EXPLANATORY POWER OF CURRENT EXECUTIVE COMPENSATION IN FUTURE FIRM PERFORMANCE

Author : Dony Wahyudistira

Student Number : 428103

Supervisor : Dr. Nick Benschop

Master Thesis for M.Sc. in Accounting and Finance,

Erasmus School of Economics,

Erasmus Universiteit Rotterdam

2016

Abstract

This thesis re-examines the power of current executive compensation in predicting future firm performance, previously examined by (Hayes & Schaefer, 2000). It extends this literature by including the board independence as a moderation effect and analysing previously found effect given this new moderator. Using the idea that a compensation contract is a function of a mix of explicit and implicit contract and it is substituting each other (Gillian, et al., 2009), I argue that the relation between current executive compensation and future firm performance is stronger with a higher proportion of insider directors than with a lower proportion of insider directors. The in-depth knowledge of firm-specific activities and competitive environment held by insider directors plausibly increasing the outcome of any additional information available, which is not observable to the outsiders. This condition presumably is inducing the board of directors to place more weight on this kind of information in compensating the executives. When the unobservable (to outsiders) measure of performance is correlated with future firm performance, then current executive compensation shall be more highly correlated with future firm performance. To test the prediction, this thesis performs an empirical study with OLS regression analysis using several datasets for 6,920 North America firms in 10 years of observations. The results of this thesis provide the new insights into how the investors might use the current executive compensation to predict future firm performance, given the information of proportion of insider directors. The findings are supporting the prediction that current executive compensation is useful in predicting future firm performance. However, while I found the predicted, positive direction from the moderation effect of proportion of insider directors, I cannot find the evidence with the regression analysis to support the prediction. The finding is supporting the disadvantage theory of the presence of insider directors which argue that they are less independent and utilize their close relationship to the executives to focussing on other factors than firm performances.

Table of Contents

List of Tables:

List of Figures:

1 Introduction

Most of accounting researches have focused much attention on understanding the usefulness of current firm's financial performance to predict future firm performance. In his study, (Anhar, 2015) examined the relation between current firm's financial ratios and future firm performance. The relation between discretionary accruals and future firm performance were examined by (Louis & Robinson, 2005) followed by (Pashei & Talebnia, 2015). These researches have been done to help the investors to get a higher quality of investment decisions to meet their expectations in acquiring investment return commensurate with taking into account specific risks of ownership. By taking the risks of ownership in a specific firm, the investors expect to get an investment return from both of the profit from future firm performance and the capital gain from the changes in the stock price of the firm.

However, there are limited evidences that examine other factor than firm current performance which could help the investors to predict future firm performance. A study from (Mayew & Venkatachalam, 2012) revealed that verbal communication, indicated by positive and negative affects displayed by managers during earnings conference calls are informative about future firm performance. From another perspective, (Hayes & Schaefer, 2000) developed a framework to support their argument if current compensation has an explanatory power in future firm performance. They argue that a compensation contract is divided into an explicit and implicit contract based on the observability of the performance measures. Explicit compensation contract consists of a target, which can certainly be measured and observable by the parties outside the contract *at the time* when the executives take the efforts. Despite this, the implicit contract consists of a target, which can certainly be measured and observable by the parties outside the contract, *but only in the next period after* the executives were taking their effort. Then, they mention that "When compensation contracts optimally incorporate both observable/explicit and unobservable/implicit (to an outsider) measures of performance, *and* the unobservable measures of performance are correlated with future observable measures of performance, then variation in *current* compensation that is not explained by variation in current observable performance measures should predict *future* variation in observable performance measures. " (Hayes & Schaefer, 2000) page 273.

Even though, there raise some contra arguments regarding the usage of unobservable (to outsiders) performance-based-evaluation (implicit contracts) in executive compensation contract. Firstly, (Bol, 2008) in his study argue that it is not contractible, it could lead to reneging behavior by the principal when the principal promises subjective bonuses in the beginning but does not pay (or pays a lower) bonuses at the end. Secondly, it could also lead to managerial power hypotheses when the agent tries to influence principal's subjective assessment with unproductive activities. These contra arguments challenge the conclusion of (Hayes & Schaefer, 2000) study. If those contra arguments are satisfactory, the remuneration board will only rely on explicit contracts in compensating the executives, which only relates to current observable (to outsiders) performance measures. In result, current compensation will not have an explanatory power in the future firm performance.

Despite these researches on predicting future firm performance literature, this thesis finds a way to broader the existing literature by extending (Hayes & Schaefer, 2000) study. The reasoning from explanatory power of current executive compensation in future firm performance also suggest that, when the weight placed on the unobservable (to outsiders) performance measure is higher, there is more information about future performance contained in current executive compensation (Hayes & Schaefer, 2000). I use that idea to examine whether the strength of the relation between current compensation and future firm performance varies with a different level of board independence. In particular, the strength of the association between current compensation and future firm performance is more highly correlated with a higher proportion of insider directors than in a lower proportion of insider directors. Most of the several pieces of research on the board of director literature suggest that outside directors dominated board has better governance, which leads to better performance of the firm. However, on the other hand, insider directors have the advantage from their in-depth knowledge of firm-specific activities and competitive environment (Bushman, et al., 2000). The study from (Coles, et al., 2008) revealed that firm with high project verification costs (such as R&D expenses) benefits from having more insider directors on the board.

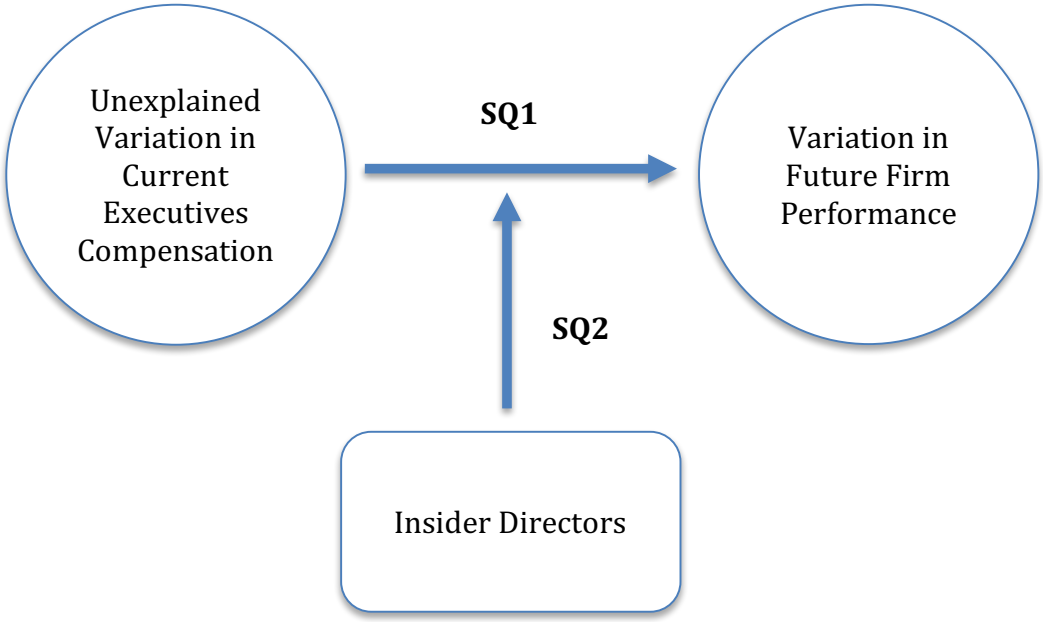
The in-depth knowledge of firm-specific activities and firm's competitive environment makes the insider directors have more information which is not available to outsiders (implicit information). Reasonably, they are more likely to placed more weight in those unobservable (to outsiders) kind of information in compensating the executives. When the board place more weight into unobservable (to outsiders) measure of

performance in optimal compensation contract and the unobservable (to outsiders) measures of performance are correlated with future firm performance, it is reasonable to argue that there is more information about future performance contained in current executive compensation. Hence, it is interesting to examine whether explanatory power of current compensation in future firm performance varies monotonically with a different level of insider directors proportion on the board. Thus, the main research question is:

RQ: *Does current compensation has an explanatory power in future firm performance and does the effect stronger with a higher proportion of insider directors than in a lower proportion of insider directors on the board?*

Figure 1 describe the relation to be examined in this thesis. To answer that research question, I generate two sub-questions. Firstly, this thesis needs to test whether current compensation still has an explanatory power in future firm performance in the most recent financial condition. Study result from (Hayes & Schaefer, 2000) suggests that when the remuneration board incorporates both observable and unobservable (to outsiders) measures of performance, and unobservable measures of performance are correlated with future firm performance, current compensation is informative about future firm performance. However, there raise some contra arguments regarding to the findings of (Hayes & Schaefer, 2000) study as discussed in the previous paragraphs.

Figure 1 (Libby Boxes)



Using the most recent data, the first aim of this thesis is examining whether the findings of (Hayes & Schaefer, 2000) study can be replicated in a different dataset. The result of this thesis would be valuable to see if their findings is robust in a different setting and could be generalized. Hence, the first sub-question (SQ1) would be:

***SQ1**: Does current executive compensation has an explanatory power in future firm performance?*

Furthermore, one characteristic and benefit of implicit contract theory is; it allows the principal to take into account any additional relevant information that becomes available during the contract period (Baker & Murphy, 1994). Insider directors with their experiences in the firm generate the in-depth knowledge of firm-specific activities and competitive environment (Bushman, et al., 2000). The in-depth knowledge of firm-specific activities and competitive environment are increasing the outcome of any additional information available during the executive's contract period. Intuitively, this condition will increase the weight placed on the unobservable (to outsiders) measures of performance in the compensation contract. When the unobservable (to outsiders) measures of performance are correlated to future firm performance, it is interesting to examine whether the strength of the relation between current executive compensation and future performance is stronger with a different level of board independence proportion. Hence, the second sub-question (SQ2) of this thesis is:

***SQ2**: Does the relation between current executive compensation and future firm performance is stronger in a higher proportion of insider directors than in a lower proportion of insider directors of the board?*

Using a sample of publicly traded firms in North America, this thesis examines the association of current executive compensation with future firm performance and analyzes the particular relation given a moderation effect from proportion of insider directors. To answer the first sub-question, this thesis follows a model develop by (Hayes & Schaefer, 2000) in regressing future firm performance on current compensation and controlling for current observable (to outsiders) performance measures. Then this thesis develops a proxy for the proportion of insider directors from board of director database to answer the

second sub-question. Proportion of insider directors is defined as total number of directors who has been an employee at the particular firm, divided by total number of directors on the board. I interact this proxy with the current executive compensation to allow this variable to vary monotonically in different proportion of insider directors on the board. This method suggests that the relation between current executive compensation and future firm performance is stronger in a firm with higher proportion of insider directors on the board.

The empirical results of this thesis revealed that the findings of (Hayes & Schaefer, 2000) study are robust in different dataset and it allows me to reject the contra arguments against it. Hence, the variation in current executive compensation that is not explained by variation in current observable performance measures is useful to predict variation in future observable performance measure. Furthermore, this thesis finds the predicted direction suggesting that the relation between current executive compensation and future performance is stronger in a firm with higher proportion of insider directors on the board. It is supporting the argument that the in-depth knowledge of firm-specific activities and competitive environment own by insider directors is increasing the outcome of any additional information available that is not observable (to outsiders). This condition is inducing the board to put more weight into that kind of information, which in the result, current compensation residual is more highly correlated with future performance residual However, I cannot find the evidence to support the prediction with the regression analysis. On the other hand, I also found that the presence of insider directors is giving a negative impact to future firm performance. It supports the argument that insider directors are holding lack of independence and use their close relationship to focus in other factors than long-term firm performance.

This thesis is very relevant for my study in Accounting and Finance track in Erasmus School of Economics. In the courses and seminars which I took during the year such as Advance Corporate Finance & Corporate Governance, Seminar Corporate Finance & Governance, and also Seminar Management Control, we discuss a broad level of theories and practices on the executive compensation, firm performance, and board of director literature. Furthermore, in the Advance Financial Statements Analysis course, we discussed how important to understand financial figures of a firm to understand current performance and prospects better. Where managers know more about their company's prospects, risks, and values other than outsiders, they might take a choice in their favor (adverse selection problem). When the managers have complete information on a firm's

strategies, and a variety of factors make it unlikely that they fully disclose this information. From analysts and investors perspective, it is at the best of their interest to get a better understanding of the firm current performance and prospects to be able to make the best investment decision. While, most of the study on future firm performance prediction have focused on the current firm performance variables, this thesis helps the investor to consider additional information such as current executive compensation and board composition which could also predict future firm performance.

This thesis makes the following contributions. First, to my knowledge, this is the first study to provide an empirical evidence on the role of insider directors in the variation of future firm performance setting which could be predicted by variation in current executive compensation. This thesis found the predicted direction from the moderator, but it cannot find the evidence to support the prediction with regression analysis.

