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Determinants of Executive Compensation in Czech Companies

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Declaration of Authorship

The author hereby declares that he compiled this thesis independently, using only the listed resources and literature.

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Abstract

In this thesis we assess executive compensation in the Czech Republic. Our study adds to scarce literature written on this topic regarding the Czech environment. We analyze a dataset of 100 large Czech companies, we try to find the factors influencing income of Czech managers and we compare our results to existing empirical research. We found that factors such as company's size, performance or concentration and nature of ownership are determinants of the level of executive compensation. Furthermore, we find that annual growth in managerial income is to some extent sensitive to annual performance of the company. We conclude that the environment of executive compensation in the Czech Republic fits predictions of both underlying theories, optimal contracting and rent extraction view, and the compensation culture seems comparable to other countries.

JEL Classification	J31, M52, L25
Keywords	Executive compensation, optimal contracting, rent extraction, performance sensitivity

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Abstrakt

V této práci analyzujeme kulturu odměňování managementu v České republice. Tato studie je příspěvkem k malému množství prací, které se tímto tématem doposud zaobíraly. Zkoumáme vzorek 100 velkých českých firem, snažíme se najít faktory ovlivňující odměny managementu a porovnáváme výsledky s existujícím empirickým výzkumem. Zjistili jsme, že faktory jako velikost firmy, její výkonnost a koncentrace a původ vlastnictví mají vliv na výši odměn. Navíc je změna v platu do určité míry citlivá na změnu ve výkonnosti firmy. Kultura odměňování managementu v České republice je v souladu s oběma existujícími teoriemi, teorií optimálních smluv a teorií získávání renty, a je podobná jiným zemím.

Klasifikace	J31, M52, L25
Klíčová slova	Odměňování managementu, optimální smlouvy, získávání renty, citlivost na výkon

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Acronyms

AgC	Agency Costs
BE	Bonding Expenditures
CEO	Chief Executive Officer
ČSÚ	Český statistický úřad (Czech Statistic Bureau)
CZK	Czech Crowns
EBIT	Earnings before Interest and Tax
EVA	Economic Value-added
FE	Fixed Effects
FOE	Foreign-owned Enterprise
IFRS	International Financial Reporting Standards
MC	Monitoring Costs
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
RE	Random Effects
RL	Residual Loss
ROA	Return on Assets
ROE	Return on Equity
ROCE	Return on Capital Employed
SOE	State-owned Enterprise
US	United States

1 Introduction

> *The directors of such [joint-stock] companies, however, being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own. […] Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company.*
>
> Adam Smith, The Wealth of Nations, 1776, Cannan Edition

Executive compensation is one of the key internal mechanisms to ensure good corporate governance. Yet it is also a complex and controversial subject. This topic has been a concern ever since the separation of corporate ownership from corporate control, but the dramatic rise in managerial income during last two decades spurred much public criticism together with a new wave of discussions about the nature of pay-setting process and the outcomes it produces (Bebchuk & Weisbach, 2010). Many view high compensation as a product of competitive market for managerial talent, whereas others view the high level of executive pay as a result of managerial power abuse (Bertrand et al., 2001). Some even consider excessive executive compensation as one of the fundamental reasons behind recent financial crisis (Anderson, Collins, Pizzigati, & Shih, 2010), because remuneration structures were able to encourage excessive and imprudent short-term risk-taking of executives. Finding criteria determining a level of managerial income is one of the key issues in understanding processes behind executive compensation.

Searching for determinants of executive compensation in one particular country, the Czech Republic, is the main focus of this study. Even though corporate governance issues influence transition economies to a substantial extent, there are very few studies with focus on executive pay. Our study adds to this scarce literature. The objective of this thesis is to find criteria determining managerial income particularly in the Czech corporate environment, to compare the results to existing empirical findings and to assess Czech executive compensation environment based on the results. After theoretical discussion of underlying theory and review of a current situation in the country, we continue with an empirical research. We set several hypotheses which are tested by econometric methods such as linear regression, working with data collected from annual reports of Czech companies.

This study is organised as follows. In the next section, we summarize theory behind the topic, cover existing literature and assess environment in the Czech Republic. Chapter 3 covers methodology, including hypothesis setting and description of the methods used. Chapter 4 contains the empirical analysis. Discussion of results can be found in charter 5. Chapter 6 concludes.

2 Theoretical Background and Literature Review

Sections 2.1, 2.2 and 2.3 summarize theory and literature underlying the topic of executive compensation and its determinants. Part 2.4 is focused on the environment in the Czech Republic.

2.1 Agency Theory and Executive Compensation

2.1.1 Foundations of Agency Theory

An agency theory is considered a state of departure for various corporate governance analyses (Körner, 2005) and is the dominant paradigm in executive compensation research (Barkema & Gomez-mejia, 1996). Ever since the separation of corporate ownership from corporate control, firstly introduced by Berle & Means (1932), the principal-agent problem between shareholders (acting as principals) and executives (acting as agents) has been a central concern. The principal-agent problem is potentially highly detrimental to a company and its values (Frydman & Jenter, 2010), therefore a theoretical concept of agency costs has been developed. The agency costs represent a loss in shareholder's value attributable only to the nature of a principal-agent relationship. The concept operates with a picture of a corporation as a nexus of contracts, introduced by Jensen & Meckling (1976).

There are two categories of sources of agency costs, as summarized by Körner (2005). Agency costs are either driven by the nature of agents involved or they are driven by the nature of the environment surrounding these agents. Agents can differ in their objective function, risk aversion and free cash flow reinvestment motivation. The surounding environment is defined by information asymmetry and incompleteness of contracts.

If managers are self-interested agents and shareholders are not able to monitor them perfectly, executives are likely to pursue their own well-being even at the expense of shareholder value. (Frydman & Jenter, 2010). This is directly connected to executive compensation. As Barkema & Gomez-mejia (1996) stress out, managers would prefer to receive a higher portion of compensation in form of a fixed salary, to receive higher levels of compensation, and not to have their compensation linked to performance. Such compensation would decrease their exposure to risk. If

shareholders could simply observe all effort of a manager and could have access to the same information, they could indeed pay the manager generously and in form of a fixed salary, because they would be able to dismiss the executive whenever he acts incompetently. Nevertheless, given the information asymmetry, monitoring is necessarily imperfect and therefore principals need to tight at least some portion of compensation to a measure they can observe objectively (Kaen, 2003).

Generally, executive compensation should be based on indicators that are informative about whether an executive has taken actions that maximize shareholder value. This creates a need for an incentive contract. Since shareholders are unlikely to know which action or which behaviour of the executive is the most value maximizing, incentive contracts are often directly linked on the principals' ultimate objective, no matter what the objective is (e.g. shareholder value in terms of accounting returns) (Frydman & Jenter, 2010).

2.1.2 Incentives and Reduction in Agency Costs

Jensen & Meckling (1976) discuss the problem of an incentive scheme:

> The principal can limit divergences from his interest by establishing appropriate incentives for the agent and by incurring monitoring costs designed to limit the aberrant activities of the agent. […] In addition, in some situations it will pay the agent to expend resources (bonding costs) to guarantee that he [an executive] will not take certain actions which would harm the principal or to ensure that the principal will be compensated if he does take such actions. However, it is generally impossible for the principal or the agent at zero cost to ensure that the agent will make optimal decisions from the principal's viewpoint. In most agency relationships the principal and the agent will incur positive monitoring and bonding costs (non-pecuniary as well as pecuniary), and in addition there will be some divergence between the agent's decisions and those decisions which would maximize the welfare of the principal. The dollar equivalent of the reduction in welfare experienced by the principal due to this divergence is also a cost of the agency relationship, and we refer to this latter cost as the "residual loss".

Körner (2005) continues and explain the agency costs with an equation (1)

$$AgC = MC + BE + RL \qquad (1)$$

where AgC are agency costs, MC are monitoring and controlling expenditures spent by the principal, BE are bonding expenditures spent by the principal in order to tie the activities of the agent to the activities increasing wealth of the principal, and RL

is a residual loss. One of the reasons for existence of the residual loss is that at some point the costs of the additional monitoring or bonding activities outweighs the benefits to be gained by principals (Hamill, Ward, & Wylie, 2011).

Given the aforementioned, monitoring and reward structures are meant to align the incentives of managers with the interests of shareholders. These monitoring and bonding solutions are means of reduction of the agent driven agency costs. The environment driven agency costs can be reduced as well, e.g. by reputation building or transparency enhancement (Körner, 2005). We will elaborate more on the agent driven agency costs, which are crucial to our topic.

The right setting of an incentive scheme is very important, since a „dilution and a distortion of incentives could well impose a larger cost on shareholders than excessive compensation per se“ (L. Bebchuk & Fried, 2005). Khan, Dharwadkar & Brandes (2005) suggests that the incentive scheme should reflect the ability of principals to monitor. The more they are able to monitor the management, the more they should use behavioral-based incentives (principals know what executives' behavior should be rewarded; also can be called „input-based incentives“, i.e. an input can be observed) and less outcome-based compensation (e.g. accounting returns) and vice-versa. In general, monitoring and incentive alignment can reduce agency costs when used in combination (Khan, Dharwadkar & Brandes 2005). Another challenge is that an optimal incentive strength depends on parameters that are unlikely to be observable, such as the marginal product of manager's effort, the manager's risk aversion, the manager's cost of effort or the manager's outside wealth (Frydman & Jenter, 2010).

2.1.3 Matter of Luck in Incentives

There is also an additional problem connected to outcome-based compensation. The outcomes depend not just on managers' decisions, but also on many other events outside their control (Brealey & Meyers, 2003). Since managers are usually risk-averse and want to avoid bearing any uncontrollable risk of the firm, they want to pass this risk to shareholders (Kaen, 2003). Therefore, „an ideal incentive contract should filter out any systematic (e.g. market or industry) components in measured performance, because executives cannot affect these components and suffer from bearing the associated risk“ (Frydman & Jenter, 2010).

Unless shareholders separate out these systematic components, they face a dilemma. They want to apply a high-powered incentive on the managers to capture all possible

benefits of their contributions to the company, but this scheme would load all the risks of volatility in the firm's value onto the manager. Therefore, companies do link managerial compensation to outcomes (performance), but fluctuations in firm value are shared by both shareholders and executives. Whereas managers are forced to bear part of the risks that they cannot control, shareholders bear some of the agency costs if managers fail to maximize company's value (Brealey & Meyers, 2003).

(Bertrand et al., 2001) summarizes the aforementioned in a simple theoretical model.

> Let *p* represent firm performance and *a* the CEO's actions, which by assumption are unobservable to the shareholders. Firm performance depends on the actions of the CEO and on random factors. We split the random factors into two components: those that can be observed by shareholders and those that cannot. For an oil firm, the price of crude oil would be an observable random factor. Letting *o* be the observable factor and *u* be the unobservable noise term, we assume that performance can be written as $p = a + \sigma o + u$.
>
> Holmstrom and Milgrom (1987) calculate the optimal incentive scheme for this model. Let *s* denote this incentive scheme. Since shareholders can only observe two variables, *p* and *o*, the incentive scheme could at most depend on these two variables. In fact, shareholders will only reward CEOs for performance *net of the observable factor:* $s = \alpha + \beta(p - \sigma o) = \alpha + \beta(a + u)$
>
> In other words, the optimal incentive scheme *filters* the observable luck from performance. This is because leaving *o* in the incentive scheme provides no added benefit to the principal as, by definition, the agent has no control over *o*. Motivating her on *o* has no incentive effects. Beyond providing no benefit, tying pay to luck actually costs the principal because the variance of the incentive scheme is higher, and the principal must increase mean pay to compensate the risk-averse CEO.

Consistent with this prediction of an ideal incentive scheme, compensation can be linked to the performance of the firm relative to an industry benchmark (Frydman & Jenter, 2010). According to Kaen (2003), performance of executives can be benchmarked against industry-wide financial ratios such as profit margins, return on assets, return on shareholders' equity, and rates of growth in sales or net income.

2.2 Contrasting Theories: Optimal Contracting versus Rent Extraction

We will be talking about the theories in terms of US corporate governance system, because most of the literature is focused on it. Later in this work, we will discuss to what extent is the theory applicable on the Czech environment.

