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ERASMUS UNIVERSITEIT ROTTERDAM

Master Thesis

Do overconfident executives maintain materially deficient internal control systems as a means of maximizing their own personal benefit?

An empirical study concerning chief executive officers in U.S. firms.

Abstract:

Prior literature has shown that materially deficient internal control systems are more likely to be present when executives are overconfident (see Chen et al. (2014), and Lee (2016)). Overconfidence in an individual results in (1) them believing that they are better than their peers, (2) having narrower forecast estimations (3) and the individual attempting to mitigate risks beyond their control (Chen et al., 2014). Therefore, overconfidence affects the executives' decision making process. This study builds upon the findings presented by prior research, and investigates whether an overconfident executive prolongs the internal control deficiencies as a means of the maximizing their own compensation package. Initially, a logistic regression model is used to determine whether a relationship between executive overconfidence and the presence of materially deficient internal controls exists. This model is then slightly altered to determine whether overconfidence in an executive increases the probability of the recurrence of internal control deficiencies. These two models are the foundation of the final model, where it is ascertained whether an executive benefits through prolonging the deficiencies. A sample of executives from U.S. companies is used, for the years ranging 2003 to 2011. The findings of this paper suggest that there is no direct relationship between executive overconfidence and the occurrence of materially deficient internal controls. However, it does suggest that executive overconfidence leads to the recurrence of deficient internal controls. Lastly, this study also suggests overconfident executives prolong deficient internal controls as a means of increasing their own personal salaries and bonuses.

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Date: 17-June-2016

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Chapter 1: Introduction

1.1. General Introduction

This thesis determines whether hubristic executives deteriorate, or take advantage of a materially weak internal control framework to maximize their own personal benefit at the cost of company shareholders. More specifically, the focus of this analysis is on the chief executive officer of individual companies. Exploring this relationship provides an indication as to whether specific characteristics of a company's executive results in the deterioration of the quality of company control systems for their own benefit. With this in mind the proposed research question is:

> *Do overconfident executives benefit from maintaining materially weakened internal control systems?*

Examining the relationship between internal controls and executive hubris is important because it helps ascertain whether a company's internal control system is susceptible to material weaknesses as a result of the executive. Overconfident executives overestimate their own ability; and believe that they can control events outside their span of influence (Chen et al., 2014). This implies that overconfidence obscures the executive's own perceptions about their abilities, and is therefore less effective in making decisions. For example, finance literature portrays hubristic executives as individuals that systematically misestimate the value of future outcomes (See e.g. Heaton (2002); Malmendier & Tate (2005); Ahmed & Duellman (2013)). Therefore, overconfidence biases an executive's decision-making process. This bias is also present in non-financial settings, such as capital budgeting decisions (Jermais & Hu, 2012), accounting conservatism (Ahmed & Duellman, 2013), and internal control decisions (Lee, 2016).

Lee (2016) suggests that, due the overconfidence effect, executives place a lower level of importance on the infrastructure of their company's internal control frameworks. He suggests that overconfident executives are less likely to ensure the effectiveness of their company's financial reporting information systems, and have insufficient accounting personnel. Essentially what is suggested by Lee (2016) is that the quality of the activities surrounding the maintenance of a company's internal control framework diminishes, as a result of the executive's overconfidence. Like Chen et al. (2014), Lee (2016) finds a significant relationship between the overconfidence of an executive, and deficient controls. Similarly to Chen et al. (2014), and Lee (2016) this study investigates the same relationship.

Chen et al. (2014) not only support a relationship between the executive overconfidence and deficient internal controls, but ascertains that overconfidence results in the executive being less able to mitigate the effects of weak internal controls. The negative effects they mention are inefficient investments, lower operating efficiency, and lower financial reporting quality. This may have material consequences for external stakeholders. Furthermore, Chen et al. (2014) determine that overconfident executives are more likely to maintain deficient internal controls. Using a different variable this study investigates whether this is true. In ascertaining whether overconfident executives maintain deficient internal controls

The findings of Chen et al. (2014) and Lee (2016) provide a solid foundation to answer the research question. Initially this thesis determines whether a relationship exists between overconfidence and deficient internal controls. Thereafter, already in the presence of material weaknesses, it determines whether overconfidence influences an executive's ability to rectify recurring material weaknesses and thereby ascertains whether they maintain these deficiencies. Upon determining these two outcomes, with the use of agency theory, this thesis contributes by determining whether executives maintain deficient internal controls as a means of maximizing their own personal benefit. The findings of this thesis support a scenario where executives maintain deficient internal controls as a means of getting a larger bonus and a salary increment.

1.2. Data Sources & Methodology

The research question is answered using a data sample based on the United States, from the years 2003 to 2011. Data from *Audit Analytics* is gathered to determine the quality of a company's internal control system. Furthermore, data from *ExecuComp* is gathered for the purposes of constructing variables that are used to represent executive overconfidence, more specifically these variables are be based on the executive stock option exercising patterns. Data from *Compustat* is also required, as it provides information on company characteristics that are controlled for. Lastly, a data set is obtained from Sen & Tumarkin (2015), wherein a recently constructed overconfidence measure is obtained from.

A binary logistic regression model is used to associate overconfident executives and the presence of deficient internal controls. The model determines the effect of executive overconfidence on the propensity for companies to have material weaknesses present in their internal control system. This model is further refined to identify whether management

overconfidence results in the recurrence of the deficiencies. This approach provides a good indication of the relationship between executive overconfidence and the presence of material weaknesses, and whether overconfidence prolongs the presence of material weaknesses. In both these cases the overconfidence measure, used from Sen & Tumarkin (2015), will be compared against the overconfidence measure constructed by Hall & Murphy (2002) as a means of ensuring that the more recent overconfidence measure obtains robust results. The variable being used from Sen & Tumarkin (2015) is labelled *Share_Retainer*, and the one created by Hall & Murphy (2002) is labelled *Holder_67*.

Lastly, a binary logistic regression model is used to determine whether an interaction effect between recurring deficiencies and executive overconfidence leads to an improvement in the executive's compensation. This model, is an extension of the previous two models, but uses the executive's compensation as the dependent variable. Three different dependent variables are used in this part of the analysis: the executive's total compensation; his or her salary; and bonus. These three variables are dummy variables that are coded one if there is an increase compared to the previous fiscal year, for each specific variable. In associating the interaction effect, between executive overconfidence and the recurrence of deficient internal controls, it can be established whether executives maintain deficient internal control frameworks as a means of maximizing their own personal benefit. Thereby, allowing the research question to be answered.

1.3.Summary of Findings

The first section of the introduction mentioned three different aspects of the research question. The second subsection of the introduction, briefly explained three different logistic regression models that will be used in this study. These aspects of the research question, and the logistic regression models coincide with the hypothesises used in this study. The first hypothesis predicts that there is a significantly positive association between executive overconfidence and the presence of deficient internal control systems. The second hypothesis predicts that an overconfident executive is less effective in resolving deficient internal controls. The last hypothesis of this study states that, in the presence of recurring material weaknesses, overconfident executives are more likely to have a larger benefits.

The initial logistic regression model, where overconfident executives are associated against the presence of material weaknesses, does not confirm the first hypothesis of the study. The regression outputs do not establish a significant association between executive overconfidence and the presence of deficient internal controls. As, a result the first hypothesis in this study is rejected. This is a possible result of the fact that executives, albeit overconfident or not, have no incentive to deteriorate their company's internal control framework. Furthermore, the results suggest that the weaknesses are more likely to occur as a result of the complexities surrounding company operations.

Despite there being no significant association between executive overconfidence and the deficient internal controls, this study finds a significant association between executive overconfidence and the prolonging of the company's material weak internal controls. As a result, the second hypothesis presented in this study is accepted. This study attributes the recurrence of a companies deficient internal control framework to the executive's poor decision making abilities.

The initial results of the final hypothesis, where the abovementioned interaction effect is regressed against the dummy variable concerning the executive's total compensation, indicate that there is no statistical relationship between the two. Thereby inferring that the third hypothesis is to be rejected. However, when the total compensation of the executive is replaced by the dummy variables concerning his, or her bonus and salary; then the there is a significant statistical relationship. The results of the tests concerning the third hypothesis infer that when an executive is overconfident, and prolongs internal control deficiencies, he or she is more likely to have an increased salary and bonus. Therefore, the final hypothesis is accepted.

The outcomes of the abovementioned hypothesises suggests that overconfident executives, are more likely to maintain defective internal control systems for their company. In the presence of these deficiencies, overconfident executives are more likely to have increased salaries and bonuses. However, the results do not suggest the overconfident executives are a possible source of material weaknesses in a company's internal control framework.

1.4. Social Implications of the Findings

The findings present some controversy. They suggest that an executive takes advantage of a situation where materially deficient internal controls exist, and use it as a means of increasing their salary and bonuses. In such a situation where a company is faced with materially weakened internal controls, it is the responsibility of the executive to ensure that this does not carry over into the next fiscal year. However, the findings support a scenario where, in the presence of materially deficient internal controls, executives act according to their own personal interest rather than that of the company's stakeholders. Therefore it can be presumed, from these findings, that overconfident executives are not suitable in rectifying material deficient internal controls in their company. A possible solution to this is ensuring that the executive's incentives are aligned with that of the shareholder.

1.5.Scientific Implications of this Study

The main purpose of this study is to determine the relationship between executive overconfidence and whether they benefit by maintaining a deficient internal control system in their company. Despite the abovementioned findings, this study contributes by using a recently developed overconfidence measure and compares it with a more established one in accounting literature. Lastly, it makes an alteration to a commonly used variable in accounting literature, as a means of assessing an overconfident executive's effectiveness in resolving deficient internal control systems.

This study uses a recently introduced measure, created by Sen & Tumarkin (2015), to determine whether executives are overconfident or not. It assesses the robustness of the new measure against *Holder_67,* which is a measure introduced by Hall & Murphy (2002) and used by Malmendier & Tate (2005). The underlying differences between these two measures is that *Share_Retainer* establishes an executive as being overconfident if he or she retains a significant amount of shares after his or her options are exercised, whereas *Holder_67* classifies an executive as being overconfident if they hold a minimum of 67% of their options after vesting. Despite this difference, the study confirms that they act in a similar manner. Therefore, *Share_Retainer*, as presented by Sen & Tumarkin (2015), is a suitable measure for executive overconfidence.

Lastly, study makes a slight alteration to the dummy variable that is coded one to indicate the presence internal control weaknesses. The dummy variable is altered in such a way that it is only coded one when deficient internal control systems are present for two consecutive years, in a company. This simple alternative, in this study, effectively represents the executive's ability to prevent the recurrence of the internal control deficiencies. Prior literature mainly uses the former dummy variable, and not the latter one (See e.g. Chen et al., (2014) and Lee (2016)). By utilizing a dummy variable that represents the recurrence of an event over a consecutive number of years, rather than the occurrence of an event, literature can focus on coming up with solutions to the presence of deficient internal controls. Although, the setting in this study concerns executive overconfidence and deficient internal controls, this approach can most certainly incorporated into other studies.

1.6. Structure

The paper is structured as follows. After the introduction a theoretical framework that links the concepts, and where the hypotheses are developed, is presented. Thereafter, a literature review is presented clarifying the contribution of this study. Hereafter, the data section describes how the sample is selected and the axioms imposed on the sample. The methodology follows after the data section; it justifies the models and variables used in the study. The results section follows the methodology part. It also describes the statistical significance and relationships of the findings. These sections allow for a conclusion to be drawn, where the answer to the research question is justified and explained, followed by the limitations of the paper, and suggestions for further research.