Secondly, the findings of this thesis provide the new insights into how the different proportion of insider directors might help the investors to determine into which extends they can rely on variation in current executive compensation to predict future variation in firm performance. This would be very useful to the investors since the information regarding the independency of each director are publicly available in the annual report.

The remainder of this thesis structured as follows. Section 2 is discussing the prevailing theory, literature review, and also hypotheses development of this thesis. This section is divided into two main parts. The first part (sub-sections 2.1, 2.2, and 2.3) are discussing on how we could examine whether executive compensation is informative about future firm performance. The second part (sub-section 2.4), is discussing on how different proportion of insider directors on the board could affect the relation between current compensation and future firm performance. Next, section 3 discuss the data (sub-section 3.1), the variables (sub-section 3.2), and the statistical method (sub-section 3.3) used in this thesis. Equally important, sub-section 3.4 discuss the limitation of the methodology. Then, section 4 is discussing the empirical results and analysis from the model tested in this thesis. At last, it is wrapped up with the discussion & conclusion in section 5.

2 Theoretical review and hypotheses development

2.1 Performance-based compensation

In the financial market context, managers communicate information to (potential) investors about the past, current, and future prospect of the firm's financial performance. However, the information asymmetry raises a concern when the managers have complete information on a firm's strategies, and a variety of factors make it unlikely that they fully disclose this information (adverse selection problem). On the other hand, from the analyst and investors perspective, it is at the best of their interest to get a better understanding of the firm current performance and prospects to be able to make the best investment decision. Following (Hayes & Schaefer, 2000) model, the following sections (2.1, 2.2, and 2.3) is discussing on how the investor might use current executive compensation to predict future firm performance.

Inside a firm, executive compensation is often used as a key instrument to mitigate the difference in interest between the shareholders and the executives. Compensation scheme should make it rational for the executives to put in high levels of effort to increase firm value (Bebchuck & Fried, 2003). Thus the shareholders, via the board of directors shall compensates the executives based on their performance. Performance is measured to facilitate decision-making and provide an incentive for managers to take actions, which are maximizing firm and shareholders value (O'Hanlon & Peasnell, 1998). Furthermore, they argue that to facilitate decision-making process, performance measures shall be able to measure value changes to make a better-informed decision. A performance measure also shall be able to capture manager's effort or contribution accurately to become a basis to compensate them. Hence, compensation is positively associated with performance.

However, performance is also imperfect by nature in measuring executive's efforts (Holmstorm, 1983) (Banker & Datar, 1989) (Baker & Murphy, 1994). Two main issues are the sensitivity and precision of a performance measure. A performance measure will be less sensitive when performance, as an indicator of effort might not pick up all effort. Moreover, a performance measure will be less precise when performance, as an indicator of effort might reflect other factors than effort. (Banker & Datar, 1989) also argue that even we had a perfect measure of value creation and who are contribute to it, it is not sure if that measure can be a good indicator of effort because some effort does not affect value creation and

another factor other than effort might affect value creation. Thus, it is reasonable to argue that executive's effort is measured in more than one dimensions in an optimal compensation contract. The next sub-section is discussing on how compensation contract is divided into explicit and implicit contract.

2.2 Explicit and implicit contracts

When a firm hires an executive, it enters into a complex relationship that has significant long-term implications for its shareholders (Gillian, et al., 2009). Moreover, they argue that after the executive is on the ship, they will be given a compensation contract which contains several targets determined by the principal. Those targets have a purpose to maximizing the firm and shareholders value. Based on the uncertainty of its target, compensation contract is divided into an explicit and implicit contract. Explicit compensation contract consists of more certain objectives, which can certainly be measured, and it involves an objective performance evaluation. In contrast, implicit compensation contract consists of less certain targets, which relatively harder to be measured, and it involves subjective performance appraisal (Schmidt & Schnitzer, 1995).

Based on the observability (to outsiders) of a performance measure, compensation contract is also divided into an explicit and implicit contract. Explicit compensation contract consists of certain targets which can certainly be measured, and observable by the parties outside the contract at the time when the executives take the efforts. On the contrary, the implicit contract consists of certain targets, which can certainly be measured and observable by the parties outside the contract, *but only in the next period after* the executives are taking their effort (Hayes & Schaefer, 2000). Moreover, each of them is substituting each other in an optimal compensation contract (Gillian, et al., 2009). This thesis is focusing on this explicit and implicit contract theory to examine whether current compensation has an explanatory power in future firm performance and how the effect differs given a moderation effect from proportion of insider directors on the board.

The purpose of this deviation of compensation contract is to give the executives more motivation to extract more effort in maximizing the firm and shareholders value. Otherwise, executives will do just "enough" so they will not get being fired (Bebchuck & Fried, 2003). Thus, it is reasonable to argue that in an optimal compensation contract, the remuneration board, as the representation of the

shareholders in the firm, incorporates implicit contract in compensating the executives.

By integrating implicit contract when compensating the executives, the remuneration board might get some benefits from it (Bol, 2008). Firstly, it could mitigate the incentive distortion. When the explicit contract often uses backward-looking performance measures, it could distort a rational agent incentive into short-term focus. With its uncertainty, implicit contracts on the other hand, often put enough emphasis on long-term effects. With its subjectivity, implicit contract allows the principal to includes value-enhancing efforts that are not easily quantified. Using analytical model, (Holmström & Milgrom, 1991) prove that the increase of ability to capture a certain dimension of efforts can lead to improvement of the efficiency from the job assignment.

Secondly, an implicit contract can reduce risks. An explicit contract, which involves objective performance measures, are often noisy (Banker & Datar, 1989). They might pick up uncontrollably random effects that contaminate agent's effort (e.g. financial crisis and significant changes in oil price). They also might not pull up all agent's effort at the appropriate moment (e.g. M&A project which still ongoing). Because it allows subjectivity, implicit contract, could filter out the uncontrollable events that contaminate the agent's effort. It also allows the principal the option of making discretionary adjustments.

The next benefit of the implicit contract is inducement of adaptive behavior. The implicit contract allows the principal to take into account any additional relevant information that becomes available during the contract period when renegotiating formal, explicit contract will likely be expensive and will consume much time (Baker & Murphy, 1994). This ability to incorporate information that becomes available during the period, allows the principal to stimulate adaptive behavior. When using implicit contract, the principal can adjust the weighting of a certain objective, to suit the priorities of the firm.

Another benefit of the implicit contract is, it can reduce perceived unfairness from the agent. This thesis has discussed that explicit contract, which involves mostly objective performance measures might not pick up all of the agent's efforts. For example, let an explicit contract state that an agent bonus depends on the Company's net assets for each fiscal year. On the current year, the agent involves in an ongoing project to acquires an oil field, which will become the company's assets

when the acquisition closes in favor to the company. Until the end of the particular fiscal year, the acquisition is about 80% progress to be closed in favor to the acquirer company. By incorporating implicit contract when compensating the agent at that particular year, the principal can add up additional information, which happened after the explicit contract was signed. Furthermore, the agent will find that his effort is acknowledged and rewarded, and feel like to put more effort to make the acquisition done in favor to his company in the next period. Restoring the perceived fairness can improve incentive contracting by creating a feeling of reciprocity, which in the result, will stimulate the agent to put more effort in maximizing shareholders value. Hence it is also reasonable to argue that current executive compensation is related to future firm performance.

Those benefits of implicit contract might induce the remuneration board to incorporate implicit contracts in compensating the executives. Moreover, when the implicit contract is related to firm unobservable (to outsiders) performance measures, and those measures are related to future firm performance, we shall find a relation between current executive compensation and future firm performance. This statement will be discussed further in the next sub-section.

This other example would give an overview of imperfect nature of performance measure and the usage of an implicit contract. Assume a CEO who works for Company A, has been working on a merger and acquisition (M&A) project to acquire Company B for the whole year t, and the particular M&A project will continue to be on going until in the middle of next period (year t+1) when the deal will be done. The board of directors, with many inputs and considerations, believes, after Company A acquires Company B, shareholders will get a higher return on their investment, and this changes in shareholder's return could be looked up at the end of period t+1 firm performance indicator. From this example, we could see that the CEO has been giving his effort to get the M&A project done since year t so that shareholders can have a higher return on the next period (year t+1). However, the CEO's effort is not reflected in the changes of firm performance yet at year t. Hence, to capture CEO's effort, remuneration board shall use the M&A progress when compensating the CEO at year t, so the CEO will not decrease his effort to finalize the M&A project on the following year. For this reason, it is reasonable to argue that, the portion of current compensation which is not explained by current observable firm performance might be useful to predict future firm performance.

2.3 Explanatory power of current executive compensation in predicting future firm performance

This thesis is an extension of (Hayes & Schaefer, 2000) study which found that after netting out current observable performance, current executive compensations are positively associated with future firm performance. It has been discussed in the previous sub-sections that compensation contract is divided into an explicit and implicit contract based on its observability (to outsiders). Consequently, it is reasonable to argue that compensation is a function of the mix of explicit and implicit contracts (Gillian, et al., 2009).

If these assumptions are acceptable, we should find current compensation has an explanatory power on future firm performance. Theoretical researches on implicit or relational contract suggest that incentive contract might be based on performance measures that are observable only to the parties on the contracts. On their study, (Hayes & Schaefer, 2000) have argued that, if compensation contracts optimally incorporate both observable/explicit *and* unobservable/implicit (to outsiders) measures of performance, and the unobservable measures are correlated with future observable measures of performance, then variation in *current* compensation that is not explained by variation in current observable performance measures should predict *future* variation in observable performance measures.

In the agency relationship, the principal (shareholder) delegates the authorities to the agent (the executive) to take a control of their firm. The shareholders hope the executive will take some actions which contribute to the increments in firm and shareholders value. In their study, (Hayes & Schaefer, 2000) argue that the action taken by the executive could be assumed to produces three noisy signals which differ according to by whom, and when they are observed. In particular, quoted from their paper:

- "Suppose *x* is publicly observable signal concurrent with effort. (On the other words, *x* is observable in the first period when executive is taking his action.)
- Then assume *y* be publicly observable, but suppose it is not revealed to the outsiders until the second period after executive is taking his action.
- Moreover, let *z* be concurrent with effort, but assume *z* is only observable between the contracting parties." (Hayes & Schaefer, 2000) page 275.

The study from (Banker & Datar, 1989) also supporting the assumptions that executive's effort is generating several signals/indicator. Furthermore, performance-based-compensation theory argue that the executive is compensated based on the indicators of their effort. Where the indicators are assumed to be *x*, *y*, and *z* from the above, then the executive compensation could be formed by these three factors:

- The first period observable (to outsiders) performance measure *(x)*,
- The first period unobservable (to outsiders) performance measures *(z),*
- Other individual or firm-specific factors that are orthogonal to current and future performance *(q)*

Thus, (Hayes & Schaefer, 2000) in their study at page 275 were assuming the compensation contract is a linear function of these factors, then they wrote:

$$w = \gamma_0 + \gamma_x \chi + \gamma_z Z + \gamma_q q$$

However, with the limitation of master thesis period, this thesis is not focusing on the signals which only observable between the contracting parties and the firm-specific factors *(q)*. The reason is, those kind of information are not available publicly, and it will take a long time to gathered the data. Future research with sufficient period might be possible to extend this study to analyzes this factors if the researcher can get access to obtain the data from inside the firms.

To get the portion of current executive compensation that is not explained by current observable performance which are useful to predict future firm performance, (Hayes & Schaefer, 2000) in page 275-276 developed below model. First, they consider a linear regression of current executive compensation *(w)* on just current observable performance measures *(x)*. Then, they letting $\hat{w} = E[w|x]$ and wrote the residual from this regression as

$$w - \hat{w}$$

They argue that if the residual is positive, then it must be due to:

$$z > E[z|x] \text{ or } q > E[q]$$

That is, if compensation is unexpectedly high compared to one of the effort indicator (which is observable to outsider and concurrent with the action), then they mention that "The unobserved signal of performance is greater than its expectation given that particular indicator (*x*)*."* (Hayes & Schaefer, 2000) page 276.

Second, they consider the residual in a linear regression of second-period performance *(y)* on the first-period performance *(x)*. They letting $\hat{y} = E[y|x]$ and then wrote the residual as:

$$y - \hat{y}$$

However, they argue in page 276: "as long as x is not sufficient for z with respect to y we can have that:"

$$E[y - \hat{y}]|\ z > E[z|x] > 0$$

Or

$$E[y - \hat{y}]|\ q > E[q] = 0$$

Since *[q]* is orthogonal to performance we could drop it from the equation.

Remember if the residual value of current executive compensation *[w]* can be written as $z > E[z|x]$.

