer group assessment obtainable. Companies are able to measure the relative return much more efficient today, than they were in the conglomerate boom period. This factor has especially a significant impact on total shareholder return, where analysts are able to monitor and evaluate companies more closely than ever before.

Litterateur Overview

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Appendix

Appendix I: Overview of Board of Directors costs for the 19th largest companies in Denmark

Company		Board Compensation (DKK million)
MÆRSK	Maersk	19.0
Danske Bank	Danske Bank	9.3
novo nordisk	Novo Nordisk	9.2
Carlsberg	Carlsberg	8.2
Nordea	Nordea	7.8
Vestas	Vestas	7.4
PANDORA	Pandora	7.1
TDC	TDC	6.8
Tryg	Tryg	6.5
GN	GN Store Nord	6.1
novozymes	Novozymes	6.0
CHR. HANSEN	Chr. Hansen Holding	5.2
FLSmidth	FLSmidth & Co	5.0
Genmab	Genmab	5.0
Topdanmark Forsikring • Pension	Topdanmark	4.6
Coloplast	Coloplast	4.6
DSV	DSV	4.2
William Demant	William Demant	3.0
JYSKE BANK	Jyske Bank	2.8
Total:		**127.9**
Average		**6.7**

Appendix II: Performance Overview

TSR	Diversified	Diversified	Diversified	Diversified	Slightly diversified	Slightly diversified	Slightly diversified	Slightly diversified	Undiversified	Undiversified	Undiversified	Undiversified
Year	Asia	North America	Europe	Overall	Asia	North America	Europe	Overall	Asia	Americas	Europe	Overall
2006	31.0%	17.6%	32.7%	28.1%	30.1%	13.3%	35.2%	23.7%	33.3%	19.5%	27.0%	26.3%
2007	21.4%	13.0%	22.0%	21.0%	12.6%	21.1%	27.2%	20.6%	20.8%	13.3%	25.4%	20.0%
2008	27.1%	26.5%	9.2%	22.2%	25.7%	18.2%	13.1%	18.9%	20.8%	16.1%	15.2%	17.1%
2009	-46.9%	-37.7%	-37.7%	-42.2%	-35.0%	-30.2%	-35.7%	-33.0%	-40.7%	-28.6%	-32.9%	-33.8%
2010	49.3%	50.8%	36.8%	46.3%	41.3%	27.9%	32.5%	32.8%	43.2%	29.3%	39.4%	37.0%
2011	11.0%	26.3%	20.8%	17.4%	5.9%	17.8%	17.6%	14.6%	12.1%	15.4%	16.6%	14.9%
2012	-12.2%	2.6%	-12.4%	-8.6%	-11.7%	6.6%	-5.3%	-1.6%	-8.6%	6.7%	-4.6%	-2.0%
2013	23.2%	17.3%	15.8%	19.8%	14.9%	15.5%	14.9%	15.2%	19.0%	15.0%	22.7%	19.1%
2014	24.4%	33.8%	27.5%	27.6%	29.3%	40.5%	23.1%	32.7%	28.2%	38.5%	30.9%	32.6%
2015	12.7%	12.6%	11.1%	12.2%	35.0%	11.6%	5.4%	16.1%	22.7%	22.8%	7.9%	17.2%
2016	2.3%	3.5%	8.1%	4.1%	10.3%	-9.2%	2.0%	-0.9%	1.6%	-2.2%	7.8%	2.6%
Average	13.0%	15.7%	12.2%	13.4%	14.4%	12.1%	11.8%	12.6%	13.9%	13.2%	14.1%	13.7%
Std.dev	0.24	0.21	0.20	0.22	0.21	0.18	0.19	0.18	0.22	0.17	0.19	0.19

ROA	Diversified	Diversified	Diversified	Diversified	Slightly diversified	Slightly diversified	Slightly diversified	Slightly diversified	Undiversified	Undiversified	Undiversified	Undiversified
Year	Asia	North America	Europe	Overall	Asia	North America	Europe	Overall	Asia	Americas	Europe	Overall
2006	6.3%	7.8%	6.1%	6.9%	3.6%	7.7%	5.4%	6.0%	8.7%	5.9%	6.8%	7.1%
2007	7.5%	8.2%	6.9%	7.5%	4.1%	8.9%	5.8%	6.8%	8.0%	5.9%	7.2%	7.0%
2008	8.1%	9.6%	7.4%	8.3%	4.9%	9.2%	7.0%	7.5%	7.8%	7.6%	7.6%	7.7%
2009	8.2%	10.1%	6.9%	8.3%	5.1%	9.6%	5.5%	7.2%	8.5%	7.1%	7.8%	7.8%
2010	4.6%	6.0%	4.6%	4.9%	3.2%	7.9%	5.8%	6.1%	4.0%	5.1%	4.8%	4.7%
2011	5.4%	8.6%	3.2%	5.7%	3.9%	6.5%	4.3%	5.2%	5.5%	6.6%	5.5%	5.9%
2012	6.4%	10.2%	6.0%	7.2%	5.0%	8.5%	5.9%	6.9%	7.0%	7.2%	6.5%	6.9%
2013	6.6%	9.0%	4.6%	6.7%	4.5%	7.8%	6.0%	6.4%	6.3%	7.4%	6.8%	6.8%
2014	5.4%	8.3%	3.9%	5.7%	3.8%	8.5%	5.7%	6.4%	6.0%	6.2%	6.4%	6.2%
2015	5.8%	7.7%	4.0%	5.8%	4.6%	7.7%	5.0%	6.1%	6.9%	7.1%	6.3%	6.8%
2016	5.2%	7.3%	4.5%	5.6%	4.3%	7.4%	4.4%	5.7%	6.3%	7.6%	5.8%	6.5%
Average	6.4%	8.4%	5.3%	6.6%	4.3%	8.1%	5.5%	6.4%	6.8%	6.7%	6.5%	6.7%
Std.dev	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

