The influence of clawback adoption on investment efficiency of companies.

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Abstract

This thesis examines the influence of voluntary clawback adoption on investment efficiency. Univariate results show a significant correlation between clawbacks and investment efficiency. However, I do not find significant results when controlling for more variables in the multivariate tests. Regarding hypothesis 2, I examine if the impact of clawback adoption on the level of over-investment is more pronounced when the compensation at risk of executives is higher than average. Results show a significant negative impact. I observe lower levels of over-investment when the compensation at risk is above average. Controlling for governance variables in the additional tests, I find that the results of both hypotheses mainly weaken. I posit that other governance mechanisms may have an impact on the adoption of a clawback, which curtails the association with investment efficiency and compensation at risk.

Key words: Clawback adoption, Investment, investment efficiency and compensation at risk.

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1. Introduction

A classical principal-agent complication arises because of information asymmetry between the executives and shareholders of a firm. Executives have incentives to optimise their welfare, whereas shareholders would like to see the firm investing in all projects to maximise profits, implicating a misalignment problem with corresponding agency costs (Jensen, 1986; Kaplan & Atkinson, 1989). Compensation contracts and monitoring are mechanisms to curtail these agency costs and align the goals of both parties (Jensen & Meckling, 1976; Shleifer & Vishny, 1997). One possibility to incentivise true and fair disclosure of financial information is to increase managers' costs of misreporting (DeHaan et al., 2013). Since the beginning of 2005, firms have started to adopt clawback provisions voluntarily (Denis, 2012). A clawback provision is an extra clause in the compensation contracts of executives and allows for the recoupment of compensation from top executives in case of a financial restatement (Chan et al., 2012). This recoupment makes the voluntary adoption of clawback provisions an interesting topic for research because the frequency of firms bringing them into practice and disclosing them is continuously increasing (Prescott & Vann, 2018).

Clawbacks were introduced by The Sarbanes-Oxley act of 2002[1] (SOX) in Section 304[2] and gave the Securities and Exchange Commission (SEC) the authority to carry out the recovery of rewarded compensation to the top level managers of public companies when a restatement of the financial statements was necessary as a consequence of the accidental mistakes, intentional manipulation or both (DeHaan et al., 2013). However, due to the uncertainty of meaning, the vagueness in the SOX Section 304 and limited abilities of the SEC, the enforcement of clawbacks sticks to a minimal level (Fried & Shilon, 2011). Section 2.1 describes the lack of enforcement in more detail. The in 2010 introduced Dodd-Frank Wall Street Reform and Consumer Protection Act (DFA) with Section 954 brought in new rules regarding clawback provisions and proposed that firms are required to implement and carry out clawback provisions themselves. Due to complicated implementation and potential concerns about the unknown effects of clawback provisions, no finished final rules are yet declared.[3]

[1] Sarbanes–Oxley Act of 2002, Pub.L. 107–204, 116 Stat. 745, enacted July 30, 2002
[2] Sarbanes–Oxley Act of 2002 § 304, 15 U.S.C. § 7243 (2002).
[3] https://www.sec.gov/spotlight/dodd-frank.shtml#

Although clawback provisions are not mandatory, many firms started to adopt them voluntarily. The frequency of S&P 500 firms disclosing clawback provisions rose from 1% in 2000 to almost 70% in 2011 and by the end of the year 2016 to 92% (Prescott & Vann, 2018).

Articles about the adoption effect of clawbacks in the top academic journals contain mixed evidence. Chan et al. (2012) find a decline in the incidence of accounting restatements and a higher earnings response coefficient after the adoption of clawbacks. DeHaan et al. (2013) conclude that actual and perceived quality of a firm's financial reporting quality improves. Moreover, Iskandar-Datta and Jia (2013) find a lower bid-ask spread of adopting firms and suggest that clawback provisions serve as a mechanism to enhance information quality. Besides improving financial reporting quality after the adoption, a different stream of research finds a positive relation between financial reporting quality and investment efficiency, suggesting that the adoption of clawback provisions could be beneficial (Biddle & Hilary; Biddle et al., 2009; Chen et al., 2011).

It is interesting to examine the effect of clawbacks on investment efficiency because Biddle et al. (2009) find that firms with under-investment problems are helped with a higher financial reporting quality, which results in alleviated financial constraints. On the other hand, the higher transparency and thus quality helps firms to curb over-investment problems because of increasing investor monitoring capabilities. Chen & Vann (2017) find declining abnormal investment levels after investigating the effect of clawback provisions on the investment behaviour of executives, which implies a change but does not make conclusions about investment efficiency. Further, Lin (2017) find lower over-investment levels within firms that adopt clawbacks, explained by more transparent financial statements resulting in the cutback of information asymmetries and therefore better insights regarding future payoffs and risk of certain investment projects. However, Biddle et al. (2018) find contradicting results regarding over-investment after the adoption of clawback provisions, compatible with compensation incentives of executives.

In addition to the already existing literature of clawback adoption, I will look at another dimension. Academics made no definite conclusions regarding the beneficial or harmful effects of clawback adoptions on both sides of investment efficiency. This thesis examines if the voluntary adoption of clawbacks leads to a positive or a negative effect on under- and over-investment. Secondly, I examine the influence of compensation at risk on investment efficiency. This leads to the following research question:

RQ: *Does the voluntary adoption of Clawbacks influence investment efficiency?*

The uncertainty of the effect of clawback adoption on a broad level of accounting matters, unfinished regulations and therefore no guidance on composition and the rise of the voluntary adoption of clawback provisions captured international interest among academics, accounting firms, governments and others (Prescott & Vann, 2018). This makes clawback provisions a relevant topic to write my master thesis about. Besides relevance, the answer to this research question could be of interest of investors and shareholders. Investment decisions represent the main ingredient and are the foundation for a firm's prospects and profitability (Hope & Thomas, 2008; Chen & Vann, 2017). More efficient investment decisions result in long-term profitability and thus, a higher firm valuation (Iskandar-Datta & Jia, 2013; Biddle et al., 2018).

The results I find in this thesis contribute to the existing literature by adding to the current discussion and ongoing research about the potential effects of (voluntary) clawback provisions and thereby explicitly attention to the yet unexplored effect of the adoption of clawback provisions on the under- and over-investment problems of firms. I extend prior research of Biddle et al. (2018) by examining the association between clawback provisions and under-investment. Next, I give new insights regarding the potential impact of compensation at risk on the level of over-investment. Lastly, I find that governance mechanisms may impact the association with clawback provisions and investment efficiency.

To answer the research question, I execute probit regression models. I examine whether the actual total level of capital investment exceeds a fit with corresponding investment opportunities. I estimate the capital investment level based on two proxies; Tobin's Q and Sales growth. Next, I estimate the result by the subtraction of the actual level minus the estimated level. Following the research method of Biddle et al. (2018), I create binary variables for the six investment policies; Overinvestment, Underinvestment, OverinvestmentCapEx, UnderinvestmentCapEx, OverinvestmentRDEx and Under-investmentRDEx. A firm is observed as over-investing when the amount of total investments is significantly higher than the estimated investment opportunities. Similarly, a firm is observed as under-investment when the amount of total investments in significantly lower than the estimated investment opportunities.

Regarding hypothesis 2, I examine if the impact of clawback adoption on the level of over-investment is more pronounced when the average total incentive compensation of executives is higher than the median. Executives seem to have incentives to change investment decisions to retain personal compensation perks (Biddle et al., 2018). Next, as an additional test, I include governance variables in the

regression models. The adoption of a clawback is possibly interrelated with other governance mechanisms (Denis, 2012; Dicks, 2012).

I use an empirical archival design to test the hypotheses. The regressions include difference-in-difference designs, where I examine the effect of the adoption of a clawback provision on investment efficiency, relative to non-adopters. The random sample of (non)clawback adopters consists of 600 firms. The treatment group contains 382 firms that adopt a clawback, whereas the control group entails 218 firms. A final sample of 265 firms remains after the merging process. 190 firms adopt a clawback, and 75 firms do not adopt a clawback. The sample is distributed over a period from 2007 to 2016.

When performing t-tests on clawbacks and over- and under-investment, I find a significant correlation. However, when including more variables in the multivariate regression models, I do not find a significant interaction between the adoption of a clawback provision and investment efficiency. Regarding hypothesis 2, I find a significantly negative result. Over-investment seems to be less when the compensation at risk is above average. However, additional testing results in the disappearance of significant results. I find that the governance variables will mainly weaken my results found in hypothesis 1 and 2. Reflecting the results, I posit that other governance mechanisms may have an impact on the adoption of a clawback, which curtails the association with investment efficiency and compensation at risk.

I construct the thesis in the following way. First, I describe the constitutional background and literature review in chapter 2. Then, established in the literature review, I formulate the hypotheses in chapter 3. In chapter 4, I discuss the research design and sample selection. Next, chapter 5, presents the results from the regression models. Lastly, chapter 6 will end with a conclusion and discussion of the found results.

2. Background and Literature Review

This chapter contains the institutional background and the review of relevant literature for my study. First, I explain the institutional background and history of events of clawback provisions in section 2.1. Further, in section 2.2, I examine the association between voluntary clawback adoption and financial reporting quality. I do not empirically test the association in this thesis, but it is necessary to develop an understanding for the relation between financial reporting quality and investment efficiency in section 2.3 and the link between the adoption of clawbacks and investment efficiency in section 2.4. In section 2.5, I will review the literature on the second hypothesis regarding compensation at risk.

2.1 Institutional background of Clawbacks

Clawbacks were introduced by The Sarbanes-Oxley act of 2002 (SOX) in Section 304 and gave the Securities and Exchange Commission (SEC) the authority to carry out the recovery of compensation paid to top executives of public companies when a restatement of the financial statements was necessary as a consequence of the accidental mistakes and/or intentional manipulation (DeHaan et al., 2013). Only the chief executive officer and the chief financial officer were held liable for misconducts. The obtained compensation can be recouped within 12 months after the misstatement, together with gained benefits as a result of sold stock in the corresponding period. However, in practice, the obligation to prove that the corresponding chief executive officer or chief financial officer is guilty of malfeasance is onerous. This resulted in targeting only executives that were already found guilty of fraud. Altogether, due to the uncertainty of meaning, the vagueness in the SOX Section 304, limited abilities and scope of the SEC, the enforcement of clawbacks sticks to a minimal level (Fried & Shilon, 2011).

In 2008 and 2009 several financial institutions incorporated clawback provisions by partaking in a new program released by the government of the United States in the middle of the financial crisis. The Troubled Asset Relief Program (TARP) was a program designed to reinforce the financial sector. In exchange for financial back-up from the government, financial institutions needed to implement clawbacks for their executives that persist until liabilities were redeemed[4].

The in 2010 introduced Dodd-Frank Wall Street Reform and Consumer Protection Act (DFA) with Section 954 brought in new rules regarding clawback provisions and widened the scope significantly in

[4] https://www.sec.gov/rules/final/2010/34-61335.pdf

comparison with previous 'clawback' mechanisms. DFA proposed that all exchange-listed firms are now obligated to implement and carry out clawback provisions themselves. The board of directors has the task to take responsibility for the clawback recoupment prescription. To trigger this clawback mechanism, not only misconducts from top executives are necessary, but any material misstatement is enough to clawback excess awarded compensation of any kind. Moreover, all current and prior executives of the firm are subject to the new regulation. Compensation can be recouped within three years after a restatement of the financial statements (Fried & Shilon, 2011; Chen et al., 2015). Due to complicated implementation and potential concerns about the unknown effects of clawback provisions, until this day no finished final rules are yet declared.[5]

Even though clawback provisions are not mandatory, a lot of firms started to adopt them voluntarily. The frequency of S&P 500 firms disclosing clawback provisions rose from 1% in 2000 to almost 70% in 2011 and by the end of the year 2016 to 92% (Prescott & Vann, 2018).

The Kraft Foods Group Inc.[6] implemented a clawback provision in the compensation contracts of executives that is not limited to intentional manipulation and covers accidental errors as well:

"The Board or the Committee may determine that, as a result of a restatement of Kraft's financial statements, an executive officer received more compensation than the executive officer would have received absent the incorrect financial statements. The Board or the Committee, in its discretion, may then take such actions as it deems necessary or appropriate to address the events that gave rise to the restatement and to prevent its recurrence. Such actions may include, to the extent permitted by applicable law":

- requiring the executive officer to repay some or all of any bonus or other incentive compensation paid;
- requiring the executive officer to repay any gains realised on the exercise of stock options or on the open-market sale of vested shares;

[5] https://www.sec.gov/spotlight/dodd-frank.shtml#
[6] Kraft Foods Group Inc , as reported in the firm's SEC DEF14A filing on 31 march 2015 (p43). https://www.sec.gov/Archives/edgar/data/1545158/000119312515096211/d863159ddef14a.htm#tx863159_1

- cancelling some or all of the executive officer's restricted stock or RSU awards and outstanding stock options; adjusting the executive officer's future compensation; or
- terminating or initiating legal action against the executive officer.

2.2 Voluntary Clawback Adoption on Financial Reporting Quality

Given continuously increasing rates of voluntary clawback adoption and unknown effects for adopting firms under current regulation, many academic researchers started to investigate the consequences (Chan et al., 2012; DeHaan et al., 2013; Iskandar-Datta & Jia, 2013; Chan et al., 2015) and determinants (Chen et al., 2015; Cashman et al., 2016; Babenko et al., 2017) of Clawback provisions.

Chan et al. (2012) and DeHaan et al. (2013) find that firms implementing clawback provisions increase financial reporting quality. Chan et al. (2012), one of the first researchers that examine voluntary clawback provisions, focus on 343 non-financial companies in the Russel 3000 index that voluntarily adopt clawback provisions and compare them with a propensity-matched control sample. They find a decline in the incidence of accounting restatements after the adoption of clawback provisions, which implies that when managers are subject to clawbacks, they have lower incentives to engage in earnings manipulation. Moreover, a higher earnings response coefficient is observed, which implicates that investors see earnings as more reliable. DeHaan et al. (2013) suggest that voluntary clawback adoption improves the actual and perceived quality of a firm's financial reporting quality. They define financial reporting quality as: *"the extent to which financial statements represent a diligent and unbiased application of the financial reporting standards* (2013, p.1031)." I use this definition for financial reporting quality because the definition is directly or indirectly used in later papers about clawback provisions (Chen et al., 2015; Chen & Vann, 2017; Lin, 2017; Erkens et al., 2018; Prescott & Vann, 2018).