Hence, together, these statements imply that

$$E[y - \hat{y}|\ w - \hat{w}] > 0$$

In words, (Hayes & Schaefer, 2000) argue that when the changes of current observable measures of performance cannot explain the changes in current executive compensation, the residual must be due to the changes on other measure of performance. In their model, they assume this other measure of performance is observable to the outsiders, but not in a parallel time when the effort was taken (future firm performance). Hence, we should find the variation in executive compensation that is not explained by current performance should be positively

associated with variation in future firm performance. To test the prediction, (Hayes & Schaefer, 2000) used these reasonable procedures:

i. Regress future performance on current performance
ii. Regress current executive compensation on current performance, and
iii. Regress the residual from (i) on the residual from (ii)

They mentioned that "Those procedures would tell us how compensation is related to future firm performance after *netting out* the effects of current performance. It is equivalent to regressing future performance on current performance and current executive compensation." (Hayes & Schaefer, 2000) page 276. Therefore, they consider the following regression equation:

$$y = \beta_0 + \beta_1 x + \beta_2 w + \varepsilon$$

The expected sign of β_2 is positive to indicate that even controlling for current performance, future performance is positively associated with current executive compensation. Therefore, the first hypothesis of this thesis is:

H1: *Future firm performance is positively associated with current executive compensation*

2.4 Moderation effect of board composition on the relation between current executive compensation and future firm performance

In the previous sub-sections, this thesis has discussed the usage of unobservable (to outsiders) measure of performance (implicit contract) in the executive compensation contract. This thesis also has discussed how to test the prediction; when remuneration board incorporates unobservable/implicit (to outsiders) measures of performance and those measures are correlated with future firm performance, then we can find that unexplained variation in current compensation should predict variation in future firm performance.

According to the agency model that consider a setting which there are multiple performance measures in an executive compensation contract, this thesis links board of director literature into implicit contract theory. In their study, (Banker & Datar, 1989) argue that, in a model with multiple verifiable measures of performance, each performance measures are substituting each other in an optimal compensation contract. From the other perspective, an optimal compensation contract is a function of the mix of explicit and implicit contracts (Gillian, et al., 2009) and it is also a substitute for each other. Hence, it is reasonable to argue that, where an implicit contract is correlated to the first period unobservable (to outsiders) performance measures *(z)*, and there is a condition when we might put more weight on those kind of performance measures, then compensation residual $w - \hat{w}$ should be more highly correlated with the future performance residual $y - \hat{y}$.

This thesis then identifies the condition under when the board would place more weight on the implicit contract in an optimal compensation contract. On their study, (Fama & Jensen, 1983) argue that the board monitoring role effectiveness be a function of the mix of insider and outsider directors. Moreover, (Fama, 1980) followed with (Fama & Jensen, 1983) argue that outside directors be more independent and have more incentives to be an active monitor to maintain the value of their reputational capital in the director's market. In contrast, insider directors are more likely to act in executive's favor because of their close relationship with the managers (Byrd & Hickman, 1992). However, insider directors, have an advantage for their in-depth knowledge of firm-specific activities and competitive environment, which are not owned by outside directors (Bushman, et al., 2000).

One benefit of the implicit contract is inducement of adaptive behavior when it allows the principal to take into account any additional relevant information that becomes available during the contract period when renegotiating formal, explicit contract will likely be expensive and consume much time. Intuitively, the insider-dominated board would increase the weight placed on any additional information which are not observable to the outsiders in compensating the executives. When this additional information is related to future firm performance (*(z)* in the equation). Then we shall find the relation between current compensation and future firm performance is stronger in a firm with higher proportion of insider directors than in a firm with lower proportion of insider directors, Hence, the second hypothesis is:

***H2**: The relation between current executive compensation and future firm performance is stronger with a higher proportion of insider directors than in a lower proportion of insider directors on the board.*

3 Data and methodology

3.1 Data

Data sources for firm's performances are taken from COMPUSTAT database, whereas, executive compensation data are taken from EXECUCOMP database. Moreover, this thesis retrieves board of director affiliation with the firm data from ISS (formerly RiskMetrics) database. All of those datasets are taken from Wharton Research Data Services (WRDS), which Erasmus Universiteit Rotterdam is subscribing to. This thesis takes the most recent ten-year observations to capture the most recent condition in the financial world. Thus, the starting period of the observation starts from 2005 up to 2014 for North America companies. This thesis is excluding the year 2015 from the base sample to avoid unavailability of the data since I need the lead value (year t+1) data for each firm, while 2016 data is not available yet until the end period of this thesis. This thesis comes up with 692 base sample of firms in 10 years of observation, which in the result, there are 6,920 firm-years number of observations in the final dataset. I believe this number of observation is enough to get an acceptable level of validity for the empirical results. Table 1 presents the summary statistic for the samples. Since the model uses the regressions run in first differences, the summary statistic also reporting the changes as well as levels. Graph 1 - Graph 8 in the appendices are presenting the graph of sample distribution to test the normality of the samples. Based on those graphs, the samples are normally distributed.

Table 1 Summary Statistics

Variable	Number of Observations	Mean	Standard Deviation	Q1	Median	Q3
$logCOMP_t$	6,911	8.11	.568	7.74	8.05	8.36
ROE_t	6,070	.130	.216	.068	.122	.193

ROE_{t+1}	6,270	.124	.238	.066	.118	.191
$logSALES_t$	6,920	8.06	1.51	6.94	7.88	9.10
MTB_t	6,920	1.24	1.01	.546	.963	1.64
$\Delta logCOMP_t$	6,910	-.037	.327	-.122	.015	.097
ΔROE_t	5,705	.002	.221	-.033	.002	.036
ΔROE_{t+1}	5,210	-.006	.235	-.036	.0009	.035
$\Delta logSALES_t$	6,920	.056	.185	-.001	.061	.127
ΔMTB_t	6,920	-.013	.438	-.155	.001	.167

COMP = salary plus bonus (in thousand USD). ROE = Firm's return on equity. SALES = Firm's sales (in million USD). MTB = Firm's market to book value ratio

I notice that there are some missing data in the dataset. As the consequences, it raises a concern that those missing values are producing a bias to the regression results. I then investigate what happens to the missing values and found that there is no pattern in the missing values in the dataset. Based on the investigation, I found that the most occurrence of the missing value is coming from ROE variable which is formulated by the firm's financial figures in the firm's financial statements. In my opinion, it is unlikely that a firm does not report its financial figures in their financial statements for even a single period. Hence, considering the data which I use in this thesis is a large-scale secondary data, the possible reason for the missing values data might be a miss recording by WRDS. It suggests that a missing value have the same probability for all units (at random). According to (Field, 2009), if data are missing at random (MAR), then the missing values are just a random subset of the data, which could be ignored and does not bias the inferences. Stata itself has its own method to treat this kind of missing value data called listwise deletion. That is, if an observation is missing a data on any of the variables used in the analysis, it is dropped completely. By using listwise deletion method, Stata might be able to keep the random assignment of treatment. Based on this argument, I decided to use this dataset as my base samples. In addition, I also perform a robustness check by performing another regression analysis by only including the firms with no missing values during the period of observation in my data set. This procedure could be found in section 4. I believe this method would allow me to get a robust result to support the findings of this thesis by using this base sample.

3.2 Variables

This thesis understands the difficulty in translating the observable (to outsiders) measures of performance in the model describe in the previous section (x and y), into the actual executive compensation context. To address the part of the variation in executive compensation that is not explained by variation in current observable performance measures, this thesis uses various year-t measures of performance. It is including both accounting performance measures and market performance measure to get a better proxy for variation in current compensation part that is not explained by variation in current performance. This thesis is following (Hayes & Schaefer, 2000) method by performing a regression analysis by using the changes value of variables used in the model. They mention on page 279: "Our basic approach is to study an empirical model that is analogous to the first difference of the variables. We relate changes in future ROE to changes in log compensation, stock returns, log sales, and ROE."

3.2.1 Dependent variable

The purpose of this thesis is to help the investors to get an additional variable which can be used to predict future firm performance. This objective shall be achieved to make the investors have a better investment decision. Hence, to support the argument that unexplained variation in current compensation shall predict variation in future firm performance, this thesis uses variation in future firm performance compared to prior year performance as the dependent variable. To measure variation in future firm performance, this thesis uses the changes in the firm's Return on Equity ratio from the year $_t$ to year $_{t+1}$. (ΔROE $_{t+1}$). I prefer to use ROE as the indicator of performance since it shows the rate of return for the investors given their investment of an equity in a firm, which is they care the most. However, this thesis also uses ROA as the measure of performance to check if the results are robust given different measurements of performance.

3.2.2 Independent variable

To test the first prediction (H1) of this whether future firm performance is positively associated with current executive compensation, this thesis takes the natural logarithm of changes in salary plus bonus as the measure of executive compensation (w in the equation) as the explanatory variable of future firm performance (ΔlogCOMP$_t$). This thesis excludes the executive's stock holdings and stock option from compensation proxy because those compensations have a

clear target, which can be observed by the outsiders via compensation report or annual report. I put an underline that I am only interested in the incentives provided by the remuneration board to reward the executives based on the signals which are not publicly observable

3.2.3 Interaction term

As discussed in theoretical review and hypotheses development sections, insider directors with their in-depth knowledge of firm-specific activities and competitive environment are increasing the outcome of any additional information that becomes available during executive contract period. When this kind of information is related to future firm performance, we shall find a stronger relation between current compensation and future firm performance. Thus, I develop a proxy from board of director literature which I expect to meet the condition that the board would place more weight on the unobservable (to outsider) measures of performance in an optimal compensation contract. This thesis uses the natural logarithm of the three years average of proportion of insider directors to the total number of directors on the board (logIDt) as the proxy to measure board composition. Insider director is determined as a director who has been an employee at the particular firm before he/she became a director at the same firm.

3.2.4 Control variables

To filter out the portion of variations in current compensation that have been explained by variation in current observable performance measures, this thesis is controlling the changes in return on equity (ΔROE_t) and changes in the log of sales amount ($\Delta logSALES_t$) as the measures of current accounting performance, and the changes in the market to book value ratio (ΔMTB_t) as a proxy for firm performance in the market. In addition, this thesis also controlling the lagged value of observable performance measures to provide as much explanatory power as possible for current compensation and future firm performance (Hayes & Schaefer, 2000). Moreover, this thesis also including the firm as well as year dummy variables (fixed effects) to control any influence from particular year or firm characteristics which have nothing to do with the causal relation. By controlling these variables, I am confidence that I can filter out as much as possible the portion of variations in current compensation that has been explained by variation in current firm performance. Hence, the residual is useful to better predict future variation in firm performance. Based on (Murphy, 1999)

survey, most studies of executive compensation literature have focused on these measures of firm performance. For the summary of variables and its description, please refer to Table 2.

Table 2
Variables Description

No.	Type of Variables	Name of Variables	Descriptions
1	Dependent Variable	ΔROE_{t+1}	To measure future firm performance. It is the changes the firm's ROE from year t to year *t+1*. ROE is defined by net income divided by total shareholder's equity.
2	Independent Variables	$\Delta logCOMP_t$	To measure current executive compensations. It is the changes of total executive's salary + bonus from year *t-1* to year *t.*
3		$logID_t$	To measure insider directors proportion. It is the natural logarithm of the total number of insider directors, who has been an employee of the firm divided by total number of directors on the board
4	Interaction Term	COMP*ID	Interaction term between executive compensation and board independence
5	Control Variables	ΔROE_t	To control current firm performance. It is the changes of the firm's ROE from year *t-1* to year *t.* ROE is defined as net income divided by total shareholder's equity.
6		$\Delta logSALES_t$	To control firm's current accounting performance measure. It is the changes of the firm's total revenue from year *t-1* to year *t*
8		Lagged variables	Lagged value of those control variables
9		Firm and Year Fixed Effects	To control any influence from particular year and firm characteristics which have nothing to do with the causal relationship.

3.3 Statistical Method

The first aim of this thesis is to test the assertion that variation in current compensation which is not explained by variation in current firm performance should explain variation in future firm performance. To test that prediction, this thesis uses an empirical study method with OLS panel data regression analysis. By using OLS regression analysis, I could get the typical value of future firm performance changes when current compensation is varied (Field, 2009). The research design utilizes panel data analysis over a sample period. The benefit of using empirical study is I can get a

larger sample to get a higher external validity. Different from laboratory experiment, in empirical study treatment to the sample occur naturally and cannot be manipulated Therefore, the result can be generalized to the real world setting. Furthermore, this thesis uses large-scale secondary data analysis. I choose this method to be able to meet the short period of master thesis while gathering primary data will consume much time and also very risky to human error.