ROIC	Diversified	Diversified	Diversified	Diversified	Slightly diversified	Slightly diversified	Slightly diversified	Slightly diversified	Undiversified	Undiversified	Undiversified	Undiversified
Year	Asia	North America	Europe	Overall	Asia	North America	Europe	Overall	Asia	Americas	Europe	Overall
2006	8.7%	10.9%	9.8%	9.5%	4.5%	11.4%	7.8%	8.6%	10.7%	8.3%	11.1%	10.1%
2007	9.8%	11.7%	10.9%	10.6%	5.7%	13.5%	8.6%	10.1%	10.1%	8.5%	11.3%	10.0%
2008	10.0%	14.4%	12.1%	11.6%	6.9%	14.8%	10.1%	11.4%	10.0%	13.5%	11.8%	11.8%
2009	10.1%	15.1%	10.3%	11.4%	7.0%	15.1%	6.7%	10.6%	10.8%	11.0%	11.9%	11.3%
2010	5.9%	7.8%	6.7%	6.6%	4.7%	15.1%	8.4%	10.5%	4.8%	7.3%	8.5%	7.0%
2011	7.1%	12.4%	5.2%	7.9%	5.0%	11.5%	6.8%	8.5%	7.1%	10.4%	10.2%	9.4%
2012	8.0%	14.3%	9.4%	9.9%	6.7%	14.7%	8.3%	10.8%	9.3%	11.0%	10.0%	10.1%
2013	8.3%	12.8%	6.8%	9.0%	6.0%	13.5%	8.7%	10.1%	8.3%	10.8%	10.7%	10.1%
2014	7.2%	11.6%	5.8%	8.0%	4.8%	14.8%	8.2%	10.3%	7.9%	9.1%	10.1%	9.1%
2015	7.4%	11.0%	6.5%	8.1%	6.3%	12.6%	7.1%	9.4%	9.5%	10.8%	9.9%	10.1%
2016	6.6%	10.7%	7.4%	7.8%	5.9%	13.7%	5.1%	9.2%	8.6%	11.5%	8.9%	9.7%
Average	8.1%	12.1%	8.3%	9.1%	5.8%	13.7%	7.8%	10.0%	8.8%	10.2%	10.4%	9.9%
Std.dev	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01

ROE	Diversified	Diversified	Diversified	Diversified	Slightly diversified	Slightly diversified	Slightly diversified	Slightly diversified	Undiversified	Undiversified	Undiversified	Undiversified
Year	Asia	North America	Europe	Overall	Asia	North America	Europe	Overall	Asia	Americas	Europe	Overall
2006	16.7%	15.4%	20.5%	17.4%	8.7%	20.7%	13.4%	15.5%	17.7%	14.5%	19.8%	17.4%
2007	18.7%	17.6%	24.2%	19.3%	10.8%	22.1%	15.2%	17.2%	15.6%	15.8%	21.3%	17.6%
2008	19.0%	24.2%	21.0%	20.8%	12.4%	23.7%	17.3%	18.9%	14.8%	15.1%	20.1%	16.9%
2009	19.3%	24.8%	19.7%	20.7%	11.7%	25.3%	15.6%	19.0%	17.1%	15.6%	20.2%	17.8%
2010	9.9%	14.9%	12.5%	11.8%	7.0%	23.3%	15.7%	16.8%	5.7%	10.7%	12.1%	9.8%
2011	12.2%	18.2%	9.3%	12.9%	9.1%	20.6%	10.8%	14.7%	10.8%	14.4%	14.6%	13.5%
2012	14.0%	20.7%	18.1%	16.7%	11.0%	28.3%	15.6%	20.2%	14.8%	18.0%	17.4%	16.8%
2013	14.9%	19.5%	14.3%	15.9%	10.2%	26.8%	15.2%	19.2%	12.7%	17.1%	17.7%	16.0%
2014	12.7%	20.1%	7.7%	13.3%	7.2%	25.9%	13.7%	17.4%	11.9%	14.7%	17.0%	14.7%
2015	14.4%	19.0%	7.9%	13.9%	10.7%	27.3%	10.8%	18.3%	14.1%	20.3%	16.7%	17.1%
2016	11.8%	18.0%	11.9%	13.4%	9.9%	27.7%	7.5%	17.4%	12.6%	20.9%	15.5%	16.5%
Average	14.9%	19.3%	15.2%	16.1%	9.8%	24.7%	13.7%	17.7%	13.4%	16.1%	17.5%	15.8%
Std.dev	0.03	0.03	0.06	0.03	0.02	0.03	0.03	0.02	0.03	0.03	0.03	0.02