2.2.1 Optimal Contracting Theory

In every corporate governance system, there are representatives in corporate bodies of a company who are supposed to act in shareholders' interest. In the US system, such a body is a board of directors. An „optimal contracting theory" is consistent with the agency theory and operates with an assumption that shareholders (i.e. their representatives in the board of directors) act in a way that maximizes shareholders' value. In such environment, every contract between directors (principals) and managers (agents), including executive compensation contracts, is a product of an arm's length contracting. Therefore conflicting interests are taken into account and result in an "optimal contract", in case of executive compensation a contract consistent with efficient labour market.

Consistent with this theory, the extensive increase in managerial pay over past decades is a result of market forces taking into consideration a scarcity of managerial talent. The growth in pay therefore reflects a shift in the importance of managerial ability, which grows with increasing complexity of management of globalised companies (Gomez-Mejia & Wiseman, 1997). An increase in importance of managerial skills transferable across companies relative to firm-specific human capital (valuable only within the organization) has been observed as well as an improvement of managers' exit opportunities (Bebchuk & Weisbach, 2010). Increased hiring across industries suggests that either factors other than industry experience matter or that management experience is transferable even across industries.

Critics of the optimal contracting theory suggest that „just as there is no reason to assume that managers automatically seek to maximize shareholder value, there is no reason to expect that directors will either" (Bebchuk & Fried, 2005). An analysis of directors' incentives and circumstances indicates that director's behavior could be also subject to the agency problem. Directors are affected by various social and psychological factors that pull them in the direction of favoring executives.

Bebchuk & Fried (2005) suggest variety of influential factors. Psychological phenomena such as loyalty, friendship, collegiality, authority, cognitive dissonance or solidarity are observed in many professional contexts and the relationships between directors and managers are not an exception. Moreover, directors' time limitations forces them to rely on information presented by human resources staff or compensation consultants, all of whom have incentives to please the manager. Also directors's incentive to be re-elected plays a role, since significant informal power of managers over the voting process is observed, even though they might not have a formal power. Additionally, directors usually perceive it as necessary from a reputational point of view to retain the manager in the firm and therefore tend to pay managers more than a prevailing market average pay. From this reason, companies tend to make adjustments to executives' pay independently of their results (Barkema & Gomez-mejia, 1996). Such a phenomenon is called "ratcheting", an ever increasing pay.

All the aforementioned factors create space for an opinion that directors might not always be able to or might not always be motivated to act in a way that maximizes shareholder value. This is an assumption of a rent extraction theory (Bebchuk & Fried, 2005).

2.2.2 Rent Extraction Theory

Rent extraction theory is also referred to as „managerial power approach" and is built up on an assumption that contracting between boards and executives is not arm's-length. As Bebchuk & Fried (2005) summarize:

> Like the arm's length contracting approach, the managerial power analysis begins by recognizing the agency problem inherent in the manager-shareholder relationship. The managerial power approach, however, does not view executive compensation as a remedy for this agency problem. On the contrary, the pay-setting process is itself seen as a major part of the problem.

Managerial influence over the pay-setting process is a phenomenon critical for the rent extraction theory. As Lin & Lu (2009) add, „instead of mitigating the agency conflicts between management and shareholders, compensation contract becomes the product of the same agency problem". The question to what extent compensation contracts are flawed is crucial for shareholders and policymakers, because these can be very detrimental to shareholders (Bebchuk & Fried, 2005).

Flawed pay arrangements produce two types of incentive problems (Bebchuk & Fried, 2005). First, it provides weaker incentives to increase shareholder value than it would provide under arm's-length contracting. Second, it even creates inappropriate incentives (e.g. rewarding managers for expansion through acquisitions even when that strategy is value-reducing).

The managerial power approach predicts a correlation between power and rents. Even when only a CEO has a significant power, rents are likely to spill over to other executives (Bebchuk & Fried, 2004). The only limitations to managerial influence are „outrage costs", i.e. how big outrage the pay arrangement will generate. These costs are represented by a potential decrease in market reputation of managers or their desire for esteem by some social groups. Consistent with the rent extraction theory, the extensive increase in managerial pay over past decades is a result of managerial power in the corporate governance structures.

2.2.3 Implications

There is no clear consensus on the relative importance of both theories, optimal contracting or rent extraction, in determining a pay of a typical manager (Frydman & Jenter, 2010). Both theories play an important role in explaining executive compensation. Nevertheless, there can be a corporate governance culture in a particular economy which makes the corporate environment more or less vulnerable to managerial influence over a pay-setting process. According to Bebchuk & Fried (2004), the amount of managerial power varies across firms depending on governance structures. Therefore an analysis of factors of managerial power can provide an insight whether it is probable that flawed compensation contracts emerge from pay-setting processes in a particular economy.

What can be the factors indicating managerial power? According to Bebchuk & Fried (2004), managerial power approach predicts that compensation contracts are less sensitive to performance in companies where managers have relatively more power. Given this assumption, in a company which applies relatively less performance-sensitive compensation, managers are likely to have relatively more power. Bebchuk & Fried (2004) also suggest that managers will tend to have more power when (i) a board is relatively weak or ineffectual vis-á-vis the management; (ii) there is no large shareholder or the influence of the biggest shareholder is low; (iii) managers are protected by antitakeover arrangements. These results suggest that by assessing these corporate governance factors it is possible to consider a particular corporate

environment more or less vulnerable to managerial influence. We will perform such an assessment later in this work.

2.3 Determinants of Executive Compensation

Executive compensation is influenced by a broad variety of factors. Two particular meta-analyses, Barkema & Gomez-mejia (1996) and Gomez-Mejia & Wiseman (1997) provide a very complex overview of determinants of executive compensation. Most of the empirical studies they built on are from US environment, however similar results were found in several European countries (England, Netherlands, Denmark or Spain). Barkema & Gomez-mejia (1996) provide a general framework for understanding executive compensation:

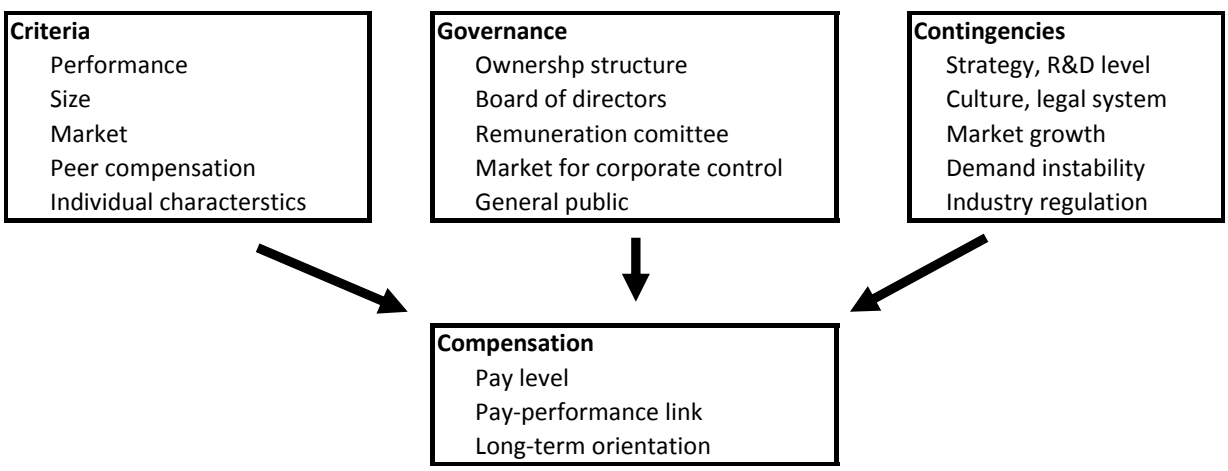

Figure 1. Executive Compensation Framework
Source: Barkema & Gomez-mejia (1996)

We focus particularly on two from the three presented components of compensation – pay level in Section 2.3.1. and pay-performance link in Section 2.3.2.

2.3.1 Determinants of the Level of Executive Pay

There are many influences that impact the level of managerial compensation. We focus on few of the most important – firm's size, financial performance, largest shareholder, financial leverage and size of the board. Every determinant is assessed separately, but overall, the empirical evidence indicates that companies with weaker governance structures have greater agency problems and that executives at companies with greater agency problems receive higher compensation (Core, Holthausen, & Larcker, 1999).

Company's Size Positive size effects on executive pay are frequently found in empirical studies and are typically interpreted as reflecting the fact that leading a bigger company requires better managerial skills, for which the manager is compensated (Eriksson, 2005). As Core et al. (1999) summarizes, „we expect that larger firms with more complex operations will demand higher-quality managers with higher equilibrium wages". Kaen (2003) points out that salary is also a function of the degree of responsibility the officer has, which is presumably higher in a larger firm.

During past decades, the growth in executive pay has been much steeper in larger firms. As a result, the compensation premium for managing a larger firm has increased (Frydman & Jenter, 2010). The result of the meta-analysis shown that firm size explains approximately 54% of variance in executive pay (Gomez-Mejia & Wiseman, 1997).

Financial performance As discussed earlier, a positive relationship between executive compensation and financial performance would be consistent with the agency theory (also Barkema & Gomez-mejia, 1996). Meta-analysis by Gomez-Mejia & Wiseman (1997) suggest that performance explains 5% of variance in executive pay.

Largest shareholder Large owners can more effectively monitor agents because of their relatively lower coordination costs compared to more dispersed owners (Khan, Dharwadkar & Brandes, 2005). „Large blockholders have both the incentives and the voting power to discipline executives", write Barkema & Gomez-mejia (1996). Moreover, dispersion of ownership is subject to a free-rider problem (Brealey & Meyers, 2003). Therefore, concentrated ownership leads to higher efficiency in company's governance structure.

Core et al. (1999) suggest that executives earn lower compensation when governance structures are more effective. Therefore, higher owners' concentration is associated with lower managerial power and lower levels of compensation. Studies find a negative correlation between the equity ownership of the largest shareholder and the amount of managerial compensation (L. Bebchuk & Fried, 2005).

Financial leverage Financial leverage serves as a proxy for indebtedness which leads to monitoring of the company by creditors. Such monitoring could be associated with decrease of managerial power and lower rents. Lower costs of capital arising from financial leverage are partially offset by creditors' (e.g. banks') tendency to intervene

in corporate governance structure. Brealey & Meyers (2003) write that by monitoring to protect its loan, the bank protects shareholders' interests as well. According to Kaen (2003), the IPOs of companies with banking relationships sell for a higher price than the IPOs of companies with no banking relationships. This is consistent with the idea of a bank as delegated monitor of management.

Banks indeed are motivated to monitor, since one of the most common motivations of managers for earnings manipulation is the desire to raise external financing at low cost and to avoid debt covenant restrictions (Dechow, Sloan, & Sweeney, 1996). Körner (2005) writes about a different point of view on why the presence of banks decrease managerial power:

> Denis (2001) or Shleifer and Vishny (1997) also called attention to the ability of debt financing to reduce agency costs via reducing residual cash flows. In profit distribution via dividends the management has some degrees of freedom in decision making. But this is not the case for debt financing since the corporation is obliged to meet the due repayments. Here the debt service decreases free cash flow and therefore decreases the conflict of interests between shareholders and managers.

Size of the board Measures of board efficiency could explain some amount of cross-sectional variation in executive compensation. The less effective the board operates, the greater compensation managers earn (Core et al., 1999). According to Körner (2005), the empirical evidence strongly supports the idea that higher agency costs are associated with larger boards. Main reasons are more common communication failures, free-riders effect and higher costs of motivation streamlining. Therefore larger boards are correlated to bigger managerial influence and higher executive pay, which is confirmed also by positive relationship found by Bebchuk & Fried (2005).

Other determinants Barkema & Gomez-mejia (1996) suggest that the more uncertain, varied, and ambiguous the environment faced by a firm, the higher the executive compensation as a reward for dealing with complexity. It is possible to use proxies such as market growth, industry characteristics, demand instability or regulation. Another important factor is an investment opportunity set (Gaver & Gaver, 1993). There are also manager-specific determinants such as number of years of experience or promotion prospects (Körner, 2005). Some of these determinants are very problematic to quantify and an availability of data is a common problem. Overall, there is still a significant portion of variation in executive compensation not explained by existing empirical literature.

