

Charles University

Faculty of Social Sciences
Institute of Economic Studies



MASTER'S THESIS

**Equity incentives and company
performance**

Author: **Bc. Theodor Šárec**

Supervisor: **prof. Ing. Evžen Kočenda M.A., Ph.D., DSc.**

Academic Year: **2018/2019**

Declaration of Authorship

The author hereby declares that he compiled this thesis independently; using only the listed resources and literature, and the thesis has not been used to obtain a different or the same degree.

The author grants to Charles University permission to reproduce and to distribute copies of this thesis document in whole or in part.

Prague, January 4, 2019

Signature

Acknowledgments

I would like to express my deep gratitude to my supervisor Professor Evžen Kočenda for his guidance and useful comments.

Abstract

The equity-based incentives are considered to be one of the instruments helping to motivate executives. The use of this compensation framework should in theory tackle and mitigate the agency problems, and prevent the possible attempts of managers to pursue their own interest over the interests of shareholders. The literature focusing on the effects differs greatly. There is no conformity over the effect of equity compensation on company performance. This research study the effect of CEO-related equity incentives and stock ownership on company performance. The main finding is the positive effect of the equity incentives measured by the percentage of CEOs' equity-based compensation on company performance proxied by the change in Tobin's Q. The thesis does not find any significant effect of insiders' stock ownership. The dataset of 107 publicly traded US companies is used for the empirical analysis. The results are estimated based on a fixed effects model and pooled ordinary least squares. This thesis contributes to the ongoing debate over the effects. It also widens the narrow literature on the structure of compensation.

JEL Classification	M120
Keywords	Equity-based, CEO, compensation structure, equity ownership, company performance
Author's e-mail	theo.sarec@gmail.com
Supervisor's e-mail	Evzen.Kocenda@fsv.cuni.cz

Abstrakt

Akciové pobídky jsou považovány za jeden z nástrojů, který pomáhá motivovat vedoucí pracovníky. Použití tohoto odměňovacího rámce by mělo podle teorie řešit a zmírňovat problém zmocnění a předcházet možným pokusům vedoucích pracovníků maximalizovat vlastní užitek na úkor užitku akcionáře. Názory a poznatky v literatuře na vliv akciových pobídek pro ředitele na výkonnost společnosti se rozcházejí. Tato práce se zabývá vlivem akciových pobídek pro ředitele a vlastnické struktury akcií ředitele na výkonnost společnosti. Primárním výsledkem této práce je zjištění, že vliv akciových pobídek, měřených procentem pobídek na celkových odměnách, na výkonnost společnosti měřené změnou v Tobinově Q, je statisticky signifikantní a pozitivní. Tato práce nenachází žádný statisticky signifikantní vliv vlastnické struktury ředitele na výkonnost společnosti. Jako předmět empirické analýzy je použit datový soubor 107 veřejně obchodovaných amerických společností. Výsledky jsou vypočteny pomocí fixed effects modelu a pooled OLS modelu. Tato práce přispívá k probíhající debatě na téma vlivu pobídek. Práce taky rozšiřuje relativně omezenou literaturu zabývající se strukturou odměňování.

Klasifikace	M120
Klíčová slova	Akciové pobídky, výkonnost společnosti, vlastnická struktura, struktura odměňování
E-mail autora	theo.sarec@gmail.com
E-mail vedoucího práce	Evzen.Kocenda@fsv.cuni.cz

Contents

Master's Thesis Proposal	vii
1 Introduction	1
2 Literature Review	4
2.1 Equity incentives as one of the solutions to principal agent problem	4
2.2 Compensation structure and company performance	5
2.2.1 Equity based compensation for all employees.....	11
2.3 Different ownership levels and company performance	13
2.4 Hypotheses Statement.....	16
3 Data description	17
3.1 Description of dataset	17
4 Methodology	23
4.1 Methodological approach	23
5 Results	28
5.1 Results of the regression.....	28
5.2 Other Results	31
6 Discussion	32
6.1 Equity-based compensation and company performance	33
6.2 Stock Ownership and company performance	35
6.3 Other results & Robustness Checks.....	37
7 Conclusion	39
Bibliography	42

Master's Thesis Proposal

Author:	Bc. Theodor Šářec
Supervisor:	prof. Ing. Evžen Kočenda M.A., Ph.D., DSc.
Defense Planned:	January 2019

Proposed Topic:

Stock option incentive and company performance
--

Motivtion:

Equity stock options, as a part of equity incentives for CEOs and other company top managers, are nowadays a solid part of compensation structure in a vast majority of publicly traded companies in the United States. This state of things is an outflow of 30 years lasting substantial growth in share which followed the development of agency theory and its incorporation to corporate governance in the 1970s (Frydman & Jenter, 2010). Agency theory suggests that the best possible way to assure top managers of a company to pursue the same motives as the company's shareholders is through the employment of equity incentives which should decrease agency costs for company owners (Jensen & Meckling, 1976). In comparison, during decades preceding the 1970s, the use of equity incentives for top management was negligible (Frydman & Jenter, 2010). Since then equity-based incentives became a crucial substance of the compensation systems.

Despite Mehran (1991) mentioning a lack of understanding of equity incentive influence on company performance, studies suggesting a positive relationship between share of equity options in compensation and company performance were carried out mainly in the 1990s. Mehran (1991) suggests there is a positive relationship between total shares owned by managers and company's performance. Jensen & Murphy (1990) also claim that right incentive to maximize company value is through equity incentives. Himmelberg et al. (1999) suggest that managers who are enabled to own some margin of a company are motivated to improve company's performance and thus increase their own wealth. Nevertheless, prevalence of positive opinions towards equity incentive mechanism changed as the discussion about this framework moved to the new millennium. Dalton et al. (2003) as well as Frydman & Jenter (2010) suggest that there is no benefit of equity incentive frameworks on performance indicators such as ROE or Tobin's Q. Rather negative findings are suggested by Rajgopal et al. 2004 who state that stock options are negatively connected to future shareholders value as well as firm performance.

As many findings lately start to accentuate scepticism towards equity incentives, there is a motivation to examine certain questions. Is there a negative effect of equity options on company performance? Does the share of stock options in the compensation structure matter? There is also an opportunity to introduce new topics which haven't been studied in detail yet. Is there any difference in the effect of equity incentives in sectors heavily dependent on business cycle such as energy sector?

Hypotheses:

1. Hypothesis #1: Equity options have negative effect on company performance
2. Hypothesis #2: Share of equity options on total compensation has a positive effect on company performance.
3. Hypothesis #3: Effect of equity options in sectors dependent on business cycle is weaker.

Methodology:

To examine equity options as a percentage of the whole compensation, it is necessary to assess value of stock options using Black Scholes formula. The data sample consists of US companies from several different sectors within the economy. Each time, the five biggest companies based on market capitalization are chosen to ensure coverage of the whole economy. Datasets are collected from financial and proxy statements of each company. The main variables are describing the relative compensation structure of executives in each company, percentage of equity held by managers and variables describing company performance such as ROA, ROE and Tobin's Q. The hypotheses above are tested cross-sectionally employing Ordinary least-squares estimation with the dependent variable being a measurement of company's performance. The independent variables are then compensation structure, the percentage of equity held by executives and variable describing business cycle dependent companies. The structure of the OLS model follows the one proposed by Mehran (1991).

Expected Contribution:

The current discussion about equity incentives in academic literature argues whether there is any empirical effect of equity incentives on shareholders in terms of firm's performance or if it is just a framework, implemented in corporate governance as the best practice, based on rationale usage of agency theory.

Equity options are nowadays a vital part of top management's reward. Based on the share of companies using this framework, there is a strong belief among shareholders that this is the most efficient way to organize relationships between shareholders and top managers to ensure positive future for a company. Any empirical findings introduced in this thesis could contribute to existing debate. The outcomes of academic discussion should then help to improve future efficiency of corporate governance.

Outline:

1. Introduction
2. Literature review & Theoretic Background
3. Institutional background
4. Data and Methodology
5. Empirical Results
6. Discussion
7. Conclusion

Core Bibliography:

1. BARENBAUM, Les; SCHUBERT, Walt. Measuring the Value of Executive Stock Options. *Compensation & Benefits Review*, 1993, 25.5: 19-24.
2. DALTON, Dan R., et al. Meta-analyses of financial performance and equity: fusion or confusion?. *Academy of Management Journal*, 2003, 46.1: 13-26.

3. FRYDMAN, Carola; JENTER, Dirk. CEO compensation. *Annu. Rev. Financ. Econ.*, 2010, 2.1: 75-102.
4. HIMMELBERG, Charles P.; HUBBARD, R. Glenn; PALIA, Darius. Understanding the determinants of managerial ownership and the link between ownership and performance. *Journal of financial economics*, 1999, 53.3: 353-384.
5. JARQUE, Arantxa, et al. Measuring CEO Compensation. *Richmond Fed Economic Brief*, 2016, Mar: 1-6.
6. JENSEN, Michael C.; MECKLING, William H. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 1976, 3.4: 305-360.
7. JENSEN, Michael C.; MURPHY, Kevin J. Performance pay and top-management incentives. *Journal of political economy*, 1990, 98.2: 225-264.
8. MEHRAN, Hamid. Executive compensation structure, ownership, and firm performance. *Journal of financial economics*, 1995, 38.2: 163-184.
9. RAJGOPAL, Shivaram; HANLON, Michelle; SHEVLIN, Terry. Large sample evidence on the relation between stock option compensation and risk taking. 2004.
10. TINGLE, Bryce C. How Good Are Our Best Practices When It Comes to Executive Compensation: A Review of Forty Years of Skyrocketing Pay, Regulation, and the Forces of Good Governance. *Sask. L. Rev.*, 2017, 80: 387.
11. UDELL, S. Understanding stock options. *American Journal of Family Law*, 2008, 22.1: 23.

