



## **Corporate Governance structure: A comparison between the one-tier and the two-tier board structure**

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### **Abstract**

The demand for more supervision and control and more shareholders right have increased during the past years. A strong corporate governance should function as a mechanism to achieving this objective. However, a strong corporate governance depends on a couple of institutional factors. One of them is the firm's board structure. This Master thesis aims at investigating whether a one-tier or a two-tier board structure leads to higher earning quality. The research was operationalized by calculating the discretionary accruals of US-firms and German-firms based on the modified Jones model. Thereafter, the association between the two countries and the absolute discretionary was tested. The results obtained provides evidence that a one-tier board structure leads to lower earnings management, meaning that is a better monitoring mechanism for a strong corporate governance.

**Keywords:** Corporate Governance, One-tier, two-tier, Board structure, Earnings management.

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# Chapter 1: Introduction

## 1.1 Background

Firms that are financed through publicly traded bonds are most of the time managed by a board of directors, as shareholders do not exercise the managing tasks of these companies on their own. This leads to a separation of ownership and control, whereas shareholders delegate the management tasks to the executive directors, which should manage the firm with the objective of creating value for the shareholders (Berle and Means, 1932). Remuneration incentive mechanisms to put the interest of the management and that of the shareholders on the same line may lead to opposite effects (Jensen & Meckling, 1976). While the firm might not be performing well, managers may try to steer earnings in a direction to still achieve their bonuses, which leads to a lower quality of earnings.

According to Hayes, Gortemaker & Wallage (2014) good corporate governance is the process and structure in place to manage and direct a firm, to achieve the objective of creating value for the shareholders. Corporate governance has also been recognized that it deals with the impact decisions of business directors may have on other stakeholders. The aim of corporate governance at aligning the interest of stakeholders within a firm depends on a couple of institutional factors like ownership characteristics and board structure. A firm's board may be structured according to the one-tier model, which is common for Anglo-Saxon countries<sup>1</sup>, or the two-tier model, which is common for continental countries. Most of the time the board structure of firms depends on the country where the firm is established (Millet-Reyes and Zhao, 2010). The US is a well-known Anglo Saxon country that adopted the one-tier board model. Discussion related to corporate governance originated during the 1970s after the Watergate affair in the USA, and since the collapse and fraud scandals of large corporations like Enron, WorldCom, Parmalat and Ahold during 2001-2002 corporate governance issues were again point of discussion. Due to harmonization and internationalization of capital markets, the discussions are also active in continental Europe and Asia (Hayes et al., 2014). In response to these several fraud cases and bankruptcies, the US as well as the EU are continuously enhancing corporate governance guidelines to prevent such disasters to repeat. According to Hayes *et al.* (2014), there is a demand for stronger supervision and control in Anglo Saxon countries, and a demand for more shareholders right in continental countries. It is common knowledge that conflict of interests between management and stakeholders do exist on a day-today basis, which in many cases is the cause of major frauds and bankruptcies. This being said points out the importance of incorporating

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<sup>1</sup> See paragraph 2.3.2

effective monitoring mechanisms. One can conclude that a key element for having strong corporate governance is by having a clear separation between management board and the supervisory board.

## 1.2 Research question

Looking back at past several big fraud and bankruptcy cases it is noticeable that most of them took place in the US, who uses the one-tier board model. Given the demand for more supervision and control and more shareholders rights, this thesis investigates if the two-tier board model is a more effective mechanism for having successful corporate governance due to its clear separation between the management board and the supervisory board. This study investigates if one of the two board models leads to higher earnings quality. This leads to the following research questions:

*Is a two-tier board structure a superior mechanism for higher earnings quality compared to the one-tier board structure?*

## 1.3 Contribution

The result of this study contributes to existing literature and discussion on the effectiveness of corporate governance. The main objective is to investigate which board model is more effective in providing supervision of the executive board. I expect that a two-tier board structure is a more effective control mechanism than a one-tier board structure. The difference in private interests and the separation of ownership and control leads to information disadvantaged at the side of the principle. An effective control mechanism is a key element for low information asymmetry when there is a separation of ownership and control. For this study, data on listed US and German firms will be used. The choice for US is due to the fact that it is a well-known country that allows only the one-tier board model and also due to the fact that most major fraud and bankruptcy cases occurred in the US<sup>2</sup>. Germany on the other hand traditionally requires firms to employ the two-tier board model. Thus by comparing earnings data of both countries with each other I want to test if one of the two board models can be classified as the superior method for a strong corporate governance.

## 1.4 Outline

Chapter 2 of the thesis starts with describing the supporting theory that better explains the separation of ownership and control, followed by describing the concept of the two board models. The one-tier board model is described according to the US one-tier board model and the two-tier board model according to the German two-tier board model. Chapter 3 discusses previous relevant studies regarding both board models and the effectiveness of the models. Furthermore chapter 3 will also discuss literature examining

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<sup>2</sup> The Enron, WorldCom and Ahold scandal

earnings quality and which proxies to use when measuring earnings quality. In chapter 4, the research design is discussed together with the sample selection and the hypothesis to be tested is formulated. Chapter 5 discusses the methodology, where the sampling and the research design used for this study are explained. In chapter 6, the results of the OLS-regression analysis are discussed. Chapter 7 discussed the limitations of this study and suggestions for further research. The last chapter, chapter 8, summarizes the main findings and provides a conclusion on the research question.

## Chapter 2: Corporate Governance

### 2.1 Introduction

This chapter discusses the theoretical framework supporting this thesis. Section 2.2 discusses the Agency theory, which is the supporting theory for the separation of ownership and control and why it is important to have a strong corporate governance, followed by section 2.3 which explains the concept of corporate governance with the focus on the distinction between one-tier and two-tier corporate governance model.

### 2.2 The theory supporting corporate governance

#### 2.2.1 Agency theory

Firms are most of the time not directly managed by their owners. This is due to the fact that firms are generally financed by several shareholders. As the property rights are dispersed among the several shareholders, control of the firms is in hands of a top management. This phenomenon can be tilted as the separation of ownership and control (Berle and Means, 1932). Due to this separation of ownership and control the power of daily operations are now transferred to executive managers, who need to manage the firm with the objective of creating value for the owners (Berle and Means, 1932). This will be further explained through the agency theory.

