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# Foundation vs. Non-Foundation

- *A study of ownership structure and financial performance  
in the pharmaceutical industry*

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## *Abstract*

This study focuses on the ownership structure in the pharmaceutical industry with emphasis on foundations and their impact on financial performance. Our study will examine whether non-foundation owned companies perform better than the foundation owned. We will also further discuss the advantages and disadvantages of foundation ownership. In order to examine the financial performance, we use a statistical program that compares the financial measurement of Tobin's Q, Return on Asset (ROA) and Jensen's alpha. The final results showed no significant performance difference between foundation owned and non-foundation owned pharmaceutical companies. This study may be provided as a base for the argument of optimal ownership structure for pharmaceutical companies. The study implies that, despite the advantages and disadvantages, foundation owned companies do not perform significantly better or worse than non-foundation owned firms. Foundations may contribute to the innovation and development in the industry and a future study with more samples could create a better view of which ownership structure that is more advantageous for pharmaceutical firms

***Keywords: Foundation owned companies, Non-foundation owned companies, Research and Development, Profit Maximization, Ownership, Financial performances, Pharmaceutical.***

## *Preface*

We want to thank all the people who have through their support helped us to write this essay. We want to especially thank our supervisor Hans Jeppsson who has continuously given us support and helped us to improve our essay. We also want to thank the different opposition groups who have given us a lot of good feedback. Finally we also want to thank our families for supporting us and making sure that we could focus on our essay.

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# 1. Introduction

*This section presents the link between foundations ownership and pharmaceutical industry and the importance of it. The overall characteristics of foundation and pharmaceutical industry will be discussed below. The section will also point out the reason why foundations might be optimal for the pharmaceutical industry.*

The development of new medicines to battle outbreaks of different diseases is vital to society. Among our most serious threats today there are cancer, HIV/ AIDS, Cardiovascular and Pulmonary Diseases and more recently Ebola, which has attracted a lot of attention in media. The search for potential cures is constantly ongoing. To achieve a good result the pharmaceutical companies have to be able to allocate their financial resources so that their research and development departments obtain the financial funding that is needed to continue with their research. Kola and Landis (2004) discusses how the medicines have to go through three different phases over approximately 13 years during which they are scrutinized. The fail rate of this process is very high and only one out of nine reaches the final market where it can make any actual profit. The cost of developing new drugs is substantial and the authors discuss the need to make the development more efficient to be able to phase out unsuccessful projects at earlier stages. According to their research, companies that have a research and development budget of below 800 million US dollars have a higher success rate compared to other companies. However, this may be because they are not as innovative as the other companies and probably develop similar drugs to already existing ones. Developing new medicines is a gamble and only three out of the ten that reach the market recover the money spent on their initial investment. Besides research and development, other factors need to be taken into consideration for the company's survival, among which are the shareholders.

It is important to discuss the optimal ownership model in the pharmaceutical industry since the industry takes such an important responsibility for humanity. With the consideration that development in the pharmaceutical industry is longer than other industries, foundation ownership may be better aligned with plan for the long-term, rather than focusing on the short term, such as the next quarterly report.

As a general rule, one of the main objectives of a company is to maximize shareholder wealth. Therefore the managers' strategies have to be balanced between investing in long-term projects and focusing on the short-term profit goals. For a company to survive they have to have satisfied shareholders which leads to them prioritizing the shareholders so that they decide to remain within the company. A new medicine can take several years to launch on the market because it has to be developed and tested properly before it can be used on humans (Kola and Landis, 2004). This means that financial profits are uncertain and it can take a long time before seeing actual profits that can be handed out as dividends to shareholders. If the company tries to maintain high dividend payments this can be hard to achieve and the company may have to cut down on other expenses. Because of the long development periods Shleifer and Vishny (1997) discusses how foundations can help to prevent hostile takeovers as they do not have the same potential gain as regular shareholders. This helps to reassure that the medicines can be developed without the fear of potential major changes in ownership.

Corporate governance may have had an impact on the pharmaceutical firms' capability to innovate and compete. When pharmaceutical firms' compete in the global market, their corporate governance frameworks are however rather dependent on national historical and legal background (Casper and Matraives, 2003). Foundation ownership is considered as one of the features that partly stems from historical and regional background in Germany and Scandinavia.

In the paper of Casper and Matraives (2003), they discuss how corporate governance within pharmaceutical firms remains high compared with other firms on a national domestic level. In other words, the differences of corporate governance and ownership between countries influence how the firms perform globally. In our study, the pharmaceutical companies are competing in the same global market, yet the ownership structure differs depending on the geographical and cultural background. (Casper and Matraives, 2003)

Moreover, different levels of ownership concentration affect the amount invested in research. Shleifer and Vishny (1997) mentioned that companies that have shareholders, who own a large portion of the shares, have more control over the cash flows. These holders usually consist of banks, the founder or potential family members. This is more common in Europe than in the US especially in Germany. In general these owners tend to not want to invest as much in research



and development. Foundations do not share the same profit maximization perspective, regardless of the amount of shares that they own. (Shleifer and Vishny, 1997)

There are benefits of foundation ownership that contradict each other which is what Thomsen (1999) described as a “paradox”. The paradox comes from the standard agency theory, which means that foundation ownership violates the neoclassical economic theory of profit maximization. Foundations have less incentive to monitor managers and have less intention to pursue maximum profit, thereby potentially making them less efficient (Fama and Jensen, 1983a). With many foundations being large shareholders of the firms, the risk is highly concentrated, which violates the principle behind risk diversification (Demsetz and Lehn, 1985). Moreover, private foundation owned companies have difficulties to obtain funding and capital from outside investors (Thomsen, 1999), which is a major shortcoming of foundation ownership, especially if the foundation owns a pharmaceutical firm that usually requires intensive capital investment. Nonetheless, as Demsetz (1985) mentions, the effect of ownership structure relies on the balance of the disadvantages and the costs of them.

Thomsen and Rose (2004) examined a similar field of study in which they discussed the different ownership structures of companies, namely foundation versus non- foundation on the Danish Stock Market. A foundation is an entity with a non-profit goal, which either supports a charity, works for the improved conditions among the employees of the company or other objectives that the foundation has written in its charter. The foundation then uses the dividends received from their shares to reinvest within the company or do something that will generate a positive outcome for others. In the previous study their vantage point was companies listed on the Copenhagen Stock Exchange during a time period regardless of industry. In our essay, we want to maintain a focus on pharmaceutical companies since the funding of their research is very dependent on what sort of owners they have. Different owners invest differently in R&D, which we will discuss further in our report. Foundations enable the managers to have more control over how the money should be allocated most efficiently, even if it is not in the interest of the owners. (Thomsen and Rose, 2004)

## 1.2 Problem Discussion

In this essay we examine how a foundation owned company differs from a non-foundation owned company from a financial performance perspective. Our study focus on the pharmaceutical industry as this is one industry where it takes a long time to see any real earnings according to Kola and Landis (2004). The goal of the company, maximizing shareholder value or not, affects how the company prioritizes. Since foundations are non-profit organizations they do not act in a profit-maximizing way, which gives the manager freer reins and it is their attitude that determines the effort they invest in the firm (Hansmann, 2006). Non-foundation owned companies always want to please their shareholders by maximizing profit. Therefore a study which focuses on the comparisons of their financial performances would give an appropriate view of which sort of ownership is more appropriate for a pharmaceutical company. The shareholders have to be prepared to invest for the long run and not have an urge to see major earnings at an instant. Here lies the advantage of the foundations as their financial need is not crucial. In an industry such as the pharmaceutical, where they need to focus on the development of new medicines, such a perspective may be optimal as the need to generate cash flows at the shareholders satisfaction becomes a lesser priority.

If a company has large shareholders these will then in turn keep a watchful eye over the managers to lessen the agency costs (Shleifer and Vishny, 1997). Agency Costs can be created when the managers do something that is in their own personal interest rather than what is optimal for the company. Ways of avoiding this is to either offer incentives or by monitoring more closely, which is what major shareholders do as their risk is substantially greater than that of a minor shareholder. (Jensen and Meckling, 1976)

Therefore, foundation ownership or donation form of non-profit ownership can sometimes be a solution to the agency problem. Since there are no other equity holders than the foundation itself, there is no worry from the donor whether the donation will be used in the purposes that are stated in the donors will. However, the risk attained by cash flows is also concentrated since there are no equity claimants, which makes non-profit organizations inefficient. When a foundation acts as a large shareholder, they may only be concerned about their own well-being rather than other small shareholders (Shleifer and Vishny, 1997). The cost of the separation between controlling and managing might be larger than other forms of corporate governance since managers lack

incentives. Moreover, without managers being part of the equity claimants, there is no incentive for managers to maximize the profit (Fama and Jensen, 1983b).

As Thomsen and Rose (2004) show in their similar study, there does not exist a difference between the financial performances of foundation owned and non-foundation owned companies, we want to examine if this is applicable to the pharmaceutical industry as well. At present there exist certain areas where non-profit organizations are more common, such as hospitals and universities. These organizations are proven to be effective in their sectors, hence we believe that there is also a chance that this can be applicable to the pharmaceutical industry. (Thomsen and Rose, 2004)

However, disadvantages still exist as Shleifer and Vishny (1997) discuss the lack of risk spreading and how the interests of the large shareholders align with that of the company. Thomsen and Rose (2004) also mentions that foundation owned companies tend to invest excessively in badly performed projects if the company is owned by foundation as majority shareholder.