Adequate clawback provision implicates that there is a higher chance that the board of directors will be able to recoup mistakenly awarded compensation to managers and therefore increase the cost of getting caught. The possibility of the restatement of financial statements followed up by a clawback provision is expected to decrease the incentives of managers to manipulate accruals. A clawback could increase the effort to avoid accidental mistakes and decrease intentional manipulation (DeHaan et al., 2013). Chen, Green & Owers (2015) complement Chan et al. (2012) and DeHaan et al. (2013) with their systematic research on the tradeoffs associated with clawback provisions. Clawback provisions expand

the perspectives of managers and their incentives over a longer timeframe hampering fraud and improve financial reporting quality. A reduced aggressiveness in financial reporting is observed after voluntary adoption, followed by fewer earnings restatements, less abnormal accruals and a higher earnings response coefficient (Chen, Green & Owers, 2015).

On the other hand, Erkens et al. (2018) show in their paper that not every adopted clawback provision is the same, and it depends on how they are composed. There are different economic consequences of clawback adoption across firms that adopt these provisions. For example, how vigorous is the enforcement of the clawback and which employees within the company does the provision cover? The characteristics determine the strength of a clawback provision. Using an index incorporating five different elements of clawback adoption, they split their sample into weak clawbacks and strong clawbacks. A weak clawback design suggests that firms only adopt for window dressing. A durable clawback design, on the other hand, suggests that the firm really has the intention to implement and execute the clawback provision. Results indicate that financial reporting quality only increases for strong clawback provisions and not for weak clawback provisions, implicating that interpretations about the effects of voluntary clawback adoption in previous studies may be upward biased. Beneficial effects of clawback provisions may not be entirely attributable to the voluntary adoption of clawbacks (Erkens et al., 2018).

Further, Chan et al. (2015) do not find merely positive consequences either. Their results indicate that adopters of clawback provisions tend to substitute accruals earnings management with real earnings management, resulting in the same level of earnings management subsequent to clawback adoption. Their findings suggest that the adoption of clawbacks result in less financial misreporting, but do not entirely rule out negative consequences, implicating the elimination of earnings management (Chan et al., 2015). Moreover, Denis (2012) responds to the paper of (Chan et al., 2012) pointing out that all the findings under the voluntary adoption condition will not automatically lead to the same conclusions under a mandatory provision. A question mark is placed whether clawback provisions enhance the financial reporting quality because the conditions change when the provision becomes mandatory. Effects on firms and the economy could be different (Denis, 2012).

Contrary to the findings from Chan et al. (2012) and Chen, Green & Owers (2015), Babenko et al. (2017) do not find a lower incidence of financial restatements after the clawback adoption, implicating no conclusive results about an improvement of the quality of financial reporting. The different reseach designs may explain the difference in findings. Chan et al. (2012) and Chen et al. (2015) use a difference-

in-difference design together with a propensity-score method to match adopting firms with a control firm that is a non-adapter but regarding specific characteristics a counterpart. Babenko et al. (2017), on the other hand, use a multivariate OLS design with a different sample and period time.

2.3 Financial reporting quality and investment efficiency

Under- and over-investments by firms are identified as sub-optimal efficient investments, implicating investment inefficiency. A firm that involves itself in projects with a positive net present value has a higher investment efficiency. Biddle et al. (2009, p.113) define under-investments and over-investments as: *"Under-investment includes passing up investment opportunities that would have a positive net present value in the absence of adverse selection. Over-investment is defined as investing in projects with negative net present value."*

Multiple researchers provide a link between financial reporting quality and investment efficiency in their papers (Biddle & Hilary, 2006; McNichols & Stubben, 2008; Thomas & Hope, 2008), but do not give a clear view of the association with a higher financial reporting quality and lower under- and over-investment (Biddle et al., 2009; Chen et al., 2012).

Higher financial reporting quality mitigates information frictions between the firm and outside financing sources. Firms with under-investment problems, having cash constraints and a high debt-equity ratio, are helped by higher financial reporting quality to make investments because the better visibility of positive net present value projects helps to raise more capital from outside financing sources. On the other hand, firms with over-investment problems do not have cash problems, and their debt-equity ratio is lower. Firms without cash problems have more ability to invest, resulting in possible investments in projects with a negative net present value (Biddle et al., 2009). Empire building is an example where executives could involve the firm in value-destroying activities. It is an attempt to achieve more influence and dominance within a firm by engaging in riskier projects to create extra value (Opler et al., 1999). A better financial reporting quality could curb investments in firms where managers invest in projects with a negative net present value. The better visibility in the financial statements results in more monitoring capabilities by investors (Biddle et al., 2009).

Biddle et al. (2009) find that financial reporting quality is negatively associated with under- and over-investment by firms. More precisely, they look at the association between financial reporting quality and lower investments for firms in environments which are more likely to over-invest. They use the same

reasoning for under-investment, were they examine the association between financial reporting quality and higher investments for firms in environments which are more likely to under-invest. When aggregated investment levels within firms are high, they invest less when the financial reporting quality is high and reason that the higher quality of financial reporting curbs investments for over-investing firms. Firms with a low level of aggregate investment, invest more when financial reporting quality is high. The financial reporting quality makes it easier for firms, that have difficulties to raise capital, to make investments (Biddle et al., 2009).

Moreover, Chen et al. (2011) complements Biddle et al. (2009) and finds more ground for a positive relation between financial reporting quality and investment efficiency using a different setting. In their paper, they take a close look at private firms in an emerging sector which is a significantly different setting in comparison with the public firms in a developed market examined in the research from Biddle et al. (2009). Private firms in an emerging sector have two crucial differences. First, private firms have more difficulties issuing debt than public firms, because private firms are smaller, and their financial statement are not spread on a large scale. Second, emerging countries have more variation in accounting regulations and practices, which result in lower value relevance of accounting information in financial statements. Despite the different setting, they use the same measure for investment efficiency as Biddle et al. (2009) in their examination. Their model predicts investment levels of a firm as a function of revenue growth. Negative divergence from estimated investments is considered under-investment and positive divergence from estimated investments are considered over-investment. Despite prior research suggesting that a setting with these characteristics have lower financial reporting quality, Chen et al. (2011) find a positive relation between financial reporting quality and investment efficiency.

2.4 Voluntary clawback adoption and investments efficiency

Prior research about the effects of clawback adoption on increasing financial reporting quality (Chan et al., 2012; DeHaan et al., 2013; Chen, Green & Owers, 2015) and the positive association between financial reporting quality and higher investment efficiency (Biddle et al., 2009; Chen et al., 2011) implies a link between the adoption of clawback provisions and investment efficiency (Chen & Vann, 2017; Lin, 2017; Biddle et al., 2018).

Chen & Vann (2017) answer Chan et al. (2015)'s call for more extensive research on the unknown effects of the adoption of clawback provisions, with their paper about the effects of corporate governance

on clawbacks and their consequences on, besides risk-taking, the investment behaviour of managers. First, they find that firms have a higher likelihood of adopting clawback provisions when corporate governance mechanisms are more established and a lower likelihood when these mechanisms are less pronounced (Chen & Vann, 2017). These findings complement with Denis (2012), about statements of the potentially interrelated corporate governance mechanisms.

Further, Chen & Vann (2017) find that clawbacks impose certain potential consequences. One of those potential consequences is the change in the investment decisions of executives. Using a propensity-score matched sample in combination with a difference-in-difference design, they find declining abnormal investment levels when firms adopt clawback provisions. However, they do not examine whether these declining abnormal investment levels improve investment efficiency.

Where Chen & Vann (2017) found declining abnormal investment levels, but could not make conclusions about over- or under-investment, Lin (2017) uses besides aggregate investment levels, abnormal investment as a proxy for over-investment in her paper. Lin (2017) provides the link between clawback provisions, higher financial reporting quality, and lower over-investment levels. Building further on conclusive findings in prior research about the link between clawback provisions and higher financial reporting quality, Lin (2017) finds lower over-investment levels within firms that adopt clawbacks. She states that clawbacks lead to more transparent financial statements, indicating a higher financial reporting quality, resulting in a cutback of information asymmetries and thereby to lower levels of over-investment (Lin, 2017).

Further, Biddle et al. (2018) also add their share to the existing literature about the effects that clawbacks provisions release. Contrary to the findings of Lin (2017), they find a higher tendency of over-investment after the adoption of clawbacks, compatible with compensation incentives of executives instead of the monitoring solution. They are one of the first to examine the mix of total investment expenditures after the adoption of clawback provisions, complementing and broaden Chan et al. (2015)'s findings of the cutting in discretionary expenses. Biddle et al. (2018) find that for firms with compensation contracts for their executives that contain more performance-based year salary compatible with short-term based incentives, the capital investments shift away from R&D and flows into capital expenditures. The adoption of clawbacks gives managers a reason to examine different methods to retain performance-based compensation because clawbacks disincentive accrual earnings management. Biddle et al. (2018) reason that R&D expenses and capital expenditure ininvestments have divergent consequences for earnings. A cutting in R&D expenses results in a higher earnings number. Subsequently, the potential cost

of these lower R&D expenses is lower profits in the long run, which are therefore difficult to predict. Investments in R&D will not indeed lead to profits.

On the other hand, capital expenditures have the intention to enlarge current business activities, simultaneously resulting in a higher earnings number. Higher depreciation levels in the long-run are the subsequent costs of these extension activities. The lower R&D expenses and higher capital expenditures together lead to a higher earnings number and higher performance-based benefits for managers transferred for reduced less-certain profits in the long run (Biddle et al. 2018).

Besides performance-based incentives, Biddle et al. (2018) examine the equity component in the compensation contracts of executives. They find that for firms with compensation contracts for their executives that contain more equity-based determinants, the adoption of clawbacks results in a higher level of capital expenditures but do not result in lower R&D expenses. Managers with a higher equity component in their compensation contract benefit more from a higher share value. The value of a share is a reflection of the prediction and confidence of investors in the growth opportunities of the company. These growth opportunities depend on capital investments, which incentivise managers to raise the total capital investment level (Biddle et al., 2018).

2.5 Compensation at risk

According to the agency theory, the adoption of clawback provisions has an increasing impact on executive compensation because an executive requires more compensation to make up for rising personal costs. Compensation contracts have to rise to manage an equal level of exertion and utility. Compensation contracts of executives ordinarily consist out of four elements; equity incentives, non-incentive compensation, non-equity incentive compensation and long-term incentive plans (Baber et al., 1996). Compensation that is subject to clawback provisions consists of the equity incentives and the non-equity incentive compensation. Equity incentives contain stock-based options, whereas non-equity incentive compensation enclose bonus plans. Non-incentive compensation contains the annual base salary of the executive and is not subjective to clawback provisions. Reflecting these different components of compensation contracts, compensation at risk entails incentive compensation exclusively.

Academic research in the top academic journals about the adoption effect of clawbacks on compensation contracts contains mixed evidence. Babenko et al. (2017) find that the adoption of clawback provisions is positively related to the total compensation level, explained explicitly by the higher

ratio of equity incentive compensation. Moreover, DeHaan et al. (2013) and Chen et al. (2015) also find an increase in the total compensation level but present deviate conclusions regarding the effect on the non-incentive compensation. Chen et al. (2015) conclude that the ratio of equity-based compensation increases and base salary declines. DeHaan et al. (2013), on the other hand, find that the total compensation level subsequent of the adoption increases but that an increase in base salary is the underlying cause.

Erkens et al. (2018) hold a different view and conclude that clawback provisions have an unfavorable effect on the total compensation level of executives and that base salary does not change. The reasoning behind these conclusions entails the implementation of weak versus strong clawbacks (Erkens et al., 2018) and the interrelated effects of different governance mechanisms (Denis, 2012; Dicks, 2012). The effect of clawback provisions depends on the implementation of other governance mechanisms. The combination with other mechanisms will prevent relatively more unintentional mistakes, resulting in less risk of restatement for the executives. In this case, less executive compensation is corroborated (Dicks, 2012).

Iskandar-Datta & Jia's (2013) findings contradict all the findings in the previous paragraphs. Their results indicate no conclusive evidence regarding a change in the total compensation level of executives. They follow the reasoning that firms which had problems with the financial statements voluntarily adopt clawback provisions to enhance their flawed reputation. Firms that already have a excellent reputation adopt clawbacks for retaining sustainability in their reputation (Iskandar-Datta & Jia's, 2013).

3. Hypothesis Development

Misaligned incentives between executives and shareholders of firms result in sub-optimal investment decisions, as both parties want to optimize their utility. To align the goals of executives and shareholders, the principal has to incentivize the agent through compensation contracts and monitor their activities. One possibility to incentivize true and fair disclosure of financial information is to increase managers' costs of misreporting (DeHaan et al., 2013). A clawback provision is a clause in the compensation contracts of executives. Any material misstatement is enough to trigger a clawback mechanism and clawback excess awarded compensation of any kind, regardless made by current or prior executives. The likelihood of executives ending up repaying compensation because of restatements that are not entirely their fault, increases. Subsequently implying that including a clawback provision in the compensation contracts of executives increase personal costs. Several studies regarding the adoption of clawback provisions provide insights into the consequences for financial reporting quality. They find that clawbacks generate an additional punishment on earnings restatements resulting in a higher financial reporting quality. A higher financial reporting quality alleviates financial constraints because better visibility of positive net present value projects helps to raise more capital, mitigating under-investment. Firms with over-investment problems are helped with a higher financial reporting quality to hamper investments by curtailing empire building (Opler et al., 1999) and increase monitoring capabilities by investors (Biddle et al., 2009). Reduced information asymmetry results in more transparency regarding the future payoffs of managers and insights in the risk of certain investment projects (Lin, 2017).

However, Chan et al. (2015) find that adopters of clawback provisions tend to substitute accruals earnings management with real earnings management. Further, Biddle et al. (2018)'s findings indicate that clawback provisions induce executives to conduct countervailing actions trying to find other ways than accrual management to retain personal compensation perks. These incentives influence the capital investment mix to enhance earnings, resulting in a higher total level of capital investment. Clawback provisions result in lower investment efficiency because a higher total level of capital investment leads to more over-investment (Biddle et al., 2018).