Author

Supervisor

1 Introduction

The proper alignment between the motivation of shareholders and the motives of managers is one of the key conditions for the efficient operation of a company. The issue occurs when managers pursue their own interests over the interest of shareholders. The problem with the mismatch of the interests between the shareholders in form of a principal and the managers in form of an agent was firstly proposed by Jensen & Meckling (1976) and formulated in the agency theory. The literature since then studied what the best ways to mitigate this problem are. The equity-incentives as a method to motivate executives were proposed by (Grossman & Hart, 1983; Jensen & Murphy, 1990). Since then, the use of the equity incentives increased. The rapid rise in the number of incentives took place mainly in the 1990s, Kim *et al.* (2010). At the moment, the overall high levels of the equity incentives are a subject of discussions and this topic resonates among the wider public. However, the literature does not have a proper answer to the actual empirical effects of the equity incentives. There is no common ground on the sign of the effect of equity-based compensation in relation to company performance, Guay *et al.* (2002). The positive effect is proposed (by Mehran, 1995; Frydman & Saks, 2010; Blackwell, 2007). Moreover, the papers (by Kato *et al.* 2005; Tai, 2004) suggested a positive effect of option contracts and a positive impact of stock awards was proposed in the paper of Habib & Ljunqvist (2005). On the other hand, a negative effect of the equity incentives was proposed (by Balafas & Florackis, 2014; Hasegawa *et al.* 2017; Brick *et al.* 2006). The paper by Yermack (1997) proposed a negative effect of option incentives. In the study of Brick *et al.* (2006), the whole benefit of additional excessive compensation is suggested to have a negative effect. This disparity in the literature represents a compelling argument for additional research.

The purpose of this thesis is to study the relationship between equity-based incentives, insider stock ownership, and company performance. The question is whether there is any effect of equity incentives on company performance. The other question is if there is any effect of insider stock ownership on company performance. To study these questions, I employ framework used by Mehran (1995) who studied the effect of compensation structure on company performance proxied by market-related

Tobin's Q and account-based Return on Assets. The thesis borrows the basic model and adds the control variables proposed by Brick *et al.* (2006). The added value of this research is the employment of the panel data. In comparison to Mehran (1995) who used cross-sectional data, this study employs panel data of 107 companies publicly traded on NYSE between 2007 and 2017. The use of panel data gives us the opportunity to employ a framework of lagged variables as proposed by Brick *et al.* (2006). This helps us to prevent possible endogeneity as suggested by Palia (2001).

I employ a fixed effects model and pooled ordinary least squares model to estimate the empirical effects. I find a statistically significant positive effect of the percentage of CEOs' equity-based compensation on company performance proxied by Change in Tobin's Q. The effect holds in the basic model as well as in the model with control variables. The positive statistically significant results hold in both estimation methods.

I find no effect of the percentage of CEOs' stock ownership level on company performance. The result is insignificant in all model and for both methods. I propose two main reasons for these findings. The insignificant results might be caused by the fact that we control for each company's heterogeneity, Himmelberg *et al.* (1999). The other explanation is the suggestion that the company ownerships are influenced by numerous market-based variables, unique for each company, Demsetz & Villalonga (2001).

The main goal of this thesis is a contribution to the current literature with the following topics. The first addition is the use of model based on the equation proposed by Mehran (1995). The primary input of this thesis to the original estimation framework is the utilization of panel data. The longitudinal data enable to observe the effect of incentives and stock ownership on company performance in the next period. Another addition is the use of a wider range of control variables that control for companies' growth opportunities, risk, indebtedness and size. The selection of control variables is based on the research proposed by Brick *et al.* (2006). The author used panel data in comparable settings as well and the choice of control variables, therefore, suits better to my setup. This thesis contributes to the narrow stream of the literature that is concerned with the structure of compensation rather than the absolute levels. The prevailing majority of the literature is interested in the absolute values of equity incentives. From these authors, the larger part is interested in option contracts. On the contrary, this research studies the whole sum of equity awards. Another contribution

of this equation is the use of Change in Tobin's Q as a proxy for company performance instead of the usual Tobin's Q. I also employ Return on Assets to inspect the effect on the accounting-based variable as suggested by Mehran (1996). However, the variables in the estimation were not significant.

The thesis is structured as follows. The literature review chapter draws a summary of major and recent papers in the field of study. The opening consists of a brief description of the agency theory and proceeds with the review of the literature on equity-based compensation and company performance. The remaining part of the literature review outlines the researches on the effect of insider stock ownership on company performance. The data & methodology part consists of two segments. The first section describes the process of data collection, data structure and definitions of each variable employed. The second section describes the used methodology. The Result section summarizes the outcomes of regression estimation. Interpretation of the empirical results and comparison to the findings in related literature can be found in the Conclusion chapter. Finally, the Conclusion part of the thesis closes the whole study and suggests riveting areas for possible future research.

2 Literature Review

2.1 Equity incentives as one of the solutions to principal agent problem

One of the most important relationships in any corporation is the one between shareholders and managers who are responsible for the control over a company. The motivations of the shareholders are obviously an increase in their wealth and a well-being of the company. In order to pursue these goals, shareholders delegate their deciding power over a company to the hands of specialists. These individuals, who have the needed ability, should be able to govern the company most effectively.

The problem, which arises with a delegation of powers from owners to managers, describes the agency theory firstly proposed by Jensen & Meckling (1976). The theory defines a relationship between a manager as an agent and an owner as a principal in a way that the principal delegates some decision making to the agent. The main issue arises, as the principal and the agent tend to maximize their own utilities. Thus, there is a danger of agent acting in a specific way and not maximizing the principal's utility. In this setting, it is a situation when the manager is not maximizing the utility of the owner. Therefore, the owner ensures his goals by an introduction of incentives for a manager, Jensen & Meckling (1976). The authors suggested that the other instrument, owners respectively shareholders, also use are the monitoring costs which are designed to lower possible unsolicited behaviour of the manager. Next used instrument are the bonding costs which is the amount principals give to the agent in an expectation that he would not proceed in some actions that would be against maximization of their utility. Jensen & Meckling (1976) suggested that it is simply unattainable to guarantee fulfilment of the principal's expectation without any costs. The authors proposed that these two costs, the bonding and the monitoring, will be positive in most relationships between principals and agents. Moreover, there is still some dispersion between things, which are in the best interest of shareholders and the actual state of things proposed by the manager. The costs associated with these dispersions are, as suggested by the authors, the residual loss. Taking all the costs

together, the authors proposed that agency cost is a sum of the bonding costs, the monitoring costs, and the residual loss.

As stated by Jensen & Meckling (1976), the relationship between a manager and a shareholder, which is caused by diffuse ownership over a corporation, is a very good example of agency theory in practice. Moreover, the authors suggested that understanding of the basis of agency costs of the company, which is a price of principal's welfare lost by delegating the responsibility to the manager, leads to a theory of the capital structure of a company, executive compensation, and board structure. Then, the question is whether well set-up compensation structure can influence the company performance and if the insider's equity ownership has any effect on company performance. The literature finds different answers to both questions as presented in the next sections.

2.2 Compensation structure and company performance

The notion that equity incentives serve as a good instrument to improve company performance is one of the suggestions by Jensen & Murphy (1990). Nevertheless, since this study was published, there has been still underway a debate of researchers about this topic. The question whether equity incentives serve as a good instrument for the improvement of company performance and stock price was a central element of a broad spectrum of researches made in the last few decades. Regardless of great attention in the past literature, there is still no common ground on the effect of equity compensation in relation to company performance, Guay et al. (2002). A wide spectrum of studies suggested positive influence of executives' options and restricted stock programmes on company performance. On the other hand, there is a substantial stream of literature that introduced a different conclusion. The following section sums up the literature describing the phenomenon. The summary begins with papers from 1990s that have contradictory findings. The next paragraphs consist of summaries and comparisons of newer studies.

Lewellen et al. (1992) focused their research on a relationship between size of executives' incentive packages and performance of companies. The main question was whether there is any performance improvement for the companies. According to the authors and based on the data from 49 Fortune 500 companies from 1964 to 1973, there

was a positive connection between the size of incentives for top managers and the share price and operating profitability in studied companies. Thus, author suggested that settings of compensation design might improve agency problem across various corporation.

The different findings to Lewellen et al. (1992) were proposed by Yermack (1997) who studied on the data from S&P 500 companies CEOs' stock option contracts between 1992 and 1994 and possible influence of managers on their contracts. According to the author's findings, there is a connection between the timing of stock option received and positive development of stock price. The improvement in price was taking place 50 days after the award nonetheless the decision to award these options is shared with general public after 3 months. The author suggested that the interpretation is different to the ones proposed in other studies. The stock options are not affecting the later performance of the company, instead CEOs are acquainted of good financial results of a company and positive financial outlook. Therefore, CEOs manipulate committees to get more performance-based options which they realize with a profit.

A newer paper which found a positive effect of option contracts was proposed by Kato et al. (2005). The change in Japanese Commercial Code allowed the authors to study possible influences of stock option packages on company performance. Until 1997, there was a ban on stock option schemes among Japanese corporations. In 1997, the Japanese Commercial Code was changed and allowed firms to set up option contracts for their executives. The abundance of the old Code served as a unique setting for an investigation of the relationship between the option schemes and the company performance. The period between 1997 and 2001 was a subject of the research. Kato et al. (2005) suggested that the option plans are more represented in the companies with greater expanding potential, also the more leveraged the company is the probability of it having option scheme decreases. The main result of the research was that there is a clear positive relationship between well set up option schemes and increase in shareholders' value.

Comparable to Kato et al. (2005) is the research by Tai (2004) who also worked with non-US dataset and presented findings supporting the positive effect of the option schemes. The author studied the relationship between incentives for executives and financial performance on a sample of companies who became winners of Malcolm Bridge National Quality Award between 1988 and 1998. In order to control for industry

specifics, each company was paired with a company from the same industry. The main finding was a positive relationship between option schemes and company performance.

Many of the studies that explain the effect of equity-based compensation used absolute values of the equity awards. Mehran (1995) on the other hand focused on the reward structure rather than the total amount itself. Apart from equity-based compensation, the author also analysed the effect of ownership structure and structure of a board. The author used data from 153 randomly chosen U.S. manufacturing companies between years 1973 and 1983. The performance numbers were obtained from COMPUSTAT database, however, the data which showed the structure of compensation were manually picked from the proxy statements of the companies. The hypothesis was tested using two models. In the first model, compensation structure was regressed on ownership structure variables and control variables. In the second model, firm performance was regressed on compensation, ownership structure, and control variable. According to the authors, the results suggest that stock option incentives are positively linked to operating output. Authors also suggest that the level of incentives itself is less important for company performance than the structure of rewards.

A representative of the more recent literature who studied compensation structure is Frydman & Saks (2010). In their study, they dealt with an issue which affects this research field in finance. The problem is that most studies are focused on the US based market or US exchanged companies. They studied 3503 firm-years between 1999 and 2005 in the Australian market. This setting offered, according to authors, bigger differences in compensation structures compared to the US where the differences were rather small. There was substantial proportion of companies rewarding their managers only with cash type compensation, other group with only equity and the rest of companies used a combination of the former two. Using these differences in compensation, authors were able to study the effect of different incentives on company performance. Their main goal was to study the efficient design of managerial incentives. The efficient design is a concept firstly proposed by Jensen & Meckling (1976). It is a framework of compensation in which the agency costs are reduced to minimum. According to Frydman and Saks (2010), the companies with rewarding structure different to the efficient design face consecutively worse performance compared to the companies with awards better aligned to efficient state. Moreover, the authors suggested that both cash rewards and equity-based awards are effective to do so.

