Accounting scandals and the Dutch accounting sector reputation: Is there a relation?

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Abstract

This thesis examines if there is a relation between the recent occurrence of accounting scandals and the reputation of the accounting sector as a whole. Specifically, the stock market reaction of the companies listed on the Dutch stock exchange are examined for various dates on which accounting scandals, that were not retained by the auditor, came to light. This relation is significant when the company committing the scandal is big and has a big societal impact. Furthermore this must be the first scandal for the company. If these conditions are not met, no significant negative effect is found. In addition this thesis examines if the decline in auditor reputation is larger for the Big Four auditing firms, this is called the Big Four effect. This thesis finds significant results for a Big Four effect when the Big Four firm settles an arrangement for a record-breaking amount and when in a short period multiple events occur for the same auditing firm. If these conditions are not met, there are no significant results found for the Big Four effect.

Keywords: *Accounting scandals; auditor reputation; cumulative abnormal returns; Big Four.*

S u p e r v i s o r : M . v a n D o n g e n

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1. Introduction

Fraud is timeless. In The Netherlands there are known stories of captains who stole from their own government during the Dutch War of Independence (1568-1648). During inspections they disguised normal soldiers as veterans. The captains did this because veterans received more money. Furthermore the captains disguised normal people as soldiers. This way the captains obtained got money from their government in a fraudulent way (Boterbergh, 2000).

Financial scandals are also timeless. 1792 was the year of the first big financial crisis (Wachtel, 1996). The highly esteemed William Duer caused this crisis in the United States through his buying and selling of stocks (Wachtel, 1996). Duer had a simple plan. First of all he spread rumors about a new bank that would compete with the Bank of New York. These rumors caused a drop in the stock price of the Bank of New York. Duer's speculations grew rapidly, because he bought as much stock as possible with expensive loans (Jones, 1975). The idea was to spread other rumors that there would not be another bank. If people believed the new rumors the stock price would rise again. Unfortunately the plan of Duer got discovered and the Bank of New York prevented Duer to execute his plan. At the same time the interest rate was rising, this meant that Duer could not fulfill his obligations (Jones, 1975). This resulted in a number of panic reactions and finally the crash of 1792. After the crash of 1792 Wall Street responded with some new reforms. The most famous one is the Buttonwood Agreement. The Buttonwood Agreement created standards that would carry forward into the 20th century: the alternative between on the one hand self-regulation and on the other hand public regulation. Furthermore the Buttonwood Agreement established rules and fixed commission rates among brokers who are dealing in securities (Wachtel, 1996).

Duer was not the last one who played the system for his own gain. Even nowadays fraud is one of the most important subjects in the accounting sector. Since the beginning of the millennium we have had a tsunami of accounting scandals (Ball, 2009). To name a few: AOL, Xerox, Enron, WorldCom, Parmalat, Tesco and Lernout & Hauspie Speech Products. In The Netherlands we have had Royal Ahold, Vestia, DSB, meat processor Weyl, SNS, Imtech and Ballast Nedam. (Piersma, 2016; Van den Akker, 2014).

These scandals have caused a lot of damage, for example a decline in the reputation of the regulators and financial markets in general (Ball, 2009; Spaenjers, 2004). Since then a lot of new regulations have been issued across the world. The best known is the Sarbanes-Oxley Act in the United States. Also the Dutch government, the standard setter in The Netherlands,

have made quite a few changes over the years (Piersma, 2016). Nowadays there is a mandatory firm rotation, more tightened rules regarding the independence of the auditor and a division between the assurance and advisory departments within an auditing firm. Furthermore the NBA, the professional organization for accountants in The Netherlands, has established a code for accounting organizations (Van den Akker, 2014).

Besides the decline in reputation of the regulators and financial markets, the reputation of the accounting sector itself was severely hit by these accounting scandals (Ball, 2009; Spaenjers, 2004). According to Accountantweek (2015) the accountingfirms in The Netherlands are suffering from the scandals that occurred in the past few years. Furthermore Berry Wammes, the director of the NBA, stated in an article of Van den Akker (2014) that the scandals are very inconvenient for the the Dutch accounting sector as a whole. More specifically the accounting sector suffers from a loss of reputation. According to the NBA, who conducted a research on the topic in 2013, the reputation of the accountants is viewed as mediocre. Moreover the reputation of the accountingfirms themselves is viewed even less than mediocre (NBA, 2013).

This phenomenon is actually quite peculiar. In other industries when one company does something unethical, this does not influence the reputation of the whole industry. For example the diesel engine fraud committed by Volkswagen does not influence the reputation of General Motors or Fiat. Therefore it is interesting to look at this phenomenon more closely.

The purpose of this thesis is to examine if there is a relation between accounting scandals and the reputation of the accounting sector as a whole. More specifically, the thesis will examine if there is an effect of an accounting scandal committed by a publicly traded Dutch firm, which was not retained by the auditor, for the reputation of the Dutch accounting sector as a whole. Hence the research question of this thesis is:

RQ: Does an accounting scandal committed by a Dutch company, which was not retained by the auditor, have a negative influence on the reputation of the Dutch accounting sector as a whole?

This thesis only examines the accounting scandals that were not retained by the auditor. The reason for this is that the aim of this thesis is to provide evidence for the relation between accounting scandals and the auditing sector. Therefore the auditors should have had an active role in the scandal. This thesis defines having an active role in the scandal as not retaining the fraudulent accounting. In other words, the auditor knew that something was wrong with the

financial statements, but did not do anything to prevent the fraudulent accounting from happening.

This thesis aims to provide evidence for the relation between accounting scandals and the reputation of the auditing sector as a whole. Therefore the research question is about the accounting sector as a whole, which in this thesis are the 30 most important accounting firms of The Netherlands (Schutte & Maassen, 2015). To provide an answer to this question there are two sub questions formulated.

What is the influence of accounting scandals committed by a Dutch company, which were not retained by the auditor, on the reputation the Big Four firms in The Netherlands?

In this sub question this thesis only focuses on the Big Four accounting firms: EY, PwC, Deloitte and KPMG. Looking at the accounting sector, the media pays most attention to the Big Four firms (Groot, 2014). Therefore, when something scandalous happens the media focuses primarily on the Big Four (Van den Akker, 2014). This is why these findings could be different from the overall findings of this thesis.

What is the influence of accounting scandals committed by a Dutch company, which were not retained by the auditor, on the reputation of the firms other than the Big Four firms?

In the article of Van den Akker (2014) Berry Wammes stated that that the Big Four firms do not stand alone in this and that the same problems arise within the smaller firms in The Netherlands. Due to the fact that there is less media coverage for the smaller firms (Van den Akker, 2014; Groot, 2014) the loss of reputation could be less than for the sector as a whole and the Big Four firms in particular. Therefore it is interesting to see if there is a difference between the influence of scandalous behavior on the reputation of the Big Four firms and the non-Big Four firms.

When the sub questions are answered the research question could also be answered.

1.1 Academic Relevance

A lot of newspapers, television programs and even magazines discuss the topic of the reputational loss of the accounting sector as a whole, which is caused by the accounting scandals of the last few years. However, up and until now there has not been any empirical

evidence found, that support these claims made by the media. Not having empirical evidence could mislead the public opinion. The public could therefore make assumptions, which are not true and based on claims that are not empirically supported. This thesis aims to provide empirical evidence, to see if accounting scandals do actually have the negative effect on the whole accounting sector as proposed by the media.

Furthermore, the outcome of this thesis should be of relevance to other researchers, because empirical evidence will be provided about the general assumed statement that an accounting scandal affects all firms in the accounting industry. In addition this thesis also examines the difference in the magnitude of the effect between the Big Four firms and the non-Big Four firms. Moreover the research on the topic of a decline in reputation of the accountancy industry gives valuable insights in the debate whether or not there need to be a new standard for the accountancy sector. The reputation of the accountancy sector as a whole would be boosted when a new set of standards is introduced, according to the people in favor of a new set of standards (Lasance, 2015). This argument lacks empirical evidence, this thesis will provide profound research on the topic if all accounting firms truly suffer from reputational loss after a scandal.

1.2 Methodology

This thesis gives an answer to the main research question through an empirical study. For this thesis a few elements are important to be predetermined.

First of all in this thesis one of the main challenges is to determine which events can be defined as an accounting scandal. The definition of this variable is divided into two parts. . First of all the definition of a public scandal. This thesis follows Wilson (1993) and his definition of a public scandal. Wilson opens his book The Moral Sense (1993) with the observation that for the occurrence of a public scandal two conditions must hold. Firstly the events must not be usual; the occurrence of these events must be relatively infrequent. Furthermore the events must be shocking; the events must counter our norms (Wilson, 1993). Moreover no scandal arises from unusual but morally acceptable events. Due to the fact that this thesis examines the accounting scandals that were committed by Dutch companies, this thesis will be focusing on the Dutch disciplinary accounting institutions. In The Netherlands the 'Accountantskamer' is the institution where claims can be made against accountants (Accountantskamer, 2015). Judgments made by the 'Accountantskamer' will be validated along the two conditions of Wilson (1993) to decide if these judgments will be regarded as an

accounting scandal. Secondly it needs to be determined when a public scandal can be seen as an accounting scandal. Only the scandals where the auditors did not retain these scandalous events are taken into consideration.

Secondly a loss of reputation needs to be defined. This thesis uses the stock market reaction to the accounting scandals of the clients of the auditing firms, as a measure for the loss of reputation. The papers of Chaney & Philipich (2002), Menon & Williams (1994) and Krishnamurthy et al. (2006) find significant evidence of the existence of a negative relation between a decline in auditor reputation and the stock market reaction of the clients of this specific firm. Therefore a negative stock market reaction of the clients of an auditing firm to the news of accounting scandals shows that there is a loss of reputation for the auditors.

Furthermore the accounting sector as a whole needs to be defined. This thesis will use the top 30 accounting firms in The Netherlands. Every year the magazine Accountancy Vanmorgen publishes the top 30 accounting firms in The Netherlands in cooperation with Full Finance, a consultancy firm. This list looks at the total amount of revenue from the accounting branch in a firm and the total fte's, which stands for full time equivalents. This thesis uses this list, because it represents 78% of the accounting sector in 2014 in terms of revenue. The Big Four represent 52%, while the other 26 firms represent 26% of the accounting sector (AFM, 2015; Schutte & Maassen, 2015).

Taking these variables into account, an event study will be performed to see if the cumulative abnormal returns (CAR) are negatively influenced by the news of an accounting scandal. Besides the event study there will also be a cross-sectional analysis performed to see if the dummy variable Big Four will have a significant negative influence on the CAR of the clients of the auditing firms after the news of an accounting scandal. Moreover this thesis also controls for other factors that influence the cumulative abnormal returns for the clients of the accounting firms. Firm size and sales growth are implemented as the control variables.

Chapter 2 presents the theoretical framework in which this thesis will operate. Besides this Chapter 2 provides also the definitions of the most important variables used in this research. Chapter 3 describes the prior research done on the subject of accounting scandals. Furthermore Chapter 4 describes the development of the hypotheses and link them to the theory as described in Chapter 3 and Chapter 2. Chapter 5 shows the research design used in this thesis. Chapter 6 presents the results from the regressions performed in this paper. Finally Chapter 7 provides the conclusion, the limitations of this study and the possibilities for further research.

2. Theoretical Framework

This chapter provides the theoretical framework wherein this thesis operates. The thesis uses the agency theory as theoretical framework. The agency theory is being used because the research question fits in the agency theory. This will be discussed further in Chapter 2.3, which will provide the link between the agency theory and the research question of this thesis. But first of all this chapter provides an analysis of the agency theory. Furthermore it points out some critique that business ethicists have on the use of the agency theory. Thirdly this chapter provides the link between the agency theory and the research question of this thesis. Finally in this chapter you can find the definitions of the most important variables of the research question.

2.1 Agency Theory

Wilson (1968) and Arrow (1974) are two of the first economists to explore risk sharing among individuals or groups. These two researchers described in their research the risk sharing problem that arises when two parties, who work together, have different mindsets towards risk (Eisenhardt, 1989). According to Jensen & Meckling (1976) the agency theory broadened the already existing risk-sharing literature as described by Wilson (1968) and Arrow (1974). The theory is extended by including the so-called agency problem. This problem occurs when parties who work together have different goals and there is division of labor (Ross, 1973). Specifically, the agency theory describes "situations in which an individual (the agent) acts on behalf of another (the principal) and is supposed to advance the principal his goals" (Roberts & Milgrom, 1992). The agency theory tries to describe these situations using the metaphor of a contract (Jensen & Meckling, 1976).

There are two problems that can arise in a principal-agent relationship. First of all there is the agency problem (Eisenhardt, 1989). The agency problem arises when the desires or goals of the principal and agent are in conflict with each other. The term used for this specific type is adverse selection (Balakrishnan & Koza, 1993). Furthermore the agency problem arises when it is very difficult for the principal to verify what the agent actually is doing. Another name for this phenomenon is moral hazard (Zeckhauser, 1970). The problem with moral hazard is that the principal cannot verify if the agent behaved properly according to the rules. The second problem that can arise from the principal-agent relationship is the problem of risk sharing. The source of the risk-sharing problem is the difference in attitude towards

risk between the principal and the agent. The problem is that both principal and agent could prefer different actions, because of the existing difference in attitude towards risk (Eisenhardt, 1989).

The agency theory uses the contract that arranges the relationship between the principal and the agent as the unit of analysis. For this reason the main focus point of the agency theory is to determine the most efficient contract that arranges the relationship between the principal and the agent, given certain assumptions about people, organizations and information. More specifically the question is: "is a behavior-oriented contract, for example salaries, more efficient than an outcome-oriented contract, for example stock options or commissions?" (Eisenhardt, 1989).

The agency theory consists of assumptions in three areas: people, organization, information. First of all the assumptions for people are: self-interest, bounded rationality and risk aversion. Secondly the assumptions for organizations in the agency theory are: goal conflict among participants, efficiency as the effectiveness criterion and there is information asymmetry between the principal and the agent. Lastly the assumption about information in the agency theory is that information is seen as a purchasable commodity (Eisenhardt, 1989).

The agency theory can be used in a variety of settings such as regulatory policy or explaining expressions of self-interest. An example of expressions of self-interest is the occurrence of accounting scandals which will be elaborated on further in the chapter. However the agency theory is used most often to explain organizational phenomena such as compensation (Conlon & Parks, 1990) and vertical integration (Anderson, 2008). Overall, the agency theory is used for relationships that contain the basic agency structure of a principal and an agent who are trying to work together, but they have both different goals and different attitudes towards risk (Eisenhardt, 1989).

During the years the agency theory has developed into two streams: positivist and principal-agent (Jensen, 1983). The two streams share the same unit of analysis, the contract between the principal and the agent. Furthermore the two streams also share the assumptions regarding people, organizations and information. There are also differences. The two streams differ in their mathematical severity, dependent variable and finally the two streams differ in their style.

2.1.1 Positivist

Eisenhardt (1989) states in her article that positivist researchers focus on identifying situations in which the principal and the agent are likely to have a difference in their goals. When this is the case the positivist researchers then describe the governance mechanisms that would limit the self-interest behavior of the agent. The difference between the positivist stream and the principal-agent stream is that the positivist researches use less mathematical explanations than the principal-agent research. Moreover the positivist researchers focus almost only on a very particular case of the principal-agent relationship, the relationship between owners and managers of large, public corporations (Payne et al., 1993).

According to Eisenhardt (1989) three articles have had a big impact on the positivist research. First of all the research of Jensen and Meckling (1976). They did research on the topic of ownership structure of corporations. In their research they included how equity ownership by managers aligns the interests of managers with the interests of the owners (Eisenhardt, 1989). The second article is written by Fama in 1980. He discussed the role of efficient capital markets and efficient labor markets as information mechanisms, which are used to control the self-interest behavior of top executives (Eisenhardt, 1989). Lastly Fama and Jensen (1983) focused on monitoring within large corporations where there is separation of ownership. They describe that stockholders could use the board of directors as an information system to monitor the opportunism of top executives.

When we look at the positivist stream from a theoretical point of view, we can conclude that the positivist stream was primarily focused with describing the governance mechanisms that solve the agency problem.

Jensen's (1983) view on the positivist stream in the agency theory was that it can be seen as enriching economics by offering a more complex view of organizations. On the other hand it has been criticized by organizational theorists as minimalistic (Perrow, 1972) and by micro economists as tautological and lacking severity (Jensen, 1983).

2.1.2 Principal-Agent

The principal-agent stream in the agency theory is focused on the general theory of the principal-agent relationship. This general theory can be applied to buyer-supplier, psychiatrist-patient and other agency relationships (Harris & Raviv, 1978).

The principal-agent stream and the positivist stream differ from each other. The principal-agent stream is abstract and mathematical. Mathematical means that this stream is more focused on the math than on reasoning. This stream looks in a more calculating way to the principal-agent relationship. Therefore it is less accessible to scholars. An example for this is that the most vocal critics of the agency theory (Perrow, 1972; Hirsch et al., 1987) focused primarily on the positivist stream. Furthermore the principal-agent stream has a broader focus and greater interest in general in comparison to the positivist stream. Finally according to Eisenhardt (1989) the principal-agent stream research includes more testable implications.

These differences are not crucial. On the contrary, Eisenhardt (1989) states in her article that the two streams are complementary to each other. On the one hand the positivist stream identifies various alternatives in contracts, while on the other hand the principal-agent stream indicates which contract is the most efficient under a few variables such as, risk aversion, behavior and varying levels of outcome uncertainty.

The principal-agent stream focuses on determining the optimal contract, behavior-oriented or outcome-oriented, between the principal and agent. This stream starts with a simple model that assumes that the principal and the agent have different goals. Furthermore the simple model assumes that the agent is more risk averse than the principal. Eisenhardt (1989) states that the argument for the difference in attitude towards risk lays in the fact that agent are unable to diversify their employment and therefore should be risk averse. While on the other hand the principals can diversify their investments and therefore should be risk neutral. Hence, their attitude towards risk differs.

Demski & Feltham (1978) described the approach of the simple model in terms of cases. The first case occurs when the principal knows what the agent has done. This is a case of complete information. In this case a contact that is based on behavior would be the most efficient one, given the fact that the principal buys the behavior of the agent. In contrast an outcome-based contract would transfer risk to the agent, while the agent is assumed to be more risk averse as explained above.

The second case described by Demski & Feltham (1978) occurs when the principal does not know exactly what the agent has done. Given the fact that an agent acts primarily on his self-interest, the agent may or may not have behaved as is stated in the contract. In this case the agency problem will arise. This is due to the fact that first of all the principal and the agent have different goals and secondly because the principal cannot monitor the agent properly. In other words the principal cannot determine if the agent behaved according to the agreed terms (Eisenhardt, 1989). The literature on the principal-agent stream describes two aspects. First of

all, moral hazard. This phenomenon arises when the agent does not put in the effort that is specified in the contract between the principal and the agent. An example of the moral hazard phenomenon is fire insurance. It is very likely that the insured in a fire insurance contract spends less money and effort in taken safety measures. The reason is that the costs for these safety measures are for the insured, while in the case of a fire the costs are for the insurance company. The other aspect is adverse selection. This phenomenon refers to the misrepresentation of the ability of the agent by the principal (Eisenhardt, 1989; Demski & Feltham, 1978). Adverse selection occurs when the agent claims it has the desired skills while in fact the agent does not have these skills. An example of adverse selection is that only 'bad' cars are being sold in the used car market.

When the second case occurs the principal has two options. Firstly the principal could invest in information systems, for example reporting procedures, to discover the behavior of the agent. The investments will unveil the behavior of the agent to the principal. This means that the second case, the case of unobservable behavior, reverts to the first case, the case of complete information.

Secondly the principal could use an outcome-based contract. Such outcome-based contracts motivate the agent to change his behavior to become more aligned with the principal his preferences. This comes at the price of transferring risk to the agent. The risk issue only occurs because outcomes are only partly due to the behavior of the agent. Also the economic climate, the competition and regulations are uncontrollable factors that influence outcomes. These uncontrollable factors result in outcome uncertainty, which carries a certain amount of risk with it. This risk must be carried by someone. In the case of low outcome uncertainty, the cost of shifting the risk to the agent is low. Therefore outcome-based contracts are attractive. On the other hand if there is high outcome uncertainty, the cost of shifting the risk to the agent is high. Therefore outcome-based contracts are less attractive, despite the alignment of interests between the principal and the agent (Eisenhardt, 1989; Demski & Feltham, 1978).