2.3.2 Performance Sensitivity of Executive Pay

A lot of the literature is focused on a relationship between changes in pay and changes in corporate performance (Eriksson, 2005). In other words, researchers try to find which changes in performance can predict a flow of new compensation, i.e. whether these changes in performance are part of managers‘ incentive plans.

We comment on two performance proxies. First, a change in accounting returns, as the most commonly used performance proxy, and second, a growth proxy. As Barkema & Gomez-mejia (1996) find in their meta-analysis, „the overall explanatory power of the empirical model for pay-for-performance sensitivity is quite low“. Gomez-Mejia & Wiseman (1997) conclude that firm growth, when compared to performance improvement, explains twice the amount of variation in executive pay adjustments (8% versus 4%).

Change in accounting returns Bertrand et al. (2001) note that performance is typically measured as changes in accounting returns. As Kaen (2003) summarizes:

> Short-term (annual) incentive pay plans tie a portion of managerial pay to the performance of the company over the past year. Performance measures for short-term incentive plans almost always include one or more financial statement metrics. Individual and group performance is measured against standards. These standards may be the previous year’s actual performance, a budget, or some absolute standard that remains the same from one year to the next.

Nevertheless, it is important to notice that there are also several problems connected to usage of accounting profits. First, they are partly within the control of management and can be a subject to creative accounting. Second, they are not necessarily a measure of true profitability, because they often do not take into account cost of capital (Brealey & Meyers, 2003).

Growth Various measures can be used as growth proxies – e.g. change in sales or change in assets. Kaen (2003) points out that rates of growth in sales are often used as part of incentive plans since shareholders typically appreciate it. Change in fixed assets can be seen a proxy for „empire building“. Executives are tempted to expand the size of their „empire“ even without any incentive (Jensen & Murphy, 1990), because „other things equal, managers prefer to run large businesses rather than small ones“ (Brealey & Meyers, 2003). This may lead into growth even beyond the size that maximizes shareholder value. Therefore this should be prevented by monitoring

and there is no need to incentivize such behaviour. Despite these findings, existing compensation contracts often reward managers for increasing company's size.

Other factors Considering other performance indicators with influence on change in compensation, an increasing role of nonfinancial measures in incentive plans is observed since the 90's (Banker, Potter, & Srinivasan, 2000). These often follow a balanced scorecard approach reflecting measures such as customer satisfaction, market share or product quality.

2.3.3 Best Practices in Companies

This section briefly assess remuneration policies in several large European companies in order to introduce current best practices used. The companies usually publish a corporate governance report or compensation report within their annual report. Transparency in executive compensation is certainly an observable trend and detailed presentation of remuneration of all top executives is a usual practise.

Various accounting measures are used as part of an incentive plan, among them return on capital employed (ROCE; e.g. by Siemens and Thyssenkrupp), return on equity (ROE; e.g. by Deutsche Bank), return on assets (ROA; e.g. by BASF) and operating profit (EBIT; e.g. by Volkswagen). Revenue growth is used as well (e.g. by SAP or Siemens). A growing number of firms uses economic value-added (EVA), because they believe it can help managers to concentrate on increasing shareholder wealth. Some industry specific financial measures are applied as well, e.g. net credit losses for financial institutions. Share options often represent a long-term incentive plan. Some of the criteria are assessed individually and some of them relatively to a peer group.

2.4 Environment in the Czech Republic

2.4.1 Czech Corporate Law and Accounting Duties

Mainly two types of corporate entities are present in Czech corporate sector – a joint-stock company („a.s.“) and a limited liability company („s.r.o.“). A joint-stock company has two mandatory bodies - board of directors, which is an executive body, and supervisory board, which monitors the management and acts in the interest of shareholders (Schneider, 2002). A limited liability company has at least one executive and the supervisory board is established voluntarily. Historically, the supervisory boards in general has been weak in Czech corporate culture and sometimes were not able to act independently from executives (Schneider, 2002).

There is a Czech Corporate Governance Codex („Kodex řízení a správy společností“) issued by Commission for Securities („Komise pro cenné papíry“) in 2005 and based on OECD Principles of Corporate Governance. The codex is not legally enforceable, it is only recommended for companies to comply with it. The codex suggests that at least 25% of members of the supervisory board should be completely independent of the company.

According to Czech accounting standards, companies are obliged to disclose personnel expenses on managerial employees together with a number of managerial employees in notes to financial statements annually. However, companies that publish public financial statements only according to International Financial Reporting Standards (IFRS) do not disclose this information, because IFRS do not require it. According to Czech accounting standards, all forms of financial compensation corresponding with a particular year, including bonuses, should be included in personnel expenses for that particular year.

2.4.2 Czech Corporate Governance Environment

Given the 40-year-long era of socialism and planned economy in Czechoslovakia, a tradition of managerial ethics struggled to develop (Mejstřík, 1999). Management suffered from lack of motivation due to lack of incentives for productivity improvement. As Eriksson (2005) summarizes:

> […] the typical manager was a production engineer and not a businessman. Managers faced a mix of monetary and career-based incentives, which were a function of plan fulfillment, enterprise performance, and political loyalty. Profits and efficiency were much less important than they are under capitalism.

Moreover, the regime practised very egalitarian remuneration and a proverb „who does not rob the state, robs the family“ often shaped managerial attitude. In the first decade of capitalistic economy in the Czech Republic, privatization took place, characterised inter alia by a delay in legal environment development. The privatization in „wild“ setting together with a managerial culture from the previous regime often led to very short-term thinking of managers, characterised by „grab all you can and run“ approach where „cheating“, i.e. „exploiting any contractual incompleteness in largely unregulated environment to one´s own advantage“, was a dominant strategy (Mejstřík, 1999). At the end of the 90's, mainly the foreign owned companies were effectively governed (Mejstřík, 1999).

Czech corporate governance system is much closer to German stakeholder model rather than anglosaxon shareholder model, mainly because of high concentration of ownership and less effective capital market with limited amount of listed stocks. Corporate governance environment today has been positively influenced by the entrance to European Union in 2004 and foreign direct investments, resulting in relatively big amount of large Czech companies being foreign-owned. These factors together with healthy banking sector helped to improve corporate governance culture. Currently a growing involvement of Czech capital can be seen on the market (Němec, 2014).

Annual incentive schemes in large Czech companies do use similar financial measures as their foreign counterparts do. Nevertheless, there is one significant difference – as a consequence of low number of listed companies, Czech companies almost do not use share-based compensation. There were cca 36 thousands people with brutto monthly salary more than CZK 100 000 in 2012, according to Czech Statistic Bureau. A typical Czech manager is a male in the age of 40-49 with more than a five-year tenure (Stanton & Chase, 2013).

2.4.3 Literature on the Topic Covering Czech Environment

Literature focused particularly on the Czech Republic is almost non-existent. We assess results of two existing studies, first by Eriksson (2005) and second by Habinak (2013).

Eriksson (2005) focused in his study on managerial pay and executive turnover in Czech and Slovak environment. The dataset consists of cca 1700 Czech and Slovak companies and their data for the years 1997 to 2000. He found a strong association between company's size and levels of executive compensation. Interestingly, he discovered that „the estimates imply that there are strong incentives for the chief executives to increase the size of the firm, something which is not necessarily consistent with profitability." Regarding performance sensitivity, changes in performance do not give rise to changes in pay. However, lagged levels of performance influenced the compensation. Therefore the results regarding performance were somewhat tentative. According to the study, managers of state-owned enterprises earn less when compared to privately owned firms.

Habinak (2013) examined relationships between governance and performance in his academic thesis. The study describes effects of corporate governance on firm performance and managerial income in firms from financial industry and export-

oriented manufacturing industries. Dataset consists of data on 60 Czech companies for the year 2012. The author did not find statistically significant effect of performance on managerial income. In line with Eriksson (2005), he concludes that bigger company size implies higher executive compensation.

3 Methodology

3.1 Hypotheses

We set several hypotheses based on the underlying theory and the specifics of the Czech environment, which were both discussed in the previous chapter.

3.1.1 Level of Pay

First, we set hypotheses covering the determinants of the level of pay. Company's size has been found one of the strongest predictors of managerial compensation. Both Eriksson (2005) and Habinak (2013) found positive relationships also in the Czech environment and we expect to find the same result in our analysis. Another determinant proven strong by various meta-analyses, company's performance, was not found significant by Habinak (2013) in case of Czech companies. However, we expect to find a positive relationship in our data, given the strong theoretical support and its consistency with the agency theory.

We also predict three factors connected to efficiency of corporate governance to have influence on the level of Czech managerial pay. First, strength of the largest shareholder. We believe this could be a significant factor in a country with rather concentrated ownership. As in line with the theory, we expect that the stronger the largest shareholder, the more effective the corporate governance, the less space for managerial power abuse and the lower the level of pay. Second, financial leverage as a proxy for involvement of creditors. Corporate governance environment in the Czech Republic incline to a stakeholder model, where creditors might have a significant influence on monitoring. Therefore we expect a negative relationship. Third, size of a supervisory board. This body represents a monitoring body in Czech corporate system and according to theory, the bigger such bodies are, the less effective they operate. We can investigate whether a number of members of the supervisory board has a significant positive effect on the level of compensation.

Because foreign-ownership has such importance to Czech corporate sector, we will investigate whether this factor influences pay of executives employed in such companies. According to Czech Statistic Bureau (ČSÚ, 2014), foreign-owned enterprises (FOE) pay higher salary to their employees than domestic companies. We will expect positive relationship, which is in line with the results of Eriksson (2005).

Last, we will investigate whether state-owned enterprises (SOE) compensate their managers differently than other companies. Eriksson (2005) found that SOE pay relatively less and explains that „it reflects the poor quality of the non-privatized state-owned firms“, suggesting that the better performing companies were already privatized. We expect to find the same result.

In order to test all these hypotheses, we will construct Model 1, which will investigate whether all of these factors – company's size, performance, percentage strength of a largest shareholder, leverage, size of supervisory board and form of ownership (private-owned by a Czech entity, state-owned or foreign-owned) – do influence a level of managerial income, i.e. whether they are determinants of executive compensation.

3.1.2 Performance Sensitivity of Pay

Second, we set hypotheses covering the performance sensitivity of executive compensation. According to Eriksson (2005), estimating the effect of changes in company's performance on changes in executive pay from panel data is a frequent practice in empirical literature. With respect to the theory, we expect a positive relationship. Nevertheless, we suggest that in Czech environment, the effect might be relatively weaker. Why? According to Khan, Dharwadkar & Brandes (2005), outcome-based incentives are needed in case of relatively lower ability to monitor behaviour. Higher concentration of ownership in Czech environment implies better ability to monitor and that might indicate relatively lower need for outcome-based incentives (behaviour-based might be used instead). Compensation with high ratio of behaviour-based incentives might still be performance sensitive, however the performance is not observable from the researcher's point of view. Therefore we might find a weaker relationship. Moreover, Eriksson (2005) did not find a significant sensitivity.

Additionally we will investigate whether change in sales, as a growth proxy, has a positive relationship to change in compensation, i.e. whether it is part of the incentive plans used by Czech companies. Last, the effect of change in fixed assets will be examined, as a proxy for empire building. Eriksson (2005) found a positive relationship and we expect the same result. Model 2 will be constructed to test these hypotheses, i.e. whether a year-on-year change in company's performance and growth is positively correlated to a year-on-year change in managerial income.

Following table summarizes all the hypotheses, our expectations and the model used:

Determinant	Expected relationship	Tested by model	Dependent variable
Size	+	Model 1	level of pay
Performance	+	Model 1	level of pay
Largest shareholder	-	Model 1	level of pay
Leverage	-	Model 1	level of pay
Size of supervisory board	+	Model 1	level of pay
FOE	+	Model 1	level of pay
SOE	-	Model 1	level of pay
change in performance	+	Model 2	change in pay
change in sales	+	Model 2	change in pay
change in fixed assets	+	Model 2	change in pay

Table 1. Set of Hypotheses

Source: Author's methodology.