On the other hand, the effect of clawback provisions could also be used as a signal to investors to show financial reporting integrity (Chan et al., 2012), implicating that there is no causal effect. The signal effect could positively affect the investor's perceived quality of the firm's financial reporting, even if there is not an actual alteration in the level of quality (DeHaan, 2013).

Thus, to the extent that clawback provisions improve financial reporting quality and have a potential effect on the total capital investment level, I posit that the adoption of clawbacks incentivizes managers to reach higher investment levels, resulting in less under-investment and more over-investment.

H1a: *The adoption of clawback provisions is positively associated with over-investment.*

H1b: *The adoption of clawback provisions is negatively associated with under-investment.*

Prendergast (1999) shows that executives will insist on higher levels of compensation to compensate for increased risk, according to the principal-agent relation. Consistent with this view, DeHaan et al. (2013) find an increase in total executive compensation and base pay over the sample period for voluntary clawback adopters. Moreover, Chen et al. (2014) also find an increase in total compensation but show a positive effect regarding equity incentive pay and a negative effect regarding base pay in the contracts. However, Erkens et al. (2018) find a decrease in executive compensation and no change in the level of base pay.

Compensation that is subject to clawback provisions consists of the performance or bonus related components of compensation contracts. The annual base salary, which is non-incentive is not subject to clawback provisions. Thus, managers with a relatively high annual base salary in comparison with incentive pay, have less compensation at risk.

Biddle et al. (2018) find a positive association between the likelihood of overinvestment and pay based on performance and equity incentives. Executives have incentives to change investment decisions in order to retain personal compensation perks. Because a fixed salary is not subject to a clawback provision, a higher level of annual base pay results in less compensation at risk. This implicates that executives have fewer incentives to change investment decisions in order to retain private benefits based on performance pay.

Reflecting Biddle et al. (2018)'s findings, I posit that executives with compensation contracts that contain a relatively higher level of incentive compensation have more incentives to overinvest because their salary is subject to the way investment decisions are carried out. Thus increasing incentive compensation after the adoption of clawbacks compensates the increased exposed risks of executives.

H2: *The association between clawback adoption and over-investment is* ***more pronounced*** *for firms with executives holding compensation contracts with* ***more*** *compensation at risk.*

4. Research Design

This chapter contains the research design to answer the research question: "*Does the voluntary adoption of Clawbacks influence investment efficiency?".* First, in section 4.1, I explain how I estimate the investment opportunities to examine the influence of clawback adoption on investment efficiency. Further, in section 4.2, I explain how I examine the effect of compensation at risk on overinvestment after the adoption of clawbacks. Section 4.3 discloses the additional analyses. In section 4.4, I describe the control variables used in the regressions. Section 4.5 describes the importance of the difference-in-difference design. The chapter ends with section 4.6, describing the data and sample selection procedure.

4.1 Investment efficiency

Executives responding to voluntary clawback adoption might increase their total level of capital investment, compatible with managerial compensation incentives (Biddle et al., 2018). The total level of capital investment could, therefore, exceed a fit with investment opportunities. To examine whether the increase in the total level of capital investment after the adoption of clawbacks is under-investment or over-investment, I estimate the expected capital investment on a firm level. To calculate the expected capital investment level, I use two proxies; Tobin's Q and Sales growth.

In a situation of perfect markets, investments are explained by the marginal Q ratio because they measure the investment incentive (Brainard & Tobin, 1968). The ratio between the value of a company on the market and the cost of capital stock reimbursement is defined as "Q" ratio and is used to capture the capital investment incentives of the company (Tobin, 1969). The proxy Tobin's Q is a widely used measure in economic literature because it is able to capture future investment opportunities (Yermack, 1996).

Prior research regarding investment efficiency (Biddle & Hilary, 2006; Biddle et al., 2009) and the effect of the adoption of clawback provision on investment used Tobin's Q as a variable of significant influence (Babenko et al., 2017; Chen & Vann, 2017; Biddle et al., 2018). In this regard, I use Tobin's Q as a determinant to estimate the capital investment level.

Similarly, as Tobin's Q, I follow prior research regarding the use of sales growth as a second proxy to capture investment opportunities (Biddle et al., 2009; Lin, 2017; Biddle et al., 2018). To estimate the different investment levels, I formulate the following equation:

$$TotalInv_{t+1} = \alpha + \beta_1 Tobin's\ Q + \beta_2 Sales\ Growth + Fixed\ effects + \varepsilon_{it} \quad (1)$$

Totalinv refers to three investment policy variables: total investment level, capital expenditures and R&D expenses. Tobin's Q is measured as the book value of long-term debt and debt in current liabilities plus the market capitalization of the firm divided by total book assets (Erkens et al., 2018). Sales growth is the percentage change in sales from t-1 to t (Lin, 2017; Biddle et al., 2018).

First, I estimate the coefficients β_1, β_2 and the constant by a regression of investment on the investment proxies and fixed effects. Next, I calculate the total level of expected investment for year t+1. To calculate the actual total investment level, I follow Biddle et al. (2018). I take the sum of the variables capital expenditures (*CapEx)*, R&D expenses (*RDEx)*, acquisition and subtract sale of property (sppe). I multiply by a factor 100 and scale the amount by current total assets. To prevent significant loss of observations for over and under-investment, the variables *CapEx, RDEx, sppe and Acq* are replaced by zero when missing.

Reflecting conclusions from Biddle et al. (2018) the variables *CapEx and RDEx* have respectively a positive and a negative effect on the total investment level. Therefore, I include these variables in the model. The second and third investment policy variable are the capital expenditures *(CapEx)* and Research and Development expense *(RDEx),* which are estimated similarly as the expected total investment level. I do not examine the shift from Capex to R&D expense but focus on the effect of the total investment level. For completeness, I include acquisition expense in the calculation to compute the total level of investment. Nevertheless, I do not further analyse acquisition expense, as Biddle et al. (2018) did not find significant results regarding this variable.

After computing the different investment policy variables, I estimate the residual by subtracting the actual level minus the estimated level. This results in a distribution of the residual, which I divide into four segments. I follow the research method of Biddle et al. (2018), creating a binary variable for over-investment that takes the value of 1 when the residual is in the upper 25% segment, zero if between the 25% en 75% segment. The zero represents the benchmark group. In contrary to Biddle et al. (2018)'s examination, I split up investment efficiency in under- and over-investment and test them both. For under-investment, the binary variable takes the value of 1 when the residual is in the lower 25% segment, zero if between the 25% and 75% segment.

Using this approach, a firm is observed as over-investing when the amount of total investments is significantly higher than the estimated investment opportunities. Similarly, a firm is observed as under-investing when the amount of total investments is significantly lower than the estimated investment opportunities. To examine the influence of clawback adoption on investment efficiency, I formulate the following equations:

H1a: $$OverInvestment_{it} = \alpha + \beta_1 CLAW_{it} + \beta_2 POST_{it} + \beta_3 CLAW_{it} * POST_{it} + \beta\gamma Controls_{it} + Fixed\ effects + \varepsilon_{it} \quad (2)$$

H1b: $$UnderInvestment_{it} = \alpha + \beta_1 CLAW_{it} + \beta_2 POST_{it} + \beta_3 CLAW_{it} * POST_{it} + \beta\gamma Controls_{it} + Fixed\ effects + \varepsilon_{it} \quad (3)$$

In equation 2 and 3, the independent variable (X) is the voluntary clawback adoption. CLAW is a binary variable that takes the value of 1 if the firm adopts a clawback provision. For non-adoption firms, the variable takes the value of 0. Further, POST is also a binary variable and takes the value of 1 for firm-years after the year of adoption, otherwise 0. Moreover, the term $\beta\gamma Controls$ represents a vector of control variables, which I further explain in section 4.4. The dependent variable (Y) represents over- and under-investment, which will each have three variables. I examine besides the total investment level, also the capital expenditures (*CapEx)* and the R&D expenditures *(RDEx)* for both equations. This results in 6 different outcome variables: Overinvestment, Underinvestment, OverinvestmentCapEx, UnderinvestmentCapEx, OverinvestmentRDEx and UnderinvestmentRDEx. In equation 1 and 2 is β_3 the coefficient of interest, because it represents the difference-in-difference effect on over- and under-investments. Following hypotheses H1a and H1b, I expect over-investment significant and positive and under-investment significant and negative. In section 4.5, I will explain the difference-in-difference effect in further detail.

4.2 Compensation at risk

Executives have incentives to change investment decisions in order to retain personal compensation perks (Biddle et al., 2018). This implicates that executives holding compensation contracts containing higher

levels of incentive compensation have more incentives to over-invest. Their payout depends on how investments are carried out. To investigate the second hypothesis, I examine whether the effect of clawback adoption on over-investment is more pronounced when executives have more compensation at risk embedded in their compensation contracts. I formulate the following equation:

H2:

$$OverInvestment_{it} = \alpha + \beta_1 CLAW_{it} + \beta_2 POST_{it} + \beta_3 TIC_{it} + \beta_4 CLAW_{it} * POST_{it} + \beta_5 CLAW_{it} * TIC_{it} + \beta_6 CLAW_{it} * POST_{it} * TIC_{it} + \beta\gamma Controls_{it} + Fixed\ effects + \varepsilon_{it} \quad (4)$$

To examine the influence of compensation at risk in hypothesis 2, I extend equation 3 by adding an extra interaction effect. The total incentive compensation variable (*TIC)* reflects a binary variable and takes the value of 1 when the total incentive compensation of executives at a particular firm is above the median of the total sample. *TIC* takes the value of 0 if the total incentive compensation is below the median. To compute *TIC* I add equity incentive compensation and non-equity incentive compensation. Equity incentive compensation is not a particular variable in Compustat, therefore, I calculate the equity incentive compensation by using total compensation and subtract non-incentive compensation and non-equity incentive compensation. To calculate non-equity incentive compensation, I add up bonuses and other non-equity incentive compensation. Because each firm has a different amount of executives per year, I compute total incentive compensation per year per company and scale it by the number of present executives, resulting in the average total incentive compensation. Every executive working for the firm in a certain year is now represented. This reduces the impact of outliers on the model. This method prevents sample selection bias because now I do not only examine the CEO with a relatively higher average compensation.

Moreover, $\beta\gamma Controls$ represents a vector of control variables which I further explain in section 4.4. Next, values are replaced by zero if they were missing and dropped when negative. I specifically pay attention to the interaction effect of coefficient β_6. Following hypothesis H2, I expect that the interaction term is positive and significant.

4.3 Additional analyses

The adoption of a clawback provision is possibly interrelated with other governance mechanisms (Denis, 2012; Dicks, 2012). This means that the effect of adopting a clawback depends on the implementation of other governance variables. A combination of multiple governance mechanisms will hamper relatively more unintentional mistakes (Dicks, 2012). Therefore, as an additional test, I include six extra governance variables in the regressions of hypothesis 1 and 2. I formulate the following equations:

H1a:
$$OverInvestment_{it} = \alpha + \beta_1 CLAW_{it} + \beta_2 POST_{it} + \beta_3 CLAW_{it} * POST_{it} + \beta\gamma Controls_{it} + \beta\Theta Governance_{it} + Fixed\ effects + \varepsilon_{it} \quad (5)$$

H1b:
$$UnderInvestment_{it} = \alpha + \beta_1 CLAW_{it} + \beta_2 POST_{it} + \beta_3 CLAW_{it} * POST_{it} + \beta\gamma Controls_{it} + \beta\Theta Governance_{it} + Fixed\ effects + \varepsilon_{it} \quad (6)$$

H2:
$$OverInvestment_{it} = \alpha + \beta_1 CLAW_{it} + \beta_2 POST_{it} + \beta_3 TIC_{it} + \beta_4 CLAW_{it} * POST_{it} + \beta_5\ CLAW_{it} * TIC_{it} + \beta_6 CLAW_{it} * POST_{it} * TIC_{it} + \beta\gamma Controls_{it} + \beta\Theta Governance_{it} + Fixed\ effects + \varepsilon_{it} \quad (7)$$

Equation (5), (6) and (7) includes the term $\beta\Theta Governance$. This term represents a vector of governance-related control variables, which I further declare in detail in section 4.4. Next, I execute the regressions for hypothesis 1 and 2 and examine if controlling for governance will weaken or strengthen my main results. For hypothesis 1, I expect that the significant and positive effect for over-investment and the significant and negative effect for under-investment will weaken. Similarly, for hypothesis 2, I expect that the positive and significant effect of total incentive compensation weakens. I expect a reducing effect on the significance level because the potentially interrelated association of clawback provisions with other governance mechanisms could diminish the association with investment efficiency and compensation.

4.4 Control Variables

4.4.1 Hypothesis 1

The term $\beta\gamma Controls$ included in equation (2) and (3) represents a vector of control variables used in the regression models. The control variables I use in my examination are based on previous research papers regarding clawback adoption and investment efficiency (Lin, 2017; Biddle et al., 2018; Erkens et al., 2018).

I Include the market-to-book ratio as an extra control variable to control for investment opportunities *(MTB)*[7] and the standard deviation of investments divided by average total assets *(StdInvestment).* Further, I include firm size (*LogAssets),* because the size of a firm might control for firm specific risks (Lin, 2017) and larger firms are more likely to adopt clawback provisions (Babenko et al., 2017). Following Biddle et al. (2018), I control for variables that indicate possible financial constraints like the standard deviation of operating cash flows (*CFOSales),* the cash on hand that is unused (*Slack)*. This ratio can help alleviate the consequences of disappointing sales results (Zona, 2012). Further, the structure of how capital is lined out on average firm level (*CapStructure)* and industry level *(IndCapStructure).* I also include the variable *(Dividend),* which represents a binary variable that takes the value of 1 if the firm paid any form of a dividend, otherwise 0.

Next, I control for the risk of a firm going bankrupt and the costs this is taking with it (Biddle et al., 2018). This is measured by a standard deviation of the five years prior to the current year for operating cash flows (*StdCFO),* and sales *(StdSales).* Further, I use the Zscore composed by Altman (1968), which captures the risk of actual bankruptcy. Moreover, the ratio of property, plant and equipment to total assets (*Tangibility)* and a binary variable that takes the value of one if the company makes a *(Loss)*, otherwise 0. The likelihood of adopting clawbacks is higher when a firm has a positive income (Babenko et al., 2017). Next, i control for the operating cycle *(OperatingCycle)*. This variable contains the period necessary for a firm from the original disbursement of cash to make the goods, to eventually earn money from selling the goods to customers (Chang, 2018).