Chapter 2: Literature Review & Contribution:

The literature review provides an overview of studies that are related to executive hubris, and materially weak internal controls. The review highlights the contributions these studies make towards this thesis, but also exemplify the contributions this thesis makes to current literature. It also clarifies the consequences of weak internal controls, and overconfident executives. However, prior to doing this, an explanation is provided about what executive overconfidence and internal controls is. The literature review initially looks at the studies related to each of the two variables separately; then it is concluded with a review of literature that relates the two concepts of interest.

2.1. Explanation of the Concept: Executive Overconfidence

Overconfidence is a personality bias that is associated with an individual's over optimism (Schrand & Zechman, 2012). Hayward & Hambrick (1997) define overconfidence as an exaggerated self-confidence, or hubris. Recent literature has expanded the definition of overconfidence to incorporate the consequences of this bias. For example, Ahmed & Duellman (2013) define an overconfident executive as an individual that systematically overestimate the returns on their company projects. However, some studies distinguish between overoptimistic and overconfident executives. For example, David et al. (2007) defines overoptimistic executives as individuals that overestimate the mean of future cash flows, whereas they define overconfident executives as individuals that underestimate the volatility of future cash flows. However, this study does not distinguish between overconfidence and over optimism, and considers them to be the same concept. They are considered to be synonyms, because the definition presented by David et al. (2007) is a symptom of overconfidence. Malmendier & Tate (2005) exclaim that overconfident executives overestimate their returns to investment, which is similar to the definition of over optimism. Therefore this study does not differentiate between the two concepts, and considers them to be the same.

2.2. Explanation of the Concept: Internal Control

Kinney et al. (1990) define internal control as a plan effectuated by company management to ensure that the organizational structure, operational procedures, and company records; facilitate efficient operations, safeguard assets, and promote effective financial reporting to external stakeholders. However, the Committee of Sponsoring Organizations of the Treadway

Commision (2013; COSO) have a slightly altered definition to that presented by Kinney et al. (1990). The definition presented by COSO (2013) describes a company's internal control system as a process effectuated by relevant company personnel, as a means of assuring the achievement of objectives in the following categories: efficiency of operations, reliability of financial reporting, safeguarding assets, and compliance with local laws. The proposed definition presented by Kinney et al. (1990) does not incorporate the provision of assurance concerning the achievement of company objectives, and it does not include compliance with the local laws and regulations. Therefore, this study uses the definition presented by COSO (2013) rather than the one presented by Kinney et al. (1990).

Scandals, such as those concerning Enron and Worldcom, motivated the implementation of the Sarbanes-Oxley Act (SOX), in the year 2002 (Vaassen, Meuwissen, & Schelleman, 2009). Section 404 of the act has direct implications for management's relationship with their company's internal control system. Section 404 requires (1) management to state which framework is used to assess the effectiveness of their companies internal control system; (2) a statement that explains what managements' role is in maintaining their company's internal control system; (3) and lastly a statement from both management and the external auditor concerning the effectiveness the company's internal controls (Securities Exchange Commision, 2003). SOX 404 requires the disclosure any material deficiencies, concerning the company's internal control framework, in the abovementioned statements. A material weaknesses, in the context of internal controls, is defined by the Public Company Accounting Oversight Board (2007; PCAOB), in Auditing Standard 5, as a weakness in a company's internal control system that may result in a material misstatement in the company's financial reports not being detected in a timely manner. This is the definition used in this study, when referring to material weaknesses, or internal control deficiencies.

2.3. Consequences of Executive Hubris

This study relates to prior literature on hubristic executives. A lot of negativity has been associated with the overconfidence of executives. This is a result of the over optimism exhibited by the executive, as a result of their overconfidence (Hribrar & Yang, 2010). This review mainly focuses on the effects of executive overconfidence and its interaction with outside stakeholders. This section provides a summary of studies that examine executive overconfidence, and their conclusions.

Hribar and Yang (2010) investigate the relationship between overconfidence and earnings management, alongside executive's earnings forecasts. Their results suggest that overconfident executives miss their own forecasts, and manage earnings upwards in an attempt to meet their own benchmarks. Ahmed & Duellman (2013) investigate the relationship between the overconfidence of executives and their use of conservative accounting. They predict that there is a negative relationship between overconfident executives and (un)-conditional conservatism. Their results determine that overconfident executives are more likely to use less conservative accounting and therefore delay loss recognition. Schrand & Zechman (2012) investigate the relationship between overconfidence and the likelihood of a company being presented with an Accounting, Audit, and Enforcement Release. Their findings support a slippery slope scenario, where an initial misstatement leads to a further larger intentional misstatement. From these papers it can be ascertained that overconfidence contributes to executives managing their company's earnings to meet targets, and may induce them to perform more earnings management.

The abovementioned papers approach overconfidence from three aspects: recent organizational successes, recent media praise for the executive, and the executive's self-importance. However, using recent media praise in an empirical analysis may result in biases, as it represents the journalist's opinion of the executive. Therefore, this thesis follows in the footsteps of Hribrar & Yang (2010) and Ahmed & Duellman (2013) by examining the executive's stock option exercising patterns as means of measuring their overconfidence levels.

2.4. Consequences of Materially Weak Internal Controls

The thesis is related to prior literature on company internal control frameworks. With companies issuing internal control disclosure reports, papers have been able to empirically analyse the effects of internal controls on multiple aspects of business. Prior research focuses mainly on the association between internal control quality, and reported earnings (Feng et al. 2009). For instance, Doyle et al. (2007) and Ashbaugh – Skaife et al. (2008) look at how internal controls affect accrual quality; and Chan et al. (2008) look at the association between materially weak internal controls and earnings management. Some literature has diverged from this trend. For example: Feng et al. (2009) look at how the quality of internal controls affects management forecasts, whereas Kim et al. (2009) looks at the effects on analyst

forecasts. What is evident in these studies is that internal control weaknesses are used as an independent variable and aim to proxy the consequences of internal control weaknesses.

These studies show that materially weak internal control systems have reduced information quality, which is presented to the external stakeholders of the firm. Doyle et al. (2007) and Ashbaugh-Skaife et al. (2008) suggest that the presence of deficient internal control lowers the quality of company accruals. This suggests that management biases accruals through earnings management, or are caused by unintentional errors (Doyle et al. 2007). Chan et al. (2008) extends these studies and determines that discretionary accruals are larger when material weaknesses are present. This furthers the notion that earnings are managed when internal controls are ineffective. This thesis contributes to these findings by determining whether executives benefit from having materially weak internal controls.

These studies contribute by determining the consequences of maintaining deficient internal control systems, namely: lower financial reporting quality; more earnings management; and reduced forecast ability on the part of management and analysts. However, they suffer a limitation as they exclude the "decision-maker" from their models. It is shown by Chen et al. (2014) and Lee (2016) that executive overconfidence associated with the existence of material weaknesses in a company's internal control system. Lastly, prior research does not distinguish between the different types of material weaknesses that occur in each company, and the relative damage they may each cause to the company itself. This limitation results in the models not being able to determine how much damage a specific aspect of a materially weak internal control causes a company. This limitation carries over into this study.

2.5. Executive Hubris & Materially Weak Internal Controls

Chen et al. (2014) and Lee (2016) investigate overconfidence and its relationship with the effectiveness a company's internal control system. They both suggest a positive association between executive overconfidence and the likelihood of a company having a materially weakened internal control framework. The two papers diverge from one another when investigating further hypotheses. Chen et al. (2014) investigates whether overconfident executives exacerbate the negative effects of having a weak internal control framework. More specifically, they ascertain that executive overconfidence lowers: investment inefficiency, future return on assets, and financial reporting quality. They exclaim that overconfident executives are less capable in mitigating these effects. Lee (2016) focuses more on how

executive overconfidence affects the investments that help maintain internal controls. He initially determines that overconfident executives underinvest in their control systems. Building on this finding, he determines that firms with overconfident CEOs, that underinvest, have significantly larger accruals compared to their peers.

A comparison is made between overconfident executives with their peers, in this study, by determining which is more effective in resolving material weaknesses in a company's internal control system. It builds upon Lee's (2016) suggestion that overconfident executives opportunistically manage earnings when there is an underinvestment, by ascertaining whether they receive higher compensation as when material weaknesses are present. In summary this thesis contributes by attempting to determine what happens after material weaknesses have been identified. More specifically, it determines whether executives can benefit by maintaining a materially weak internal control system.

Chapter 3: Theoretical Framework & Hypothesis Development

The theoretical framework presented here defines and explains the relationship between the two concepts. It examines how overconfident executives are a possible cause of material weaknesses. Furthermore, it extends current literature by investigating how overconfidence hampers judgement in rectifying the weak internal control system and also attempts to clarify whether executives benefit by maintaining weak controls, thereby providing evidence as to whether hubristic executives are the cause of these weaknesses. With the arguments presented in the framework, the hypotheses are presented.

3.1. Association between Executive Hubris and Internal Control Weaknesses

A characteristic of an overconfident executive is someone who systematically overestimates returns on their company's projects; and overestimates (underestimates) the likelihood of a positive (negative) favourable (unfavourable) event on their company's cash flows (See e.g. Heaton (2002); Malmendier & Tate (2005); Ahmed & Duellman (2013)). This implies that hubristic executives base their decisions on miscalculated outcomes that are overly-optimistic or overly-pessimistic, depending on the situation. This further indicates that the executive, due to hubris, "unknowingly" or "knowingly" makes a sub-optimal decision; and may benefit personally in an agent-principle setting.

Chen et al. (2014) explain how overconfidence manifests itself in multiple ways in an individual. These manifestations affect how individuals' process information presented to them, and inevitably affects the outcome of one's decision. Overconfidence manifests itself in three ways: the above average effect; being under the illusion of having control over certain outcomes; and having narrower forecast estimations (Chen et al., 2014). The above average-effect refers to individuals who believe their abilities supersede that of their peers. These manifestations result in the executive overestimating their abilities, attempting to mitigate risks beyond their control, and making unrealistic forecasts (Chen et al., 2014). A combination of these three manifestations, resulting in the executive being overconfident, leads to poor judgement and decision making (Chen et al., 2014). This may be carried over to internal control related situations. Prior literature provides excellent examples stressing the pitfalls of overconfidence on decision making. For example: Hayward & Hambrick (1997) provide evidence that overconfident executives overpay acquisition premiums and Hribrar & Yang (2010) state that overconfidence leads to increased earnings management. Lastly, Lee (2016)

observes that overconfident executives underinvest in their company's internal control framework. As a result of overconfidence, decision-making is hampered and it is argued that this results in material weaknesses being present in a company's internal control system. This allows for the first hypothesis to be stated:

H1: There is a positive relation between executive overconfidence and the propensity for material weaknesses being present in a company's internal control system.

3.2. Resolving the Material Weaknesses with an Overconfident Executive

Lee (2016) argues that overconfident managers are more likely to discount the importance of internal control efficiencies, because overconfident executives prioritize future performance. They do this "unknowingly" or "knowingly". Focusing on future performance results in fewer resources being allocated towards the company's internal control system, and contributes towards information inefficiencies. From a practical perspective the overconfident executive employs insufficient staff to maintain the internal control system, and further results in less resources being allocated for monitoring purposes. This underinvestment inadvertently weakens the internal control framework leading to information inefficiencies. It is expected that these information inefficiencies not only affect financial reporting quality but carry forward and hamper the executive's ability to rectify the deficiencies. Kim et al. (2009) show that internal control deficiencies result in lower quality internal reports being produced. This suggests information quality within the firm has decreased. Incomplete information results in the decision-maker not having a stable preference structure, or inexactly evaluating possible consequences (Weber, 1987). It has already been explained that overconfident executives bias their decisions; therefore this study expects them to resolve the material weaknesses less efficiently compared to their peers who are not overconfident. Acknowledging the fact that information quality is reduced and affects decision making, in combination with the biased decision making on the part of the overconfident executive the following hypothesis is stated:

H2: Overconfident executives are less effective in resolving materially weak internal controls.