There are foundation- owned companies that perform financially well in the pharmaceutical industry, a few examples being Roche which is owned by The Wolf Foundation together with the descendants of the founder, Eli Lilly which is partially owned by Lilly Endowment and Novo Nordisk which is owned by The Novo Foundation. These are pharmaceutical companies that managed to maintain the foundation ownership and create remarkable revenues. They are in other words valid examples of the argument that foundation ownership can still generate high revenues, which also reflect the hypothesis of Thomsen' study in 1994. In Thomsen's earlier study, he mentioned that the success of Novo Nordisk implies the advantage of foundation ownership on research and development intensive firms, but the effects might vary from case to case (Thomsen, 1996).

Foundation owned companies however do not dominate the top pharmaceutical list based on the revenue. In the US there are Johnson and Johnson and Pfizer who are at the top list of companies with the highest revenue in the industry. Both are owned by private shareholders such as financial institutions and other investors. There are pharmaceutical firms that are financially comparable to Novo Nordisk that have non-foundation ownership structure and perform just as

profitably as Novo Nordisk. An earlier study performed by Thomsen (1999) has in fact shown that there is no significant difference in terms of financial performance between foundation ownership and non-foundation ownership, however, without specifically looking at the pharmaceutical industry it is hard to conclude that the same results can be applied. Therefore, it will be interesting to have a main focus on the pharmaceutical industry and its relationship with foundation ownership.

## **1.2 Purpose and Research Question**

The purpose of this study is to examine the different financial performance measurements between foundation and non-foundation owned firms in the pharmaceutical industry. It will help to elaborate a deeper understanding of foundation ownership and its role in the field of corporate governance.

Our research question is:

Is there a correlation between financial performance and whether the company is foundation owned or not?

## **1.3 Delimitations**

Our sample is non-region specific and it is collected worldwide. All the firms operate within the pharmaceutical field as that is the area which we want to study. The companies have net earnings exceeding two billions in 2013 except for companies which have previously merged with companies that are present in our sample. These are also included to increase the data available. We choose to focus on the pharmaceutical industry and not all the industries due to the reason that pharmaceutical industry aligned with the features that are beneficial with foundation ownership. This gives us enough reason to believe that foundation might be optimal for the pharmaceutical industry. Moreover, we have limited this study by not conducting the test to assure whether the ownership is endogenous variable. We have reason to believe that it does not have an effect in this study but in a future study this should be controlled more thoroughly.

## 2. Theoretical Framework

*In this section we will introduce the fundamental ground of theories regarding the advantages and disadvantages of the foundation compared with different economics theories and earlier studies. These theories are the backbone for the analysis of our statistical result. In the end of this section there is a summary of all the theories that are mentioned in order to show how they are related to each other.*

There is an ongoing debate regarding ownership structure and financial performance. By assembling the most relevant different theories these can then be used to analyze the compiled results. These theories will also provide potential explanations to the result of this study.

### 2.1 Is The Ownership Structure The Cause or The Consequence?

Earlier study of Cho (1998) found that there is a link between the ownership structure of the firm and investment. He found that the link only goes one way, i.e. the corporate value affects ownership, not the other way around. This study reflects another study performed by Thomsen and Rose (2004) on the issue and suggestion of treating ownership variable as endogenous, which means that the ownership is influenced by internal economic factors and variables in the model. Earlier studies have treated ownership as endogenous, which means that the ownership is influenced by the factors in the model. As Demsetz and Villalonga (1983) also found no link between how the ownership changes correspond to the firm value with the endogenous model. By treating the foundation variable as endogenous this means that the percentage held by foundation is determined by the financial performance. (Thomsen and Rose (2004))

### 2.2 The Donor- Agency Problem

The founder creates a foundation due to the reason of fear for losing both power and wealth to the other shareholders after distributing their wealth. The other shareholders might be employees or a management team who choose to spend the wealth in a way that is against the founder's wishes. To avoid this, the founder creates a foundation and donates the wealth to the foundation in order to manage the wealth. This is called the donor agency problem (Fama and Jensen, 1983a). However, the foundation has no owners, thus no equity claimants and there is no hierarchy in decision making since the step after the founder is the foundation. There is no incentive program for the foundation, thus foundations and managers have no intention to maximize their own profit.

### **2.3 Large Shareholders**

A large shareholder usually monitors the company more closely to avoid the agency problem. Since the shareholders have a large amount of shares, they might have a significant impact and this makes them more interested in the wellbeing of the company. Except for in the US, these large shareholders are common especially in Europe. These large shareholders can consist of families, foundations or banks (Shleifer and Vishny, 1997). If the major shareholders monitor the company this helps to enhance the value of the company. It also helps to decrease the risk for the small shareholders (Lins, 2003). Family owned companies tend to not invest as much in research and development compared to companies not owned by families (Villalonga and Amit, 2006). Research made by Thomsen (1996) also claims that foundations tend to have a more positive relationship to R&D. In Thomsen and Rose's study (2004), they found no significant difference on financial performance between foundation owned firms and non-foundation owned firms. What is interesting in this study is that the variable for industry categories implies the difference impacts of foundation ownership on different industries. Equity ratio is also one of the controlled variables that come from the advantage of foundations, hence, foundations usually have higher equity than other forms of corporate governance. However, not even after controlling this variable they see a significant difference on financial performance.

### **2.4 The Agency Problem**

The agency problem regarding the monitoring and incentive issues might be solved by other factors such as the external market competition. The minority shareholder also plays a part on monitoring the managers. Moreover, the foundation owned companies might have learned to imitate the non-foundation owned firms and behave in the same way in order to survive, since the market conditions they face are the same. (Thomsen and Rose, 2004)

Large shareholders maintain more control over the company. There are however a few disadvantages to this, one being that the risk of the company is not as spread, another being that with their increase in control, the company's focus aligns with that of the shareholders. Therefore the decisions made by the company are more likely a reflection of what is best for the majority owner. This could lead to other owners coming in the periphery (Shleifer and Vishny, 1997). Apart from the risk not being as spread, Thomsen (1996) mentions that there is not as possible to

give incentives to managers in foundation owned companies. Because of these reasons, a foundation should not be able to perform at the same level as a company with other ownership. Villalonga and Amit (2006) divide these costs into two problems: Agency Problem I is the classical principal-agent problem discussed by Jensen and Meckling (1976). This is when there is a separation of ownership and managers which leads to agency costs, i.e. when the principal's (the owner) of the company and the agent's (the manager) interests do not coincide. The agent chooses to do something that is in his or her best interest rather than what is best for the company. The costs that occur because of this are known as agency costs. There are ways of minimizing this for example by offering the agent incentives so they will cooperate, but also by monitoring the agent and its activities. (Jensen and Meckling, 1976)

Agency Problem II according to Villalonga and Amit (2006) are the costs created when large shareholders affects the company so it follows their preferences. Depending on the ownership of the company these costs will vary in size. Thomsen and Rose (2004) discuss how the minor shareholders can manipulate the share price and how this affects the market based measurements. This can create biased measurements of how the foundation is performing. The comparison of the costs of agency problem I and II helps to determine which is preferable.

Hansmann (2006) determine owners from two criteria, either if they have the control right or the right to use the money of the company. In foundation owned firms these are separated. Glaeser and Shleifer (2001) discuss how non-profit firms can be successful and the thing they put most focus on are the entrepreneurs and how they value their reputation. If they have low quality on their products this will damage their reputation which might lead to losses in the future. The way they treat their employees regarding their salaries also affects their reputation. If the entrepreneur is fond of having a good reputation he or she will strive to maintain this if the costs of high quality remains lower than that of a bad reputation or possibly if the entrepreneur simply wants what is best for their customers. Hansmann (2006) also attributes the success of the firm to the managers' pride, their accountability and goal congruence.

Foundations lacking the profit maximization motive do not have the same gain in cutting expenses. A profit maximizing company, might due to asymmetric information, is able to charge a higher price for something that is not worth as much. Non-profit companies are more likely to

have higher quality since they do not gain as much by swindling their customers. (Thomsen, 1999)

Both Shleifer and Vishny (1997) and Grossman and Hart (1988) discuss takeovers. Shleifer and Vishny consider foundation ownership as a protection against hostile takeovers as this can be harmful for the companies and their projects. Grossman and Hart (1988) have another opinion as they believe that takeovers are essential to maintain market control and increase productivity. Shleifer and Vishny fear that with takeovers, managers are often replaced and the new managers might have other prioritizations.

Takeovers are when an external party bypasses the managers of a company and goes straight to the shareholders with their bid. If the bid is accepted they will have full or partial control over the company. By maintaining large shareholders this can be avoided as a family can maintain their control over the company and a foundation, which does not have a profit purpose, does not have any advantages from a takeover. Their goal is the survival of the firm. (Shleifer and Vishny, 1997)

On the more pessimistic viewpoint is that the reason that companies survive is due to the efficiency of agent monitoring, diversified risk bearing and strong incentive to the profit maximization. They also categorize the features of non-profit organizations. The non-profit organization has neither owner nor equity claimants; there is not any contractual relationship between the owners or claimants either. In other words, they imply that non-profit is not an efficient and rational form of corporate governance unless large proportion of cash flow is coming from the donors donation. (Fama and Jensen, 1987)

Demsetz and Lehn (1985) argue that the diffuseness of ownership coincides with the principle of corporate profit maximization. Furthermore, it all boils down to the balance of advantages and disadvantages of diversity of ownerships. Large public corporations are often characterized by having many small shareholders. One of the advantages for the firm held by diverse owners is the risk diversification. On the other hand, there is a risk of management neglect and therefore a lack of incentives (Demsetz and Lehn, 1985).