In contrast with suggestion from Frydman & Saks (2010) that the equity-based awards have positive effect on company performance is the research by Habib & Ljungqvist (2005) who studied the hypothesis that managers do not maximize shareholders' value. Using the difference between hypothetical shareholders' value maximizing Tobin's Q and real Tobin's Q in an estimation, the authors suggest that US publicly traded companies fell behind in the researched period. The authors suggest that the falling behind might be caused by incorrect incentive strategy choice. The CEOs and other executives were in the research period awarded with excessive amounts of stock options which were more sensitive to company risk. The levels of stock awards were on the other hand too low. The performance, after boards have changed the incentives, prompted a positive relationship between greater use of stock awards and improved performance.

Balafas & Florackis (2014) is another example of recent literature studying the relationship between corporate governance set-up and corporate performance. The authors study relationship between different CEO reward setups and future company operational performance as well as stock returns. The main objective is then to study hypothesis which states that the increase in reward paid to executives has any influence on consequent future performance and serves as a tool for preclude agency problems among executives. Authors employ BoardEx datasets from London Stock Exchange between years 1998 and 2010 where the sample consists of 1787 companies. According to authors, this study is the first to address this problem using data LSE companies. In order to examine the difference and to be able to distinguish benefits for shareholders of single pay components, both cash reward, as well as equity incentives, are part of the model. Moreover, to study an influence of CEO reward on the operating performance, authors deploy model firstly used by Cooper et. Al (2016) and regress the t+1 return on operating assets on above average compensation and other company, CEO and director specifics. According to Balafas & Florackis (2014), the result suggests that there is a negative effect of incentive pay on future company performance. The authors extend their findings with a comparison of single ends of the spectrum. The difference between the 2% of companies with least paid CEOs and their 2% opposition with the highest paid CEOs reveals high differences.

Another research that studied what is the most efficient compensation framework is Hasegawa (2017). The difference of this paper to some others mentioned in this review is the usage of an accounting operational ratios as a proxy for company

performance. Hasegawa (2017) et al. studied the empirical effect of equity incentives introduction on company performance in Japanese corporations after the year 2000. The usage of data from Japan is also quite interesting and rare. According to the author, as the result of the downturn in the late 1990s, there was a shift towards U.S. type of incentives scheme and corporate governance. The main goal of the research was to study the effects of herding behaviour and whether Japanese companies are exposed to this phenomenon. According to the author the shift from conservative style of reward towards a system where a large portion of remuneration is option based. If majority of the companies in one specific industry decides to implement this type of U.S. style corporate governance, the rest of the companies which are in the minority might decide to pursue this change based on the need to not be in the minority. The other goal of the research is to find out if there was any link between equity options and company performance, more precisely if the introduced stock options influenced positively company performance. The data of companies listed at Tokyo Stock Exchange between years 2004 and 2008 were used in the analysis. The authors suggested according to their findings that the introduction of the stock option is represented mainly in an industry where the ratio of option-based schemes among companies was high prior to the change. This confirms their hypothesis about “herding phenomenon”. Moreover, the authors suggested that with the introduction of equity incentives, the operational performance weakened, nevertheless pay-out and liquidity ratios remained without a change. Thus, this study can be added to a stream of literature which doesn’t support premise which states that the equity incentives are the right instrument to improve corporate performance.

The recent research by Cooper et al. (2016) is consistent with findings of Hasewaga (2017) who studied the relationship between stock option incentives and possible influence on future company performance. The main hypothesis of the research stated that overconfident executives are motivated to enter equity incentive schemes. The main objective of these schemes is an increase in company performance but the CEOs are motivated to enter to these schemes and then are more likely to fail to deliver. That implies a negative link between equity incentives and long-term performance of the company. The authors studied this hypothesis on the data from Execucomp U.S. S&P1500 companies between years 1994 and 2015. Based on the results from their investigation, the authors suggested that incentive pay has a negative effect on forthcoming stock returns of the company. According to the authors, there is

a contrast between what the equity incentives such as restricted stock and stocks options are designed to deal with and what in fact these are responsible for. The instruments which are used in order to mitigate agency problems and support shareholders' goal of good stock performance are causing what is the complete opposite.

Another paper from a group of researches that suggested findings not supporting the positive effect of executive option plans on company performance is Core et al. (1999) who approached the CEO incentives phenomenon from a perspective of quality of corporate governance. The main aspiration of the research was to find out if there is a connection between structure and amount of executive's reward and quality of corporate governance. Additionally, authors were interested whether the expected poor performance of corporate governance has some effect on following company performance from a perspective of accounting figures and share price. The data used in this analysis were a sample of 495 observations from 205 publicly US corporations between 1982 and 1984. The main findings proposed by authors were that firstly the ownership and board structure influence the level of CEO reward, the higher level of the CEO compensation is as suggested influenced by poorer levels of governance in the company. Secondly, the amount and structure of executive reward which is a consequence of the weak governance are responsible for poorer financial results and lower stock price. Based on these findings, the authors suggested that board and ownership structure serve as a good sign for a future financial and stock performance. The authors created links to agency theory. The problems are result of weak corporate governance and consequently these companies with agency problems consequently overpay their executives and at the same time, these same companies have poor financial results.

From a different perspective but with the same suggestion of negative effects came up Brick et al. (2006) who studied the relationship between CEO compensation and firm performance by the employing data from Standard and Poor's Execucomp and COMPUSTAT between 1992 and 2001. The main goal of the research was to shed light on a hypothesis which stated that excessive awards for CEOs and directors result in weaker company performance. There were two main findings which are emphasized by the authors. In case of CEO and director compensations after controlling for directors' monitoring, which is closely linked to director's reward, there is highly significant relationship determined. The author suggested that the connection between

directors' and CEOs' reward might be hypothetically caused by either some omitted complexity within the company or by a practice of insufficient monitoring among executives popularly related to as cronyism. Based on these findings, the authors question the effect of the complexity and insufficient monitoring of the future performance of the company. The suggested result is that due to the linkage between directors and CEOs compensation being a consequence of insufficient monitoring (cronyism), there is a negative correlation between excessive rewards for directors and CEOs and firm performance.

Finally, the last-mentioned research is quite interesting study by Blackwell et al. (2007). The main advantage of their research is an innovative approach. The authors studied the effect of compensation structure on company performance around the arrival of new CEO. The company performance was measured as a difference between the two-year average of Tobin's Q after the arrival of new CEO and Tobin's Q of the former CEO in his/her last year. They argued that with the end of old CEO, who was released from the employment, there was an opportunity for the shareholders to come up with a new compensation structure. The newly set up framework should have worked then in the shareholders interest and the operational performance should have been improved. Based on the data of 125 changes of CEOs between 1982 and 1991, the authors suggested that there is a positive relationship between the percentage size of stock grants on total compensation and the future company performance. The authors also differentiated between forced and voluntary terminations of the employment. In case of subsample with forced turnovers, there is a positive effect of option grants on company future performance. Moreover, authors suggested that the restricted stock grants are better instrument for motivating CEOs to steer the company in right direction than stock options. The stock grants are more firmly linked to better future performance.

2.2.1 Equity based compensation for all employees

The effect of equity incentives is mainly studied on data describing compensation for executives or directors. The effect of equity incentives awarded to all employees is studied much rarely. In the following section, I provide a short review

of two studies (Frye, 2004; Sesil *et al.*, 2000) that research this topic. In both cases then the authors find the effect of equity incentives positive.

Frye (2004) studies the relation between equity incentive plans and company performance among all employees. The use of all employees instead of just only executives or CEOs represents a different approach. One of the findings proposed by the author is the fact that there is a substantial increase in equity awards in the late 1990s. Employing Tobin's Q as proxy for company performance, the author finds a strong support for the positive relationship between equity incentives for all workers including executives and company performance. The author finds that greater equity incentives are followed by increased performance and vice versa. Nevertheless, in case of use of accounting variable as company performance proxy and substituting Tobin's Q for return on assets, the results differ. According to authors, an increase in equity awards does not result in an increase of ROA.

The main goal of the paper of Sesil *et al.* (2000) study is to examine the usage of equity stock options among wide portion of companies' employees and the effect of this corporate governance. The authors study the effect on dataset of US companies during late 1990s. Based on the results, the authors suggest that there is no decrease in company performance in connection with an introduction of stock awards for employees. Furthermore, authors suggest that the effect of an increase caused by higher incentives results in an additional performance which covers up for the costs associated with the stock options. The authors also suggest that the option incentives come handy in the case of new fast-growing companies which are better able to attract new talents and continue the growth in long-term horizon.

To sum it up, the literature on the effect of equity-based compensation on company performance introduces inconsistent findings. There is not one common explanation on the effect of equity incentives. The positive effect of stock option incentives which are part of equity incentives was proposed by (Kato *et al.* 2005; Tai, 2004). On contrary, the negative effect was presented by Core *et al.* (1999). The papers by (Mehran 1995; Frydman & Saks 2010; Blackwell, 2007) introduced positive effect of equity incentives. Moreover, the study by Habib & Ljunqvist (2005) showed a positive effect of stock awards. The positive effect of incentives as a whole was presented by Lewellen *et al.* (1992). Contradictory findings about the effect were presented by (Yermack, 1997; Balafas & Florackis, 2014; Hasegawa *et al.* 2017; Brick *et al.* 2006).

2.3 Different ownership levels and company performance

The levels of ownership among executives and their linkage to company performance are studied by a substantial proportion of researchers. There is however not one common outcome of these studies. There are two main views on the effects of managerial ownership and company performance. The first view suggests that there is an effect of the level of ownership on company performance. Though, this effect is positive across all ownership levels or differs in particular levels of the ownership. The second view suggests that the level of managerial equity ownership has no effect. The summary begins with literature from the 1990s and then it continues with an overview of more recent literature. The core of research literature on this topic, however, lies in the 1990s and early 2000s when the subject received the most attention.