3.2 Method

This section provides a brief theoretical introduction of the methods used. We will test our hypotheses using a linear regression model as a method for searching for relationships within variables from our dataset. We choose a linear regression, because we expect the relationships to be explainable by a linear model with respect to existing empirical literature (in case of some variables after their logarithmic transformation; this assumption will be further tested in Section 4.1.2. and Section 4.2.2.).

A linear regression model has dependent variable y and independent variables x_k:

$$y = \beta_0 + \sum_{k=1}^{m} \beta_k x_k$$

We will construct two different models for testing the hypotheses. Model 1 will use an ordinary least squares (OLS) method, because only one time period will be examined (cross-sectional data). The OLS method minimizes a sum of square distances between the actual observations (i.e. $[y_i, x_{ik}]$) and the values predicted by the linear model. This can be, according to Wooldridge (2009), written as

$$\min \sum_{i=1}^{n} (y_i + \hat{\beta}_0 - \sum_{k=1}^{m} \hat{\beta}_k x_{ik})^2$$

where $\hat{\beta}_0$ and $\hat{\beta}_k$ are the estimated coefficients.

An OLS method has several assumptions (Wooldridge, 2002) which needs to hold or to be corrected for when we want to properly use this method:

1) The model can be written as $y = \beta_0 + \sum_{k=1}^{m} \beta_k x_k + u$; where u are unobserved disturbances.
2) We have a random sample of n observations.
3) Conditionally on x_k, an expected value of disturbances u is zero.
$$E\left(u \middle| x_1, ..., x_m\right) = 0$$
4) There is no exact linear relationships present among independent variables and none of them is a constant.
5) The disturbances have, conditionally on x_k, constant variance (i.e. homoscedasticity).
$$Var\left(u \middle| x_1, ..., x_m\right) = \sigma^2$$
6) The disturbances are independent on x_k and are normally distributed $\sim N(0, \sigma^2)$.

Under assumptions 1-4, the OLS estimates are unbiased. Under assumptions 1-5, also σ^2 is unbiased and the OLS estimates are best linear unbiased estimators. When all six assumptions hold, we can use t- and F-tests for testing sigfnificance of variables (Wooldridge, 2002). The aforementioned assumptions are tested by several tests checking for multicollinearity (VIF test), misspecification (Ramsey RESET test), goodness-of-fit (R-squared) and heteroscedasticty (Breusch-Pagan test and White test). Normality is graphically tested using histograms.

In Model 2, where we work with panel data, we operate with two different methods for estimating unobserved effects in panel data models - Fixed effects (FE) model and Random effects (RE) model. FE model assumes some correlation between a disturbance and independent variables (Torres-Reyna, 2014). FE model uses a transformation to remove the unobserved effect prior to estimation. Time-constant explanatory variables are removed (Wooldridge, 2002). Not taking into account these fixed effect can lead into omitted variable bias. On the other hand, RE model is used when unobserved effect is not correlated with any of independent variables (Wooldridge, 2002). In other words, we should use RE model in case that differences across entities have some influence on our dependent variable. In RE model it is possible to include time-invariant variables (Torres-Reyna, 2014).

Hausman Test is performed to test the assumption that the unobserved effect is uncorrelated with explanatory variables, therefore we use this test for a decision whether FE or RE model will be more appropriate for our model. There is also a possibility that characteristics of a dataset lead to the fact that pooled OLS method can be used. We will test this by performing a Lagrange multiplier test for random effects.

3.3 Dataset

The dataset consists of data on 100 large Czech companies. Most of the firms were taken from a CzechTOP100 ranking, which lists Czech based companies with the highest revenues. The association CzechTOP100 puts together the most respected rankings of companies in the Czech Republic. The main information we are interested in is an average managerial income in the company, counted as personnel expenses on managerial employees divided by a number of managerial employees. However, not all of the companies do disclose these information (please refer to Section 2.3.1.). Therefore the dataset was complemented with other companies which do disclose this information, represented mainly by the biggest retail chains in the Czech Republic (not included in CzechTOP100) and also with some state-owned enterprises (please find a full list of companies in the sample in Appendix A). Majority of the firms in the sample were foreign-owned (64), whereas only 19 were owned by a private Czech entity and 17 companies were state-owned. The data were manually collected from annual reports as a panel across four years, from year 2009 to year 2012.

3.4 Value Added of the Thesis

This study examines a topic which is very weakly covered by empirical literature in the Czech environment. As Barkema & Gomez-mejia (1996) notice, previous empirical research was extremely US focused, but data on other countries could bring an increased understanding of what determines executive pay. According to Körner (2005), there are only few studies of determinants of executive compensation in the Central European economies.

We also extend the focus of the most recent study on the topic - Habinak (2013) - in two particular ways. First, as opposed to his study, we collected data for fours years and therefore we can work with a panel. Second, apart from the relationship between pay level and performance, we examine the performance sensitivity as well.

3.5 Framework for Analysis

Considering an empirical analysis (performed in the following chapter), we will use a similar framework for both of our models:

1. In the first part, we describe the variables from dataset used in the model and we examine a transformation of some variables.
2. Second, we state a regression model and perform a specification if necessary.
3. In the third part, we estimate our final model and test it for the assumptions of the method used.
4. Last, we present the results of the final model. Economic interpretation is further discussed in Chapter 5.

4 Empirical Analysis

4.1 Model 1: Determinants of the Level of Pay

4.1.1 Data

We will not work with the data as with panel data in the Model 1. Since all of the variables we are going to investigate in the Model 1 are very correlated across the monitored years on a firm-level (e.g. a size of a supervisory board is very stable over time in one company), we include a four-year average of every variable in the model. By performing a cross-sectional analysis with average variables we are able to avoid autocorrelation which would be present when working with the data as a panel.

We use an amount of assets, an amount of sales and a number of employees as three different proxies for company's size. All of them were used by various empirical studies, some of them in a logarithmized form (Khan, Dharwadkar & Brandes (2005); Lin & Lu (2009); Gomez-Mejia & Wiseman (1997)). Four different proxies are used for firm's performance – ROE, ROA, ROCE and EBIT margin. All of them are used by both various researchers (Lin & Lu (2009); Core, Holthausen, & Larcker (1999); Gomez-Mejia & Wiseman (1997)) and various companies (see Section 2.3.3.) as a base for management remuneration. As a proxy for strength of the largest shareholder, a percentage owned by the largest owner is used (similarly as Khan, Dharwadkar & Brandes (2005)).

aMI	average annual managerial income in CZK thousands; counted as total personell expenses on management divided by a number of managerial employees
supboard	number of members of a supervisory board
largshare	percentage owned by a largest shareholder
FOE	foreign-owned enterprise; a dummy
SOE	state-owned enterprise; a dummy
asales	average sales in CZK million
aassets	average total assets in CZK million
employees	number of employees
aleverage	average leverage, counted as total liabilities divided by equity
aROE	average return-on-equity, counted as net income divided by equity
aROA	average return-on-assets, counted as net income divided by total assets
aEBITmargin	average EBIT margin, counted as EBIT divided by sales
aROCE	average return-on-capital-employed, counted as EBIT divided by total assets less current liabilities

Figure 2. Model 1: Description of variables

A letter „a" at the beginning of some variables refers to a word „average", meaning that those are average amounts for the four observed years. *Source*: Author's methodology.

Variable	Obs	Mean	Std. Dev.	Min	Max
aMI	100	2510	1146	740	6230
supboard	100	3,35	3,52	0	15
largshare	100	94	14	50	100
FOE	100	0,64	0,48	0	1
SOE	100	0,17	0,38	0	1
asales	100	16817	19292	949	107036
aassets	100	14434	18888	943	89182
employees	100	3253	5664	42	32163
aleverage	100	0,55	0,23	0,07	0,99
aROE	100	0,068	0,278	-1,854	0,639
aROA	100	0,046	0,062	-0,175	0,263
aEBITmargin	100	0,061	0,093	-0,086	0,576
aROCE	100	0,093	0,119	-0,292	0,442

Table 2. Model 1: Descriptive statistics of variables

Source: Author's methodology. Econometric software Stata.

According to the descriptive statistics, all variables are available for the 100 observations and there are no wrong inputs or significant outliers when assessing the min and max values. The mean of *aMI* shows us that company's annual personnel expenses on a manager accounted for CZK 2.5 million, resulting in a monthly gross salary of CZK 156 thousands (taking into account 34% tax a company has to pay for an employee). Nevertheless, the median gross salary is somewhat lower at CZK 148 thousands, which is in line with Frydman & Jenter (2010): „[managerial wages] are amplified when focusing on average instead of median compensation". There are big differences in executive compensations among the companies and testing our hypotheses will help us to find the drivers of this variance.

One of the important assumptions for hypothesis testing is a normal distribution of variables. Looking at Figure 3 we can observe that the distribution of our dependent variable, „aMI", is strongly skewed to the left. Nevertheless, we have the opportunity to transform the data trying to reach a normalised distribution. Generation of a variable *laMI* by logarithmizing *aMI* shifts the data very close to normal distribution, as can be seen from Figure 3 and as was also confirmed by a result of a Shapiro-Wilk test for normality (a hypothesis that the residuals are normal cannot be rejected even at 70% confidence level).

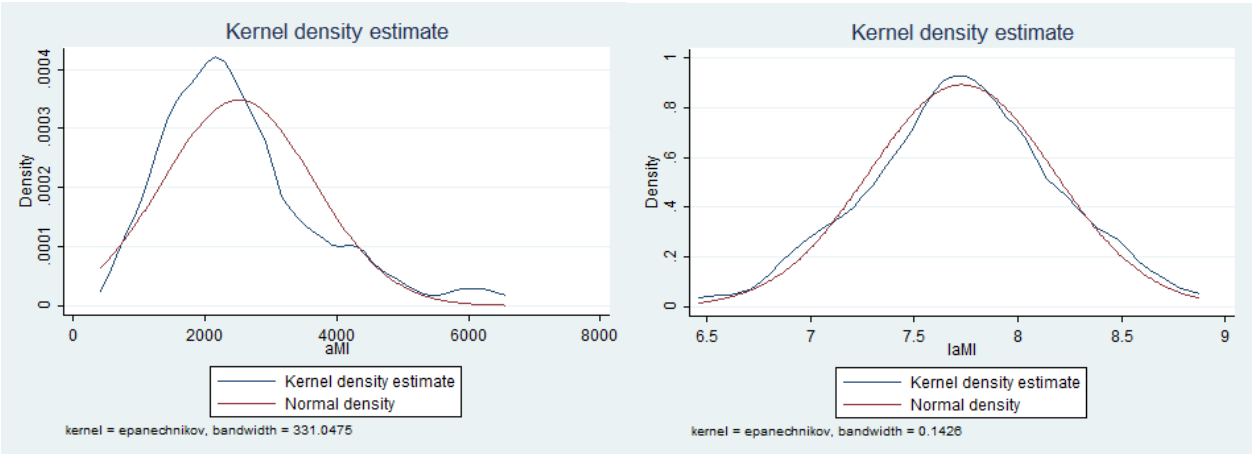

Figure 3. Model 1: Kernel density of variables *aMI* and *laMI*

Source: Author's methodology. Econometric software Stata.

The logarithmization was applied also for assets, sales and employees, resulting in normalised variables *laassets*, *lasales* and *lemployees*. According to a Shapiro-Wilk test, variables *aleverage*, *largshare*, *supboard*, *aROE*, *aROCE* are close to normal distribution without any transformation. We are not able to logarithmize the variables *aROA* and *aEBITmargin* unless all their values are positive. Therefore we created adjusted variables, adding 2 units to every observation. That resulted in positive values of all observations with no change in distribution, only the mean values being different. Newly created adjusted variables are called *aaROA* and *aaEBITmargin* (first letter „a" refers to a word „adjusted"). Variables *laaROA* and *laaEBITmargin* were created by logarithmization, shifting the distribution closer to normal. Variables *SOE* and *FOE* are dummies and therefore they cannot have a normal distribution.