The relationship between a firm's executive management and its shareholders can be explained by the well-known agency theory. Jensen and Meckling (1976) call it the agency relationship and define it as a contract between two parties, the agent and the principle, in which the principle assigns decision-making power to the agent to run the firm. The agent can be seen as the management of the firm and the principles as the shareholders or owners of the firm. The Agency theory assumes that all individuals within the contract are driven by self-interest and are utility maximizer, which leads to a conflict of interest between agent and principle (Jensen and Meckling, 1976). Lambert (2001) gives four reasons for this conflict of interest:

- Effort aversion by the agent;
- The agent has the possibility of diverting resources for his private use;
- The agent care less about the effect his actions may have on the future firm performance because he might not be working for the firm anymore;
- Difference in risk-aversion between agent and principle.

Given these assumptions, one can conclude that the agent (management) will act on their own best interest instead of in the interest of the principles (Shareholders) in creating shareholder's value. This so called agency problem arises due to the fact that the agent is in charge with the day to day operations which puts the agent in an beneficial position.

### **2.2.2 Information asymmetry**

The difference in private interests and the separation of ownership and control leads to information disadvantaged at the side of the principle. This is the basic idea behind agency theory (Jensen & Meckling, 1976). As discussed in the previous paragraph managers will put their own interest at first place, above that of the shareholders. This possession of knowledge and information advantages puts the management in a beneficial position to pursue their private interests (Healy & Palepu, 2001). This difference in information possession leads to information asymmetry.

One can make a distinction between two types of information asymmetry (Zajac, 1990): Adverse selection and moral hazard. Adverse selection refers to when one party have information advantages over the other to base their decision-making. For example, the principle hires an agent without knowing the actual true qualities of the agent. The moral hazard problem refers to the principle not being able to always observe the actions of the agent, while these actions may result in disadvantages for the principle.

Due to the fact that both parties are driven by self-interest, the principle will anticipate on the self-interest behavior of the agent by establishing monitoring mechanisms and creating appropriate bonding mechanism for the agent to limit the divergence form the principle's interest (Jensen and Meckling, 1976). These mechanisms forms the agency cost. An example of an agency cost is by attaching a bonus payout to the agent's remuneration, depending on the earnings of the firm as an incentive mechanism. However, due to the existence of information asymmetry the agents might be able to manage earnings to cover bad performance and still achieve the bonus payout (Jensen and Meckling, 1976). A good monitoring mechanism to mitigate information asymmetry is by having strong corporate governance in place. This will be further explained in the next paragraph.

### **2.3 Corporate governance characteristics**

According to Gillette, Noe, Rebello (2008), board structures across the world vary considerably and claims that differences exist due to historical and cultural influences of each country. One can make a distinction between a one-tier board structure and a two-tier board structure. As with this thesis I want to investigate if board structure have an effect on the quality of earnings, this paragraph will give a comparison between the two types of board models. Comparing the corporate governance systems of Germany and US will do this.



### 2.3.1 Definition and developments of corporate governance

Corporate governance is all about how a firm is being managed. According to Larcker & Richardson (2007), corporate governance is a set of control measures in place, which has an impact on the decision making of managers.

Shleifer & Vishny (1997) state that corporate governance is about how investors tend to assure themselves of obtaining benefits from their investment in a firm. The Organization for Economic Cooperation and Development (OECD, 2004) gives a comprehensive definition of corporate governance. It characterizes corporate governance as being a factor for economic efficiency and growth. In addition, it helps at improving shareholders confidence. Corporate governance is the interrelationship between the company and its stakeholders and functions as an internal control mechanism for achieving the company's objectives<sup>3</sup>.

In summary, corporate governance deals with the separation of ownership and control and functions as a mechanism in place to ensure that management still manage the firm with the objective to obtain benefits for the investors. It addresses on one hand the principle-agent relationship between shareholders and directors and at the other hand the relationship between company agents and stakeholders (OECD, 2004). Stakeholders refer to e.g. workers, customers, suppliers and general public. In other words all parties that have an interest in the success of the firm (Donaldson and Preston, 1995).

On the other hand, corporate governance itself also creates agency problems. The board of directors represents the shareholders/owners of the firm by setting the firm's long-term strategy and supervising the management board of the firm. But who monitors the once in charge of monitoring the management? The members of the board of directors are also driven by self-interest, which may also lead to a conflict of interest between them and the shareholders they represent (Jesover & Kirkpatrick, 2005). According to the principles of corporate governance (OECD, 2004), to limit the divergence from the shareholders' interest, the shareholders/owners should always be able to exercise their fundamental ownership right, with emphasis on appointing and removing members of the board, and all shareholders must be fairly treated by the company. The board must be transparent to the shareholders and should provide them with accurate information for them to monitor the board and influence the decision-making. However, in reality it is more complex when a firm has a dominant shareholder (Jesover & Kirkpatrick, 2005).

Another problem with effectiveness of the board of director can be explained through the hegemony theory, which argues that the board of directors may be incapable of fulfilling its supervisory role and of protecting shareholders' interest (Kosnik, 1987 & Mace, 1986 in Nahar Abdullah, 2004). According to this theory, the management board dominates the board of directors and argues that the board of

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<sup>3</sup> <http://www.oecd.org/corporate/ca/corporategovernanceprinciples/31557724.pdf>

directors has a symbolic function (Nahar Abdullah, 2004). This and the board composition will be further explained in the next paragraph.

The principles for good corporate governance were originally formulated in 1999 by the Organization for Economic Co-operation and Development (OECD). At that time it was adopted by all members of the OECD, of which US and Germany are both a member. It has become a reference tool for corporate governance for countries all over the world (Jesover & Kirkpatrick, 2005). In 2002, the OECD ministers called for an assessment of the principles of corporate governance by 2004. The assessment took place a year earlier than was previously agreed due to the major business scandals in the early 2000s, which had a negative impact on the integrity of corporations, financial institution and markets<sup>4</sup>. This led to a revised version in 2004, in which all the members shared the same belief that more transparency, accountability, board supervision, and respect for the rights of shareholders and role of key stakeholders is part of the foundation of a well-functioning corporate governance system<sup>5</sup>.