Dividend Yield	Diversified	Diversified	Diversified	Diversified	Slightly diversified	Slightly diversified	Slightly diversified	Slightly diversified	Undiversified	Undiversified	Undiversified	Undiversified
Year	Asia	North America	Europe	Overall	Asia	North America	Europe	Overall	Asia	Americas	Europe	Overall
2006												
2007												
2008												
2009	3.4%	2.8%	5.2%	3.7%	2.3%	2.8%	4.9%	3.2%	2.9%	2.2%	4.2%	3.2%
2010	1.4%	1.9%	2.8%	1.9%	1.3%	2.3%	2.8%	2.2%	1.2%	1.8%	2.7%	2.0%
2011	1.6%	1.8%	2.8%	1.9%	1.5%	2.4%	2.6%	2.2%	1.5%	1.9%	2.8%	2.1%
2012	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%
2013	2.5%	2.4%	3.9%	2.9%	2.1%	2.6%	3.5%	2.7%	2.0%	2.2%	3.7%	2.7%
2014	2.4%	2.3%	2.9%	2.5%	1.9%	2.3%	3.5%	2.5%	2.0%	2.1%	3.1%	2.4%
2015	2.5%	2.4%	2.9%	2.6%	1.8%	2.4%	3.6%	2.6%	2.2%	2.1%	3.3%	2.6%
2016	2.8%	3.0%	3.7%	3.1%	1.9%	3.1%	3.5%	2.9%	2.8%	2.5%	3.7%	3.0%
Average	2.1%	2.1%	3.0%	2.3%	1.6%	2.2%	3.1%	2.3%	1.8%	1.9%	2.9%	2.3%
Std.dev	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Leverage	Diversified	Diversified	Diversified	Diversified	Slightly diversified	Slightly diversified	Slightly diversified	Slightly diversified	Undiversified	Undiversified	Undiversified	Undiversified
Year	Asia	North America	Europe	Overall	Asia	North America	Europe	Overall	Asia	Americas	Europe	Overall
2006	0.11	1.21	1.31	0.70	-0.98	1.20	0.40	0.39	0.55	0.17	0.58	0.44
2007	-0.17	0.46	-0.48	-0.09	0.21	1.10	0.83	0.80	-1.01	1.30	0.27	0.24
2008	0.37	0.68	0.59	0.50	0.68	-0.06	0.86	0.40	0.67	0.51	0.52	0.56
2009	0.38	0.33	0.42	0.38	0.79	-0.19	0.78	0.37	0.11	1.15	0.34	0.53
2010	0.44	-0.48	0.36	0.18	0.52	1.87	0.73	1.18	-0.09	0.14	0.70	0.29
2011	0.16	0.28	0.36	0.24	0.36	0.85	0.55	0.64	0.39	0.34	0.28	0.33
2012	0.62	0.67	0.67	0.64	-0.58	1.58	0.61	0.74	-0.10	0.24	0.70	0.31
2013	0.46	0.88	-0.12	0.41	1.28	0.95	0.72	0.97	0.16	0.58	0.88	0.57
2014	1.07	0.24	0.55	0.73	0.72	0.46	-0.65	0.22	-0.34	0.39	0.71	0.29
2015	0.22	1.28	0.37	0.68	0.41	1.07	-0.40	0.43	-0.07	0.56	0.36	0.30
2016	0.19	0.31	1.08	0.60	0.64	0.36	0.64	0.52	0.26	0.44	0.37	0.36
Average	0.35	0.59	0.52	0.45	0.37	0.84	0.46	0.61	0.05	0.53	0.52	0.38
Std.dev	0.30	0.48	0.49	0.25	0.61	0.61	0.49	0.28	0.44	0.36	0.20	0.11

Capex Ratio	Diversified	Diversified	Diversified	Diversified	Slightly diversified	Slightly diversified	Slightly diversified	Slightly diversified	Undiversified	Undiversified	Undiversified	Undiversified
Year	Asia	North America	Europe	Overall	Asia	North America	Europe	Overall	Asia	Americas	Europe	Overall
2006	5.6%	4.2%	4.8%	5.0%	6.8%	4.8%	7.0%	6.0%	7.9%	5.9%	4.5%	5.9%
2007	5.9%	4.9%	5.2%	5.5%	7.3%	5.5%	6.9%	6.3%	10.4%	6.1%	4.6%	6.8%
2008	6.6%	4.8%	5.3%	5.8%	7.9%	5.9%	7.0%	6.7%	8.5%	7.0%	5.0%	6.7%
2009	7.0%	5.0%	5.1%	6.0%	7.6%	5.7%	6.9%	6.5%	8.3%	7.0%	5.2%	6.7%
2010	6.8%	5.2%	5.5%	6.1%	7.8%	6.4%	7.1%	7.0%	8.4%	7.0%	5.3%	6.7%
2011	6.0%	4.0%	3.9%	4.9%	6.0%	4.7%	6.2%	5.5%	6.9%	5.4%	4.3%	5.4%
2012	5.7%	4.6%	3.7%	4.9%	6.2%	4.9%	6.0%	5.5%	6.6%	5.7%	4.4%	5.5%
2013	5.6%	5.0%	4.3%	5.1%	5.9%	5.7%	6.0%	5.9%	6.6%	6.0%	4.7%	5.7%
2014	5.7%	5.2%	4.6%	5.3%	6.1%	5.5%	5.8%	5.8%	6.4%	5.9%	4.8%	5.7%
2015	5.5%	5.3%	4.2%	5.1%	5.8%	5.0%	5.5%	5.3%	6.3%	5.6%	4.8%	5.5%
2016	5.1%	5.4%	4.3%	5.0%	5.6%	5.3%	5.4%	5.4%	6.2%	5.9%	4.7%	5.6%
Average	6.0%	4.9%	4.6%	5.3%	6.7%	5.4%	6.4%	6.0%	7.5%	6.1%	4.7%	6.0%
Std.dev	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01