4.4.2 Hypothesis 2

Regarding hypothesis 2, I use the same control variables as for the analysis of hypothesis 1. However, I extend my examination with the compensation levels of executives, which results in the extention of the

[7] All the exact definitions and computations of the variables are explained in the variable desciption table 1, in the appendix.

model with corresponding control variables. Following Biddle et al. (2018) I include controls for the return on assets *(ROA)* and the standard deviation of the return on assets over a prior period of five years *(StdROA).* Firms that adopt clawback provisions tend to have better profitability (Chan et al., 2012). Next, the average market-to-book ratio over a prior period of five years *(AvgMTB),* the natural logarithm of sales for the next period *(LogSales),* the pay-for-performance ratio (*PerfPayRatio*) and the equity grant ratio *(EquityGrantRatio).* Lastly, I control for the influence of stock returns, because it correlates with the hight of compensation levels for executives. (*Return)* is the return on stock for the upcoming period and *(StdReturn)* is the standard deviation of the return on stocks over a prior period of five years.

4.4.3 Additional tests

First, I include variables regarding CEO characteristics, to account for the possible level of strength and power of a CEO. Executives holding their occupation for an extended time period or when the chairman of the board of directors is also the CEO of the same company, tend to enhance the power of a CEO (Adams et al., 2005). Therefore, I include the binary variable *(CEOChair),* that takes the value of 1 if the CEO is also the chairman of the board, otherwise 0. Moverover, I include *(CEOTenure),* the natural logarithm of the occupation of the CEO at the same company.

Next, firms with a higher level of independent governance mechanisms tend to have higher chances of adopting a voluntary clawback provision (Addy et al., 2014). In this regard, I follow prior literature and include *(AudComm), (TotalDirectors)* and *(Independence).* Audcomm is the amount of executives of the firm that have a seat in the audit committee. TotalDirectors is the amount of executives that have a seat on the board. Next, Independence represents the ratio of the total board of directors that are not active for business activities of the company themselves.

Lastly, I also include (*Institutions),* which represent the shares of the firm in the hands of institutional investors in terms of percentage. This variable tends to have a positive association with the adoption of a clawback provision (Erkens et al., 2018).

4.5 Difference-in-Difference

To test the hypotheses in this thesis, I use an empirical archival design. The difference-in-difference method is suitable to capture the effect on the variable of interest before and after the adoption of clawback provisions and the within-subject variations between the firms that adopted clawbacks and the

control group (Bertrand et al., 2004; Chen & Vann, 2017). This approach reduces possible omitted variable bias because it takes time-varying effects into account.

I do not implement the propensity score matching method. That means that I need to compare firms that do adopt a clawback provision with firms that do *not* adopt a clawback provision in a different way to observe the counterfactual for non-clawback adopters. I created a random draw of numbers between 2007 and 2013. The draw will assign a pseudo adoption year for firms that do not adopt a clawback. Put differently; this method will generate a random adoption year for non-adopters that can be used to carry out the difference-in-difference test and capture the effect of the variable of interest.

Table 2 contains the difference-in-difference test for the six outcome variables: Overinvestment and Underinvestment, OverinvestmentCapEx, UnderinvestmentCapEx, OverinvestmentRDEx and UnderinvestmentRDEx, which represent the numbers (1) to (6). The first number in every cell is the mean, the second number is the amount of observations. The terms of interest in the table are the difference-in-difference numbers. The one's that are significant are made bold. The difference-in-difference effect is negative and significant for underinvestment, meaning that the level of underinvestment is significantly lower after the adoption of a clawback, which is in line with my expectations in H1a. Overinvestment is positive, which is in line with my expecations in H1b. Nevertheless, the effect is insignificant. Further, OverinvestmentCapEx and OverinvestmentRDEx are significant and are respectively higher and lower after adopting a clawback.

Table 2: Difference-in-Difference test for the 6 outcome variables

		POST = 0	POST = 1	Difference-in-difference:
Clawback = 0	(1)	0.511 (282)	0.380 (777)	
	(2)	0.160 (282)	0.287 (777)	
	(3)	0.369 (282)	0.250 (777)	
	(4)	0.199 (282)	0.356 (777)	
	(5)	0.284 (282)	0.282 (777)	
	(6)	0.213 (282)	0.310 (777)	
Clawback = 1	(1)	0.286 (710)	0.159 (1370)	
	(2)	0.203 (710)	0.253 (1370)	
	(3)	0.266 (710)	0.236 (1370)	
	(4)	0.148 (710)	0.247 (1370)	
	(5)	0.328 (710)	0.203 (1370)	
	(6)	0.193 (710)	0.247 (1370)	
Difference Clawback	(1)	*** -0.225	***-0.221	0.004
	(2)	0.043	*-0.034	**-0.077**
	(3)	***-0.103	-0.014	**0.089**
	(4)	*-0.051	***-0.109	-0.058
	(5)	0.044	***-0.079	***-0.123**
	(6)	-0.020	***-0.063	-0.044

*Note: The numbers (1) to (6) represent the outcome variables: (1) Overinvestment, (2) Underinvestment, (3) OverinvestmentCapEx, (4) UnderinvestmentCapEx, (5) OverinvestmentRDEx, (6) UnderinvestmentRDEx. The first number for every cell represents the mean, the second number (between the brackets) represents the amount of observations. The significant tests are two-tailed showing P-vales only in *, ** and *** form. The stars represent significance levels of respectively 0.10, 0.05 and 0.01.*

4.6 Data and Sample Selection

I retrieve the data required to carry out the empirical analyses from various databases of Wharton Research Data Services (WRDS) where the Erasmus University Rotterdam has a subscription. I collect data regarding detailed financial accounting information from Compustat and data regarding the composition of the compensation contracts of executives from ExecuComp. Further, my thesis supervisor, Dr. Michael Erkens provides me data about clawback provisions. Next, to complete my set of control variables regarding hypothesis 2, I require data about stock returns from CRSP. For both my hypotheses, I include governance characteristics for additional analyses gathered from ISS and Thompson Reuters. I include

these to control for potential interrelated governance mechanisms with the adoption of clawback provisions. For all the datasets I retrieve from WRDS, I extend the timeframe with five years prior to the initial sample period of examination to compute various lagged variables.

The initial dataset regarding the adoption of clawback provisions entails a random sample of 4870 firm-year observations in the Russell 3000 Index, distributed over a period from 2007 to 2016. Table 3 lines out the sample selection procedure. The sample consists of 600 firms, where I identify 382 firms that adopt a clawback provision and 218 firms that do not adopt a clawback provision. Next, I edit the Compustat dataset to panel data and remove duplicates. Merging Compustat with the Clawback dataset based on the unique identifiers cusip8 and fyear results in the deletion of 50 firms consisting of 31 clawback adopters and 19 non-clawback adopters.

Further, I delete firms if their SIC code lies between 5999 and 6999. Firms with these SIC codes are financial firms and are removed because adopting a clawback provision was mandatory following the Troubled Asset Relief Program. I already discussed the program in section 2.1, regarding the institutional background of clawback provisions. Including these types of firms would bias my results because the adoption proces is not voluntary. Merging with compustat and deleting financial firms results in the final sample for hypothesis 1. This sample consists of 407 firms, where 249 adopt a clawback and 158 do not adopt a clawback. Table 3 represents a schematic overview of the sample selection procedure in order to come to the final samples for the hypotheses.

For the second hypothesis, I look at the total incentive compensation of executives. Execucomp has multiple observations per year per firm because each firm has more than 1 executive working per year working for them. As already described in section 4.2, I compute the average total incentive compensation and scale it by the total amount of executives working for the firm that year. This method reduces sample selection bias because now I do not examine only CEO's with a relatively higher compensation structure. Now that every executive has the same amount of average total incentive compensation per year, I can remove duplicates. I take into account that merging with ISS later in the sample selection procedure require CEO's because of the governance variables and CEO characteristics. Therefore, I keep only the CEO per year per firm and remove duplicates. Next, I require stock price data from CRSP, which I first had to convert from monthly stock prices to annual stock prices. After dropping duplicates and merging with the main database, a final sample for hypothesis 2 remains. This sample consists of 341 firms where 232 adopt a clawback provision and 109 do not.

For additional testing, I retrieve governance variables from Thompson Reuters and ISS. Merging ISS with the primary dataset, required the use of a different unique identifier than the merging process of the other datasets. For ISS, I make use of the unique identifier ticker. Removing duplicates and merging results in the deletion of 76 firms. The final sample consist of 265 firms in total. 190 of these firms adopt a clawback; 75 of these firms do not adopt a clawback.

Table 3: Sample Selection Procedure

	Exclusive Firms		
	Total Firms	Clawback Adopters	Non-Clawback Adopters
Merging Clawback Database	**600**	**382**	**218**
Less: Merging with Compustat	-50	-31	-19
Less: Deleting Financial Firms	-143	-102	-41
Database for hypothesis 1	**407**	**249**	**158**
Less: Merging with ExecuComp	-65	-16	-49
Less: Merging with CRSP	-1	-1	0
Database for hypothesis 2	**341**	**232**	**109**
Less: Merging with Thompson Reuters	-26	-10	-16
Less: Merging with ISS	-50	-32	-18
Database after all merging	**265**	**190**	**75**

Note:Table 3 represents a schematic view of the sample selection procedure. The tables shows the exact number of firms deleted after the merge with a new dataset, split up in total firms, clawback adopters, non- clawback adopters and firm-years with a clawback. Also the final sample numbers for hypothesis 1, hypothesis 2 and for additional analyses stated.

5. Results

This chapter presents an overview of the regressions lined out in my research design. I conduct an empirical analyse, interpret results and draw conclusions. First, in section 5.1, I analyze the descriptive statistics and the Pearson correlation matrix. In section 5.2, I examine the univariate results and multivariate results of the main regression regarding hypothesis 1. Then, in section 5.3, I analyze the multivariate results when including compensation at risk. The chapter ends with section 5.4, where I evaluate the outcomes of additional testing.

5.1 Descriptive statistics and Pearson correlation matrix

Table 4 describes the variable statistics used in this examination. I line out the six outcome variables regarding Over- and Underinvestment and the independent variables Clawbacks and Post first. Then the variables I use to estimate the investments: Tobin'sQ and Growth, the binary variable TIC for the second hypothesis and lastly the control variables for both regressions and additional testing. I winsorized all the continuous variables at a 1 per cent level on both the top and the bottom.

According to table 4 panel A, the variable Clawback, which indicates the firm-year observations with implemented clawback provisions, represents 66,3% of the total observations. I split up non-clawback adopters and clawback adopters in panel B and C. Table 4 panel B represent the descriptive statistics for non-clawback adopters. Panel C represent the descriptive statistics for clawback adopters. Panel B en C have the objective to expose differences between clawback adopters and non-adopters. Also, the distribution of the sample becomes more apparent. The sample contains 2080 firm-year observations with a clawback provisions and 1059 observations without.

The variable Growth in panel A, which entails the lagged sales growth in percentage, has an average growth per company of 11,9% with a high standard deviation of 36,7%. But according to table 4 panel B and C, non-clawback adopters have 5.2 percentage points of annual sales growth more than clawback adopters. Next, clawback adopters have a higher level total of asset than non-clawback adopters. According to table 4 panel B, non-clawback adopters have a logarithm of assets (LogAssets) of 6,4 in comparison to a higher logarithm of assets of 7,7 for clawback adopters. Babenko et al. (2017) explains this finding and argues in his paper that larger firms are more likely to adopt clawback provisions.

Moreover, non-clawback adopters record a loss more often. From the non-clawback adopters does 32,7% record a year of loss in comparison to 20,6% for clawback adopters. According to Babenko et

al. (2017), this could be due to the higher likelihood of adopting a clawback when a firm has a positive income.

Regarding hypothesis 2, the variable TIC stays approximately the same for both non-adopters and adopters, where I would expect differences in the means. Moreover, the variable ROA is different for clawback adopters and non-clawback adopters. Where clawback adopters have a positive ROA of 3,4, does non-clawback adopters record a negative mean of ROA of 1,7%.

Lastly, both groups differ in the variable CEOChair, which represents a binary variable that takes the value of 1 when the CEO is also the chairman of the board of directors. Clawback adopters report in 46,6% of their firm-year observations that the CEO is also the chairman, against 35,7% for non-clawback adopters.