The non-profit organization has the feature of non-existence of equity claimants. This feature was supposed to help avoid agency problems but instead created another one. The foundation



owned firms still have to compete with other organizational forms in the market, however, the donor has no intention to obtain real profit in terms of capital return. In other words, they give up the opportunity to maximize profit, which result in allowing either higher cost or lower price of output (Fama and Jensen, 1987).

One of the main advantages that Thomsen (1996) discusses is that foundations are more competitive in the long run, since they are more patient than competitors. The foundations act mainly for the good of the company and do not pursue profit maximization. Because the goal is for the company to survive, this might lead to them having lower demands on return, which in turn can enable them to commit to customers and employees for a long time as they have a survival instinct. Hansmann (2006) also discusses the life of the company. A non-profit firm's lifespan is usually a very long one, which can help in creating a trust for the company's product since the risk for bankruptcy is lower. However Hansmann (2006) also mentions that survival cannot be used to measure how well the company is, since it is very hard to go bankrupt.

The presence of family within the company can have an increased effect on the value of the company. However this is more commonly achieved when the actual founder is present. In the study of Villalonga and Amit (2006) there is an increase of value when the founder is present but not when the second generation is present. According to them an optimal scenario would be when the founder remains as a CEO and chairman. It is almost, but not quite, as valuable if the founder remains within the board with an external CEO.

Other disadvantage of the foundation ownership that Fama and Jensen researched is the separation of control system and management within the organization. There are three important bases on the organization's structure regarding monitoring and control, the first is to define the equity holders, they should be reasonably diversified. The second is the steps in the process. The final is the incentive program for the managers (Fama and Jensen, 1983a).

The financial performance in this study measures in terms of ROA, Tobin's Q and Jensen's alpha. De Wet, et al, (2007) argued in their article that although ROA has been a widely used measurement, there are accounting methods for manipulation when calculating the ROA. Tobin's Q has neither been perfectly usable (Blanchard, Rhee and Summers, 1990), a couple of

scholars tried to use it to predict the market development of investment in the American market but they were unsuccessful (Henwood, 1997).

## 2.5 Summary

Apart from the issue of endogenous ownership, previous studies of Demsetz and Lehn (1985), McConnell and Servaes (1990), Jensen and Meckling, (1976), Shleifer and Vishny, (1997) and Cho (1998) have found the correlation between ownership structure and corporate value. McConnell and Servaes (1990) show in their additional evidence how important the insight of heterogeneous shareholder and the impact of the indistinguishable diversified shareholders are. On one hand Shleifer and Vishny (1997) argue that large block shareholder have positive influence on the firm, while on the other hand Demsetz and Lehn (1985) discusses the diffused ownership which the advantages of the diversity are offset by the disadvantage of the incentive issue. Moreover, as mentioned before, the small investors might leave the badly performing company held by diversified small shareholders to the large shareholder-held company for avoiding lost cost caused by the agency problem, which indicates that ownership structure once again may actually be an endogenous variable (Thomsen and Rose, 2004). Fama and Jensen (1983a, 1983b) argue regarding the inefficiency by lack of residual claimants of the non-profit organizations while Hansmann (2006) discuss the quality and reputation of non-profit and allowing non-profit organizations to be efficient with lower transaction cost making them profitable. Glaeser and Shleifer (2001) attribute the success of non-profit companies to the managers' motivation and their pride. Villalonga and Amit (2006) writes about how the costs of large shareholders and those created by the original principal agent problem that Jensen and Meckling (1976) discussed varies depending on company. These costs will be different and it is not always clear which is preferable.

## 3. Method

*In this section we present the statistical methodology that is used in this study. The treatment of data and the financial measurements will be presented in this section. Furthermore, discussion regarding the credibility of this study will also be considered in this section.*

The aim of this study is to answer the question regarding whether there is a link between foundation ownership and financial performance. In order to examine the correlation, the financial performance needs to be measured and compared; the ownership of foundations also needs to be clearly defined. We therefore chose to quantify the measurements and the definitions in order to examine the correlation. In order to evaluate the value of the companies, we choose a group consisting of approximately the forty-eighth largest pharmaceutical firms internationally. By the aid of statistical tools, we then computed the financial performance which we evaluated and thereafter conducted a two tails statistical hypothesis test. We will further discuss the method of choice, data collection and the process of the data later in this section.

### 3.1 Research Hypothesis

In order to help us determine if the financial performance differentiates depending on ownership structure we set a hypothesis. This will then with the help of our collected data either be rejected or fail to be rejected.

**Null hypothesis:** There is no correlation between financial performance and whether the company is foundation owned or not.

**Alternative hypothesis:** There is a correlation between financial performance and whether the company is foundation owned or not.

### 3.2 Method of Choice- Qualitative vs. Quantitative

#### 3.2.1 Quantitative Study

To be able to compare and analyze the different financial performances between the ownerships, the value of the financial performance should be measurable. We therefore decided that the best approach is through a quantitative study, where different financial numbers and how

performance has evolved within the companies are compared between foundation and non-foundation owned companies. These values were processed in a statistical program called Stata.

The focuses of this quantitative study were primarily the measurements. It was important to analyze and discuss the usage and validity of these measurements that were applied in this study since the measurements have to truly reflect the financial performance in order to answer our research hypothesis (Bryman and Bell, 2011). We obtained a clearer picture of the actual value of a firm by using quantitative measurements such as Tobin's Q, ROA and Jensen's alpha. These measurements reflected both market and book value performance. It is also necessary to assure that the study is possible to conduct again but in another industrial field. The study's aim was to describe the general effect of other foundation owned companies not present in our data. We hoped to help shed some light on the difference in general financial performance between foundation and non-foundation. In this study, we explained and described the cause and effect of the result from the financial measurements with the support of different theories. The explanation and analysis of why and how foundations act differently and the effect of the actions is just as important as the result of null hypothesis test.

### **3.2.2 Qualitative Study**

There are some advantages of a qualitative approach. A qualitative approach tend to focus on the opinions among those who are involved in the issue, in our case, a qualitative approach will be focusing on news statements and subjective opinions in the field of foundation and non-foundation. This means that the qualitative method is closer to the anticipator in the field (Bryman and Bell, 2011) and the understanding or foundation in reality largely varies depending on cases. However, a qualitative approach would not provide us with the information needed to capture an accurate view of the company's actual financial performance which is the purpose of this essay.

### **3.3 Criteria**

By using our collected observations, a regression analysis is then conducted in order to see the link between foundation ownership and financial performance. The indicators were determined in order to decide the definition of the concept (Bryman and Bell, 2011), in this study, our concept of foundations was indicated by the percentage of shareholding in order to decide what it means by 'foundation owned'. The primary definition of foundation is whether the firm has

any foundation owner. The indicators for a significantly better or worse performance for foundation firms would be if two out of three measurements indicated the significant positive estimators of foundation ownership, or two out of three measurements indicated the significant negative effect of foundation ownership. If two out of three performance measurements showed significant better or worse effect, we would reject the null hypothesis.

## **3.4 Data Collection**

### **3.4.1 Panel Data**

We chose to construct the data in the form of panel data. Panel data is a way of collecting information about the sample across a period of time. In this study, there are forty-eight companies with approximately ten years each of observation data. However, not all companies revealed data for the ten year period, but to maintain a large sample size we decided to keep all the companies regardless of this drawback. There are a few advantages of the panel data, such as providing a larger numbers of observation data and reducing the problem of collinearity between variables. (Hsiao, 2003)

### **3.4.2 Sample<sup>1</sup>**

The majority of our sample was collected from the pharmaceutical firms with the highest revenues in 2013 globally. Since the factors of cultural differences between countries are not considered in this study, the study is not region specific, which means that the sample was collected worldwide. Our samples all have net sales exceeding two billion US dollars in the year 2013 with exception for companies that have merged in years previous to 2013. They were added to our list because the companies they have merged with are present on our list. For these forty-eight companies, the data of financial performance was collected annually over a ten year period. The information of ownership structure and board participation of family members was collected from proxy statements and annual reports. Financial figures were compiled by using the Thomsen Reuters Datastream database and they were then compared with random sample examinations from the annual reports. The amount of samples helped us to even out the different numbers of non-foundation and foundation owned companies.

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<sup>1</sup> Our sample consists of a total selection of the 48 highest grossing medical firms all over the world making the significance irrelevant.

## 3.5 Processing the Data

### 3.5.1 Regression with Panel Data- Fixed Effect and Random Effect<sup>2</sup>

There are two different alternatives to conduct regression with the panel data. One of them is with fixed effect and the other one is with random effect. The differences of these two effects will be discussed further in the following paragraphs.