Appendix III: SIC Code overview

SIC Code	Business Area
0100-0999	Agriculture, Forestry and Fishing
1000-1499	Mining
1500-1799	Construction
2000-3999	Manufacturing
4000-4999	Transportation, Communications, Electric, Gas and Sanitary service
5000-5199	Wholesale Trade
5200-5999	Retail Trade
6000-6799	Finance, Insurance and Real Estate
7000-8999	Services
9100-9729	Public Administration
9900-9999	Non-classifiable

Appendix IV: Panel Data Extract

Observation Number	Year	YTD TSR (%)	ROA (%)	ROE (%)	ROIC (%)	Ln (M.Cap)	Undiv.	Div.	American Company	European company
1	2016	-3.02	20.45	46.25	29.05	13.3	0	1	1	0
1	2015	40.62	18.01	33.61	26.91	13.4	0	1	1	0
1	2014	8.06	19.34	30.64	26.36	13.1	0	1	1	0
1	2013	32.59	28.54	42.84	35.30	13.1	0	1	1	0
1	2012	25.56	27.06	41.67	33.83	12.8	0	1	1	0
1	2011	53.07	22.84	35.28	29.32	12.6	0	1	1	0
1	2010	146.90	19.68	30.54	26.03	12.2	0	1	1	0
1	2009	-56.91	19.89	33.23	27.44	11.2	0	1	1	0
1	2008	133.47	16.43	28.51	24.05	12.1	0	1	1	0
1	2007	18.01	13.85	22.85	19.92	11.2	0	1	1	0
1	2006	123.26	13.57	21.24	17.88	11.0	0	1	1	0
2	2016	22.70	7.03	14.36	10.57	13.0	0	1	1	0
…	…	…	…	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…	…	…	…
450	2013	9.94	2.82	5.36	3.09	8.4	1	0	0	1
450	2012	-33.28	4.09	8.20	5.13	8.4	1	0	0	1
450	2011	66.86	1.23	2.66	1.56	8.8	1	0	0	1
450	2010	0.02	-1.30	-2.78	-1.65	8.4	1	0	0	1
450	2009	-30.56	0.57	1.21	0.75	8.5	1	0	0	1
450	2008	-24.84	2.25	4.66	3.03	8.9	1	0	0	1
450	2007	19.90	1.66	3.53	2.25	9.2	1	0	0	1
450	2006	5.91	5.68	12.60	7.57	9.1	1	0	0	1

Please note that the panel data set is based on the full extended dataset, where the number of SIC codes which the company is operating within is available.

Appendix V: R code

```
#Data preparation

data = read.csv("R dataset.csv", header = TRUE)

attach(data)

y1 <- cbind(YTD.TSR)

y2 <- cbind(ROIC)

x1 <- cbind(Ln.M.Cap., Slightly.Diversified, Diversified, American.Company, European.company)

#Set data as paneldata

pdata <- plm.data(data, index=c("Company.number","Year"))

#Data analysis for TSR

Pooling1 <- plm(y1~x1, data=pdata, model="pooling", na.omit=TRUE)

summary(Pooling1)

Fixed1 <- plm(y1~x1, data=pdata, model="within", na.omit=TRUE)

summary(Fixed1)

Random1 <- plm(y1~x1, data=pdata, model="random", na.omit=TRUE)

summary(Random1)

Between1 <- plm(y1~x1, data=pdata, model="between", na.omit=TRUE)

summary(Between1)

Firstdifference1 <- plm(y1~x1, data=pdata, model="fd", na.omit=TRUE)

summary(Firstdifference1)

#Data analysis for ROIC

Pooling2 <- plm(y2~x1, data=pdata, model="pooling", na.omit=TRUE)
```

```
summary(Pooling2)

Fixed2 <- plm(y2~x1, data=pdata, model="within", na.omit=TRUE)

summary(Fixed2)

Random2 <- plm(y2~x1, data=pdata, model="random", na.omit=TRUE)

summary(Random2)

Between2 <- plm(y2~x1, data=pdata, model="between", na.omit=TRUE)

summary(Between2)

Firstdifference2 <- plm(y2~x1, data=pdata, model="fd", na.omit=TRUE)

summary(Firstdifference2)

#Testing of data

plmtest(Pooling1)

plmtest(Pooling2)
```