Table 4: Descriptive statistics

Panel A: Total descriptive statistics

	N	Mean	St.Dev	min	Median	max
Overinvestment	3139	0.274	0.446	0	0	1
Underinvestment	3139	0.242	0.428	0	0	1
OverinvestCapEx	3139	0.258	0.438	0	0	1
UnderinvestCapEx	3139	0.248	0.432	0	0	1
OverinvestRDEx	3139	0.258	0.438	0	0	1
UnderinvestRDEx	3139	0.248	0.432	0	0	1
Clawback	3139	0.663	0.473	0	1	1
Post	3139	0.684	0.465	0	1	1
Growth	3116	0.119	0.367	-0.526	0.060	2.502
TobinQ	3124	1.825	1.639	0.401	1.270	10.164
TIC	3139	0.639	0.480	0	1	1
LogAssets	3136	7.304	1.662	3.809	7.143	11.674
Tangibility	3136	0.268	0.244	0.006	0.178	0.867
Slack	3136	0.192	0.208	0.001	0.115	0.933
CFOsale	3121	-0.014	1	-8.455	0.104	0.707
Zscore	3056	4.272	4.614	-5.244	3.372	27.984
Dividend	3139	0.480	0.5	0	0	1
Loss	3139	0.247	0.431	0	0	1
MTB	3122	3.662	6.295	-13.638	2.208	44.977
CapStructure	3124	0.191	0.202	0	0.127	0.794
IndCapStructure	3139	0.177	0.118	0.031	0.141	0.558
Operatingcycle	3080	4.561	0.811	1.984	4.655	6.680
StdInvestment	3055	20.843	44.049	0.018	2.510	174.968
StdCFO	3123	0.060	0.064	0.006	0.040	0.403
Stdsales	3123	0.215	0.199	0.006	0.154	1.035

PerfPayRatio	2263	71.822	20.649	0	78.592	96.533
EquityGrantratio	2263	53.626	28.518	0	55.964	184.016
ROA	3132	0.017	0.176	-0.937	0.046	0.376
StdROA	3077	0.096	0.191	0.003	0.042	1.424
AvgMTB	3078	3.845	7.107	-12.906	2.355	52.817
LogSales	2782	7.126	1.809	1.558	7.141	11.549
StdReturn	2223	0.352	0.255	0	0.292	1.439
Return	2249	0.144	0.421	-1.086	0.150	1.614
Independence	1720	0.797	0.105	0	0.818	0.941
AudComm	1720	3.797	1.001	1	4	9
TotalDirectors	1720	9.318	2.177	3	9	23
Institutions	2025	0.980	3.258	0.022	0.859	5.145
CEOTenure	3139	1.097	0.721	0	1.099	2.303
CEOChair	1720	0.443	0.497	0	0	1

Panel B: non-clawback adopters

	N	mean	sd	min	Median	max
Overinvestment	1059	0.369	0.483	0	0	1
Underinvestment	1059	0.260	0.439	0	0	1
OverinvestCapEx	1059	0.277	0.448	0	0	1
UnderinvestCapEx	1059	0.314	0.464	0	0	1
OverinvestRDEx	1059	0.282	0.450	0	0	1
UnderinvestRDEx	1059	0.281	0.450	0	0	1
Clawback	1059	0	0	0	0	0
Post	1059	0.734	0.442	0	1	1
Growth	1041	0.153	0.461	-0.526	0.072	2.502
TobinQ	1051	2.067	1.863	0.401	1.360	10.164
TIC	1059	0.638	0.481	0	1	1
LogAssets	1059	6.436	1.338	3.809	6.382	11.674
Tangibility	1059	0.280	0.264	0.006	0.178	0.867
Slack	1059	0.244	0.259	0.001	0.138	0.933
CFOsale	1045	-0.219	1.583	-8.455	0.109	0.707
Zscore	1013	4.833	5.907	-5.244	3.210	27.984
Dividend	1059	0.407	0.492	0	0	1
Loss	1059	0.327	0.469	0	0	1
MTB	1049	3.457	5.460	-13.638	2.297	44.977
CapStructure	1051	0.185	0.215	0	0.096	0.794
IndCapStructure	1059	0.171	0.123	0.031	0.135	0.558
Operatingcycle	1024	4.516	0.914	1.984	4.655	6.680
StdInvestment	1012	36.524	57.029	0.041	6.891	174.968
StdCFO	1050	0.076	0.081	0.006	0.048	0.403
Stdsales	1050	0.216	0.210	0.006	0.147	1.035
PerfPayRatio	541	61.063	25.398	0	68.755	94.752
EquityGrantratio	541	45.215	33.313	0	46.066	184.016
ROA	1057	-0.017	0.222	-0.937	0.034	0.376
StdROA	1026	0.140	0.261	0.003	0.057	1.424
AvgMTB	1027	3.832	6.933	-12.906	2.474	52.817

LogSales	929	6.068	1.637	1.558	6.183	11.549
StdReturn	538	0.376	0.259	0	0.321	1.439
Return	541	0.128	0.446	-1.086	0.135	1.614
Independence	359	0.787	0.114	0	0.818	0.917
AudComm	359	3.577	0.887	2	3	6
TotalDirectors	359	8.557	2.165	3	9	23
Institutions	478	0.908	3.858	0.022	0.867	5.145
CEOTenure	1059	1.101	0.712	0	1.099	2.303
CEOChair	359	0.357	0.480	0	0	1

Panel C: Clawback adopters

	N	mean	sd	min	Median	max
Overinvestment	2080	0.225	0.418	0	0	1
Underinvestment	2080	0.233	0.423	0	0	1
OverinvestCapEx	2080	0.249	0.432	0	0	1
UnderinvestCapEx	2080	0.214	0.410	0	0	1
OverinvestRDEx	2080	0.246	0.431	0	0	1
UnderinvestRDEx	2080	0.230	0.421	0	0	1
Clawback	2080	1	0	1	1	1
Post	2080	0.659	0.474	0	1	1
Growth	2075	0.101	0.307	-0.526	0.054	2.502
TobinQ	2073	1.702	1.498	0.401	1.234	10.164
TIC	2080	0.640	0.480	0	1	1
LogAssets	2077	7.746	1.636	3.809	7.743	11.674
Tangibility	2077	0.262	0.233	0.006	0.178	0.867
Slack	2077	0.166	0.170	0.001	0.108	0.933
CFOsale	2076	0.090	0.460	-8.455	0.101	0.707
Zscore	2043	3.993	3.785	-5.244	3.408	27.984
Dividend	2080	0.518	0.5	0	1	1
Loss	2080	0.206	0.404	0	0	1
MTB	2073	3.766	6.677	-13.638	2.183	44.977
CapStructure	2073	0.195	0.194	0	0.138	0.794
IndCapStructure	2080	0.180	0.116	0.031	0.144	0.558
Operatingcycle	2056	4.584	0.753	1.984	4.655	6.680
StdInvestment	2043	13.076	33.309	0.018	1.511	174.968
StdCFO	2073	0.051	0.051	0.006	0.037	0.403
Stdsales	2073	0.215	0.193	0.006	0.158	1.035
PerfPayRatio	1722	75.202	17.613	0	80.312	96.533
EquityGrantratio	1722	56.269	26.296	0	57.884	184.016
ROA	2075	0.034	0.143	-0.937	0.051	0.376
StdROA	2051	0.074	0.139	0.003	0.036	1.424
AvgMTB	2051	3.851	7.194	-12.906	2.294	52.817
LogSales	1853	7.656	1.652	1.558	7.714	11.549
StdReturn	1685	0.344	0.253	0	0.281	1.439
Return	1708	0.149	0.413	-1.086	0.155	1.614
Independence	1361	0.800	0.102	0.429	0.818	0.941

AudComm	1361	3.855	1.021	1	4	9
TotalDirectors	1361	9.519	2.136	4	9	20
Institutions	1547	0.932	3.030	0.076	0.856	4.910
CEOTenure	2080	1.095	0.725	0	1.099	2.303
CEOChair	1361	0.466	0.499	0	0	1

Note: Table 4 describes the variable statistics used in the regressions. Panel A represents all the descriptive statistics together. In panel B and panel C are non-adopters and adopters split up.

Table 5 contains the Pearson correlation matrix conducted on all the variables I use in the regressions. This correlation matrix should correspond accurately with the univariate analyses in section 5.2. Firstly, the variable Clawback correlates significantly negative with the six outcome variables: Overinvestment, Underinvestment, OverinvestmentCapEx, UnderinvestmentCapEx, Overinvestment-RDEx and UnderinvestmentRDEx. Thus, a firm implement a clawback provision it has less over- and under-investment. This association is in line with my expectations because I expect a correlation between clawbacks and over- and under-investment. More specifically, the association is in line with my first hypothesis H1b, where I expect that a clawback leads to less under-investment. On the other hand, the association is not in line with hypothesis H1a, where I expect that a clawback leads to more over-investment. Next, also the variable Post significantly correlates with the outcome variables, meaning that the adoption of a clawback provision does affect the investment efficiency.

The control variables I use in regressions for hypothesis 1 and 2 are generally correlated with the outcome variables. If the variables do not correlate significantly with the outcome variables, they still have a significant correlation with other variables in the regression. Thus, control variables that do not directly correlate with the outcome variables, are still meaningful and affect the variables of interest. According to table 5, none of the variables I use in the regressions correlate perfectly with each other. In other words, there is no present multicollinearity between the variables.

Table 5: Pearson Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) Overinvestment	1.000													
(2) Underinvestment	-0.347*	1.000												
(3) OverinvestmentCapex	0.289*	-0.186*	1.000											
(4) UnderinvestmentCapex	-0.124*	0.207*	-0.339*	1.000										
(5) OverinvestmentRDEx	-0.098*	0.186*	-0.225*	0.049*	1.000									
(6) UnderinvestmentRDEx	-0.215*	0.204*	0.063*	0.137*	-0.338*	1.000								
(7) Clawback	-0.225*	-0.019*	-0.038*	-0.111*	-0.040*	-0.061*	1.000							
(8) Post	-0.166*	0.081*	-0.058*	0.134*	-0.089*	0.077*	-0.076*	1.000						
(9) Growth	-0.022	0.058*	-0.021	0.068*	0.041*	-0.021	-0.049*	0.011	1.000					
(10) TobinQ	-0.220*	0.529*	-0.121*	0.235*	0.249*	0.144*	-0.092*	-0.015	0.073*	1.000				
(11) LogAssets	-0.025	-0.176*	0.129*	-0.116*	-0.200*	-0.106*	0.373*	0.201*	-0.052*	-0.294*	1.000			
(12) Tangibility	0.356*	-0.231*	0.645*	-0.217*	-0.368*	0.083*	-0.035	0.014	-0.040*	-0.206*	0.185*	1.000		
(13) Slack	-0.189*	0.374*	-0.249*	0.331*	0.485*	-0.055*	-0.178*	-0.054*	0.138*	0.482*	-0.449*	-0.402*	1.000	
(14) CFOsales	0.006	-0.110*	0.095*	-0.202*	-0.178*	0.050*	0.145*	-0.001	-0.149*	-0.362*	0.253*	0.177*	-0.431*	1.000
(15) Zscore	-0.243*	0.463*	-0.134*	0.157*	0.105*	0.157*	-0.086*	0.007	0.115*	0.498*	-0.243*	-0.197*	0.341*	-0.118*
(16) Dividend	0.014	-0.124*	0.104*	-0.089*	-0.321*	0.074*	0.105*	0.167*	-0.048*	-0.165*	0.381*	0.217*	-0.292*	0.140*
(17) Loss	0.167*	-0.014	-0.062*	0.121*	0.216*	-0.146*	-0.133*	-0.066*	0.033	0.139*	-0.243*	-0.035*	0.287*	-0.284*
(18) MTB	-0.174*	0.317*	-0.077*	0.130*	0.134*	0.080*	0.023	0.034	0.032	0.422*	-0.073*	-0.117*	0.236*	-0.143*
(19) Capstructure	0.349*	-0.339*	0.239*	-0.111*	-0.331*	-0.164*	0.022	0.048*	-0.042*	-0.321*	0.352*	0.392*	-0.452*	0.123*
(20) IndCapStructure	0.302*	-0.274*	0.308*	-0.124*	-0.396*	-0.043*	0.038*	0.044*	-0.045*	-0.287*	0.279*	0.457*	-0.406*	0.142*
(21) Operatingcycle	-0.195*	0.118*	-0.383*	0.132*	0.232*	-0.128*	0.039*	0.023	0.017	0.117*	0.025	-0.402*	0.099*	-0.128*
(22) StdInvestment	0.180*	-0.001	0.171*	0.019	0.045*	0.061*	-0.183*	-0.039*	0.032	0.237*	-0.222*	0.159*	0.085*	-0.140*
(23) StdCFO	-0.042*	0.231*	-0.033	0.241*	0.268*	0.012	-0.187*	-0.068*	0.145*	0.447*	-0.424*	-0.167*	0.598*	-0.477*
(24) Stdsales	-0.041*	0.011	-0.034	-0.025	-0.084*	0.080*	-0.003	-0.147*	-0.031	0.023	-0.154*	-0.097*	0.023	0.028
(25) PerfPayRatio	-0.160*	0.104*	-0.022	0.082*	0.077*	0.007	0.292*	0.117*	0.041	0.127*	0.389*	-0.086*	0.076*	0.073*
(26) EquityGrantRatio	-0.064*	0.071*	-0.031	0.041*	0.093*	-0.005	0.073*	0.087*	0.007	0.130*	0.134*	-0.048*	0.050*	0.046*
(27) TIC	-0.146*	0.083*	-0.017	0.080*	0.037	0.015	0.233*	0.176*	0.027	0.107*	0.575*	-0.050*	-0.019	0.116*
(28) ROA	-0.081*	0.030	0.004	-0.060*	-0.132*	0.098*	0.060*	0.047*	-0.020	-0.287*	0.125*	0.038*	-0.174*	0.332*
(29) StdROA	-0.012	0.072*	-0.017	0.074*	0.069*	-0.010	-0.006	-0.043*	0.015	0.156*	-0.092*	-0.043*	0.158*	-0.136*
(30) AvgMTB	0.002	0.064*	0.039*	0.035	0.043*	0.021	0.018	0.025	0.011	0.098*	-0.049*	-0.001	0.070*	-0.025
(31) LogSaleS	-0.077*	-0.174*	0.084*	-0.272*	-0.284*	-0.031	0.411*	0.159*	-0.098*	-0.356*	0.881*	0.108*	-0.525*	0.408*
(32) StdReturn	0.054*	-0.059*	-0.050*	-0.037	0.114*	-0.114*	-0.043*	-0.022	0.019	-0.033	-0.205*	-0.062*	0.225*	-0.038
(33) Return	-0.175*	0.152*	-0.015	0.070*	-0.017	0.118*	0.024	0.048*	0.043*	0.202*	-0.034	-0.034	0.054*	0.059*
(34) Independence	0.075*	-0.043	0.042	0.032	0.021	-0.102*	0.049*	0.196*	-0.068*	-0.062*	0.218*	0.062*	-0.089*	0.052*
(35) AudComm	0.080*	-0.057*	0.087*	-0.027	-0.193*	-0.068*	0.113*	0.109*	-0.089*	-0.121*	0.342*	0.120*	-0.213*	0.018
(36) TotalDirectors	0.039	-0.084*	0.146*	-0.097*	-0.084*	-0.119*	0.180*	0.150*	-0.066*	-0.102*	0.637*	0.175*	-0.218*	0.066*
(37) Institutions	0.006	0.000	0.017	0.048*	-0.003	0.026	-0.090*	-0.045*	0.060*	-0.003	-0.094*	-0.006	0.063*	-0.032
(38) CEOTenure	-0.068*	0.082*	-0.053*	0.145*	-0.068*	0.062*	-0.004	0.360*	0.012	0.050*	0.036*	0.013	-0.015	0.018
(39) CEOChair	0.033	-0.014	0.081*	-0.024	-0.047	0.015	0.089*	0.010	-0.042	-0.082*	0.132*	0.062*	-0.061*	0.011