### 3.5.2 Fixed Effect Model with Least Squares Dummy Variable Approach (LSDV)

In this study, we chose to use the Least Squares Dummy Variable (LSDV) approach. In the fixed effect approach, the assumption is that there are several variables that have potential impact on the financial measurements that are either not observed or omitted, or there are other variables that are correlated with independent variables and therefore also correlated to the dependent variable. It is hard to determine whether there are more omitted variables that could potentially influence our independent variables. Those omitted variables can have two different features. One feature is that the variables are typically constant over the observed time period but vary between individuals (Hsiao, 2003). For example the size of a firm varies significantly between different firms but does not vary as much within one firm during the ten year observation time. The other one is that the effect of the omitted variable is specific only during a specific time period but remains the same to all individuals (Hsiao, 2003). For example, the stock return was much lower during the period of the financial crisis, the crisis impacted most firms at the same specific time period. In other words, different firms and different time period have special characteristics that are not ownership related that potentially can affect the estimation. The fixed effect model allows the statistic program to control the impacts of omitted variables in order to obtain the pure effect of the explanatory variable (Hsiao, 2003) which in our study refers to the foundation ownership as the explanatory variable. Those variables that can potentially influence financial performance such as equity ratio, book to market ratio, R&D investment and the firm size will be controlled in the model in order to see the pure effect of the foundation ownership.

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<sup>2</sup> We also tested for heteroscedasticity, but found no relevant results.

The fixed effect model is expressed as:

$$y_{it} = \beta x_{it} + \rho z_{it} + \mu_{it}$$
<sup>3</sup>

The fixed model assumes that there is a correlation between the error term ( $\mu_{it}$ ) and the explanatory variable ( $x_{it}$ ). This correlation therefore needs to be taken into account. We conducted the fixed effect model using the Least Squares Dummy Variable (LSDV) approach in order to include two dummy variables- “Any Foundation” and “Family on the board” in the regression.

### 3.5.3 Random Effect

Another method is the random effect method. The random effect method assumes that the companies or observation-specific characteristics have no correlation to the independent variables. Moreover, the omitted variables that have impact on the independent variable are affecting the independent variable randomly (Hsiao, 2003). In our study, the random effect viewpoint would be the heterogeneities between these forty-eight companies such as if firm size or equity ratio are correlated to whether they are foundation owned or not, or if the impact of these variables affected all the firms equally. In other words, the model would treat those omitted variables as if they randomly affect the independent variables. If the assumptions in the random effect model are true, the random model is more appropriate. This indicates that there is no correlation between firm-specific characteristics and foundation. This means that there is no correlation between individual specific characteristics and the independent variable. If this were to happen the random effect model is better than fixed model effect. However, it is difficult to be

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<sup>3</sup>  $y_{it}$  = the result of the dependent variable. For example, one of our financial measurements is Tobin' Q, for individual "i" at the time period "t". The  $y_{it}$  in this case will be the value for individual "i" at the time period "t".

$\beta$  = the result of the estimated coefficient for the variable "x" where the individual is "i" at the time period "t". For example, the dependent variable in this study is "Any Foundation".  $\beta$  will be the estimated coefficient for the variable "Any Foundation" where the individual is "i" at the time period "t"

$\rho$  = the result of estimated coefficient for the variable "z" where the individual is "i" at the time period "t". For example, one of the controlled variables is "firm size".  $\rho$  will be the estimated coefficient for variable "firm size" where the individual is "i" at the time period "t"

$\mu_{it}$  = error term

certain about this assumption because there are unobserved variables that might not be taken into account and therefore be " unobserved ". If the assumption is not true, then the individual-specific variables need to be controlled for in the regression by using the fixed model.

#### **3.5.4 Hausman Test**

To be able to determine whether to use fixed or random effect, we performed a test called the Hausman Test (1978). The test controlled the correlation of estimators, which is indifferent regardless of hypothesis. The idea is that when the null hypothesis is not rejected there exists a constant correlation between the hypothesis and the estimator. If, however the null hypothesis is not correct the estimator will not be consistent. The Hausman test was then performed in Stata. If the significance value was less than 0.05 the fixed effect regression would be more accurate. If the significant value was more than 0.05, the random regression would be more appropriate. In our Hausman test, the model was a value of less than 0.05 and therefore we decided to use the fixed effect model.

#### **3.5.5 Variables**

There are other factors that influence financial performance that are not related to the structure of ownership. For example, the size of the firm is one factor that influences its return, therefore a smaller firm may generate a higher stock return. Fama and French (1992) discussed how both book to market ratio and firm size have an impact on the stock return. The final regression analysis after controlling these variables gives us a clearer indication of the relationship between foundation ownership and financial performance.

When calculating our data we use different variables. "Any Foundation" was our dummy variable that was either 1 or 0 depending on whether a foundation is a shareholder regardless of to what extent. "Foundation 3%", "Foundation 5%" and "Foundation 10%" each represented foundation ownership at different percentages 3,5,10 respectively. We also had a dummy variable, "Family on the board", which indicated 1 if there was any presence of the founding family in the board of the company and 0 if there was not. R&D was a measurement of how much the company spent on research and development. We also included size, equity ratio and book-to-market ratio in our calculations. The variables were then gradually removed from the regression to measure the relationship between the remaining variables.



### 3.6 Financial Measurements

In this quantitative study, the annual reports of the companies contained the financial figures needed to make a fair adjustment and they are an effective tool in collecting data when performing a quantitative study. There are several different measurements that can be used to evaluate a firm's value, in this study, Tobin's Q, Jensen's alpha and Return on Assets (ROA) are used as financial measurements.

#### 3.6.1 Tobin's Q

*Q Ratio = Total market value of the firm/ total asset of the firm*

Tobin's Q measures general firm performance by the market value of the firm divided by the total asset. Usually the market value of the firm is larger than total asset in a well functioning and well performing firm. Moreover, market value is a more accurate measurement compared with the accounting value. Accounting value does not take intangible assets into account, which differentiates book and market value. A Q ratio under 1 indicates that the market value is less than what the total assets are worth. If the ratio is larger than 1 the market value exceeds the value of the total assets.

Tobin's Q is a common measurement where the formula is dependent on the market as one of the components is the market value of equity. This is calculated by multiplying the share price with the number of outstanding shares. This however can be a bit uncertain since the share price is determined by what others believe a share is worth. However we assume that the market is efficient and that the share price fairly reflects the value of the firm.

#### 3.6.2 Return on Assets

*ROA = EBIT/ Total Assets*

ROA is a measurement of the profitability of the assets calculated by dividing EBIT with the total assets. This is a measure of earnings from the investments a firm has made. A high ROA is considered to be good as this shows to what extent invested money is transformed into earnings (Berk and DeMarzo, 2011). The amount of assets can depend on what sort of industry the company belongs to, but because all of our companies belong to the same industry this should not be a problem. One disadvantage when calculating ROA is that the value of the assets is the one that can be found in the annual report. This might not always fully reflect the value of the assets on the market.

### 3.6.3 Risk Adjusted Stock Return (Jensen's alpha)

$$\text{Alpha} = (\text{Expected return of stock} - \text{risk free rate}) - (\text{Beta} * (\text{Expected return on market} - \text{risk free rate}))$$

The alpha compares how the stock has performed historically in comparison to the expected return of the market. It is a measurement of the historical performance adjusted for risk. An alpha Value according to CAPM should remain close to 0 if the market is efficient. However, in reality there are some securities that perform better than the market and some who perform worse when taking the same risk. A positive value indicates how much the average return of the stock is above the security market line (Berk and DeMarzo, 2011), which means that the stock has either earned more or less than the market and outperformed the security market line. With an efficient market, the sum of the alpha of all tradable securities in the market should be zero.

As all our companies are spread over the world we choose to use the same risk-free rate, namely that of the US Treasury Bill. For our market return we use a market index called MSCI World. We also choose an index, the MSCI World Health Care Index, in order for the financial measurement to be compared in the more specific industry market.

In the formula we also look at the market risk and how the expected return is affected by this. As we chose to both use a world index and an industry specific index we are able to obtain a good assessment of how it is affected by the market in general but also by our specific pharmaceutical market.

### 3.6.4 Other Potential Measurements

Although there are many measurements that are as sufficient to indicate firm value, for example non-financial measurement that are operational-oriented such as customer satisfaction, employee satisfaction (Perera, Harrison and Poole, 1997), our theoretical standpoint is profit maximization, giving this essay a shareholder's perspective. There are also other ways to measure a numeric financial performance of a pharmaceutical firm, such as result of innovation, expenditure on R&D etc. However, we chose the aforementioned financial measurements as they most accurately represent the value of a company.

### 3.6.5 Adjusted $r^2$

To be able to assess if the different financial measurements were valid we looked at their adjusted  $r^2$ .  $r^2$  measures the variation proportion of a dependent variable whilst taking the independent

variables under consideration. The difference between  $r^2$  and adjusted  $r^2$  is that adjusted  $r^2$  is also affected by the additional information contributed by the new independent variable and how this affects the degrees of freedom of the regression according to Cortinhas and Black (2012).

### 3.7 Endogeneity

Endogenous variable is a problem that frequently emerges in the statistical research. We will further more discuss the problem of endogenous variable and what it implies in this study. When a variable is endogenous, the variable is influenced by variables inside the model, a more severe problem is when the independent variable in the model is changing according to the dependent variable (Hsiao, 2003). In this study, it practically means that the amount of shareholding and the ownership structure is changing according to the financial performance of the firm. In statistics, endogeneity happens when the error term is not only correlated with the dependent variable but also correlated with the independent variable. (Woolridge, 2010) In our case this means that the error term has to do with the ownership.