This thesis follows (Hayes & Schaefer, 2000) model in their study. They develop these three-step procedures: First, regress future performance on current observable performance measures. Second, regress current compensation on current observable performance measures, then regress the residual from the first regression and second regression. It is also equivalent to regressing future performance on current performance and current compensation. This method would bring out the relation between future firm performance and current compensation, after netting out the effect of current observable performance measures.

Return on equity and market to book value variables are winsorized to replace the extreme value at 1% and 99% level in either tail of the distributions. This method would replace the outliers and reduce the risk of most extremely miss-recorded data without reducing the total number of observation. Besides that, winsorized technique is also generating more robust estimators to outliers than their more standard forms. In addition, the regression is also including fixed effects to remove all the cross-sectional variation in both the explanatory and dependent variables. Moreover, I use heteroscedasticity-consistent standard errors technique to avoid heterogeneity issues across the residual of the model of estimators. To process the data, I use STATA 13.0 program since I am familiar to use it during the seminars I took during my master program. Besides that, it has the most capabilities of data management, statistical analysis, graphics, and regression, which I need to test the predictions in this thesis.

3.4 Limitation

I recognized at least two limitations of this methodology. Firstly, the board affiliation with the firm database is only available for North America companies and its divided into two parts (before and after the year 2007). Each of those board databases has a different CUSIP code for each company, which I use as the identifier when merging the data between three datasets (financial, compensation, and board

data). CUSIP is an acronym which refers to Committee on Uniform Security Identification Procedures and the nine-digit, alphanumeric CUSIP numbers are used to identify firm, securities, municipal bonds, etc. As the result, I have to use TICKER symbol as the identifier to merge the databases, since replacing the CUSIP identifier for each company (so I will have the same identifier in three datasets) will consuming much time and very risky to human errors. The consequence of using TICKER symbol is, some members of the population cannot be included in the final dataset than the others. I only have firm samples that are listed in the stock market, since ticker is an abbreviation used to uniquely identify publicly traded shares of a particular stock on a particular stock market. By using ticker, I lost some ability to randomize my sample, sample selection bias might occur because I cannot capture large private company that is not listed in the stock market. This condition might lower the external validity of my empirical results. With the limitation period of my Master Thesis, I would suggest future research to take more time in finding another identifier for three datasets, so both public and private company has the same chance to be included in the sample.

Secondly, I understand that a warning must be raised to this method of analysis because of the potential presence of omitted firm-performance-related variables. To mitigate this concern, I already take a large variety of different explanatory variables, with contemporaneous and lagged value of performance measures variables. It is including accounting performance measures as well as measures of performance in the market. I believe there is no such way to systematically filter out the risk that any connection find between unexplained variation in compensation and future performance is due to the omission of an observable performance variable that is correlated with both current compensation and future performance. However, I am confidence by using a large variety of different control variables, I have mitigated that risk and bring it to reasonable acceptance level.

4 Empirical Analysis

4.1 Variation in current compensation that is not explained by current observable performance predicting variation in future performance

4.1.1 OLS regression assumptions test

To answer the main research question if the relation between current compensation and future firm performance is stronger with a higher proportion of insider directors than in a lower proportion of insider directors, I need first to answer the first sub-question whether current compensation itself has an explanatory power in future firm performance. According to (Hayes & Schaefer, 2000), instead of regressing the residual of variation in future firm performance on variation in current performance regression and the residual of current compensation on current performance regression, this prediction could be tested in one step OLS regression by regressing variation in future performance on variation in current compensation by controlling variation in current observable (to outsiders) measures of performance.

OLS is a method for estimating a parameter in a linear regression model with the goal of minimizing the sum of the squares of the number of data points residual. Gauss–Markov theorem states that an OLS regression has the best linear unbiased estimator when the error terms are homoscedastic and serially uncorrelated. Moreover, one or more estimator in OLS model shall not be correlated (free multicollinearity issue), and the residual of the model should be normally distributed. Under this condition, the method of OLS provides minimum-variance mean-unbiased estimation when the errors have finite variances.

Then I investigate whether my model of estimator and my dataset have met these OLS assumptions. Firstly, I already use heteroscedasticity-consistent standard errors technique when I perform the regression. Using this technique allows me to avoid the heteroscedastic issue in the error term from my model of estimator. Hence, I am confidence that my model of estimator has met the assumption if the error terms of my model of estimator are homoscedastic.

Secondly, I investigate whether the residual of my model is serially uncorrelated to prove that there is no autocorrelation issue. Autocorrelation is defined as the similarity of a time series over a successive time interval. An OLS estimator would become a biased estimator when this autocorrelation issue exists. I apply Durbin-Watson test to measure the autocorrelation in the residual of the regression model used to test the predictions in this thesis and present the result in

Table 3. According to (Field, 2009) Durbin-Watson statistic is showing a value from 0 to 4, where a value of 2 indicates there is no autocorrelation, 0-2 indicates positive autocorrelation, and 2-4 indicates negative autocorrelation. Moreover, he argues that the test statistic value in the range of 1.5-2.5 are relatively normal. Table 3 shows that the Durbin-Watson statistic for the residual value of the model used in this thesis has a value of 2.055. According to (Field, 2009), I should not put any concern to autocorrelation issue, considering this Durbin-Watson test result.

Table 3.
Durbin-Watson Statistic

Model	R Square	Adjusted R Square	Durbin-Watson
Colum 1 of Table 7	.218	.216	2.055

Next, according to Gauss–Markov theorem, another OLS assumption that has to be meet is the residual of the model should normally be distributed. I check the residual of the model of estimator used to test the predictions in this thesis and present the residual distribution graph in Graph 9 in the appendices. The graph shows that the residual of my model of estimator is normally distributed.

Furthermore, there raises a possibility that the explanatory variables are strongly correlated with each other (multicollinearity issue). To check whether there are any highly correlated explanatory variables in the model, I perform multicollinearity check by using Pearson's Correlation test with "pwcorr" command in Stata and report the result in Table 4. Pearson's Correlation test measures the strength and linear relationship between the two variables. The correlation coefficient can range from -1 to +1, with -1 indicating a perfect negative correlation, +1 indicating a perfect positive correlation, and 0 indicating no correlation at all (a variable correlated with itself will always have a correlation coefficient of 1). The correlation coefficient is showing the extend of one variable given a value of the other variable.

Table 4 reveals that most of the variables are correlated less than 15% to each other, suggesting none of them is highly correlated. The highest correlation occurred between variable $\Delta\text{logCOMP}_t$ and $\Delta\text{logCOMP}_t*\text{ID}_t$ with 96% correlation. Even so, it

is natural since variable $\Delta logCOMP_t*ID_t$ is formed by the interaction term between $\Delta logCOMP_t$ and ID_t which is multiplied by each other. Moreover, high correlations occurred between a variable with its lagged value. In an example, variable ΔROE_t is 33% correlated with variable ΔROE_{t-1}. However, it is also reasonable for a variable to be slightly correlated with its lagged value.

Table 4.
Correlation Matix

	$\Delta logCOMP_t$	ΔROE_t	ΔROE_{t-1}	ID	$\Delta logCOMP_t$ *ID	$\Delta logSALES_t$	$\Delta logSALES_{t-1}$	ΔMTB_t	ΔMTB_{t-1}
$\Delta logCOMP_t$	**1.000**								
ΔROE_t	**.0647**	**1.000**							
ΔROE_{t-1}	**-.0367**	**-.3303**	**1.000**						
ID	**-.0173**	**-.0127**	**.0065**	**1.000**					
$\Delta logCOMP_t*ID$	**-.9689**	**-.0576**	**.0336**	**-.0121**	**1.000**				
$\Delta logSALES_t$	**.0564**	**.1393**	**.0622**	**.0727**	**-.0530**	**1.000**			
$\Delta logSALES_{t-1}$	**-.0417**	**-.0994**	**.1466**	**.0865**	**.0376**	**.1040**	**1.000**		
ΔMTB_t	**.0358**	**.0854**	**-.0457**	**-.0356**	**-.0320**	**-.0864**	**-.1285**	**1.000**	
ΔMTB_{t-1}	**-.0038**	**.1375**	**.0783**	**-.0238**	**.0045**	**.1897**	**-.0728**	**-.1424**	**1.000**

As a further check for multicollinearity issue, this thesis use VIF (Variance Inflation Factor) analysis. VIF analysis provides a coefficient that measures how much variance of estimated regression increases because of multicollinearity between the predictors. According to (Hair, et al., 1995), multicollinearity should become a concern when the value of VIF is greater than 10. He mentions that "It is called the variance inflation factor because it estimates how much the variance of a coefficient is "inflated" because of linear dependence with other predictors." The VIF has a lower bound of 1 but no upper bound. To perform VIF analysis, I regress each of the predictor to the remaining predictors in the model to get the R^2. Then I put the R^2 into VIF formula to get the VIF value for each variable and report the result in Table 5. Column VIF in Table 5 shows that only variable $\Delta logCOMP_t$ and $\Delta logCOMP_t*ID_t$ have a VIF value greater than 10.

According to (Hair, et al., 1995), I have to put a multicollinearity concern for those two variables. However, the two variables are highly correlated because of $\Delta logCOMP_t*ID_t$ is formed by the interaction term between $\Delta logCOMP_t$ and ID_t. Hence, it is natural if they are highly correlated with each other. Furthermore, I

cannot drop one of those variable since both of them are the variables of interest, which this thesis aims to examine.

Table 5.
VIF Analysis

Variable	R^2	$1-R^2$	VIF $1/(1-R^2)$
$\Delta logCOMP_t$	0.93	0.07	14.28
ΔROE_t	0.16	0.84	1.19
ΔROE_{t-1}	0.15	0.85	1.17
ID_t	0.02	0.98	1.02
$\Delta logCOMP_t * ID_t$	0.93	0.07	14.28
$\Delta logSALES_t$	0.09	0.91	1.09
$\Delta logSALES_{t-1}$	0.07	0.93	1.07
ΔMTB_t	0.05	0.95	1.05
ΔMTB_{t-1}	0.09	0.91	1.09

4.1.2 The regression analysis

After performing heteroscedasticity-consistent standard errors, auto-correlation test, residual distribution test, and multicollinearity test, there is no concern raises from the dataset and model of estimator regarding a breach of one or more OLS assumption that has to be meet. This results suggest me to continue to perform the OLS regression analysis.

To test the prediction if future performance is positively associated with current executive compensation, I relate the changes in future firm performance (ΔROE_{t+1}) to the changes in the log of current compensation ($\Delta logCOMP_t$) and the changes in current observable performance, measured by changes in ROE (ΔROE_t), changes in log sales ($\Delta logSALES_t$), changes in the market to book value ratio ($\Delta logMTB_t$). In the result I get this model of estimator:

$$\Delta ROE_{t+1} = \Delta logCOMP_t + \Delta ROE_t + \Delta logSALES_t + \Delta logMTB_t$$

I then estimate that model using ordinary least square regression with heteroscedasticity-consistent standard errors technique, and I report the results in Table 6. The value on the same line with the variable name shows the regression

coefficient of the particular variable. The value below it inside the brackets shows the heteroscedasticity-consistent standard error. The two-tailed p-value is denoted by the asterisk where one asterisk indicates that the coefficient has a p-value <0.1, two asterisks means that the coefficient has a p-value <0.05, and three asterisks indicates that the coefficient has a p-value <0.01. These legends are applied for all the regression result tables in this thesis. The base model is presented in column "Model" in table 6. The analysis of the use of unobservable (to outsiders) information in executive's current compensation contracts expecting that coefficient on $\Delta\text{logCOMP}_t$ should be positive. The regression result shows that coefficient on $\Delta\text{logCOMP}_t$ is positive, suggesting the unexplained variation in current compensation is useful in predicting future firm performance and it is positively associated. The estimate on coefficient on $\Delta\text{logCOMP}_t$ is 0.0297 and it is significant at better than 1% level (p-value <0.01) with standard error 0.00968 . Since the predictor is put on a log scale, the slope measures the expected change in dependent variable when the predictor increases by fixed percentage (Stine, 2001). It indicates that when there is 1% raise in changes of current executive compensation, changes in future ROE will increase by 0.029%. It confirms the first hypothesis of this thesis that future firm performance is positively associated with current executive compensations.

In the next following columns, I including year fixed effect ("Year FE"), firm fixed effect ("Firm FE") and firm-year fixed effects ("Firm-Year FE") respectively. The coefficient of determination (R^2) figures in the table are showing the portion of the variation in the dependent variable that is explained by the explanatory variables. The table indicates that the regression of the model including firm and year fixed effects has the greatest value of R^2. I interpret that result as; the particular model including firm and year fixed effects is better fitted the variation in the dependent variable. In other words, changes in log compensation at year *t*, ROE at year *t*, log sales at year *t,* and MTB at year *t* together explained the variance of changes in future performance (ROE at year *t*+1) by 17.6%. The estimate of coefficient on current compensation ($\Delta\text{logCOMP}_t$) in column "Firm-Year FE" is 0.035 and it is statistically significant at better than 1% level (p-value <0.01) with standard error 0.0129. It indicates that whenever there is 1% raise in changes of current compensation that is not explained by current observable performance measures, the changes in future

firm performance will increase by 0.035%. This result is in line with the first hypothesis of this thesis.