Variables	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)
(15) Zscore	1.000														
(16) Dividend	-0.039*	1.000													
(17) Loss	-0.132*	-0.272*	1.000												
(18) MTB	0.185*	-0.097*	0.060*	1.000											
(19) CapStructure	-0.462*	0.067*	0.120*	-0.143*	1.000										
(20) IndCapStructure	-0.299*	0.229*	-0.055*	-0.143*	0.594*	1.000									
(21) Operatingcycle	0.127*	-0.029	0.037*	0.026	-0.203*	-0.288*	1.000								
(22) StdInvestment	0.066*	-0.141*	0.124*	0.095*	-0.011	-0.010	-0.149*	1.000							
(23) StdCFO	0.211*	-0.280*	0.280*	0.224*	-0.272*	-0.276*	0.051*	0.274*	1.000						
(24) Stdsales	0.163*	-0.138*	-0.037*	-0.009	-0.134*	-0.109*	-0.127*	-0.036*	0.210*	1.000					
(25) PerfPayRatio	0.017	0.061*	-0.101*	0.138*	-0.051*	-0.064*	0.070*	-0.117*	0.010	-0.099*	1.000				
(26) EquityGrantRatio	0.012	-0.006	0.029	0.069*	-0.014	-0.041	0.056*	-0.041	0.017	-0.074*	0.260*	1.000			
(27) TIC	-0.040	0.118*	-0.052*	0.132*	0.047*	-0.070*	0.111*	-0.098*	-0.057*	-0.127*	0.546*	0.196*	1.000		
(28) ROA	0.119*	0.108*	-0.290*	-0.041*	-0.004	0.031	-0.027	-0.102*	-0.180*	0.027	0.102*	-0.011	0.091*	1.000	
(29) StdROA	0.030	-0.054*	0.088*	0.136*	-0.047*	-0.043*	0.018	0.094*	0.213*	-0.031	0.013	-0.007	-0.051*	-0.044*	1.000
(30) AvgMTB	0.042*	-0.066*	0.044*	0.234*	-0.010	-0.022	-0.060*	0.147*	0.133*	-0.019	0.074*	0.024	0.089*	-0.039*	0.044*
(31) LogSaleS	-0.187*	0.365*	-0.326*	-0.102*	0.251*	0.213*	-0.060*	-0.300*	-0.509*	0.060*	0.364*	0.081*	0.545*	0.138*	-0.143*
(32) StdReturn	-0.001	-0.251*	0.121*	-0.015	0.035	-0.065*	0.044*	0.047*	0.288*	0.152*	-0.019	-0.020	-0.019	-0.030	0.187*
(33) Return	0.106*	-0.014	-0.109*	0.109*	-0.111*	-0.090*	0.022	0.037	0.009	-0.023	0.021	-0.033	-0.002	0.178*	0.034
(34) Independence	-0.145*	0.149*	-0.011	0.043	0.123*	0.066*	0.051*	-0.082*	-0.085*	-0.140*	0.231*	0.090*	0.173*	-0.026	-0.019
(35) AudComm	-0.108*	0.287*	-0.015	0.010	0.165*	0.207*	0.025	-0.077*	-0.147*	-0.105*	0.140*	-0.004	0.165*	-0.028	-0.128*
(36) TotalDirectors	-0.235*	0.319*	-0.044	0.063*	0.206*	0.167*	0.031	-0.160*	-0.190*	-0.169*	0.228*	0.083*	0.353*	0.014	-0.127*
(37) Institutions	0.040	-0.071*	0.067*	-0.028	0.027	-0.009	0.016	0.044	0.059*	0.046*	0.007	0.013	0.009	-0.002	0.025
(38) CEOTenure	0.037*	0.058*	-0.036*	0.038*	-0.016	0.004	0.002	-0.068*	-0.035*	-0.080*	0.118*	0.042*	0.106*	0.028	-0.026
(39) CEOChair	-0.032	0.151*	-0.058*	0.010	0.019	0.138*	-0.059*	-0.030	-0.127*	0.002	-0.011	-0.080*	-0.013	-0.004	-0.097*

Variables	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)
(30) AvgMTB	1.000									
(31) LogSaleS	-0.036	1.000								
(32) StdReturn	-0.027	-0.175*	1.000							
(33) Return	0.011	0.003	0.119*	1.000						
(34) Independence	-0.008	0.192*	-0.062*	-0.018	1.000					
(35) AudComm	-0.003	0.336*	-0.110*	-0.017	0.235*	1.000				
(36) TotalDirectors	0.043	0.611*	-0.177*	-0.010	0.169*	0.443*	1.000			
(37) Institutions	0.010	-0.096*	-0.000	-0.061*	0.050*	-0.075*	-0.124*	1.000		
(38) CEOTenure	0.003	0.038*	0.004	0.071*	0.126*	0.012	-0.046	0.005	1.000	
(39) CEOChair	0.028	0.137*	-0.071*	-0.010	0.121*	0.085*	0.033	-0.065*	0.221*	1.000

Note: Table 5 contains the Pearson correlation matrix and shows the correlation between all the variables used in the regressions.

5.2 Regression results Investment policy variables

Table 6 contains the univariate results on the six outcome variables: Overinvestment, Underinvestment, OverinvestmentCapEx, UnderinvestmentCapEx, OverinvestmentRDEx and UnderinvestmentRDEx. Univariate results generally show the mean of the output variables within 1 binary variable. In table 6, I line out T-tests and show the mean of the different investment outcome variables on the independent variables Clawback and Post. The fourth column represents the difference between the implementation of a clawback or not in Panel A. Panel B shows the difference between before and after the implementation. I conclude that the univariate results complement the findings in table 5 because the sign and level of significance of the variable Clawback and Post in combination with the outcome variables correspond accurately. The only noted difference is that the relation between Clawback and Underinvestment is not significant anymore.

In Panel A, the outcome variables are all lower when Clawback is 1 in comparison with when Clawback is 0. The outcome variables Overinvestment, UnderinvestmentCapx and UnderinvestmentRDEx are significant at a 1% level, and OverinvestmentCapEx and OverinvestmentRDEx are significant at a 5% level. This means that these investment policy outcome variables are lower after the adoption of a clawback.

In Panel B, the three outcome variables regarding Overinvestment are significantly lower when Post is 1 than when Post is 0. The three outcome variables regarding Underinvestment are significantly higher when Post is 1 than when Post is 0. I interpret the differences as lower Overinvestment and higher Underinvestment in the period after adoption of a clawback in comparison with the period before. These findings contradict my expectations in hypothesis 1 and 2, where I expect Overinvestment to be higher and Underinvestment to be lower in the period after the adoption of clawbacks.

Table 7 contains the probit regression results for hypothesis 1 regarding over-investment and under-investment. The first hypothesis predicts that the adoption of a clawback leads to more over-investment and less under-investment. The variable of interest which captures this effect is the term CLAW*POST. The table consists of six regressions on the different investment policy variables. I include Industry fixed effects and year fixed effects in all the regressions. The industry fixed effects entail the clustering of firms where the first two digits of the SIC code matches.

Table 6: Univariate results on the outcome variables

Panel A		Mean if Clawback=0	Mean if Clawback=1	Difference
Clawback	Overinvestment	0,415	0,202	-0,212***
		(1.059)	(2.080)	
	Underinvestment	0,253	0,236	-0,017
		(1,059)	(2.080)	
	OverinvestmentCapEx	0,281	0,246	-0,035**
		(1.059)	(2.080)	
	UnderinvestmentCapEx	0,314	0,213	-0,101***
		(1.059)	(2.080)	
	OverinvestmentRDEx	0,282	0,246	-0,037**
		(1.059)	(2.080)	
	UnderinvestmentRDEx	0,284	0,228	-0,056***
		(1.059)	(2.080)	

Panel B		Mean if Post=0	Mean if Post=1	Difference
Post	Overinvestment	0,350	0,239	-0,111***
		(992)	(2.147	
	Underinvestment	0,191	0,265	0,075***
		(992)	(2.147)	
	OverinvestmentCapEx	0,295	0,241	-0,055***
		(992)	(2.147)	
	UnderinvestmentCapEx	0,162	0,287	0,125***
		(992)	(2.147)	
	OverinvestmentRDEx	0,316	0,231	-0,084***
		(992)	(2.147)	
	UnderinvestmentRDEx	0,199	0,270	0,071***
		(992)	(2.147)	

*Note: Table 6 shows the univariate results of Clawback (panel A) and Post (panel B) on the six outcome variables: Overinvestment, Underinvestment, OverinvestmentCapEx, UnderinvestmentCapEx, OverinvestmentRDEx, UnderinvestmentRDEx. The first number for every cell represents the t-value, the second number below (between the brackets) represents the amount of observations. The significant tests are two-tailed showing P-vales only in *, ** and *** form. The stars represent significance levels of respectively 0.10, 0.05 and 0.01.*

This way, the results reflect more truly the effect in reality, because otherwise, differences of specific industries can interfere with the association with clawbacks. Next, I include year fixed effects to reduce possible bias in the covariates in my cross-sectional panel data. The fixed effects mitigate the impact of possible omitted variables.

In column six regarding OverinvestmentRDEx, is the amount of observations lower than the other models. The regression model exclude a significant amount of observations. Untabulated results shows that certain SIC codes have a high percentage of underinvestment observations, resulting in too few observations for overinvestment. The model predicts the failure perfectly, consequently dropping the observations in the corresponding SIC code because it can not use them. This results in fewer observations for OverinvestmentRDEx.

The coefficients of interest are mainly insignificant when controlling for various variables that are associated with the adoption of clawback provisions. That these coefficients are insignificant means that treatment group and the control group are not different in terms of overinvestment and underinvestment. Put differently, a firm that adopts a clawback and a firm that does not adopt a clawback does not differ significantly from each other.

There may be a few reasons that contribute to the insignificant results. At first, the sample of firms I used in my thesis is relatively small in comparison to research papers in journals. I execute the regressions from my first hypothesis on 249 clawback adopters and 158 non-clawback adopters. The sample becomes smaller for the second hypothesis and even smaller for additional testing. The small sample has an increasing influence on the standard error of the regression, possibly resulting in biased results. Second, there is really no causal effect at all. Third, there may be other variables that correlate with the variables of interest. In section 5.4, additional testing, I take a close look at the third reason. Here I take governance variables into account, because of the possible interrelated characteristics of clawbacks and other governance mechanisms.

The control variables are in line with my expecations, except for LogAssets which has a significantly negative effect on the total level of overinvestment in column 1. This means that the bigger the firm, the less overinvestment they have. I expected a positive effect here.

Concluding, I reject hypothesis H1a and H1b (not rejecting the null hypotheses), because the level of over-investment and under-investment is not significantly different from firms that adopt a clawback provision, relative to firms that do not adopt a clawback provision.

Table 7: Regression output

VARIABLES	Total Overinv	Total Underinv	CapEx Overinv	CapEx Underinv	R&D Ex Overinv	R&D Ex Underinv
Clawback	-0.016	-0.119	-0.232	-0.353**	0.401**	0.175
	(0.907)	(0.491)	(0.162)	(0.024)	(0.022)	(0.219)
Post	0.016	0.150	-0.318*	0.041	0.062	0.171
	(0.919)	(0.410)	(0.071)	(0.807)	(0.740)	(0.267)
CLAW*POST	-0.120	-0.162	0.042	0.014	-0.208	-0.230
	(0.494)	(0.393)	(0.835)	(0.939)	(0.308)	(0.159)
LogAssets	-0.724***	0.018	0.197***	-0.002	0.214***	-0.130***
	(0.000)	(0.563)	(0.000)	(0.959)	(0.000)	(0.000)
Tangibility	2.405***	-0.331	4.826***	-3.255***	-0.996**	-0.269
	(0.000)	(0.304)	(0.000)	(0.000)	(0.024)	(0.321)
Slack	-2.215***	-0.006	-0.693	1.584***	1.594***	0.533
	(0.000)	(0.985)	(0.228)	(0.000)	(0.000)	(0.116)
CFOsale	-0.158**	0.149**	-0.211*	0.028	0.054	0.156**
	(0.028)	(0.039)	(0.064)	(0.584)	(0.320)	(0.036)
Zscore	-0.070***	0.118***	-0.017	0.043***	-0.052***	0.025**
	(0.000)	(0.000)	(0.366)	(0.000)	(0.000)	(0.037)
Dividend	-0.159	-0.206***	-0.160	-0.167*	-1.061***	0.094
	(0.132)	(0.008)	(0.126)	(0.073)	(0.000)	(0.245)
Loss	0.101	-0.351***	-0.408***	-0.160	0.341***	-0.188*
	(0.301)	(0.001)	(0.001)	(0.156)	(0.007)	(0.068)
MTB	-0.004	0.039***	-0.009	0.017***	0.019*	0.029***
	(0.633)	(0.000)	(0.158)	(0.002)	(0.063)	(0.000)
CapStructure	-0.685**	-0.746**	-0.909***	0.122	-3.476***	-1.991***
	(0.026)	(0.044)	(0.009)	(0.698)	(0.000)	(0.000)
IndCapStructure	-0.255	-0.764	-0.841	-1.724**	-0.308	-1.903***
	(0.718)	(0.202)	(0.271)	(0.040)	(0.804)	(0.001)
OperatingCycle	-0.424***	0.070	-0.481***	0.083	0.105	0.028
	(0.000)	(0.299)	(0.000)	(0.254)	(0.181)	(0.725)
StdInvestment	0.004**	0.004**	0.008***	0.005***	0.006***	0.004***
	(0.010)	(0.017)	(0.000)	(0.001)	(0.001)	(0.001)
StdCFO	1.800*	1.822*	4.023***	2.062*	-0.563	0.032
	(0.086)	(0.087)	(0.002)	(0.068)	(0.620)	(0.972)
StdSales	-0.954***	-0.727***	-0.226	-0.083	-0.920***	-0.054
	(0.000)	(0.003)	(0.425)	(0.736)	(0.007)	(0.791)
Constant	4.508***	-0.135	-2.539*	1.762***	-3.826***	2.448***
	(0.000)	(0.868)	(0.074)	(0.004)	(0.000)	(0.001)
Observations	2,072	2,116	1,926	2,195	1,370	2,172
Pseudo R2	0.498	0.277	0.541	0.466	0.442	0.306
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

*Note: Table 7 shows the multivariate regression results for hypothesis 1 regarding the effect of clawback adoption on investment efficiency. The second column represents: Overinvestment, (3) Underinvestment, (4) OverinvestmentCapEx, (5) UnderinvestmentCapEx, (5) OverinvestmentRDEx, (7) UnderinvestmentRDEx. The first number for every cell represents the t-value, the second number below (between the brackets) the p-value. The significant tests are two-tailed showing P-vales with corresponding *, ** and *** form. The stars represent significance levels of respectively 0.10, 0.05 and 0.01.*

5.3 Regression results Compensation at Risk

Table 8 contains the probit regressions results for hypothesis 2, regarding the compensation at risk on the level of overinvestment. The second hypothesis predicts that the association between the adoption of a clawback provision and the level of over-investment is more pronounced for firms with executives holding compensation contracts with more compensation at risk. The higher the compensation at risk, the more executives want to preserve their own benefits, resulting in more overinvestment. The variable of interest which captures this effect is the term CLAW*POST*TIC. The table consists of three regressions of the investment policy variable over-investment.