After weaknesses have been found and presented in the company's internal disclosure reports, the executive contributes to rectifying the pitfalls. If a there is a significant difference between the amounts of time taken to correct these material weaknesses, between overconfident executives and their peers, and then it can be presumed that overconfidence hampers the executive's ability to rectify the situation.

3.3. Is there a Personal Benefit to Weakening the Internal Control Framework?

COSO's Integrated Framework (2013) defines a company's internal control system as a process effectuated by a company's governing body and other relevant personnel; with the purpose of providing reasonable assurance concerning the achievement of company objectives related to the following: operations, reporting and compliance. Doyle et al. (2007) distinguishes between two different types of internal control weaknesses, company-level weaknesses and account-specific weaknesses. Company level weaknesses relate to fundamental problems concerning the company's control environment, and accounting specific weaknesses concern transaction level processes or accounting balances. This thesis does not distinguish between the two, however these weaknesses have a direct effect on the company's financial reporting quality (Doyle et al., 2007).

An agency relationship is present when a principle (in this case: the company shareholders), delegate instructions to an agent (in this case: the executive) so that the agent performs services for them, under contract (Jensen & Meckling, 1976). An underlying assumption in this theory is that the principle and the agent are both self-interested individuals and aim to maximize their own utility. The presence of asymmetric information between the principle and agent creates the possibility for the agent to extract rents, at the cost of the principle. This asymmetry provides the executive with the opportunity to maximize his or her gains, rather than that of shareholders. The incentives of the executive can be aligned with that of the shareholders, or the executive can be monitored in order to mitigate the negative implications of such an information asymmetry. Monitoring executives can be implemented internally, as well as externally. For example the company's internal control framework itself and an external auditor can be used as monitoring tools. The fear of getting caught is what prevents this misalignment of objectives between the shareholder and executive. Tetlock & Boettger (1994) suggest that when decisions are reviewed, individuals become risk-averse. Therefore, when executives are monitored they are less likely to benefit themselves at the cost of their shareholders. However, Schrand & Zechman (2011) find that overconfident executives are more likely to be faced with an Accounting, Audit and Enforcement Release (AAER) from the Securities Exchange Commission (SEC). This indicates that executives, who are overconfident in their own ability, may not make decisions in the best interests of their shareholders. Hribrar and Yang (2010) find that overconfident executives are more susceptible to earnings management. This is not to the benefit of company shareholders, as it artificially

improves company performance. Assuming that overconfident executives are self-interested individuals this thesis argues they maintain material weaknesses with the purpose of extracting rents. The following hypothesis is stated:

H3: Overconfident executives receive more benefits than their peers in the presence of recurring material weaknesses.

The final hypothesis ultimately provides an answer to the research question. It builds on the second hypothesis, by attempting to determine whether there is a motive for overconfident executives to maintain weak internal controls and in doing so provides further evidence towards the notion that hubristic executives reduce the quality of a company's internal control system.

Chapter 4: Data Sampling & Variable Construction

This chapter explains the various sources used for acquiring quantitative data, for the forthcoming models used in this study. Furthermore, it clarifies how the data is merged and explains what effect this has on the final sample. Lastly, it also explains how the variables of interest, *Share_Retainer* and *Holder_67,* are acquired or constructed; and what their inherent differences are.

4.1. Data Sources

The data is obtained from three different databases: Audit Analytics, Compustat, and Execucomp. The data collected relates to companies listed in the U.S.A., and from the periods 2003 – 2011. These fiscal year ranges are chosen as result of the fact that the Sarbanes Oxley Act was implemented in the year 2002, therefore no prior mandatory disclosures are available concerning the material weaknesses of a company's internal control system from Audit Analytics. Furthermore, fiscal year dates larger than the year 2011 are not used; because the data obtained from Sen & Tumarkin (2015), concerning the *Share_ Retainer* variable, only incorporates the fiscal years ranging from 1993 to 2011.

Initially 126,367 firm-year observations are extracted from the audit analytics database, for years ranging the years 2000 to 2014. Audit Analytics is used to acquire data on section 404 filings at the Securities Exchange Commission. This provides information about the presence of any internal control deficiencies present in a specific company. An initial 293,703 firm-year observation originating from Compustat is required to find information on company performance metrics. These data points range from the fiscal years of 1992 to 2015.The observations are used as control measures in the main tests. Finally, information on the executive's option holding patterns is extracted from the Execucomp database. An initial data sample of 246,247 firm-year observations is gathered from the Execucomp database for the years ranging 1993 to 2015. Data from Execucomp is used to construct the *Holder_67* variable, and the data also allows for controlling executive characteristics in the model.

As a result of the mismatch between the initial samples and sample years, observations are dropped throughout the merging of the data sets; and missing data points from variables of interest are eliminated. These eliminations occur as a result of the following variables: *Bankruptcy_Score, Inventory,* and *Log_Sales.* This ensures that the multiple regressions are based on the same sample. Companies that belong to the financial industry are eliminated

from the sample; these are companies within the SIC code ranges 6000 – 6999. Finance companies are omitted as a result of the fact that including them may bias the *Inventory* variable. Financial companies tend to not have any inventory, and considering the fact that this would have accounted for 1455 observations this would significantly bias the results, despite winsorizing. With everything being taken into consideration the final merged sample used contains 6,612 firm-year observations for the years ranging 2003 to 2011. Table 1 clearly identifies the steps that are taken to obtain the final data sample.

Table 1: Data Sample Construction

Share Retainer Dataset	
Start	17,339
Elimination of Duplicates & Missing Variables	*(13)*
Observation total prior to Merging	17,326
Merger with Execucomp	*(94)*
Merger with Compustat	*(4)*
Elimination of Duplicates & Missing Variables	*(119)*
Merger with Audit Analytics	*(8,677)*
Observation total after Merging	8432
Execucomp Database	
Start	246,247
Elimination of Duplicates and Missing Variables	*(203,731)*
Observation total prior to Merging	42,516
Merge with Share Retainer Dataset	*(25,284)*
Merger with Compustat	*(4)*
Elimination of Duplicates & Missing Variables	*(119)*
Merger with Audit Analytics	*(8,677)*
Observation total after Merging	8,432
Compustat Database	
Start	293,703
Elimination of Duplicates & Missing Variables	*(27,566)*
Observation total prior to Merging	266,137
Merger with Execucomp & Share Retainer Dataset	*(248,919)*
Elimination of Duplicates & Missing Variables	*(119)*
Merger with Audit Analytics	*(8,677)*
Observation total after Merging	8432
Audit Analytics Database	
Start	126,367
Elimination of Duplicates & Missing Variables	*(46,398)*
Observation total prior to Merging	79,969
Merger with Compustat, Execucomp, & Share (...)	*(71,537)*
Observation total after Merging	8,432

Merged Databases	
Start	8,432
Dropping observations < 2003	*(0)*
Dropping Observations > 2011	*(104)*
Dropping Finance Companies (SIC 6000-6999)	*(1,455)*
Drop if Missing (Bankruptcy_Score)	*(197)*
Drop if Missing (Inventory)	*(61)*
Drop if Missing (Log_Sales)	*(3)*
Final Sample	6,612

4.2. The Share Retainer Variable

Sen & Tumarkin (2015), construct the *Share_Retainer* variable in order to classify whether an executive is overconfident, it is a dummy variable. The *Share_Retainer* variable is the primary variable used in the thesis to determine whether an executive is overconfident or not. Using this variable contributes to current literature as the variable is fairly new and has rarely been used in a relational setting.

A dataset similar to Sen & Tumarkin's (2015) is used in this analysis, however only the outputs that capture the years 2003 to 2011 are used and the rest of their sample is omitted from the regression. This omission is a result of the fact that a mandatory internal control reports did not exist prior to 2003. In constructing the variable, the first step determines the difference between the shares obtained as a result of exercising the options, and the shares sold as a result of obtaining those shares. This difference represents the shares retained by the executive. Sen & Tumarkin (2015) calculate these differences for each exercise date within a fiscal year. If the shares sold are greater than the shares obtained in a year, then the *Share_Retainer* variable is automatically equal to zero for that particular year. Thereafter, a fraction is calculated where the shares retained is the numerator and shares obtained is the denominator. If the result of this fraction is above 1% then the *Share_Retainer* variable receives a value of 1. Sen & Tumarkin (2015) apply this threshold of 1% in order to classify CEO's as overconfident if they only retain a significant amount of the shares. Lastly, in order to capture a more permanent overconfidence effect, and not a temporary one; a further imposition is made on the variable. The executive is only considered overconfident if he or she retains shares for two consecutive years. Further clarification on how this dummy variable is coded, can be found in table 15 of the appendix.

4.3. Constructing the Holder 67 Variable

Similar assumptions and a similar approach are used in accordance with Hall & Murphy (2002) and Malmendier & Tate (2005) to construct the *Holder_67* variable. This variable uses the timing of an executives option exercising habits, and further exploits the under diversification of executive portfolios to identify whether an executive is overconfident (Malmendier & Tate, 2005). The variable is based on the options vesting period, and similarly to *Share_Retainer;* it is a dummy variable. The purpose of using *Holder_67* is to ensure that *Share_Retainer* is a robust overconfidence measure.

The *Holder_67* variable focuses on the vesting period of the executive's stock option. To determine whether an executive is overconfident or not, the same benchmark of 67% in the money is used in accordance with (Malmendier & Tate, 2005). If the amount of stock options that are in the money exceeds 67%, of the executive's total stock options, then the executive is classified as overconfident. Furthermore, in order to distinguish between executives that "accidently" exercise their options late and those that do that do this on "purpose"; a further requirement is imposed on the variable. If the executive exercises their options late for two years consecutively, then they are considered overconfident. This requirement is stricter than that used in Malmendier & Tate (2005) as they only required it to occur a minimum of two times during the sample period, whereas here it is necessary for the material weaknesses to be present for two consecutive years. Further clarification on how this dummy variable is coded, can be found in table 15 of the appendix.

4.4. Comparing Share Retainer against Holder 67

There are many underlying differences and similarities between the *Share_Retainer* variable and its counterpart in this thesis. This section focuses on making a comparison between the *Share_Retainer* variable and its counterpart from two perspectives: the theoretical foundation of each variable and the consequences of how they are constructed. From this comparison, the advantages and disadvantages of using the *Share_Retainer* variable are highlighted.

The rationale behind the *Holder_67* variable is that an executive's option exercising pattern is dependent on three factors: individual wealth, degree of risk aversion, and to what extent their portfolio is under diversified (Hall & Murphy, 2002). The risk aversion of the executive and the under diversification of his or her portfolio dictate that the executive must exercise their options immediately when the options are in the money, and the vesting period has been

fulfilled (Malmendier & Tate, 2005). The fact that the executive, to an extent is compensated with his or her own company's stock options exposes them to idiosyncratic risks. Therefore keeping the stock, after exercising the options, can be considered irrational. If the company's performance significantly diminishes, then their portfolios would suffer considerably more compared to outside investors, due to a lack of diversification. Therefore, the postponement of exercising deep in the money options can be attributed to the overconfidence effect, because it is not considered rational to keep in the money stocks. The executive believes that due to their management prowess they are able improve future company, and therefore they believe that holding these options results in higher returns for their personal portfolio.