This simple model of the agency theory has been a topic for many articles (Demski & Feltham, 1978; Hölmstrom, 1979; Eisenhardt, 1989). However according to Eisenhardt (1989) is the key of the principal-agent theory the tradeoff between on the one hand the cost of measuring behavior and on the other hand the cost of measuring outcomes and transferring risk to the agent.

2.2 Critique on the agency theory

According to Heath (2013) the agency theory is an approach that uses the application of game theory to analyze a particular class of actions. He also states that the controversial aspect of the agency theory lies in the usage of game theory.

The use of game theory is surrounded by controversy, because game theory uses a number of substantive assumptions, including most famously, a commitment to an economic model of rational action. In this model individuals are seen as expected utility maximizers. This means that when an individual is faced with a problem, this individual will take actions that are in his own best interest. This is for ethicist the reason for controversy, since these models of rationality classify all moral action as irrational, or these models rationalize it with the discovery and attribution of some underlying non-moral incentive (Heath, 2013).

Hence, ethicists often complain about the assumption of agency theorists that rational individuals are self-interested and act from an egocentric point of view instead of an altruistic point of view. This is according to the ethicists the same as endorsing moral skepticism. It is therefore not a helpful starting point for the creation of a system of applied ethics. The response to this critical note is that the economic model of rationality does not imply such a thing. In the agency theory the definition of utility is made with respect to the preferences of individuals. These preferences only reflects what an individual wants, this could be either egoistic or altruistic (Solomon, 1999).

However one could search the literature for a long time before finding an example of an agency theory analysis that describes altruistic motivation to either the principal or the agent. Agency theorists make often empirical assumptions about the preferences of individuals, while the theoretical framework does not force them to make those assumptions. For example agency theorists often assume that work effort bears negative utility, while the reward of money bears positive utility and they assume that individuals have no other relevant motives (Dees, 1992). Buchanan (1996), however, states that the agency theory per se does not imply commitment to such claims.

Besides the problem ethicists have with the concept of rationality in the agency theory there are other substantive assumptions in the economic model. These assumptions are, seen from an ethicist point of view, adverse. Furthermore these assumptions cannot be purified from the model so easily (Heath, 2013).

Heath (2013) describes two outstanding problems with the assumptions in the economic model. Heath (2013) states that the first problem is the inclination among game theorists to

'black box' all questions of motivation. The so-called 'black boxing' helps the theorists to avoid arguments about egoism and altruism, but the downside is that there is also no developed theory of preference-formation. Therefore there is no ability in the theory to reproduce the way that preferences change due to social interactions (Knight, 1992). In game theory preferences are seen as given variables and are also seen as independent of strategies. Hence, players in a standard game theory model cannot change the preference of each other through their interactions. This restriction is often forgotten by agency theorists who apply them to the analysis of empirical interactions (Heath, 2013).

Due to the fact that there is no generally accepted theory of preference-formation in games, agency theorist have spent a lot of time studying in what way external incentives can be used to dissolve the divergence of goals between the principal and the agent.

The economic model of rationality does not imply that people can only look at the external incentives; agency theorists just have no idea how to model a process with the possibility of preference change in games. Therefore most agency theorists have chosen to ignore them. Heath (2013) also states that the focus on external incentives is just a methodological problem, which can be solved by developing a more sophisticated way of modeling techniques. Once again there is no reason per se for ethicists to decline the use of the agency theory.

In contrary to the first outstanding problem, the second outstanding problem is a real reason for the ethicists to decline the use of the agency theory. The problem, according to the ethicists, is that agency theorists believe that individuals will behave in an opportunistic manner whenever they have the chance to do so. In this case opportunistic is defined as a condition of self-interest seeking with deceit (Williamson, 1985). In other words regardless of what people say they are going to act, they will always change their actions as the situation unfolds. Furthermore they renounce any earlier made agreements, whenever it is in their best interest to do so (Heath, 2013). For example, a farmer could hire a few workers, who promise to harvest his crops. But when it is harvesting season he is faced with a strike threat, when it is too late for the farmer to hire new workers (Roberts & Milgrom, 1992).

Alongside the characterization of the opportunistic behavior, the agency theorists assume that individuals are not able to really commit to contain themselves from acting in an opportunistic way. Unless they are able to create an external incentive structure that also changes their own future incentives (Heath, 2013).

It is very unlikely that ethicists see this as a good framework for analysis, because this assumption suggests that an individual, to be rational, needs to display a variety of vices such

as deceit. The agency theory seems to use some of the worst assumptions about human and put those assumptions in the definition of rationality (Heath, 2001).

Opportunistic behavior is often viewed as a consequence of agents behaving according to the principle of sequential rationality. Sequential rationality is defined by Hendon et al. (1996) as: "The strategy of any player should be optimal from any information set at which he moves, given his beliefs at that information set and the strategies of the other players." The principle of sequential rationality is what justifies the use of backward induction by game theorists (Fudenberg & Tirole, 1991). Backward induction, consequentialism, means that the last player, who must choose between the branches of a game tree, makes the choice that maximizes his own utility. When we take this as a given fact, we can determine what the previous player would do. The previous player would maximize his own utility given the next player his choice. This goes on until the beginning of the game (Aumann, 1995).

In other words the hypothesis of consequentialism is that the value of an action is the function of the anticipated consequences, nothing else (Heath, 2013). However consequentialism excludes that an agent, who acts in a rational manner, includes deontic constraints into the decision making process. Deontic constraints are principles that are directly linked with actions, independent of the consequences. Such principles are loyalty, commitment and ethical thinking (Wieringa & Weigand, 1989). It is an important restriction that these principles are excluded.

Concluding, ethicists have some justifiable concerns about the framework used in the agency theory, because the framework uses a controversial concept of rationality. However according to Heath (2013) it is still not clear if these doubts should really turn into complaints. The reason is that agency theorists are not telling how you should behave, but the primarily focus on developing a positive theory of the company. They focus on this to offer empirical explanations as to why organizations take on such forms and offer a particular set of incentives on why people behave in the way they do (Heath, 2013).

2.3   Link with accounting scandals

First of all recall the definition of the principal-agent relation as described by Roberts & Milgrom (1992): "Agency theory describes situations in which on individual (the agent) acts on behalf of another (the principal) and is supposed to advance the principal his goals." The relationship between owners of a company and the managers of that company is an example of a principal-agent relationship (Roberts & Milgrom, 1992).

According to Hansmann (1996) owners are residual plaintiffs on its earnings. As a result of this, the owners have no evident contract to protect their interests. Instead they rely on the formal control of the decision-making device of the company to make sure that the interests of the owners are decently respected by the management of the firm (Heath, 2009). In most business situations the owners are the shareholders of the company. However as seen in the last years it is difficult for the shareholders to use their formal control over management. In other words, it is very difficult to achieve proper alignment of the interests between the shareholders, the principal, and the management of the firm, the agent.

The scandals that happened for the last few years are a clear indication of the difference in interests between the shareholders and the management of the firm (Heath, 2009) Such scandals are: Enron, Worldcom, Parmalat, Vestia and Imtech. One of the best examples of the attitude management had towards investors is given by Hollinger International his CEO Conrad Black in an internal memo. One of the members of the board of directors of Hollinger International, Richard Perle, signed a document, without authorization of the board, which committed Hollinger to invest $25 million in the trust fund of Perle himself. About this deal Black stated that this is a good deal of "nest-feathering". The only thing Black had a comment on is the exclusion of management to the benefits of this deal. Black wrote: "I think they have done a good job rummaging all this together, but they should treat us as insiders with our hands cupped as the money flows down, and not as outsiders pouring in the money." (Labaton, 2004).

Furthermore deceit and the misappropriation of assets by management, the agent, is a textbook example of the moral hazard problems. These problems belong to the focus points of the agency theory (Heath, 2009). Moral hazard could also be described as opportunistic behavior as stated before. Jensen & Meckling (1976) point out that the cost of this opportunistic behavior lies by the offending party. This provides an incentive for the offending party to write up a contract that limits his own opportunistic behavior. To enforce these contracts, there must be some kind of monitoring of the behavior of management. According to Jensen & Meckling (1976) this is the role of the auditor. In other words, the auditor is the monitoring mechanism in a company to look after the interests of the principal and monitor the behavior of the agent (Watts & Zimmerman, 1983).

Besides the typical principal-agent relationship that applies to the research question of this thesis, there is also another link between the scandals and the agency theory. Ghoshal (2005) states that the agency theory is responsible for creating a business culture that eventually led to the scandals as seen in the past few years.

The field of accounting research is a social science, but there is a strong reliance on the methodological instruments that are used in the physical sciences, for example biology, chemistry and physics. The use of these instruments from the physical sciences for social science purposes is inappropriate and it damages the legitimacy of the work of accounting researchers (Ghoshal, 2005). To make instruments from the physical sciences usable for the problems that researchers face in the social sciences, the accounting researchers adopted a practice of developing very simplistic models. In these models the issues of social dynamics and social context are ignored to reduce the behavior of individuals to a mathematically manageable model (Cohen & Holder-Webb, 2006). These models have been used by researchers and by teachers without sufficient consideration of the limitations of these models.

When teachers teach these models, or theories, to their students it may change the behavior of the actors in the real world (Cohen & Holder-Webb, 2006). An example is illustrated by Ferraro et al. (2005); if there is a theory stating that employees are primarily motivated by extrinsic incentives, it influences companies to focus more on these incentives in the control systems of the companies. On the other hand employees see what behavior is rewarded and adjust their behavior to get the rewards that the company focuses on. This self-fulfilling process, together with the trend of accounting researchers to use simplistic models, could change the business environment and therefore the economy in an undesirable way (Cohen & Holder-Webb, 2006).

As mentioned before there have been a lot of accounting scandals in the past few years. But, when looking beneath the surface of these scandals, one common element arises: inventive and desperate attempts to meet or exceed earnings forecasts and make the numbers at all cost (Knapp, 1999). According to Cohen & Holder-Webb (2006), this loss of ethical behavior could be caused by using these simplistic models to teach students.

In conclusion the agency theory links to the research question of this thesis in two ways. First of all there is the principal-agent relationship as described in the agency theory. The auditor is there to monitor the behavior of the agent to reduce agency costs. In this case management is the agent and the shareholders are the principal. Secondly there is the theory described by a few ethicists (Cohen & Holder-Webb, 2006; Ghoshal, 2005) that teaching the agency theory to students is cause of the decline in ethical behavior in the economy. This decline in ethical behavior is the cause for the scandals of the past few years.

2.4 Definitions

The research question of this thesis is: *Does an accounting scandal committed in The Netherlands have a negative influence on the reputation of the Dutch accounting sector as a whole?*

One of the most important variables in this research question is the variable accounting scandal. The definition of this variable is divided into two parts. First of all the definition of a public scandal. This thesis uses the definition of a public scandal as used by Wilson (1993) in his book The Moral Sense. Wilson states that for the occurrence of a public scandal two conditions must hold. Firstly the events must not be usual; the occurrence of these events must be relatively infrequent. Furthermore the events must be shocking; the events must counter our norms (Wilson, 1993). The general public pays almost no attention to events that happen frequently. Moreover no scandal arises from unusual but morally acceptable events.

Secondly it needs to be determined when a public scandal can be seen as an accounting scandal. There are two, closely related, categories of accounting scandals. First of all there are the accounting scandals that are initiated by the management of the company. Examples are Ahold, Enron and Parmalat. The second category consists of scandals that are initiated by the management, but the auditors did not retain such events and knew what was going on. An example of these scandals is Vestia. The two categories are closely related, because the scandals need to be initiated by the management of the company. However the difference is that in the second category the auditor did not retain the scandals from happening even if they knew about it. This thesis focusses on the second category, because this thesis examines the relation between accounting scandals and the decline in auditor reputation. Due to the fact that this thesis examines the accounting scandals that were committed by Dutch companies, it will be focusing on the Dutch disciplinary accounting institutions. In The Netherlands the "Accountantskamer" is the institution where complaints can be filed against accountants (Accountantskamer, 2015). Therefore this thesis looks at the judgements made by the "Accountantskamer" to look for scandals. The judgements of the "Accountantskamer" are then validated alongside the two criteria defined by Wilson (1993). If a judgement is validated then this thesis recognizes this judgement as an accounting scandal.

Another important variable that needs to be defined is the variable of reputational loss of the accounting firms. As stated in "Het Financieele Dagblad" (2016) the reputation of the accounting sector in general is declining since several scandals have happened.

To measure the decline in reputation this thesis looks at the research of Chaney & Philipich (2002) who conducted research on the topic of auditor reputation and the stock market reaction to a decline in the reputation. They use the cumulative abnormal returns as a measure of the negative stock market reaction of the clients of the auditing firms. Furthermore Chaney & Philipich (2002) state that due to de decline in reputation, the investors view the audits performed by these companies of inferior quality. In other words, because the decline in reputation affects the firm performance, investors view the work of these audit firms as of less quality. Therefore this thesis defines audit firm reputation as the CAR of their clients. Using CAR as a measure is also in line with Menon & Williams (1994) and Krishnamurhty et al. (2006).

The final aspect of the research question that needs to be defined is the accounting sector as a whole. Because this thesis defines accounting scandals as scandalous actions initiated by the management of the company and not retained by the auditors, who knew about these actions, the variable accounting sector is defined as the Dutch auditing firms. This thesis looks at the list of top 30 accounting firms in The Netherlands published annually by Accountancy Vanmorgen. This list looks at the total amount of revenue form the accounting branch in a firm and the total fte's, which stands for full time equivalents. This thesis uses this list because it represents 78% of the accounting sector in terms of revenue. According to a report published by the AFM in 2015 the Big Four accounting firms represent 52% of the total market. According to the list of Accountancy Vanmorgen the Big Four had together a total revenue of €2.578,1 million. Therefore the total revenue of the accounting sector as a whole is €5000 million. Given by the list of Accountancy Vanmorgen, the total revenue of the 30 largest accounting companies is: €3.882,6 million. This means that the total market share of the 30 largest companies is 78%. These 30 companies represent enough of the total market to make the outcome of this study generalizable.

2.5   Summary

First of all this chapter introduces and explains the agency theory. The agency theory describes "situations in which on individual (the agent) acts on behalf of another (the principal) and is supposed to advance the principal his goals" (Roberts & Milgrom, 1992). The agency theory is divided into two streams: the positivist stream and the principal-agent stream. Positivist researchers focus on identifying situations in which the principal and the

agent are likely to have different goals, while the principal-agent stream is focused on the general theory of the principal-agent relationship.

Furthermore this chapter presents some critical comments on the agency theory. Ethicists have some justifiable concerns about the framework used in the agency theory, because the framework uses a controversial concept of rationality. However according to Heath (2013) it is still not clear if these doubts should really turn into complaints. The reason is that agency theorists are not telling how you should behave, but they primarily focus on developing a positive theory of the company. They focus on this to offer empirical explanations as to why organizations take on such forms and offer a particular set of incentives on why people behave in the way they do (Heath, 2013).

Moreover this chapter links the agency theory to the research question of this thesis. The agency theory links to the research question of this thesis in two ways. First of all there is the principal-agent relationship as described in the agency theory. The shareholders are the principals and the management of the company is the agent. The auditor is there to monitor the behavior of management to reduce agency costs. Secondly there is the theory described by a few ethicists (Cohen & Holder-Webb, 2006; Ghoshal, 2005) that teaching the agency theory to students is cause of the decline in ethical behavior in the economy. This decline in ethical behavior is the cause for the scandals of the past few years.

Finally this chapter provides the definitions of the most important variables in the research question of the thesis. On the one hand the variable accounting scandal is defined by Wilson (1993) his definition of scandals. On the other hand this variable is explained by using the judgment of the "Accountantskamer" to look if there are any scandals in the accounting sector. Furthermore the loss of reputation is defined as the decline in firm performance and firm performance is defined as the change in ROA. Lastly the accounting sector as whole is defined as the top 30 accounting firms in The Netherlands as presented by Accountancy Vanmorgen.

3. Prior Research

This chapter provides the prior research related to the topic of this thesis. There are four streams of literature related to this topic. The first stream describes the accounting scandals and interprets the scandals. The second stream is concerned with the underlying factors that lead to the occurrence of these scandals. The third stream focuses on the consequences of the accounting scandals. Finally the last stream of literature that is related to the subject of this thesis examines the auditor reputation. At the end of this chapter an overview will be provided through a table.

3.1   Giving an overview of the accounting scandals

First of all, this thesis is related to the literature that describes the accounting scandals and interprets them. Spaenjers & Manigard (2004) give an overview of the major accounting scandals that have happened in the U.S. and in Europe. Such scandals are Enron, Worldcom, Royal Ahold, Lernout & Haspie and Parmalat. According to Spaenjers & Manigard (2004) the most important lesson to take from the accounting scandals is that the financial system is based around the investors. Therefore, to gain more security, investors do not need to count on new legislation, but instead the investors should use the financial system itself to gain the security they want. They should use the two most important mechanisms of the financial system: rationality and the self-regulating market. However to gain security using the financial system alone is not enough. Investors should also be pro-active by being skeptical and keep asking questions to management of the companies they invest in.

The opposite view of the paper by Spaenjers & Manigard (2004) can be found in the paper of Ball (2009). Ball (2009) looks at the accounting scandals from different perspectives. On the one hand, he looks at the scandals from the political/regulatory perspective and on the other hand he looks at the scandals from the market of corporate finance and financial reporting perspective. He states, in contrast to Spaenjers & Manigard (2004) that markets need rules and new legislation. Furthermore he states that markets rely on trust. Ball (2009) states also that the U.S. had a very effective set of rules, however these rules were broken and had severe consequences for not only the companies, since they mostly effected the shareholders. Moreover, according to Ball (2009), the set of rules in the U.S. were very effective in detecting the various scandals but not in preventing them.

Jones (2010) agrees with Ball (2009) that the problem could not be prevented, he goes a bit further. In his book Jones (2010) asked researchers in 12 different countries to describe the scandals that have happened in their own countries. This leads to a book with 58 high profile accounting scandals. The main takeaway is that fraud and creative accounting is an everlasting problem. This could not be resolved by issuing new legislation as mentioned by Ball (2009) or by using the financial system itself to provide better security for investors as stated by Spaenjers & Manigard (2004).

3.2   Underlying factors for accounting scandals

The second stream of literature related to the topic of this thesis is about the underlying factors for accounting scandals. A part of this stream of literature looks at the underlying factors of earnings management. Earnings management is related to the topic of accounting scandals in the way that through earnings management accounting scandals may occur. First of al Dechow et al. (1996) find in their paper that getting external financing at low costs and evading debt covenants restrictions are important motivations for managers to manage earnings. However Dechow et al. (1996) did not find any significant evidence that earnings management is used by managers to earn larger earnings based bonuses. Dechow et al. (1996) also did not find any significant evidence that top management made unusual amounts of stock sales during the period of earnings management. However Beneish (1999) does find significant evidence that top management is more likely to sell overpriced stock and other equity holdings during the period of earnings management. In contrast to the paper by Dechow et al. (1996), Beneish (1999) does not find any significant evidence that managers are motivated to manage the earnings to get external financing at low costs.

A second part of this literature looks at the influence of corporate governance on the likelihood of accounting scandals. Jones (2010) states in his book that the collapses occurred, because the managers are motivated by personal gain. This personal gain is easily obtained through a poor corporate governance system and the failure of the external auditor. Dechow et al. (1996) also find that a weak corporate governance structure causes earnings management to arise in their sample of 92 U.S. firms. Beasly (1996) and Klein (2002) further proved these outcomes. Beasly (1996) finds that firms who were involved in financial statement fraud have a lower percentage of outside board members in their board in comparison to firms who were not involved in financial statement fraud. Outside board members is defined as non-employee board members, in other words directors who are currently not employed at the same

company. Furthermore Beasly (1996) emphasizes the importance of a good corporate governance system by finding significant evidence that the composition of the board is more important than the presence of an audit committee. Klein (2002) finds in her study of 692 U.S. publicly traded firms that the likelihood of earnings management is higher for firms with less independent boards and audit committees.