The coefficient of interest for Overinvestment and OverinvestmentRDEx is negative and significant at a 5% level. This finding is contrary to my expectations, where I expect a positive influence on the total level of overinvestment. This means that the clawback adopters are significantly different from the non-clawback adopters in terms of overinvestment. Clawback adopters with executives having above average total incentive compensation have less Overinvestment, relative to the non-adopters.

An explanation for the contrary results could be that executives do experience more risk regarding the adoption of a clawback provision, request more compensation, but at the same time invest less in projects with relatively more risk than average. This results in less overinvestment. So it can be that executives have above average total incentive pay because of increased risk, but they will invest more thoughtful, because wrongful investment brings harm to their reputation. Further research could look into outcomes with variations in the classification of compensation. Are the results different when you take base salary or total compensation into account?

When I examine the control variables in table 8, I note that LogAssets has a significantly negative impact on the total level of overinvestment in column 2. This means that the bigger the firm, the less overinvestment they experience. I expected a positive effect here. Also, the effect of Return is significantly negative, where I expect a positive influence on the effect of returns of companies on the overinvestment level.

Concluding, I reject hypothesis 2 (not rejecting the null hypothesis), because the level of over-investment is significantly less for clawback adopters with high incentive compensation, relative to the non-adopters.

Table 8: Regression output hypothesis 2

VARIABLES	Total Overin	CapEx Overin	R&DEx Overin
Clawback	-0.639***	-0.386	0.362
	(0.005)	(0.211)	(0.244)
POST	-0.374	-0.209	0.190
	(0.111)	(0.460)	(0.561)
TIC	-0.542**	-0.443	0.506
	(0.049)	(0.216)	(0.319)
CLAW*POST	0.640**	0.237	0.338
	(0.021)	(0.509)	(0.402)
CLAW*TIC	0.914***	0.545	0.435
	(0.008)	(0.211)	(0.415)
CLAW*POST*TIC	-0.731**	-0.093	-0.706**
	(0.011)	(0.779)	(0.031)
LogAssets	-0.581***	-0.077	0.604***
	(0.002)	(0.748)	(0.000)
Tangibility	2.972***	5.938***	-1.282*
	(0.000)	(0.000)	(0.077)
Slack	-3.950***	-1.875*	2.236***
	(0.000)	(0.073)	(0.002)
CFOsales	-0.456	1.263	0.182
	(0.416)	(0.286)	(0.225)
Zscore	-0.225***	0.019	-0.177***
	(0.000)	(0.762)	(0.000)
Dividend	-0.054	-0.256	-1.002***
	(0.740)	(0.130)	(0.000)
Loss	-0.061	-0.191	0.669**
	(0.751)	(0.421)	(0.013)
MTB	-0.060*	-0.006	0.037***
	(0.082)	(0.631)	(0.008)
CapStructure	-1.967***	-1.102*	-5.031***
	(0.000)	(0.073)	(0.000)
IndCapStructure	-0.630	-3.218***	2.375
	(0.580)	(0.005)	(0.177)
Operatingcycle	-0.397***	-0.896***	0.046
	(0.007)	(0.000)	(0.774)
StdInvestment	0.008**	0.001	0.011**
	(0.010)	(0.748)	(0.016)
StdCFO	1.841	4.831**	-9.520***
	(0.349)	(0.040)	(0.000)
Stdsales	-0.522	-0.295	0.177
	(0.284)	(0.568)	(0.767)
ROA	-0.234	2.560*	0.750
	(0.813)	(0.055)	(0.536)
StdROA	1.661**	-0.398	5.311***

	(0.018)	(0.401)	(0.002)
AvgMTB	0.001	0.038***	-0.007
	(0.960)	(0.004)	(0.589)
LogSales	-0.411**	0.266	-0.751***
	(0.013)	(0.249)	(0.000)
PerfPayRatio	0.007**	0.002	0.001
	(0.046)	(0.727)	(0.916)
EquityGrantRatio	-0.003	-0.000	0.002
	(0.142)	(0.901)	(0.420)
Return	-0.601***	0.214	0.311
	(0.001)	(0.244)	(0.143)
StdReturn	0.001	0.302	-0.556
	(0.997)	(0.393)	(0.110)
Constant	9.939***	0.844	0.984
	(0.000)	(0.483)	(0.386)
Observations	1,317	934	662
Pseudo R2	0.586	0.517	0.490
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

*Note: Table 8 shows the multivariate regression results for hypothesis 2 regarding the compensation at risk on the level of overinvestment. The second column represtents: Overinvestment, (3) OverinvestmentCapEx, (4) OverinvestmentRDEx. The first number for every cell represents the t-value, the second number below (between the brackets) the p-value. The significant tests are two-tailed showing P-vales with corresponding *, ** and *** form. The stars represent significance levels of respectively 0.10, 0.05 and 0.01.*

5.4 Regression results additional testing

Table 9 contains the additional testing results complementing the probit regressions of hypothesis 1. In these models, I include six extra governance variables: AudComm, TotalDirectors, Independence, Institutions, CEOTenure and CEOChair. The variable of interest (CLAW*POST) stays the same as for the initial regression. Comparing the coefficient of interest in table 9 with table 7, the outcome variables will mainly weaken, which follow my expectations. Only OverinvestmentCapEx is statistically significant at the 10% level. This probably caused, in combination with the governance variables, the switch of the sign of Overinvestment from negative in Table 7 to positive in Table 9. Nevertheless, the interaction term for Overinvestment is insignificant. A positive OverinvestmentCapEx, means that clawback adopters have significantly more overinvestment in capital expenditures after the adoption, relative to non-adopters.

Evidently, the Pseudo R-squared increases for every single regression in table 9, in comparison with table 8. This means that when controlling for governance variables, the regression explains a higher

percentage of the variation of the corresponding outcome variables. Also, the amount of observations is approximately divided in halves. This is the result of many missing values for governance variables of the corresponding companies.

Table 9: Regression output with governance variables

VARIABLES	Total Overin	Total Underinv	CapEx Overin	CapEx Underinv	R&D Ex Overin	R&D Ex Underinv
Clawback	-0.209	-0.043	-0.494	-0.058	0.410	0.150
	(0.443)	(0.874)	(0.154)	(0.835)	(0.232)	(0.575)
POST	-0.350	-0.449	-0.255	0.083	0.084	0.031
	(0.232)	(0.133)	(0.454)	(0.781)	(0.826)	(0.914)
CLAW*POST	0.188	-0.016	0.646*	-0.201	0.125	-0.317
	(0.576)	(0.957)	(0.080)	(0.522)	(0.744)	(0.281)
LogAssets	-1.184***	0.086	0.073	-0.026	0.326***	-0.076
	(0.000)	(0.154)	(0.436)	(0.707)	(0.000)	(0.284)
Tangibility	3.981***	-0.092	5.421***	-5.338***	-2.970***	0.236
	(0.000)	(0.876)	(0.000)	(0.000)	(0.000)	(0.660)
Slack	-2.914***	-0.862*	-1.800*	1.093*	1.040*	1.066*
	(0.000)	(0.095)	(0.089)	(0.068)	(0.069)	(0.065)
CFOsales	-0.293	1.316*	1.525	1.619**	2.859***	1.094
	(0.683)	(0.088)	(0.205)	(0.013)	(0.001)	(0.138)
Zscore	-0.239***	0.366***	-0.027	0.037*	-0.060**	-0.024
	(0.000)	(0.000)	(0.507)	(0.053)	(0.016)	(0.284)
Dividend	-0.323	-0.293**	-0.143	-0.371**	-1.002***	0.167
	(0.153)	(0.026)	(0.444)	(0.021)	(0.000)	(0.242)
Loss	-0.004	0.278*	-0.456*	-0.107	0.946***	-0.194
	(0.986)	(0.091)	(0.064)	(0.620)	(0.000)	(0.325)
MTB	-0.183***	0.052***	-0.010	0.010	0.026	0.035**
	(0.001)	(0.000)	(0.287)	(0.466)	(0.107)	(0.011)
CapStructure	-1.679**	-0.253	-0.360	-0.511	-3.975***	-4.367***
	(0.015)	(0.708)	(0.655)	(0.403)	(0.000)	(0.000)
IndCapStructure	0.443	-1.008	-3.511***	0.711	2.362	-1.553
	(0.752)	(0.296)	(0.010)	(0.615)	(0.223)	(0.110)
OperatingCycle	0.084	0.434***	-0.922***	0.148	0.380**	0.105
	(0.669)	(0.000)	(0.000)	(0.260)	(0.013)	(0.393)
StdInvestment	0.015***	0.002	0.020***	0.008**	0.003	0.007**
	(0.002)	(0.696)	(0.003)	(0.026)	(0.480)	(0.013)
StdCFO	5.152*	0.039	10.657***	2.023	-1.671	0.050
	(0.060)	(0.984)	(0.000)	(0.429)	(0.469)	(0.981)
Stdsales	-1.775***	-0.604	-0.039	0.433	-0.198	0.144
	(0.004)	(0.145)	(0.957)	(0.321)	(0.748)	(0.684)
Independence	-1.224	1.325**	-0.131	-0.432	-0.655	-0.236
	(0.114)	(0.014)	(0.850)	(0.476)	(0.299)	(0.639)
AudComm	-0.002	-0.011	0.074	0.192***	-0.375***	-0.012
	(0.977)	(0.844)	(0.379)	(0.007)	(0.000)	(0.831)
TotalDirectors	0.039	0.025	0.053	-0.106***	-0.012	-0.025
	(0.491)	(0.471)	(0.208)	(0.009)	(0.818)	(0.473)

Institutions	-0.000	-0.000	0.000***	-0.000	-0.000	-0.000
	(0.477)	(0.173)	(0.009)	(0.186)	(0.961)	(0.434)
CEOTenure	-0.232*	0.203**	-0.161	0.192*	-0.329***	-0.073
	(0.081)	(0.018)	(0.240)	(0.098)	(0.007)	(0.418)
CEOChair	0.306*	-0.162	0.018	0.193	0.462***	-0.082
	(0.083)	(0.151)	(0.911)	(0.183)	(0.002)	(0.495)
Constant	8.909***	-3.107***	-0.337	2.212*	-1.589	1.769*
	(0.000)	(0.002)	(0.782)	(0.072)	(0.113)	(0.070)
Observations	829	1,190	777	1,123	600	1,145
Pseudo R2	0.566	0.396	0.510	0.542	0.380	0.391
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

*Note: Table 9 shows the additional tests with governance variables included in the multivariate regression of hypothesis 1. The second column represtents: Overinvestment, (3) Underinvestment, (4) OverinvestmentCapEx, (5) UnderinvestmentCapEx, (5) OverinvestmentRDEx, (7) UnderinvestmentRDEx. The first number for every cell represents the t-value, the second number below (between the brackets) the p-value. The significant tests are two-tailed showing P-vales with corresponding *, ** and *** form. The stars represent significance levels of respectively 0.10, 0.05 and 0.01.*

Table 10 contains the additional testing results complementing the probit regressions of hypothesis 2. In this table, I also include the six governance variables. Comparing the coefficients of interest in table 10 with the coefficients of interest in table 8, the outcome variables will mainly weaken, resulting in the disappearance of significant results. OverinvesmentRDEx stays at the same significance level and gains some strength, in contrast to the total level of Overinvestment, which completely loses the level of significance.

Similar to the first additional test, the Pseudo R-squared is higher for the regressions where I take governance variables into account. The amount of observations decreases, with 40 per cent on average in the additional test. Further, I include industry fixed effects, year fixed effects and robustness checks.

Concluding, Table 9 and 10 show that when controlling for governance, the results from table 7 and 8 will mainly weaken. To the best of my knowledge, this results from the effect of possibly interrelated other governance mechanisms (Denis, 2012; Dicks, 2012). The impact of adopting a clawback could depend on the implementation of different governance mechanisms, therefore, resulting in a diminishing association with investment efficiency and compensation at risk.