The *Share_Retainer* variable classifies an executive as overconfident if they retain shares after exercising an option. Despite the differences in construction Sen & Tumarkin (2015) show that executives who retain shares behave in a similar manner as to those who hold shares in the context of leverage, financing and acquisitions. The benefit of using the *Share_Retainer* variable rather than its option holding counterparts, is that the *Holder_67* variable may omit optimistic executives from the sample. This occurs when company stock prices increase substantially to a point where the executive exercises a large portion their options, but retain some of them for capturing future dividends. Therefore, the *Holder_67* does not take into consideration the shares retained and may misclassify executives as not being overconfident. However, the "transaction-approach" used in constructing the *Share_Retainer* variable ensures that no transactions are omitted from the analysis and it more thoroughly determines whether an executive is overconfident for each fiscal year.

4.5. Control Variables – Company Characteristics

Ashbaugh – Skaife et al. (2007) identified various factors that affect the company's exposure to risks associated with internal control deficiencies. Based on their argumentation, the control variables used in the methodology are determined. These variables are included in order to mitigate the effects of a correlated omitted variable bias. This section explains and identifies the control variables pertaining towards overall company characteristics.

Various aspects of business may affect the presence of material weaknesses in a company's internal control framework. Ashbaugh – Skaife et al. (2007) mention four factors that influence risk exposure to materially weak internal controls: the complexity of the organizations; change in organization; resources allocated to the internal controls and the

accounting and application risk. The complexity of organisations is controlled for using the dummy variable *Foreign_Sales.* This is adequate as it is argued that firms with complex transactions require more demanding internal controls to ensure their completeness. In assessing the change in organizations the following two dummy variables are used: *Merger,* and *Restructure.* It is argued that firms are exposed to materially weak internal controls are the ones that cannot keep up with the firm's own dynamism (Ashbaugh-Skaife et al., 2007). Mergers are one aspect of a dynamic company, and are a good indicator as firms that engage in acquisitions have the difficulty of unifying the two separate internal control systems. *Restructure,* is also another good indicator of firm dynamism, as firms that restructure their organization make personnel redundant; are more likely to face deficient internal controls as a result of issues related to segregation of duties. It is argued that firms with fewer resources are more likely to have deficient internal controls as they are less capable in making significant investments into their internal controls (Ashbaugh-Skaife et al., 2007), therefore *Log_Assets* used as control variable. In using a logarithm of the total assets the value changes to a relative value; that signifies a percent change in the total assets. This proxies for the resources available to firm in investing in their control systems. Lastly, in order to assess the impacts that applying accounting techniques on a company's internal control framework. *Log_Sales* and *Inventory* is used as control as a control variable for this aspect. Converting sales into a logarithm, changes the output to a relative one, rather than an absolute one. With this in mind the value is considered to be a percent change in sales. Inventory is taken as a ratio between the companies stated inventory and total assets. The variables proxy for the possible accounting inaccuracies within a company. Companies that grow too quickly may be a result of revenue-manipulating accounting techniques, and companies that hold too much inventory may be exposed to pilferage and contain obsolete stock (Ashbaugh-Skaife et al., 2007). Therefore, these two variables are adequate in being a proxy for the application of accounting techniques.

Ashbaugh – Skaife et al. (2007) indicated other factors that may influence whether material weaknesses are disclosed or not. Considering that Ahsbaugh – Skaife et al. (2007) used a sample prior to the implementation of SOX 404, their arguments no longer hold for the majority of these variables, because it is now mandatory to disclose deficiencies. However, they are still used because they provide a good indication of the company's accounting environment. A dummy variable, representing whether a company is audited by a *Big 4* company or not is used to assess the audit quality of the company. Companies that restate their financial statements tend to have lower accounting quality, and are more prone to having material weaknesses. Therefore the dummy variable *Restatement* is used.

Chapter 5: Research Design

This chapter identifies and explains the logistic regression models used to determine whether the hypotheses should be accepted or rejected. The independent variables of interest are the overconfidence measures. *Share_Retainer* is considered to be the primary measure, whereas *Holder_67* is used to ascertain whether *Share_Retainer* is a robust measure for overconfidence. Furthermore, it clarifies why the models have been used and why they have been structured accordingly. The three different tables presented after sub-chapter 5.3. clearly show how the different variables are named and constructed in the forthcoming models.

5.1. Testing Hypothesis One

From the initial hypothesis, it is expected that a positive relationship exists between executive overconfidence and the presence of material weaknesses. The model used to test this hypothesis is, to some extent, based on what is presented in Chen et al. (2014) & Lee (2016). The deviation from their models lies primarily in the overconfidence variables. The model is as follows:

$$MW_{t,i} = \beta_0 + \beta_1 Share\_Retainer_{t,i} + \beta_2 Control\_Variables_{t,i} + \varepsilon$$

The dependent variable used is a dummy variable; it presents the existence of material weaknesses in a company's internal control system. If this variable takes the value of one, then it infers that there is at least one material weakness presented in the company's SOX 404 report. This variable is used consistently throughout prior research (See e.g. Ashbaugh-Skaife et al. (2008); Chen et al. (2014); Lee (2016)). However, it does not effectively represent the relative magnitudes of the damages caused between the different internal control deficiencies for each company presented in the sample.

5.2. Testing Hypothesis 2

The second hypothesis evaluates how effectively overconfident executives rectify the internal control weaknesses compared to non-overconfident peers. A model similar to that used in the previous hypothesis is used, however a stricter requirement is placed on the $MW_{t,i}$ variable:

$$Consecutive\_MW_{t,i} = \beta_0 + \beta_1 Share\_Retainer_{t,i} + \beta_2 Control\_Variables_{t,i} + \varepsilon$$

The dummy variable is only coded 1 if in the previous fiscal year and the current fiscal year; the company had a materially deficient internal control system. This stricter requirement

represents ineffective management, on the part of the executive. It is argued that effective executives resolve the material weaknesses and ensure they do not recur within their tenure, or the following fiscal period. Therefore this stricter requirement is a viable option for measuring the effectiveness an executive that is overconfident. For further clarity on how this dummy variable is determined, refer to table 15 of the appendix.

5.3. Testing Hypothesis 3

This hypothesis ascertains whether executives benefit by prolonging the presence of material internal control weaknesses. The model for the second hypothesis provides the foundation for the following model:

$$Total\_Compensation = \beta_0 + \beta_1 Share\_Retainer_{t,i} + \beta_2 Consecutive_{MW\,t,i} + \beta_3\, Consecutive\_MW \times Share\_Retainer_{t,i} + \beta_4 Control\_Variables_{t,i} + \varepsilon$$

A dummy variable representing the increase in total compensation is used to determine whether the executive receives increased benefits as a result of maintaining the recurrence of materially weak internal controls. The dummy variable is equal to the value of 1 when the total compensation of the executive increases compared to the previous year. The variables of interest in this model are the interaction effects between the $Consecutive\_MW_{t,i}$ and $Share\_Retainer_{t,i}$. If a significant positive association is present between the interaction value and the dependent variable, then it infers that overconfident managers are more likely to allow for the recurrence of material weaknesses across the years and are more likely to benefit from the material weaknesses.

The total compensation of an executive primarily comprises of a fixed component (salary), and a variable component (bonuses), and summing these two results in the total compensation. In order to further determine which component of total compensation is most affected, the dependent variable is separated into two different dummy variables: *Salary* and *Bonus*. The former is coded one when the salary of the executive in the given year is greater than that of the previous year, and the latter one is coded one when the executives' bonus is greater than that of the previous year.

Table 2: Variable Definitions – Dependent Variables

Dependent Variables	Definition
MW_t	This variable is a dummy variable which is coded 1 when Audit Analytics item *count_weaknesses* is greater than one. This concerns SOX 404 related internal disclosure reports.
Consecutive_MW	This variable is a dummy variable which is coded 1 if *MW* is coded 1 for two consecutive years in the sample period, for that specific executive. This concerns SOX 404 related internal disclosure reports.
Total_Compensation	This variable is a dummy variable, and is coded 1 the Execucomp item *tot_curr* increases compared to the previous fiscal year.
Salary	This variable is a dummy variable, and is coded 1 if the Execucomp item *salary* increases compared to the previous fiscal year.
Bonus	This variable is a dummy variable, and is coded 1 if the Execucomp item *bonus* increases compared to the previous fiscal year.

Table 3: Variable Definitions – Independent Variables

Independent Variables	Definition
$Share\_Retainer_{t,i}$	This variable is a dummy variable, and is coded 1 if the executive is overconfident. If an executive retains more shares than they obtain, after exercising an option, then they are considered to be overconfident.
$Holder\_67_{t,i}$	This variable is a dummy variable, and is coded 1 if the following formula, (A)/ (A+B) is greater than 0.67. (A) Execucomp item *opt_unex_exer_est_val* (B) Execucomp item *opt_unex_unexer_est_val* If the variable is coded 1, it indicates an overconfident executive.

Table 4: Variables Definitions – Control Variables - Company Characteristics

Control Variables	Definition & Explanation
*Bankruptcy_Score***	This variable is a bankruptcy score and represents the financial health of a company. It is constructed a follows: -4.803 – 3.599*(Net Income/Total Assets) + 5.406*(Total Liabilities/Total Assets)
*Big4***	This variable is a dummy variable, and is coded 1 if Audit Analytics item *auditor_fkey* is less than 5.
*Foreign_Sales***	This variable is a dummy variable, and is coded 1 if Compustat item *pifo* is not equal to 0.
Log_Sales	This variable is defined as the logarithm of Compustat item *revt*.
*Inventory***	This variable is defined as a ratio between inventory and total assets. It is the ratio between Compustat items *invt* and *at*.
Industry	This classifies the firms in the sample into its industry. This is based on Fama-Frenches 12 industry classification scheme.
*Litigation***	This variable is a dummy variable, and is coded 1 if the company is situated in a litigious industry. The companies with the following SIC codes are considered to be litigious: 2833–2836; 3570–3577; 3600–3674; 5200–5961; and 7370.
*Merger***	This variable is a dummy variable, and is coded 1 Compustat item *aqa* is not equal to 0.
*Restatement***	This variable is a dummy variable, and is coded 1 if Audit Analytics item *restatement* is equal to one.
*Restructure***	This variable is a dummy variable, and is coded 1 if Compustat item *rca* is not equal to 0.
Log_Assets	This variable is a logarithm of Compustat item *at.*
ROA	This is the company's return on assets. It is a fraction of *Compustat* items *ni* and *at.*
Year	This is the fiscal year the observation is taken from.

Sources: Malmendier & Tate (2005) *; Ashbaugh – Skaife (2007) **; Lee (2016

Chapter 6: Empirical Analysis and Results

This section explains the outcomes of the models presented in the previous section, and their implications towards the hypothesis used to answer the research question. Prior to describing the results, the variables used are described and explanations are made, on how outliers are avoided.

6.1. Descriptive Statistics

The only treatment imposed on the sample is the winsorizing of continuous independent variables, after the data sets have been merged. They are winsorized to a 99% confidence level. Dummy variables are not winsorized. Winsorizing is done to ensure that no outliers significantly bias the models used in this thesis. The following variables are winsorized: Bankruptcy_Score, Inventory, Log_Assets, Log_Sales and ROA.

The majority of the variables used in the methodology are dummy variables. By taking the product of the mean and the number of observations, the values that are coded one can be determined. The relevant descriptive statistics can be found in table 5. From the 6,612 observations there were 281 occasions where *Material Weaknesses* were present. There were 4,037 occasions where executive retained their shares in the two consecutive years that the weaknesses occurred.