The endogeneity occurs when the variable is omitted or having the effect of self-selection, which means that the ownership self regulated and changes according to the financial performance. In this study, we did not find dramatic changes in shareholding of foundations. Furthermore, the foundations are less likely to suffer from takeovers that are caused by bad financial performance. Therefore it did not cause strong suspicion of endogeneity.

There are tests that can be conducted with suitable instrument variable in order to see whether the error term is related to the ownership structure. However, in this study, we chose to only discuss the possibility with minor suspicion. However, a future study with a larger sample with a longer time horizon should include the test of endogeneity in order to make sure that the impact between the independent and dependent variable is exogenous.

### **3.8 Criticism and Credibility**

There might be other variables that influence the financial performance of a firm that are not considered in our model. The control variables in our model were based on the earlier finding by Fama and French (1992) such as the impact of book-to-market ratio and the firm size on the firm's financial performance.

An issue that might potentially lower the credibility of this study was that the ownership might actually be influenced by the financial performance and changed according to it. Ownership might be an endogenous variable which means that it not only affects the result but also change according to it. In this study, the financial performance was set instead as dependent variable. However, the changing of ownership structure is minor as all of the foundations from the samples have been acting as a majority and large shareholders over the time period with only a small variation of shareholding percentage. We did not see the foundation ownership changing according to the financial performance. The issue of whether the ownership is an endogenous variable or not will be discussed further in later sections.

To assess the relevance of the articles we have chosen to look at the number of times the articles have been quoted. If an article has numerous quotations, we have interpreted this as a way of creating credibility as a large population believes that it is relevant and of high quality.

## 4. Empirical

*This section presents the background of the empirical finding regarding different foundations. These foundations are presented below.*

### 4.1 What is a Foundation?<sup>4</sup>

A key word commonly used by Thomsen (1996) is Industrial Foundation. It is defined namely by three different aspects. Firstly, it is created by for example a donation of shares which generates ownership within an industry. Secondly, it has no owners or members. Thirdly, it is controlled by a charter which defines its objective and regulations. The objectives can differ between either benefiting a certain charity or to keep control over the company in a way expressed by the founder. In theory, a foundation will operate indefinitely and usually their goal is the survival of the firm (Thomsen, 1996). Thomsen (2012) also uses this key word in another paper where he describes Industrial Foundations as foundations that owns business entities which operates commercially.

There are different categories of foundations that depend on the purpose of the foundation. In our study however, we will be concentrating on industrial foundations. There are other sorts of foundations such as public foundations which are financed by donations of individuals in the society without a guaranteed source of income (Foundation Center, 2014). Nevertheless, we focus solely on industrial foundations that have rather steady donations from the founder's endowment.

In our data sample, a foundation owns in average approximately 39% of a firm over the 10 years. This data is not completely reliable as it is uncertain to what degree the Wolf foundation owns Hoffman- La Roche. It is stated that the funding family together with the foundation owns the percentage presented. The variation of shareholding is minor over the observation period. Most of the foundations shareholders are majority shareholders in the company and act as large shareholders.

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<sup>4</sup> Among our initial sample companies all are listed on the stock exchange except for Boehringer Ingelheim. This is relatively unique but because of this we cannot include them in our sample as stock price is necessary in some of our financial measurements and variables.

*Table 1. Foundation ownership of selected pharmaceutical firms*

<b>Name</b>	<b>Hoffman- La Roche</b>	<b>Eli Lilly</b>	<b>Novo Nordisk</b>	<b>H. Lundbeck</b>	<b>Takeda</b>
<b>2013</b>	45,06%	12,10%	57,16%	70%	2,27%
<b>2012</b>	45,01%	11,80%	56,81%	70%	2,27%
<b>2011</b>	45,01%	11,70%	56,71%	70%	2,27%
<b>2010</b>	50,01%	11,70%	61,71%	70%	2,27%
<b>2009</b>	50,01%	11,80%	61,81%	70%	2,27%
<b>2008</b>	50,01%	11,90%	61,91%	74%	2,01%
<b>2007</b>	50,013%	12,10%	62,11%	74%	2,01%
<b>2006</b>	50,013%	12,40%	62,41%	75%	
<b>2005</b>	50,013%	13%	63,01%	76%	
<b>2004</b>	50,013%	13,35%	63,36%	77%	
<b>Average</b>	<b>49%</b>	<b>12%</b>	<b>61%</b>	<b>73%</b>	<b>2,2%</b>

*Notes: This table presents the shareholding by foundations over the observation period.*

#### **4.1.1 The Wolf Foundation**

There are numbers of foundations that are actively operating in the pharmaceutical industry. One of those among the largest pharmaceutical companies is The Wolf Foundation. The Wolf Foundation is a non-profit charity foundation that gives out prizes and scholarships. The Wolf Foundation owns approximately 45% of Hoffman La Roche together with descendants and relatives of Fritz Hoffman La-Roche. The distribution of the shares between the Wolf Foundation and the relatives of Fritz Hoffman La-Roche is not clear (New York Times, 2014). Hoffman La Roche researches and produces mainly cancer treatments drugs. The company is ranked as third largest pharmaceutical companies in 2014 by Pmlive (2014) in terms of revenue.

#### **4.1.2 Novo Nordisk**

Novo Nordisk Foundation together with Novo A/S Bagvaerd Denmark owns approximately 60% of the pharmaceutical company Novo Nordisk. Together they obtain about 74% of the voting rights in the company. Novo Nordisk is the leading pharmaceutical company within diabetes and pharmaceutical in Scandinavia. (NovoNordisk, 2014)

#### **4.1.3 Lilly endowment**

Another foundation that owns a pharmaceutical company is the Lilly endowment. The foundation is financed by owning shares within the pharmaceutical company Eli Lilly. The shareholding of Lilly Endowment had been around 11% -12% throughout the last ten years. The foundation is charitably devoted in the well being of community, mostly in Indiana, where the foundation was founded in 1937 by the Lilly family. (Lilly, 2014)

#### **4.1.4 Takeda Science Foundation**

The Takeda Science Foundation was founded in 1963 with the aim to offer scholarships to researchers within the medical and pharmaceutical field. These scholarships are offered to researchers who want to study medicine in Japan regardless of country. The recipients are selected each year by a board of trustees. In March 2014, approximately 1400 scholarships have been offered. At present Takeda Science Foundation owns 2,27% of Takeda. (Takeda Science Foundation, 2014)

#### **4.1.5 The Lundbeck Foundation**

The Lundbeck Foundation was established in 1954 by the widow of the founder of Lundbeck. The goal was to keep control over the company and at the same time insure the quality of the research in the biomedical field. To achieve this, the foundation gives grants to independent young researchers to help encourage their research. The Lundbeck Foundation owns a substantial part of Lundbeck generating at 70%. (Lundbeck, 2014)

## 5. Result

*This section presents the result from the statistical program STATA. We will further analyze the result in the order of the financial measurement as followed; Tobin's Q, ROA, alpha market and alpha Pharmaceutical. We will present the result in the form of tables.*

### 5.1 Descriptive Statistics

In our Descriptive Statistics table there is information about all the independent variables and the dependent variable "Any Foundation". The data consists of 409 observations constructed in the panel data and our dummy that we put the most focus on is "Any Foundation". The interesting numbers in this model are; the variation of the observed numbers and the standard deviation, which indicates the variation of the observation within the variable.

Among all the independent variables, the R&D investment in relation to net sales has the most with a standard deviation of 6.6, which means that the investment of R&D varies significantly between different companies. The second largest is the unadjusted stock return, however, the unadjusted stock return is not included in our final measurements. Tobin's Q also has a higher standard deviation. The calculation of Tobin's Q relies on the market value of equity which is highly correlated to the stock price and therefore the variation of Tobin's Q can be explained by the variation of stock return. Furthermore, the Equity ratio has a marginal variation between 0 and 0.369. The rest of the variables have rather modest standard deviations varying between 0.028 and 0.11.

The Q ratio has a mean of 0.118, this means that the market value of the average firm is undervalued. 0.999 is the largest value and therefore neither of the Q ratios have a market value that is higher than that of the total assets. The mean of the alphas are -0.010 and -0.007 since both values are negative the return of these alphas are below that of the market. The firms that have higher values than zero perform better than the market. ROA has a mean of 0.116 and the highest value is 0.493. A higher ROA is better as this is an indication of how well the money invested in assets is returned in earnings.



*Table 2. Summary Statistics*

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Any Foundation	409	0,130	0,336	0	1
3% Foundation	409	0,098	0,297	0	1
5% Foundation	409	0,098	0,297	0	1
10% Foundation	409	0,098	0,297	0	1
Family on board	409	0,103	0,304	0	1
Size	401	2,79*10 <sup>7</sup>	3,36*10 <sup>7</sup>	14869	2,12*10 <sup>8</sup>
Alpha Market	409	-0,007	0,106	-0,781	1,329
Alpha Pharma	409	-0,010	0,109	-0,767	1,385
Unadjusted Return	409	0,133	0,263	-,486	1,104
Tobin's Q	409	0,188	0,158	0	0,999
Return on Assets	409	0,116	0,086	-0,218	0,493
Equityratio	407	0,004	0,028	0	0,369
Book to Market	401	3,71*10 <sup>9</sup>	2,63*10 <sup>9</sup>	0	9,92*10 <sup>9</sup>
Research & Development	397	14,776	6,609	0,04	49,6

Notes: This table presents the overall statistics of the data sample including the number of observations in every variable, the mean, the standard deviation as well as the minimum and maximum value of every variable.