However Agrawal & Chadha (2005) find in their study that several governance characteristics are essentially unrelated to the probability of a company restating their earnings. These characteristics include providing non-audit services by auditors to the same client and the independence of the board and audit committees, which is in contrast to the paper of Klein (2002). Agrawal & Chadha (2005) do find that the likelihood of restating the earnings is significantly higher for firms whose CEO belongs to the founding family. Furthermore they find that this likelihood is significantly lower for firms whose boards or audit committees have an independent expert in them. This finding is in line with the paper of Beasly (1996), which emphasizes the importance of board composition.

Another part of this stream of literature looks at the relation between certain compensation incentives and the probability of financial statement fraud. Bergstresser & Philippon (2006) find that companies with a more incentivized CEO have higher level of earnings management. The definition of incentivized CEO according to Bergstresser & Philippon (2006) is that the compensation of the CEO is more sensitive to the share prices of the company. Burns & Keita (2006) also find that CEO's who have option holdings, that are sensitive to the stock prices of the company, are more likely to misreport. However Burns & Keita (2006) do not find evidence that other components of the compensation have the same effect. In contrast to these findings is the paper of Erickson et al. (2006). They find that there is no significant evidence for the relation between incentives of stock-based compensation and the likelihood of financial statement fraud.

Kedia & Philippon (2009) look at the problem of managers who see the true productivity of their firms, while these managers make also hiring and investment decisions. Kedia & Philippon (2009) find that in a period of alleged financial statement fraud, firms hire and invest in an excessive way. While on the other hand managers still exercise their options. When the fraud is eventually detected, firms lose the labor and capital. This leads to an improvement in the firm's productivity once again.

Alexander & Cohen (1999) looked at the relation between ownership structure and corporate crimes committed by public companies by examining 78 public companies in the U.S. All these companies were involved in corporate crimes. Alexander & Cohen (1999) find

that the likelihood of corporate crimes is associated with ownership structure. More specifically they find that corporate crimes occur less often at firms where management owns part of the equity.

Povel et al. (2007) developed their own model to examine why fraud peaks at the end of a boom and then in the following burst. The model used by Povel et al. (2007) shows the factors that determine if a firm commits fraud or not. The most important factor is how carefully the investors can be expected to examine the firms they want to invest in. Furthermore Povel et al. (2007) find that the possibility of fraud does not always respond to changes in the circumstances as expected.

Besides the behavior of management as an underlying factor for the occurrence of accounting scandals, the behavior of auditors is also an underlying factor. Auditors themselves do not commit the accounting scandals, but auditors can contribute to these scandals. For example by helping the company covering up the evidence or by not performing their professional judgment to be skeptical and independent. The idea is that the auditors learn throughout their study to be skeptical and independent. The paper of Low et al. (2008) looked at the influence of education. The main focus point of this paper is to discuss the inadequacy of the programs provided by the universities with regards to the influence of ethics education on accounting graduates. Low et al. (2008) find, through a survey with 72 participants, that most of the students think that ethical education can only have a moderate influence on the behavior of accountants. This suggests that the thinking of accounting graduates could be influenced before they enter the business world. Therefore Low et al. (2008) conclude that to make a difference the universities need to cover ethics in their programs for accounting students. The likelihood of accounting scandals increases if auditors do not behave ethically.

3.3   Consequences of the accounting scandals

The third stream of literature related to the topic of this thesis, is the literature that looks at the consequences of the accounting scandals. First of all after performing some multivariate tests on the same sample as previously used by Alexander and Cohen (1999), Alexander (1999) comes to three main findings in her research. First of all Alexander (1999) finds that the losses in shareholder wealth are larger for crimes committed against related parties than for crimes against a third-party. This finding is an extension of the paper of Alexander & Cohen (1999) who find that accounting scandals do not benefit the shareholders. Secondly Alexander (1999) concludes that companies who commit a crime, experience a significant

loss of clients and reassignments of management and employees. Besides reassignments Alexander (1999) also finds that these companies suffer from a significant turnover in management and employees. Finally the victims of these firms with reputational losses are mostly government agencies instead of private parties.

Carcello et al. (2005) did research on the changes in the internal auditing during the Enron and Worldcom scandals. Carcello et al. (2005) find that the levels of staff, the audit committee meetings, the length of the audit committee meetings and the internal audit budget increased significantly in the years 2001 and 2002. Furthermore Carcello et al. (2005) conclude after performing OLS regressions, that there is a larger budget increase for the auditors within smaller firms. Moreover there is a larger budget and staff increases for firms with more financial recourses or more liquidity risk. Finally Carcello et al. (2005) find that there are differences between industries in regard to the changes in internal auditing.

As mentioned before Dechow et al. (1996) find in their research that an important motivation for earnings management is to get external financing at low cost. However Dechow et al. (1996) find that a consequence of earnings management, accounting scandals, is that the cost of capital is higher than before the firm managed their earnings. Finally Jones (2010) concludes his book with the takeaways of the 58 major accounting scandals in 12 different countries. Jones (2010) finds that these scandals lead to financial losses and in most countries an increase in the legislation. If this increase in legislation is a good thing, is debatable as mentioned before.

3.4   Auditor reputation

The last stream of literature that is related to the topic of this thesis is on the subject of auditor reputation. Francis (1984) looked at the a sample of 150 publicly traded Australian firms to determine the difference in price between the Big Eight auditing firms and the non-Big Eight auditing firms. Francis (1984) concludes that the Big Eight firms earn a premium in comparison to non-Big Eight firms. Furthermore Francis (1984) finds that there is no price cutting behavior by the auditing firms in the Australian market. Francis (1984) defines price cutting behavior as: "lower initial audit fees than continuing engagement fees for a comparable audit." Furthermore he finds weak evidence that the initial audit fees are higher than the audit fees for a continuous engagement. Francis & Simon (1987) provide further evidence of the existence of a Big Eight premium. Francis & Simon (1987) looked at the small auditee segment in the U.S. for publicly traded companies. They find that there is a Big

Eight premium for both second-tier national firms and local and regional firms. Craswell et al. (1995) examined the relation between brand name reputation and industry specialization by the Big Eight firms and the amount of the audit fees. After using a cross-sectional audit fee regression model and an OLS regression model, Craswell et al. (1995) find that Big Eight firms who specialize themselves in an industry earn a premium in comparison to non-specialist Big Eight firms. Moreover the Big Eight auditing firms earn a premium over non-Big Eight auditing firms, because of their high level reputation. However Chaney (2004) found contrary evidence. Chaney (2004) looked at a sample of 15484 private firm observations in the period 1994-1998. He finds no significant evidence for a Big Five premium. Furthermore Chaney (2004) even finds significant evidence that if clients had chosen for non-Big Five auditing firms instead of the Big Five auditing firms, they would have paid a higher auditing fee.

Datar et al. (1991) provide their own model where the value of an audit is increasing by the audit quality and the firm-specific risk. This model is also a non-decreasing function of the expectations about the future value of the firm. Datar et al. (1991) their proposition is therefore that the initial value of an IPO depends on the audit quality. Feltham et al. (1991) try to find significant evidence for the proposition of Datar et al. (1991). Feltham et al. (1991) do find empirical support for the proposition that the initial value of an IPO depends on the audit quality, however this empirical support is very weak. Feltham et al. (1991) do not find any evidence that support their second hypothesis. The second hypothesis states that financial reports audited by higher quality auditors should have a bigger marginal effect on the current market value than if the financial reports were audited by a lower quality auditor. Finally Feltham et al. (1991) conclude that models like the one developed by Datar et al. (1991) are useful but are only successful if the use the analysis of the demand and supply side effects. Clarkson & Simunic (1994) however do find significant evidence for the relation between the audit quality and the initial IPO value as stated in the paper of Datar et al. (1991).

Balvers et al. (1988) look at the relation between the reputation of investment bankers and the reputation of the auditors they select. Furthermore Balvers et al. (1988) also examines if the reputation of the auditor has influence on the underpricing of IPOs. Balvers et al. (1988) conclude that investment bankers with a high reputation are more likely to select an auditor with a high reputation. Furthermore high reputations help to reduce the underpricing of IPOs. Beatty (1989) provides also evidence that there is less underpricing for IPOs if they hire an audit firm with a high reputation. Moreover Beatty (1989) looks at the relation between the reputation of an auditor of an IPO and the initial return earning by an investor. Beatty (1989)

concludes that clients who hire an audit firm with a high reputation have lower initial returns, than if they hired an auditor with a lower reputation. The reason for this is that auditors with a high reputation earn a premium as seen earlier in this thesis.

Menon & Williams (1994) look at the effect on stock prices of the clients of the audit firm Laventhol & Horwath after their bankruptcy. Menon & Williams (1994) provide significant evidence that the bankruptcy of L&H had a negative effect on the stock prices of their clients. This negative effect had even a greater impact on IPOs. However Menon & Williams (1994) do not find any significant market reactions to the announcement of a replacement audit firm made by the old clients of L&H. Chaney & Philipich (2002) find the same reaction for the clients of Arthur Andersen. Chaney & Philipich (2002) give an explanation for this effect. They state that this negative market reaction could mean that investors view the audits performed by Arthur Andersen of an inferior quality.

Lastly Teoh & Wong (1993) examine if there is a difference between the earnings response coefficient of the clients of the Big Eight and the non-Big Eight firms. After using a cross-sectional multiple regression model of abnormal stock returns, Teoh & Wong (1993) find that the earnings response coefficients of clients of the Big Eight firms are higher than the earnings response coefficients of clients of the non-Big Eight firms.

3.5   Summary

This chapter looks at the prior research that is related to the topic of this thesis. There are four streams of literature that are related to this thesis. First of all there is the literature that describes the accounting scandals and interprets them. On the one hand there is the article of Spaenjers and Manigard (2004) who state that the investors need to look at themselves to gain more security. On the other hand there is the article of Ball (2009) who states that new legislation will help preventing the problem that causes the accounting scandals. Finally Jones (2010) states that fraud and accounting fraud is an everlasting problem.

The second stream of literature describes the underlying factors that cause the scandals. A lot of papers, Dechow et al. (1996) Beasly (1996) Klein (2002) Jones (2010), state that a weak corporate governance structure is an important underlying factor. However Agrawal & Chadha (2005) find mixed evidence. There is also mixed evidence found for the relation between compensation incentives and the likelihood of the occurrence of accounting scandals.

The third stream of literature describes the consequences of the accounting scandals. There is mixed evidence for the relation between the occurrence of accounting scandals and

management turnover. The literature finds more consequences of the accounting scandals. For example, higher cost of capital and an increase in litigation.

The last stream of literature is on the topic of auditor reputation. First of all there is mixed evidence for the existence of a so-called Big Eight premium. Furthermore Datar et al. (1991) provide their own model, where the value of an audit is increasing by the audit quality and the firm-specific risk. Other researchers try to find empirical support for this model. Moreover the literature also looks at the consequences for the clients of auditing firms who went bankrupt. There is a negative market reaction to these bankruptcies.

Year	Author	Subject	Methodology	Sample	Results
2004	C. Spaenjers & S. Manigart	Giving an overview of the recent cases of accounting scandals. Furthermore to present the lessons we can take from these scandals to prevent these events from happening again	First of all he gives an overview of the recent cases he wants to discuss. After the description he analyzes the cases and shows how the scandals could have happened, which reforms are introduced and finally if and where there are still problems.	The biggest cases of accounting scandals until 2004. On the one hand he uses the big American regulation of the market, but he also looks at the European scandals such as Royal Ahold.	The most important lesson according to the author is that the financial system is all about the investors. Therefore if investors want more security, they do not need to count on new legislation. Rather they need to use the most powerful mechanisms that there are: rationality and self-regulation of the market. Furthermore investors need to be alert and pro-active. Finally they need to be skeptical and keep asking questions.
2009	R. Ball	The subject is to consider the scandals and several of the important subsequent events from two contrasting perspectives: the political/regulatory perspective and the market for corporate governance and financial reporting perspective	The author describes first of all the scandals that have happened in the period 2001-2002. Then he analyzes the political/regulatory and market reactions to the scandalous events to assess their relative roles. Furthermore he examines the principal political/regulatory response to the scandals from a market perspective and finally the author speculates on the long-run consequences of the Sarbanes-Oxley Act.	The author took the years 2001 and 2002 as sample years. All the scandals that have happened in this period are part of the sample. The author uses these years, because a lot of scandals happened that particular period, while in other years it was less.	According to the author, markets need rules and rely on trust. The financial markets in the U.S. had very effective rules by world standards, however the rules were broke and there were severe consequences for the offenders. The system worked surprisingly well in detecting the problem, but not in preventing the problem. The answer to the question if the Sarbanes-Oxley Act was an overreaction depends on whether you take a market perspective or a political/regulatory perspective.
2010	M. Jones	This book is about the role of accounting. More specifically the role of creative accounting and fraud, in accounting scandals across different countries.	First of all the author examines the basic underlying themes of the book. He describes creative accounting environment, motives, methods and impression management. Furthermore look at the major accounting scandals that have occurred since 1980.	58 high profile cases in 12 different countries. This are the major accounting scandals since the 1980's	Creative accounting and fraud are everlasting problems. This study shows some sensational collapses such as Parmalat and Enron. Furthermore this study shows that these collapses occur because there is managerial motivation for personal gain. This managerial motivation is often proclaimed by people who are charismatic and can easily persuade somebody. The personal gain is eased by a poor corporate governance system and

Year	Author			
				through the failure of the external audit. These scandals lead to financial losses and an increase in the legislation of a country.
1996	M. Beasly	This paper looks at the relation between what members are in the board and the occurrence of fraud in the financial statements	The researchers use a logit cross-sectional regression model where the most important variable is %OUTSIDE, which represents the percentage of outside board members.	The sample used in this paper consists of 75 fraud and 75 no-fraud firms. All firms are publicly traded firms in the U.S. Furthermore the time period is between 1980 and 1991	The main finding of this paper is that for firms who were involved in financial statement fraud the percentage of outside board members is lower in comparison with no-fraud firms. Furthermore the results show that who are in the board is more important than the presence of an audit committee for reducing the possibility of financial statement fraud.
1996	P. Dechow, R. Sloan & A. Sweeney	This paper examines the motives for earnings manipulation and the consequences of these manipulations for firms who are subject to accounting enforcement actions of the SEC	This paper uses t-tests and the Wilcoxon signed sum test to look at the differences in both means as in medians between the SEC firms and the Control group. This research looks at three aspects: the characteristics of the SEC and the control firms, the motivations for earnings management and the impact for the governance structures and they look at the consequences for the SEC firms	The sample consists of 92 firms who are subject to the enforcement actions of the SEC in the period 1982-1992	This paper shows that important motivations for earnings management are to get external financing at low cost and evade debt covenant restrictions. They do not find that EM is used to get a larger earnings based bonus, or that managers use EM to sell stockholdings at inflated prices. Furthermore they find that weak governance causes EM. Finally the results show that the consequences of EM are that the cost of capital is higher.
1999	C. Alexander & M. Cohen	This research investigates the relation ownership structure and corporate crime committed by public companies.	This paper uses a multivariate analysis; the researchers used the conditional logit model of McFadden to get their empirical results. Furthermore they looked at the stock-price reactions to news of corporate crimes.	This paper had a sample of 78 public companies in the U.S. who were involved in corporate crimes. These crimes took place between 1984 and 1990	The main finding of this article is that the occurrence of corporate crimes happens less often at firms where management owns more equity. Furthermore they conclude that corporate crime does not benefit the shareholders.

Year	Author				
1999	M. Beneish	This paper examines the incentives and the penalties for companies that got accounting enforcement actions from the SEC	This research identifies 4 different incentives for managers to overstate the earnings. These 4 incentives are each tested with a variety of tests, such as an OLS regression and a Wilcoxon signed rank test. The 4 incentives are affiliated with earnings overstatements	The sample in this research consists of 64 firms. These firms use SEC and news media releases from 1987 until 1993. This sample comes from the Beneish paper in 1997	The results show that the desire of managers to sell their overpriced stock and other equity holdings is a motivation for earnings overstatement.
2002	A. Klein	This paper investigates the relation between earnings management and the composition of the board and audit committee	This paper uses accruals to determine if there is earnings management. She uses the cross-sectional model of Jones to calculate the accruals. Furthermore she uses Kasznik's matched-portfolio method. After this she uses Univariate models with dependent variable AAAC and multivariate variables to define the audit committee/board independence	The sample consists of 692 firm years of U.S. publicly traded companies of the S&P 500. The sample period is 1992-1993	The main finding of this paper is that there are more earnings management in firms who have less independent boards and audit committees.
2005	A. Agrawal & S. Chadha	This research examines, empirically, if there is a relation between certain corporate governance mechanisms and the likelihood of a company having an important accounting problem.	First of all the paper computes the abnormal return for day around the announcement date, besides this they also compute the cumulative abnormal return(CAR) and the cumulative average abnormal return (CAAR). Furthermore they use an OLS regression to compute abnormal stock returns over a longer period. They use the intercept of the regression to compute CAAR. To calculate the relation between corporate governance mechanisms and the likelihood of an earnings restatement they use univariate tests, Pearson product-moment correlations and matched-pairs logistic regressions	The sample used in this paper consists of 159 U.S. public companies that restated their earnings in the years 2000 or 2001. Furthermore it consists of 159 non-restating firms as an industry-size control.	The authors find that several governance characteristics are essentially unrelated to the probability of a company restating his earnings. These characteristics include the independence of boards and audit committees. Also the extent to which external auditors provide non-audit services to a firm are part of these characteristics. However they do find that the probability of a restatement is significantly higher for companies whose CEO belongs to the founding family. On the other hand they find that it is significantly lower for companies whose boards or audit committees have an independent financial expert in them.

Year	Author	Description	Methodology	Sample	Results
2006	D. Bergstresser & T. Philippon	This paper examines the relation between incentivized CEO's and the level of earnings management	To measure the accruals this paper uses the methods as seen in the paper of Dechow et al. (1995). Besides the Modified Jones model they also use one more method as described by Hribar and Collins in 2002 to calculate total accruals. To measure the executive incentives this paper uses multiple regressions.	The researchers divided the sample they use into two groups. The group with lagged assets below $1 billion and the group with lagged assets above $1 billion. They consist of 4671 and 4199 observations respectively.	The results indicate that companies that have a more incentivized CEO show a higher level of earnings management. In this context incentivized means that the compensation the CEO receives is more sensitive for the share price of the company.
2006	N. Burns & S. Kedia	This research investigates the effect of the compensation of CEO's on misreporting	This research uses different measures for the CEO compensation. They measure the pay-for-performance of stock options by using the method from Core & Guay (2002). Furthermore they use the Black-Scholes model for dividend payouts. They also use a logistic regression.	The sample consists of 215 firms that restated their financial statements during the period 1995-2002.	The researchers find that CEO's who have option holdings that are sensitive to the stock prices are more likely to misreport. However the researchers do not find that other components of the compensation for CEO's have the same effect
2006	M. Erickson, M. Hanlon & E. Maydew	This paper compares the equity incentives for top management between firms who are accused of financial statement fraud by the SEC and no-accused firms	They first of all conduct a univariate test with each individual variable and then compare the outcome between the accused and no-accused firms. Furthermore they used multivariate tests to determine whether compensation is related to accused accounting fraud. They use a matched sample and an unmatched sample.	The sample consists of 50 firms who are accused of fraud and 100 firms who are not. The sample is based on the period January 1, 1996 – November 19, 2003	The results show that there is no consistent evidence that the incentives from stock-based compensation are related to the likelihood of financial statement fraud.
2007	P. Povel, R. Singh & A. Winton	This paper examines the relation between fraud and economic good times, why fraud peaks at the end of a boom and then in the ensuing bust.	The researchers provide their own model, which is very simplistic. They provide proof of the propositions of the model through the use of econometrics and math.	No sample was used in this research	The model used in this paper shows the factors that determine if a firm commits fraud or not. The most important one is how carefully investors can be expected to examine the firms they want to invest in. Furthermore the results show that the likelihood of fraud does not always respond as expected to changes in the circumstances.