Table 6.
Estimates of Future Performance in Current Compensation
Dependent Variable: ΔROE_{t+1}

	Model	Year FE	Firm FE	Firm-Year FE
$\Delta logCOMP_t$	0.0297***	0.0279***	0.0346***	0.0348***
	(0.00968)	(0.0102)	(0.0124)	(0.0129)
ΔROE_t	-0.357***	-0.357***	-0.409***	-0.410***
	(0.0136)	(0.0136)	(0.0370)	(0.0373)
$\Delta logSALES_t$	-0.0229	-0.00568	-0.0345	-0.0148
	(0.0169)	(0.0179)	(0.0291)	(0.0289)
ΔMTB_t	0.0850***	0.0792***	0.0861***	0.0781***
	(0.00705)	(0.00772)	(0.00893)	(0.0104)
Constant	-0.00317	0.0163	-0.00232	0.0137
	(0.00314)	(0.0122)	(0.00163)	(0.0184)
Observations	5,579	5,579	5,579	5,579
R^2	0.127	0.138	0.165	0.176
Adjusted R^2	0.127	0.136	0.165	0.174

Heteroscedasticity-consistent standard errors parentheses
Significance at (two tailed):
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Looking for the control variables, the results shows that, future changes in ROE (ΔROE_{t+1}) is shown to be negatively associated with the changes in current ROE (ΔROE_t). The coefficients on ΔROE_t is negative (-0.41) and it is statistically significant at better than 1% level (p-value <0.01) with standard error 0.0373, indicating when there is a raise 1 point in changes of current ROE, changes in future ROE will decrease by 0.41 point. It supports the mean reversion theory of ROE which suggests that the ROE will tend to move to the average value over time (Freeman, et al., 1982). In example, when there is negative change of ROE in year *t*, management will try to getting back the ratio into the mean (thus, the changes in future ROE will become positive). In addition, (Freeman, et al., 1982) also argue that ROE is divided by "Core ROE" and "One Time ROE", when One Time ROE affects future Core ROE. In example, when there is an impairment of asset occurred in year *t*, it makes a negative change in ROE in year *t* comparing to ROE in year *t-1*. However, an impairment of asset reduces future depreciation, which in result will

increase net income in year *t+1* as the nominator of ROE, comparing to the previous period in year *t*. Hence, the change in future ROE at year *t+1* will become positive. I believe those arguments are fit to support the negative relation between ΔROE_t and ΔROE_{t+1} in the model. Furthermore, future changes in ROE (ΔROE_{t+1}) is shown to be positively associated with changes in market to book value ratio and it is statistically significant at better than 1% level (p-value <0.01). I interpret this result as management will try to increase ROE in subsequent year to capture positive change in MTB at current year. The result is also consistent with (Penman, 1991) study with result that subsequent ROE is positively associated with current MTB. Moreover, the changes in future ROE is shown to be negatively associated with changes in log sales. Even so, it is not statistically different from zero. I will not discuss further regarding the relation of control variables with the dependent variable since my point of interest in this thesis is to examine whether current compensation has an explanatory power in future firm performance and how proportion of insider directors on the board affecting the relation. Future research might perform a study regarding the relation between the control variables and the dependent variable used in this thesis. These results is consistent with (Hallock & Oyer, 1999) and (Hayes & Schaefer, 2000) studies which examine the relationship between compensation and performance of the firm in accounting and market perspectives. However, neither of those studies investigate how the strength of relationship between future performance and current compensation are varies with the presence of insider directors on the board.

To get a better estimator of the explanatory power of current compensation in future firm performance, I then including the lagged values of the firm performance variables. It is reasonable to argue that future firm performance is a consequence of the performance of the firm in the past. Hence, by controlling the lagged value of firm performance variables, I expect to be able to filter out more the portion of executive compensation, which has been explained by the current and the past observable (to outsiders) measures of performance. Then the residual will become more useful to predict future firm performance.

I relate changes in future firm performance (ΔROE_{t+1}) to changes in log current compensation ($\Delta logCOMP_t$) and changes in current observable (to outsiders) performance measures, valued by changes in ROE (ΔROE_t), changes in log sales

($\Delta logSALES_t$), changes in the market to book value ratio (ΔMTB_t). In addition, I am also controlling the lagged value of ΔROE, ΔlogSALES, and ΔMTB. In result I come up with this model of estimator:

$$\Delta ROE_{t+1} = \Delta logCOMP_t + \Delta ROE_t + \Delta logSALES_t + \Delta MTB_t + \Delta ROE_{t-1} + \Delta logSALES_{t-1} + \Delta MTB_{t-1}$$

Using ordinary least square regression with heteroskedastic-consistent standard errors, I report the regression result of the above model of estimator in Table 7. Column "Firm-Year FE" in Table 7 shows that the coefficient on $\Delta logCOMP_t$ remains positive on future firm performance, and based on the p-value, it is statistically significant at better than 5% level (p-value <0.05). The coefficient estimates on $\Delta logCOMP_t$ in "Firm-Year FE" column from Table 6 and Table 7 thins out from 0.0348 to 0.0306, suggesting that there is a portion of current compensation that explained by previous firm performances (0.0348-0.0306). It indicates that the residual of current compensation in the model including lagged value of firm performances has become a better predictor of future firm performance since we could filter out additional current compensation part that is explained by previous firm performances. The coefficient on $\Delta logCOMP_t$ in column Firm-Year FE is positive 0.0306 and significant based on the p-value at better than 5% level (p-value <0.05) with standard error 0.0124. It indicates that when there is 1% raise in variation of current compensation that is not explained by variation in the current and the past performance measures, future variation in performance measure is increases by 0.031%. It suggests me to accept the first hypothesis of this thesis if the future firm performance is positively associated with current executive compensation.

Table 7
Estimates of Future Performance in Current Compensation (Controlling Lagged Value of Firm Performance Variables).
Dependent Variable is future firm performance (ΔROE_{t+1})

	Model	Year FE	Firm FE	Firm-Year FE
$\Delta logCOMP_t$	0.0238**	0.0238**	0.0265**	0.0306**
	(0.0105)	(0.0105)	(0.0119)	(0.0124)
ΔROE_t	-0.411***	-0.411***	-0.510***	-0.513***
	(0.0152)	(0.0152)	(0.0496)	(0.0501)
ΔROE_{t-1}	-0.151***	-0.151***	-0.226***	-0.228***
	(0.0142)	(0.0142)	(0.0291)	(0.0297)
$\Delta logSALES_t$	-0.00986	-0.00986	-0.0283	-0.0208
	(0.0191)	(0.0191)	(0.0282)	(0.0284)
$\Delta logSALES_{t-1}$	-0.0447**	-0.0447**	-0.0549*	-0.0591**
	(0.0180)	(0.0180)	(0.0285)	(0.0291)
ΔMTB_t	0.0825***	0.0825***	0.0827***	0.0838***
	(0.00800)	(0.00800)	(0.0105)	(0.0125)
ΔMTB_{t-1}	0.0408***	0.0408***	0.0358***	0.0483***
	(0.00779)	(0.00779)	(0.00857)	(0.0101)
Constant	0.0306**	0.0306**	0.00227	0.0398*
	(0.0131)	(0.0131)	(0.00229)	(0.0206)
Observations	5,186	5,186	5,186	5,186
R^2	0.152	0.152	0.208	0.217
Adjusted R^2	0.149	0.149	0.206	0.215

Heteroscedasticity-consistent standard errors parentheses
Significance at (two tailed):
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4.1.3 Robustness check

As further checks on the robustness of these results, I estimate the regression in Table 7 using two alternative approaches. Firstly, I am conducting my analysis using return on assets (ROA) rather than return on equity (ROE) as the measure of performance. Please keep in mind that the point of interest in this thesis is put on how current compensation might predict future firm performance instead of what kind of performance that could be predicted by current executive compensation.

Hence, changing the measurement of firm performance variables would assured that the regression result of the model is robust. I relate changes in future firm performance (ΔROA_{t+1}) to the changes in log current compensation ($\Delta logCOMP_t$) and the changes in current observable (to outsiders) performance measures, valued by changes in ROA (ΔROA_t), changes in log sales ($\Delta logSALES_t$), and changes in the market to book value ratio (ΔMTB_t). Also, I control the lagged value of ΔROA, ΔlogSALES, and ΔMTB. In result I come up with this model of estimator:

$$\Delta ROA_{t+1} = \Delta logCOMP_t + \Delta ROA_t + \Delta logSALES_t + \Delta MTB_t + \Delta ROA_{t-1} + \Delta logSALES_{t-1} + \Delta MTB_{t-1}$$

I re-apply the heteroscedasticity-consistent standard errors regression technique to this model and report the comparison of ROE and ROA as the measures of firm performance in Table 8. After changing the measure of performance from ROE into ROA, the coefficient of $\Delta logCOMP_t$ remains significant at better than 5% level (p-value < 0.05). Parameter estimates on $\Delta logCOMP_t$ from column ROE and ROA range from .00306 to .000904 indicating that the power of current compensation to predict future firm performance is decreasing when the measure of performance is changing from ROE into ROA. One reasonable explanation is, the remuneration board as the representative of shareholders is put more weight to a performance measure that portrays the ability of the firm to generate profits from its shareholder's investment in the company instead of a performance measure that portrays the ability to generate profit from total assets. The explanation is reasonable since the denominator of ROA is total assets which is not deducted by the firm's liability yet. On the other hand, the denominator of ROE is the equity (total assets – total liabilities). Hence ROE might become a better measurement of firm performance since its already netting the assets with its liabilities. However, I will not discuss any further about the range in both of the results considering the purpose of this robustness test is only to support the argument; unexplained variation in current compensation shall predict future variation in firm performance.

Table 8

Robustness Test 1 for Estimates of Future Performance in Current Compensation Controlling Lagged Value of Firm Performance Variables, firm and year fixed effects included. Comparison of ROE and ROA as the measure of firm performance. Dependent Variable is future firm performance (ΔROE_{t+1}) (ΔROA_{t+1})

	ROE	ROA
$\Delta logCOMP_t$	0.0306**	0.00904**
	(0.0124)	(0.00398)
ΔROE_t	-0.513***	
	(0.0501)	
ΔROE_{t-1}	-0.228***	
	(0.0297)	
ΔROA_t		-0.603***
		(0.0668)
ΔROA_{t-1}		-0.309***
		(0.0253)
$\Delta logSALES_t$	-0.0208	0.0116
	(0.0284)	(0.0119)
$\Delta logSALES_{t-1}$	-0.0591**	-0.0284**
	(0.0291)	(0.0119)
ΔMTB_t	0.0838***	0.0412***
	(0.0125)	(0.00417)
ΔMTB_{t-1}	0.0483***	0.0235***
	(0.0101)	(0.00405)
Constant	0.0398*	0.0102***
	(0.0206)	(0.00373)
Observations	5186	6900
R^2	0.217	0.277
Adjusted R^2	0.215	0.275

Heteroscedasticity-consistent standard errors parentheses
Significance at (two tailed):
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Secondly, I notice that there is a significant decrease in the number of observation in the base sample from 6,920 into 5,186 in the regression results in Table 7. After conducting some investigations on the dataset, I found that there are some missing values in the variables used in the model. As the consequences, it

raises a concern that those missing values are producing a bias to the regression results. Thus, I re-construct the dataset by excluding the firm which has a missing value in one or more variables used in the model. After I rule out the firms which have a missing value in one or more variables used in the model, I then narrowing the period of the observation from ten years into five years of observation to assure that the results are robust to the most recent financial condition. At the end, I have 498 sample firms in 5 years of observation without any missing value, which in the result, I have 2,490 total number of observation in the data set. Then, I apply the same model I used in Table 7 into this dataset, and report the heteroskedastic-consistent standard errors result in Table 9. We can see from the result in column "Firm-Year FE" of Table 9 that the coefficient on $\Delta logCOMP_t$ remains positive on future firm performance (ΔROE_{t+1}), and it is statistically significant at better than 5% level (p-value <0.05). The coefficient estimates on $\Delta logCOMP_t$ in "Firm-Year FE" column from Table 7 and Table 9 raises from 0.0306 to 0.0513. It indicates that without any missing value in the dataset and using the period of the most recent financial condition, explanatory power of current compensation in future firm is increasing by 0.021% (0.0513% - 0.0306%), compared to the regression result of 10 years of observation which including some missing values in the dataset.