According to the OECD's corporate governance steering group, weak corporate governance is the main reason for the financial crisis, which started in 2007<sup>6</sup>. This had to do with boards of banks not being extremely knowledgeable about their company's risk measurement methodology and/or risk management information not being appropriate or available to the board to support them on their supervisory tasks (Kirkpatrick, 2009).

Currently the OECD is conducting a review of the principles. The review is to ensure the continuing high quality, usefulness and relevance of the Principles. The review should maintain the above mentioned core values and be strengthened where needed in response to development since 2004, especially the financial crisis (Review of the OECD Principles of Corporate Governance, 2014-2015).

### **2.3.2 Board composition**

Corporate governance systems differ across countries. In the Anglo-Saxon countries such as the UK, the US and Canada the one-tier board structure is commonly used, while in Continental countries such as Germany, the Netherlands and Finland the two-tier board structure is the norm (Hayes et al., 2014). Although board structure differs across countries, they have the same primary objective, which is to monitor the management of the firm to protect the long-term interest of the shareholders (Connelly and Limpaphayom, 2004). In theory, the two board structures differ from each other in the way they separate the decision management from the decision control. In practice the two board structures differs from the way the board are composed, how the leadership structure of the board is organized and the way the board uses oversight board committees (Maassen, 1999).

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<sup>4</sup> <https://www.oecd.org/daf/ca/2014-review-oecd-corporate-governance-principles.htm>

<sup>5</sup> Refer to previous note

<sup>6</sup> <http://www.oecd.org/corporate/ca/corporategovernanceprinciples/43056196.pdf>

### 2.3.2.1 One-tier model

In the Anglo-Saxon model, it is assumed that shares are widely distributed among individuals (Hayes et al., 2014). The Anglo-Saxon one-tier board model consists of a single layer, which only consists of the board of directors (Hayes et al., 2014). In this single-tier board structure, according to the US corporate law and UK corporate governance code, there is no distinction between the role and the position of the executive and the non-executive directors (Maasen, 1999). Both group of directors have the same legal responsibilities and liabilities (Maasen, 1999). The executive directors can be seen as the management board in the two-tier board model, whereas the non-executive directors can be seen as the supervisory board. In the one-tier model, they are jointly responsible for the day-to-day operations. According to Maasen (1999) boards composed of more executive directors are usually associated with a higher risk of the agency problem between management and shareholders.

A company that is structured according to the one-tier model can have a board leadership structure that separates the duties of the CEO and chair position of the board, but it can also have a board leadership structure that combines the roles of the CEO and that of the chairman (Maasen, 1999). The role of the non-executive or the independent director is crucial when it comes to monitoring the management; they are in charge of supervising the management board to prevent divergence from the shareholders interest. Sheridan & Kendall (1992) claims that having one group of directors monitoring the other group on the same board, gives an uncomfortable feeling about the monitoring mechanism. However, the one-tier board makes use of several board committees like remuneration, audit, nomination and oversight committees (Maassen, 1999). The function of these board committees is primary to function as decision control mechanism in the board of directors. From the Agency problem perspective, the oversight committees might function as an additional effective monitoring mechanism to improve independence in the one-tier board (Maassen, 1999).

### 2.3.2.2 Two-tier model

In Continental European countries like Germany, Netherlands and Finland companies are structured according to the two-tier board model. These countries are known for their concentrated ownership, whereas mainly banks, insurance companies and other institutions hold shares (Hayes et al., 2014). In Germany for example all stock corporations are, according to the German Stock Corporation Act of 1965, required to have a two-tier board structure (Jungmann, 2006). The board should consist of a management board (Vorstand) and a supervisory board (Aufsichtsrat), which both have different legal responsibilities<sup>7</sup>. The members of the supervisory board consist of shareholders representatives, government or labor representatives (Jungmann, 2006). The members of a board are not permitted to be a member of both boards at the same time (Jungmann, 2006). This means that the chairman of the

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<sup>7</sup>[http://www.dcgk.de/files/dcgk/usercontent/en/download/code/2015-05-05\\_Corporate\\_Governance\\_Code\\_EN.pdf](http://www.dcgk.de/files/dcgk/usercontent/en/download/code/2015-05-05_Corporate_Governance_Code_EN.pdf)

management board is in charge of coordinating the tasks of only the management board, while the chairman of the supervisory board is in charge of coordinating the tasks of the supervisory board.

The management board is responsible for managing the firm in the best interests of its stakeholders, with the main objective of creating value. The management is in charge of formulating the firm's strategy and coordinates the implementation and the execution of it with the supervision of the supervisory board. The tasks of the supervisory board are emphasized in Sec. 5.1 of the German Corporate Governance Code (2015)<sup>8</sup> and it states that the supervisory board should regularly advise and supervise the management board and it should be involved in fundamental decisions that are of importance to the firm. The supervisory board is also in charge of appointing, dismissing and determining the total compensation of the members of the management board, while the members of the supervisory board are elected by the shareholders of the firm during the general meeting<sup>9</sup>. The supervisory board represents the firm in all affairs concerning the management board, mainly by initiating lawsuits against the members of the board (Jungmann, 2006). In addition, according to Berran in Jungmann (2006), the supervisory board is also responsible for approving the annual accounts and in the case where the firm's interests are harmed, they should intervene. At last, the supervisory board also exercises some soft tasks, like networking with stakeholders (Davies in Jungmann, 2006). However, the main task of the supervisory board is monitoring the management boards, while all management tasks are the responsibility of the management board (Jungmann, 2006). On the other hand, this clear separation between management board and supervisory board may lead to information asymmetry between the two boards, since compared to the one-tier structure only the management board is in charge of the day-to-day operations.

For the supervisory board to act as an effective advice and control mechanism it should consist of an adequate amount of independent members. Section 5.4.2 of the German Corporate Governance Code (2015)<sup>10</sup> states that a member of the supervisory board "*is considered independent if he/she has no business or personal relations with the company or its Management Board which cause a conflict of interests.*" In addition, a member of the management may become a member of the supervisory board after two years of the end of their appointment or if a motion by a shareholder, holding more than 25% of voting rights, is presented (German Corporate Governance Code, 2015).