Morck et al. (1988) suggested a substantial effect of the level of managerial equity ownership on company performance. The study was carried out on a cross-sectional sample consisting of Fortune 500 companies. The first finding suggested by authors is an increase in company performance, measured by Tobin's Q. Among companies with managerial ownership between 0% and 5%, company performance is positively affected. The increase is also persistent among companies with management ownership exceeding 25%. The second finding is a contrary effect of ownership on companies with management shareholding between 5% and 25%. According to the authors, an increase in company performance can be understood as an evidence of unification of motivation between owners and managers. On the other hand, a decrease can be described as an evidence of entrenchment among executives. These basic explanations, however, do not explain the whole outcome of the model. The authors propose an explanation for their findings. In case of a positive effect among companies with ownership in the lowest class between 0 and 5 percent, the authors suggest the very high effect on performance measured by Tobin's Q. This can be caused by the fact that the companies with ownership lower than 5% are in large portions awarding their managers with substantial equity incentives as these are well-performing companies with high Q.

Another study which showed a positive relation between manager stock ownership and company market performance was McConnell & Sarveas (1990). The Tobin's Q was once again used to measure performance. The authors suggested that with a lower percentage of ownership the effect is stronger. However, with the increasing percentage, however, the effect decreases. In case of insiders with a high level of ownership, the effect is negative, although the slope of decrease is very shallow.

Agrawal & Knoeber (1996) used data from 400 US large firms during 1987 to study the effect of seven control mechanisms on company performance. In case of regressing firm performance on every mechanism individual, there is a statistically significant relationship for each variable. Based on this result, an increase in management ownership has a positive effect on company performance. However, there is evidence of interdependence between variables which the authors used. The authors, therefore, employ a regression of all variables to control for this dependence. The outside directors on board is the only significant variable remaining. According to the authors, the effect of all remaining variables is insignificant. This is in line with the notion of the effective use of all mechanisms. In case of the variable outside directors on board the increase in their number reduces the performance of a company. The authors explain this phenomenon as the evidence about a decrease in performance due to the appointment of politicians or some activists who are interested in different goals.

Ofek & Yermack (2000) used data from 1646 companies on manager stock and option ownership between 1993 and 1995. The authors studied the changes in the portfolio of managers base on their original stock ownership and their yearly stock and option awards. Based on their findings, the authors suggested that there is a distinct difference between a behaviour and decision making of managers with minimal stock ownership and individuals with a substantial holding. The group with small ownership levels showed no sales of stock holding after allocation of new stock options and only sales of small magnitude in case of restricted stocks. In case of the latter group with higher holdings, there was a strong evidence of the selling of stocks after awards on new restricted stocks. This conduct indicated a small influence of equity awards on individuals with substantial holdings. The authors suggested that the motivational component of equity awards works for executives with small holdings however for their counterparts with high levels of ownership this has no effect.

Demsetz & Villalonga (2001) studied the effect of management ownership on company performance. The research followed the paper by Demsetz & Lehn (1985) who found a positive effect of insider ownership on company performance. Demsetz & Villalonga (2001) present a new revised empirical part. The authors suggest that there was an obvious endogeneity present in the model with the single equation describing the effect of ownership levels on company performance. Therefore, the findings were biased. The authors applied the two-equation model. This should mitigate possible endogeneity problems. The main finding proposed by the authors is the lack of evidence of any effect of different ownership levels on company performance measured by Tobin's Q. Explanation for this finding is the presumption that the levels of company ownerships are influenced by multiple market-based variables which are unique for each company.

Same as Demsetz & Villalonga (2001), also Himmelberg *et al.* (1999) built on the research undertaken by Demsetz & Lehn (1985). The authors similarly extended the original cross-sectional analysis of the relation between manager ownership and company performance. The main addition is the use of panel data for the analysis. The authors pointed out the fact that the connections between the incentive framework and firm performance are harder to study because these are partially influenced by exogenous and sometimes unobserved forces each company faces. The authors suggested that a noticeable part of an effect, each ownership level has on the company performance, is caused by unobserved firm heterogeneity. This finding implicates insufficient robustness of cross-sectional models. The authors suggested that after controlling for company-specific unobserved effects and adding control variables, there is not enough evidence to claim that different manager ownership affects performance.

The following study belongs to the most recent and rather scarce literature describing this topic. Kim & Lu (2011) studied on the data of US companies between 1992 and 2006. They focused on the effect of quality of external governance on a relationship between CEO ownership and company performance measured by Tobin's Q. The external performance according to the authors leaves less space for agency problems and in the estimation was expressed by industry concentration ratio and institutional ownership ratio. The results suggested that the effect of CEOs' ownership on company performance indeed depends on an outside force for good governance. In case of weak external governance for the CEOs, there is more room for motivation

from incentives as well as lack of encouragement for individuals holding a bigger portion of shares. The strong outside pressure results in insignificant variables in estimation. The authors also suggest that CEOs influence the Tobin's Q mainly by changes in R&D.

Overall, the literature focusing on the effect of insider ownership on company performance proposes contradictory findings. The positive effect of the insider ownership on company performance is suggested by (Morck *et al.* 1988; McConnell & Servaes 1990). The authors suggested that the effect is strong for the executives with small ownership to 5 percent and with ownership that exceeds 25%. On the contrary (Agrawal & Knoeber, 1996; Himmelberg *et al.*, 1999; Demsetz & Villalonga, 2001; Kim & Lu, 2011) found no effect of executives' ownership on company performance. These authors proposed that the effect of ownership level is not significant.

2.4 Hypotheses Statement

The analysis of literature shows that the findings on the effect of equity-based compensation on company performance as well as on the effect of insider stock ownership remain contradictory. There is no common ground on answers to these two research questions. Based on the study of former literature, I state the following two hypotheses.

Hypothesis 1

H0: CEOs' equity incentives have no effect on company performance.

Hypothesis 2

H0: CEOs' stock ownership has no effect on company performance.

3 Data description

3.1 Description of dataset

The following chapter describes data collection, data structure and each single variable. To ensure possible future revision of the analysis, non-trivial elements of data collection are emphasized as well as variable description.

The dataset used to test my hypotheses is based on the data from 107 companies publicly traded on the New York Stock Exchange. The company dataset includes annual data between the years 2006 and 2017. The selection of the set of companies is based on Thomson Reuters Business Classification (TRBC). The TRBC is a market-based classification system. There are five hierarchical structures in the Thomson Reuters Business Classification. All structures together create an imaginary pyramid with the top structure consisting of 10 economic sectors and the very bottom layer covering up 837 activities. The companies in my dataset are selected based on the first layer – economic sector. The whole set of companies consists of two similarly sized subsets. Altogether there are 107 companies. First half of the companies is included in Cyclical Goods & Services economic sector. This subset of 54 companies captures more than 90% of market capitalisation and represent substantial proportion of the economic sector. Second half of the companies is selected from Non-Cyclical Goods and Services economic sector. Also, these 53 companies as well capture substantial proportion of the economic sector with more than 90% of overall market capitalisation.

The main criteria for selection of every single company is the necessity of balanced dataset. Only the companies with complete data from 2006 to 2017 are selected. The companies traded on the New York Stock Exchange in the course of 2018 with an IPO that took place after 2006 are excluded. There are 21 companies excluded due to IPO after 2006; 10 of them in cyclical, 11 in noncyclical Goods & Services economic sector. The companies with missing proxy statements are excluded as well. There are 3 companies that are excluded due to missing proxy statements. 2 of the were from Cyclical Goods & Services economic sector, 1 of them were from the Non-Cyclical.

Table 1**Description and definition of variables**

Variable name

CEO variables

CEOs' equity compensation_{t-1} The sum of stock awards compensation and stock option compensation in fiscal year divided by the total compensation in fiscal year, for fiscal year t-1.

CEOs' equity ownership_{t-1} The beneficial ownership of stocks held by CEO and stock options held by CEO that can be vested in under 60 days for the fiscal year t-1.

Control variables

Employees_{t-2} The log value of the number of company employees in the fiscal year t-2

Revenue_{t-2} The log value of company sales in the fiscal year t-2

Return on Assets_{t-2} Revenues before interest, tax and depreciation divided by total assets in the fiscal year t-2.

Historic Return on Assets_{t-2} The average return on assets in the prior three fiscal years, between t-2 and t-4.

Cash Flow Risk_{t-2} The standard deviation in Return on Assets for prior 8 periods.

Advertising_{t-2} The advertising costs divided by total assets in period t-2.

Debt_{t-2} The total long-term debt divided by total assets in period t-2.

Property, plant and Equipment_{t-2} The amount of property, plant and equipment divided by the total assets in period t-2

Capital Expenditures_{t-2} The total investments in fiscal year divided by total assets for period t-2.

Dependent Variables

Change in Tobin's Q_t The percentage change in Tobin's Q between periods t and t-1

Table 1 provides description and definition of variables. The data describing CEO equity-based compensation and percentual share of CEO ownership on common stock are hand-collected by author from proxy statements of companies. Each company is required to provide an annual proxy statements with a summary of executives' compensation as well as beneficial ownership of common stock by insiders. The annual proxy statements are referred to as DEF 14A filling type and the annual submission is mandatory for publicly traded companies in the United States. The fillings are submitted after the end of each company fiscal year to the Securities and exchange commission. The basic structure of the fillings is with some minor differences the same

for all companies. Compensation summary is divided into seven categories. These are Salary, Bonuses, Stock Awards, Option Awards, Non-Equity Incentive Plan Compensation, Change in Pension Value and Non-Qualified Deferred Compensation Earnings, All Other Compensation and Total Compensation. The equity-based compensation variable is the sum of Stock Awards and Option Awards divided by Total Compensation. Stock awards and Option awards represent grant date fair value of stock and options under FASB ASC TOPIC 718 respectively. The equity-based compensation variable shows a percentage of equity-based compensation company awards to CEO. Beneficial ownership of executives is according to the Stock Exchange Commission a percentage sum of common stock CEO owns and options exercisable within 60 days. The variable CEO ownership then follows this figure. In case of company with Class A and Class B stocks, the beneficial ownership is a combined percentage of holdings in both Classes.