Year	Author	Description	Method	Sample	Results
2008	M. Low, H. Davey & K. Hooper.	This paper identifies and takes an in-depth look at five factors that apparently influences and contributes to the everlasting accounting scandals. Furthermore this paper discusses the inadequacy of the university programs with regard to the influence of ethics education on accounting graduates.	In this paper the researchers conducted two surveys. The first survey was created to test the students their responses on how they thought they would behave in situations, which are ethically challenging, related to the five factors as earlier identified. The second survey was developed to find out whether students perceive ethics education to be important and to what extent they find that ethics education could influence their behavior in ethical dilemmas.	The first survey had 25 participants. The participants where all senior students. The second survey had a ranging participation from 70 to 72 participants. The participants are all from a third year accounting students.	The results of the survey show that most of the students think that education can only have a moderate influence on the behavior of accountants. The authors state that to make a difference ethics coverage need to be integrated in the program for students.
2009	S. Kedia & T. Philippon	This paper examines the problem of managers who see the true productivity of their companies, but also make hiring and investment decisions	The researchers made their own model. This model predicts certain outcomes. First of all the researchers give certain theoretical arguments before they empirically test these predictions. The researchers test through the sample of collected data based on these firms the outcomes of these predictions by comparing the firms who restated their earnings and firms who did not.	The sample consists of two groups: Firms that restated their earnings and firms who did not. They got their data from GAO accounting, and Compustat. They looked at the variables from their own model and collected data based on these variables. The sample period is 1991-2003.	The results show that when there is a period of alleged fraudulent accounting, firms hire and invest excessively. While managers on the other hand exercise their options. When the fraud is detected, firms lose the labor and capital and the productivity of the companies will improve once again.
1999	C. Alexander	This paper examines legal and market-based penalties. Especially the reputational sanctions public companies get for committing a federal crime	First of all she provides an event study to compare the market reaction to related party versus third party crimes. Then she described which parties are damaged by the crime, either the government, private or none. Furthermore she states a table with the observable reputational consequences. Finally she uses multivariate tests.	This paper uses the sample that was already used by Alexander & Cohen in their paper in 1999.	This paper has three main findings. First the losses in shareholder wealth are larger for crimes against related parties than for a third-party crime. Second, this paper shows that corporations who commit a crime experience a significant loss of clients and reassignment or turnover of managers and employees. Third, the victims of these reputational losses are rather government agencies than private parties.

Year	Author	Summary	Method	Sample	Conclusion
2005	J. Carcello, D. Hermanson & K. Raghunandan	The article investigates the changes in the internal auditing committee meetings, meeting length and the staff level. Furthermore they look at the related legislation, media attention and corporate governance	For the first and third hypothesis they use paired t-tests to compare the mean of the internal audit budget, audit committee meetings, meeting length and the staff level. Furthermore they use two OLS regression models for the second hypothesis. The dependent variables are the internal audit budget and the number of internal audit staff.	The sample consists of 271 respondents to the survey they send out. The recourses or more there are chief audit executives of mid-sized U.S. public industries in regards to internal auditing.	This paper concludes that the staffing levels, audit committee meetings, meeting length and the internal audit budget increased considerably in the years 2001 and 2002. Furthermore the OLS regressions show that there is a larger budget increase within smaller firms, there is a larger budget and staff increase if a firm has more financial recourses or more liquidity risk. Finally the OLS regressions show that there are differences between industries in regards to the change in internal auditing.
1984	J. Francis	This paper examines the Australian auditing market. Specifically it looks at the prices of the Big Eight in comparison to non-Big Eight firms	For Hypothesis one this thesis uses the multiple-regression equation of the audit fee function. Furthermore to test the joint effects of product differentiation and scale economies there are separate regressions for large and small auditee partitions.	The sample consists of 150 Australian companies from the Sydney Stock Exchange in the period 1974-1978.	The results show that the Big Eight firms earn a premium in comparison to Non-Big eight firms. Furthermore there is no price cutting behavior by accounting firms. There is weak evidence that initial audit fees are higher than continuous
1987	J. Francis & D. Simon	This thesis examines the relation between the Big Eight auditor price premium and the small auditee segment in the U.S. for publicly traded companies	First of all this paper uses a survey to get the audit fees. Furthermore they us an OLS audit fee model. They also use T-tests and Chi square tests. Moreover they perform a Pearson product-moment correlation test.	The sample consists of 210 small U.S. companies as defined by Simunic (1980).	The results show that there is a Big Eight price premium for both second-tier national firms and local/regional firms.
1988	R. Balvers, B. McDonald & R. Miller	This paper examines the relation between the reputation of investment bankers and the reputation of the auditors they select. Furthermore if the reputation has influence on underpricing	This paper provides its own model where IPO underpricing is a function of auditor quality. This model is used to provide a framework to test the effect of auditor selection on the underpricing.	The sample consists of 1182 securities gathered in the period of 1981-1985. The data was collected from Going Public: The IPO Reporter	The conclusion of this paper is that investment bankers with a high reputation will select auditors with a high reputation. Furthermore these reputations help to reduce the underpricing of IPOs.

1989	R. Beatty	This paper examines the relation between the reputation of an auditor of an IPO and the initial return earned by an investor	This paper uses a few regression models to gather the empirical results. Furthermore they perform a Pearson Product-Moment Correlation. Going Public: The IPO Reporter	The sample consists of 2215 IPOs from the period 1975-1984.	The results show that clients who hire an audit firm with high reputation the initial returns to their investors are also lower, than if they hired an auditor with low reputation. Furthermore the results show that there is less underpricing for IPOs if they hire an audit firm with high reputation
1991	S. Datar, G. Feltham & J. Hughes	This paper provides its own model where the value of an audit is increasing by audit quality and the firm-specific risk and is a non-decreasing function of the expectations about the future value of the firm.		There is no sample used in this paper.	The proposition of Datar, Feltham and Hughes is that the initial IPO value depends on audit quality.
1991	Hughes	This paper tests his own model and the predictions the model presents on the topic the value of an audit		There is no sample used in this paper.	
1991	G. Feltham, J. Hughes & D. Simunic	This thesis examines the positive relation between audit quality and firm-specific risk as stated by Datar, Feltham & Hughes (1991)	This paper uses an OLS cross-sectional regression equation. They furthermore provide other regressional analyses to provide the empirical evidence.	The sample consists of the 469 new issues offered in 1981 as already seen in the paper of Simunic and Stein (1987)	The results provide weak empirical support for the proposition of Datar, Feltham and Hughes (1991). Furthermore the results do not support the second hypothesis.
1993	S. Teoh & T. Wong	This paper investigates if there is a difference between the earnings response coefficient of the Big Eight audit firms and noon-Big Eight audit firms	This paper uses a cross-sectional multiple regression model of abnormal stock returns by using OLS.	The sample consists of two groups. First the matched pair groups. This sample contains of 2564 firms form the NYSE, AMEX and NASDAQ. The switch sample consists of 134 switches.	The results show that the earnings response coefficients of clients of the Big Eight firms are significantly higher than those of Non-Big Eight clients.
1994	P. Clarkson & D. Simunic	This paper examines the demand-side prediction as stated in Datar, Feltham & Hughes (1991)	This paper uses a logistic regression. They perform a one-tail t-test and they also use a regular regression.	The sample consists of 174 Canadian IPOs in the period 1984-1987	The results show that there is a relation between audit quality and the initial IPO value as stated in Datar, Feltham & Hughes (1991).

Year	Authors	Description	Method	Sample	Results
1994	K. Menon & D. Williams	This thesis looks at the effect on stock prices of the clients of Laventhol & Horwath after their bankruptcy in combination with the insurance hypothesis	For the first hypothesis they measure the CAR for November 19-20. They compare the CAR's of the two samples. To test the other hypotheses they use a regression model.	The sample consists of two groups. To test hypothesis one the group contains all publicly traded U.S. companies. For the other hypotheses the sample consists of publicly traded companies audited by L&H	The results show that the bankruptcy of L&H had a negative effect on the stock prices of their clients. The effect was greater for IPOs. Furthermore there was no significant market reaction detected to the announcement of clients of a replacement audit firm.
1995	A. Craswell, J. Francis & S. Taylor	This paper examines the relation between brand name reputation and industry specialization by the Big Eight audit firms and the amount of the audit fees	They use a cross-sectional audit fee regression model to test their first three hypotheses. Furthermore they use an OLS regression model.	The sample consists of 1484 publicly listed companies in Australia.	The results show that industry specialist Big Eight audit firms earn a premium over nonspecialist Big Eight auditors. Furthermore the Big Eight auditors earn a premium over Non-Big Eight auditors for their brand name.
2002	P. Chaney & K. Philipich	This paper examines the influence of the audit failure by Enron on auditor reputation. More specifically, this paper looks at the stock market impact of the clients of Arthur Andersen.	For the first hypothesis they measure the market reaction with CAR. Furthermore they us a cross-sectional analysis to test the second and third hypotheses.	The sample in this paper consists of 284 clients of Arthur Andersen who are included in the S&P 1500. Furthermore for the negative market reaction audit fees the sample consists of 208 companies	The authors concluded that in the three-day window they used the clients of Arthur Andersen encounter a negative market reaction. This negative market reaction could indicate that investors viewed audits performed by Arthur Andersen of less quality.
2004	P.Chaney	This paper examines the relation between audit pricing and the reputation of the audit firm	This paper uses OLS regression models, some of them with the inverse Mills ratio included. They also use an OLS regression which controls for private firm observations self-selection bias. Furthermore they provide the results of the Spearman Cross-Correlations test.	The sample consists of a yearly mean of 15484 private firm observations in the period 1994-1998. The data is collected from FAME database.	The results show that there is no evidence for a Big Five premium. Furthermore the results show that clients that choose Big Five auditors would have had higher fees if they had chosen Non-Big Five auditors.

4. Hypothesis Development

This chapter contains the hypotheses of this thesis. Furthermore this chapter provides the link between the prior research and the hypotheses: the hypothesis development. Moreover, the Libby boxes are presented in this chapter. Finally the construct, internal and external validity of this thesis are being discussed in this chapter.

4.1   Hypotheses

According to Low et al. (2008) the behavior of auditors is an underlying factor of the occurrence of the accounting scandals of the past few years. In the article they focus on the influence ethics education has on the behavior of auditors. More specifically they focus on the inadequacy of the programs provided by the universities in regards to ethics education. Low et al. (2008) state furthermore that to make a difference the universities should cover ethics in their courses. From this can be concluded that the likelihood of accounting scandals happening increases if auditors do not behave ethically.

Due to the fact that the behavior of auditors is one of the underlying factors for the occurrence of the auditing scandals in the past few years, it also has an influence on the auditing firms. As previously stated, the accounting scandals damaged the reputation of the auditing firms (Ball, 2009; Spaenjers, 2004). Moreover Agrawal & Cooper (2016) find that there is more auditor turnover for firms who restate their earnings. Furthermore, Accountantweek (2015) also states that the auditing firms in The Netherlands are suffering from the scandals in the past few years. More specifically the whole accounting sector is suffering from a loss of reputation.

Menon & Williams (1994) provide significant evidence that the bankruptcy of Laventhol & Horwath had a negative impact on the stock prices of the clients of L&H. Furthermore, Chaney & Philipich (2002) find significant evidence for the relation between the decline in reputation for Arthur Andersen and a negative stock market reaction for their clients. Chaney & Philipich (2002) explain this effect by stating that investors view the audits performed by Arthur Andersen of inferior quality. Combining the prior literature, this means that if an auditing firm experiences a decline in reputation, this would have a significant negative influence on the stock prices of the clients of this auditing firm.

According to newspapers and professionals, the accounting sector as a whole experiences a decline in reputation, due to the occurrence of the accounting scandals of the past few years. This means that not just one auditing firm, but the whole sector suffers a decline in reputation. Combining this with prior research, that finds significant evidence for the relation between a decline in reputation for an auditing firm and a negative reaction on the stock prices of the clients of this firm, this thesis assumes there must be a negative stock market reaction for the clients of all the auditing firms. Due to the fact that all publicly traded firms need an audit opinion, this means there must be a significant negative market reaction for all publicly traded firms in The Netherlands. Hence, the first hypothesis is as follows:

H1: Accounting scandals committed by Dutch companies, which were not retained by the auditors, cause a decline in the reputation of the whole accounting sector in The Netherlands.

According to Francis (1984) there is a difference in price between Big Eight, now Big Four, and non-Big Eight firms. This is also found by Francis & Simon (1987) for the small auditee segment. Furthermore Craswell et al. (1995) find significant evidence for the existence of a Big-Eight premium, because of the high level of reputation for the Big-Eight firms. This means that there exists a difference between the Big Four and non-Big Four firms.

Moreover looking at the accounting sector, the media pays most attention to the Big Four firms (Van den Akker, 2014). However in the same article of Van den Akker (2014) Berry Wammes, member of the board of the NBA, stated that the Big Four do not stand alone in being part of the accounting scandals. These problems also arise for the non-Big Four firms. However, there could be a difference in the in the decline of auditor reputation, due to the fact that there is less media coverage for the non-Big Four firms. This thesis hypothesizes that the decline in auditor reputation is different. Therefore the negative stock market reaction for Big Four firms should be higher than for non-Big Four firms. Hence the following hypothesis:

H2: The magnitude of the decline in auditor reputation is larger for the Big Four auditing firms than for non-Big Four auditing firms

4.2   Libby Boxes

The Libby boxes are provided to give a better view of the hypotheses.

Hypothesis 1:

Conceptual Operational

Independent variable (X)   **Dependent variable (Y)**

Accounting scandals	Auditor Reputation
Cross-referencing between databases of "Het Financieele Dagblad" and the Accountantskamer / CBb	Cumulative abnormal returns (CAR) for the whole Dutch stock market
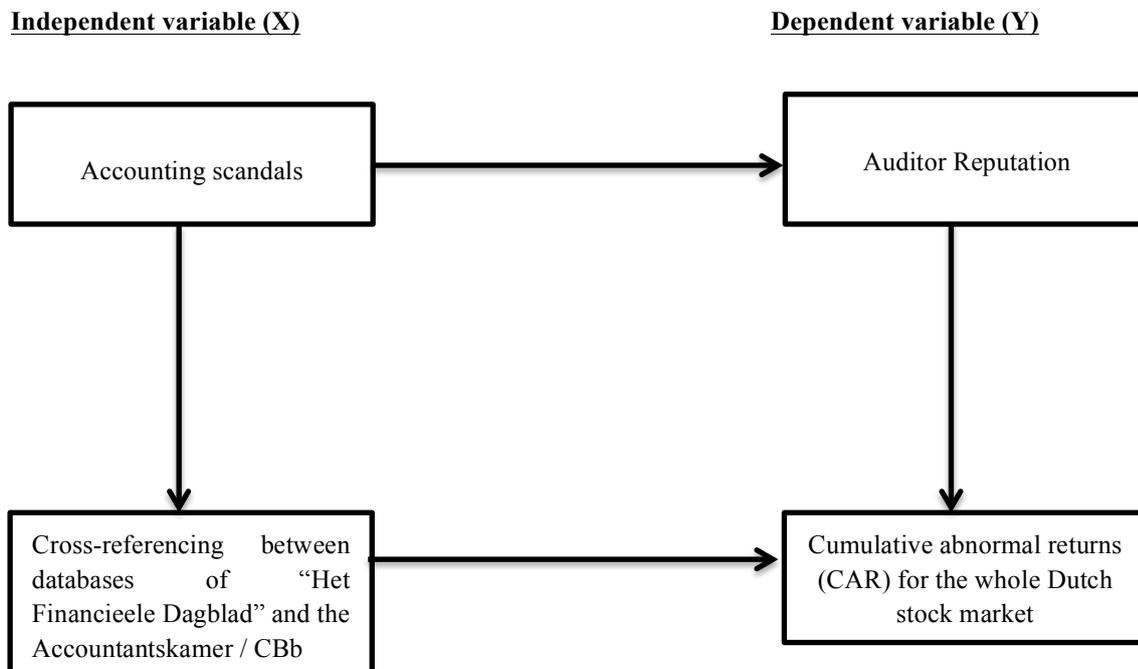
To test hypothesis 1, an event study is performed. This thesis examines if there is a negative relation between the accounting scandals and the reputation of the auditor sector as a whole. In this hypothesis the dependent variable is auditor reputation. The dependent variable auditor reputation is operationalized by the variable CAR. CAR is seen as the stock market reaction. This thesis uses the stock market reaction as an indication for auditor reputation. This thesis looks at the stock market reaction of the clients of an auditing firm. In The Netherlands all publicly traded companies need to have an auditor to audit their financial statements. Therefore this thesis examines the CARs of the Dutch stock market. This is based on the assumption that there is a negative stock market reaction to the news of an accounting scandal which the auditor did not retain. The link between a negative CAR, market reaction, and a drop in the reputation of the auditor lies in the paper of Chaney & Philipich (2002). They find that if there is an accounting scandal, the investors view the auditor reports as of inferior quality. Therefore there will be a negative stock market reaction. To conclude this thesis uses CAR, because it is assumed that a drop in auditor reputation can be seen in the stock market reaction.

Furthermore the independent variable in hypothesis 1 is the accounting scandals. In this paper the concept accounting scandal is operationalized in a three-day event window. The scandals are found in the database of "Het Financieele Dagblad". More information about the event selection can be found in chapter five.

Hypothesis 2:

Independent variable (X)   **Dependent variable (Y)**

Big Four Auditing Firm	→	Auditor Reputation

Dummy variable 1 if the firm is part of the Big Four, 0 otherwise	→	Cumulative abnormal returns (CAR)

Controls variables: Sales growth, Log assets, AEX, AMX and AScX
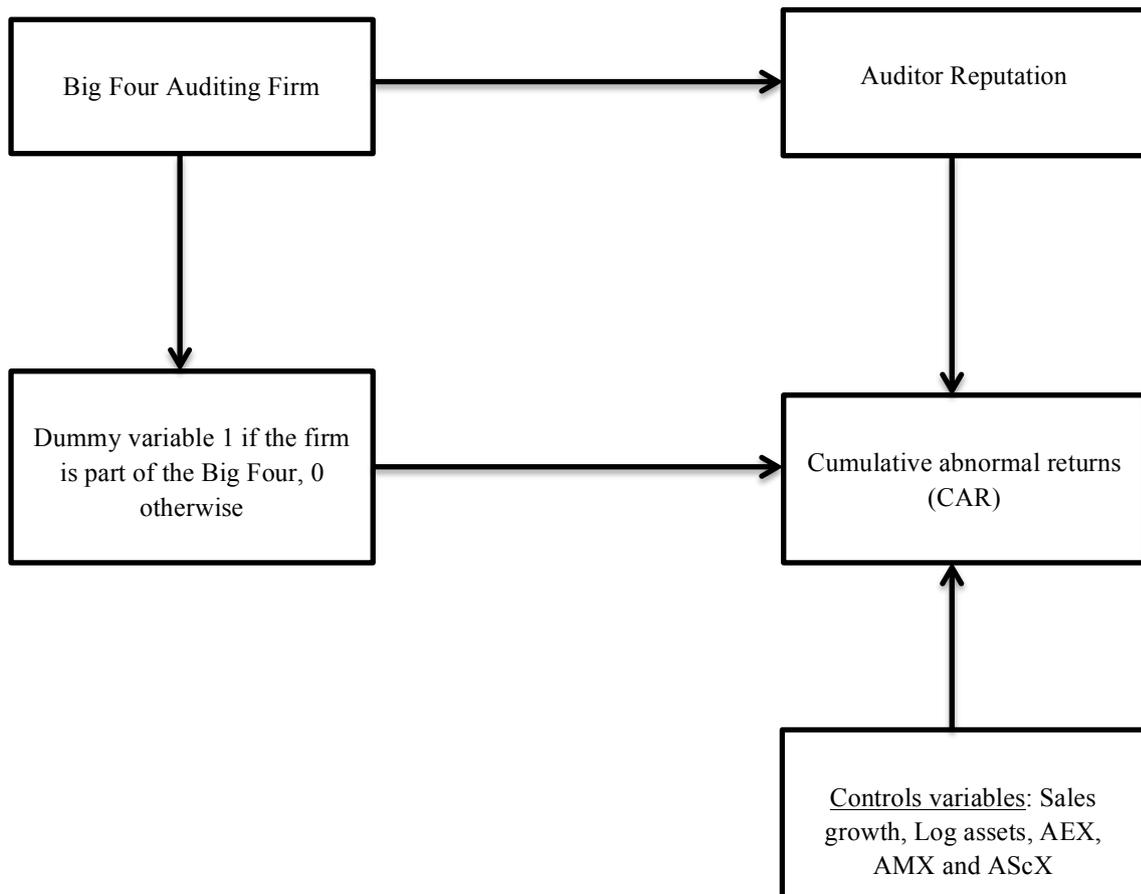
Conceptual

Operational

To test hypothesis 2, a cross-sectional analysis is performed. This hypothesis examines whether the magnitude of the decline in auditor reputation is larger for Big Four firms than for non-Big Four firms. The dependent variable is once again the auditor reputation, which is operationalized as CAR as already mentioned before. The independent variable is the Big Four auditing firms. This concept is operationalized by using a dummy variable, which it is equal to 1 if the auditing firm for the company was a Big Four firm and 0 otherwise. Besides, this dummy variable a few control variables have been used. These are Sales Growth, Log of Total Assets, AEX, AMX and AScX. These control variables are included to measure the relation between a drop in auditor reputation and a Big Four firm more accurately.