The majority of the firms in the sample have a Big4 auditor; this applies to 6,129 firm-year observations. To support the notion that these firms have high audit quality amongst one another, 709 of the firms in the sample required a restatement. The majority of the firms in the sample are financially healthy. This is indicated by the variable *Bankruptcy_Score.* It is a continuous variable used in Lee (2016) study. It attempts to predict the bankruptcy of a firm within two years. It is interpreted from the perspective of probability, and therefore the negative mean indicates that firms in the sample are less likely to go bankrupt within two years. This supports the notion that they are financially healthy. Furthermore, the majority of firms are considered to be a part of litigious industry. Of the 6,612 observations in the sample, 1,799 firms face a substantially larger risk of being exposed to legal proceedings.

Firms with a complex organisational structure, and also those that are dynamic are indicated by the following three variables: *Foreign_Sales, Merger, and Restructure.* They all support the notion that firms within the sample have a complex and an ever-changing organizational

structure. Of the 6,612 observations, there are 4,114 observations that indicate foreign sales taking place; a minimum of 1048 acquisitions took place; and 2,426 occasions where companies restructured their organization. From this it is evident that the organizational effects of the companies, may affect the regression outputs in the methodology.

Table 5: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
MW	6,612	0.042	0.202	0.000	1.000
Share_Retainer	6,612	0.611	0.488	0.000	1.000
Holder_67	6,612	0.747	0.435	0.000	1.000
Bankruptcy_Score	6,612	-2.547	1.365	-5.719	1.403
Big4	6,612	0.927	0.260	0.000	1.000
Foreign_Sales	6,612	0.622	0.489	0.000	1.000
Inventory	6,612	0.107	0.113	0.000	0.648
Litigation	6,612	0.272	0.445	0.000	1.000
Log_Assets	6,612	7.619	1.560	-0.178	0.092
Log_Sales	6,612	7.522	1.537	-0.065	0.218
Merger	6,612	0.159	0.365	0.000	1.000
Restatement	6,612	0.107	0.309	0.000	1.000
Restructure	6,612	0.367	0.482	0.000	1.000
ROA	6,612	0.056	0.090	-0.371	0.285

Table 6, represents the fiscal year distributions of the firm-year observations within the sample. The disparities between the percent frequency, and percentage of material weaknesses for a specific year indicate the fiscal year distribution may be skewed. This is confirmed by the Shapiro-Wilk test in Table 8, where the p-value is significant at 0.000.

Table 6: Fiscal Year Distributions

Fiscal Year	Frequency	Percent (%)	Material Weaknesses	Percent (%)
2003	1	0.02	0	0.00
2004	552	8.35	55	19.57
2005	864	13.07	80	28.47
2006	887	13.42	43	15.30
2007	904	13.67	40	14.23
2008	879	13.29	26	9.25
2009	853	12.90	18	6.40
2010	847	12.81	8	2.84
2011	825	12.48	11	3.91
Total	6,612	100	281	100.00

Table 7, represents the distribution of firm-year observations across different industries. The industries classifications are based off of Fama & French's (1997) 12 industry classification scheme, where this thesis omits financial companies from the sample. Despite the fact that there are slight differences between the percent frequency of observations per industry category, and the percentage of material weaknesses present per industry category; the variable is still considered not-normally distributed.

Table 7: Industry Distributions

Industry	Frequency	Percent (%)	Material Weaknesses	Percent
Consumer Non-Durables	576	8.71	24	8.54
Consumer Durables	210	3.18	10	3.56
Manufacturing	961	14.53	28	9.96
Oil, Gas & Coal Extraction	392	5.93	11	3.91
Chemicals	256	3.87	5	1.78
Business Equipment	1,389	21.01	76	27.04
Telephone & Television	180	2.72	13	4.63
Utilities	343	5.19	6	2.41
Wholesalers & Retailers	888	13.43	46	16.37
Healthcare	720	10.89	31	11.03
Other	697	10.54	31	11.03
Total	6,612	100.00	281	100.00

Table 8, presents a Shapiro-Wilk Test of the all the main variables that are used in the forthcoming models. The Shapiro-Wilk test determines whether the variables used are normally distributed, or not. From the table it is observed that the majority of the variables are significant, and therefore not normally distributed. This biases the regression. In order correct for this, throughout the forthcoming models, White Robust Standard Errors are used. This helps to correct for the heteroskedastic disturbances in the model (White, 1980).

Table 8: Shapiro-Wilk Test

Variable	Obs	W	V	Z	Prob>z
MW	6,612	0.993	24.366	8.450	0.000
Consecutive_MW	6,612	0.999	2.186	2.070	0.019
Share_Retainer	6,612	1.000	0.200	-4.263	1.000
Holder_67	6,612	1.000	1.438	0.961	0.168
Bankruptcy_Score	6,612	0.995	16.316	7.388	0.000
Big4	6,612	0.997	11.741	6.518	0.000
Foreign_Sales	6,612	1.000	0.252	-3.652	1.000
Inventory	6,612	0.873	442.396	16.121	0.000
Litigation	6,612	0.999	1.793	1.545	0.061
Log_Assets	6,612	0.988	41.981	9.889	0.000
Log_Sales	6,612	0.996	15.287	7.216	0.000
Merger	6,612	0.999	5.045	4.283	0.000
Restatement	6,612	0.998	8.606	5.696	0.000
Restructure	6,612	1.000	0.653	-1.126	0.870
ROA	6,612	0.848	527.420	16.586	0.000
Industry	6,612	0.978	75.677	11.448	0.000
Year	6,612	0.988	42.924	9.948	0.000

6.2. Summary of Empirical Findings - Hypothesis 1

The results presented for hypothesis one indicate a positive relationship between the overconfidence of the executive and the susceptibility the company's internal control system to material deficiencies. Table 9, provides a detailed overview of the regression outputs. It should be noted that there is no significant relationship when the control variables are included.

There is a significant positive relationship between executive overconfidence and the likelihood of there being internal control weaknesses. When looking at *Model-1* the coefficient of 0.622 indicates that an overconfident executive increases the likelihood a material weaknesses. The coefficient is significant at a one percent level with a p-value of 0.000. Despite the significance level of the overconfidence variable, the constant has a larger coefficient of -3.534, in absolute terms. It too has a p-value of 0.000. This indicates that the majority of variation in the model is explained by the constant. This is supported by the pseudo – r square of 0.01. Therefore the propensity of there being a materially weak internal control is explained better in combination with other variables. Using *Holder_67* rather than

Share_Retainer as the overconfidence measure provides a similar result. The coefficient is positively and significantly correlated with the dependent variable, with a coefficient of 0.626, and a p-value of 0.000. Upon introducing the control variables, both overconfidence measures become insignificant. The model using *Share_Retainer* has an insignificant coefficient of 0.057, with a p-value of 0.702. When *Holder_67* is the overconfidence measure, the coefficient is 0.212. However, it is insignificant with a p-value of 0.223.

Throughout the models used to test hypothesis one there is an element of consistency in the overconfidence measures used. In both non-controlled regressions, both measures obtain a significantly positive result; whereas in the controlled regressions they are both insignificant. Furthermore, the explanatory power of all the binary logistic regression models mentioned in table 10, of the appendix, are significant on a 1%-level with a p-value of 0.000. Although there is a slight difference in the Wald Chi-Squared outputs, between the non-controlled models, of approximately 6.060. However the controlled models have similar explanatory powers, where the Chi-Squared result differs by approximately 0.420. This consistency in outcomes further shows that the overconfidence measures behave in the same manner, and therefore it can be said the *Share_Retainer* is robust against *Holder_67* in this particular case.

The majority of control variables used in the regression models, behaves in conformity with what is expected. Referring to the correlation matrix (Table 14, in the appendix), none of the associations of the variables deviate with the associations indicated in the first column of the Pearson correlation matrix. Therefore, it can be presumed that the control variables behave in the statistical manner that they are intended to for this sample.

As a result of the outcomes presented in this sub-chapter it is inconclusive as to whether a relationship exists between overconfidence and the occurrence of internal control deficiencies. Introducing control variables explains away the relationship in the non-controlled regressions, and these point towards other variables that better explain the relationship.

Table 9: Regression Results H1

MW	*Model 1*		*Robustness Check 1*		*Model 2*		*Robustness Check 2*	
	Coef.	*P-Value*	*Coef.*	*P-Value*	*Coef.*	*P-Value*	*Coef.*	*P-Value*
	(Rob. Std. Error)		*(Rob. Std. Error)*		*(Rob. Std. Error)*		*(Rob. Std. Error)*	
Share_Retainer	0.622***	0.000	-	-	0.057	0.702	-	-
	(0.138)				(0.149)			
Holder_67	-	-	0.626***	0.000	-	-	0.212	0.223
			(0.167)				(0.174)	
Bankruptcy_Score	-	-	-	-	0.279***	0.000	0.280***	0.000
					(0.055)		(0.054)	
Big4	-	-	-	-	-0.550***	0.011	-0.549***	0.011
					(0.217)		(0.216)	
Foreign_Sales	-	-	-	-	0.429***	0.003	0.427***	0.003
					(0.144)		(0.143)	
Inventory	-	-	-	-	1.149*	0.061	1.145*	0.062
					(0.614)		(0.613)	
Litigation	-	-	-	-	0.218	0.124	0.221	0.120
					(0.142)		(0.140)	
Merger	-	-	-	-	-0.273	0.244	-0.270	0.245
					(0.233)		(0.233)	
Restatement	-	-	-	-	0.640***	0.000	0.645***	0.000
					(0.163)		(0.163)	
Restructure	-	-	-	-	0.232	0.110	0.236*	0.105
					(0.146)		(0.146)	
Log_Assets	-	-	-	-	-0.022	0.875	-0.018	0.900
					(0.139)		(0.140)	
Log_Sales	-	-	-	-	-0.355***	0.014	-0.361***	0.001
					(0.137)		(0.144)	
ROA	-	-	-	-	-0.617	0.349	-0.589	0.371
					(0.660)		(0.658)	
Industry	-	-	-	-	Included		Included	
Year	-	-	-	-	Included		Included	
Constant	-3.534***	0.000	-3.613***	0.000	1,650***	0.003	1.653***	0.001
	(0.119)		(0.153)		(0.548)		(0.510)	
N	6,612		6,612		6,612		6,612	
Pseudo - R square	0.009		0.007		0.128		0.128	
Wald Chi-Squared	20.150		14.090		288.200		288.620	
P-Value Chi-Squared	0.000		0.000		0.000		0.000	

This table represents the output of a logistic regression model, where the dummy variable *MW* is the dependent variable. The independent variables of interest are either the dummy variables *Share_Retainer* or *Holder_67*. These two independent variables are coded one when the executive is considered to be overconfident. The variables other than the two mentioned independent variables are the control variables used in the regression, with the exception of the constant. Coefficients that are significant are annotated with asterisks if they are statistically significant to a certain degree, as follows: if $p \leq (0.1)^{*}$; if $p \leq (0.05)^{**}$ and if $p \leq (0.01)^{***}$.

6.3. Summary of Empirical Findings - Hypothesis 2

The results confirm the second hypothesis. Table 10 supports the notion that overconfident executives prolong the presence of materially weak internal controls, and that a company that is led by an overconfident executive is more likely to have recurring deficient internal controls over a consecutive number of years.