Extended model regression code

```
#Data preparation

data = read.csv("R dataset.v2.csv", header = TRUE)

attach(data)

y1 <- cbind(YTD.TSR)

y2 <- cbind(ROIC)

x1 <- cbind(Ln.M.Cap., Slightly.div, Diversified, American.Company, European.company, Div.American,
Div.European, SD.American, SD.European)

#Set data as paneldata

pdata <- plm.data(data, index=c("Company.number","Year"))

#Data analysis for TSR

Pooling1 <- plm(y1~x1, data=pdata, model="pooling", na.omit=TRUE)
```

```
summary(Pooling1)

Fixed1 <- plm(y1~x1, data=pdata, model="within", na.omit=TRUE)

summary(Fixed1)

Random1 <- plm(y1~x1, data=pdata, model="random", na.omit=TRUE)

summary(Random1)

Between1 <- plm(y1~x1, data=pdata, model="between", na.omit=TRUE)

summary(Between1)

Firstdifference1 <- plm(y1~x1, data=pdata, model="fd", na.omit=TRUE)

summary(Firstdifference1)

#Data analysis for ROIC

Pooling2 <- plm(y2~x1, data=pdata, model="pooling", na.omit=TRUE)

summary(Pooling2)

Fixed2 <- plm(y2~x1, data=pdata, model="within", na.omit=TRUE)

summary(Fixed2)

Random2 <- plm(y2~x1, data=pdata, model="random", na.omit=TRUE)

summary(Random2)

Between2 <- plm(y2~x1, data=pdata, model="between", na.omit=TRUE)

summary(Between2)

Firstdifference2 <- plm(y2~x1, data=pdata, model="fd", na.omit=TRUE)

summary(Firstdifference2)
```

Appendix VI: Full regression overview

Total shareholder return pooled OLS:

```
plm(formula = y1 ~ x1, data = pdata, model = "pooling", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Residuals :
   Min. 1st Qu.  Median 3rd Qu.    Max.
-113.00  -21.00   -5.05   15.20  488.00

Coefficients :
                        Estimate Std. Error t-value  Pr(>|t|)
(Intercept)            19.891434   1.371480 14.5036 < 2.2e-16 ***
x1Ln.M.Cap.            -0.050835   0.013138 -3.8694 0.0001105 ***
x1Slightly.Diversified -0.412025   1.771294 -0.2326 0.8160719
x1Diversified          -1.227936   1.516228 -0.8099 0.4180582
x1American.Company     -3.480871   1.525030 -2.2825 0.0225026 *
x1European.company     -1.220044   1.536679 -0.7939 0.4272635
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    9178700
Residual Sum of Squares: 9141800
R-Squared:      0.0040195
Adj. R-Squared: 0.0040146
F-statistic: 3.98163 on 5 and 4933 DF, p-value: 0.0013196
```

Total shareholder return fixed effect:

```
plm(formula = y1 ~ x1, data = pdata, model = "within", na.omit = TRUE)


Balanced Panel: n=450, T=11, N=4950

Residuals :
   Min. 1st Qu.  Median 3rd Qu.    Max.
-268.00  -20.10   -1.43   16.20  449.00

Coefficients :
             Estimate Std. Error t-value  Pr(>|t|)
x1Ln.M.Cap. -0.116004   0.019481 -5.9548 2.803e-09 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    8385500
Residual Sum of Squares: 8319800
R-Squared:      0.0078373
Adj. R-Squared: 0.0071232
F-statistic: 35.4595 on 1 and 4489 DF, p-value: 2.8028e-09
```

Total shareholder return random effect:

```
plm(formula = y1 ~ x1, data = pdata, model = "random", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Effects:
                  var  std.dev  share
idiosyncratic 1855.023   43.070  1.004
individual      -7.764       NA -0.004
theta:  -0.02385

Residuals :
   Min. 1st Qu.  Median 3rd Qu.    Max.
-110.00  -21.00   -5.09   15.20  492.00

Coefficients :
                        Estimate Std. Error t-value  Pr(>|t|)
(Intercept)            19.824478   1.345402 14.7350 < 2.2e-16 ***
x1Ln.M.Cap.            -0.049441   0.012996 -3.8044 0.0001438 ***
x1Slightly.Diversified -0.395970   1.733828 -0.2284 0.8193611
x1Diversified          -1.223366   1.484053 -0.8243 0.4097855
x1American.Company     -3.475687   1.492672 -2.3285 0.0199257 *
x1European.company     -1.245473   1.504449 -0.8279 0.4077900
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    9216900
Residual Sum of Squares: 9180400
R-Squared:      0.0039628
Adj. R-Squared: 0.003958
F-statistic: 3.92523 on 5 and 4933 DF, p-value: 0.0014895
```

Total shareholder return between effects

```
plm(formula = y1 ~ x1, data = pdata, model = "between", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Residuals :
   Min. 1st Qu.  Median 3rd Qu.    Max.
 -24.40   -6.39   -1.99    3.53  151.00

Coefficients :
                        Estimate Std. Error t-value Pr(>|t|)
(Intercept)            17.2795781  1.4537648 11.8861  < 2e-16 ***
x1Ln.M.Cap.             0.0035393  0.0173876  0.2036  0.83880
x1Slightly.Diversified  0.2142808  1.7361587  0.1234  0.90183
x1Diversified          -1.0496710  1.4821461 -0.7082  0.47919
x1American.Company     -3.2786671  1.4908862 -2.1991  0.02838 *
x1European.company     -2.2119624  1.5167934 -1.4583  0.14546
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    72106
Residual Sum of Squares: 71267
R-Squared:      0.011625
Adj. R-Squared: 0.01147
F-statistic: 1.0421 on 5 and 443 DF, p-value: 0.39224
```