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<sup>8</sup> Refer to note 7

<sup>9</sup> Refer to note 7

<sup>10</sup> Refer to note 7

### 2.3.2.3 CEO duality

So according to the above written, in essence the main differences between the two boards structures lies in the way they separate the decision management from the decision control. One important aspect of this difference is the possibility that the CEO may also be the chairman of the board in the one-tier board structure. This so called CEO duality, according to the Agency theory, may cause an imbalanced distribution of power since a heavy concentration of management and control of the firm is in hand of one person, which makes it difficult for the non-executive board members to effectively supervise the management board (Lawal, 2012). This is because the chairperson is the one in charge of running the board meetings and overseeing the process of hiring, firing, evaluating, and compensating the senior management (Beasley & Salterio, 2001) and according to Jensen (1993) for board to function as an effective monitoring mechanism the position of the CEO and the chairman should be separated. Dechow, Sloan and Sweeney (1996) found evidence that firms that manipulate earnings are more likely to have a CEO who at the same time is the chairman of the board.

On the other hand combining the position of the CEO and that of the chairperson does also have benefits for the firm. It is said that when both position are exercised by the same person, he or she has more knowledge of decisions that need to be taken to improve firm performance and due to CEO duality the decisions are reached faster (Nahar Abdullah, 2004). According to Brickley, Coles & Jarrell (1997) for larger firms when the two functions are split, the costs are higher than the benefits. For example, they have higher cost for information sharing and higher salary costs due to the split of the two functions (Brickley et al., 1997).

### 2.3.2.4 Board size

Another important aspect of board composition is the size of the board. According to Kyereboah-Coleman & Biekpe (2006) a view exist that larger boards are an effective mechanism for firm performance due to larger boards having a range of expertise to help giving advice for decision making. Also, a larger board may be more difficult for a powerful CEO to dominate. However, previous researches have proven that large boards are less effective than small boards. According to Jensen (1993) larger board suffer from coordination, communication and processing problems. Kang (2007), also claims that larger boards suffer from an ineffective decision making process because the larger the board, the harder it is to reach consensus on drastic corporate strategies. Furthermore, a larger board is easily associated with free-rider problem, due to the communication and coordination problems (Ahmed, Hossain & Adams, 2006). In addition, the paper of Yermack (1996) provides evidence that smaller boards are more effective in monitoring the CEO, compared to larger boards.

Evidence from previous research has proven that a board should consist of more non-executive directors which does not share any material connection such as family ties, employment, professional services, financial relationship and interlocked directorship amongst others with the management (Lawal, 2012; Ayuso and Argandoña, 2007; Shivdasani and Zenner, 2002).

## 2.4 Summary

Large firms are most of the time financed by several shareholders. This means that most firms are not managed by their owners but by a board of director. This is called the separation of ownership and control. The agency theory is the theory that best explains the relationship between the owners/shareholders and the executive management of a firm. The agent can be seen as the management board and the principles as the owners/shareholders of the firm. Due to the fact that all individual that all individuals are driven by self-interest there is need for a strong corporate governance to limit the divergence from the principle's interest. A firm can be managed according to the one-tier or the two-tier board model.

Next chapter discusses literature on the two board models together with literature on earning quality.

## Chapter 3: Earnings management

### 3.1 Introduction

In the previous chapter the agency theory and corporate governance was discussed. Due to the separation of ownership and control, firms are not directly managed by their owners, but by a top management. Because the day-to-day operations are in hands of a top management, they possess information advantages over the shareholders, which put them in a beneficial position to act opportunistically. A common way of achieving their own private interests is by managing earnings. The following paragraphs will discuss the definition of earnings management, the supporting theory for earning management, how it is applied and how it can be detected.

### 3.2 Definition of earnings management

For academic researchers, stakeholders, industry practitioners and regulators earning management has become a highly discussed topic (Eckles, Halek, He, Sommer, & Zhang 2011). The literature provides several definitions of earnings management; some provide a definition as it being a bad thing, others as it being a positive thing. Healy & Wahlen (1999), for example, explains earnings management as a practice where managers use their discretion in the financial reports by altering the transactions with the purpose either to misinform some stakeholders regarding the hidden economic performance of the organization, or to influence certain outcomes that have an impact on the accounting figures. The other way around Beneish (2001) provides a definition of earnings management as firm executives providing more insight to the shareholders regarding the company's future performance.

The book of Scott (2012) gives a more neutral definition. He defines earnings management as the way managers try to influences the reported figures as such to achieve a desired financial result through the chosen accounting policies or transactions.

According to Scott (2012) the reason for managers to engage into earnings management can be viewed from two perspectives, namely the financial reporting perspective and the contracting perspective. From the financial reporting perspective, managers may engage into earnings management with the objective to meet or beat analysts' earnings forecast, therefore to prevent damage to their reputation and to avoid that share prices react in a negative way (Scott, 2012). However, managers may also use earnings management to try to report stable and smooth growing earnings over time. This is a way of communicating management's inside information to Shareholders, because being able to smoothen earnings, management depends on inside information (Scott, 2012). In addition, Shareholders prefer smooth earnings over volatile earnings, since volatile earnings is seen as a risky investment (Graham, Harvey & Rajgopal, 2005). From the contracting perspective, earnings management gives managers the flexibility to react to unexpected state realizations when contract are rigid and incomplete (Scott, 2012).

Due to the separation of ownership and control, as explained in previous chapter, managers have more knowledge of the firm since they are responsible for the day-to-day operations. Financial statements are a primary source of information to investors to gain knowledge of how the firm is performing and if the agreed objectives are achieved. However, if figures of a firm are severely managed, the usefulness of the financial statement is reduced, since it is not showing the true economic value of the firm (Scott, 2012).

Looking back at the definition of earnings management as defined by Scott (2012), one can conclude that earnings management concerns choices of accounting policies by managers and real actions. Managing earnings by means of real actions is by suddenly spending more on advertising, R&D and maintenance, timing of purchases and disposals of capital assets, stuffing the channels, overproduction, etc. (Scott, 2012). Since this thesis puts the focus on choices of accounting policies, earnings management by real action will not be further explained.