Table 10: Regression output hypothesis 2

VARIABLES	Total Overin	CapEx Overin	R&DEx Overin
Clawback	-0.512	-0.145	0.639
	(0.102)	(0.738)	(0.141)
POST	-0.387	-0.338	0.211
	(0.209)	(0.415)	(0.646)
TIC	-0.341	0.102	0.557
	(0.358)	(0.838)	(0.313)
CLAW*POST	0.459	0.832	1.059*
	(0.231)	(0.119)	(0.059)
CLAW*TIC	1.036**	0.315	0.613
	(0.022)	(0.598)	(0.320)
CLAW*POST*TIC	-0.500	-0.511	-1.048**
	(0.195)	(0.263)	(0.026)
LogAssets	-0.815***	0.984***	0.810***
	(0.004)	(0.002)	(0.009)
Tangibility	4.296***	7.296***	-4.626***
	(0.000)	(0.000)	(0.000)
Slack	-4.125***	-0.609	0.678
	(0.000)	(0.653)	(0.423)
CFOsales	-1.193	-1.280	3.166**
	(0.116)	(0.380)	(0.025)
Zscore	-0.238***	0.059	-0.186**
	(0.001)	(0.575)	(0.018)
Dividend	-0.289	-0.038	-0.768***
	(0.279)	(0.886)	(0.001)
Loss	0.042	-0.621*	0.898***
	(0.875)	(0.074)	(0.008)
MTB	-0.234***	-0.026	0.059***
	(0.007)	(0.226)	(0.006)
CapStructure	-1.664**	-0.838	-6.036***
	(0.030)	(0.344)	(0.000)
IndCapStructure	1.033	-5.343***	2.771
	(0.480)	(0.002)	(0.265)
Operatingcycle	-0.058	-1.037***	0.449**
	(0.794)	(0.000)	(0.040)
StdInvestment	0.014**	0.004	0.014*
	(0.010)	(0.374)	(0.099)
StdCFO	3.012	9.564**	-7.936**
	(0.304)	(0.011)	(0.039)
Stdsales	-1.352*	1.227	1.610*
	(0.054)	(0.187)	(0.079)
ROA	1.186	4.529***	-0.406
	(0.407)	(0.008)	(0.789)
StdROA	0.548	-5.586**	8.535***

	(0.695)	(0.049)	(0.001)
AvgMTB	0.028	0.074***	0.002
	(0.318)	(0.000)	(0.915)
LogSales	-0.669**	-0.700**	-0.916***
	(0.012)	(0.017)	(0.002)
PerfPayRatio	0.005	-0.022***	0.002
	(0.301)	(0.001)	(0.794)
EquityGrantRatio	0.000	0.010***	0.003
	(0.952)	(0.007)	(0.366)
Return	-0.214	0.859***	0.038
	(0.421)	(0.004)	(0.905)
StdReturn	-0.232	1.053*	-1.589***
	(0.613)	(0.074)	(0.010)
Independence	-1.223	0.000	-1.185
	(0.121)	(1.000)	(0.139)
AudComm	0.017	0.097	-0.478***
	(0.849)	(0.319)	(0.000)
TotalDirectors	0.054	-0.010	0.029
	(0.391)	(0.866)	(0.680)
Institutions	-0.000	0.000***	-0.000
	(0.248)	(0.001)	(0.547)
CEOTenure	-0.277*	-0.295*	-0.487***
	(0.055)	(0.088)	(0.002)
CEOChair	0.313*	0.005	0.606***
	(0.089)	(0.983)	(0.004)
Constant	10.983***	-0.043	0.856
	(0.000)	(0.978)	(0.540)
Observations	818	533	425
Pseudo R2	0.591	0.559	0.523
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

*Note: Table 10 shows additional tests including governance variables in the multivariate regression results for hypothesis 2 regarding the compensation at risk on the level of overinvestment. The second column represents: Overinvestment, (3) OverinvestmentCapEx, (4) OverinvestmentRDEx. The first number for every cell represents the t-value, the second number below (between the brackets) the p-value. The significant tests are two-tailed showing P-vales with corresponding *, ** and *** form. The stars represent significance levels of respectively 0.10, 0.05 and 0.01.*

6 Conclusion and Discussion

Prior literature describes a clawback provision as an appended clause in the compensation contracts of executives that allows for the recoupment of compensation from top executives in case of a restatement of the financial statements. In this thesis, I examine if the influence of voluntary clawback adoption leads to a higher level of investment efficiency. The continuous increase of the voluntary adoption of clawbacks by firms corresponding with unfinished regulations captured international interest among academics and therefore, attractive for me to examine a relatively non-exhausted topic. First, I determine if the voluntary adoption of clawbacks leads to a positive or a negative effect on over- and under-investment. Second, I test if the association between clawback adoption and overinvestment becomes more pronounced when executives have above average compensation at risk.

I base my examinations on a dataset regarding the adoption of clawback provisions of firms in the Russel 3000 Index, distributed over a period from 2007 to 2016. Univariate tests between clawbacks and over- and under-investment show a significant correlation. Nevertheless, regarding hypothesis 1, I conduct six separate regressions on over- and under-investment outcome variables and do not find a significant interaction between the adoption of clawback provisions and over- and under-investment when controlling for more variables. A firm that adopts a clawback provision and a firm that does not adopt a clawback provision does not differ significantly from each other in terms of over-investment and under-investment. Regarding hypothesis 2, I conduct a multivariate analysis on the association between clawback adoption and overinvestment with the influence of compensation at risk. I find a significantly negative result. Clawback adopters seem to over-invest less when the incentive compensation of the executives is above average, relative to the non-adopters.

Moreover, I conduct additional tests on both hypotheses, where I include six governance variables to control for the potentially interrelated association of other governance mechanisms. My findings show that the results found for hypothesis 1 and 2 will mainly weaken. The results suggest that the effect of adopting a clawback could depend on the implementation of other governance mechanisms, therefore, resulting in a diminishing association with investment efficiency and compensation at risk. The answer to my research question is that there is no influence of the adoption of clawback provisions on investment efficiency. Clawback adopters and non-clawback adopters do not significantly differ in terms of over-investment and under-investment.

This thesis has four limitations. First, contrary to previous research papers, I do not implement the propensity score matching method. Academics use this method to match clawback adoption firms with a control firm that is a non-clawback adopter but regarding specific characteristics a counterpart. This way, it is possible to control for symptoms that may have led to the decision to adopt a clawback provision. Implementing the propensity score matching method would have let to more accurate results. Second, I base my literature review on an indirect link between clawback adoption and investment efficiency, but in this thesis, I test the direct link. I describe the link between clawback provisions and financial reporting quality, the link between financial reporting quality and investment efficiency. Next, I imply that there is a link between clawback provisions and investment efficiency. There is up to this point not much prior literature available regarding clawback provision and investment efficiency. Additional path analyses would partly take this limitation away because this method allows you to decompose the correlated variables into components, and analyse direct and indirect effects.

Third, Erkens et al. (2018) show in their paper that not very clawback provision is the same. It depends on how firms compose their clawback. I do not account for the strength of clawbacks, which may bias my results. Fourth, the sample of firms I use in my thesis is relatively small. The researchers with papers in high-ranked journals make use of larger databases, which makes the examination of particular associations between clawback provisions and investment efficiency more robust against high standard errors.

Future research could examine if more components of compensation influence the level of over-investment. The level of base salary or total compensation could have an impact on the way executives make investment decisions. Next, future research could also explore the impact of the level of leverage on the association between clawback provisions and investment efficiency. Firms with a high debt-equity ratio could have cash constraints (Biddle et al., 2009). Does the adoption of a clawback could influence the leverage of a firm, resulting in a different investment decision from executives?

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Appendix

Table 1: Variable description

Variable	Description	Database
Dependent Variables		
Overinvestment	Binary variable takes the value of 1 when the residual of the estimation of the total investment level is in the upper 25% segment, zero if between the 25% and 75% segment.	Own Computation
Underinvestment	Binary variable takes the value of 1 when the residual of the estimation of the total investment level is in the lower 25% segment, zero if between the 25% and 75% segment.	Own Computation
OverinvestmentCapEx	Binary variable takes the value of 1 when the residual of the estimation of the Capital Expenditures is in the upper 25% segment, zero if between the 25% and 75% segment.	Own Computation
UnderinvestmentCapEx	Binary variable takes the value of 1 when the residual of the estimation of the Capital Expenditures is in the lower 25% segment, zero if between the 25% and 75% segment.	Own Computation
OverinvestmentRDEx	Binary variable takes the value of 1 when the residual of the estimation of the R&D expenses is in the upper 25% segment, zero if between the 25% and 75% segment.	Own Computation
UnderinvestmentRDEx	Binary variable takes the value of 1 when the residual of the estimation of the R&D expenses is in the lower 25% segment, zero if between the 25% and 75% segment.	Own Computation
Independent Variables		
CLAW	Binary variable that takes the value of 1 for voluntary clawback provision adopters, 0 for non-adopters.	Supervisor
POST	Binary variable that takes the value of 1 for the periods after the adoption of a clawback provision.	Supervisor
TIC	Binary variable that takes the value of 1 when the total incentive compensation of the CEO is above the median, 0 if lower than the median.	ExecuComp

Firm specific variables

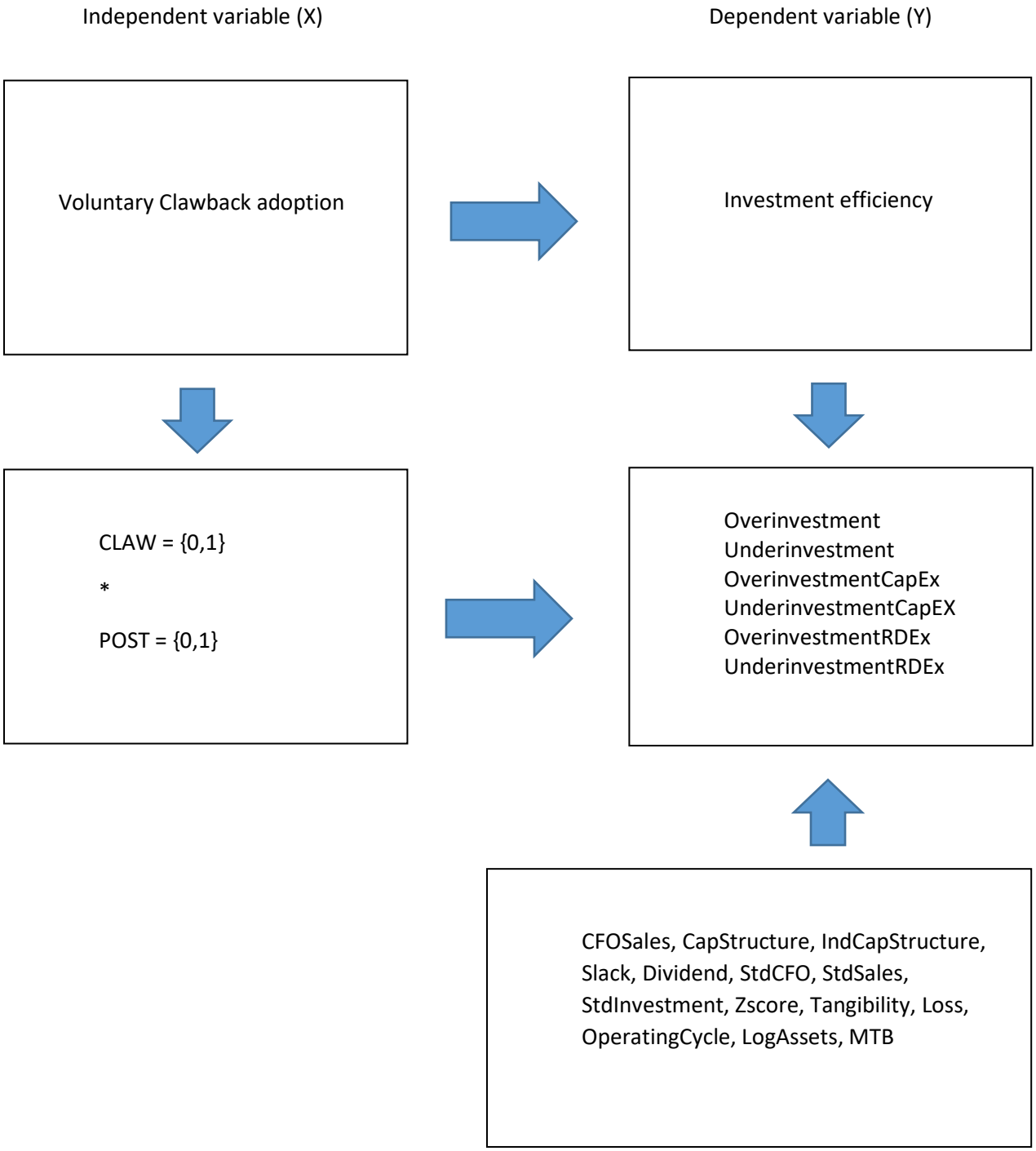
Investment	The total of T+1 capital expenditures, research and development expenditure, acquisition expenditure minus sold property, plant and equipment (PPE) multiplied by 100 and scaled by current total assets	Compustat
Acquisition	T+1 acquisition expenditures multiplied by 100 and scaled by current total assets	Compustat
Capex	T+1 capital expenditures multiplied by 100 and scaled by current total assets	Compustat
R&D	T+1 research and development expenditures multiplied by 100 and scaled by current total assets	Compustat
Growth	The change in sales from period T-1 to T in terms of percentage	Compustat
Tobin'sQ	The total of the book value of long-term debt, debt in current liabilities and the market capitalization divided by total book assets	Compustat
CFOSales	The operating cash flows to sales ratio	Compustat
CapStructure	The capital structure of the firm calculated as the long-term debt divided by the sum of long-term debt plus the market value of equity	Compustat
IndCapStructure	The average industry K-Structure for all the firms within a 3 digit SIC code range	Compustat
Slack	The cash and cash equivalents to total assets ratio	Compustat
Dividend	Binary variable that equals 1 if the firm paid any form of a dividend, zero otherwise	Compustat
StdCFO	Standard deviation of operating cash flows scaled by average total assets from years t-5 to t-1	Compustat
StdSales	Standard deviation of sales divided by average total assets from years t-5 to t-1	Compustat
StdInvestment	Standard deviation of investment divided by average total assets from years t-3 to t-1	Compustat
Zscore	Proxy out of the paper of Altman (1968) for the risk of bankruptcy	Compustat
Tangibility	The PPE to total assets ratio	Compustat
Loss	Binary variable that takes the value of 1 if net income is lower than zero	Compustat
OperatingCycle	The logarithm of receivables divided by sales plus the inventory divided by costs of goods sold multiplied by a factor 360	Compustat
LogAssets	The logarithm of total assets	Compustat
ROA	The return on assets for the period T+1	Compustat
StdROA	Standard deviation of ROA over the period T-5 to T-1	Compustat

MTB	Total market value divided by total assets minus total liabilities	Compustat
AvgMTB	Average MTB ratio over the period T-5 to T-1	Compustat
LogSales	The natural logarithm of sales for the period T+1	Compustat
PerfPayRatio	The pay for performance ratio calculated as the total compensation minus salary and other compensation multiplied by 100 and divided by total compensation	ExecuComp
EquityGrantRatio	The sum of stock options and stock awards multiplied by 100 and divided by total compensation	ExecuComp
Return	The return on stocks for de period T+1	CRSP
StdReturn	The standard deviation of the return on stock over the period of T-5 to T-1	CRSP

<u>Governance Variables</u>

AudComm	The amount of executives of the firm that have a seat in the audit committee	ISS
Independence	The ratio of total board executives that are independent	ISS
TotalDirectors	The amount of executives that have a seat on the board	ISS
CEOChair	Binary variable that takes the value of 1 if the CEO is chairman of the board of directors, and 0 otherwise	ISS
CEOTenure	The Natural Logarithm of the tenure of the CEO	ExecuComp
Institutions	The shares of the firm in the hands of institutional investors in terms of percentage	Thomson Reuters

Libby boxes H1



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