Total shareholder return first difference effect

```
plm(formula = y1 ~ x1, data = pdata, model = "fd", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Residuals :
    Min.  1st Qu.   Median  3rd Qu.     Max.
-487.000  -23.500    0.467   28.000  605.000

Coefficients :
             Estimate Std. Error t-value  Pr(>|t|)
(intercept)  3.213162   0.924014  3.4774 0.0005111 ***
x1Ln.M.Cap. -0.251068   0.027873 -9.0077 < 2.2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    17414000
Residual Sum of Squares: 17105000
R-Squared:      0.017758
Adj. R-Squared: 0.01775
F-statistic: 81.1378 on 1 and 4488 DF, p-value: < 2.22e-16
```

Return on invested capital pooled OLS:

```
plm(formula = y2 ~ x1, data = pdata, model = "pooling", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Residuals :
   Min. 1st Qu.  Median 3rd Qu.    Max.
-204.00   -5.12   -1.49    3.63  221.00

Coefficients :
                         Estimate Std. Error t-value  Pr(>|t|)
(Intercept)            10.0193194  0.3723159 26.9108 < 2.2e-16 ***
x1Ln.M.Cap.            -0.0333958  0.0035665 -9.3638 < 2.2e-16 ***
x1Slightly.Diversified -0.7124425  0.4808534 -1.4816    0.1385
x1Diversified          -0.5695358  0.4116105 -1.3837    0.1665
x1American.Company      3.1233226  0.4139999  7.5443 5.384e-14 ***
x1European.company      2.0038198  0.4171624  4.8035 1.606e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Total Sum of Squares:    694840
Residual Sum of Squares: 673710
R-Squared:      0.030413
Adj. R-Squared: 0.030376
F-statistic: 30.9467 on 5 and 4933 DF, p-value: < 2.22e-16
```

Return on invested capital fixed effect:

```
plm(formula = y2 ~ x1, data = pdata, model = "within", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Residuals :
     Min.   1st Qu.    Median   3rd Qu.      Max.
-183.0000   -2.2500    0.0263    2.4800  193.0000

Coefficients :
              Estimate Std. Error t-value Pr(>|t|)
x1Ln.M.Cap. -0.0140418  0.0043755 -3.2092 0.001341 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Total Sum of Squares:    420680
Residual Sum of Squares: 419720
R-Squared:      0.002289
Adj. R-Squared: 0.0020804
F-statistic: 10.2988 on 1 and 4489 DF, p-value: 0.0013405
```

Return on invested capital random effect:

```
plm(formula = y2 ~ x1, data = pdata, model = "random", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Effects:
                 var std.dev share
idiosyncratic 93.582   9.674 0.686
individual    42.927   6.552 0.314
theta:  0.5933

Residuals :
   Min. 1st Qu.  Median 3rd Qu.    Max.
-192.00   -3.04   -0.64    2.63  204.00

Coefficients :
                          Estimate Std. Error t-value  Pr(>|t|)
(Intercept)             9.3717879  0.7001111 13.3861 < 2.2e-16 ***
x1Ln.M.Cap.            -0.0199154  0.0040014 -4.9772 6.672e-07 ***
x1Slightly.Diversified -0.5571686  0.9768021 -0.5704 0.5684319
x1Diversified          -0.5253402  0.8380405 -0.6269 0.5307752
x1American.Company      3.1734530  0.8428409  3.7652 0.0001684 ***
x1European.company      1.7579034  0.8423553  2.0869 0.0369492 *
```

```
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    466030
Residual Sum of Squares: 462190
R-Squared:      0.0082306
Adj. R-Squared: 0.0082206
F-statistic: 8.18772 on 5 and 4933 DF, p-value: 1.0384e-07
```

Return on invested capital between effects

```
plm(formula = y2 ~ x1, data = pdata, model = "between", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Residuals :
   Min. 1st Qu.  Median 3rd Qu.    Max.
 -20.40   -4.17   -1.17    2.50   47.00

Coefficients :
                         Estimate Std. Error t-value  Pr(>|t|)
(Intercept)            10.7949890  0.8220109 13.1324 < 2.2e-16 ***
x1Ln.M.Cap.            -0.0495438  0.0098316 -5.0393  6.82e-07 ***
x1Slightly.Diversified -0.8984430  0.9816866 -0.9152  0.360583
x1Diversified          -0.6224770  0.8380587 -0.7428  0.458020
x1American.Company      3.0632721  0.8430007  3.6338  0.000312 ***
x1European.company      2.2983997  0.8576496  2.6799  0.007639 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    24924
Residual Sum of Squares: 22785
R-Squared:      0.085806
Adj. R-Squared: 0.084659
F-statistic: 8.31599 on 5 and 443 DF, p-value: 1.5818e-07
```