There is a significant positive relationship between *Share_Retainer* and *Consecutive_MW*. *Model-1,* in table 10, indicates that *Share_Retainer* has a coefficient of 4.157. Therefore, when an executive is considered overconfident, the likelihood of there being a deficient internal control framework for a second consecutive year increases. The coefficient is significant with a p-value of 0.000. However, the constant of the initial regression takes on a similar value of -4.547, in absolute terms, and is also significant with a p-value of 0.000. Using *Holder_67* as the overconfidence measure results in a similar outcome. The coefficient is significantly and positively associated with the dependent variable; it has a coefficient of 3.715 and a p-value of 0.000. Upon introducing the control variables for the regressions concerning both overconfidence measures, positive significant results are obtained for both measures. *Share_Retainer* has a coefficient of 3.921 and *Holder_67* obtained a result of 3.553. Both variables of interest have a p-value of 0.000.

In both the controlled and non-controlled regressions the p-values of the overconfidence measures remain consistent with a value of 0.000. The values of the overconfidence measures thoughout all four models are positively associated with the dependent variable. Therefore, even in this case *Share_Retainer* is robust against *Holder_67.* Throughout the four models, the relevant p-values for each Wald Chi-Square test are equal to 0.000. This implies that the models significantly explain the variation in the model between the dependent and independent variables. In comparing the Wald Chi-Squared outputs between the non-controlled models it is evident that the Chi-Square value is significantly larger in the case of *Share_Retainer* with a difference of 181.540. This infers that when the *Share_Retainer* variable is used, as opposed to the *Holder_67* variable, it explains more of the variation. A consistent outcome is also observed in the case of the controlled models. Therefore it can be said that *Share_Retainer* is better explains the relationship between overconfidence and the presence of recurring material weaknesses. Lastly, the outputs for the overconfidence measures are consistent in terms of association and significance, and therefore *Share_Retainer* can be considered robust against *Holder_67*.

Table 10: Regression Results H2

Consecutive_MW	Model 1		Robustness Check 1		Model 2		Robustness Check 2	
	Coeff.	*P-Value*	*Coeff.*	*P-Value*	*Coeff.*	*P-Value*	*Coeff.*	*P-Value*
	(Rob. Std. Error)		*(Rob. Std. Error)*		*(Rob. Std. Error)*		*(Rob. Std. Error)*	
Share_Retainer	4.157***	0.000	-	-	3.921***	0.000	-	-
	(0.196)				(0.197)			
Holder_67	-	-	3.715***	0.000	-	-	3.553***	0.000
			(0.227)				(0.227)	
Bankruptcy_Score	-	-	-	-	0.163***	0.000	0.189***	0.000
					(0.036)		(0.034)	
Big4	-	-	-	-	-0.172	0.225	-0.284**	0.044
					(0.142)		(0.141)	
Foreign_Sales	-	-	-	-	0.094	0.237	0.037	0.625
					(0.079)		(0.075)	
Inventory	-	-	-	-	0.334	0.383	0.202	0.568
					(0.383)		(0.354)	
Litigation	-	-	-	-	0.193**	0.023	0.211***	0.009
					(0.085)		(0.080)	
Merger	-	-	-	-	0.163	0.190	0.179	0.134
					(0.124)		(0.120)	
Restatement	-	-	-	-	-0.024	0.830	0.004	0.969
					(0.113)		(0.103)	
Restructure	-	-	-	-	-0.042	0.609	-0.019	0.806
					(0.083)		(0.078)	
Log_Assets	-	-	-	-	-0.055	0.984	-0.002	0.982
					(0.071)		(0.067)	
Log_Sales	-	-	-	-	-0.151***	0.000	-0.252***	0.000
					(0.072)		(0.070)	
ROA	-	-	-	-	2.280	0.000	2.277	0.000
					(0.490)		(0.479)	
Industry	-	-	-	-	Included		Included	
Year	-	-	-	-	Included		Included	
Constant	-4.547***	0.000	-4.416***	0.000	-0.378	0.308	0.975***	0.012
	(0.193)		(0.225)		(0.371)		(0.379)	
N	6,612		6,873		6,612		6,612	
Pseudo - R square	0.228		0.128		0.375		0.307	
Wald Chi-Squared	449.360		267.82		1154.160		1002.110	
P-Value Chi-Squared	0.000		0.000		0.000		0.000	

This table represents the output of a logistic regression model, where the dummy variable *Consecutive_MW* is the dependent variable. The independent variables of interest are either the dummy variables *Share_Retainer* or *Holder_67*. These two independent variables are coded one when the executive is considered to be overconfident. The variables other than the two mentioned independent variables are the control variables used in the regression, with the exception of the constant. Coefficients that are significant are annotated with asterisks if they are statistically significant to a certain degree, as follows: if p≤ (0.1)*; if p≤ (0.05) ** and if p≤ (0.01)***.

All significant control variables acted in the way they intended to according to the correlation matrix in table 14. The associations of the significant control variables are in conformity with the first column in table 14. However, some variables have contradicting associations as opposed to the correlation matrix, such as *Merger, Restatement and Restructure.* These variables are insignificant, and therefore do not contribute towards the explanatory power of the model. As a result it can be said that the control variables behave in the way they are supposed to and do not deviate from what is expected.

The outcomes presented in this sub-chapter support the confirmation of hypothesis two. Overconfident executives are less effective in resolving materially weak internal controls, and therefore are likely to maintain weak internal controls for a prolonged period of time, compared to their non-overconfident peers. This is evident as a result of the positively significant relationships between the mentioned overconfidence measures and *Consecutive_MW*.

6.4. The Effect of Restricting the Material Weakness Variable

The purpose of restricting *MW* is to help evaluate the effectiveness of overconfident managers in preventing the recurrence of deficiencies in their companies' internal control framework, within a period of two consecutive years. This restriction creates results that are significantly different from the hypothesis one's regression output.

Upon restricting the variable, all the associations between the dependent variable and overconfidence measures are consistent. This is contrary to what happened in regressions relating to hypothesis one. From hypothesis one it may be ascertained that there is no direct association between an overconfident executive and the presence of deficient internal controls, however there is a significant association between executive overconfidence and recurring deficient internal controls. This insinuates that executives may not be a direct cause of internal control deficiencies, however their management skills are less attuned to resolving the weaknesses when compared to their peers.

Comparing the explanatory powers between the two different models, it is observed that in the case of *Conservative_MW,* the models better explain the likelihood of there being deficient internal controls. Only observing the controlled models, concerning hypothesis 1 and hypothesis 2, the explanatory power of the models are significantly different from one another; despite the fact that the p-values remain 0.000. The controlled models in table 10

explain the variation in the models better than those in table 9, upon restricting the material weaknesses variable. *Model 2,* in table 10, has a significantly larger Chi-Square value than *Model 2* in table 9; with a difference of 925.96. Furthermore, the second robustness check also has significantly larger Chi-Square value, with a difference of 713.49. Therefore, restricting the material weaknesses variable significantly improves the explanatory power in the models.

The results presented above contradict the findings of Chen et al. (2014) and Lee 2016), to some extent. However, the results confirm Chens et al.'s (2014) presumption that executives maintain material weaknesses, or that companies may hire executives that are willing to maintain material weaknesses.

6.5. Summary of Empirical Findings - Hypothesis 3

The variable of interest presented in tables 11 to 13, is the interaction effect between *Share_Retainer* and *Consecutive_MW.* If the coefficient is significant and positively correlated with the dependent variable; then this indicates that when an executive is overconfident and are in the presence of recurring material weaknesses then the total compensation, or fixed salary, or bonus is likely to increase. In finding such a relationship the third hypothesis is confirmed.

Table 11 of the appendix uses *Total_Compensation* as the dependent variable. It is regressed against *Share_Retainer, Consecutive_MW,* and the interaction effect. The interaction variable is positively associated with the dependent variable, however it is not significant with a p-value of 0.117. Furthermore when including the control variables, both the coefficient and p-value do not change by a significant amount. The coefficient increases from 0.615 to 0.648, whereas the p-value decreases to 0.103. The value is not rounded down to 0.10, and is therefore still insignificant. This is likely the result of the fact that the variable and fixed components of total compensation are not separated.

Table 11: Regression Results H3 – Total Compensation

Total_Compensation	*Model 1*			*Model 2*		
	Coef.	*Rob. Std. Error*	*P-Value*	*Coef.*	*Rob. Std. Error.*	*P-Value*
Share_Retainer	0.028	0.057	0.621	0.045	0.058	0.435
Consecutive_MW	-0,338	0.387	0.383	-0.232	0.393	0.555
Share_Retainer Consecutive_MW*	0.615	0.393	0.117	0.648	0.398	0.103
Bankruptcy_Score	-	-	-	0.048	0.025	0.059
Big4	-	-	-	0.017	0.104	0.869
Foreign_Sales	-	-	-	0.038	0.057	0.509
Inventory	-	-	-	0.304	0.269	0.259
Litigation	-	-	-	-0.175***	0.061	0.004
Merger	-	-	-	0.055	0.073	0.451
Restatement	-	-	-	0.092	0.083	0.266
Restructure	-	-	-	-0.0925*	0.057	0.095
Log_Assets	-	-	-	0.107**	0.049	0.031
Log_Sales	-	-	-	-0.077***	0.049	0.004
ROA	-	-	-	1.681	0.352	0.000
Industry	-	-	-		(Included)	
Year	-	-	-		(Included)	
Constant	0.264***	0.040	0.000	0.168**	0.230	0.467
N	6,612			6,612		
Pseudo - R square	0.003			0.012		
Wald Chi-Squared	25.930			96.170		
P-Value Chi-Squared	0.000			0.000		

This table represents the output of a logistic regression model, where the dummy variable *Total_Compensation* is the dependent variable. The main variable of interest is the interaction effect between *Consecutive_MW* and *Share_Retainer*. The interaction effect is coded one if the executive is overconfident, and material weaknesses are present. The variables other than the independent variables are the control variables used in the regression, with the exception of the constant. Coefficients that are significant are annotated with asterisks if they are statistically significant to a certain degree, as follows: if p≤(0.1)*; if p≤ (0.05) ** and if p≤ (0.01) ***.

When the dependent variable is *Salary,* the coefficient for the interaction effect increases and becomes significant. The coefficient for the non – controlled regression is significantly and positively associated with the dummy variable; and has a value of 0.865. The controlled regression has a slightly smaller coefficient of 0.831. The former coefficient has a p-value of 0.029 and the latter has an insignificantly larger one of 0.030. This infers that when material weaknesses are recurring for two consecutive years, in a company's internal control framework; then the overconfident executive is likely to have his or her salary increased. In this particular case, both the controlled and non-controlled model has a Chi-squared p-value of 0.000. Therefore, the variation in the models is significantly explained by the chosen independent variables.