4.3   Construct Validity

Construct validity is "the degree to which a test measures what it claims, or purports, to be measuring." (Brown, 1996). In other words; construct validity means that the tests you use measure what you want to measure. This thesis wants to measure the influence of the accounting scandals on the reputation of the accounting sector as a whole. Several academic papers state that if there is a decline in the reputation of an auditor, the stock market reaction for the clients of this firm is negative. This means that if there is a decline in auditor reputation for the whole sector, all the publicly traded firms should experience a negative stock market reaction. Therefore to measure if there is a decline in reputation, this thesis measures the stock market reaction. The event study this thesis uses, measures the stock market reaction through cumulative abnormal returns (CAR). This is with previous research related to accounting scandals (Chaney & Philipich, 2002; Menon & Williams, 1994; Krishnamurthy et al., 2006). Therefore the construct validity of the first hypothesis is sufficient, since the event study measures the hypothesized statement accurately.

The second hypothesis examines the relation between the stock market reaction to the accounting scandals and having a Big Four auditor. Therefore this thesis uses a multivariate model to examing this cross-sectional relation. This model measures the CAR by looking at the influence of having a Big Four auditing firm. Furthermore the multivariate model controls for the variables firm size and sales growth. It is hard to say if this model measures what this thesis wants to measure. It could be that there are other variables influencing the outcome of CAR, besides the variables used in this model. This leads to relative low construct validity.

4.4   Internal Validity

Internal validity is "the ability of a researcher to argue that observed correlations are causal." (Roe & Just, 2009). This thesis uses an event study. An event study has the problem that it only examines a certain window. This means that it is difficult to see if there really is a causal relation between the dependent and independent variable (Roe & Just, 2009). Furthermore this thesis uses a cross-sectional analysis. According to Roe & Just (2009) cross-sectional data may not observe the timing of exposure and potential response, while this is an important element to determine causality. Because this thesis uses cross-sectional data, this means that the internal validity is relatively low

4.5   External Validity

External validity is defined by Roe & Just (2009) as "the ability to generalize the relationships found in a study to other persons, times and settings." This thesis uses all the publicly traded firms in The Netherlands. This means that the sample size contains a lot of observations. Therefore the generalizability is higher, because the sample contains more naturally occurring data (Roe & Just, 2009). Furthermore because there are no exclusions of the sample, there are less limited observations (Roe & Just, 2009). This means that the external validity is relatively high.

4.6   Summary

This chapter provides the two hypotheses of this thesis. First of all hypothesis one:

H1: Accounting scandals committed by Dutch firms, which were not retained by the auditor, cause a decline in the reputation of the whole accounting sector in The Netherlands.

According to several academic papers a decline in the reputation of an auditing firm, leads to a negative stock market reaction for the clients of this specific firm. However in The Netherlands the media and the auditors themselves state that due to the accounting scandals the whole accounting sector suffers from a decline in reputation. Therefore this thesis hypothesizes that there is a negative relation between the accounting scandals and the stock market reaction to these scandals.

Furthermore several academic papers look at the differences between the Big Four auditing firms and the non-Big Four firms. These papers find significant evidence that the Big Four firms earn a premium compared to the non-Big Four firms. Moreover there is more media coverage of the Big Four than of non-Big Four firms (Van den Akker, 2014). Therefore this thesis hypothesizes that the magnitude of the stock market reaction for the clients of the Big Four is larger than for clients of non-Big Four firms. Hence:

H2: The magnitude of the decline in auditor reputation is larger for the Big Four auditing firms than for non-Big Four auditing firms

Secondly this chapter discusses the construct, internal and external validity. The construct validity for the first hypothesis is sufficient, because by measuring CAR for the stock market reaction this thesis measures accurately the hypothesized statement. However for the second hypothesis the construct validity is lower, because there could be an omitted variable problem.

Finally there is a relativley low internal validity, because this thesis uses cross-sectional data. On the other hand using cross-sectional data improves the external validity.

5. Research Design

This chapter provides the methodology used in this thesis. First of all the sample size is examined. Secondly the events used in this thesis are discussed. Moreover the research design of the event study is discussed. Finally the research design of the cross-sectional analysis is examined in this chapter.

5.1   Sample

The sample of this thesis consists of all publicly traded companies in The Netherlands. There are 141 firms listed at Euronext Amsterdam. The 25 biggest firms combined are called the AEX index, the next 25 are the AMX index and numbers 51-75 together are the AScX index. The other firms are combined in the "lokaal" index.

To be included in the sample the firms have to meet a few criteria, besides being listed at the Euronext Amsterdam. First of all, the firm needs to have stock return data on the Datastream database. Furthermore, the firm needs to have stock return data for all the events identified in this thesis and for the estimation window used by this thesis. Finally the firm should not have made any dividend or earnings announcements during the event window.

The first two criteria are formulated to meet the complete data requirement. The third criterion is formulated to reduce the effect of confounding events. Due to these criteria a few publicly traded firms are excluded from this sample. First of all 19 firms do not have any stock return data in the Datastream database. Furthermore there are 21 firms that do not have any stock return data for the events identified by this study. Moreover there are four firms who do not have data for the estimation window this thesis uses. If there is no data for the estimation window the abnormal returns cannot be determined and therefore also these firms are being excluded from the sample. Finally there are no firms who made any dividend or earnings announcement during the event window. After excluding these firms the final sample contains 97 publicly traded firms in The Netherlands. The sample selection can be found in panel A of Table one. The sample period contains the years between 2008 and 2016, in which a scandal happened that was not retained by the auditor. The scandals and the years in which they occurred can be seen in Table one Panel B.

5.2 Events

This thesis identified the events, the accounting scandals, by looking at the database of "Het Financieele Dagblad" first. In this database events were found by searching for the terms: "accounting schandalen", "boekhoud schandalen", "accountantskamer" or "CBb". Furthermore these founded events were then cross-referenced with the database of both the CBb and the accountantskamer. CBb stands for "het College van Beroep voor het bedrijfsleven" this is the highest court in The Netherlands on the subject of administrative law. Finally the events are compared to the definition of a public scandal as seen by Wilson (1993). Wilson's (1993) definition of a public scandal can be divided into two components. Firstly the events must not be usual; the occurrence of these events must be relatively infrequent. Moreover the events must be shocking; the events must counter our norms (Wilson, 1993). All the events identified by this thesis meet the definition of Wilson (1993). The events and a description of the events can be found in panel B of Table one.

Table 1 - Panel A
Sample Selection

		Number of firms
All Dutch listed firms on Euronext Amsterdam		141
Less: firms missing data in Datastream database	-19	
Less: firms who do not have data for all the events	-25	
Final sample main analysis		97

Table 1 - Panel B
Summary of Events

Event	Description of Event	Firm	Accounting Firm
(1) February 12, 2008	Deloitte came to an arrangement with the creditors of Van der Hoop to pay them a total amount of 30 million euro's	Van der Hoop	Deloitte
(2) September 11, 2008	The CBb gave, in the appeal, a reprimand to the accountant of Ahold	Ahold	Deloitte
(3) November 23, 2012	The Accountantskamer gave a reprimand to the accountants of the DSB bank	DSB	EY
(4) July 9, 2013	EY came to an arrangement with the investors, in the case of ICT-company Landis for a record breaking amount of more than 40 million euro's	Landis	EY

Event	Description of Event	Firm	Accounting Firm
(5) July 26, 2013	The Accountantskamer gave a reprimand to the accountant of Van der Moolen	Van der Moolen	EY
(6) August 19, 2013	The Accountantskamer gave a reprimand to the accountant of Vestia, because there was not enough professional skepticism	Vestia	KPMG
(7) December 30, 2013	KPMG came to an arrangement with the Dutch public prosecutor to pay a total amount of 7 million euro's for their part in the fraud by Ballast Nedam	Ballast Nedam	KPMG
(8) June 30, 2014	The Accountantskamer gave a reprimand to former-chairman of Deloitte Roger Dassen for his part in the fraud by Ahold	Ahold	Deloitte
(9) November 18, 2015	The CBb gave the accountant a suspension of six months. Which is a more severe penalty in comparison to the reprimand he got in 2012	DSB	EY
(10) December 11, 2015	Deloitte came to an arrangement with the curator to pay a total amount of 18 million euro's	Innoconcepts	Deloitte
(11) December 18, 2015	The Accountantskamer has suspended the former KPMG auditor, Edwin Slutter, for life	Weyl	KPMG
(12) February 25, 2016	The CBb gave two accountants, of KPMG and Deloitte, a reprimand for their audits of Vestia in the period of 2000-2011	Vestia	KPMG & Deloitte

Table 1 presents a summary of first of all the sample selection in panel A and secondly all the events included in the sample and the accounting firms who were responsible in panel B

5.3 Market reaction

The first hypothesis is tested by investigating the market's reaction to the accounting scandals as provided in panel B of Table one. To determine the market's reaction the daily abnormal returns need to be measured. Abnormal return is the difference between the actual and the expected return. To control for the overall trend in the market, this thesis uses the market model to estimate the abnormal returns. The first step in measuring the abnormal returns is determining the actual return:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$$

Where:

R_{it} = return for firm i on day t

α_i = intercept for firm i

β_i = beta for firm i

R_{mt} = return on the AEX all Share index on day t

ϵ_{it} = error term

The abnormal return on day t is the difference between the actual return, as seen above, and the expected return based on the market model. This gives the formula:

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt})$$

Where:

AR_{it} = abnormal return for firm i on day t

$\hat{\alpha}_i$ = average intercept for firm i

$\hat{\beta}_i$ = average beta for firm i

The total market reaction is defined as the cumulative abnormal returns (CAR):

$$CAR = \sum_{t=0}^{T} AR_{it}$$

To test the significance of the abnormal returns, this thesis uses the Z-test as seen in the paper of Mikkelson & Partch (1988). Furthermore, the adjusted Z-test, which is based on the original Mikkelson & Partch (1988) Z-test, is also used in this thesis. The adjusted Z-test model can be found in the papers of Mann & Sicherman (1991), Lee (1992) and Chaney & Philipich (2002).

$$Z_i = \frac{1}{\sqrt{N}} \sum_{i=1}^{N} \left(\sum_{t=t1}^{t2} AR_{it} \Big/ \left(Var \left(\sum_{t=t1}^{t2} AR_{it} \right) \right)^{1/2} \right)$$

Where:

N = number of firms in the sample

AR_{it} = abnormal returns for firm i on day t

Var = the variance of the cumulative abnormal returns

The variance of the calculated abnormal returns is measured differently between the two Z-tests. The adjusted Z-test only estimates the sample variance estimates, V_i^2 to calculate the variance. This difference exists because the adjusted Z-test takes into account that within the event window, the abnormal returns are serially correlated. The variance used in the paper of Mikkelson & Partch (1988) is calculated as followed:

$$Var\left(\sum_{t=t1}^{t2} AR_{it}\right) = V_i^2\left(T + \frac{T^2}{ED} + \frac{\left(\left(\sum_{t=t1}^{t2} R_{mt}\right) - T * \bar{R}_m\right)^2}{\sum_{E=E1}^{E2}\left(R'_{mj} - \bar{R}_m\right)^2}\right)$$

Where:

V_i^2 = sample variance estimates

T = the number of days in the event window

ED = the number of days in the estimation window

R'_{mj} = the return of the market on day j in the estimation period

$\bar{R}_m$ = the mean market return in the estimation period

R_{mt} = the market return on day t in the event window

The variance used in the adjusted Z-test is calculated as follows:

$$Var\left(\sum_{t=t1}^{t2} AR_{it}\right) = V_i^2(T)$$

Where:

V_i^2 = sample variance estimates

T = the number of days in the event window

The market return measure, used for estimating the market model, in this thesis is the "AEX all share" index from the Datastream database. The Datastream database has all the

information on stock markets from all over the world, including The Netherlands. Another database that has information on the subject of equities is CRSP. However, this database only has information for the North-American stock market. This thesis looks at the stock market in The Netherlands, therefore the Datastream database is used. Furthermore the estimation window used in this thesis is 258 trading days. This is based on the 252 trading days in the U.S. and adjusted to the Dutch stock market which has more trading days. The estimation window is used to determine the market return and to establish the intercept and beta for each firm in the sample. For the descriptive statistics see Table 2.

Table 2
Descriptive Statistics Event Study Dutch Stock Market

Event Date	Mean Return	Mean Beta	Variance	Variance Adjusted
(1) February 12, 2008	-0,073%	0,722	0,0019	0,0005
(2) September 11, 2008	-0,102%	0,706	0,0026	0,0007
(3) November 23, 2012	0,056%	0,719	0,0036	0,0009
(4) July 9, 2013	0,063%	0,695	0,0061	0,0011
(5) July 26, 2013	0,075%	0,666	0,0054	0,0011
(6) August 19, 2013	0,071%	0,653	0,0049	0,0011
(7) December 30, 2013	0,101%	0,649	0,0035	0,0008
(8) June 30, 2014	0,121%	0,64	0,0030	0,0006
(9) November 18, 2015	0,050%	0,605	0,0037	0,0008
(10) December 11, 2015	0,052%	0,61	0,0051	0,0009
(11) December 18, 2015	0,051%	0,611	0,0034	0,0010
(12) February 25, 2016	-0,011%	0,625	0,0042	0,0013

5.4 Cross-sectional analysis

The second hypothesis is tested by performing a cross-sectional analysis through an OLS regression. To examine the cross-sectional relation between firm-specific market reactions and firm specific variables, the following multivariate model is used:

$$CAR_{it} = \beta_0 + \beta_1 Big\ 4_{it} + \beta_2 Salesgrowth_{it} + \beta_3 AEX_{it} + \beta_4 AMX_{it} + \beta_5 AScX_{it} +$$
$$\beta_6 LogAssets_{it} + \epsilon$$

Where:

CAR_{it} = cumulative abnormal return for company i over the three day window

$Big\ 4_{it}$ = dummy variable, 1 if company i was audited by one of the Big Four firms, 0 otherwise

$LogAssets_{it}$ = the log of the total assets for company i

$Salesgrowth_{it}$ = the sales growth for company i during the event window

AEX_{it} = dummy variable, 1 if company i was listed at Amsterdam Exchange Index, 0 otherwise

AMX_{it} = dummy variable, 1 if company i was listed at Amsterdam Midkap Index, 0 otherwise

$AScX_{it}$ = dummy variable, 1 if company i was listed at Amsterdam Small Cap Index, 0 otherwise

This thesis examines whether the magnitude of the drop in auditor reputation is larger for Big Four auditing firms in comparison to non-Big Four firms. To test for this cross-sectional relation, the dummy variable $Big\ 4$ is included, where $Big\ 4$ equals one if a Big Four auditing firm performed the audit at that company and zero otherwise. Based on hypothesis two this thesis predicts that the estimated coefficient on $Big\ 4$ to be negative. As seen in Table 3, during the events used in this thesis an average of 81,3% of the firms in the sample were audited by a Big Four auditing firm. Furthermore as already stated in this thesis, the media pays most attention to the Big Four firms (Groot, 2014). Hence, when something scandalous happens the media focuses primarily on the Big Four (Van den Akker, 2014). Therefore this thesis assumes that the magnitude of the decline in auditor reputation is larger for Big Four firms, because the Big Four audit most of the companies.

One of the important factors that influence the CAR of a company, is the size of that company. To control for this factor, this thesis implements the variable $LogAssets$ as a control variable. The variable $LogAssets$ is calculated by taking the logarithmic function of the Total Assets. This thesis uses the logarithmic function, because an OLS regression is used. The OLS regression is a linear method and therefore the variables also need to be linear. By taking the logarithmic function of the Total Assets the total assets are linearized (Wooldrigde,

2003). This is the reason this thesis uses the $LogAssets$ and not the Total Assets as a control variable for firm size.

Besides using the variable $LogAssets$ as a control variable for firm size, the three dummy variables AEX, AMX and $AScX$ are implemented as control variables for firm size. These dummies equal one when the company is listed at respectively the AEX, AMX or $AScX$ and zero otherwise. The companies listed at the AEX are the 25 biggest publicly traded companies in The Netherlands. The companies listed at the AMX and $AScX$ are numbers 26 till 50 and 51 till 75 respectively. During the 12 events an average of 24,7 % of the sample was listed at the AEX index, while 17,2 % of the sample firms were listed at the AMX index and finally an average of 21,5 % of the sample firms were listed on the $AScX$ index.

Finally not only firm size but also the growth of a company influences the CAR of that company. Therefore this thesis implemented the variable $Salesgrowth$ in the regression. $Salesgrowth$ is calculated as the growth of the total sales between two years in percentages. The average $Salesgrowth$ during the events is 1,7%, as seen in Table three.

Performing the OLS regression we assume that the model is in accordance with the four principal assumptions of a linear regression. These four assumptions are: 1) normality of the error distribution, 2) statistical independence of the errors, 3) homoscedasticity of the errors and 4) linearity and additivity of the relationship between dependent and independent variables (Poole & O'Farrel, 1971). In Chapter six the be additional tests are performed to see if this model meets the assumptions of a linear regression.

Table 3
Descriptive Statistics Combined Events

Variable	Obs	Mean	Std.Dev.	Min	Max
CAR	1117	0,002	0,050	-0,144	0,280
Log Assets	1117	8,842	1,365	4,383	9,306
Sales growth	1105	0,017	2,673	-11,418	15,621
AEX	1117	0,247	0,434	0,000	1,000
AMX	1117	0,172	0,379	0,000	1,000
AScX	1117	0,215	0,413	0,000	1,000
Big 4	1117	0,813	0,392	0,000	1,000

Table 3 presents the descriptive statistics of the Combined Events

5.5 Summary

This chapter provides first of all a discussion about the sample of this thesis. The sample is selected form all publicly traded firms in The Netherlands. There are 141 publicly traded firms in The Netherlands. The firms for which Datastream does not provide stock return data on the events are eliminated from the sample. The final sample therefore consists of 97 publicly traded firms in The Netherlands.

This chapter provides the events used in the thesis. There are 12 events selected in accordance with the definition of the variable accounting scandal as presented in Chapter 2.4. The 12 events selected can be found in Table one Panel B.