Return on invested capital first difference effect

```
plm(formula = y2 ~ x1, data = pdata, model = "fd", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Residuals :
    Min.  1st Qu.   Median  3rd Qu.     Max.
-369.000   -2.020   -0.052    1.850  223.000

Coefficients :
               Estimate  Std. Error t-value Pr(>|t|)
(intercept)  0.05200998  0.18892677  0.2753   0.7831
x1Ln.M.Cap. -0.00049822  0.00569896 -0.0874   0.9303
```

```
Total Sum of Squares:    715080
Residual Sum of Squares: 715080
R-Squared:      1.7029e-06
Adj. R-Squared: 1.7022e-06
F-statistic: 0.00764279 on 1 and 4488 DF, p-value: 0.93034
```

Total shareholder return test

```
Lagrange Multiplier Test - (Honda)

data:  y1 ~ x1
normal = -0.56392, p-value = 0.5728
alternative hypothesis: significant effects
```

Return on invested capital test

```
Lagrange Multiplier Test - (Honda)

data:  y2 ~ x1
normal = 48.986, p-value < 2.2e-16
alternative hypothesis: significant effects
```

Appendix VII: Additional regressions

Extended pooled OLS model total shareholder return

```
neway (individual) effect Pooling Model

Call:
plm(formula = y1 ~ x1, data = pdata, model = "pooling", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Residuals :
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
-1.90e+17 -7.40e+15 -3.19e+15  3.00e+00  5.03e+15  3.73e+19

Coefficients :
                    Estimate  Std. Error t-value Pr(>|t|)
(Intercept)        8.0865e+15  1.9090e+16  0.4236 0.671871
x1Ln.M.Cap.       -2.0253e+14  1.6955e+14 -1.1945 0.232353
x1Slightly.div     5.0143e+14  4.1861e+16  0.0120 0.990443
x1Diversified     -2.8774e+13  2.8715e+16 -0.0010 0.999201
x1American.Company 2.1407e+14  2.4477e+16  0.0087 0.993022
x1European.company 4.5790e+15  2.4112e+16  0.1899 0.849393
x1Div.American    -6.2254e+14  4.5802e+16 -0.0136 0.989156
x1Div.European    -5.7380e+14  4.5041e+16 -0.0127 0.989836
x1SD.American     -3.3421e+15  5.3600e+16 -0.0624 0.950284
x1SD.European      1.7726e+17  5.7981e+16  3.0573 0.002246 **
```

```
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    1.406e+39
Residual Sum of Squares: 1.3991e+39
R-Squared:      0.0048712
Adj. R-Squared: 0.0048613
F-statistic: 2.68085 on 9 and 4929 DF, p-value: 0.0041676
```

Extended random effect model total shareholder return

```
Oneway (individual) effect Random Effect Model
   (Swamy-Arora's transformation)

Call:
plm(formula = y1 ~ x1, data = pdata, model = "random", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Effects:
                     var    std.dev  share
idiosyncratic  2.850e+35  5.339e+17  1.003
individual    -8.341e+32         NA -0.003
theta:  -0.01649

Residuals :
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
-1.93e+17 -7.25e+15 -3.17e+15  1.50e+01  4.93e+15  3.74e+19

Coefficients :
                       Estimate  Std. Error t-value Pr(>|t|)
(Intercept)         7.9099e+15  1.8824e+16  0.4202  0.67435
x1Ln.M.Cap.        -1.9810e+14  1.6821e+14 -1.1777  0.23897
x1Slightly.div      4.9048e+14  4.1241e+16  0.0119  0.99051
x1Diversified      -2.8145e+13  2.8290e+16 -0.0010  0.99921
x1American.Company  2.0940e+14  2.4114e+16  0.0087  0.99307
x1European.company  4.4790e+15  2.3759e+16  0.1885  0.85048
x1Div.American     -6.0895e+14  4.5124e+16 -0.0135  0.98923
x1Div.European     -5.6127e+14  4.4374e+16 -0.0126  0.98991
x1SD.American      -3.2691e+15  5.2807e+16 -0.0619  0.95064
x1SD.European       1.7731e+17  5.7122e+16  3.1040  0.00192 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    1.4102e+39
Residual Sum of Squares: 1.4032e+39
R-Squared:      0.0050013
Adj. R-Squared: 0.0049912
F-statistic: 2.75282 on 9 and 4929 DF, p-value: 0.0032837
```

Extended between effect model total shareholder return

```
Oneway (individual) effect Between Model
```

```
Call:
plm(formula = y1 ~ x1, data = pdata, model = "between", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Residuals :
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
-1.82e+17 -8.95e+14  8.77e+13  0.00e+00  8.75e+14  3.23e+18

Coefficients :
                       Estimate  Std. Error t-value Pr(>|t|)
(Intercept)        -1.4149e+15  1.9694e+16 -0.0718 0.942761
x1Ln.M.Cap.         3.5435e+13  2.2155e+14  0.1599 0.872998
x1Slightly.div     -8.7733e+13  4.1270e+16 -0.0021 0.998305
x1Diversified       5.0344e+12  2.8308e+16  0.0002 0.999858
x1American.Company -3.7455e+13  2.4130e+16 -0.0016 0.998762
x1European.company -8.0117e+14  2.3997e+16 -0.0334 0.973382
x1Div.American      1.0892e+14  4.5155e+16  0.0024 0.998076
x1Div.European      1.0040e+14  4.4404e+16  0.0023 0.998197
x1SD.American       5.8475e+14  5.2895e+16  0.0111 0.991185
x1SD.European       1.7980e+17  5.7180e+16  3.1445 0.001776 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    1.1596e+37
Residual Sum of Squares: 1.101e+37
R-Squared:      0.050572
Adj. R-Squared: 0.049446
F-statistic: 2.5982 on 9 and 439 DF, p-value: 0.0062805
```