Table 2

This table shows a summary statistic of variables from the sample that is used in regression estimation. The combined data come from proxy statements of 107 companies between 2007 and 2017 and CEO equity compensation is the percentage of stock awards and option awards on total compensation hand-collected from companies' proxy statements; CEO stock ownership is the level of beneficial ownership of company stock by CEO, the beneficial ownership includes also the ownership of family members, stocks stored in trust funds and options exercisable within 60 days;

Variable name	Minimum	1st Quantile	Median	Mean	3rd Quantile	Maximum
<i>CEO variables</i>						
CEOs' equity compensation _{t-1}	0.0000	0.3442	0.5082	0.4767	0.6326	0.9713
CEOs' Stock Awards _{t-1}	0.0000	0.1503	0.2902	0.3028	0.4417	0.9713
CEOs' Stock Options _{t-1}	0.0000	0.0000	0.1565	0.1800	0.2765	0.9618
CEOs' equity ownership _{t-1}	0.0000	0.0019	0.00600	0.0469	0.0149	0.8770

As mentioned before the dataset is balanced. There are 1020 observation of each variable. *Table 2* presents summary statistics of dataset describing percentage of compensation in equity-based instruments to CEO and CEO beneficial owned stocks collected between 2007 and 2017. The average amount of equity-based compensation for CEO is 47.67%. We can see below that the equity compensation is mostly created by stock awards at 30.28%. Stock options are with 18% in minority. In case of CEO equity compensation which describes the percentage of equity-based awards, there is a larger number of values closer to minimum as the mean is smaller than median, at

50.82% versus 47.76% respectively. Nevertheless, the maximum value shows that the observation is distributed across the whole spectrum of values. The percentage amount of stocks beneficial owned is reported in the last figure in the *Table 2*. The average CEO beneficial owns 4.69 % of company stocks. In comparison, the median CEO owns 0.6% of company stocks. This show very uneven distribution of beneficial stock ownership by CEOs. A substantial amount of values is distributed close to zero percent.

Table 3

This table offers summary statistics of control variables used in the regression estimation. The source of the data is Thomson Reuters database between 2005 and 2017. Employees is a logarithmic value of employees of the company in period t-2; Sales is logarithmic value of sales at period t-2; Return on assets is the earnings before interest, depreciation and amortization divided by total assets in period t-2; Historic mean ROA is the return on assets average from 8 years prior in period t-2; Cash Flow risk is the standard deviation in ROA for prior 8 years in period t-2; Advertising/Assets is the advertising costs divided by total assets in period t-2; Debt/Assets is the total debt divided by total assets in period t-2; Property, plant & Equipment/assets is the property, plant and equipment divided by total assets in period t-2; Investments/assets is the amount of investments divided by total assets in period t-2; Q change is the Tobin's Q from period t divided by Q from period t-1 minus 1.

Variable name	Minimum	1st Quantile	Median	Mean	3rd Quantile	Maximum
<i>Company (control) variables</i>						
Employees _{t-2}	5.501	8.907	9.901	9.864	10.834	14.648
Revenue _{t-2}	18.12	21.76	22.65	22.67	23.56	26.91
Return on Assets _{t-2}	-0.19841	0.0973	0.1513	0.1639	0.2041	0.6967
Historic Return on Assets _{t-2}	-0.12736	0.0998	0.1495	0.1637	0.2017	0.7571
Cash Flow Risk _{t-2}	0.00381	0.0158	0.0255	0.0340	0.0405	0.2531
Advertising _{t-2}	0.0000	0.0000	0.0175	0.0405	0.0452	0.7358
Debt _{t-2}	0.0000	0.1496	0.2574	0.3001	0.3835	3.6757
Property, plant and Equipment _{t-2}	0.0000	0.2889	0.4915	0.5228	0.7359	1.5173
Capital Expenditures _{t-2}	0.0000	0.0144	0.0338	0.0402	0.0569	0.5316
<i>Dependent Variable</i>						
Change in Tobin's Q _t	-0.8095	-0.0874	0.0414	0.0523	0.1742	3.3865

Table 3 presents the summary statistics of control variables. There is also the summary statistics for the dependent variable Change in Tobin's Q. The figures show that there is not a big difference between mean and median, which account for 5.2% and 4.1% respectively. The maximum is an outlier equal to 338.6%.

Table 4

This table shows a summary statistic of variables from the sample that are used in the regression estimation. The combined data come from proxy statements of 107 companies between 2007 and 2017 and CEO equity compensation is the percentage of stock awards and option awards on total compensation hand collected from companies' proxy statements; CEO stock ownership is the level of beneficial ownership of company stock by CEO, the beneficial ownership includes also the ownership of family members, stocks stored in trust funds and options exercisable within 60 days. Cyclical and Non-Cyclical are economic sectors from Thomson Reuters Business Classification. The Cyclical economic sector consists of four business sectors: Automobiles & Auto Parts, Cyclical Consumer Products, Cyclical Consumer Services and Retailers. The Non-Cyclical economic sector consists of three business sectors: Food & Beverages, Food & Drug Retailing and Personal & Household & Products & Services. Number of companies column is equivalent to number of companies in each economic or business sector.

	CEOs' equity compensation _{t-1}		CEOs' equity ownership _{t-1}		Number of companies
	Median	Mean	Median	Mean	
<i>Economic Sector</i>					
<i>Cyclical</i>	52.07%	50.68%	0.61%	6.23%	55
<i>Non-Cyclical</i>	48.69%	44.48%	0.53%	3.06%	52
<i>Business Sector</i>					
Automobiles & Auto Parts	46.34%	45.25%	0.19%	0.28%	6
Cyclical Consumer Products	53.26%	52.79%	0.93%	10.99%	16
Cyclical Consumer Services	46.37%	44.21%	0.85%	8.58%	16
Retailers	60.10%	56.70%	0.57%	1.64%	17
Food & Beverages	45.61%	43.32%	0.53%	1.96%	27
Food & Drug Retailing	50.26%	47.37%	0.42%	2.58%	8
Personal & Household Products & Services	50.78%	44.96%	0.68%	5.05%	17

Table 4 gives an overview of the sector-categorization of the companies that constitute the dataset. The summary is presented with the median, and mean values of CEOs' equity compensation and CEOs' equity ownership variables. The economic sector Cyclical goods consists of four Business sectors: Automobiles & Auto parts sector, Cyclical Consumer products sector, Cyclical consumer services sector and Retailers sector. Three Business sectors, on the other hand, create the Non-Cyclical economic sector. These are: Food & Beverage sector, Food & Drug Retailing sector and Personal & Households & Products & Services sector. The column with the

number of companies shows that the biggest business sector in the dataset is the Food & Beverages. Contrary, the smallest sector in terms of a number of companies is the Automobiles & Auto Parts sector. In comparison, the mean and median values of CEOs' equity compensation variable are distributed evenly across all business sectors. The same can be, to a certain degree, said about the mean and median values of the CEOs' equity ownership variable. The only exception being that Cyclical consumer products and Cyclical consumer services sectors show substantially higher mean values. This is probably caused by outliers because the median values are consistent with other sectors.

4 Methodology

4.1 Methodological approach

In this section, the used methods are described in the context of other literature. Based on that, I show the main factors that influence and support my decisions to use these methods. The basic research framework unfolds from the structure of the used data. Panel data allows us to choose from multiple estimation approaches. Based on the underlying criteria and limitations of each model, I proceed in the estimation with a specific set of tools.

To test the hypotheses stated in the Hypotheses section, I compile linear regression models. In the following paragraphs, the frameworks are described. These frameworks are used in former researches which serve as the main inspiration for my estimation methods, and the selection of used methodology. The basic structure of models in the literature studying this phenomenon follows three main types of independent variables. These types are variables describing CEO, variables describing financial state of company, and variables that serve as a proxy for corporate governance, see (Mehran, 1995; Core *et al.*, 1999; Brick *et al.*, 2006; Palia, 2007)

The fundamental, for the models used in the analysis, is the methodology used in research by Mehran (1995) who studied the effect of percentage of equity compensation and CEO equity ownership on company performance. The author used multiple dependent variables to model the company performance. The first dependent variable is the Tobin's Q. The second dependent variable is the Return on Assets. Using the first dependent variable author created two models. The first model is a simple regression of Tobin's Q on percentage of CEOs 'equity compensation and CEOs' equity ownership. In the second equation author used the former model and added another seven variables. Two of these variables describe company governance and the remaining five variables are proxy for financial condition of company and its business opportunities. The two variables for corporate governance are the percentage of shares held by outside block holders, these are individuals or institutions with ownership greater than 5 percent, and percentage of outside directors on board of directors. The author used the second dependent variable Return on Assets in another two models.

The two models are identical to the former models with the dependent variable Tobin's Q, the only difference is the replacement of the dependent variable Tobin's Q with the variable Return on Assets. In my framework I employed the variable change in Tobin's Q which is a variation of the variable Tobin's Q. I built the essential framework of the models based on these four equations suggested by Mehran (1995).

The second main research which serves as great inspiration to my estimation framework is the one from Brick et al. (2006). The authors estimated the effect of logarithmic value of CEO's compensation on company performance. As the proxy for company performance, the authors used the difference in the estimated and the actual company performance. The estimated performance is measured by the One-factor model and the Fama French three-factor model. The authors however suggested that similar results had been also achieved using the Change in Tobin's Q as the proxy variable for company performance. I find this approach well suiting for my research. Going forward, I prefer to use this approach with all three dependent variables in the respective models. Therefore, the independent variables would be the difference between actual return and One factor model, the difference between actual return and Three factor model, and the Change in Tobin's Q. Each of these in separate regressions. Nevertheless, due to restrains in the availability of data I employed only the dependent variable Change in Tobin's Q.

The remaining variables in the Brick *et al.* (2006) models serve as proxies for corporate governance. One of these proxies is the percentage of CEO ownership. The rest of the variables, the authors used in the models, are control variables which are proxy for company characteristics. The authors used both Fixed effect regression model as well as Pooled Ordinary Least Squares.

I employ linear regression model to test the hypotheses stated in Hypotheses section. The used methods follow the stream of literature describing this phenomenon. The essence of my model is created based on the regression equation proposed by Mehran (1995) and Brick *et al.* (2006). The main difference between the research by Mehran (1995) and my estimation is the usage of cross-sectional data instead of panel data as in this case. But the basic four models proposed in the author's study and mentioned above are however a cornerstone of my estimation. The use of panel data gives me greater options in terms of lagged variables. I created four models to test my research hypotheses. As mentioned in the previous chapter, the dependent variable Change in Tobin's Q is employed. I create two models with the Change in Tobin's Q

as a dependent variable. In the first model I regress the Change in Tobin's Q on the percentage of CEOs' equity compensation and the CEOs' ownership. See the equation below.

$$\begin{aligned} &\text{Change in Tobin's } Q_t \\ &= f(\text{CEOs' equity compensation}_{t-1} + \text{CEOs' equity compensation}_{t-1}) \end{aligned}$$

The second model is an extension of the first one, see the equation below. In this case, the control variables for the company characteristics are added. These control variables are entirely based on the research by Brick *et al.* (2006).

$$\begin{aligned} &\text{Change in Tobin's } Q_t \\ &= f(\text{CEOs' equity compensation}_{t-1} + \text{CEOs' equity ownership}_{t-1} \\ &+ \text{controlling variables}_{t-2}) \end{aligned}$$

In order to control for other effects, there are control variables included in the model which should prevent the omitted variable bias. The control variables in the models are variables describing company performance and other characteristics. These variables mainly act as proxies for company development potential, growth potential, indebtedness, size and risk. However, the selection of these variables seems in the light of the recent literature, studying the effect of CEOs pay on performance models for company performance, insufficient, Himmelberg *et al.* (1999). Comparing Mehran (1995), who introduced few control variables, to a more recent literature by Brick *et al.* (2006), and considering the fact that cross sectional data are used in the paper, I decided to employ additional control variables to tackle more of the omitted variable bias. The number of financial control variables are extended based on the more recent literature, Brick *et al.* (2006). The advantage here is also the fact that authors used the panel data. There is therefore a possibility to use lagged variables and tackle possible endogeneity which is discussed later in this section. All the control variables are lagged by two years in order to tackle possible endogeneity.