Both of the main results and robustness tests are allowing me to accept the first hypothesis (H1) that future firm performance is positively associated with current executive compensation.

Table 9

Robustness Test 2 for Estimates of Future Performance in Current Compensation (Controlling Lagged Value of Firm Performance Variables). Dependent Variable is future firm performance (ΔROE_{t+1})

	Model	Year FE	Firm FE	Firm-Year FE
$\Delta logCOMP_t$	0.0447**	0.0447**	0.0525**	0.0513**
	(0.0185)	(0.0185)	(0.0223)	(0.0220)
ΔROE_t	-0.353***	-0.353***	-0.501***	-0.499***
	(0.0222)	(0.0222)	(0.0646)	(0.0647)
ΔROE_{t-1}	-0.0725***	-0.0725***	-0.163***	-0.163***
	(0.0191)	(0.0191)	(0.0380)	(0.0387)
$\Delta logSALES_t$	0.0180	0.0180	0.0548	0.0489
	(0.0280)	(0.0280)	(0.0368)	(0.0370)

$\Delta logSALES_{t-1}$	-0.0380	-0.0380	-0.0331	-0.0438
	(0.0247)	(0.0247)	(0.0324)	(0.0349)
ΔMTB_t	0.0984***	0.0984***	0.0720***	0.0711***
	(0.0139)	(0.0139)	(0.0193)	(0.0202)
ΔMTB_{t-1}	0.0447***	0.0447***	0.0239	0.0353**
	(0.0139)	(0.0139)	(0.0148)	(0.0149)
Constant	-0.0169	-0.0169	-0.00429	-0.00988
	(0.0113)	(0.0113)	(0.00317)	(0.0125)
Observations	2490	2490	2490	2490
R^2	0.114	0.114	0.195	0.198
Adjusted R^2	0.110	0.110	0.192	0.194

Heteroscedasticity-consistent standard errors parentheses
Significance at (two tailed):
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4.2 Insider directors affecting the relationship between unexplained variation in current compensation and variation in future firm performance

To test the prediction if the relationship between current compensation and future firm performance is stronger with a higher proportion of insider directors than in a lower proportion of insider directors on the board, I develop a proxy from board of director literature. Insider directors have the advantage for their in-depth knowledge of firm-specific activities and competitive environment, which are not owned by outside directors (Bushman, et al., 2000). One benefit of the implicit contract is inducement of adaptive behavior when it allows the principal to take into account any additional relevant information that becomes available during the contract period, when renegotiating formal, explicit contract will likely be expensive and consume much time. Thus, it is reasonable to argue that, the in-depth knowledge of firm-specific activities and competitive environment held by insider directors are increasing the outcome of additional information available during the executive's contract period. Intuitively, this condition will increase the weight put on unobservable (to outsiders) measures of performance (implicit contracts). Hence, I presumably argue that, when the proportion of insider directors on the board is increasing, the board will put more weight into unobservable (to outsiders) measures of performance. When the unobservable measure of performance is correlated with the future observable measure of firm performance, we will find a stronger relation between current executive compensation and future firm performance. The

proportion of insider directors is defined as the percentage of insider directors on the board, comparing to the total number of directors on the board. To test this prediction, I interact the proxy of insider directors on the board with $\Delta logCOMP_{t.}$ variable. This methodology allows the coefficient on $\Delta logCOMP_t$ to vary monotonically with the changes in the proportion of insider directors. I use the natural logarithm from the average of three years' proportion of insider directors to capture the behavior of the board in using the unobservable (to outsiders) measure of performance in compensating the executives. In result, I got this model of estimator:

$$\Delta ROE_{t+1} = \Delta logCOMP_t + ID_t + \Delta logCOMP_t * ID_t + \Delta ROE_t + \Delta logSALES_t + \Delta MTB_t + \Delta ROE_{t-1} + \Delta logSALES_{t-1} + \Delta MTB_{t-1}$$

The expected sign of coefficient on $\Delta logCOMP_t$ is positive, indicating that future firm performance is positively associated with current executive compensation. According to the model developed in section 2, when the unobservable measure of performance receives more weight in the compensation contract, compensation residual should be more highly correlated with future firm performance residual. Hence, I expect the coefficient on the interaction term between changes in current executive compensation and proportion of insider directors on the board ($\Delta logCOMP_t * ID_t$) to be positive.

I then estimate the model with OLS regression and report the results along with firm fixed effect, year fixed effect and heteroscedasticity-consistent standard errors in column 1 Table 10. I control the lagged value of observable performance variables in the regression but not present it on the table since my point of interest is the coefficient of $\Delta logCOMP_t$ and $\Delta logCOMP_t * ID_t$. Column 1 in Table 10 shows that after including the proportion of insider directors on the board and its interaction term with current executive compensation, the coefficient on $\Delta logCOMP_t$ lost its significance to future firm performance. The interaction term itself is insignificant at 10% level (p-value >0.1) either on one-tail or two-tail of distribution (not reported). It suggests that I have to reject the second hypothesis (H2) which predicts if the relationship between current compensation and future firm performance is stronger in a higher proportion of insider directors than in a lower proportion of insider directors on the board.

Table 10
Estimates of Future Performance in Current Compensation with interaction Effect of Proportion of Insider Directors on The Board
Dependent Variable is future firm performance (ΔROE_{t+1})

	1	2	3
$\Delta logCOMP_t$	0.0830	0.0797	0.0796
	(0.0548)	(0.0543)	(0.0547)
ID	-0.0407*	-0.0409*	-0.0408*
	(0.0228)	(0.0228)	(0.0227)
$\Delta logCOMP_t$*ID	0.0283	0.0270	0.0271
	(0.0272)	(0.0270)	(0.0272)
ΔROE_t	-0.513***	-0.536***	-0.542***
	(0.0500)	(0.0631)	(0.0643)
ΔROA_t		0.112	0.0423
		(0.114)	(0.127)
ΔPM_t			0.0578
			(0.0459)
$\Delta logSALES_t$	-0.0214	-0.0280	-0.0358
	(0.0285)	(0.0281)	(0.0267)
ΔMTB_t	0.0839***	0.0822***	0.0830***
	(0.0125)	(0.0127)	(0.0123)
Constant	-0.0323	-0.0323	-0.0302
	(0.0475)	(0.0476)	(0.0477)
Observations	5179	5179	5179
R^2	0.218	0.219	0.221
Adjusted R^2	0.216	0.216	0.217

Heteroscedasticity-consistent standard errors parentheses
Significance at (two tailed):
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

As further checks, I estimate the model into two alternative approaches. First, I control another current observable measures of performance, valued by the changes in ROA (ΔROA_t) and the changes in profit margin (ΔPM_t) into the model and report the results in column 2 and 3 in Table 10 respectively. It tends to anticipate any omitted related variables which allegedly interfere the relation between current compensation, future firm performance and the interaction term between current compensation and proportion of insider directors on the board. Based on the

regression results, the coefficient on $\Delta logCOMP_t$ and coefficient on interaction term $\Delta logCOMP_t * ID_t$ remain insignificant to future firm performance (ΔROE_{t+1}) at 10% level (p-value >0.1). Secondly, I also try to reconstruct the dataset by excluding firms which have a missing value in one or more variables used in the model then narrow the period of my observation from 10 years into five years. The results (not reported) are pretty similar with Table 10.

Even so, I found that the coefficient on $logID_t$ in column 1 of table 10 is negative -0.0407 and significant at better than 10% level (p-value <0.1) with standard error 0.0228. It indicates that when there is 1% raise in the proportion of insider directors on the board, future firm performance is decreasing about 0.041%. This result is supporting the argument if insider directors are more likely to act in executive's favor because of their close relationship with the managers (Byrd & Hickman, 1992) (Guo & Masulis, 2015). The close relationship between insider directors and the executives allegedly induces a game between both parties such as extraction of private benefits, increments of managerial power, focus on short-term performance and empire building instead of maximizing long-term shareholders value. Hence, the executives are less motivated to improve future firm performance since their incentives are not aligned with this indicator. Moreover, the results also suggest me to reject the second hypothesis of this thesis.

However, I still curious to examine the prediction from the second hypothesis (H2) if proportion of insider directors is affecting the relation between current compensation and future firm performance. I then try to examine how insider directors would affect the relation between current compensation and future firm performance by comparing the linear relation between two subgroups. I divided the data into above-the-mean and below-the-mean subgroup from the total subgroup then compare the linear relation between those two subgroups. I report the summary statistic from the proportion of insider directors on the board, along with the subgroup in Table 11. The table shows that from all the firms along the period in the dataset on average have 15.8% proportion of insider directors on the board. After the group is divided by mean, the below-the-mean subgroup has on average 11% proportion of insider directors on the board, while the above-the-mean subgroup has on average 24.6% proportion of insider directors on the board.

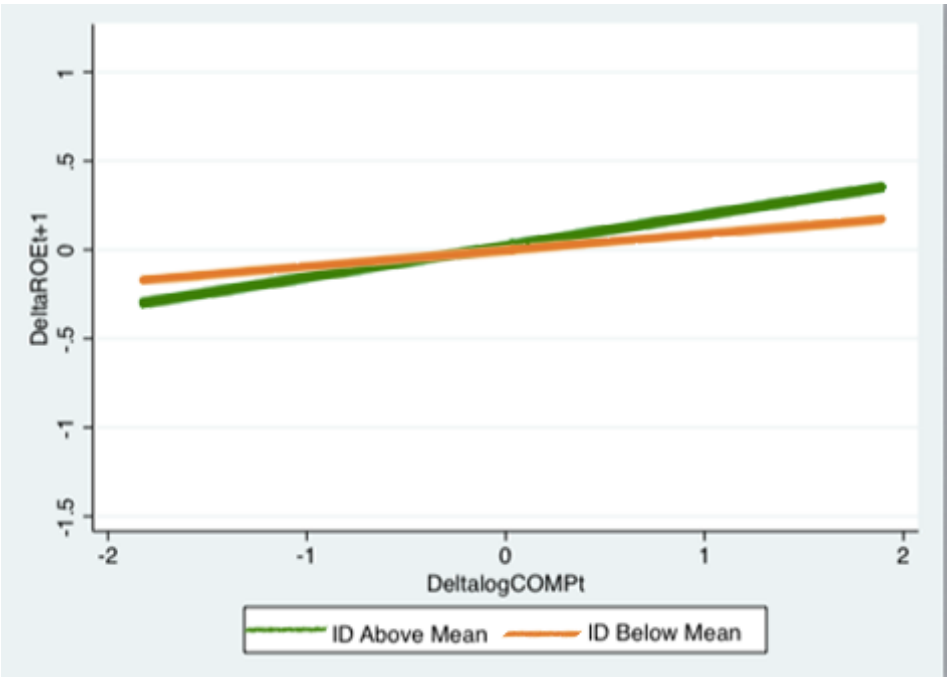
Table 11 Summary Statistics Proportion of Insider Directors

Variable	Number of Observations	Mean	Standard Deviation	Q1	Median	Q3
ID	6,920	.158	.0818	.101	.130	.190
ID (below-the-mean)	4,476	.1101	.0230	.0939	.1093	.126
ID (above-the-mean)	2,444	.2464	.0774	.1851	.2222	.2857

ID = 3 years average proportion of insider directors on the board

Using scatter plot in Stata, I get the fitted value line of the relation between current executive compensation and future firm performance for both of the subgroups and report the result in Figure 2. The figure is showing that the subgroup which has the proportion of insider directors above the mean of the total group (green color) has a steeper slope, comparing to the subgroup which has the proportion of insider directors below the mean of the total group (orange color).

Figure 2.
Comparison of the relation between current compensation and future firm performance between the below-the-mean and above-the-mean subgroup of proportion of insider directors on the board



The comparison result in Figure 2 is showing that the relation between current compensation and future firm performance is going to the expected direction given a moderation effect of proportion of insider directors, but unfortunately, I have a lack sufficient of statistical power to confirm this hypothesis since the effect was not significant at (p-value <10).

5 Discussion & conclusion

5.1 Discussion

5.1.1 Current executive compensation and future firm performance (SQ1)

To answer the main research question of this thesis whether current compensation has a positive explanatory power in future firm performance and does the effect stronger in a higher proportion of insider directors than in a lower proportion of insider directors on the board, I generate two sub-questions. Firstly, this thesis aims to check if the future firm performance is positively associated with current executive compensation (SQ1). This sub-question also allows me to check if the findings of (Hayes & Schaefer, 2000) study where current compensation has an explanatory power in future firm performance is robust and can be replicated in different setting and dataset.