Furthermore this chapter provides the research design for the event study. This thesis looks at the market's reaction to the events that can be seen in Table 1 Panel B. To determine the market's reaction, the daily abnormal returns need to be calculated. The following calculation is used:

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt})$$

Where:

AR_{it} = abnormal return for firm i on day t

$\hat{\alpha}_i$ = average intercept for firm i

$\hat{\beta}_i$ = average beta for firm i

The total market's reaction is defined as CAR:

$$CAR = \sum_{t=0}^{T} AR_{it}$$

To examine whether the abnormal returns are significant, this thesis uses the Z-test as seen in the paper of Mikkelson & Partch (1988). Furthermore this thesis uses the adjusted Z-test which is based on the original Z-test from Mikkelson & Partch (1988).

Finally this chapter provides the research design of the cross-sectional analysis performed in this thesis. A multivariate model is used with CAR as the dependent variable. The Big 4 dummy variable is added to test whether the decline in auditor reputation is larger

for Big Four firms than for non-Big Four firms, therefore $Big\ 4$ is the independent variable. In this model the variables $Log\ Assets,\ AEX$, AMX and $AScX$ are implemented to control for the size of the firm. Furthermore $Sales\ growth$ is implemented to control for the growth of the company. Both growth and firm size are important factors that influence the CAR of a certain company.

6. Results

This chapter provides the results of the event study, the OLS regression and the additional tests. The event study is done to test the first hypothesis and the OLS regression is performed to test the second hypothesis. Finally the additional tests are performed to test whether the model used in this thesis meets the principal assumptions of a linear regression. Furthermore this thesis provides the analyses for the event study, the OLS regression and finally the additional tests.

6.1   CAR analysis

This thesis tests 12 event dates for their market reaction. The CARs for these dates are presented in Table 4. Each of the events is presented in the horizontal line. For ten of the twelve events there is no statistically significant results are found. The market reaction to the scandals of Van der Hoop, DSB, Landis, Van der Moolen, Ballast Nedam, Innoconcepts and Weyl are not significant.

However there are two significant findings. The market reaction for the second and the sixth event are significant for both the normal Z-test and the adjusted Z-test. The second event is based around Royal Ahold and the sixth event around Vestia. Both these events are examined in the next section of this thesis.

The second event occurred on the 11th of September 2008. The CBb gave the auditor of Ahold a reprimand for the audit performed. The cumulative average abnormal return (CAAR) of the market was -1,38%. This means that the average abnormal market reaction was negative for this event. Furthermore 67 of the sample firms had a negative market reaction. The reason that the market reaction for this event is significant while almost all the other market reactions are not significant could be explained by the company. Ahold is one of the largest companies in The Netherlands and one of the best known companies in The Netherlands. Ahold was seen as one of the most reliable companies before the scandal occurred. The case of Ahold is one of the biggest accounting scandals in The Netherlands and even in continental Europe. The accounting scandal committed by Ahold is even called "Europe's Enron" (The Economist, 2003). It was a shock for the investors to find out that one of the most reliable companies could commit such a scandal. Therefore it is not surprising that the market reaction to this event is negative and that it also is significant. Beside this factor also the date itself, the 11th of September, could be an explanation of the significantly

negative market reaction. On this date there were a lot of concerns about the future of Lehman Brothers, an import bank in the U.S.A. that had a big influence on the stock markets all across the world (Vigna, 2013). Furthermore after the terrorist attacks in 2001 the 11th of September is a special date that still has an influence on the stock market (Waller, 2013)

However event eight is also related to Ahold. Therefore it is very peculiar that the market reaction to this event is not significant. This can be explained by the fact that in this event just one individual accountant got a reprimand of the Accountantskamer instead of the whole auditing firm, in this case Deloitte. On the 30th of June 2014 the former chairman of Deloitte, Roger Dassen, got a reprimand of the Accountantskamer. The Accountantskamer judged that Dassen acted unfair and dishonest. He was actively creating confusion about which department of Deloitte was managing the claim of the duped investors. The claim of the duped investors was about the Ahold scandal. Due to the fact that just an individual accountant got a reprimand it is likely that investors do not view the audits performed by the whole firm as of inferior quality, just the audits performed by Roger Dassen. This is an explanation for the market reaction being negative but not significant.

The second significant market reaction to these events is event six. On the 19th of August, 2013 the Accountantskamer gave a reprimand to the auditors of Vestia. The Accountantskamer judged that the auditors did not perform and plan the audit of 2010 with sufficient professional skepticism. Due to this the auditor gave an unqualified opinion, without a valid base for the unqualified opinion. Therefore the auditor of Vestia got a reprimand of the Accountantskamer. Vestia was the biggest housing cooperative in The Netherlands at the beginning of 2012. The focus of housing cooperatives in The Netherlands is to build, manage and rent good houses for affordable price. Most of the people that rent these houses are part of the lower income class. At this moment, 2012, it came to light that Vestia could not fulfill the obligations of their derivatives portfolio. The other problem was that not only Vestia itself but also other big housing cooperatives in The Netherlands would go bankrupt. This was one of the biggest accounting scandals in The Netherlands and it had a big impact on the society. This is why it is logical that this thesis finds a negative and significant market reaction to this event.

The other event linked to Vestia is event twelve. On the 25th of February, 2016 the CBb gave the auditors from both Deloitte and KPMG a reprimand. This is in contrary to the judgment of the Accountantskamer, who only gave a reprimand to the auditor of KPMG. Because the Accountantskamer already gave a reprimand to the auditor of KPMG this is only an extension of the earlier punishment. Because the reprimand is an extension, the

information is not new to the investors. This is the reason why the market reaction to this event is negative, but not significant.

The event study is performed to test hypothesis one. To recall, hypothesis one was based on the beliefs of newspapers and professionals that not one auditing firm, but the whole sector suffers from a decline in reputation due to the accounting scandals. Combining this with prior research that finds significant evidence for the relation between a decline in reputation for an auditing firm and a negative reaction on the stock prices of the clients of this firm, this thesis assumed there must be a negative stock market reaction for the clients of all the auditing firms. Because all the publicly traded firms in The Netherlands need to have an audit opinion, this means there must be a significant negative market reaction for all publicly traded firms in The Netherlands. Therefore hypothesis one is formulated as follows:

H1: Accounting scandals committed by Dutch companies, which were not retained by the auditors, cause a decline in the reputation of the whole accounting sector in The Netherlands.

In accordance with the results as shown in Table 4 hypothesis one is rejected. Only two of the twelve events were significantly negative. These two events have in common that both companies, who were the subject of the scandals, were large companies with a big societal impact. Ahold was first seen as one of the most reliable companies and Vestia is a company that provides housing for the lower income class. Furthermore these events are the first events for both companies. This means that it was news for the investors that the auditors did not retain the accounting scandals at these companies. One of the reasons that the other events are not significant is that the other events are not new events, which means that the event was an extension of an earlier event for example event twelve. Another reason is that the firms subject to these events were not big, well known firms or these firms do not have such a societal impact as Ahold and Vestia. However looking at the events combined there is a negative market reaction, but this finding is not significant. This thesis does not find any significant evidence for the relation between accounting scandals and a decline in auditor reputation for the whole sector, measured through the market reaction.

Table 4
Mean Cumulative Abnormal Returns For Dutch Stock Market

Event date	CAR	Pos/Neg	Z	Adjusted Z
(1) February 12, 2008	-0,25%	40/57	-0,356	-0,152
(2) September 11, 2008	-1,38%	30/67	**-3,076***	**-3,333***
(3) November 23, 2012	-0,21%	45/52	0,163	0,195
(4) July 9, 2013	-0,51%	36/61	-0,561	-0,768
(5) July 26, 2013	0,22%	54/43	0,637	0,821
(6) August 19, 2013	-0,61%	42/55	**-1,614***	**-2,002****
(7) December 30, 2013	0,45%	47/50	0,139	0,164
(8) June 30, 2014	-0,09%	38/59	-0,549	-0,689
(9) November 18, 2015	0,66%	48/49	0,805	0,981
(10) December 11, 2015	-0,14%	50/47	-0,411	0,490
(11) December 18, 2015	1,65%	43/54	0,964	1,044
(12) February 25, 2016	-0,83%	44/53	-0,599	-0,629
Combined Events	-0,09%	43/54	-0,372	-0,323

***, **, * significant at respectively 1%, 5% or 10% level

6.2 Cross-Sectional Analysis

In Table 6 the results of the multivariate cross-sectional analysis of the CARs from the events are presented. For the sake of completeness this thesis also examines each event separately, but the focus lies on the combined events. The combined events column consists of the observations of all the events combined.

The variable of interest is the variable Big Four. This variable was implemented to test whether the decline in auditor reputation is larger for Big Four firms than for non-Big Four firms. As seen in Table 6 the coefficient of the Big Four variable is negative, but not significant. This means that there is no clear relation between the auditor reputation and whether a firm is audited by a Big Four auditing firm.

However there are two events where the coefficients of the variable Big Four are significant and negative. The first event is event number four. On the ninth of July, 2013 EY

came to an arrangement with the most important creditors of Landis; the banks. Landis was an IT company that went bankrupt in 2002. The Accountantskamer judged that EY committed mismanagement. EY performed the audit for the annual reports, but the audits were performed in a neglectful manner. Hence, annual reports got an unqualified opinion, while in fact should have gotten an adverse opinion. The arrangement was for more than 40 million euro's. This amount was record-breaking.

The Big Four firms are often seen by the media as one group instead of four individual firms (Groot, 2014). Furthermore, due to the bankruptcy of Arthur Andersen the process of market concentration intensified and therefore the media saw the Big Four firms even more as one group (Beattie et al., 2003; Groot, 2014). The record-breaking amount of the arrangement and the large focus of the media on the Big Four auditing firms is an explanation for the significant negative result found for this event.

The other event where the variable Big 4 was negatively significant occurred on the 26th of July 2013. The Accountantskamer gave the certified public accountant (CPA) of EY, who was responsible for the audit of Van Der Moolen in 2008, a reprimand. The CPA did not document his judgment about the going concern opinion of the board of Van Der Moolen in the correct way.

17 days after the record-breaking arrangement made by EY, this was another scandal EY was involved in. While the market still needed to process the previous event, yet another EY misbehavior came to light. An explanation for the second significantly negative coefficient of the variable Big 4 lies in this process. Because the market still needed to process the previous event whilst another event occurred, there will be a negative view about the Big Four firms. The second event confirmed the ideas of the investors about the Big Four firms. This is the reason for the second significantly negative coefficient.

Most of the events have negative coefficients, which could mean that the investors view the audits performed by Big Four auditors of inferior quality in comparison to non-Big Four firms, however most of the events and the combined events gave no significant results. A reason for this could be that all the companies, subject to the events, were audited by a Big Four auditing firm. The multivariate cross-sectional analysis was performed to test the second hypothesis of this thesis. To recall the second hypothesis was stated as follows:

H2: The magnitude of the decline in auditor reputation is larger for the Big Four auditing firms than for non-Big Four auditing firms

In accordance with the results as shown in Table 6 the second hypothesis is rejected. Ten out of twelve events gave no significant results and also the combined events gave no significant output, therefore this thesis concludes that there is no significant evidence that the magnitude of the decline in auditor reputation is larger for the Big Four auditing firms than for non-Big Four auditing firms. These two events have in common that in both cases the auditing firm is EY. However the most important factor is that the same auditing firm got negative media attention twice in just a few weeks time.

The correlation matrix, presented in Table 5, shows that there is a great correlation between the firms listed at the *AEX* and the variable *LogAssets*. *LogAssets* is the logarithmic function of the total assets. That these two variables have a strong correlation is expected. The biggest 25 firms are listed on the *AEX* index. Usually the biggest companies also have the biggest total assets and therefore the biggest *LogAssets* value. The biggest *LogAssets* values, also tend to have the greatest market capitalization. After these findings there are another two regressions performed. One without the dummy variables *AEX, AMX* and *AScX* and one without the variable *LogAssets*. In both cases the results remained the same. Furthermore there is a strong correlation between firms that are being audited by a Big Four firm and the variable *LogAssets*. That these two variables have a strong correlation is also not surprising. As seen in the paper of Balvers et al. (1988) firms with a high reputation select auditors with also a high reputation. The Big Four firms have a high reputation (Balvers et al., 1988). Furthermore firms with a high value in *LogAssets* tend to be famous companies with a high reputation. Therefore it is not surprising that these variables have a high correlation.

Table 5
Correlation matrix

Variable	CAR	Log Assets	Sales Growth	AEX	AMX	AScX	Big 4
CAR		0,0323	0,0025	0,0227	-0,0300	-0,0069	0,0413
Log Assets	0,0200		0,0337	**0,6698**	**0,1295**	**0,2043**	**0,5640**
Sales Growth	0,0063	0,0022		0,0603	0,0029	0,0624	**-0,0895**
AEX	0,0365	**0,5958**	0,0583		**-0,2646**	**-0,3039**	**0,2688**
AMX	-0,0039	**0,1141**	0,0022	**-0,2610**		**-0,2416**	**0,2136**
AScX	-0,0069	**0,1308**	0,0012	**-0,2997**	**-0,2383**		**0,1192**
Big 4	0,0240	**0,5740**	**-0,0370**	**0,2748**	**0,2186**	**0,1280**	

Table 5 presents the correlation of the variables. The Pearson correlation is below and the Spearman correlations are above. The correlations in bold are significant at a 5% level or less for a one-tailed test.

Table 6
Results OLS regression

Variable	Combined Events	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Event 11	Event 12
Intercept	0,0334	0,0070	-0,0090	0,0058	0,0196	-0,0024	0,0631	-0,0001	-0,0181	0,0908	-0,0100	0,2408	0,0410
(t-value)	**(2,23)****	(0,20)	(-0,27)	(0,12)	(0,57)	(-0,08)	**(2,31)****	(0,00)	(-0,86)	**(2,26)****	(-0,18)	**(1,95)****	(0,58)
Big 4	-0,0048	-0,0051	-0,0023	0,0180	-0,0325	-0,0213	0,0067	-0,0086	-0,0024	-0,0001	0,0219	0,0081	0,0232
(t-value)	(-0,79)	(-0,41)	(-0,19)	(0,83)	**(-2,24)****	**(-1,75)****	(0,58)	(-0,54)	(-0,28)	(0,00)	(0,92)	(0,16)	(0,78)
Log Assets	-0,0046	-0,0012	-0,0010	-0,0038	-0,0055	0,0019	-0,0083	0,0008	0,0022	-0,0101	-0,0003	-0,0308	-0,0075
(t-value)	**(-2,26)****	(-0,26)	(-0,23)	(-0,54)	(-1,17)	(0,48)	**(-2,20)****	(0,16)	(0,76)	**(-1,80)****	(-0,03)	**(-1,80)****	(-0,77)
Sales Growth	0,0193	0,0005	0,0003	-0,0002	0,0084	-0,0046	0,0038	-0,0363	0,0075	-0,0020	-0,0256	-0,1373	-0,0395
(t-value)	(0,22)	(1,20)	(0,79)	(-0,39)	(0,47)	(-0,30)	(0,27)	**(-1,85)****	**(1,84)****	(-0,10)	(-0,97)	**(-2,36)****	(-1,20)
AEX	0,0147	0,0128	0,0091	0,0192	-0,0004	0,0057	0,0150	0,0003	-0,0068	0,0203	-0,0089	0,1117	0,0385
(t-value)	**(2,35)****	(0,97)	(0,72)	(0,90)	(-0,03)	(0,45)	(1,24)	(0,02)	(-0,78)	(1,24)	(-0,39)	**(2,22)****	**(1,35)***
AMX	0,0055	0,0164	0,0027	0,0143	-0,0057	0,0118	0,0234	-0,0050	0,0034	-0,0041	-0,0110	0,0321	0,0306
(t-value)	(0,95)	**(1,31)***	(0,23)	(0,72)	(-0,40)	(1,01)	(1,24)	(-0,33)	(0,42)	(-0,27)	(-0,52)	(0,68)	(1,15)
AScX	0,0025	0,0047	0,0078	0,0078	0,0003	0,0078	0,0079	0,0092	-0,0074	0,0022	-0,0144	0,0404	0,0008
(t-value)	(0,50)	(0,43)	(0,75)	(0,84)	(0,03)	(0,75)	(0,80)	(0,68)	(-1,05)	(0,16)	(-0,74)	(0,95)	(0,03)
F Value	1,16	0,52	0,23	0,46	0,99	0,6	1,41	0,73	1,13	1,11	0,43	1,85	0,86
Adj. R2	0,0564	0,0352	0,0158	0,0308	0,0648	0,0403	0,0894	0,0487	0,0737	0,0737	0,0298	0,117	0,0576
Obs.	1105	92	92	93	93	93	93	93	92	91	91	91	91

Table 6 shows the results of the cross-sectional analysis. Where ** and * are significant on a 5% and 10% level, respectively.

6.3 Additional Tests

This thesis performs several additional tests to examine whether the model used in this thesis meets the four principal assumptions of a linear regression. These four assumptions are: 1) normality of the error distribution, 2) multicollinearity, 3) homoscedasticity of the errors and 4) linearity and additivity of the relationship between dependent and independent variables (Poole & O'Farrel, 1971). Furthermore this thesis performs a test to examine the model specification of the model used in this thesis.

6.3.1 Normality of Error Distribution

The normality of error distribution assumption is required for valid hypothesis testing. If the distribution of errors is not normal, the p-values of the t-tests could not be valid. However the normality is not necessary to determine the coefficients of the regression (Wooldridge, 2003). To test this assumption, the Shapiro-Wilk W test is used. The results of this test can be found in the Appendix in Table 19. The results show that the error distribution does not meet the assumption of normality. The hypothesis in the Shapiro-Wilk W test is that the distribution is normal. Therefore if the p-value is low the hypothesis will be rejected, which means that the error distribution is not normal. Table 19 shows low p-values for all the events and the combined events. This means that the error distribution is not normally distributed. The not normal distribution of the errors is a reason for the relatively low internal validity of this thesis.

6.3.2 Multicollinearity

If there is a perfect linear relation between the predictors, the estimates for the multivariate model cannot be uniquely calculated. Collinearity means that two variables are almost perfect linear combinations. Multicollinearity means that there are more than two variables almost perfect linear combinations. The problem of multicollinearity is that when it increases the estimates of the coefficients in the regression model can be unstable. Furthermore the standard errors of the coefficients can be inflated.

To test whether there is multicollinearity the VIF-test is used. VIF is short for variance inflation factor. According to Wooldridge VIF values greater than ten needs further investigation. If variables have a value of at least ten this means that this variable could be a

linear combination of other independent variables. Tables 33 till 45 present the results of the VIF-tests performed. These results show that the VIF values are all below ten. This means that no further investigation is needed. Therefore this thesis assumes, based on this results, that there is no multicollinearity in the model used in this thesis.

6.3.3   Homoscedasticity of the Errors

Another assumption of a linear regression is the homogeneity of the variance of the residuals. If the model used in this thesis is accurate, there should not be a pattern of the residuals plotted against the fitted values. If the variance of the residuals is non-constant this is called heteroscedastic. To test this assumption the White test is used. The White test tests the hypothesis that the variance of the residuals is homogenous. This means that if the p-value is very low the hypothesis is rejected. In that case the variance is not homogenous. Tables 20 till 32 show the results for the performed White tests. As the results show none of the p-values are very low. Therefore the hypotheses are accepted. This means that for the residuals of all the events the variances are homoscedastic.

6.3.4   Linearity

Another principal assumption is the assumption of linearity and additivity of the relationship between dependent and independent variables. This means that the relation between the dependent and independent variable is linear. If the relation is not linear, the regression tries to fit a straight line to data that does not follow a straight line. According to Wooldridge (2003) violation of this assumption is very serious. If this happens, it is very likely that the predictions are in error (Wooldridge, 2003).

The scatterplots, used to test whether there is linearity, for both the variables Log Assets and Sales Growth can be found in the Appendix. The results show that for the variable Log Assets the events one, two and six do not meet the assumption of linearity. The other events do meet the assumption, also the most important event, the combined events. For the three events that not meet the assumption, the skewness is examined. For these three events the variable Log Assets is not skewed. Therefore no transitions are made.

The results show that for the variable Sales Growth the events six and nine do not meet the assumption of linearity. The other events do meet the assumption, also the most important

event, the combined events. For these three events the log transformation has been used. However this does not change the results for the linearity assumption.