Combination of these two sources of model structures give us a good basis to build on. The choice of model to estimate the regressions is based on several factors. First considered factor is the economic nature of data. The data track 107 companies over twelve periods. The related literature suggests that the choice of model in this case

should aim towards Fixed effects estimation as it is the model designed to account for individual specific, in our case firm specific, error. The theory suggests that unless any assumptions about parameter homogeneity can be made, we ought to tackle unobserved heterogeneity and use Fixed effects estimation (see, Greene, 2008; Wooldridge, 2010).

To support or reject this preference, I continue with the second factor I test whether fixed effect model can serve as an efficient estimator. In order to do so, firstly Random effects model is estimated as well as Fixed effects model. To decide which suits better for the dataset, I run Hausman test, Greene (2008). The null hypothesis of the test states that the Random effect is an efficient estimator. I reject this hypothesis. Hence, I continue with fixed effects model as a preferable option for my estimation framework. Moreover, pooled ordinary least squares model is added to make the estimation results more robust. The addition of pooled OLS is also in harmony with the literature focusing on the compensation of executives and company performance, see Brick *et al.* (2006).

One of the key advantages, coming from the usage of panel data, is the ability to use framework of lagged variables in my models. The lagged variable helps to tackle the possible endogeneity, see Brick *et al.* (2006). This endogeneity might occur due to double-sided effect between dependent and independent variables. My variables are lagged across two periods. One fiscal year is equal to one period in my study. The specific settings behind the choice of lag for each variable is based on the framework proposed by Brick *et al.* (2006). The dependent variable that serves as a proxy for company performance is measured at the time t . The independent variables describing CEO compensation and ownership level are measured at the time $t-1$. Finally, the independent control variables are measured in the time $t-2$. This gives us two periods difference between dependent variable of choice and control variables.

The results of described models are subject to the test for homoskedasticity. In case of a positive result of the test of homoskedasticity I employ Homoskedasticity robust standard errors. In case of pooled OLS I estimate Cluster Standard errors, see White (1980). For fixed effect models, we estimate the general robust standard errors, see Arellano (1987) and Kedzie (2004).

The compilation of variables in my regression equation has a fundamental basis in former literature, as I mentioned above. In comparison with the literature, the novelty of this approach is, compared to Mehran (1995), the decision to use panel data instead

of cross-sectional data. In comparison with Brick *et al.* (2006), my approach covers longer time series of observations, but it falls behind in the number of companies.

5 Results

5.1 Results of the regression

The following chapter summarize results of the regression estimations. I am interested in the connection between the structure of CEO pay and the subsequent company performance. I estimate regression of the effect of percentage of the CEO equity-based compensation and level of the CEO ownership on the change in Tobin's Q. First, I describe the results of the pooled ordinary least squares models with dependent variable Change in Tobin's Q. Second, I describe the results of the fixed effect models with dependent variable Change in Tobin's Q.

Table 5

This table provides fixed effect estimates of the dependent variable Change in Tobin's in period t on the percentage of equity based CEO compensation in period $t-1$, percentage of CEO beneficial equity ownership in period $t-1$; log revenue, log of number of employees as a proxy for size of the company, debt to total assets ratio as a proxy for debt financing, property, plant and equipment to total assets, capital expenditures to total assets, advertising costs to total assets, return on assets, cashflow risk, and historic return on assets. Sample size is 107 companies between 2006 and 2017. 1070 unique company years. The dataset is balanced; t-statistics in parentheses. Asterisks show significance at 0.01 (***), 0.05 (**) and 0.10 (*) levels.

Independent variables	Dependent Variable: Change in Tobin's Q_t	
	Estimation: Pooled Ordinary Least Squares	
Intercept	-0.00485 (-0.2232)	0.257049 (1.4953)
CEOs' equity compensation $_{t-1}$	0.112939*** (2.8192)	0.180454*** (3.7092)
CEOs' equity ownership $_{t-1}$	0.070936 (1.1226)	0.108394* (1.7836)
Revenue $_{t-2}$		-0.01344 (-1.2832)
Employees $_{t-2}$		0.00144 (0.1653)
Debt $_{t-2}$		0.03761 (2.5076)
Property, plant and Equipment $_{t-2}$		0.075181** (2.7632)

Table 5 (Continued)

Capital Expenditures _{<i>t-2</i>}		-1.43368*** (-4.5854)
Advertising _{<i>t-2</i>}		0.565708*** (2.4531)
Return on Assets _{<i>t-2</i>}		0.108814 (0.4118)
Cash Flow Risk _{<i>t-2</i>}		-0.04455 (-0.2085)
Historic Return on Assets _{<i>t-2</i>}		-0.22866 (-0.8314)
R ²	0.00751	0.06192
F-Statistics	5.545	10.682

I begin with a basic model consisting of two independent variables only. I run a regression of the Change in Tobin's Q in the period $t+1$ on the CEO equity-based compensation and CEO shareholding both in the period t . The results of the regression are presented in the first column of *table 5*. The outcome of the fixed effect model shows a significant slope of the variable CEOs' equity compensation with high t statistics of 2.819. I suggest that there is a positive effect of the percentage of equity CEO earns on the change in Tobin's Q. An increase in the portion of equity compensation by ten percent corresponds to an increase in of Tobin's Q by roughly 1.2%. However, the effect of variable CEOs' ownership is not significant.

The fixed effect regression of the Change in Tobin's Q in the period $t+1$ on CEO equity compensation, equity ownership both in the period t , and controlling variables in the period $t-1$ are presented in the second column of *table y*. The estimated coefficient of CEO equity compensation is significant and the effect on company performance is positive. In comparison with the fixed effect estimation with only two variables, the slope is slightly larger. An increase in the portion of equity compensation by 10% for CEO is equal to an increase in Tobin's Q by 1.1%. The estimated effect of CEO ownership is also significant with t -statistics at 1.784. I suggest that an increase in ownership level of CEO by 1% equals to an increase in change of Tobin's Q by 0.1%.

The first column in *table 6* in the regression is the pooled OLS estimation of the Change in Tobin's Q in period $t-1$ on CEO equity compensation and CEO equity ownership both in period t . The results show remaining positive effect of CEO equity

compensation on company performance. The magnitude of the effect is lower, however, compared to the fixed effect estimation. Anyway, the significant positive effect shows robustness of the initial result in fixed effects. An increase in the sum of equity awards by 10% would improve Tobin's Q by 1.9%. Nevertheless, the other independent variable CEO ownership is insignificant in the model. That is also corresponding to the fixed effect model with two variables.

Table 6

This table provides pooled Ordinary Least squares estimates of the dependent variable Change in Tobin's in period t on the percentage of equity based CEO compensation in period t-1, percentage of CEO beneficial equity ownership in period t-1; log revenue, log of number of employees as a proxy for size of company, debt to total assets ratio as a proxy for debt financing, property, plant and equipment to total assets, capital expenditures to total assets, advertising costs to total assets, return on assets, cashflow risk, and historic return on assets. Sample size is 107 companies between 2006 and 2017. 1070 unique company years. The dataset is balanced; t-statistics in parentheses. Asterisks show significance at 0.01 (***), 0.05 (**), and 0.10 (*) levels.

Independent variables	Dependent Variable: Change in Tobin's Q_t	
	Estimation: Pooled Ordinary Least Squares	
CEOs' equity compensation $_{t-1}$	0.190846*** (3.3301)	0.215661*** (3.866105)
CEOs' equity ownership $_{t-1}$	0.044741 (0.2394)	0.094796 (0.525928)
Revenue $_{t-2}$		0.07445 (1.572698)
Employees $_{t-2}$		-0.11965** (-2.92084)
Debt $_{t-2}$		0.041796 (0.436862)
Property, plant and Equipment $_{t-2}$		0.141242* (1.887325)
Capital Expenditures $_{t-2}$		-2.27883*** (-7.18566)
Advertising $_{t-2}$		1.598503*** (4.308545)
Return on Assets $_{t-2}$		-0.48808 (-1.59561)
Cash Flow Risk $_{t-2}$		-0.41456 (-0.7388)
Historic Return on Assets $_{t-2}$		-0.59683 (-1.63497)
R ²	0.00751	0.117
F-Statistics	4.035	5.831

The second column in the *table 6* captures the regression of the Change in Tobin's Q in period $t+1$ on CEO equity compensation, ownership both in time t and the controlling variables measured in period $t-1$. The results show again significant and positive effect of equity awards on company performance. An increase by 10% in CEO comp would end up with an increase in Tobin's Q by 2.2%. The CEO ownership variable stays again insignificant.

Overall, I observe positive effect of the portion of equity-based compensation for CEOs over all the four estimations. The results are robust for the change in estimation method but a change in the size of slope is visible. The fixed effect estimation shows higher effect than the pooled OLS. In case of the effect of the level of equity ownership, I observe results with low t-values that are not significant across all our estimations. The only exception is the second estimation using pooled OLS where there is a positive effect with the t-statistics at 1.784.

5.2 Other Results

I also ran regression estimations for different independent variables. The percentage of CEOs' equity compensation was replaced with two different variables in all four models mentioned above in this chapter. The emphasis was on the effect of the percentage of CEOs' stock awards in total compensation and the percentage of CEOs' stock option compensation in total compensation. The sum of these two variables together constitutes the variable percentage CEOs' equity-based compensation that is used in the former estimation. The results of the regression estimation with percentage of stock option showed insignificant results. Also, the regressions with Percentage of stock awards gave insignificant results. This leads to a suggestion that the effect of single elements is not significant in our model.

In the next set of regressions, the dependent variable Change in Tobin's Q with a dependent variable Return on Assets were replaced. I found no statistical significance of the effect of the independent variables percentage CEOs' equity compensation and CEOs' stock ownership. Also, the regression with a dependent variable ROA adjusted for industrial effect was ran, see Eisenberg (1998). We found no statistically robust effect of the independent variables CEOs' equity compensation and CEOs' stock ownership. Finally, also the dependent variable Change in Tobin's Q with standard Tobin's Q was replaced. I found a positive effect.