Variable	Obs	Mean	Std. Dev.	Min	Max
laMI	100	7,73	0,45	6,6	87
laassets	100	8,96	1,1	6,8	11,4
lasales	100	9,24	1,01	6,9	11,6
lemployees	100	7,07	1,49	3,74	10,38
aaROA	100	2,05	0,06	1,8	2,3
aaEBITmargin	100	2,06	0,09	1,9	2,6
laaROA	100	0,72	0,03	0,6	0,82
laaEBITmargin	100	0,72	0,04	0,65	0,95

Table 3. Model 1: Descriptive statistics of variables II

Source: Author's methodology. Econometric software Stata.

4.1.2 Model

The linear regression model, examining an influence on managerial income, is represented by a following equation (1):

$$laMI = \beta_0 + \beta_1 laassets + \beta_2 lasales + \beta_3 lemployees + \beta_4 supboard + \beta_5 largshare + \beta_6 FOE + \beta_7 SOE + \beta_8 aleverage + \beta_9 aROE + \beta_{10} laaROA + \beta_{11} laaEBITmargin + \beta_{12} aROCE \quad (1)$$

The model contains a lot of variables and a reduction in a number of independent variables could result into better attributes of the model. We will try to specify the model in a way that will deal with high correlation among certain explanatory variables. We remove the variable *lasales* from the regression because of its high correlation to *laassets* (see in Table 4). Nevertheless, two other proxies for size stays in the model, therefore we will still be able to control for its effect and to test our hypothesis about it. The four profitability measures are also highly correlated (see in Table 4), therefore we retain only one of them in the model. We choose a variable *aROCE*, because we consider this measure the most stable across industries and therefore most appropriate for our sample including companies from numerous industries. Because one financial performance proxy stays in the model, we will still be able to test our hypothesis about it and control for its effect in the model.

	laassets	lasales
laassets	1	
lasales	0,6459	1

	aROCE	aROE	laaROA	laaEBITmargin
aROCE	1			
aROE	0,5807	1		
laaROA	0,7875	0,6162	1	
laaEBITmargin	0,4079	0,3062	0,5952	1

Table 4. Model 1: Correlations between selected variables

Source: Author's methodology. Econometric software Stata.

The specification of the model resulted in the following final model:

$$laMI = \beta_0 + \beta_1 laassets + \beta_2 lemployees + \beta_3 supboard + \beta_4 largshare + \beta_5 FOE + \beta_6 SOE + \beta_7 aleverage + \beta_8 aROCE \quad (2)$$

This model explains 26% of variation in laMI (R-squared at 0.26) and all the variables are jointly significant (p-value of an F-test at 0.0002). Before looking at results of the regression, we will test the assumptions of OLS method to verify whether the results are reliable. One of the important assumptions is linearity - a linear relationship between a dependent and an explanatory variable. We can find

these relationships by plotting a variable on augmented component plus residuals. All the variables showed a linear relationship (also for the variable „largshare“ despite its non-normal distribution; please find the graphs in Appendix B).

We tested the model for underspecification by performing a Ramsey RESET test. The hypothesis that the model has no omitted variables cannot be rejected (even at 85% confidence level). We can conclude that our model does not suffer from an omitted variable bias. Knowing that, we would like to check for multicollinearity. We want the independent variables not to be highly correlated. Multicollinearity was tested by a VIF test and a value of a mean VIF of 1.39 indicates that there is no multicollinearity problem. In order to test for heteroskedasticity, we applied a Breusch-Pagan test and the hypothesis of a constant variance cannot be rejected (even at 10% confidence level). To assure that there is no heteroskedasticity present, we performed also another test, a White test. Interpreting the results, we cannot reject homoskedasticity even at 90% confidence level. We conclude that heteroskedasticity is not present in our model. We need to check for normality of residuals as well. When we interpret a histogram of residuals (see Figure 4), we conclude that the residuals are close to a normal distribution. Please find results of all the tests performed in the Appendix B. Since all the assumptions of an OLS regression analysis have been fulfilled, we consider a model represented by the equation (2) a final model and we will interpret the results.

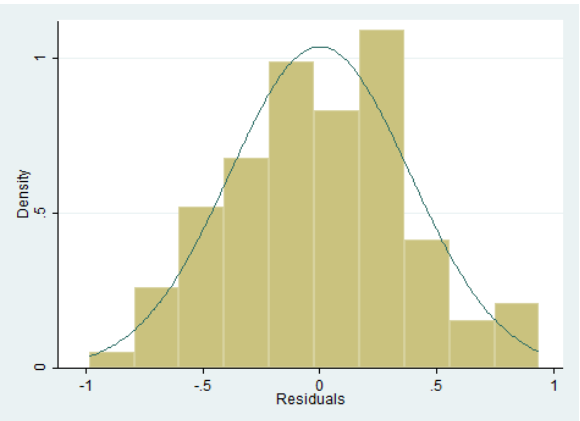

Figure 4. Model 1: Normality of residuals

Source: Author’s methodology. Econometric software Stata.

4.1.3 Results

Independent var.	Coef (sd)		Beta
laassets	0,144	**	0,354
	(0,048)		
lemployees	-0,063	**	-0,211
	(0,031)		
supboard	0,017		0,136
	(0,019)		
largshare	-0,006	*	-0,193
	(0,003)		
FOE	0,27	**	0,292
	(0,111)		
SOE	0,167		0,188
	(0,14)		
aleverage	0,245		0,124
	(0,2)		
aROCE	0,701	*	0,188
	(0,361)		

Table 5. Model 1: Results

Dependent variable is *laMI*. Significance according to p-value: * p < 0.1; ** p < 0.05. *Source*: Author's methodology. Econometric software Stata.

Alongside coeffcients, standard deviations and significance, also standardized regression coefficients („beta coefficients") are presented. The beta coefficients show by how many standard deviations will the dependent variable change if we change the independent variable by one standard deviation. In other words, beta coefficients are, unlike the coefficients measured in units of the variables, measured in standard deviations. By using them we can easily compare a relative strength of various independent variables within the model, even when these are measured in different units.

For variables *laassets*, *lemployees* and *FOE*, the null hypothesis that the coefficients are zero can be rejected at 5% confidence level. Coefficients for variable *largshare* and *aROCE* are also significant, since the null hypothesis can be rejected at 10% confidence level. Comparing the strength of influence of the significant variables we can say that the impact of *laassets* is the strongest, meaning that change of one standard deviation will result in +0,35 standard deviation change in *laMI*. Even the least influential significant variable in our model, *aROCE*, still has got a very noticable impact on managerial income. Coefficients of variables *supboard*, *SOE* and *aleverage* are not significant accroding to the t-test. Taking into account the logarithmization, we can interpret the impact of estimated coefficients on aveage managerial income as the Table 6 presents. Economic interpretation of results with relation to theory is presented in a Chapter 5.

	increase	impact on aMI		impact on aMI
aassets	by 1%	increase by 0,14%	**domestic-owned**	0
employees	by 1%	decrease by 0,06%	**FOE**	+ 27%
supboard	+ 1 member of board	increase by 2%	**SOE**	+ 16.7%
largshare	+ 1 % of ownership	decrease by 0,6%		
aleverage	+ 1%	increase by 0.25%		
aROCE	+ 1%	increase by 0.7%		

Table 6. Model 1: Interpretation of Coefficients

Source: Author's methodology. Econometric software Stata.

4.2 Model 2: Performance Sensitivity of Pay

4.2.1 Data

We will investigate a relationship between an year-on-year change in managerial income and an year-on-year change in performance. Therefore we need several variables as proxies for company's performance. Changes in the profitability measures used are ROE, ROA, EBIT margin and ROCE. We look at more proxies in one model, because as Kaen (2003) points out, problems of short-term incentive plans can be mitigated by using multiple performance measures. Therefore we suppose that companies might use more than one measure of accounting returns in the incentive plans. Measures like EVA are not used, since we lack data on costs of capital. We use two growth proxies as well - changes in sales and changes in fixed assets. Since we got a panel of data for four years, we work with changes for three time periods (2009/10, 2010/11, 2011/12).

dMI	y-o-y percentage change in annual managerial income
dsales	y-o-y percentage change in total sales
dfixassets	y-o-y percentage change in amount of fixed assets
dROA	y-o-y percentage change in return-on-assets
dROE	y-o-y percentage change in return-on-equity
dROCE	y-o-y percentage change in return-on-capital-employed
dEBITmargin	y-o-y percentage change in EBIT margin

Figure 5. Model 2: Description of variables

A letter „d" at the beginning of the variables referrs to change in the respective variable. *Source*: Author's methodology.

Variable	Obs	Mean	Std. Dev.	Min	Max
dMI	286	0,059	0,23	-0,489	0,994
dsales	284	0,071	0,184	-0,401	0,688
dfixassets	286	0,109	0,141	-0,493	0,673
dROA	284	0,301	2,116	-7,881	13,25
dROE	281	0,186	1,939	-12,04	12,545
dROCE	285	0,264	1,71	-7,455	7,585
dEBITmargin	284	0,196	1,65	-8,849	8,579

Table 7. Model 2: Descriptive statistics of variables

Source: Author's methodology. Econometric software Stata.

Because of missing values for some variables for different years we have 262 complete observations. An average year-on-year change of managerial income was an increase of 5.9%. We should have a look at the distribution of the variables. Change in managerial income, the dependent variable, shows a distribution with a very high peak skewed to the left. The trasformation by logarithmizing the variable resulted in a distribution much closer to normal, as can be seen form Figure 6. The same holds for change in sales and return-on-assets. However to be able to transform the data by logarithmization, they needed to be shifted to positive values. Therefore adujsted variables *adMI*, *adsales* and *adROA* were created. Using transformation, we created variables *ladMI*, *ladsales* and *ladROA* (see their descriptive statistics in Table 8). The other four variables are somewhat close to normal distribution.

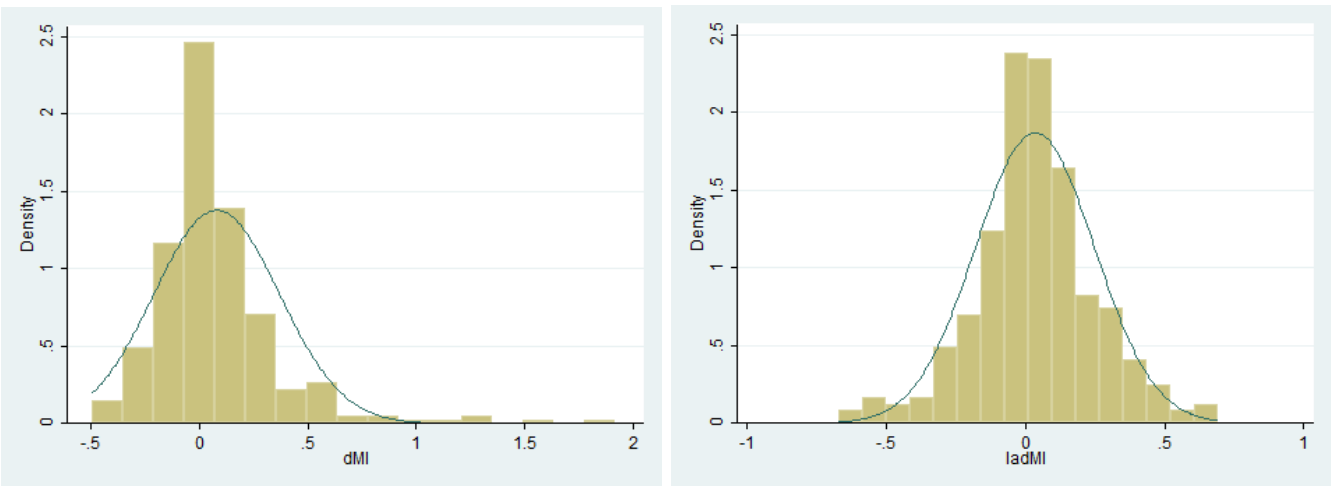

Figure 6. Model 2: Distribution of variables *dMI* and *ladMI*

Source: Author's methodology. Econometric software Stata.