Table 12: Regression Results H3 - Salary

Salary	*Model 1*			*Model 2*		
	Coef.	*Rob. Std. Error.*	*P-Value*	*Coef.*	*Rob. Std. Error.*	*P-Value*
Share_Retainer	0.048	0.0613	0.430	0.021	0.063	0.737
Consecutive_MW	-0.537	0.390	0.168	-0.795**	0.377	0.035
Share_Retainer Consecutive_MW*	0.865**	0.396	0.029	0.831**	0.383	0.030
Bankruptcy_Score	-	-	-	-0.078	0.028	0.006
Big4	-	-	-	0.267**	0.109	0.014
Foreign_Sales	-	-	-	0.007	0.063	0.917
Inventory	-	-	-	0.704**	0.303	0.020
Litigation	-	-	-	-0.210***	0.065	0.001
Merger	-	-	-	0.138**	0.079	0.081
Restatement	-	-	-	0.136	0.093	0.142
Restructure	-	-	-	-0.171***	0.063	0.006
Log_Assets	-	-	-	-0.218	0.056	0.000
Log_Sales	-	-	-	-0.101*	0.054	0.065
ROA	-	-	-	2.826	0.381	0.000
Industry	-	-	-		(Included)	
Year	-	-	-		(Included)	
Constant	0.760***	0.043	0.000	2.292***	0.253	0.000
N	6,612			6,612		
Pseudo R-Square	0.0029			0.029		
Wald Chi-Squared	32.550			219.000		
P-Value Chi-Squared	0.000			0.000		

This table represents the output of a logistic regression model, where the dummy variable *Salary* is the dependent variable. The main variable of interest is the interaction effect between *Consecutive_MW* and the relevant overconfidence variable. The interaction effect is coded one if the executive is overconfident, and material weaknesses are present. The variables other than the independent variables are the control variables used in the regression, with the exception of the constant. Coefficients that are significant are annotated with asterisks if they are statistically significant to a certain degree, as follows: if p≤ (0.1)*; if p≤ (0.05) ** and if p≤ (0.01) ***.

When the dependent variable is *Bonus* the effect is significantly larger. The coefficient increases considerably in both the controlled and non-controlled model. The coefficient of the interaction effect for the controlled model is slightly larger at 4.784, compared to 4.245. In both circumstances a p-value of 0.000 is observed. This also infers that when material weaknesses are recurring for two consecutive years, in a company's internal control framework; then the overconfident executive is likely to have his or her bonus increased. Similarly to the previous model the variation of both the controlled and non-controlled models is significantly explained by the independent variables, where the p-value is 0.000 for the relevant Wald Chi-Squared statistics.

Table 13: Regression Results H3 – Bonus

Bonus	*Model 1*			*Model 2*		
	Coef.	*Rob. Std. Error*	*P-Value*	*Coef.*	*Rob. Std. Error.*	*P-Value*
Share_Retainer	-0.115*	-0.066	0.082	-0.052	0.071	0.577
Consecutive_MW	-0.478	0.411	0.245	0.252	0.451	0.468
Share_Retainer Consecutive_MW*	4.245***	0.499	0.000	4.784***	0.536	0.000
Bankruptcy_Score	-	-	-	0.041	0.036	0.252
Big4	-	-	-	-0.201	0.159	0.205
Foreign_Sales	-	-	-	-0.020	0.081	0.803
Inventory	-	-	-	0.520	0.362	0.151
Litigation	-	-	-	-0.055	0.085	0.517
Merger	-	-	-	-0.183*	0.104	0.078
Restatement	-	-	-	0.258**	0.117	0.027
Restructure	-	-	-	0.083	0.080	0.300
Log_Assets	-	-	-	-0.046	0.070	0.508
Log_Sales	-	-	-	0.084	0.072	0.243
ROA	-	-	-	-0.982	0.509	0.053
Industry	-	-	-		Included	
Year	-	-	-		Included	
Constant	1.171***	0.047	0.000	-1.883***	0.315	0.000
N	6,612			6,612		
Pseudo R-Square	0.106			0.215		
Wald Chi-Squared	179.350			176.130		
P-Value Chi-Squared	0.000			0.000		

This table represents the output of a logistic regression model, where the dummy variable *Bonus* is the dependent variable. The main variable of interest is the interaction effect between *Consecutive_MW* and the relevant overconfidence variable. The interaction effect is coded one if the executive is overconfident, and material weaknesses are present. The variables other than the independent variables are the control variables used in the regression, with the exception of the constant. Coefficients that are significant are annotated with asterisks if they are statistically significant to a certain degree, as follows: if $p \leq (0.1)^{*}$; if $p \leq (0.05)^{**}$ and if $p \leq (0.01)^{***}$.

From this it is determined that company having an overconfident executive that maintains a materially weakened internal control system, is more likely to extract rents from the company. This provides further support the fact that executives are more likely to maintain deficient internal control systems in order to benefit from their bonuses or salaries. This further provides evidence for the reverse causality claim made by Chen et al. (2014) where executives or companies hire executives that maintain deficient internal controls.

Chapter 7: Conclusion, Limitations & Suggestions for further Research

7.1. Summary and Conclusion

The study attempts to ascertain what the relationship is between executive overconfidence and the presence of deficient internal control systems. It builds on the findings presented by Chen et al. (2014) and Lee (2016). However, some differences are present between the findings of this study and their research.

Is there a positive association between executive overconfidence and the probability of material weaknesses being present in a company's internal control system?

The results presented in the tables of the logistic regression models provide enough evidence to reject the first hypothesis presented in the paper. Although, the coefficients presented a positive relationship between the overconfidence measures: *Share_Retainer* and *Holder_67*. The p-values are not significant when controlled for company characteristics. Therefore, there is no statistical relationship between executive overconfidence and the occurrence of material weaknesses when the control variables are introduced in the model. This contradicts the findings of Chen et al. (2014) and Lee (2016). This is possibly attributed to the fact that the executive, despite being overconfident, will do everything possible to prevent material weaknesses from presenting themselves in their company's internal disclosure reports. Overconfident executives may still want to be perceived as talented by their company's shareholders. Furthermore, the majority of the control variables are significant. This provides an indication that the presence of material weaknesses is out of the executives' control, to an extent, and is mostly caused by the complexities associated with the company's daily operations. Therefore the initial hypothesis presented in this paper is rejected.

Are overconfident executives less effective in resolving materially weak internal controls?

The model used to test this hypothesis was slightly altered, as opposed to the model concerning hypothesis one. The variable concerning material weaknesses was changed, such that the dummy variable is coded one if deficient internal controls presented themselves for two consecutive years. This was done as means of assessing the executive's management skills. The results presented in the tables of the logistic regression models provide enough evidence to suggest that overconfidence hampers an executive's ability to rectify deficient internal control systems. There is a positively significant statistical association between the

overconfidence of the executive and the recurrence of deficient internal control systems. The results infer that an overconfident executive is a less effective decision-maker, than his or her peers, and is therefore less capable in correcting the situation. Therefore, the second hypothesis of this study can be accepted.

Do overconfident executive receive more benefits than their peers, in the presence of recurring material weaknesses?

In testing this hypothesis the dependent variable of the model was altered significantly as opposed to the models concerning the previous two hypotheses. The dependent variable of the model became a dummy variable that was coded one if the total compensation, or salary, or bonus of the executive had increased. The independent variables included an interaction effect between the overconfidence measure and the dummy variable associated with the presence of consecutive deficient internal controls. When *Total_Compensation* was the dependent variable, there was no significant association with the interaction effect. This infers that executive overconfidence, in combination with the presence of recurring material weaknesses does not increase the likelihood of an executive receiving a pay increase. However, when either *Salary* or *Bonus* is the dependent variables then a significantly positive association between the interaction effect and the separate dependent variable presents itself. This infers that when executives are overconfident and are in the presence of recurring material weaknesses, then they are likely to receive a salary increase, and bonus increase. Therefore the third hypothesis of the study can be accepted.

Do overconfident executives benefit from maintaining materially weakened internal control systems?

Upon summarizing the outcomes of the three hypotheses above, the research question presented in this study can be answered. From this study, it is evident that there is no relationship between the overconfidence of an executive and the occurrence of deficient internal controls. However, from the second hypothesis it is evident they are less effective in resolving the materially weakened internal controls. The second hypothesis provides the foundation for the third hypothesis, which answers the research question. Whereby, it was shown that executive overconfidence, in combination with recurring material weaknesses of the company's internal control system is more likely to ensure that the executive realizes a salary and bonus increase.

Therefore, the findings suggest that executives maintain materially weak internal controls, or allow them to recur as a means of gaining a larger bonus or salary. Upon discovering material weaknesses, it is the duty of the executive to ensure that it does not happen for a second year in a row. The fact that there is a positive relationship between having deficient internal controls for two years in a row in combination with the overconfidence of an executive, leads to increased compensation for the executive supports the statement made by Chen et al. (2014), that executives may maintain materially weakened internal controls. It shows that the executive has a motive to allow this to happen, by having increased compensation. This is a possible means an executive may extracts rents from his or her company. Ultimately, this study shows that executives maintain weakened internal controls as a means of maximizing their own personal gain.

7.2. Limitations of the Study

There are limitations in performing this study. The models may suffer from two biases, namely correlated omitted variable bias and a simultaneity bias. The control variables used to eliminate the correlated omitted variable bias may not be sufficient. The control variables used captured the various characteristics of a company. Other perspectives were ignored, such as the corporate governance structure and the executives' own personal characteristics. When associating executive overconfidence with the relevant variable it would have been ideal to include control variables relating to all three mentioned characteristics in order to holistically assess the relationships. However, due to data limitations this was not possible. Including variables that were associated with the corporate governance structure of the specific company, combined with the executives personal characteristics would have resulted in a sample size less than 1,000 firm-year observations. This would have been insufficient, considering the time period used for the study. Therefore, it is not possible to consider the other two perspectives without resulting in diminishing the quality of the data.

A simultaneity bias may present itself in the models used, as a result of the fact that executive overconfidence itself may be influenced by the dependent variables. An executive having his or her compensation increased may result in them having increased levels of confidence. This is a result of the fact that increased compensation is seen as a reward for his or her performance, and may promote the above average effect.

7.3. Suggestions for Further Research

Literature concerning the relationship between an executive's overconfidence and the quality of a company's internal controls is not as transparent as it should be. In general a holistic approach is used, whereby a dummy variable such a material weaknesses is measured against an overconfidence measure. It is beneficial to determine the relationships between executive overconfidence and specific aspects of a company's internal control system, such as: the number of internal reviews, segregation of duties, and types of material weaknesses. To an extent Lee (2016) has done this, but more studies that focus on specific aspects, or specific kinds of weaknesses are beneficial to the literature.

Using a dummy variable that represents the presence of deficient internal control, has its benefits. However, as already mentioned, it does not allow for a relative comparison of the severity of material weaknesses, nor does it represent the different kinds of material weaknesses. Future studies could attempt to differentiate between the different kinds of material weaknesses and determine which is more severe than the other. To an extent Chen et al. (2014) has already laid a foundation for this, however not with the intentions of determining which type of material weakness is more severe than the other.