6 Discussion

I am interested in the effect of equity-based awards for CEOs on company performance measured by market-related variable Change in Tobin's Q. I also study the effect of the CEO-related ownership structure on the company performance. Extent of the CEO-related ownership structure is proxied by percentage of company stocks beneficial owned by CEO. I employ fixed effects model and pooled ordinary least squares to test my hypotheses. In the following chapter, I provide a discussion of the results from my estimation regression.

Hypotheses were formulated in accordance with the research of prior literature. I expected a positive effect of the percentage of CEOs' equity compensation on the company performance. Further, I also expected a positive effect of the percentage of CEOs' stock ownership on company performance. The expectations for these results were across all models, with and without the control variables.

Based on the results of the estimations, I show a positive effect of the percentage of equity-based compensation in total compensation on company performance measured by Change in Tobin's Q. The positive effect is significant in the basic model with only two independent variables as well as in the model with controlling variables. The results persist across pooled OLS estimation as well as fixed effect estimation. This result is consistent with my expectation.

The effect of the percentage of equity held by CEOs on Change in Tobin's Q is however not significant in the models. The slope is not significant in the basic model nor in the model with the controlling independent variables. The results persist in both fixed effects and pooled OLS estimation approaches that were used. In contrary to the result of the compensation effect mentioned above, I did not expect this result. I expected a positive effect nevertheless the result was insignificant.

In the following paragraphs, I compare my findings to the literature and study the explanation for the results proposed by other authors. The literature for both effects of equity-based compensation as well as CEOs' stock ownership is not uniform and there are authors who propose different or even contradictory suggestions.

6.1 Equity-based compensation and company performance

The basic model with two independent variables percentage of CEOs' equity compensation and percentage of CEOs' equity ownership suggests a positive effect of the percentage of equity compensation on company performance measured by Change in Tobin's Q. This positive effect is consistent with the findings by Mehran (1995). The model with the controlling variables also shows a positive effect of the equity compensation. The author suggested that it makes sense to connect the compensation closer to the actual price of a company stock price. According to the author, the incentives for CEOs have a measurable effect on the corporate efficiency. Also, the form rather than the level is important for a motivation of CEOs, Mehran (1995). I show this positive effect across both estimation approaches.

The positive effect of the percentage of CEO's equity-based compensation is in line with the research by Kato et al. (2005). The authors, however, studied only option contracts which are one of the constituents of equity-based awards. The difference is also the use of data on Japan companies. The conclusion, proposed in their study, states that there is a positive relationship between a well set-up option scheme and company performance.

My findings are also consistent with Tai (2004) who studied the connection between incentives for company performance and company performance. The difference compared to my estimation is again the focus on option awards rather than the whole equity-based compensation. The author, however, suggested that the equity incentives in form of option awards are responsible for the improved company performance.

Another study consistent with my results is the analysis of Habib & Ljungqvist (2005) who suggested that the companies might improve their performance by a better choice of incentive structure. To study the performance of companies the authors used the difference between expected Tobin's Q for a period and the actual Tobin's Q for the respective period. The authors pointed out that the structure of the incentives and introduction of stock awards results in an improvement of company performance.

Consistent with my results is the study by Blackwell et al. (2007). The authors however used a different research framework than my analysis. Rather than studying a set of companies over some period, the authors studied only a subset of companies

which changed their CEO. They focused on the performance data before and after the change of CEOs. Despite the fact that the authors used different approach, their suggestion is rather close to my results. According to their findings, there is a positive relationship between the percentage of the stock grants on total compensation and future company performance.

My results contrast with the finding of Core et al. (1999). The difference is that the authors studied the absolute value of compensation rather than the proportion of equity-based component. The authors suggested that the higher levels of CEO compensation are followed by poor company performance. Higher compensation is caused by the effort to solve agency problems which are caused by weak corporate governance.

Additionally, my results also differ from the findings of Brick (2006). The comparison lags as the authors did not study the whole amount of compensation for CEOs. Still, the negative effect is in a contradiction to my results. The authors suggested that there is a negative linkage between excessive rewards for CEOs and company performance. They explained that the negative effect is caused by cronyism which is a behaviour occurring between directors and executives manifested by an excessive compensation and a weak monitoring.

Hasegawa et al. (2017) suggested that company performance is weaker with an introduction of new equity incentives which also varies from my findings. In comparison to my estimation, the authors studied the operational performance of the companies. They suggested that the decrease in operational performance is accompanied by no change in pay-out and liquidity ratios. Further, the authors suggested that the introduction of new equity incentives is driven a lot by the effect of a herd. Companies which are in a minority in their industry, in terms of compensation structure, tend to change their compensation frameworks to be in line with the majority, in other words with the herd.

Other findings which contrast with mine can be found in the study by Balafas & Florackis (2013) who studied the absolute values of pay on company performance. This is inconsistent with my estimation of the effect of the proportion of equity compensation. Nevertheless, the authors suggested that there is a negative effect of CEOs' incentives and company performance. They also suggested that this is caused by idiosyncratic risk.

Another study which is not consistent with my results is the Cooper et al. (2016) who suggested that the equity incentives in form of restricted stocks and stock options have a different effect to the intended goal of shareholders. The effect on future stock returns is negative. The authors supported their claims based on the research of large dataset between 1994 and 2015. They explained their results by a suggestion that the generous equity incentives lead to attraction of overconfident CEOs who failed to deliver demands of shareholders.

Based on the results of the regression analysis and comparing the results to the findings in the literature, I suggest that the structure of the compensation matters. I find a support to claim that the higher proportion of equity-based incentives effects positively company performance in the future. Reviewing and comparing past findings in this field, I suggest that one of the reasons for the improvement of company performance is the improved motivation of the CEOs (Jensen and Murphy, 1990; Sloan, 1993) and therefore better corporate efficiency, (Mehran, 1995; Frydman & Saks, 2010).

In conclusion, the results of the regression estimation are consistent with Mehran (1995) who used a similar model. The effect of percentage of equity-based estimation is equally positive. The results of my equations are also in line with the estimation of Habib & Ljungqvist (2005) who used panel data of US companies that are close to the dataset employed in this study. Lastly, in comparison with Brick et al. (2006), who employed the same methods and used similar control variables, the results are in contradiction. The author, however, used the log value of total CEOs' compensation as independent variable which makes the possible comparison less informative.

6.2 Stock Ownership and company performance

In contrast with my expectation about the positive effect, I find no support for the effect of CEO ownership on company performance. The effect of the percentage of CEOs' stock ownership shows insignificant results. The statistically insignificant results hold across all estimation frameworks.

In comparison with Mehran (1995) and in contrast with the above-mentioned effect of the percentage of CEOs' equity-based compensation, the percentage of CEOs' stock ownership is insignificant across all the estimations. I observe the same results

for the compensation although I do not find any evidence for the effect of stock ownership.

My findings are consistent with the research provided by Demsetz & Villalonga (2001). The authors found no statistical support for the effect of stock ownership by executives. They suggested that there is an endogeneity present in the one-equation models that study insider stock ownership and company performance. The authors proposed a revised two-equation model. Their findings do not support any effect of equity ownership on company performance.

Also, the study by Agrawal & Knoeber (1996) is consistent with my findings. The authors found the effect of managerial ownership on stock not serious. They suggested that this fact is caused by the effective use of all corporate mechanisms.

My findings are in accordance with the study by Himmelberg et al. (1999). The authors concluded that there is not enough evidence to claim that the different levels of managerial stock ownership effect the company performance. The authors used panel data and research framework comparable to mine. They suggested that after controlling for company-specific effect and adding controlling variables, the effect of stock ownership is insignificant.

Results of my research are in contrast with Morck et al. (1988) who found substantial effect of executives' stock ownership on company performance. In line with my estimation, the authors used Tobin's Q as the dependent variable. Though, the authors did not report the positive effects across the whole range of different ownership levels. The positive effect is not visible in the case of executives owning between 5 and 25 percent.

Another study which is in contrast with my findings is the one by McConnell & Sarveas (1990) who also used Tobin's Q as the dependent variable. Their findings suggested that there is, in fact, an effect of the executives' stock ownership. The effect is the strongest with the low ownership levels. The effect decreases with higher levels of ownership.

The insignificant results of the independent variable CEOs' stock ownership are presented in all my estimations. I observe different result than I proposed. After comparing with the literature, there are few possible explanations for these results. The argument for the positive effect of insider equity ownership on company performance can be supported by researches on cross-sectional datasets that suffer from omitted variable bias as each company's performance is influenced by unobserved

heterogeneity, Himmelberg et al. (1999). After using panel data and controlling for this fact, there is no evidence for the effect. Another explanation is that the levels of company ownerships are influenced by numerous market-based variables that are unique for each company, Demsetz and Villalonga (2001).

At last, the model used by Mehran (1995) is the closest to the framework used in my estimation. Nevertheless, the results are in contradiction. The explanation for the difference in the significance of results is not entirely apparent. One of the suggestions is the possible endogeneity in the original estimation proposed by Mehran (1995). On the other hand, the results are consistent with Himmelberg et al. (1999) who also used panel data of US companies and the methodology of their study is most similar to the one used in my research. These findings suggest that, in case of comparable research framework and especially with the use of panel data, my results are consistent with other similar papers.

6.3 Other results & Robustness Checks

I ran also estimations with a different dependent variable as well as different independent variables. I changed the dependent variable change in Tobin's Q for Return on Assets. In other estimation, I switched the original dependent variable for ROA adjusted for industrial effect as proposed by Eisenberg et al. (1998). In both estimations, the results are insignificant for both the percentage of CEOs' equity compensation as well as the percentage of equity owned by CEOs. I suggest that this result shows that there is no statistical effect of these variables on the accounting-based performance indicator ROA and ROA adj. This contrast with findings of Mehran (1995) who found significant effects. Nevertheless, the author's use of cross-sectional data might cause this result as he could not control for each companies' own heterogeneity.

Moreover, I employed standard Tobin's Q for dependent variable as a robustness test for my estimation. The result suggests a similar effect in terms of sign to the main estimation. This shows some level of robustness of my results in terms of different proxy for company performance. This result is also in line with the literature, specifically Mehran (1995).

To test the robustness of the models from the perspective of independent variables, I switched the percentage of equity compensation with the variables

percentage of option awards and percentage of stock awards. These two variables constitute the variable equity compensation. However, I got insignificant results. From my point of view, these results might be caused by an insufficient amount of observations in my dataset.