*Table 3a. Summary Statistics, Non-Foundation Owned Firms*

**Descriptive Statistics- Non Foundation owned**

	N	Minimum	Maximum	Mean	Std. Deviation
afou <= 0 (FILTER)	356	1	1	1.00	.000
fam	356	0	1	.09	.286
tobin	356	.000	.624	.18278	.125486
roa	356	-.218	.411	.10665	.080279
ama1	356	-.781	1.329	-.00654	.113398
apf1	356	-.767	1.385	-.00963	.116393
size	351	14869.000	211600000	28230810.9	35045474.9
eqr	354	.000	.369	.00481	.030263
bookm (billions)	351	.000	9.900	3.60000	2.600000
rnd	347	.040	49.600	14.30164	6.829356
Valid N (listwise)	347				

*Table 3b. Summary Statistics, Foundation Owned Firms*

Descriptive Statistics- Foundation Owned					
	N	Minimum	Maximum	Mean	Std. Deviation
afou >= 1 (FILTER)	53	1	1	1.00	.000
fam	53	0	1	.19	.395
tobin	53	.002	.591	.21247	.174278
roa	53	-.037	.493	.18098	.095391
ama1	53	-.085	.056	-.00753	.029979
apf1	53	-.106	.049	-.00943	.031055
size	50	1786474.00	71364816.0	25460724.3	20725324.6
eqr	53	.000	.003	.00145	.000776
bookm (billions)	50	3.200	9.900	4.40000	2.400000
rnd	50	11.930	29.450	18.06540	3.320122
Valid N (listwise)	50				

*Notes: The first table represents the companies without foundation ownership and the other represents the companies with some sort of foundation ownership.*

If we compare our summary statistics tables we can see that the mean of percentages spent on R&D is greater for the foundation owned companies. However, the size of the foundation companies is less compared with the non-foundation companies. We can also see in table 4 that Tobin's Q, ROA and Book to Market are larger than the non-foundation owned companies.

*Table 4. T-test (Mean comparison test) with two variables*

Variables	Foundation mean	Non-foundation mean	Difference	T-value
Tobin's Q	0.132	0.196	0.064	2.814
Return on Assets	0.181	0.11	-0.071	-6.13
Alpha Market	-0.008	-0.007	0.001	0.063
Alpha Pharmaceutical	-0.009	0.01	0.019	-0.012
Family on board	0.189	0.09	-0.099	-2.218
Size (millions)	25.5	28.2	2.7	0.545
R&D	18.065	14.302	-3.763	-3.829
Equityratio	0.0014	0.005	0.0036	0.808
Book/Market (billions)	4.42	3.61	-0.81	-2.045

*Notes: This table shows a comparison of the means of the different variables depending on their ownership structure, namely foundation and non-foundation.*

## 5.2 Correlations between Variables

In the Correlation table it shows that the correlations between the variables for different foundation percentages have a correlation of one. This is because these companies all maintain the foundations which fulfil these ownership percentages. The correlation between “Family on the board” and foundation ownership is around 12%. By looking at alpha, there is a 97% correlation between alpha in the market index and alpha in the pharmaceutical index, which indicates that the performance of the pharmaceutical industry is highly correlated to the world's market index. However, there is a low correlation between Alfa and foundation ownership, the correlation is nearly non-existent. The investment in R&D has nearly 19% correlation with foundation. It is assumedly due to the assumption that foundation owned companies may invest more intensively in R&D. Among these variables, there are small negative correlations between foundation ownership and firm size, equity ratio and all four dependent variables. ROA is the financial measurement that has the highest correlation to "Any Foundation". It also has high correlation to our other foundation percentages but when looking at the correlation with “Family on the board” it is negative.

*Table 5. Correlation Table*

	Any Found.	3% Found.	5% Found.	10% Found.	Family	Size	$\alpha$ Market	$\alpha$ Pharma	Unadj. Return	Tobin's Q	ROA	Equity ratio	Book to Market
3% Foundation	0.882												
5% Foundation	0.882												
10% Foundation	0.882												
Family on board	0.121	0.161	0.161	0.161									
Size	-0.030	-0.035	-0.035	-0.035	-0.038								
Alpha Market	-0.004	-0.006	-0.006	-0.006	0.014	0.007							
Alpha Pharma	-0.000	0.011	0.011	0.011	-0.003	0.023	0.970						
Unadjusted Return	-0.013	0.008	0.008	0.008	0.084	-0.061	0.229	0.224					
Tobin's Q	-0.130	-0.059	-0.059	-0.059	-0.028	0.060	-0.012	-0.022	0.015				
Return on Assets	0.328	0.332	0.332	0.332	-0.023	-0.016	0.010	0.017	0.047	-0.206			
Equityratio	-0.039	-0.034	-0.034	-0.034	-0.044	-0.089	-0.018	-0.017	-0.044	0.502	-0.105		
Book to Market	0.098	0.062	0.062	0.062	-0.005	-0.114	-0.014	0.010	-0.029	-0.029	-0.010	-0.108	
Research & Development	0.189	0.164	0.164	0.164	-0.243	-0.013	-0.054	-0.041	-0.125	-0.160	-0.020	-0.134	0.055

*Notes: This table presents the correlation between the variables.*

### 5.3 Tobin's Q

By looking at our Tobin's Q table it shows an estimation of the coefficient, which indicates that the dummy variable "Any Foundation" has a significant negative impact on Tobin's Q. "Family on the board" seems to have a negative effect but not a significant one. Both R&D and Book to Market Ratio have a negative impact but they have very small relation with Tobin's Q and both are very close to zero. Basically, despite the significance, the estimator shows nearly no impact on Tobin's Q from R&D and Book to Market ratio. The Equity Ratio has a large and significant positive impact. Tobin's Q is calculated by using the market value of equity and therefore it affects the result. The high equity ratio signals less risk of financial distress which is positive (Altman, 1968). Size has a very small influence on Tobin's Q but it is still significant according to our data. Since the estimator is 0,000 this makes the impact of the firm size non-existent. The adjusted  $r^2$  shows that 27% of the data can be explained by this model.

*Table 6. Financial Performance, Tobin's Q*

	Financial Performance, Tobin's Q			
	1	2	3	4
Any Foundation	-0.080* (0.001)	-0.069* (0.009)	-0.072* (0.002)	-0.071* (0.002)
Family on Board		-0.002 (0.401)	-0.002 (0.940)	0.001 (0.969)
R&D		-0.003* (0.003)	-0.002 (0.081)	-0.002 (0.093)
Book/Market			-0.000 (0.321)	0.000 (0.197)
Equityratio			0.703* (0.000)	2.767* (0.000)
Size				0.000* (0.015)
Constant	0.197* (0.000)	0.256* (0.000)	0.206* (0.000)	0.188* (0.000)
<i>Adjusted R<sup>2</sup></i>	0.02	0.03	0.27	0.28
f-value	7.92	5.27	29.18	25.62
p-value	0.005	0.000	0.000	0.000
n	409	397	397	397

The numbers with \* indicates significance at 5%. The numbers within the parenthesis is the significance

*Notes: This table presents the coefficient estimators for every variable from the regression model, including the constant and the significant level. For example, in the first row it shows that if "Any Foundation" increases one unit, the Tobin's Q will decrease 0,080 with a significance level of less than 5%. The first row can be expresses as: Tobin's Q = Constant + (-0,08)\* "Any Foundation"+ Error term.*

## 5.4 Return on Assets

In the ROA table we find a positive significant effect on the relationship between “Any Foundation” and ROA. Equity Ratio has the larger effect on ROA compared to the other variables but it is a negative relation, which means that the ROA will decrease as equity increases and financial leverage decreases. R&D and Book to Market have a significantly small and negative relation, which mean there is nearly no impact on Tobin's Q. “Family on the board” also has a negative impact and it is slightly larger than that of R&D and Book to Market. According to ROA it is negative for a company to include family members in the board of the company. It is also negative to have much equity and less financial leverage. The adjusted  $r^2$  has a value of 14%. The significance of the values remains even after we start to remove independent variables and "Any Foundation" remains significant all the time.