Variable	Obs	Mean	Std. Dev.	Min	Max
adMI	286	1,059	0,23	0,511	1,994
ladMI	286	0,034	0,214	-0,672	0,69
adsales	284	1,071	0,184	0,599	1,688
ladsales	284	0,054	0,172	-0,513	0,524
adROA	284	16,301	2,116	8,119	29,25
ladROA	284	2,784	0,122	2,094	3,376

Table 8. Model 2: Descriptive statistics of variables II

Source: Author's methodology. Econometric software Stata.

4.2.2 Model

The linear regression of Model 2 is represented by a following equation (3):

$$ladMI = \beta_0 + \beta_1 ladsales + \beta_2 dfixassets + \beta_3 ladROA + \beta_4 dROE + \beta_5 dROCE + \beta_6 dEBITmargin \quad (3)$$

Since we work with our data as with panel data this time, we need to decide whether to use a random effetcs (RE) model, a fixed efects (FE) model or a pooled OLS regression. We run a Hausman test to decide between a RE nad a FE model. According to the results (see them in Appendix C), the hypothesis that the difference in coefficients is not systematic cannot be rejected (even at 85% confidence level) and therefore a RE model is more suitable than a FE model. To decide whether an OLS regression is prefered to a RE model, we run Lagrange multiplier test for random effects (see results of the test in Appendix C). We fail to reject the null hypothesis that variance across entities is zero (therefore there is no significant difference across units, i.e. no panel effect (Torres-Reyna, 2014)). Therefore we conlude that we can run a simple OLS regression. A suitability of a simple OLS regression is indicated also by the fact that in the results of the FE model (as well as the RE model), the calculated *rho* is zero. Since the *rho* expresses a variance attributable to differences across panels (Torres-Reyna, 2014), we can conclude that variability within clusters is much larger than variability between them. This is confirmed also by the fact that the estimated coeficients are the same for the RE model as well as for the OLS regression. Therefore we use a simple pooled OLS regression model.

The model contains a lot of variables, therefore we test for multicollinearity by performing a VIF test. A mean VIF value of 5.81 indicates that there might be a multicollinearity problem in our model. We will try to correct for it by a reduction in a number of independent variables while avoiding an omitted variable bias. We remove the variable *dEBITmargin* from the regression since it is highly correlated

with *dROCE* (see Table 9). Three of our proxies for change in financial performance stay in the model, therefore there is no problem with testing of our hypothesis about performance sensitivity.

	dEBITmargin	dROCE
dEBITmargin	1	
dROCE	0,9522	1

Table 9. Model 2: Correlations between selected variables

Source: Author's methodology. Econometric software Stata.

The specification of the model resulted in the following equation (4):

$$ladMI = \beta_0 + \beta_1 ladsales + \beta_2 dfixassets + \beta_3 ladROA + \beta_4 dROE + \beta_5 dROCE \quad (4)$$

The model explains 6.7% of variance in change of pay (R-squared at 0.067) and variables are jointly significant (p-value of an F-test 0.0031). Before looking at results of this model, we will test the assumptions of OLS method. First, did we manage to lower the multicollinearity by specification of our model? The mean VIF value is now 2.25, therefore the multicollinearty should not be an issue anymore. Second, linear relationships between a dependent and explanatory variables are shown by plotting a variable on augmented component plus residuals (see in Appendix C). All the variables showed a linear relationship.

We performed a RESET test and we cannot reject a null hypothesis that the model has no omitted variables (at 20% confidence level). We conlcude our model does not suffer from an omitted variable bias. Results of a Breusch-Pagan test as well as a White test clearly showed that there is no heteroskedasticity present. The hypothesis of a constant variance canot be rejected even at 90% cinfidence level. Another assumption is normality of residuals. Interpreting a histogram of residuals (see Figure 7), we conclude that the distribution of residuals is close to a normal distribution. Please find results of all tests performed in the Appendix C. We consider a model represented by the equation (4) a final model, because all the assumptions of an OLS regression analysis were met, and we will interpret the results.

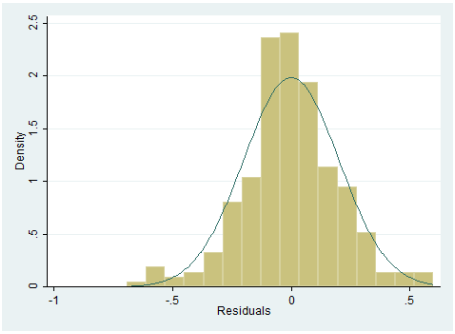

Figure 7. Model 2: Normality of residuals

Source: Author's methodology. Econometric software Stata.

4.2.3 Results

Independent var.	Coef (sd)		Beta
ladsales	0,174	**	0,144
	(0,076)		
dfixassets	0,019		0,011
	(0,099)		
ladROA	0,233		0,138
	(0,203)		
dROE	-0,012		-0,115
	(0,012)		
dROCE	0,019	*	0,148
	(0,010)		

Table 10. Model 2: Results

Dpendent variable is *ladMI*. Significance accroding to p-value: * p < 0.1; ** p < 0.05. *Source*: Author's methodology. Econometric software Stata.

The hypothesis that a coefficient of variable *ladsales* is zero can be rejected at 5% confidence level. The only other significant variable is *dROCE*, this time the hypothesis can be rejected at 10% confidence level. Both variables, *ladsales* and *dROCE*, have very similar influence on ladMI in terms of the beta coefficient. The other variables, *dfixassets*, *ladROA* and *dROE* did not prove to be significant. An interpretation of coefficients in terms of units can be seen in Table 11. Economic interpretation of results with relation to theory is presented in a following chapter.

	increase	impact on dMI
adsales	by 1%	increase by 0,17%
dfixassets	+ 1%	increase by 0,02%
adROA	by 1%	increase by 0,23%
dROE	+ 1%	decrease by 0,01%
dROCE	+ 1%	increase by 0,02 %

Table 11. Model 2: Interpretation of Coefficients

Source: Author's methodology. Econometric software Stata.

5 Discussion of Results

5.1 Economic Interpretation of Results

Model 1 Size of a company, represented by a proxy in form of an amount of assets, does have a significant influence on managerial income and the sign is positive. However, when we take a different proxy, a number of employees, an inverse relationship is observed. Nevertheless, the strength of the influence of assets is much higher as well as the significance. Doubling the number of assets results in 14% increase in managerial income. Therefore our hypothesis about size is confirmed. We also found a positive influence of higher performance, measured by ROCE, on managerial income. When the ROCE is 1% higher, the pay increases by 0.7%.

Also the percentage owned by the largest shareholder is related to managerial income. One percent more owned by the largest shareholder results in 0.6% decrease in managerial income. Executives in foreign-owned enterprises have higher compensation when compared to companies owned by a Czech entity. Average income is 27% higher for a manager employed in a foreign-owned firm than in a domestic-owned firm. Financial leverage, size of a supervisory board and ownership by state were not found to have a significant influence on managerial income and they cannot be considered determinants of level of executive pay in the Czech Republic.

The coefficient for leverage, as opposed to our expectations, was not found significant. Coles, Daniel, & Naveen (2006) suggest that operating under higher financial leverage is actually riskier, and the higher risk results in higher volatility in executive remuneration. Risk-averse executives want to be rewarded for this higher volatility and it needs to be taken into account in the compensation. We suggest that this positive effect might go against the negative effect expected and therefore it might be one of the reasons why a significant negative influence on managerial income has not been found. Another correlation coefficient which did not confirm our expectations of significance is the coefficient of SOE. We suggest that, apart from the reasons for lower compensation in SOE we have presented, there might be factors influencing the pay in an opposite direction as well, e.g. poor governance. In state-owned companies, the information asymmetry between principals (representatives of state interests) and agents (managers) might be relatively higher, given the typically lower motivation of state representatives to pursue shareholder’s (state) interests.

This high information asymmetry and lack of monitoring might lead to rent extraction.

Model 2 When the change in ROCE is 1% higher, the change in managerial income is 0,02% higher. Even though this might seem as a small effect, the beta coefficient tells us the influence is rather substantial: increase in change in ROCE by one standard deviation results in increase in change in managerial income by 0.15 standard deviation. We conclude that change in financial performance has a positive relationship with change in managerial income and our hypothesis is confirmed. Therefore ROCE might be part of a typical incentive plan of a Czech manager.

Annual growth in terms of sales has a positive relationship with change in managerial income. According to the results, doubling the change in sales results in 17% increase in change in managerial income. Therefore a growth of sales might be part of a typical incentive plan as well. The hypothesis that executives are rewarded for empire building (increasing fixed assets) was not confirmed.

Following table summarizes which hypotheses were confirmed by our analysis:

Determinant	Relationship expected	Relationship found	Hypothesis confirmed?	Dependent variable
Size	+	+	yes	level of pay
Performance	+	+	yes	level of pay
Largest shareholder	-	-	yes	level of pay
Leverage	-	no	no	level of pay
Size of supervisory board	+	no	no	level of pay
FOE	+	+	yes	level of pay
SOE	-	no	no	level of pay
change in performance	+	+	yes	change in pay
change in sales	+	+	yes	change in pay
change in fixed assets	+	no	no	change in pay

Table 12. Confirmation of hypotheses

Source: Author's methodology.

5.2 Implications: Optimal Contracting or Rent Extraction?

We can interpret the results in light of the optimal contracting theory and the rent extraction theory. As we discussed in Section 2.2.3., corporate governance structures can help us to assess whether a particular economy is more or less vulnerable to managerial influence. As Bertrand et al. (2001) notice, poorly governed firms fit the predictions of the rent extraction view better, whereas well-governed firms fit the predictions of the optimal contracting view better. We will look at the Czech

environment and the results from our analysis and discuss what does they indicate about managerial power in Czech companies.

In the Czech Republic, company's performance is a determinant of the level of managerial income. Nevertheless, managers are risk-averse and they prefer to have high levels of pay regardless the results they achieve. They are likely to pursue their own well-being even at the expense of shareholder value. Therefore, the fact that performance actually is one of the determinants indicates lower managerial power over the pay-setting process and fits the prediction of optimal contracting better. The same holds for company's size as one of the determinants. Managers would like not to have their pay dependent on the level of complexity their jobs require (i.e. the size of the company). Our results indicate they are not able to exercise their influence in this respect.

The results regarding performance sensitivity indicate low managerial influence as well. As we discussed in Section 2.1.1., managers prefer to have higher portion of compensation in form of fixed salary. However, the incentive plans contain performance and growth indicators such as change in ROCE or change in sales, positively linked to change in compensation. Moreover, Czech managers are not rewarded for a practise called empire building. We know that managers prefer to run larger businesses even when it does not maximize shareholders's value. Therefore it is not a good idea for a shareholder to incentivize such behaviour. Our results show that Czech executives are not rewarded for such practices (e.g. value-decreasing acquisitions). Since Eriksson (2005) found an opposite result, we can conclude that there has been a positive shift in this regard over the past decade.

Nevertheless, not all the results indicate low managerial influence. Beacuse of historical reasons, managerial ethics did not have a chance to develop in Czech companies in the past. Moreover, as Bebchuk & Fried (2004) suggest, low efficiency of market for corporate control, which is observed in the Czech Republic, tends to help managers to pursue their interests. Furthermore, when we compare the explanatory power of our models to the one observed in foreign empirical literature, we can see that our models explain relatively less variance in executive compensation. That could possibly imply that Czech managers are able to exercise certain power, making the standard determinants of compensation relatively weaker. Considering an efficiency of corporate governance, our hypothesis about the strength of largest shareholders is confirmed. Managers in companies with lower effectiveness of corporate governance (i.e. lower percentage of the largest shareholder) are able to extract higher rents from the company, other determinants being equal. That indicates

executives are able to exercise their influence vis-á-vis weaker shareholders. Thus, this finding fit the predictions of the rent extraction view better. On the other hand, other examined indicators of the effectiveness of corporate governance - influence of creditors (examined by leverage) and of supervisory board (examined by number of members) - did not prove to have any significant relationship on executive pay.