6.3.5 Model Specification

Besides testing the four assumptions, also the model specification of the model used in this thesis is tested. There are two kinds of model specification errors. First of all it could be that one or more relevant variables are omitted from the model. Secondly it could be that irrelevant variables are included into the model. When relevant variables are omitted the common variance these variables share with the variables included into the model can be wrongly attributed to the included variables. It could also be that the error term is inflated. If irrelevant variables are included into the model the common variance these variables share with relevant variables can be attributed to them (Wooldridge, 2003).

To test whether there are model specification errors, the link test is used. The link test creates two new variables: hat and hatsq. According to Wooldridge (2003) the variable hat should be significant while hatsq should not be significant. If this is the case, there can be assumed that there are no model specification errors. The results of the link-tests can be found in the Tables 46 till 58 in the Appendix. The results show that all the events have significant values for the variable hat and non-significant values for hatsq. This means that this thesis assumes that there are no model specification errors.

6.4 Summary

This chapter provides the results of the several tests performed in this thesis. First of all this chapter provides the results of the event study. This event study is done to test hypothesis one:

H1: Accounting scandals committed by Dutch companies, which were not retained by the auditors, cause a decline in the reputation of the whole accounting sector in The Netherlands.

The results show that only two out of the twelve events were significantly negative. These two events have in common that both companies, who were the subject of the scandals, were large companies with a big societal impact. Furthermore these events are the first events for both companies. This means that it was news for the investors that the auditors did not

retain the accounting scandals at these companies. One of the reasons that the other events are not significant is that the other events are not new events, which means that the event was an extension of an earlier event. Another reason is that the firms subject to these events were not big, well known firms or these firms do not have such a societal impact as Ahold and Vestia. However looking at the events combined there is a negative market reaction, but the reaction is not significant. Therefore this thesis assumes that the relation between accounting scandals and a decline in auditor reputation for the whole sector, measured through the market reaction is not significant. The exception is when the scandals are committed by big companies with a societal impact and when the scandal is the first scandal for that company.

Secondly this chapter provides the results and the analysis of the OLS regression performed, to test the second hypothesis:

H2: The magnitude of the decline in auditor reputation is larger for the Big Four auditing firms than for non-Big Four auditing firms.

The results, presented in Table 6, show that two out of twelve events gave significant results. These two events have in common that in both cases the auditing firm is EY. However the most important factor these events have in common is that the same auditing firm got negative media attention twice in just a few weeks' time. However the results also show that ten out of twelve events gave no significant results. Therefore this thesis presumes that there is not a larger decline in auditor reputation for Big Four firms than for non-Big Four firms, because the findings are not significant.

Finally this chapter provides the results of the additional tests performed to test whether the model used in this thesis meets the principal assumptions of a linear regression. The results were that there is linearity, there is no multicollinearity, there is homoscedasticity and there are no model specification errors. However there is a problem with the normality of the error distribution. This means that for the second hypothesis the hypothesis may not be tested in a valid way, because the p-values of the t-tests could be invalid. However there is no normality required to determine the coefficients of the variables. Therefore it does not affect the overall conclusion of this thesis. This is a reason why the internal validity of this thesis is relatively low.

7. Conclusion

Since the beginning of the millennium there was a global tsunami of accounting scandals (Ball, 2009). In the Netherlands there were famous accounting scandals such as Royal Ahold, Vestia, Ballast Nedam and DSB (Van den Akker, 2014; Piersma, 2016). These scandals caused a lot of damage. One is the reputation of the accounting sector itself, it was severely hit by these accounting scandals (Spaenjers, 2004; Ball, 2009). A lot of media and professionals state that the reputation of and Dutch accounting firms itself suffer from the occurrence of the accounting scandals in the past few years (Accountantweek, 2015; Van den Akker, 2014; NBA, 2013). However this phenomenon is actually quite peculiar. In other industries when one company does something unethical, this does not influence the reputation of the whole industry. For example the diesel engine fraud committed by Volkswagen does not influence the reputation of General Motors or Fiat. Therefore the research question of this thesis is formulated as follows:

RQ: Does an accounting scandal committed by a Dutch company, which was not retained by the auditor, have a negative influence on the reputation of the Dutch accounting sector as a whole?

This thesis finds evidence that an accounting scandal committed by a Dutch company, which was not retained by the auditor, has a negative influence on the reputation of the Dutch accounting sector as a whole. This relation is significant when the company committing the scandal is big and has a big societal impact. Furthermore this must be the first scandal for the company. If these conditions are not met, this thesis does not find a significant negative effect on the reputation of the accounting sector as a whole. However eight out of twelve coefficients of CAR are negative. This could mean that in general there is a negative effect between accounting scandals and the reputation of the accounting sector as a whole.

Furthermore this thesis finds significant results for a Big Four effect when the company settles an arrangement for a record-breaking amount and when in a short period multiple events occur for the same auditing firm. If these conditions are not met there are no significant results found for the Big Four effect.

To give a complete answer to the research question the two sub questions are examined. This thesis looks at the accounting sector as a whole. According to Groot (2014) the media

pays the most attention to the Big Four firms, therefore there could be a difference between the Big Four firms and non-Big Four firms, hence the first sub question:

What is the influence of accounting scandals committed by a Dutch company, which were not retained by the auditor, on the reputation of the Big Four firms in The Netherlands?

The results show that there is an influence of the accounting scandals committed by a Dutch company, which were not retained by the auditor, for the reputation of the Big Four firms. This influence of scandals on the reputation of the Big Four firms only holds when the company settles an arrangement for a record-breaking amount and when in a short period multiple events occur for the same auditing firm. If these conditions are not met there are no significant results found.

These results are in accordance with prior research that there is a difference between the Big Four firms and the non-Big Four firms (Francis, 1984; Francis & Simon, 1987; Teoh & Wong, 1993; Craswell et al., 1995)

This thesis examines the whole accounting sector therefore the second sub question is stated as follows

What is the influence of accounting scandals committed by a Dutch company, which were not retained by the auditor, on the reputation of the firms other than the Big Four firms?

The results show that there is an influence of the accounting scandals committed by a Dutch company, which were not retained by the auditor, on the reputation of the firms other than the Big Four firms in the Netherlands. This influence of scandals on the reputation of the firms other than the Big Four firms only hold when the company in the scandal has a large societal impact and it is the first time that a scandalous event happened with this company. If these conditions are not met there is no significant evidence found for this influence. These findings are in accordance with prior research that states there is a negative stock market reaction for the clients of the auditing firms, that did not retain a scandal from happening (Menon & Williams, 1994; Chaney & Philipich, 2002; Krishnamurthy et al., 2006).

This thesis adds to the literature of Menon & Williams (1994), Chaney & Philipich (2002) and Krishnamurthy et al. (2006) by providing evidence that not only the clients of the auditing firm involved in the scandal experienced a negative market reaction, but that the clients of other auditing firms also experienced a negative market reaction.

7.1   Limitations and Future Research

A limitation of this study is based on the problem with normality of the error distribution. This problem means that the hypotheses in this thesis may not be tested in a valid way, because the p-value of the t-tests could not be valid. However there is no normality required to determine the coefficients of the variables. Hypothesis one is not affected by this problem, only hypothesis two is affected by the problem with normality of the error distribution. This means that this problem does not affect the overall conclusion of this thesis, but does lead to a lower internal validity

Furthermore this thesis only looks at The Netherlands and does not take into account the effects of accounting scandals somewhere else in the world. This means that accounting scandals in other countries could also influence the stock market in The Netherlands and therefore the abnormal returns. This could lead to a different conclusion of this thesis.

Future research could take the accounting scandals occurring in other countries into account in the regression. Furthermore to get a better view if there is a relation between accounting scandals and the reputation of the accounting sector, future research could look at the costs of the auditing firms through the years, instead of looking at the CARs. This could give a better view if there is a relation between accounting scandals and auditor reputation. Finally future research could look at other countries to examine if there is a difference between countries.

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9. Appendix

Table 7
Descriptive Statistics - Event 1

Variable	Obs	Mean	Std. Dev.	Min	Max
CAR	93	0,001	0,037	-0,106	0,103
Log assets	93	8,870	1,247	4,176	12,124
Sales growth	92	0,936	9,453	-22,056	87,214
AEX	93	0,247	0,434	0,000	1,000
AMX	93	0,172	0,379	0,000	1,000
AScX	93	0,215	0,413	0,000	1,000
Big 4	93	0,806	0,397	0,000	1,000

Table 7 presents the descriptive statistics of Event 1

Table 8
Descriptive Statistics - Event 2

Variable	Obs	Mean	Std. Dev.	Min	Max
CAR	93	-0,015	0,034	-0,133	0,070
Log assets	93	8,870	1,247	4,176	12,124
Sales growth	92	0,936	9,453	-22,056	87,214
AEX	93	0,247	0,434	0,000	1,000
AMX	93	0,172	0,379	0,000	1,000
AScX	93	0,215	0,413	0,000	1,000
Big 4	93	0,806	0,397	0,000	1,000

Table 8 presents the descriptive statistics of Event 2

Table 9
Descriptive Statistics - Event 3

Variable	Obs	Mean	Std. Dev.	Min	Max
CAR	94	-0,002	0,056	-0,353	0,232
Log Assets	94	8,809	1,415	4,491	12,065
Sales growth	93	-1,513	10,607	-82,647	3,033
AEX	94	0,245	0,432	0,000	1,000
AMX	94	0,170	0,378	0,000	1,000
AScX	94	0,213	0,411	0,000	1,000
Big 4	94	0,819	0,387	0,000	1,000

Table 9 presents the descriptive statistics of Event 3

Table 10
Descriptive Statistics - Event 4

Variable	Obs.	Mean	Std. Dev.	Min	Max
CAR	94	-0,004	0,041	-0,091	0,280
Log assets	94	8,803	1,416	4,380	12,032
Sales growth	93	-0,050	0,240	-1,316	0,616
AEX	94	0,245	0,432	0,000	1,000
AMX	94	0,170	0,378	0,000	1,000
AScX	94	0,213	0,411	0,000	1,000
Big 4	94	0,809	0,396	0,000	1,000

Table 10 presents the descriptive statistics of Event 4

Table 11
Descriptive Statistics - Event 5

Variable	Obs.	Mean	Std. Dev.	Min	Max
CAR	94	0,002	0,034	-0,186	0,095
Log Assets	94	8,803	1,416	4,380	1,203
Sales growth	93	-0,050	0,240	-1,316	0,616
AEX	94	0,245	0,432	0,000	1,000
AMX	94	0,170	0,378	0,000	1,000
AScX	94	0,213	0,411	0,000	1,000
Big 4	94	0,809	0,396	0,000	1,000

Table 11 presents the descriptive statistics of Event 5

Table 12
Descriptive Statistics - Event 6

Variable	Obs.	Mean	Std. Dev.	Min	Max
CAR	94	0,005	0,033	-0,082	0,109
Log Assets	94	8,803	1,416	4,380	12,032
Sales growth	93	-0,050	0,240	-1,316	0,616
AEX	94	0,245	0,432	0,000	1,000
AMX	94	0,170	0,378	0,000	1,000
AScX	94	0,213	0,411	0,000	1,000
Big 4	94	0,809	0,396	0,000	1,000

Table 12 presents the descriptive statistics of Event 6

Table 13
Descriptive Statistics - Event 7

Variable	Obs.	Mean	Std. Dev.	Min	Max
CAR	94	0,003	0,044	-0,176	0,216
Log Assets	94	8,803	1,416	4,380	12,032
Sales growth	93	-0,050	0,240	-1,316	0,616
AEX	94	0,245	0,432	0,000	1,000
AMX	94	0,170	0,378	0,000	1,000
AScX	94	0,213	0,411	0,000	1,000
Big 4	94	0,809	0,396	0,000	1,000

Table 13 presents the descriptive statistics of Event 7

Table 14
Descriptive Statistics - Event 8

Variable	Obs.	Mean	Std. Dev.	Min	Max
CAR	93	-0,003	0,023	-0,071	0,081
Log Assets	93	8,856	1,369	4,447	11,997
Sales growth	92	0,074	0,610	-0,998	4,985
AEX	93	0,247	0,434	0,000	1,000
AMX	93	0,172	0,379	0,000	1,000
AScX	93	0,215	0,413	0,000	1,000
Big 4	93	0,828	0,379	0,000	1,000

Table 14 presents the descriptive statistics of Event 8

Table 15
Descriptive Statistics - Event 9

Variable	Obs.	Mean	Std. Dev.	Min	Max
CAR	92	0,007	0,042	-0,083	0,292
Log assets	92	8,873	1,359	4,447	11,925
Sales growth	91	-0,008	0,248	-1,000	0,635
AEX	92	0,250	0,435	0,000	1,000
AMX	92	0,174	0,381	0,000	1,000
AScX	92	0,217	0,415	0,000	1,000
Big 4	92	0,815	0,390	0,000	1,000

Table 15 presents the descriptive statistics of Event 9

Table 16
Descriptive Statistics - Event 10

Variable	Obs.	Mean	Std. Dev.	Min	Max
CAR	92	-0,001	0,058	-0,145	0,323
Log Assets	92	8,873	1,359	4,447	11,925
Sales growth	91	-0,008	0,248	-1,000	0,635
AEX	92	0,250	0,435	0,000	1,000
AMX	92	0,174	0,381	0,000	1,000
AScX	92	0,217	0,415	0,000	1,000
Big 4	92	0,815	0,390	0,000	1,000

Table 16 presents the descriptive statistics of Event 10

Table 17
Descriptive Statistics - Event 11

Variable	Obs.	Mean	Std. Dev.	Min	Max
CAR	92	0,018	0,132	-0,181	1,031
Log Assets	92	8,873	1,359	4,447	11,925
Sales growth	91	-0,008	0,248	-1,000	0,635
AEX	92	0,250	0,435	0,000	1,000
AMX	92	0,174	0,381	0,000	1,000
AScX	92	0,217	0,415	0,000	1,000
Big 4	92	0,815	0,390	0,000	1,000

Table 17 presents the descriptive statistics of Event 11

Table 18
Descriptive Statistics - Event 12

Variable	Obs.	Mean	Std. Dev.	Min	Max
CAR	92	0,009	0,073	-0,118	0,531
Log Assets	92	8,873	1,359	4,447	1,193
Sales growth	91	-0,008	0,248	-1,000	0,635
AEX	92	0,250	0,435	0,000	1,000
AMX	92	0,174	0,381	0,000	1,000
AScX	92	0,217	0,415	0,000	1,000
Big 4	92	0,815	0,390	0,000	1,000

Table 18 presents the descriptive statistics of Event 12

Table 19

Shapiro-Wilktest

Events	Obs.	W	V	Z	P
Combined Events	1105	0,55	307,69	14,25	0,00
Event 1	92	0,95	4,17	3,15	0,00
Event 2	92	0,97	1,87	1,38	0,08
Event 3	93	0,64	28,34	7,39	0,00
Event 4	93	0,72	21,88	6,82	0,00
Event 5	93	0,88	9,42	4,96	0,00
Event 6	93	0,96	2,95	2,39	0,01
Event 7	93	0,79	16,28	6,17	0,00
Event 8	92	0,91	6,93	4,28	0,00
Event 9	91	0,83	12,94	5,65	0,00
Event 10	91	0,70	22,60	6,88	0,00
Event 11	91	0,58	31,85	7,64	0,00
Event 12	91	0,54	35,11	7,85	0,00

Table 19 presents the Shapiro-Wilktest. This test examines the normal distribution of the residuals

Table 20

White Test - Combined Events

Source	chi2	df	p
Heteroskedasticity	25,07	18	0,1230
Skewness	7,36	6	0,2888
Kurtosis	1,45	1	0,2280
Total	33,88	25	0,1105

Table 20 presents the White test for the combined events

Table 21
White Test - Event 1

Source	chi2	df	p
Heteroskedasticity	21,69	18	0,2461
Skewness	1,54	6	0,9570
Kurtosis	9,00	1	0,0027
Total	32,23	25	0,1515

Table 21 presents the White test for Event 1

Table 22
White Test - Event 2

Source	chi2	df	p
Heteroskedasticity	13,06	18	0,7881
Skewness	4,85	6	0,5631
Kurtosis	1,79	1	0,1806
Total	19,7	25	0,7623

Table 22 presents the White test for Event 2

Table 23
White Test - Event 3

Source	chi2	df	p
Heteroskedasticity	23,42	18	0,1750
Skewness	3,48	6	0,7462
Kurtosis	1,97	1	0,1606
Total	28,87	25	0,2694

Table 23 presents the White test for Event 3

Table 24
White Test - Event 4

Source	chi2	df	p
Heteroskedasticity	14,45	18	0,6991
Skewness	6,34	6	0,3862
Kurtosis	1,12	1	0,2904
Total	21,91	25	0,6408

Table 24 presents the White test for Event 4

Table 25
White Test - Event 5

Source	chi2	df	p
Heteroskedasticity	17,05	18	0,5198
Skewness	7,10	6	0,3115
Kurtosis	1,29	1	0,2559
Total	25,44	25	0,4379

Table 25 presents the White test for Event 5

Table 26
White Test - Event 6

Source	chi2	df	p
Heteroskedasticity	24,80	18	0,1306
Skewness	7,42	6	0,2837
Kurtosis	7,11	1	0,0077
Total	39,33	25	0,0342

Table 26 presents the White test for Event 6

Table 27
White Test - Event 7

Source	chi2	df	p
Heteroskedasticity	20,61	18	0,3075
Skewness	3,78	6	0,7062
Kurtosis	3,18	1	0,0744
Total	27,57	25	0,3280

Table 27 presents the White test for Event 7

Table 28
White Test - Event 8

Source	chi2	df	p
Heteroskedasticity	18,46	18	0,4258
Skewness	5,13	6	0,5271
Kurtosis	4,77	1	0,0289
Total	28,36	25	0,2915

Table 28 presents the White test for Event 8

Table 29
White Test - Event 9

Source	chi2	df	p
Heteroskedasticity	20,24	18	0,3195
Skewness	16,52	6	0,0112
Kurtosis	1,08	1	0,2986
Total	37,84	25	0,0480

Table 29 presents the White test for Event 9

Table 30
White Test - Event 10

Source	chi2	df	p
Heteroskedasticity	23,57	18	0,1696
Skewness	5,99	6	0,4247
Kurtosis	2,23	1	0,1357
Total	31,79	25	0,1641

Table 30 presents the White test for Event 10

Event 31
White Test - Event 11

Source	chi2	df	p
Heteroskedasticity	22,35	18	0,2168
Skewness	8,05	6	0,2345
Kurtosis	1,18	1	0,2783
Total	31,58	25	0,1705

Table 31 presents the White test for Event 11

Table 32
White Test - Event 12

Source	chi2	df	p
Heteroskedasticity	25,37	18	0,1151
Skewness	8,00	6	0,2377
Kurtosis	1,60	1	0,2058
Total	34,97	25	0,0887

Table 32 presents the White test for Event 12

Table 33 VIF-test - Combined Events		
Variable	**VIF**	**1/VIF**
Log Assets	2,57	0,390
AEX	2,40	0,417
Big 4	1,83	0,547
AMX	1,57	0,635
AScX	1,45	0,688
Sales Growth	1,00	1,000
Mean VIF	1,80	

Table 33 presents the VIF-test for Combined Events

Table 34 VIF-test - Event 1		
Variable	**VIF**	**1/VIF**
AEX	2,24	0,447
Log Assets	2,21	0,453
Big 4	1,61	0,621
AMX	1,53	0,653
AScX	1,39	0,720
Sales Growth	1,02	0,977
Mean VIF	1,67	

Table 34 presents the VIF-test for Event 1

Table 35 VIF-test - Event 2		
Variable	**VIF**	**1/VIF**
AEX	2,24	0,447
Log Assets	2,21	0,453
Big 4	1,61	0,621
AMX	1,53	0,653
AScX	1,39	0,720
Sales Growth	1,02	0,977
Mean VIF	1,67	

Table 35 presents the VIF-test for Event 2

Table 36 VIF-test - Event 3		
Variable	**VIF**	**1/VIF**
Log Assets	2,76	0,362
AEX	2,45	0,408
Big 4	1,93	0,518
AMX	1,61	0,623
AScX	1,47	0,682
Sales Growth	1,08	0,930
Mean VIF	1,88	