7 Conclusion

For stockholders, one of the main concerns is to ensure that their interests are aligned with the interests of the managers who have the responsibility for the control over a company. Since Jensen & Meckling (1976) introduced the Agency Theory, the relationship between shareholders and managers became an important part of the literature. However, the suggestion about how to solve the underlying problem of agency cost varied. The authors proposed that the compensation and related incentives might be the right instrument to motivate executives, Finkelstein & Hambrick (1988). One of the possible ways to alleviate the agency problem can be equity compensation, as suggested by Jensen & Murphy (1990). The topic got large attention since then but the relationship between the equity compensation and insider ownership structure remains still a puzzle, Guay *et al.* (2002). Moreover, the differences in findings remain and there is no common ground on the effect of the compensation structure on the performance of a company. The discrepancy and contrast of the findings in the literature represent a comprehensible motive for an empirical study of the phenomenon.

This thesis studies the effect of equity-based compensation on company performance and the effect of insider ownership on company performance. The proxy for CEO-related equity compensation is the percentage of CEOs' compensation that is equity-based. On the other hand, the proxy for the CEO-related stock ownership is the percentage of CEOs' stock ownership. To study the relationship, I employ the fixed effects model and the pooled ordinary least squares.

The thesis provides an empirical indication of the positive effect of CEO-related equity compensation on company performance. I find a positive effect of the percentage of CEOs' equity-based compensation on company performance proxied by the market-related Change in Tobin's Q. The result holds in the simple regression estimation as well as in the model where I control for companies' growth opportunities, risk, and size. This thesis, however, did not provide any evidence about the effect of CEO-related stock ownership structure on company performance. The results suggest that the effect of the percentage of beneficial stock ownership on company performance measured by the Change in Tobin's Q is statistically insignificant. The result holds across all regression estimation and both estimation methods. The effect of CEOs'

stock ownership is unrelated both in a simple model as well as in a model with control variables.

The positive effect of the equity-based compensation is consistent with Mehran (1995) who used a similar model framework. The author suggested that equity compensation positively influences corporate efficiency and the result is improved company performance. The positive effect of equity-based compensation is also in line with Habib & Ljungqvist (2005) who utilized comparable US panel data set.

The insignificant effect of company performance is consistent with findings by Himmelberg et al. (1999) who used conformable methodology and panel data on US companies. On the other hand, the insignificant effect of the variable stock ownership is not consistent with the results of Mehran (1995) who suggested a positive effect. The divergent findings might have more explanation. First, the unrelated result might be caused by unobserved firm-specific heterogeneity, Himmelberg et al. (1999). Second, the size of each company CEO's ownership might be influenced by numerous market-based variables, unique for each company, see Demsetz & Villalonga (2001).

The main contribution of this study lies in the use of panel data to revise the regression estimation firstly proposed by Mehran (1995). The application of panel data allows me to benefit from lagged variables framework and to prevent possible endogeneity as proposed by (Himmelberg *et al.*, 1999; Palia, 2001). The model framework used in the study accounted for the individual heterogeneity. Another contribution is the use of control variables, originally proposed by Brick *et al.* (2006), combined with the original model by Mehran (1995). The main contribution of the study, in terms of its results, is the expansion of rather narrow literature describing the effect of the compensation structure and relative levels of incentives. This field lacks attention because majority of authors prefer to study the absolute size of single constituents of compensation structure. Moreover, the use of Change in Tobin's Q, rather than the absolute value in Tobin's Q, presents also the new approach in this specific field of literature.

The presented research represents a small piece of a puzzle that can contribute to the ongoing debate about the effects of managers' compensation and insiders' stock ownership on company performance. As suggested earlier, the presented topic offers a wide range of interesting research questions that deserve further attention. Also, the prevailing discrepancy in findings and no common ground on the effects on company performance provide a compelling argument for further research. The main bottleneck

for any refreshing future study, however, constitutes the necessity for quality data. In particular, the information about insiders in the companies requires to obtain an increased effort from the researcher. Putting away, for each individual variously important obstacle, the most interesting areas for future research are the following subjects.

The use of Fama-French Three factor variable, as well as classical One factor variable as proposed by Brick *et al.* (2006) in the model with the percentage of CEOs' equity-based compensation as the proxy for equity compensation, would represent a possibly intriguing extension. Analogous or comparable results of this kind of regression would further invigorate the robustness of the results presented in this analysis. The other riveting research would be to study the effect of different variables describing corporate governance and the relationship between shareholders, board of directors, and managers. The literature offers possible basic ways to found future analysis on, see Guay *et al.* (2002). The third possible way to guide future research is to turn over the research problem and examine what has the effect and constitutes the structure of equity-based incentives. A framework for such an analysis could be drawn from Brick *et al.* (2006).

To conclude, the future analysis is to a certain degree dependent on the availability of data. A wider dataset with more companies and larger variety of industries would make the possible future revision of this thesis an interesting topic for research. In case of the effect of percentage of option awards and stock awards on company performance, another study could shed more light on the effect.

Bibliography

- Agrawal, A., & Knoeber, C. R. (1996). Firm performance and mechanisms to control agency problems between managers and shareholders. *Journal of financial and quantitative analysis*, 31(3), 377-397.
- Arellano, M. (1987). PRACTITIONERS' CORNER: Computing Robust Standard Errors for Within-groups Estimators. *Oxford bulletin of Economics and Statistics*, 49(4), 431-434.
- Balafas, N., & Florackis, C. (2014). CEO compensation and future shareholder returns: Evidence from the London Stock Exchange. *Journal of Empirical Finance*, 27, 97-115.
- Blackwell, D. W., Dudney, D. M., & Farrell, K. A. (2007). Changes in CEO compensation structure and the impact on firm performance following CEO turnover. *Review of Quantitative Finance and Accounting*, 29(3), 315-338.
- Brick, I. E., Palmon, O., & Wald, J. K. (2006). CEO compensation, director compensation, and firm performance: Evidence of cronyism?. *Journal of Corporate Finance*, 12(3), 403-423.
- Cooper, M., Gulen, H., & Rau, P. R. (2016). Performance for pay? The relation between CEO incentive compensation and future stock price performance.
- Core, J. E., Holthausen, R. W., & Larcker, D. F. (1999). Corporate governance, chief executive officer compensation, and firm performance¹. *Journal of financial economics*, 51(3), 371-406.
- Demsetz, H., & Lehn, K. (1985). The structure of corporate ownership: Causes and consequences. *Journal of political economy*, 93(6), 1155-1177.
- Demsetz, H., & Villalonga, B. (2001). Ownership structure and corporate performance. *Journal of corporate finance*, 7(3), 209-233.
- Eisenberg, T., Sundgren, S., & Wells, M. T. (1998). Larger board size and decreasing firm value in small firms¹. *Journal of financial economics*, 48(1), 35-54.

-
- Finkelstein, S., & Hambrick, D. C. (1988). Chief executive compensation: A synthesis and reconciliation. *Strategic Management Journal*, 9(6), 543-558.
- Frye, M. B. (2004). Equity-based compensation for employees: firm performance and determinants. *Journal of Financial Research*, 27(1), 31-54.
- Frydman, C., & Saks, R. E. (2010). Executive compensation: A new view from a long-term perspective, 1936–2005. *The Review of Financial Studies*, 23(5), 2099-2138.
- GREENE, William H. *ECONOMETRIC ANALYSIS*. 2008.
- Grossman, S. J., & Hart, O. D. (1983). An analysis of the principal-agent problem. *Econometrica: Journal of the Econometric Society*, 7-45.
- Guay, W., Core, J., & Larcker, D. (2002). Executive equity compensation and incentives: A survey.
- Habib, M. A., & Ljungqvist, A. (2005). Firm value and managerial incentives: a stochastic frontier approach. *The Journal of Business*, 78(6), 2053-2094.
- Hasegawa, N., Kim, H., & Yasuda, Y. (2017). The adoption of stock option plans and their effects on firm performance during Japan's period of corporate governance reform. *Journal of the Japanese and International Economies*, 44, 13-25.
- Himmelberg, C. P., Hubbard, R. G., & Palia, D. (1999). Understanding the determinants of managerial ownership and the link between ownership and performance. *Journal of financial economics*, 53(3), 353-384.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 3(4), 305-360.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 3(4), 305-360.
- Kato, H. K., Lemmon, M., Luo, M., & Schallheim, J. (2005). An empirical examination of the costs and benefits of executive stock options: Evidence from Japan. *Journal of Financial Economics*, 78(2), 435-461.
- Kezdi, G. (2003). Robust standard error estimation in fixed-effects panel models.

-
- Kim, J. B., Li, Y., & Zhang, L. (2011). CFOs versus CEOs: Equity incentives and crashes. *Journal of Financial Economics*, 101(3), 713-730.
- Kim, E. H., & Lu, Y. (2011). CEO ownership, external governance, and risk-taking. *Journal of Financial Economics*, 102(2), 272-292.
- Lewellen, W., Loderer, C., Martin, K., & Blum, G. (1992). Executive Compensation and the Performance of the Firm. *Managerial and Decision Economics*, 13(1), 65-74.
- McConnell, J. J., & Servaes, H. (1990). Additional evidence on equity ownership and corporate value. *Journal of Financial Economics*, 27(2), 595-612.
- Mehran, H. (1995). Executive compensation structure, ownership, and firm performance. *Journal of financial economics*, 38(2), 163-184.
- Morck, R., Shleifer, A., & Vishny, R. W. (1988). Management ownership and market valuation: An empirical analysis. *Journal of financial economics*, 20, 293-315.
- Ofek, E., & Yermack, D. (2000). Taking stock: Equity-based compensation and the evolution of managerial ownership. *The Journal of Finance*, 55(3), 1367-1384.
- Palia, D. (2001). The endogeneity of managerial compensation in firm valuation: A solution. *The Review of Financial Studies*, 14(3), 735-764.
- Sesil, J. C., Kroumova, M. A., Kruse, D. L., & Blasi, J. R. (2000, August). Broad-based employee stock options in The US: Do they impact company performance?. In *Academy of Management Proceedings* (Vol. 2000, No. 1, pp. G1-G6). Academy of Management.
- Sloan, R. G. (1993). Accounting earnings and top executive compensation. *Journal of accounting and Economics*, 16(1-3), 55-100.
- Tai, L. (2004). Firm size, performance and CEO pay: Evidence from a group of American quality companies. *Total Quality Management & Business Excellence*, 15(1), 35-42.
- White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica: Journal of the Econometric Society*, 817-838.
- Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*.

Yermack, D. (1997). Good timing: CEO stock option awards and company news announcements. *The journal of Finance*, 52(2), 449-476.