Extended pooled OLS model return on invested capital

```
Oneway (individual) effect Pooling Model

Call:
plm(formula = y2 ~ x1, data = pdata, model = "pooling", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Residuals :
   Min. 1st Qu.  Median 3rd Qu.    Max.
-2.0400 -0.0490 -0.0131  0.0347  2.2300

Coefficients :
                       Estimate  Std. Error t-value  Pr(>|t|)
(Intercept)         9.8410e-02  4.1888e-03 23.4935 < 2.2e-16 ***
x1Ln.M.Cap.        -2.5307e-04  3.7205e-05 -6.8021 1.154e-11 ***
x1Slightly.div     -3.0052e-02  9.1856e-03 -3.2717 0.0010764 **
x1Diversified      -7.4678e-03  6.3009e-03 -1.1852 0.2360016
x1American.Company  1.8128e-02  5.3709e-03  3.3753 0.0007431 ***
x1European.company  2.1464e-02  5.2909e-03  4.0567 5.054e-05 ***
```

```
x1Div.American      2.1012e-02  1.0050e-02  2.0907 0.0366039 *
x1Div.European     -1.4975e-02  9.8832e-03 -1.5152 0.1297757
x1SD.American       5.7111e-02  1.1761e-02  4.8558 1.236e-06 ***
x1SD.European       2.3002e-03  1.2723e-02  0.1808 0.8565369
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    69.49
Residual Sum of Squares: 67.367
R-Squared:      0.030561
Adj. R-Squared: 0.030499
F-statistic: 17.2648 on 9 and 4929 DF, p-value: < 2.22e-16
```

Extended random effect model return on invested capital

```
Oneway (individual) effect Random Effect Model
   (Swamy-Arora's transformation)

Call:
plm(formula = y2 ~ x1, data = pdata, model = "random", na.omit = TRUE)

Balanced Panel: n=450, T=11, N=4950

Effects:
                  var  std.dev share
idiosyncratic 0.009390 0.096902 0.686
individual    0.004305 0.065610 0.314
theta:  0.5932

Residuals :
    Min.  1st Qu.   Median  3rd Qu.     Max.
-1.92000 -0.03000 -0.00551  0.02570  2.06000

Coefficients :
                     Estimate  Std. Error t-value Pr(>|t|)
(Intercept)         9.2235e-02  8.1622e-03 11.3003  < 2e-16 ***
x1Ln.M.Cap.        -9.8423e-05  4.2578e-05 -2.3116  0.02084 *
x1Slightly.div     -3.0435e-02  1.8723e-02 -1.6256  0.10410
x1Diversified      -7.4458e-03  1.2843e-02 -0.5797  0.56212
x1American.Company  1.7965e-02  1.0947e-02  1.6410  0.10086
x1European.company  1.7967e-02  1.0691e-02  1.6806  0.09290 .
x1Div.American      2.1488e-02  2.0485e-02  1.0490  0.29425
x1Div.European     -1.4537e-02  2.0144e-02 -0.7217  0.47054
x1SD.American       5.9663e-02  2.3951e-02  2.4910  0.01277 *
x1SD.European       3.9531e-03  2.5924e-02  0.1525  0.87881
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    46.616
Residual Sum of Squares: 46.318
R-Squared:      0.0063714
Adj. R-Squared: 0.0063585
```

```
F-statistic: 3.5118 on 9 and 4929 DF, p-value: 0.00024024
```

Extended between effect model return on invested capital

```
Oneway (individual) effect Between Model

Call:
plm(formula = y2 ~ x1, data = pdata, model = "between", na.omit = TRUE)

Balanced Panel: n=449, T=11, N=4939

Residuals :
    Min.  1st Qu.   Median  3rd Qu.     Max.
-0.19500 -0.04080 -0.00956  0.02680  0.46800

Coefficients :
                      Estimate  Std. Error t-value  Pr(>|t|)
(Intercept)         0.10523383  0.00893180 11.7819 < 2.2e-16 ***
x1Ln.M.Cap.        -0.00042398  0.00010048 -4.2197 2.974e-05 ***
x1Slightly.div     -0.02962931  0.01871670 -1.5830   0.11413
x1Diversified      -0.00749207  0.01283843 -0.5836   0.55981
x1American.Company  0.01830888  0.01094358  1.6730   0.09503 .
x1European.company  0.02532776  0.01088310  2.3273   0.02041 *
x1Div.American      0.02048706  0.02047886  1.0004   0.31767
x1Div.European     -0.01545968  0.02013832 -0.7677   0.44309
x1SD.American       0.05429072  0.02398888  2.2632   0.02411 *
x1SD.European       0.00047353  0.02593247  0.0183   0.98544
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    2.4919
Residual Sum of Squares: 2.2645
R-Squared:      0.091264
Adj. R-Squared: 0.089231
F-statistic: 4.89873 on 9 and 439 DF, p-value: 2.8431e-06
```


GENERAL ELECTRIC