To conclude, we see that both theories, optimal contracting and rent extraction, play an important role in explaining executive compensation in the Czech Republic. Nevertheless, our results indicate that managerial power over the pay-setting process is rather low and the corporate governance structures seems to work rather well. A slight positive shift has been observed when compared to results obtained by Eriksson (2005) one decade ago.

5.3 Drawbacks

In this section, we present potential drawbacks and weaknesses of our study. First, according to the theory discussed in Section 2.1.3., an ideal incentive contract should filter out any „compensation for luck“. In other words, it should filter out any systematic (e.g. market or industry) factors influencing performance, because executives cannot affect them. One practice, which is sometimes used by global companies discussed in Section 2.3.3., is to benchmark all performance factors against peer group. It might not be always easy to determine which companies are considered peers by a particular company, but industry performance was used as proxy in several academic studies (e.g. Eriksson (2005)). We did not categorize companies with respect to industries in our study, since the number of industries was very high within our sample and only few companies fit in one category. Therefore, we were not able to filter out this „pay for luck“ in our analysis.

Second, we work with a measure of managerial income which might not necessarily be completely consistent among companies within the sample. The accounting duty to publish personnel expenses on managerial employees does not instruct companies what categories of management they should include. Whereas some of them include only the top-management, some od them might include the second-tier management as well. Even though this effect should not be crucial, we were not able to filter it out given the lack of further data.

5.4 Suggestions for Further Research

Further research in the Czech environment can focus on a wider dataset with higher number of companies. That will allow also for including „luck factors“ such as the industry-specific ones. We also recommend to work with more specific data (e.g. data Eriksson (2005) worked with) than those obtainable from public sources such as annual reports. Such data can contain other interesting information on managerial income as well, such as compensation gaps, i.e. what is the gap between the income of the best paid and the worst paid manager within one company. As Barkema & Gomez-mejia (1996) suggest, further research might also focus on behavioral criteria and contingencies such as firm strategy, R&D level or regulation.

6 Conclusion

In this study we addressed a subject of executive compensation in the Czech corporate environment. We performed an empirical analysis working with a sample of 100 large Czech companies and we found several determinants of managerial income. This work contributed to the very scarce literature covering this issue in the Czech Republic and broadened the focus of the most recent study on the topic by Habinak (2013).

Regarding the determinants of the level of pay, company's size has a positive influence on managerial income. We also found a positive relationship between performance of a company and managerial income. Both of these findings are in line with most of the empirical results found around the world. Strength of the largest shareholder was found to have negative influence on managerial income, because a larger shareholder represents better monitoring ability and leaves less space for managerial power. Foreign ownership has a positive influence on executive compensation, as was found also in previous Czech empirical literature. As opposed to our expectations, size of supervisory board, financial leverage or state ownership did not prove to be determinants of executive pay.

Performance sensitivity of managerial pay was examined as well. We concluded that change in financial performance (approximated by ROCE) has a positive relationship with change in managerial income. Also an annual growth of a company (approximated by sales) has a positive influence on change in executive compensation. Therefore ROCE and growth in sales might be part of a typical incentive plan of a Czech manager. The hypothesis that executives are rewarded for empire building was not confirmed.

The environment of executive compensation in the Czech Republic fits predictions of both underlying theories, optimal contracting as well as rent extraction view. According to our results, the compensation culture seems comparable to other countries and managerial power over the pay-setting process does not seem to be high. The governance culture in this regard does not seem to be as weak anymore as indicated in earlier literature (e.g. Mejstřík (1999)).

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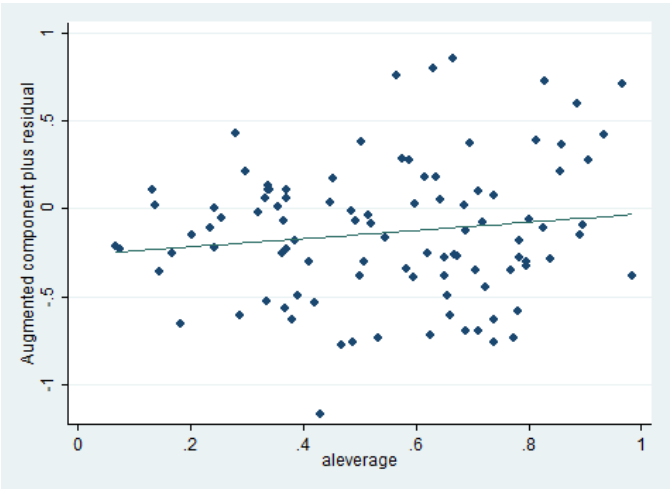
Appendix A: List of Companies

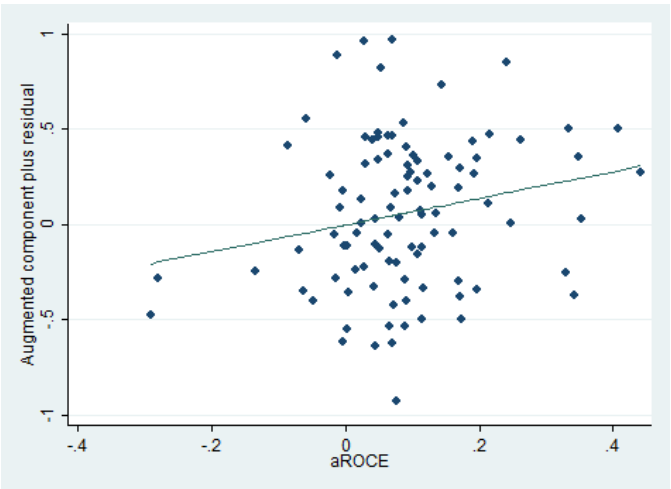
AAA AUTO a.s.
ABB s.r.o.
Advanced World Transport a.s.
AGC Flat Glass Czech a.s., člen AGC Group
AGEL a.s.
Agrofert a.s.
Ahold Czech Republic, a.s.
ArcelorMittal Ostrava a.s.
Automotive Lighting s.r.o.
BOSCH DIESEL s.r.o.
Budějovický Budvar, národní podnik
CEPRO a.s.
Continental Automotive Czech Republic s.r.o.
CTP Invest, spol. s r.o.
ČEPS, a.s.
Česká pošta, s.p.
České aerolinie a.s.
Daikin Industries Czech Republic s.r.o.
DEK a.s.
DENSO MANUFACTURING CZECH s.r.o.
DEZA, a.s.
DIAMO, státní podnik
Dopravní podnik hl.m. Prahy, a.s.
E.ON Distribuce, a.s.
E.ON Energie, a.s.
Eni Česká republika, s.r.o.
EUROVIA CS, a.s.
EVRAZ VÍTKOVICE STEEL, a.s.
Fehrer Bohemia s.r.o.
Ferona, a.s.
Foxconn CZ s.r.o.
GECO, a.s.
Globus ČR, k.s.
HELLA AUTOTECHNIK NOVA, s.r.o.
HP TRONIC Zlín, spol. s r.o.
Inventec (Czech), s.r.o.
Iveco Czech Republic, a. s.
Iveco Czech Republic, a. s.
JUTA a.s.
Kaufland Česká republika v.o.s.
KIEKERT-CS, s.r.o.
Mobis Automotive Czech s.r.o.
Mondi Štětí a.s.
MORAVIA STEEL a.s.
NET4GAS, s.r.o.
nkt cables s.r.o.
OHL ŽS, a.s.
OKD, a.s.
OMV Česká republika, s.r.o.
ON SEMICONDUCTOR CZECH REPUBLIC, s.r.o.
OTE, a.s.
PEGAS NONWOVENS s.r.o.
Penny Market s.r.o.
PHOENIX lékárenský velkoobchod, a.s.
Pražská energetika, a.s.
Pražská plynárenská, a.s.
PSG-International a.s.
PSJ, a.s
Richter + Frenzel s.r.o.
Robert Bosch, spol. s r.o.
SAFINA, a.s
SAINT-GOBAIN ADFORS CZ s.r.o.
sanofi-aventis, s.r.o.
Severočeské doly a.s.
Shell Czech Republic a.s.
Siemens, s.r.o.
Skanska a.s.
Slovnaft Česká republika, spol. s r.o.
Sochorová válcovna TŽ, a.s.
SPOLANA a.s.
Správa železniční dopravní cesty, státní organizace
STÁTNÍ TISKÁRNA CENIN, státní podnik
STOCK Plzeň-Božkov s.r.o.
Stora Enso Wood Products Ždírec s.r.o.
STRABAG a.s.
SWS a.s.
ŠKODA PRAHA Invest s.r.o.
ŠKODA TRANSPORTATION a.s.
Tereos TTD, a.s.
Tesco Stores ČR a.s.
T-Mobile Czech Republic a.s.
TONDACH Česká republika s.r.o.

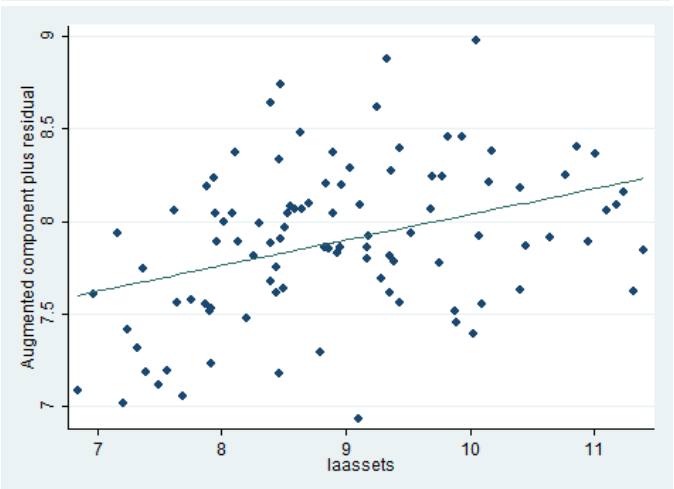
Lesy České republiky, s.p.
Lidl Česká republika v.o.s.
Linde Gas a.s.
LOM PRAHA s.p.
Lovochemie, a.s. Lovosice
Lumius, spol. s r.o.
M.L.S. Holice, spol. s r. o.
Magna Exteriors & Interiors (Bohemia) s.r.o.
METALIMEX a. s.
Toyota Peugeot Citroën Automobile Czech, s.r.o.
TRW Automotive Czech s.r.o.
Třinecké železárny, a.s.
Unipetrol a.s.
VEMEX s.r.o.
Vodafone Czech Republic a.s.
Vojenské lesy a statky ČR, s.p.
WITTE Nejdek, spol. s r.o.
Zentiva, k.s.