Managing earnings by means of accounting policies according to Scott (2012) can be divided in to two categories. The first one is the choice of accounting policies, for instance, the depreciation method used or the method used to recognize revenue. The second one is discretionary accruals, which refers to professional judgments regarding credit loss and restructuring provisions, inventory valuation, and guaranty costs (Scott, 2012). Accrual accounting is actually required under GAAP to reduce timing and matching problems. However, accruals are based on assumptions and estimations, meaning that they may contain errors or they may be used to manage earnings (Dechow, 1994). Accruals consist of a nondiscretionary part and a discretionary part. The nondiscretionary part refers to accruals, which are justifiable and expected for a specific firms or industry, while the discretionary part of accruals however, may not be explained by an economic factor and might be used by management to opportunistically manipulate earnings, and are unexpected (Ronen & Yaari, 2008). If management tends to use discretionary accruals opportunistically, it will affect the quality of earnings, meaning that earnings become a less reliable performance measure (Dechow, 1994). However, managing earnings by means of accruals is surrounded by an ‘iron law’, which states that accruals do reverse (Scott, 2012). This means that if in current period higher earnings are reported, by means of accrual accounting, this is reversed in subsequent period, forcing earnings to be lower in the next period.

### **3.3 Detecting earnings management**

Like mentioned above accruals based accounting, more specific the discretionary part of accruals, may be used by managers to meet or beat analyst expectation or for them to pursue their own private incentives (e.g. bonus purposes). Previous studies examine the quality of earnings having accruals-based earnings numbers as their main proxy (Dechow, Ge & Schrand, 2010; Bartov, Gul & Tsui, 2000). Therefore, this thesis will use the discretionary accruals to proxy earnings quality of firms.



In the literature, there are several accrual models to be found to detect earnings management. The six most common used models according to Bartov et al. (2000) are the Healy model (Healy, 1985), the DeAngelo model (Deangelo, 1986), the Jones model (Jones, 1991), the Modified Jones model (Dechow, Sloan and Sweeney, 1995), the Cross-Sectional the Modified Jones Model (Dechow et al., 1995) and the Industry Model (Dechow et al 1995).

The basis for all these accrual models is computing total accruals, which can be calculated as follows (Dechow et al., 1995; Bartov *et al*, 2000):

$$TA_t = \frac{\Delta CA_t - \Delta CASH_t - \Delta CL_t + \Delta STD_t - DEP_t}{A_{t-1}} \quad [1]$$

Where:

- TA<sub>t</sub> = the total accruals in year t;
- ΔCA<sub>t</sub> = the change in current assets in year t;
- ΔCASH<sub>t</sub> = the change in cash and cash equivalents in year t;
- ΔCL<sub>t</sub> = the change in current liabilities in year t;
- ΔSTD<sub>t</sub> = the change in debt included in current liabilities in year t;
- DEP<sub>t</sub> = depreciation and amortization expense in year t;
- A<sub>t-1</sub> = total assets in year t – 1.

This is a balance sheet approach, which according to Collins and Hribar (2000) is inferior in certain circumstances compared to a cash-flow-statement based approach. However Bartov *et al.* (2000) found a strong rank correlation, which was highly statistically significant, between the total accruals measure based on the balance sheet approach and the cash-flow-statement based approach. Based upon the above one can conclude that the two approaches are not inferior to one another. For this thesis, the balance sheet approach is used. Since the discretionary part of accruals cannot be easily identified, most models compute the non-discretionary part of the accruals. The difference between total accruals and non-discretionary accruals is the discretionary portion of accruals. Therefore, the following equation shows the split between non-discretionary and discretionary accruals:

$$TA_t = NDA_t + DA_t \quad [2]$$

Wheres:

- NDA<sub>t</sub> = Non-discretionary accruals year t
- DA<sub>t</sub> = Discretionary accruals in year t

### 3.3.1 Healy Model (1985)

According to Healy (1985) there are two proxies for discretionary accruals and accounting choices, which are total accruals and the effect of voluntary changes in accounting procedures on earnings. This model uses non-discretionary accruals (NDA) as a proxy for earnings management. To measure NDA the mean of total accruals from the estimation period is used. This leads to the following model (Dechow et al., 1995):

$$NDA_{\tau} = \frac{\sum_t TA_t}{T} \quad [3]$$

Where:

$NDA$  = estimated non-discretionary accruals;

$TA$  = total accruals scaled by lagged total assets;

$t$  = 1, 2, ..., T year subscript for years included in the estimation period;

$\tau$  = a year subscript indicating a year in the event period.

### 3.3.2 DeAngelo Model (1986)

To measure the non-discretionary accruals, The DeAngelo Model uses the last period's total accruals scaled by lagged total assets. This leads to the following model (Dechow et al., 1995):

$$NDA_t = TA_{t-1} \quad [4]$$

The difference between TA and NDA is the discretionary portion of accruals. According to Dechow et al. (1995) the DeAngelo Model as well as the Healy Model are both based on previous year's observation and both models assume that NDA are constant over time, however the two models are quite different from each other. De DeAngelo Model assumes that NDA follow a random walk process, while the Healy Model assumes a mean reverting process (Dechow et al., 1995). However, according to Kaplan (1985) NDA are not constant overtime. He found that NDA respond to changes in economic circumstances.

### 3.3.3 The Jones Model (1991)

The Jones Model compared to the two previous models explained above, attempts to control for the changes in economic circumstances of a firm on NDA. In addition, this Model assumes that non-discretionary accruals are not constant over time. This leads to the following model (Dechow et al., 1995):

$$NDA_t = \alpha_1 \left( \frac{1}{A_{t-1}} \right) + \alpha_2 (\Delta REV_t) + \alpha_3 (PPE_t) \quad [5]$$

Where:

- $NDA_t$  = the estimated non-discretionary accruals in year  $t$ ;  
 $\Delta REV_t$  = the revenue in year  $t$  less revenue in year  $t - 1$  scaled by total assets at  $t - 1$ ;  
 $PPE_t$  = the gross property plant and equipment in year  $t$  scaled by total assets at  $t - 1$ ;  
 $A_{t-1}$  = the total assets at year  $t - 1$ ;  
 $\alpha_1, \alpha_2, \alpha_3$  = the firm-specific parameters.