Table 36 presents the VIF-test for Event 3

Table 37 VIF-test - Event 4		
Variable	**VIF**	**1/VIF**
Log Assets	2,49	0,401
AEX	2,41	0,415
Big 4	1,76	0,567
AMX	1,57	0,638
AScX	1,46	0,686
Sales Growth	1,03	0,967
Mean VIF	1,79	

Table 37 presents the VIF-test for Event 4

Table 38 VIF-test - Event 5		
Variable	**VIF**	**1/VIF**
Log Assets	2,49	0,401
AEX	2,41	0,415
Big 4	1,76	0,567
AMX	1,57	0,638
AScX	1,46	0,686
Sales Growth	1,03	0,967
Mean VIF	1,79	

Table 38 presents the VIF-test for Event 5

Table 39		
VIF-test - Event 6		
Variable	**VIF**	**1/VIF**
Log Assets	2,49	0,401
AEX	2,41	0,415
Big 4	1,76	0,567
AMX	1,57	0,638
AScX	1,46	0,686
Sales Growth	1,03	0,967
Mean VIF	1,79	

Table 39 presents the VIF-test for Event 6

Table 40		
VIF-test - Event 7		
Variable	**VIF**	**1/VIF**
Log Assets	2,49	0,401
AEX	2,41	0,415
Big 4	1,76	0,567
AMX	1,57	0,638
AScX	1,46	0,686
Sales Growth	1,03	0,967
Mean VIF	1,79	

Table 40 presents the VIF-test for Event 7

Table 41		
VIF-test - Event 8		
Variable	**VIF**	**1/VIF**
Log Assets	2,68	0,374
AEX	2,46	0,406
Big 4	1,80	0,554
AMX	1,57	0,636
AScX	1,44	0,695
Sales Growth	1,05	0,956
Mean VIF	1,83	

Table 41 presents the VIF-test for Event 8

Table 42		
VIF-test - Event 9		
Variable	**VIF**	**1/VIF**
Log Assets	2,91	0,344
AEX	2,58	0,387
Big 4	2,13	0,469
AMX	1,73	0,578
AScX	1,70	0,589
Sales Growth	1,11	0,897
Mean VIF	2,03	

Table 42 presents the VIF-test for Event 9

Table 43		
VIF-test - Event 10		
Variable	**VIF**	**1/VIF**
Log Assets	2,91	0,344
AEX	2,58	0,387
Big 4	2,13	0,469
AMX	1,73	0,578
AScX	1,70	0,589
Sales Growth	1,11	0,897
Mean VIF	2,03	

Table 43 presents the VIF-test for Event 10

Table 44		
VIF-test - Event 11		
Variable	**VIF**	**1/VIF**
Log Assets	2,91	0,344
AEX	2,58	0,387
Big 4	2,13	0,469
AMX	1,73	0,578
AScX	1,70	0,589
Sales Growth	1,11	0,897
Mean VIF	2,03	

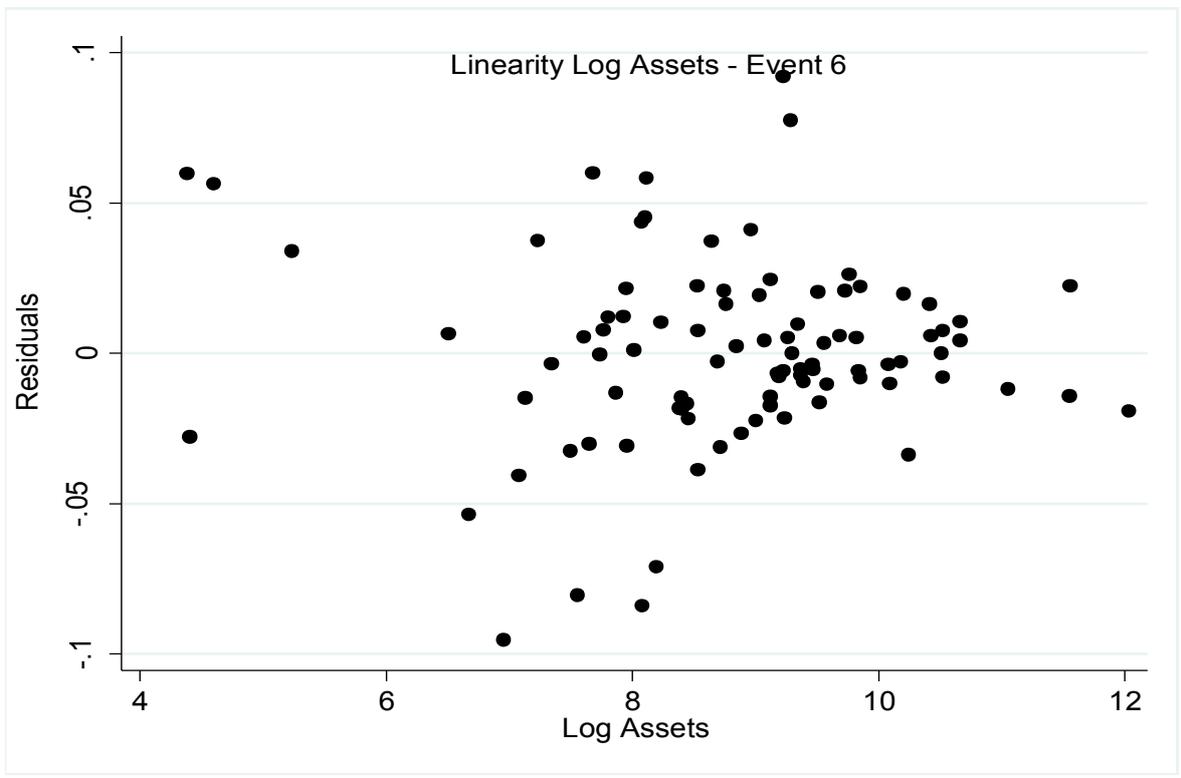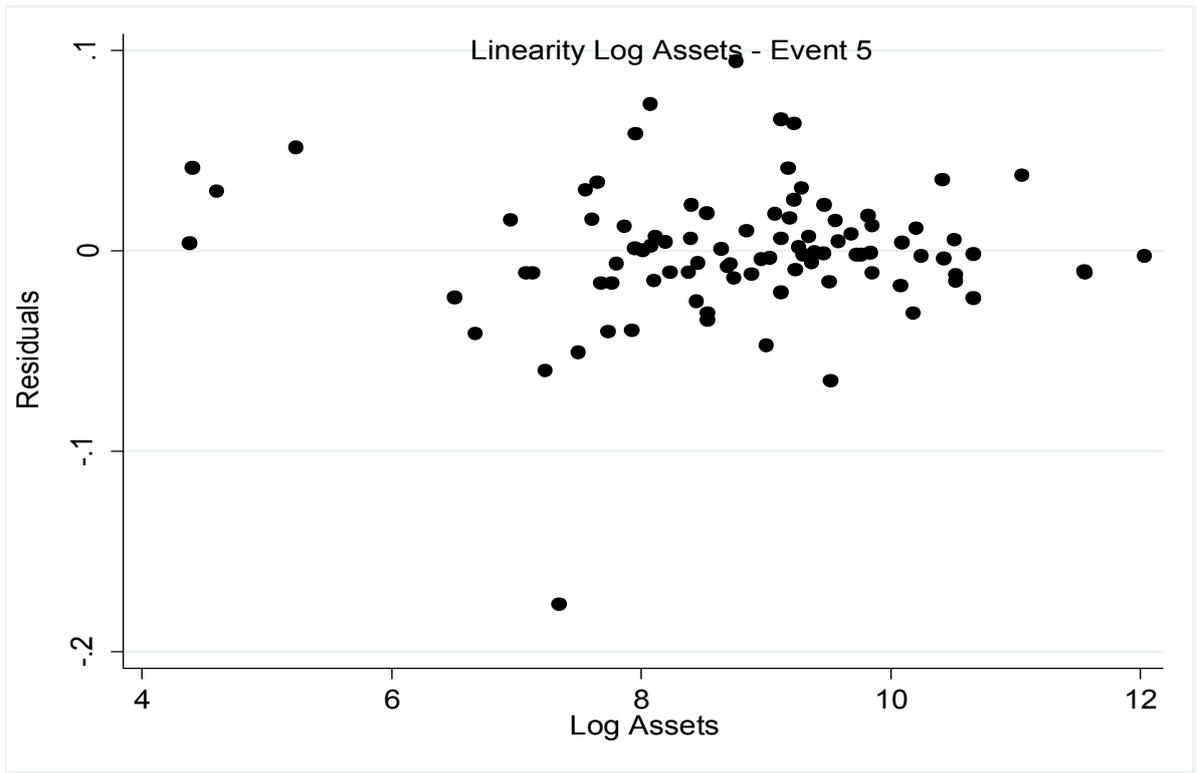Table 44 presents the VIF-test for Event 11

Table 45
VIF-test - Event 12

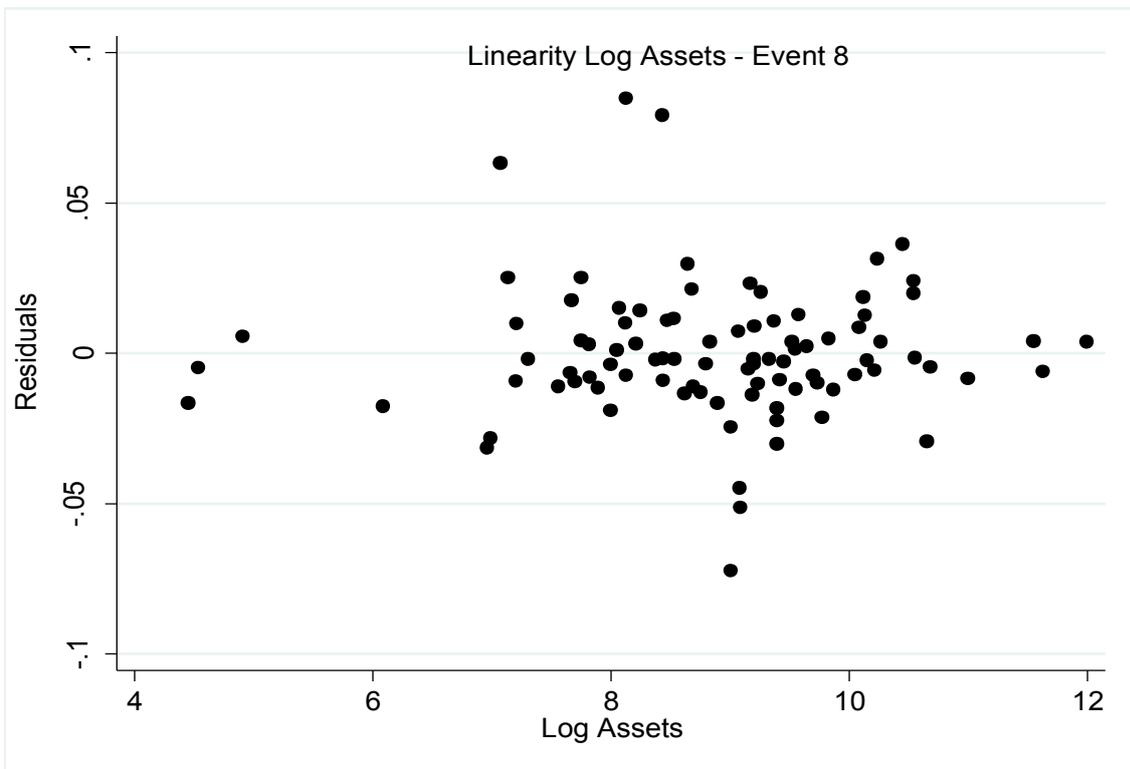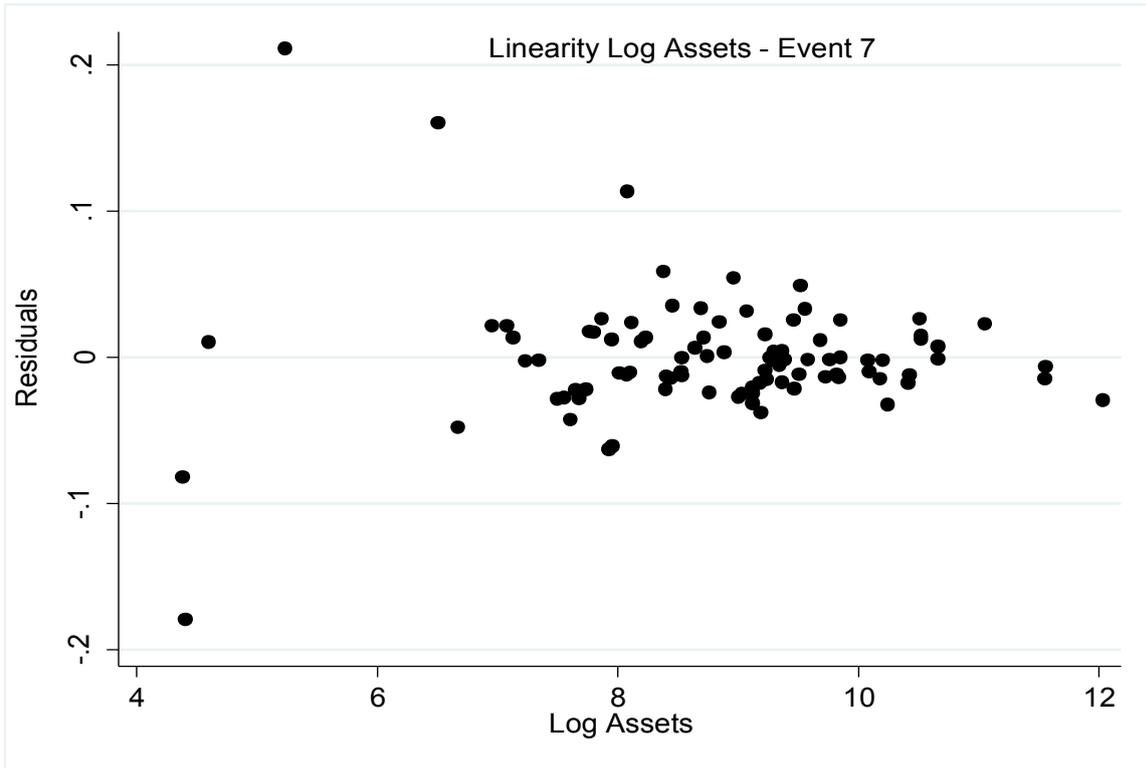| Variable	VIF	1/VIF
Log Assets	2,91	0,344
AEX	2,58	0,387
Big 4	2,13	0,469
AMX	1,73	0,578
AScX	1,70	0,589
Sales Growth	1,11	0,897
Mean VIF	2,03	

Table 45 presents the VIF-test for Event 12

Linearity Log Assets - Event 1

Linearity Log Assets - Event 2

Linearity Log Assets - Event 3

Linearity Log Assets - Event 4

Linearity Log Assets - Event 5

Linearity Log Assets - Event 6

Linearity Log Assets - Event 7

Linearity Log Assets - Event 8

Linearity Log Assets - Event 9

Linearity Log Assets - Event 10

Linearity Log Assets - Event 11

Linearity Log Assets - Event 12

Linearity Sales Growth - Combined Events

Linearity Sales Growth - Event 1

Linearity Sales Growth - Event 2

Linearity Sales Growth - Event 3

Linearity Sales Growth - Event 4

Linearity Sales Growth - Event 5

Linearity Sales Growth - Event 6

Linearity Sales Growth - Event 7

Linearity Sales Growth - Event 8

Linearity Sales Growth - Event 9

Linearity Sales Growth - Event 10

Linearity Sales Growth - Event 11

Linearity Sales Growth - Event 12

Table 46
Link-test - Combined Events

CAR	Coef.	Std. Err.	t	P
_hat	0,705	0,419	3,68	**0,000*****
_hatsq	8,986	0,549	1,35	0,181
_cons	-0,002	0,002	-0,79	0,432

Table 46 presents the results of the Link-test of the Combined Events, where *** is significant at a 1% level

Table 47
Link-test - Event 1

CAR	Coef.	Std. Err.	t	P
_hat	1,060	0,613	3,73	**0,000*****
_hatsq	-7,186	3,111	-0,23	0,818
_cons	0,000	0,004	0,08	0,935

Table 47 presents the results of the Link-test of Event 1, where *** is significant at a 1% level

Table 48
Link-test - Event 2

CAR	Coef.	Std. Err.	t	P
_hat	0,907	1,975	2,46	**0,009***
_hatsq	-3,863	0,741	-0,05	0,959
_cons	0,000	0,016	-0,03	0,977

Table 48 presents the results of the Link-test of Event 2, where *** is significant at a 1% level

Table 49
Link-test - Event 3

CAR	Coef.	Std. Err.	t	P
_hat	0,713	0,996	2,75	**0,004***
_hatsq	-2,391	6,679	-0,36	0,721
_cons	0,002	0,008	0,24	0,811

Table 49 presents the results of the Link-test of Event 3, where *** is significant at a 1% level

Table 50
Link-test - Event 4

CAR	Coef.	Std. Err.	t	P
_hat	1,429	0,610	3,34	**0,000**
_hatsq	2,829	3,044	0,93	0,355
_cons	-0,002	0,005	-0,37	0,710

Table 50 presents the results of the Link-test of Event 4, where *** is significant at a 1% level

Table 51
Link-test - Event 5

CAR	Coef.	Std. Err.	t	P
_hat	1,654	0,607	2,72	**0,008***
_hatsq	-1,005	5,201	-0,93	0,375
_cons	0,004	0,004	0,89	0,377

Table 51 presents the results of the Link-test of Event 5, where *** is significant at a 1% level

Table 52
Link-test - Event 6

CAR	Coef.	Std. Err.	t	P
_hat	0,628	0,432	3,45	**0,000***
_hatsq	3,556	2,636	1,35	0,181
_cons	-0,002	0,004	-0,59	0,555

Table 52 presents the results of the Link-test of Event 6, where *** is significant at a 1% level

Table 53
Link-test - Event 7

CAR	Coef.	Std. Err.	t	P
_hat	0,653	0,581	3,12	**0,001***
_hatsq	2,305	0,232	0,99	0,324
_cons	-0,001	0,005	-0,26	0,798

Table 53 presents the results of the Link-test of Event 7, where *** is significant at a 1% level

Table 54
Link-test - Event 8

CAR	Coef.	Std. Err.	t	P
_hat	0,112	0,425	2,64	**0,010***
_hatsq	-1,297	2,112	-0,61	0,541
_cons	0,001	0,003	0,32	0,749

Table 54 presents the results of the Link-test of Event 8, where *** is significant at a 1% level

Table 55
Link-test - Event 9

CAR	Coef.	Std. Err.	t	P
_hat	-0,374	0,536	-2,70	**0,009***
_hatsq	6,193	1,813	0,70	0,488
_cons	-0,002	0,005	-0,37	0,713

Table 55 presents the results of the Link-test of Event 9, where *** is significant at a 1% level

Table 56
Link-test - Event 10

CAR	Coef.	Std. Err.	t	P
_hat	0,102	0,606	2,68	**0,009***
_hatsq	-2,614	3,003	-0,87	0,386
_cons	0,003	0,007	0,39	0,697

Table 56 presents the results of the Link-test of Event 10, where *** is significant at a 1% level

Table 57
Link-test - Event 11

CAR	Coef.	Std. Err.	t	P
_hat	0,389	0,348	2,95	**0,004***
_hatsq	9,806	3,321	1,12	0,266
_cons	-0,012	0,014	-0,85	0,399

Table 57 presents the results of the Link-test of Event 11, where *** is significant at a 1% level

Table 58
Link-test - Event 12

CAR	Coef.	Std. Err.	t	P
_hat	0,172	0,575	3,11	**0,001**
_hatsq	5,624	2,191	0,30	0,766
_cons	-0,010	0,010	-1,08	0,283

Table 58 presents the results of the Link-test of Event 12, where *** is significant at a 1% level