**Table 7. Financial Performance, Return on Assets**

	Financial Performance, Return on Assets			
	1	2	3	4
Any Foundation	0.082* (0.000)	0.103* (0.000)	0.107* (0.000)	0.108* (0.000)
Family on Board		-0.029* (0.035)	-0.032* (0.017)	-0.033* (0.016)
R&D		-0.001 (0.057)	-0.001* (0.028)	-0.001* (0.027)
Book/Market			-0.000* (0.002)	-0.000* (0.001)
Equityratio			-0.376* (0.008)	-0.389* (0.006)
Size				-0.000 (0.414)
Constant	0.107* (0.000)	0.129* (0.000)	0.151* (0.000)	0.155* (0.000)
<i>Adjusted R<sup>2</sup></i>	0.08	0.12	0.14	0.14
f-value	37.57	18.24	14.29	12.01
p-value	0.008	0.000	0.000	0.000
n	409	397	397	397

The numbers with \* indicates significance at 5%. The numbers within the parenthesis is the significance

*Notes: This table presents the coefficient estimators for every variable from the regression model, including the constant and the significant level. For example the first row shows if "Any Foundation" increases with one unit, the ROA will increase 0,082 and the significant level is less than 5%. The first row can be expressed in the regression as:  $ROA = Constant + (0,082) * "Any Foundation" + Error term.$*

## 5.5 Alpha Market

The values in the Alpha Market table all have a small relationship to the dependent variable. None of them have any significant influences. The adjusted  $r^2$  is negative which means that the model is unfit to use with this sample. Another regression is conducted by using a different alpha, namely the pharmaceutical industry index. Here the  $r^2$  value was negative as well and the values were similar to those of Alpha Market. Because of the negative  $r^2$  value the relation between Alpha Pharma and the variables is minimal. When the sample data and the regression does not match with each other and none of the value in the data can be explained by the regression, the  $r^2$  will be close to zero, after adjusting the  $r^2$  it can sometimes have a negative value.

*Table 8. Financial Performance, Alpha Market*

	Financial Performance, Alpha Market			
	1	2	3	4
Any Foundation	0.001 (0.919)	0.004 (0.825)	0.004 (0.805)	0.004 (0.805)
Family on Board		-0.000 (0.984)	-0.001 (0.949)	-0.001 (0.951)
R&D		-0.000 (0.289)	-0.000 (0.266)	-0.000 (0.267)
Book/Market			-0.000 (0.776)	-0.000 (0.782)
Equityratio			-0.100 (0.604)	-0.099 (0.609)
Size				0.000 (0.966)
Constant	-0.006 (0.219)	0.006 (0.656)	0.009 (0.546)	0.009 (0.582)
<i>Adjusted R<sup>2</sup></i>	-0.0024	-0.00	-0.01	-0.01
f-value	0.00	0.39	0.30	0.25
p-value	0.950	0.759	0.914	0.960
n	409	397	397	397

The numbers with \* indicates significance at 5%. The numbers within the parenthesis is the significance

*Notes: This table presents the coefficient estimators for every variable from the regression model including the constant and the significant level. For example the first row shows if "Any Foundation" increase one unit, the Alpha Market will increase 0,001, the significant level is more than 5%. The first row express in the regression as: Alpha Market= Constant + (0,001)\* "Any Foundation"+ Error term. The result of the regression is not significant.*

By comparing the different tables, Tobin's Q shows a negative effect caused by foundation ownership. While the ROA table shows the opposite, a positive relationship between foundation ownership and ROA. These results contradict each other, which show that there is not enough evidence to determine if foundation ownership has a positive or negative effect on the financial performance of the firm. The other financial measurements do not show a negative relation but because of their low adjusted  $r^2$  they cannot be taken into account. There is no evidence that two of the financial performance measurements show the same result and therefore the null hypothesis is not rejected.

### **5.6 Robustness**

To research further we conducted an alternative robustness model (table 9 is located on the next page) where we used barriers to determine foundation ownership of at least 3, 5 and 10%. This enabled us to see how different amounts of foundation ownership affect the companies. The purpose of the robustness test is to make sure that when the criteria of a foundation changes, the regression still show the same result and therefore the primary regression result is robust and solid. All of these different percentage results showed a positive significant relationship between foundation ownership and ROA. The Tobin's Q tables were not significant and they varied between a positive and negative relationship. Tobin's Q still has a higher adjusted  $r^2$  compared to ROA but the result is not significant. The result of the robustness does not differ from our initial regression and we still do not have two out of three measurements that indicate the same result. In other words, the null hypothesis is still not rejected.

*Table 9. Financial Performance, Return on Assets (Foundation 10%)*

	Financial Performance, Return on Assets 10%			
	1	2	3	4
Foundation 10%	-0.095* (0.000)	0.103* (0.000)	0.105* (0.000)	0.105* (0.000)
Family on Board		-0.030* (0.030)	-0.033* (0.016)	-0.033* (0.015)
R&D		-0.001* (0.033)	-0.001* (0.016)	-0.001* (0.015)
Book/Market			-0.000* (0.006)	-0.000* (0.005)
Equityratio			-0.377* (0.008)	-0.388* (0.006)
Size				0.000 (0.452)
Constant	0.106* (0.000)	0.131* (0.000)	0.151* (0.000)	0.154* (0.000)
<i>Adjusted R<sup>2</sup></i>	0.11	0.12	0.14	0.14
f-value	50.37	18.97	14.43	12.10
p-value	0.000	0.000	0.000	0.000
n	409	397	397	397

The numbers with \* indicates significance at 5%. The numbers within the parenthesis is the significance

*Notes: This table presents the coefficient estimators for every variable from the regression model, including the constant and the significant level. For example, in the first row it shows if "Any Foundation" increase one unit, the ROA decrease 0,095, the significant level is less than 5%. The first row can be expressed as:  $ROA = Constant + (-0,095) * "Foundation 10%" + Error term$ .*

The robustness test included also unadjusted stock return as another alternative dependent variable. In the performance of unadjusted stock return, the foundation seems to have positive impact on the return of stock, although not significant enough to prove the positive affect. Since the unadjusted stock return does not take market risk into account, which Jensen's alpha does, it is therefore a less legitimate measurement. Unadjusted return is therefore not included in our primary financial measurements. The unadjusted return measurement is also used to assure that the results are relatively similar to the ones assembled through Jensen's alpha. The only difference between these are the systematic risk, the Jensen' alpha and the unadjusted stock return should not vary too much from each other. We also used two different Alphas, Pharmaceutical and World, in our regression to assess how the different markets affect the financial performance.



## 6. Discussion & Analysis

*This section presents the discussion of the reasons to the statistical result and the reasons why the data does not show correlation between non-foundation and foundation owned companies. We discuss the potential explanations with support of previously presented studies and theories.*

When performing our study we noticed a relatively high correlation of approximately 19% between research and development and "Any Foundation" ownership. We find this very interesting as the pharmaceutical industry is very dependent on how much money is spent on R&D. When we conducted an alternative regression with fixed effect of "Any Foundation" and R&D we found that if a company changed from no foundation to "Any Foundation" their R&D would increase by 4,27%. The value is also significant with an adjusted  $r^2$  of 11,59%.

These results reflect the ones Thomsen and Rose (2004) assumed were accurate in their study. We found no evidence of a significantly better or worse performance among our companies and the foundation owned companies have a higher relation with R&D. Cho (1998) discusses the positive relation between increased share price and the increase of R&D expenditure. He uses R&D expenditure as one of the financial measurements in his study which we find peculiar as our data shows us that increased R&D expenditures do not increase the financial value of the firm.

Foundations invest more in R&D according to our data, without any difference in financial results compared to the other companies we cannot see if it is generating any advantages. Perhaps there are other factors that lower the value of the companies. These disadvantages may or may not be ownership related.

Large shareholders have the disadvantage of increased risk at the same time they maintain the advantage of having more control and monitoring over the company. The cost for the risk and the monitoring might offset each other. If we look at the relationship between the variable Foundation 10% and R&D, these firms still have a high R&D but not as high as if were to compare with the companies that have any sort of foundation. Among these foundations one out of four companies have family in the board of the company. One possibility might be that we may have too few samples with 10% foundation to draw any valid conclusions. However, a not so unexpected correlation is the one between family ownership and R&D. The correlation is

negative which is also the same result discovered in studies by Villalonga and Amit (2006) as well as Thomsen (1996). Shleifer and Vishny (1997) also discuss this and they come to the same conclusion that large shareholders such as banks and families tend not to invest as much in R&D.

The fact that we have not been able to see enough significant data indicates that there might not be major differences in reality between different ownership structures, or there are more complicated factors about ownerships that we are not aware of. We have a combination of both non-foundation and foundation owned companies in the top pharmaceutical market. The difference between these two might be much smaller (Shleifer and Vishny, 1997) than we assumed.

The Tobin's Q gives us a significant negative relation with foundation ownership. This is then evened out by the positive relation given by ROA. When we computed our robustness test the data for the different percentages Tobin's Q became insignificant whilst ROA remained significant. The alpha measurement showed negative adjusted  $r^2$  which indicates that the regression line is poorly fitted compared with the data. Furthermore, the estimators are not significant either.

In spite of the criteria, the measurement of ROA has some shortcomings when it comes to calculation of EBIT. In our data collection, we use the EBIT that is presented on the annual reports. However, EBIT is something that can be changed and controlled with accounting methods by the managers, which makes ROA unreliable. Another weakness is that it does not include the company's cost of debt (De Wet, et al, 2007). A company can have a very high ROA and at the same time has a lot of debt, leading to a misinterpretation of the company's true value.

It is not completely flawless when it comes to Tobin's Q either. A couple of scholars researched on the US market and concluded that Tobin's Q predicts no more accurately than the fundamental accounting profit measurements (Blanchard, Rhee and Summers, 1990). Tobin's Q measures show a ratio between the market value of the equity and the book value of the asset. Therefore it is actually another version of market to book ratio (Henwood, 1997)

The market may have different valuation methods and attitudes towards foundation ownership. It may value foundation owned companies lower compared with non-foundation owned companies, which is shown by the Tobin's Q. By only looking at ROA the foundations earns

more EBIT in relation to total asset whilst the market does not predict the same. Moreover, Tobin's Q uses stock price in order to calculate the market value of the firm, which means that the value is actively and frequently updated by the market. However, the stock prices can also be manipulated as the buyers determine them and it is not realistic to assume that the market is always efficient. ROA on the other hand, is updated only once a year by the book values regardless the timing of the cash flow compared to Tobin's Q (De Wet, et al, 2007).