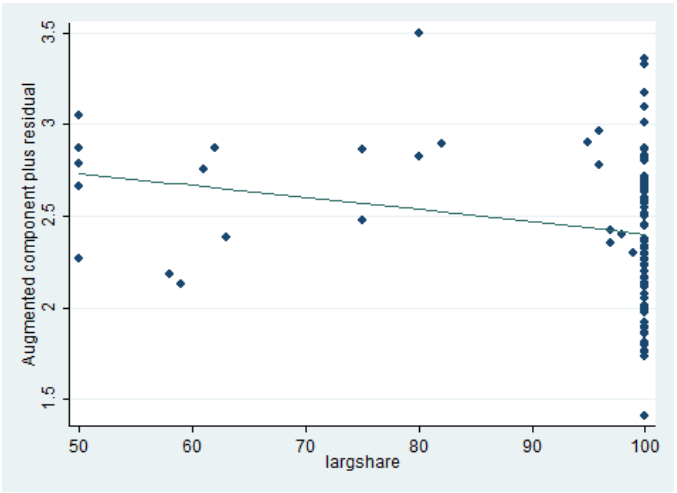
Appendix B: Model 1 in Stata

1. Plotting variables on augmented component plus residuals








Augmented component plus residual
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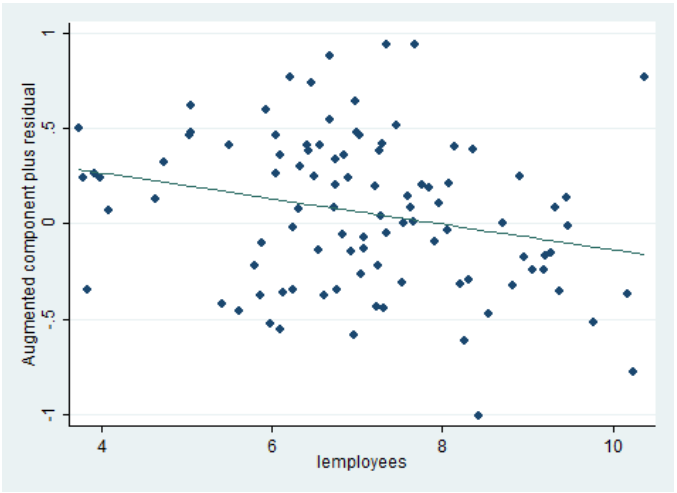
100
largshare


Augmented component plus residual
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-.5
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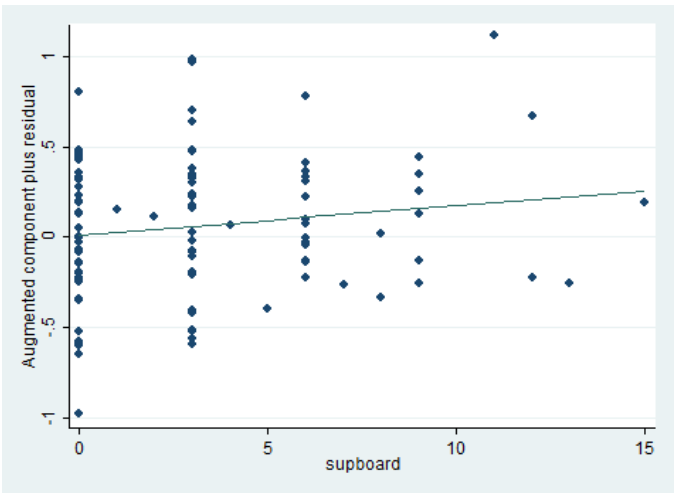
.5
1
4
6
8
10
lemployees


Augmented component plus residual
-1
-.5
0
.5
1
0
5
10
15
supboard

2. Regression results

```
. regress laMI laassets lemployees supboard largshare FOE SOE aleverage aROCE
```

Source	SS	df	MS		
Model	5.09742199	8	.637177748	Number of obs	= 100
Residual	14.6216263	91	.160677212	F(8, 91)	= 3.97
				Prob > F	= 0.0005
Total	19.7190483	99	.199182306	R-squared	= 0.2585
				Adj R-squared	= 0.1933
				Root MSE	= .40085

laMI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
laassets	.1444252	.0479925	3.01	0.003	.0490939	.2397565
lemployees	-.0634008	.0314157	-2.02	0.047	-.1258042	-.0009975
supboard	.017239	.0190643	0.90	0.368	-.02063	.0551079
largshare	-.0061683	.0031462	-1.96	0.053	-.0124178	.0000813
FOE	.27006	.1113256	2.43	0.017	.0489255	.4911946
SOE	.2223084	.1672235	1.33	0.187	-.1098605	.5544774
aleverage	.2448681	.1996154	1.23	0.223	-.1516434	.6413796
aROCE	.7012836	.3606739	1.94	0.055	-.0151509	1.417718
_cons	6.99863	.5136733	13.62	0.000	5.978281	8.018979

3. Results of tests

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of laMI

         chi2(1)      =     2.07
         Prob > chi2  =   0.1502
```

```
Ramsey RESET test using powers of the fitted values of laMI
       Ho:  model has no omitted variables
                  F(3, 88) =      1.10
                  Prob > F =      0.3554
```

Variable	VIF	1/VIF
supboard	2.77	0.360376
SOE	2.46	0.407223
FOE	1.78	0.562707
laassets	1.70	0.587456
lemployees	1.34	0.744315
aleverage	1.26	0.796443
largshare	1.19	0.837392
aROCE	1.14	0.875491
Mean VIF	1.71	

```
White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(41)     =     32.22
         Prob > chi2  =    0.8349

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	32.22	41	0.8349
Skewness	14.73	8	0.0647
Kurtosis	0.25	1	0.6186
Total	47.20	50	0.5866

Appendix C: Model 2 in Stata

1. Hausman Test

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
ladsales	.2003321	.1609507	.0393814	.0962648
dfixassets	-.0902996	.0226293	-.1129289	.1199282
ladROA	.2012832	.3063377	-.1050545	.246914
dROE	-.0091094	-.0154569	.0063475	.0148784
dROCE	.0366609	.0414893	-.0048284	.038085
dEBITmargin	-.0110342	-.0255438	.0145095	.0386434

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 2.35
Prob>chi2 = 0.8847

2. Lagrange multiplier test for random effects

Breusch and Pagan Lagrangian multiplier test for random effects

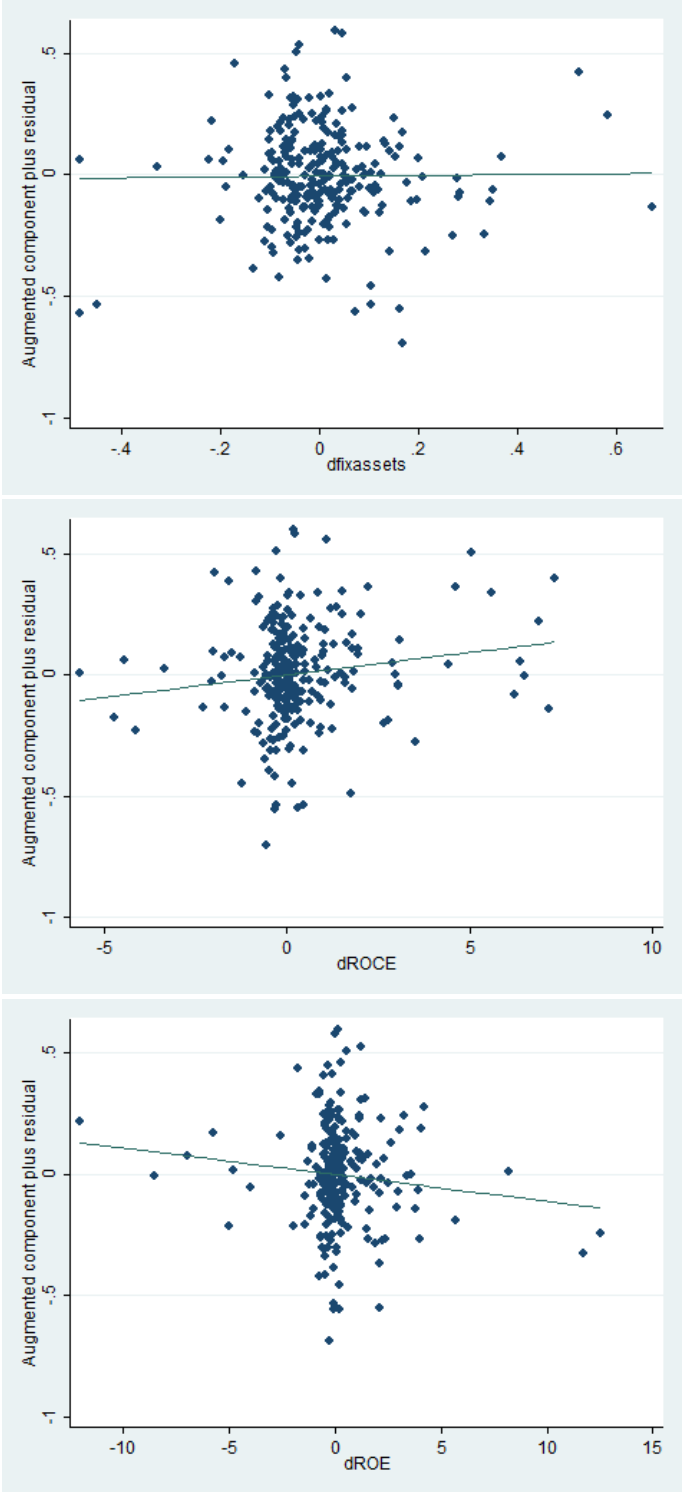
ladMI[idcode,t] = Xb + u[idcode] + e[idcode,t]

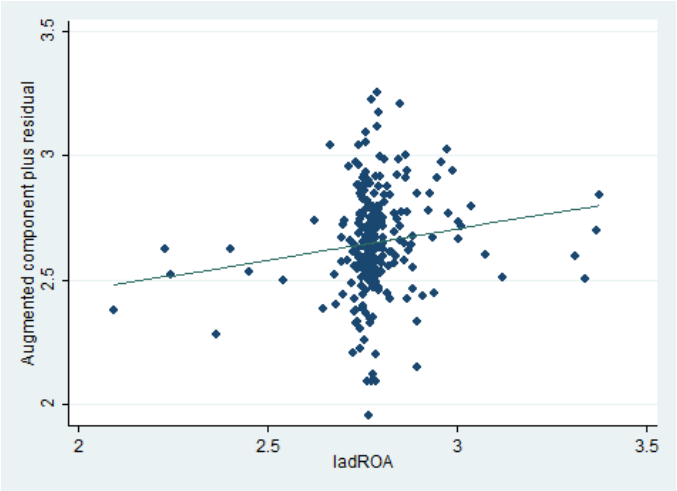
Estimated results:

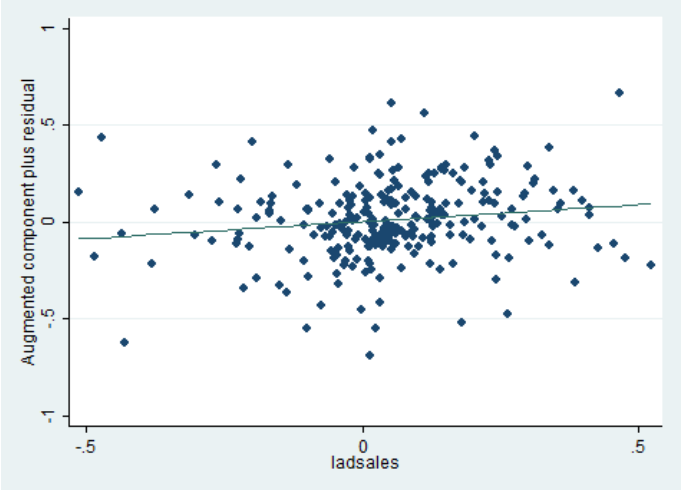
	Var	sd = sqrt(Var)
ladMI	.0434177	.2083691
e	.0541369	.2326734
u	0	0

Test: Var(u) = 0
chibar2(01) = 0.00
Prob > chibar2 = 1.0000

3. Plotting variables on augmented component plus residuals







4. Regression results

Source	SS	df	MS
Model	.761624079	5	.152324816
Residual	10.5703866	256	.041290573
Total	11.3320107	261	.043417665

Number of obs	= 262
F(5, 256)	= 3.69
Prob > F	= 0.0031
R-squared	= 0.0672
Adj R-squared	= 0.0490
Root MSE	= .2032

ladMI	Coef.	Std. Err.	t	P>|t|	Beta
ladsales	.1735617	.0762502	2.28	0.024	.1435122
dfixassets	.0185483	.0990952	0.19	0.852	.0113232
ladROA	.2333671	.2032642	1.15	0.252	.1378801
dROE	-.0119973	.0118453	-1.01	0.312	-.1148509
dROCE	.019419	.0102033	1.90	0.058	.1479061
_cons	-.6234162	.5633666	-1.11	0.270	.

5. Results of tests

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of ladMI

         chi2(1)      =     0.00
         Prob > chi2  =   0.9471
```

```
Ramsey RESET test using powers of the fitted values of ladMI
       Ho:  model has no omitted variables
                  F(3, 253) =      1.39
                   Prob > F =      0.2461
```

Variable	VIF	1/VIF
ladROA	3.96	0.252638
dROE	3.53	0.283365
dROCE	1.66	0.603323
ladsales	1.09	0.916626
dfixassets	1.00	0.995665
Mean VIF	2.25	

```
White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(20)     =     19.20
         Prob > chi2  =    0.5092
```

```
Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	19.20	20	0.5092
Skewness	1.69	5	0.8898
Kurtosis	7.19	1	0.0073
Total	28.08	26	0.3544