To obtain the firm-specific parameters in the estimation period, the follow equation is used (Dechow et al., 1995):

$$TA_t = a_1 \left( \frac{1}{A_{t-1}} \right) + a_2 (\Delta REV_t) + a_3 (PPE_t) + \epsilon_t \quad [6]$$

Where:

- $TA_t$  = the total accruals in year  $t$  scaled by lagged total assets;  
 $a_1, a_2, a_3$  = the OLS estimates of  $\alpha_1, \alpha_2$  and  $\alpha_3$ ;  
 $\Delta REV_t$  = the revenue in year  $t$  less revenue in year  $t - 1$  scaled by total assets at  $t - 1$ ;  
 $PPE_t$  = the gross property plant and equipment in year  $t$  scaled by total assets at  $t - 1$ ;  
 $A_{t-1}$  = the total assets at year  $t - 1$ ;  
 $\epsilon_t$  = the residual, which represent firm-specific discretionary portion of total accruals.

The basic philosophy behind the Jones Model (1991) is to compute unmanaged component of accruals by running a regression on economic events that drives accruals. The residual ( $\epsilon_t$ ) is the discretionary portion of accruals. However, the Jones Model contains a limitation; earnings, which are managed through discretionary revenues, are extracted from the discretionary component of the accruals. This causes the estimate of earnings management to be biased toward zero (Dechow et al., 1995).

### 3.3.4 Industry Model (1991)

The Industry Model, as used by Dechow & Sloan (1991), similar to the Jones Model assumes that non-discretionary accruals are not constant over time. This Model however, does not attempt to model the determinants of non-discretionary accruals; instead, it assumes that firms in the same industry experience similar variation in the determinants of the non-discretionary accruals. The Industry Model (1991) is as follows (Dechow et al., 1995):

$$NDA_t = \gamma_1 + \gamma_2 \text{median}_t(TA_t) \quad [7]$$

Where:  $median_t(TA_t)$  is the median value of total accruals scaled by lagged assets for all non-sample firms in the same 2-digit SIC code and  $\gamma_1$  &  $\gamma_2$  are firms specific parameters in the estimation period, which are estimated using an OLS on the observation (Dechow et al., 1995).

The Industry model is attached to two factor when trying to mitigate errors in the measurement of discretionary accruals. The first factor is that the model removes common variations in non-discretionary accruals for firms in the same industry. However, the model will not be able to extract all the non-discretionary accruals from the discretionary accrual proxy if changes in non-discretionary accruals are due to changes in firm-specific circumstances (Dechow et al., 1995). The second factor is that variations in discretionary accruals, which are correlated for firms in the same industry, are removed. This increases the probability of a type 2 error, which is not detecting earnings management while earnings management is actually present (Dechow et al., 1995).

### 3.3.5 The modified Jones Model (1995)

The Modified Jones Model by Dechow et al. (1995) is a response to the limitation of the Jones Model (1991) explained above. The modified model eliminates the bias in the original model by adjusting change of revenue by the change in receivables in the event period (Dechow et al., 1995). The idea behind this is that all changes in credit sales, in the event period, are due to earnings management, since earnings are easier to manage through credit sales than through cash transactions (Dechow et al., 1995). The modified model is as follows (Dechow et al., 1995):

$$NDA_t = \alpha_1 \left( \frac{1}{A_{t-1}} \right) + \alpha_2 (\Delta REV_t - \Delta REC_t) + \alpha_3 (PPE_t) \quad [8]$$

Where:

$\Delta REC_t$  = the net receivables in year t less net receivables in year t-1 scaled by total assets at t-1.

The remaining variables are similar to the Jones model in equation [6].

Based on a study performed by Dechow et al. (1995) evidence was found that the modified model Jones model is a more powerful test for detecting earnings management compared to the original Jones model.

### 3.3.6 Cross-sectional Modified Jones Model

The cross-sectional model is based on the modified Jones model. However, instead of estimating the firm specific parameters, the cross-sectional model estimates industry and year specific parameters (Bartov et al., 2000). The parameters are obtained by the estimating the same equation used by the modified Jones model based on contemporaneous accounting data from firms matched on year and two-digit SIC industry groupings (Bartov et al., 2000).

The modified Jones model does not assume any systematic earnings management to occur in an estimation period. The cross-sectional modified Jones model assumes that in the estimation period all firms in the same industry have the same operating cycle, which means that the estimation parameters are equal across all firms but does not make any assumptions related to systematic earnings management (Bartov et al., 2000). According to Jeter & Shivakumar (1999) the cross-sectional model may be unable to identify all negative discretionary accruals due to contemporaneous correlated earnings management across sampled firms. This would lead to not detecting earnings management while it is actually present. Jeter & Shivakumar (1999) again claimed that it is better to use the cross-sectional model when studying event-specific earnings management.

The time-series model also has its flaws. The Modified Jones model assumes that the length of a firm's operating cycle is constant over the estimation period, which in reality may not be the case (Bartov et al., 2000). However, if mature firms are used in the sample selection it is expected that the change over time is not significant (Bartov et al., 2000).

For this thesis, the modified Jones Model (1995) will be used. It is one of the most common used models to calculating discretionary accruals. Like mentioned above, it is also a more powerful model compared to the original Jones model. Moreover, since this study is not investigating any event specific earnings management the Modified Jones model will be applied.

### **3.4 Conclusion**

This chapter firstly discussed several definition of earnings management. Earnings management can be seen as negative, but also as something positive. General one can conclude that earnings management is a managerial choice of manipulating earnings is a specific way to achieve reporting objectives. Earnings can be managed by choices of accounting policies and through real actions. Several models can be applied to detect earnings management. Several of these models were analyzed based on previous literature. For this thesis, the modified Jones model (1995) is applied. Next chapter discusses the hypothesis development.

## Chapter 4: Hypothesis Development

### 4.1 Introduction

This chapter discusses the hypothesis developed, which will be researched in this thesis. The several theories and concepts explained in the previous two chapters are considered for the development of the hypothesis.