There raise soma contra arguments regarding the usage of unobservable (to outsiders) performance-based evaluation (implicit contracts) in executive compensation contract. If the contra arguments are adequate, the findings from (Hayes & Schaefer, 2000) study might be challenged. If the board will only rely on the explicit contract, then current compensation will not have an explanatory power in future firm performance. Hence, there is no use to examine the relation between current executive compensation and future firm performance given moderation effect from proportion of insider directors on the board. Thus, I follow their prediction if the future firm performance is positively associated with current executive compensations (H1). To answer this sub-question, I follow their framework if the board use performance measures that are observable only to the contracting parties (firm and executives), and these measures of performance are correlated with the future indicator of performance, then unexplained variation in current compensation should predict future variation in observable performance measures.

I test the prediction using empirical study method with OLS regression analysis. I take the data from ExecuComp, COMPUSTAT, and ISS (formerly risk metrics) databases, taken from WRDS. The regression result in column Firm-Year FE in Table 7 shows that the coefficient of variation in current executive compensation ($\Delta logCOMP_t$) is positive 0.0306 and significant at better than 5% level (p-value <0.05) with standard error 0.0123 on the variable of variance in the future firm performance (ΔROE_{t+1}). The model also controlling current observable performance measure and the lagged values of them. It indicates that when there is 1% raise in variation of current compensation that is not explained by variation in the current and the past performance measures, future variation in performance measure increases by 0.031%. This finding is enabling me to answer the first sub-question that, in line with the prediction in the first hypothesis (H1), future firm performance is positively associated with current executive compensation. The regression results allowed me to reject the hypothesis that compensation is not related to future firm performance. I prove that this result is robust to many alternative specifications.

5.1.2 The relation between current compensation and future firm performance given a moderation effect from proportion of insider directors (SQ2)

After getting the evidence to answer the first sub-question, this thesis jumped to the second sub-question. It then applies an agency model that consider a setting which there are multiple performance measures in the executive compensation contract. I argue that when there is a condition which I expect the board would put more weight into unobservable (to outsider) measures of performance, and these measures of performance are correlated to future observable measures of performance, then current performance residual will be more highly correlated with future performance residual. I am showing that insider directors, with their in-depth knowledge of firm-specific activities and competitive environment, are increasing the outcome of any additional information available (that is not observable to outsiders). This condition would induce the board to put more weight into the the unobservable measure of performance (implicit contract) in compensating the executives. Hence, when unobservable (to outsider) measures of performance are correlated with future observable measures performance, then unexplained variation in current compensation will be more highly correlated with variation in future firm performance.

To be able to answer the main research question, I generate the second sub-question to examine whether the relationship between the explanatory power of current compensation on future firm performance is stronger in a higher proportion of insider directors than a lower proportion of insider directors of the board (SQ2). To test the prediction, I re-applied an empirical study method with OLS regression analysis and interact the proxy of proportion of insider directors on the board with variation in current executive compensation variable. This method would allow the coefficient on variation in current executive compensation to vary monotonically with the changes in the proportion of insider directors. The predicted sign is positive to indicate that The relationship between current compensation and future firm performance is stronger in a higher proportion of insider directors than in lower proportion of insider directors on the board (H2).

By comparing the linear line between the two sub-groups (above-the-mean and below-the-mean proportion of insider directors) of the relation between current executive compensation and future firm performance, this thesis found the expected direction from the argument that the in-depth knowledge of firm-specific activities and competitive environment makes the current executive compensation more highly correlated with future firm performance. But unfortunately, I cannot find the empirical evidence to support the prediction of H2. The coefficient on the interaction term between variation in current executive compensation is positive 0.0283 but it is insignificant at 10% level for either one-tail or two-tail of distributions, indicated by the p-value (>0.1). However, I find the evidence that a higher proportion of insider directors is negatively associated with variation in future firm performance. The coefficient of proportion of insider directors on the board ($logID_t$) is negative -0.0407 and significant at better than 10% level (p-value <0.1) with 0.0228 standard error. It indicates that when there is 1% raise in the proportion of insider directors on the board, future firm performance is decreasing about 0.041%.This result is supporting the argument if insider directors are more likely to act in executive's favor because of their close relationship with the managers (Byrd & Hickman, 1992) (Guo & Masulis, 2015). The close relationship between insider directors and the executives allegedly induces a game between both parties such as extraction of private benefits. The possible explanation for this unpredicted finding might be; the theory which argue that insider directors has the in-depth knowledge of firm-specific activities and competitive environment is not relevant anymore in the recent day where the information is more

easily distributed with the support from many advance technologies. The advance technology has been making information distribution easier and more transparent. Thus, the insider directors do not have the particular advantage from their in-depth knowledge comparing to the independent directors. Allegedly, they just utilize their close relationship with the executives to induce a game in extracting private benefits for themselves.

5.2 Conclusion

A study from (Hayes & Schaefer, 2000) provides an empirical evidence to support their argument if the current executive compensation has an explanatory power in future firm performance. They argue that when the board incorporated both observable/explicit and unobservable/implicit measures of performance, and the unobservable measure of performance is correlated with future firm performance, then variation in current compensation that is not explained by variation in current observable performance measure is useful to predict variation in future firm performance. However, there raise some contra arguments regarding the usage implicit contract such as reneging behavior by the principal. When the board only rely on explicit contract, current executive compensation will not have the explanatory power in future firm performance. Hence, it is interesting to examine whether the findings form (Hayes & Schaefer, 2000) could be replicated in different setting and dataset.

The reasoning from explanatory power of current compensation in future firm performance (implicit contract) also suggest that, when the weight placed on the unobservable/implicit (to outsiders) measure of performance is higher, there is more information about future firm performance contained in current executive compensation (Hayes & Schaefer, 2000). This thesis develops a proxy from the board of director literature to which I expect the weight is placed more heavily on the unobservable (to outsiders) performance measure. insider directors are more likely to act in executive's favor because of their close relationship with the managers (Byrd & Hickman, 1992) (Guo & Masulis, 2015). The close relationship between insider directors and the executives allegedly induces a game between both parties. However, on the other hand, insider directors with their in-depth knowledge of firm-specific activities and competitive environment presumably increase the outcome of any additional information available during the executive's contract period, which is not observable to outsiders. For this reason, the board of directors allegedly is placing more weight into this kind of information which in the result, current executive

compensation will be more highly correlated to future firm performance. Hence this thesis aims to examine whether current executive compensation has an explanatory power in future firm performance and if the relation stronger in a higher proportion of insider directors than in a lower proportion of insider directors on the board (RQ).

Based on the regression analyses of the two sub-questions, this thesis found that current executive compensation is positively associated with future firm performance. The findings are rejecting the contra arguments related the use of implicit contract in an optimal compensation contract which has been discussed in the theoretical review section. It is also proving that the findings of (Hayes & Schaefer, 2000) study are robust and can be replicated in different dataset. Moreover, this thesis found that proportion of insider directors gives a moderation effect to the relation between current executive compensation and future firm performance in the same direction as predicted in the second hypothesis. The linear line comparison between the sub-group with higher proportion of insider directors and the sub-group with lower proportion of insider directors is showing the predicted direction. It suggests that the relation between current executive compensation and future firm performance is stronger in a firm with higher proportion of insider directors than in firm with a lower proportion of insider directors, indicated by a steeper slope from the group with higher proportion of insider directors. The linear line comparison in Figure 2 is in-line with the argument that the in-depth knowledge of firm-specific activities and competitive environment own by insider directors is increasing the outcome of any additional information available that is not observable (to outsiders). This condition is inducing the board to place more weight into that kind of information, which in the result, current compensation residual is more highly correlated with future performance residual. However, I cannot found the evidence to support this prediction from the regression analysis.

On the contrary, I also found that the coefficient on logIDt in column 1 of Table 10 is negative -0.0407 and significant at better than 10% level (p-value <0.1) with standard error 0.0228. It indicates that when there is 1% raise in the proportion of insider directors on the board, future firm performance is decreasing about 0.041%. This results supports the argument if insider directors are more likely to act in executive's favor because of their close relationship with the managers (Byrd & Hickman, 1992) (Guo & Masulis, 2015). The close relationship between insider directors and the executives allegedly induces a game between both parties such as

extraction of private benefits, increase the managerial power, focus on short-term performance and empire building instead of maximizing long-term shareholders value. Hence, the executives are less motivated to improve future firm performance since their incentives is not aligned with that indicator.

To conclude, I interpret the findings of this thesis as; The analysts and investors might use the information of current executive compensation to predict future firm performance. However, they also have to consider the presence of insider directors at the firm. Even though the presence of those directors seems to make the relation between current executive compensation and future firm performance stronger, they are giving a negative impact to future firm performance because of their close relationship to the executives. This close relationship allegedly directing their focus to other factors than long-term firm performance.

5.3 Contributions

This thesis makes the following contributions. First it confirms that the findings of (Hayes & Schaefer, 2000) which argue that unexplained variation in current executive compensation is useful to predict variation in future firm performance is robust and can be replicated into different setting and dataset. Second, this thesis finds that insider directors are less independent and allegedly utilizing their close relationship with the executives to gain private benefits for themselves. It supports the argument that outsider directors are always better because they have more incentives to be an active monitor to maintain the value of their reputational capital in director's market. From the investors and analyst perspective, this thesis gives a new insight that they can use current executive compensation to predict future firm performance, but they have to consider the presence of insider directors which is empirically proved is decreasing future firm performance.

5.4 Limitation and future research

The primary provision that must be applied to my analysis is the potential presence of omitted firm-performance-related variables. I already try to mitigate this concern by experimenting with a large variety of different explanatory variables including the lagged value of those performance variables. I believe there is no solution to systematically eliminate the possibility that the relation between unexplained variation in current executive compensation and future firm performance is due to to omission of an observable performance measure that is correlated with both current compensation and future firm performance and not discussed in this thesis.

Another caveat that must be applied is the potential confound between the advantage and disadvantage argument regarding the presence of insider directors on the board. As discussed in the theoretical review section, insider directors with their in-depth knowledge of firm specific activities and competitive environment is increasing the outcome of any additional information available during the executive's contract period. Apparently, they would place more weight in this kind of information in compensating the executives which in the result, compensation residual will be more highly correlated with future performance. However, on the other hand, insider directors allegedly are utilizing their close relationship to induce a game to extract private benefits for themselves instead of focusing in firm future performance. It raises a concern that when I testing the effects of insider directors to the current executive compensation and future firm performance, it is statistically difficult to determine whether the effect measured in the analysis is the result from one or the other theory. However, by comparing the linear relation between current compensation and future firm performance from each sub-group (above and below-the-mean of proportion of insider directors) I found a pattern in accordance to the advantage argument of the presence of insider directors on the board. On the other hand, the negative relation between proportion of insider directors and future firm performance found in the OLS regression analysis is showing a pattern that support the disadvantage argument regarding the presence of insider directors on the board.

Based on the result of my analysis in this thesis, I notice the following possibilities for the future research. Firstly, the regression result on the relation between proportion of insider directors and future firm performance brings out a prediction that outsider directors is always better than insider directors. Future research might be focusing on this prediction to contributes to the existing literature. Secondly, from the robustness check on testing the first hypothesis (H1) in this thesis, I found that unexplained variation in current executive compensation is also useful in predicting future variation in return on assets (ROA) instead of return of equity (ROE). This result is interesting since ROA portrays another dimension of compensation than ROE. Future research might be focusing on this relation between current compensation and ROA instead of just put it away as simply robustness check.

Bibliography

Anhar, M., 2015. Indicators of Company Performance, Investors' Expectation and Investment Risk in Predicting Stock Return at Indonesia Stock Exchange. *Journal of Resources Development and Management,* Volume 5, pp. 41-51.

Baker, G. G. R. & Murphy, K., 1994. Subjective Performance Measures in Optimal Incentive Contracts. *Quarterly Journal of Economics, Vol. 109,* p. 1125–1156.

Banker, R. D. & Datar, S. M., 1989. Sensitivity, precision, and linear aggregation of signals for performance evaluation. *Journal of Accounting Research,* pp. 21-39.

Banker, R., Potter, G. & Srinivasan, D., 1998. *An Empirical Investigation of an Incentive Plan Based on Nonfinancial Performance Measure,* Dallas: University of Texas.

Baysinger, B. D. & Butler, H. N., 1985. Corporate Governance and the Board of Directors: Performance Effects of Changes in Board Composition. *Journal of Law, Economics, & Organization, Vol. 1, No. 1 (Spring, 1985),* pp. 101-124.

Bebchuck, L. A. & Fried, J., 2003. Executive Compensation as an Agency Problem. *Journal of Economic Perspectives V17,* pp. 71-92.

Bol, J. C., 2008. Subjectivity in Compensation Contracting. *Journal of Accounting Literature,* Volume 27, pp. 1-24.

Bonnera, S. E. & Sprinkleb, G. B., 2002. The effects of monetary incentives on effort and task performance: theories, evidence, and a framework for research. *Accounting, Organizations and Society 27 ,* p. 303–345.