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Appendix

Figure 1: Libby Box – Hypothesis 1

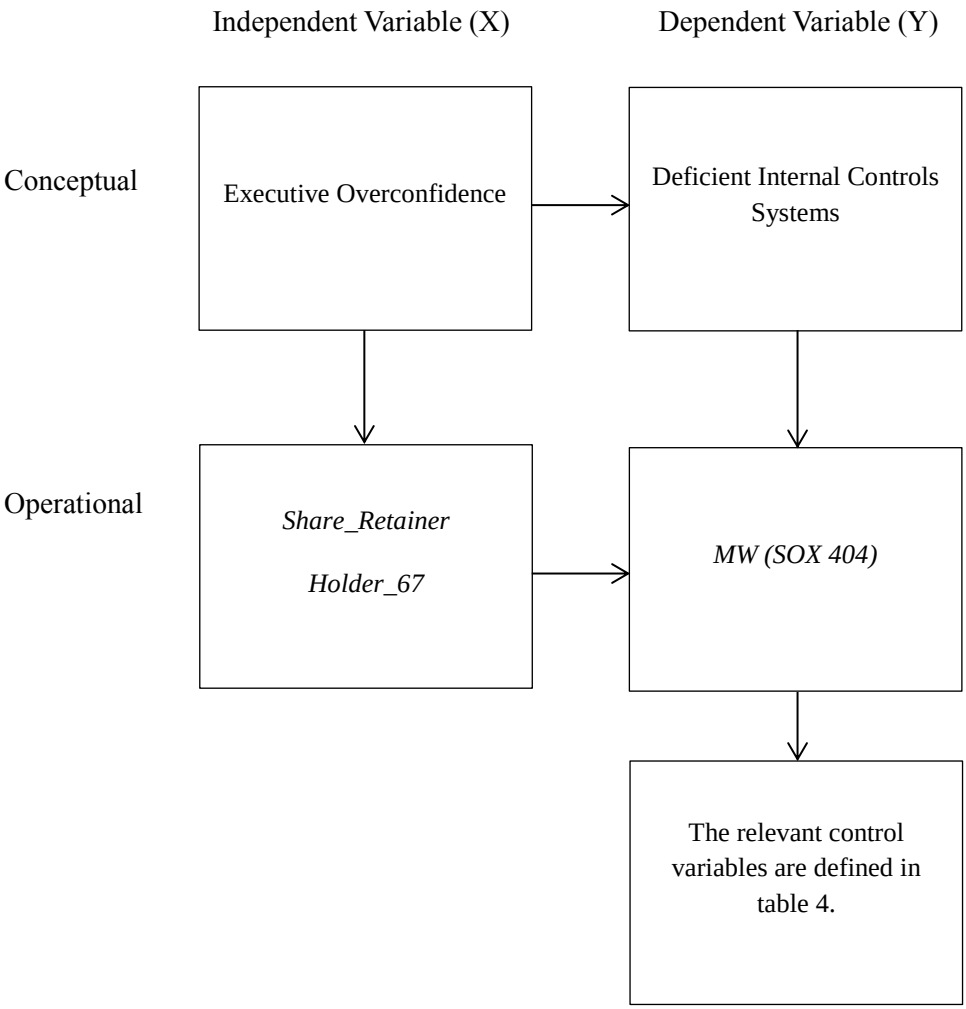

Figure 2: Libby Box – Hypothesis 2

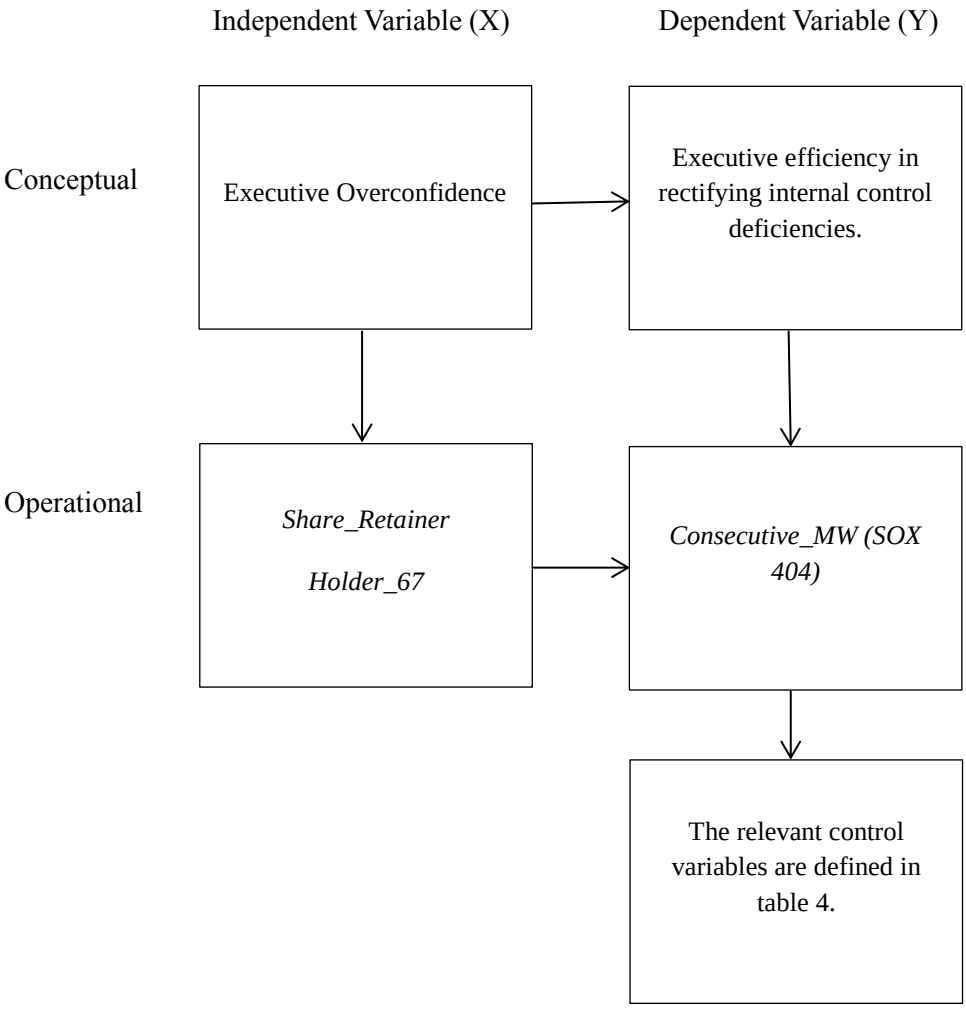

Figure 3: Libby Box – Hypothesis 3

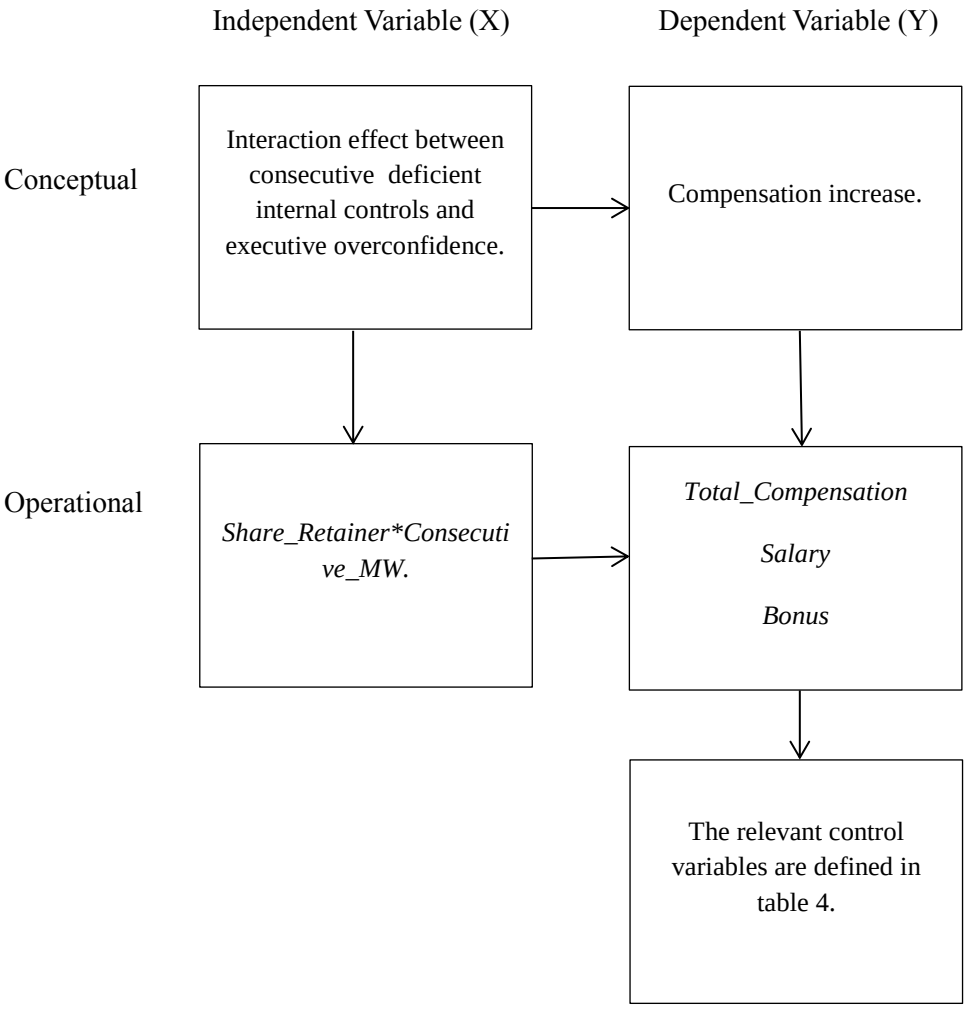

Table 14: Pearson Correlation Matrix

Variables	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*K*	*L*	*M*	*N*
MW (A)	1.000	-	-	-	-	-	-	-	-	-	-	-	-	-
Share_Retainer (B)	0.056***	1.000	-	-	-	-	-	-	-	-	-	-	-	-
Holder_67 (C)	0.047***	0.162***	1.000	-	-	-	-	-	-	-	-	-	-	-
Bankruptcy_Score (D)	0.044***	-0.012	-0.000	1.000	-	-	-	-	-	-	-	-	-	-
Big4 (E)	-0.053***	-0.060***	-0.013	0.160***	1.000	-	-	-	-	-	-	-	-	-
Foreign_Sales (F)	0.013	-0.048***	-0.032***	-0.078***	0.075***	1.000	-	-	-	-	-	-	-	-
Inventory (G)	0.012	0.017	0.005	-0.054***	-0.060***	0.043***	1.000	-	-	-	-	-	-	-
Litigation (H)	0.025**	-0.007	0.002	-0.207***	-0.078***	-0.014	0.150***	1.000	-	-	-	-	-	-
Log_Assets (I)	-0.091***	-0.129***	-0.046***	0.395***	0.310***	0.110***	-0.151***	-0.111***	1.000	-	-	-	-	-
Log_Sales (J)	-0.097***	-0.123***	-0.041***	0.409***	0.308***	0.102***	0.058***	-0.076***	0.919***	1.000	-	-	-	-
Merger (K)	-0.046***	-0.076***	-0.073***	0.033***	0.034***	0.085***	-0.073***	0.006	0.104***	0.063***	1.000	-	-	-
Restatement (L)	0.070***	0.024**	0.007	0.013	0.009***	-0.008	-0.018	-0.029**	-0.019	-0.032***	-0.019	1.000	-	-
Restructure (M)	0.025**	-0.018	-0.018	0.177***	0.079***	0.293***	0.022*	-0.030**	0.125***	0.124***	0.123***	-0.010	1.000	-
ROA (N)	-0.092***	-0.032***	-0.036***	-0.436***	0.039***	0.037***	0.034***	0.010	0.052***	0.112***	-0.042***	-0.023*	-0.182***	1.000

This table provides an overview of the correlations between the variables of interest used in the throughout the thesis. The significance levels are indicated using asterisks as follows: $p \leq (0.1)^{*}$; if $p \leq (0.05)^{**}$ and if $p \leq (0.01)^{***}$.

Table 15: Clarifications Concerning: *Consecutive_MW, Share_Retainer, Holder_67*

Dummy Variable Output	*Consecutive_MW*		*Share_Retainer*		*Holder_67*	
	T=0	T=-1	T=0	T=-1	T=0	T=-1
1	1	1	1	1	1	1
0	1	0	1	0	1	0
0	0	1	0	1	0	1
0	0	0	0	0	0	0

This table clarifies how dummy variable outputs are obtained for each of the "restricted" variables. For example, when time period T=0 contains an overconfident executive (Coded 1), but the previous time period T=-1 does not have an over confident executive (Coded 0) then Share_Retainer is 0. This is symmetrically applied to *Consecutive_MW* and *Holder_67.*