### 4.2 Hypothesis development

As discussed in the chapters above, large firms are most of the time not managed by their owners. This is due to the fact that firms are financed by several shareholders. Due to separation of ownership and control, managers who are in charge with the day-to-day operations, possesses information and knowledge advantages related to the firm (Berle and Means, 1932). According to the Agency theory, managers are opportunistic by nature and tend to put emphasis on their private interests (Jensen & Meckling, 1976). Because of this information asymmetry, management might be able to manage earnings to cover bad performance, to prevent them from attracting political attention or to achieve higher bonus payouts (Jensen and Meckling, 1976). However, if firms severally engage in earnings management, the usefulness of the financial information is reduced, since the true economic value of the firm is not shown (Scott, 2012). This is why there is a need for an effective monitoring mechanism to mitigate this agency problem. This leads to the concept of corporate governance, which is the concept of how a firm is being managed.

The literature has shown that there are two types of monitoring mechanisms to mitigate the agency problem, the one-tier and the two-tier board structure. Previous empirical studies investigated if firm performance, of one-tier firms, is related to board characteristic such as board size, board independence and internal structure (Kosnik, 1987, Jensen, 1993; Charkham, 1994; Yermack, 1996; Kyereboah-Coleman et al., 2006; Millet-Reyes et al., 2010). However, results related to these comparison provided contradicting evidence (De Andre, Azofra, & Lopez, 2005; Millet-Reyes et al., 2010).

In addition, research on an association between earnings management and corporate governance characteristic has been done. Again, the emphasis was put on board characteristics such as board size, board composition and committee composition and their activity. Most studies provided evidence that firms with an independent board and an effective audit committee are inversely associated with earnings management (Beasley, 1996; Dechow et al., 1996). Beasley (1996) for example, based on a sample of 150 publicly traded firms, found evidence that when the portion of independent members in a board increases, the probability for a firm to experience financial statements fraud decreases. Another research, done by Dechow et al. (1996), also provided evidence that firms, from which the board consists of a majority of executive directors, are more likely to engage into earnings management. However, Bedard,

Chtourou & Courteau (2004) did not find any relation between the amount of independent director and earnings management in a sample consisting of US firm.

However, the literature provides little empirical evidence on which of the board structures function as a better monitoring mechanism when it comes to earnings management. In addition, most debates on this subject are based on theoretical assumptions (Jungmann, 2006). In the last decade there were ongoing discussion regarding the reform of corporate governance when it comes to corporate control. In the 2005, the EU emphasized on then important role of independent directors and the supervisory board. Jungmann (2006) and Millet-Reyes et al. (2010) where two paper, who studied the effectiveness of the two board structures on firm performance. Jungmann (2006), based on a sample of UK and German firms, concluded that the one-tier nor the two tier board structure is superior to the other. Millet-Reyes et al. (2010) studied based on a sample of 665 firms-years observation in France covering 174 non-financial firms and 28 industry over a period of 5 years. In France, a firm is allowed to choose between the two board structures. They found evidence that firms owned by block holders and with a less transparent two-tier board is inversely associated with firm performance. In addition, they did not find evidence on a negative relation between board size and board efficiency for neither board structures.

As discussed in chapter two the two board structures differ from each other in the way they separate the decision management from the decision control (Maassen, 1999). The one-tier consists of a single board of director, which is comprised of executive as well as non-executive directors. They are jointly responsible for the day-to-day operations, which may lead to less information asymmetry between the two groups. The non-executive directors can be seen as non-employees of a firm (what makes them independent) who are in charge of monitoring the executive board. However, when it comes to monitoring the management, the roll of the non-executive directors is crucial; it should be independently judged on strategy, key appointments and standard of conduct (Jungmann, 2006). However, due to the emphasis of both the Combined Code (2006) and the Cadbury Code the roll of the non-executive tends to put more emphasis on controlling the executive directors (Jungmann, 2006). In addition, the study of Dahya, McConnell & Travlos (2002) found evidence that if the non-executives increase their monitoring role, this leads to an increase in the disciplinary function of the board. In addition, according to the Combined Code of corporate governance (2006) larger firms should have a board of director, which is half comprised by non-executive directors. The two-tier board structure on the other hand, consists of a management board and a supervisory board, both having different legal responsibilities<sup>11</sup>. The supervisory board can be seen as the non-executive directors in the one-tier structure. Supervising the management board is the main task of the supervisory board. The main difference between the two board structures is the clear separation between decision management and decision control. Sheridan & Kendall (1992) claims the one-tier board structure gives an uncomfortable feeling about the monitoring

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<sup>11</sup> Refer to note 7.

mechanism, since the clear separation between management and control is missing. Therefore, a two-tier board structure should be more effective in mitigating the self-interest problem that lives in large corporations. It is expected that executives are less able to use their managerial power to manage earnings in their favor if the company has a well-functioning supervisory board, which monitors and has a critical assessment of their decision and actions.

Since most of the previous literature mentioned above studied the association between firm performance and board structures this thesis wants to study the effectiveness of the monitoring mechanism of the board structures, instead based on earnings quality. This leads to the following hypothesis:

***H<sub>1</sub>: Firm's corporate governance comprised by a one-tier board structure tends to engage in more earnings management compared to a two-tier board structure.***

### **4.3 Conclusion:**

In this chapter the hypothesis, which will be tested, was developed. The chapter also discussed relevant theory and previous studies, which led to the developing of the hypothesis. Next chapter will discuss the methodology, which will be used to operationalize the hypothesis testing.



## Chapter 5: Methodology

### 5.1 Introduction

Previous chapters discussed the relation between earnings management and corporate governance and the hypothesis to be tested was developed. In this chapter, the data and methodology, that will be applied to test the hypothesis, is discussed. Furthermore, the regression model with the corresponding control variables will be motivated.

### 5.2 Sampling

This study investigates if one of the board structures is superior compared to the other when it comes to monitoring the management. For being able to test the board structures, US and German firms were selected. Like discussed in chapter 2, US firms have a boards structure composed of a single layer, while German firms have a two-tier board structure. To test the hypothesis a sample of 75 US firms and 75 German firms where selected over a two-year period (2013-2014). The sample of US firms consist of 75 largest firms listed on NYSE. The German firms are firms listed in the DAX 30 and MDAX 50. Ideally, for performing empirical research a larger set of data is needed. However, the sample of this thesis is restricted due to the fact that board information concerning German firms is not available through a database. Therefore, data was hand-collected concerning board composition of the 75 German firms from their corporate annual report. For the US firms data concerning board composition was gathered form ISS (formerly RiskMetrics) through Compustat. Financial institutions were left out of the sample, since the reporting requirements concerning this industry are different. Also, real estate firms were left out, since they do not generate any sales revenue according to Baxter (2009). This led to a total sample of 300 observations.