In our research we use a time period of 10 years. In the pharmaceutical industry the development of new medicines is approximately 13 years according to Kola and Landis (2004). Because of this long development time it might have been more appropriate to adapt a longer time interval for our data. However, this became apparent to us in hindsight and we decided to continue with the original data. In a future study a larger time period would be more appropriate.

In our data collection, there are a few foundation owned pharmaceuticals that have foundation owners who control more than 10% of the shares making them large block owners. Foundations tend to own a large amount of shares compared to other investors such as mutual funds and banks. Most of the companies we have observed are non- foundation owned, publicly traded corporate with small heterogeneous shareholders.

Non-foundation investor might have realized and learned to be patient, which means that the investment from non-foundation investors is more long-term. In other words, they have become patient investors. Foundations might also imitate the market behaviors of the for-profit investors in order to survive. After all, companies are competing on the same global market and the competition might outweigh corporate governance (Shleifer and Vishny, 1997) thus diminishing the difference between foundation and non-foundation. If foundation chooses to act as non-profit, they might put themselves in a risky position when comparing the risk of exiting from the market.

Foundation owned companies might unintentionally have a profit maximization aim as their goal is the survival of the firm. This means that foundation owned companies might adapt successful company strategies to their own but only with the intention to survive, not to maximize profit. It is not until after the result that a company knows if the strategy was successful or not.

One of the samples that we had to exclude was Boehringer Ingelheim which is a successful company within the pharmaceutical industry. This company is entirely family owned and the advantages of a large shareholder such as monitoring outweigh the disadvantages created by not being risk efficient. There are advantages of not being listed on the stock market for Boehringer Ingelheim. For instance, the firm does not need to report to its outside shareholders as often as other public traded companies. Boehringer Ingelheim can therefore see investment in a more flexible timeline without being concerned about annual reports and the reaction from the stock market. This makes the company more able to invest long term. However, the disadvantage is the lack of market control mechanism as the firm is not monitored by the outside shareholders (Fama and Jensen, 1983a). Furthermore, the private foundation owned companies have relatively less possibility to raise equity and have less accessibility to the capital market than the public companies.

Despite the fact that foundation ownership is considered to be less competitive in the profit maximization oriented market (Fama and Jensen, 1983a), foundations managed to stay in the competition with its quality and commitment (Hansmann, 2012), the reputation of the non-profit, charitable organization helps foundations to build up the intangible asset that is reflected in stock price.

Glaeser and Shleifer (2001) discuss how the foundation owned companies still can perform well. Among the reasons they mention are the managers' pride and how much they value their reputation. The firms represented in our sample are all successful firms. The non-foundation firm managers surely have these same incentives parallel to profit maximizing. If we were to look at companies that were not as successful with foundation ownership this might be because of uninspired managers creating agency costs because they are inefficient.

However, foundations have the tendency to stay in inefficient projects and investment excessively without considering the option of exit. Capital is therefore locked in the foundation, which violates the principle of free capital market (Thomsen and Rose, 2004). In an efficient free capital market, the capital should be as mobile as possible in order to invest in next generation products when technology and innovation are moving fast forward. Foundations receive the endowments from the founder's will and the investment may stay stable for a long period of time.

The family variable indicates if there is any presence of family in the board of the company. According to a study performed by Villalonga and Amit (2006) this is only positive when the actual founder is present. If a member of the family from the second generation is present instead this has a negative value for the company. Our results all show the same thing, in all the different regressions we have a negative value when there is family on the board. This is probably because the companies are old and that the original founder is deceased.

None of the merging companies among our samples have foundation ownership. This might be a coincidence if not for the fact that it is also what Shleifer and Vishny (1997) discusses in their paper. They state that maintaining foundation owners makes a hostile takeover more avoidable as the foundation does not have a gain in a takeover compared to a regular shareholder. In an industry where projects need time to prosper, a takeover could be fatal to projects and stable ownerships reduce this risk. However, this concept is not shared by all other authors. If the company shows weakness and shortages on financial performance, the mechanism of the market control (Grossman and Hart, 1988) should be able to absorb this unproductiveness by takeovers and mergers changing the leadership in pursuit of better productivity. There are advantages and disadvantages of takeovers and we think that it is impossible to set a standard for the entire market of what is optimal. Each individual case probably has a different solution to what is best.

## 7. Conclusion

*In this section we conclude our result and answer the research question. We will further explain our concern regarding the process of this study and thereafter suggest potential future studies. We will also discuss that even though we could not find the correlation between foundation ownership and financial performance, foundations still play an important role in the pharmaceutical industry.*

This study aims to examine the link between foundation ownership and financial performance in the pharmaceutical industry. Our null hypothesis is that there is no correlation between financial performance and whether the company is foundation owned or not.

Our Tobin's Q indicates that there is a significant negative relationship between itself and "Any Foundation" ownership. When we perform the same regression with 10% ownership it loses its significance. ROA has a positively significant relationship with a foundation. The ROA remains significant even when we use the 10 % ownership variable instead of "Any Foundation". The alpha measurements both have a very low adjusted  $r^2$ , both of the values are negative and therefore we have to exclude these measurements. The alpha value does not show any linear relationship with foundation. Since our criteria for rejecting the null hypothesis was that two out of three financial measurements have to show the same result which indicates that there is a correlation between the foundation owned and their financial performance. However, our findings does not support the criteria, therefore we fail to reject the hypothesis.

Our average Q ratio shows that average firm's market value is undervalued and no companies are overvalued. The maximum value is close to 1 but none of our values exceeds 1 in our sample. The alpha values mean are negative and they perform worse compared to the expected return on the market. They are very close to each other but the alpha value of the world market is closer to zero than the one that is market specific. The values vary between a minimum of -0,7 and a maximum of approximately 1,4. However since the average value of the alpha is negative the majority of the firms have a value that is below the expected return of the market. ROA has a mean of 0,116 indicating that the invested money in assets is not fully returned as future earnings.

### **7.1 Future Studies**

A future study regarding family ownership within the pharmaceutical field would be interesting as there are both positive and negative sides of family ownership. Since it has been more frequently discussed in other industries and other fields, the future study of family impact on pharmaceutical firms will help to shed light on the foundation ownership. There are also companies who maintain a mixture of both foundation and family ownership. It would be interesting to compare the financial results of these with companies who only have one sort of ownership to find out which is better. Furthermore, there is a discussion in this study regarding R&D investment and whether foundation owned companies invest significantly more in R&D, therefore it would be interesting to include more foundation owned pharmaceutical companies and a larger sample to examine this assumption. It would also be interesting to conduct a similar study with qualitative approach. This brings the researcher much closer to the field and the reality compared with a quantitative approach. The data and regression are in comparison more distant to the real world of pharmaceutical daily operation. An idea for a qualitative study could be to compare a few different foundations owned and non-foundation owned companies with similar financial performance more thoroughly. This might help to determine what factors lay beyond a financial decision.

### **7.2 Managerial Implications**

This study can be used as a base for conducting future studies within the foundation ownership field. However a future study should maintain more samples to help create a general idea of how the market and the companies respond to foundation ownership.

### **7.3 Endogeneity**

Endogeneity of the ownership should be examined in the future or in a further study. In this study we conclude the result without testing the endogeneity of the independent variable, due to the reason that the changing of the foundation ownerships is minor and neither of our sample companies has had dramatic changes in the amount of shareholding. (Hsiao, 2003) Since the exogeneity of the independent variable is a strict fundamental assumption of OLS, it is important to note that if the assumption does not hold, the OLS model lose its consistency of the results (Wooldridge, 2010). However, we do believe the exogeneity of the foundation ownership is

likely to be correct assumed.

## 7.4 Foundations

Many foundations stand behind as supporters for fighting serious diseases such as cancer, HIV and Ebola, foundations not only have more patience and are more long-term investors, they also contribute to encouraging the innovation and development in the pharmaceutical field by awarding scholarships and prizes. Most of the foundations such as Novo Nordisk and Eli Lilly award prizes to researchers who contribute to outstanding breakthrough in the pharmaceutical field, which is a very important incentive for innovation from the society's perspective. Among these foundations, one of the most well-known is The Nobel Foundation. The Nobel Foundation has encouraged scientists in pursuit of scientific breakthroughs for the humanity by awarding one of the most prestigious prizes to the medical research area. Foundations contribution to innovation in the pharmaceutical field cannot be underestimated although it does not show significant difference from a financial perspective.

Since foundation ownership is less common outside Europe this has not been thoroughly examined and discussed among researchers. There are numerous advantages and disadvantages of foundation ownership and there is a weight off between these according to the different economic theories. Some advantages of foundations are that they are flexible when investing money and that they are long-lived. However, this can also be a disadvantage as these companies may remain in the market longer than they should instead of filing for bankruptcy. In conclusion, from our study we do not find a significant difference between foundation and non-foundation ownership at least not from a financial perspective.



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