Bushman, R., Chen, Q. & Engel, E., 2000. *The Sensitivity of Corporate Governance Systems to the Timeliness of Accounting Earnings,* Chicago: s.n.

Byrd, J. W. & Hickman, K. A., 1992. Do Outside Directors Monitor Managers?. *Journal of Financial Economics 32,* pp. 195-221.

Coles, J. L., Daniel, N. D. & Naven, L., 2008. Boards: Does one size fit all?. *Journal of Financial Economics,* 87(2), pp. 329-356.

Crutchle, C. E. & Hansen, R. S., 1989. A Test of the Agency Theory of Managerial Ownership, Corporate Leverage, and Corporate Dividends. *Journal of Financial Management Vol 18,* pp. 36-46.

Fama, E. F. & Jensen, M. C., 1983. Separation of Ownership and Control. *Journal of Law and Economics 26,* pp. 301-325.

Fama, E. F., 1980. Agency Problems and the Theory of the Firm. *Journal of Political Economics 4,* pp. 288-307.

Field, A.P. (2009). *Discovering statistics using SPSS* (3rd edition). London:Sage.

Freeman, R. N., Ohlson, J. A. & Penman, S. H., 1982. Book Rate-of-Return and Prediction of Earnings Changes: An Empirical Investigation. *Journal of Accounting Research,* 20(2), pp. 639-653.

Gillian, S. L., Hartzell, J. C. & Parrino, R., 2009. Explicit versus Implicit Contracts: Evidence from CEO Employment Agreements. *The Journal of Finance,* pp. 1629-1655.

Guo, L. & Masulis, R. W., 2015. *Board Structure and Monitoring: New Evidence from CEO Turnovers,* s.l.: Oxford University Press.

Hair, J. F., Anderson, R. E. & Tatham, R. L. &. B. W. C., 1995. *Multivariate Data Analysis.* 3rd Edition ed. New York: Macmillan.

Hallock, K. & Oyer, P., 1999. The Timeliness of Performance Information in Determining Executive Compensation Contracts. *Journal of Corporate Finance,* Volume 5, pp. 303-321.

Hayes, R. M. & Schaefer, S., 2000. Implicit contracts and the explanatory power of top executive compensation for future performance. *RAND Journal of Economics Vol. 31,* pp. 273-293.

Healy, P. M. & Palepu, K. G., 2001. Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics 31,* pp. 405-440.

Holmstorm, B., 1983. Equilibrium Long-Term Labor Contracts. *Quarterly Journal of Economics, Vol. 98,* p. 23–54.

Holmström, B. & Milgrom, P., 1991. Multitask Principal-Agent Analyses; Incentive Contracts, Assets Ownership, and Job Design. *Journal of Law, Economics and Organization,* 7(2), pp. 24-53.

Ittner, C. D., Larcker, D. F. & Rajan, M. V., 1997. The choice of performance measures in annual bonus contracts. *The Accounting Review ,* pp. 231-255.

Jensen, M. C. & Mekcling, H., 1976. Theory of The Firm: Managerial Behavior, Agency Cost and Ownership Structure. *Journal of Financial Economics,* pp. 305-360.

Jensen, M. C. & Murphy, K. J., 1990. Performance Pay and Top-Management Incentives. *Journal of Political Economy, Vol. 98,* pp. 225-264.

Louis, H. & Robinson, D., 2005. Do managers credibly use accruals to signal private information? Evidence from the pricing of discretionary accruals around stock splits. *Journal of Accounting and Economics,* 39(2), pp. 361-380.

Mayew, W. J. & Venkatachalam, M., 2012. The Power of Voice: Managerial Affective States and Future Firm Performance. *The Journal of Finance,* 67(1), pp. 1-43.

Murphy, K., 1999. Executive Compensation. In: e. O. Ashenfelter and D. Card, ed. *The Handbook of Labor Economics.* Amsterdam(North-Holland): s.n.
O'Hanlon, J. & Peasnell, K., 1998. Wall Street's contribution to management accounting: the Stern Stewart EVA. *Management Accounting Research 9,* pp. 421-444.

Pashei, A. & Talebnia, G. A., 2015. The Investigation of the Relationship between Discretionary Accruals, Growth, and Future Firm Performance in Listed Firms at Tehran Stock Exchange (TSE). *International Research Journal of Applied and Basic Sciences,* Volume 9, pp. 1605-1613.

Penman, S. H., 1991. An Evaluation of Accounting Rate-of-Return. *Journal of Accounting, Auditing, and Finance,* Volume 6, pp. 233-254.

Ricardo-Campbel, R., 1990. Comments on The Structure of Ownership and Theory of The Firm. *Journal of Law and Economics 26,* pp. 391-394.

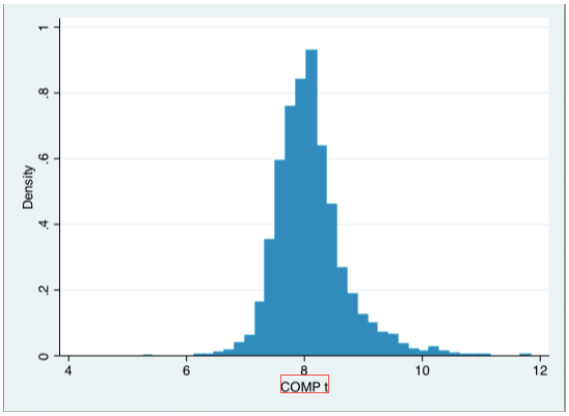
Schmidt, K. M. & Schnitzer, M., 1995. The interaction of explicit and implicit contracts. *Economics Letters,* Volume 48, pp. 193-199.

Shleifer, A. & Vishny, R., 1989. Management Entrenchment: The Case of Manager-specific Investments. *Journal of Financial Economics 25,* pp. 123-140.

Stine, R., 2001. *Statistics 621.* Pennsylvania: Wharton University of Pennsylvania.
Weisbach, M., 1988. Outside directors and CEO turnover. *Journal of Financial Economics 20,* pp. 431-460.

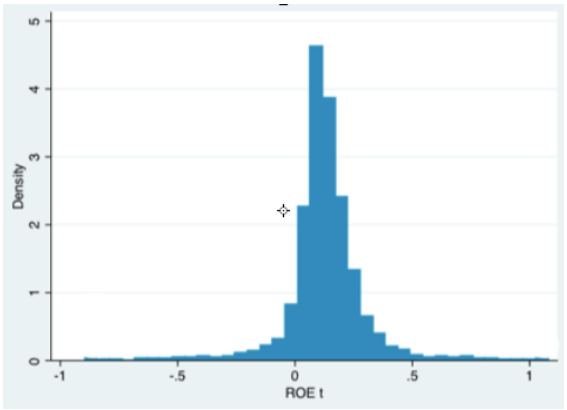
Appendices

Graph 1



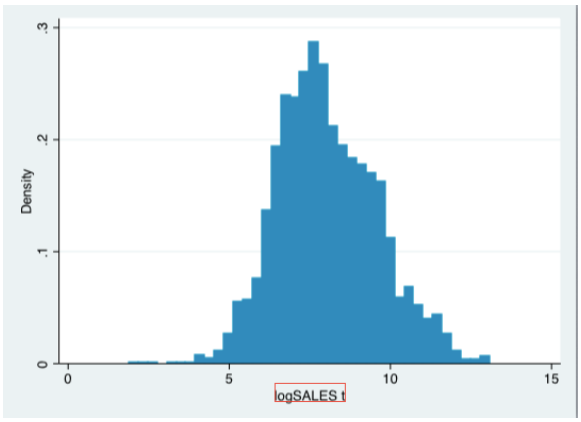
Compensation year *t* sample distribution

Graph 2



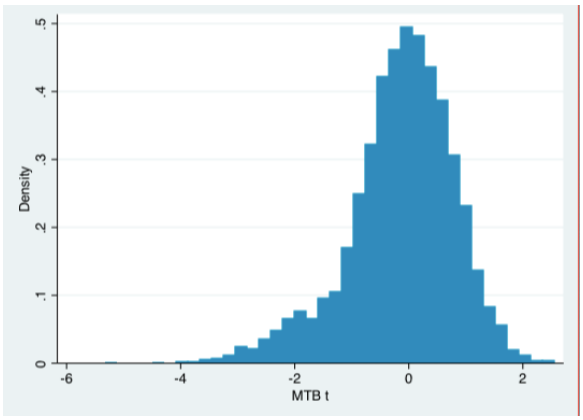
ROE year *t* sample distribution

Graph 3



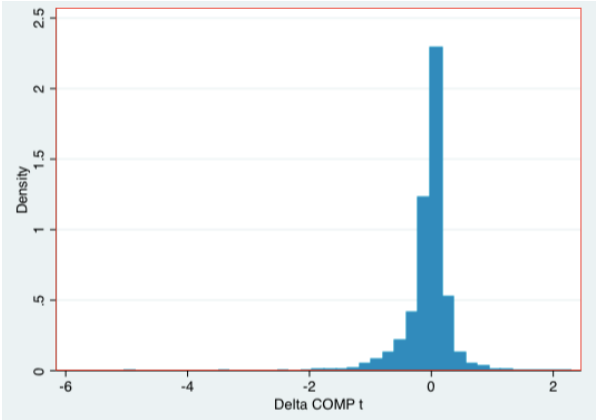
logSALES year *t* sample distribution

Graph 4



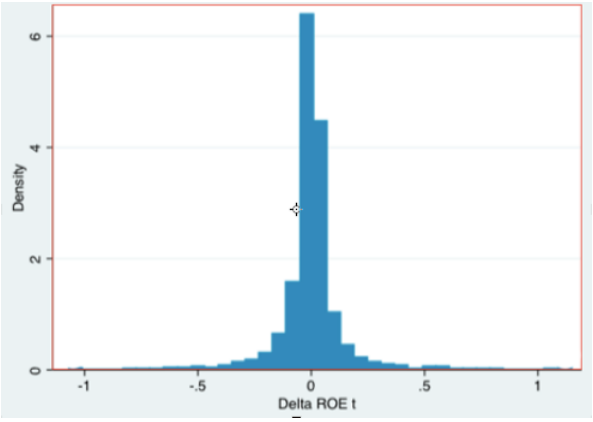
MTB year *t* sample distribution

Graph 5



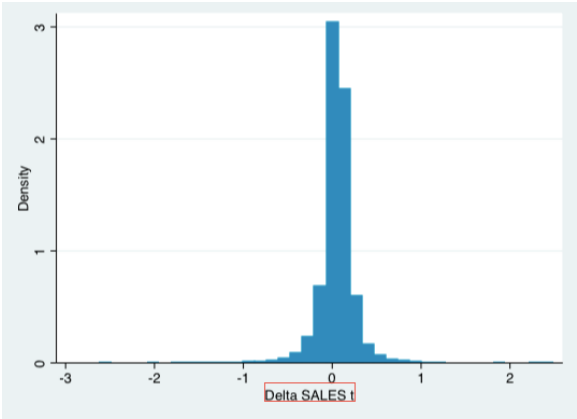
ΔlogCOMP year *t* sample distribution

Graph 6



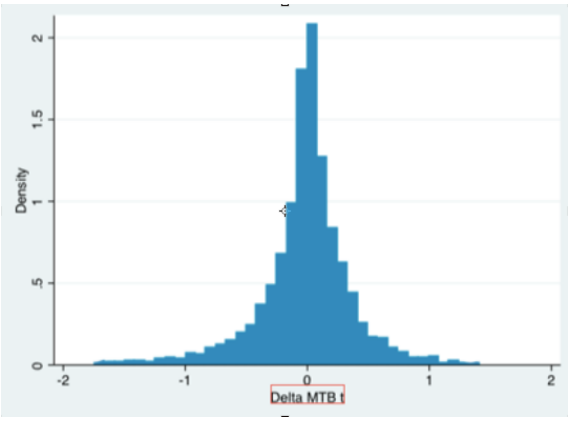
ΔROE year *t* sample distribution

Graph 7



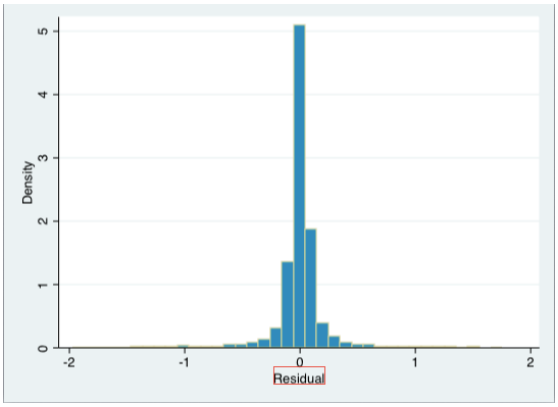
ΔlogSALES year *t* sample distribution

Graph 8



ΔMTB year *t* sample distribution

Graph 9



Residual distribution test