### 5.3 Research design

Like stated before, it is expected that the two-tier board structure is better at mitigating the agency problems and self-interest issues that comes along with separation of ownership and control in companies. Therefore, this thesis hypothesized that companies with a one-tier board structure engage in more earnings management compare to the companies with a two-tier board structure. In this study earnings management is proxied by the level of discretionary accruals. Discretionary accruals are calculated by using the modified jones model formulated by Dechow, Sloan and Sweeney in 1995. As stated before this study favors the Modified Jones model above other models because of its ability to recognize the effects of economic events on accruals and its capacity to remove the calculation error of the original Jones Model when accruals are used to report revenues (Dechow et al, 1995). In addition, this thesis is not investigating any event-specific earnings management. Furthermore, this model is widely used in previous literature as a proxy for discretionary accruals.

To calculate the discretionary accruals for the 150 firms first, ten years of data was collected, since Dechow et al. (1995) claimed that at least ten year of financial statement data is required to accurately calculate the economic estimates. Data is collected form 2005 until 2014. After calculating the discretionary accruals, only the data concerning 2013 ad 2014 will be kept to perform the hypothesis testing concerning this thesis.

First step in calculating the discretionary accruals is to calculate the total accrual (TA). To calculate TA equation number [1] is used:

$$TA_t = \frac{\Delta CA_t - \Delta CASH_t - \Delta CL_t + \Delta DCL_t - DEPT}{A_{t-1}} \quad [1]$$

Next, the non-discretionary accruals part is calculated using equation [8]:

$$\frac{NDA_t}{A_{t-1}} = \alpha_1 \left( \frac{1}{A_{t-1}} \right) + \alpha_2 \left( \frac{\Delta REV_t - \Delta RECT}{A_{t-1}} \right) + \alpha_3 \left( \frac{PPE_t}{A_{t-1}} \right) \quad [8]$$

Since total accrual is non-discretionary accruals plus discretionary accruals, the non-discretionary part is subtracted from the total accruals to calculate the total discretionary accruals.

Once the discretionary accruals are calculated for the selected firms in the chosen timeframe, the following linear regression model is used to assess the relation between one-tier (two tier) board structure with discretionary accruals:

$$|DA| = \beta_0 + \beta_1 Tier + \beta_2 FirmSize + \beta_3 BoardIndep + \beta_4 Leverage + \beta_5 Boardsize + \beta_6 ROA + \beta_7 Tenure + \beta_8 LOG\_OCF + \beta_9 Equity\_ratio + \beta_{10} Big4 + \beta_{11} SIC\_Code + \varepsilon$$

DA	= Absolute amount of DA based on the modified Jones Model
Tier	= 1 if US, otherwise 0 (US proxies one-tier structure, and Germany two-tier structure)
BoardIndep	= Percentage of independent directors in the board.
FirmSize	= Natural Logarithm of total assets.
Leverage	= Total debt divided by total assets
Boardsize	= Number of board members
ROA	= Net income divided by total assets
Tenure	= Length of CEO's tenure in office
Log_OCF	= Cash Flow from operations
Equity_ratio	= Total Equity divided by total assets
Big4	= Audited firm is a big4 audit firm
SIC_Code	= 2-digit SIC code

### 5.3.1 Dependent and Independent variables

The dependent variable in this model is DA, which represents the level of discretionary accruals. The independent variable of this analysis is COUNTRY. This thesis attempts to investigate and compare the monitoring power of two different board structures and expects companies with a one-tier board structure to be less independent from the executives, reducing their monitoring power which enables managers to use discretionary accruals to manage earnings. Therefore, it is expected that the one-tier board structure has a significant positive relation with earnings management. To proxy these two board structures we used a dummy variable COUNTRY. Therefore, the independent variable COUNTRY is '1' for all US companies in the sample (proxying one-tier boards) and 0 otherwise (German-based companies, proxying two-tier boards).

### 5.3.2 Control variable

The selected regression model includes a number of control variables that could influence the effectiveness of the supervisory board and the level of discretionary accruals. These variables are included because they are likely to influence the dependent variable DA and therefore also affect the relation between board structure and discretionary accruals (earnings management).

The first control variable of this model is FIRMSIZE. This is measured as the natural logarithm of total assets. It is expected that large firms are closely watched by the financial press and experience continuous pressure to meet or beat analyst predictions to maintain or increase share price and maximize managerial bonus. Therefore, larger firms are more likely to manage earnings upwards. Alves (2012) adds that large firms however have more political attention and experience therefore a higher political cost. These firms are consequently more likely to use income decreasing discretionary accruals to reduce their political attention (Alves, 2012). However, according to Llukani (2013) large firms are less likely to engage in earnings management because they are audited by large audit firms, have higher reputation risks and usually have their own internal audit departments. She further claimed that large companies are audited by large audit firms or audit specialists who perform high quality audits. Therefore, managers are less inclined to manipulate earnings because of the higher probability of this being detected (Llukani, 2013). Furthermore, she believes that large companies will suffer a much greater reputation loss compared to smaller companies if earnings management is detected (Llukani, 2013). Also due to the presence of internal audit departments in large corporations it is less probable that managers will engage in earnings management (Llukani, 2013). Kim, Liu & Rhee (2003) adds that larger companies have a more effective internal control and are therefore better able to mitigate the risk of reporting erroneous financial information. This study follows Kim et al (2003) and Llukani (2013) and expects the variable FIRMSIZE to have a significant but negative relation with level of discretionary accruals. Large and

well-known firms are managed by larger boards, experience more public attention, and understand the risks and consequences of being involved in financial accounting scandals.

The second control variable used in this analysis is LEVERAGE. This is measured as the total debt divided by total assets. Highly leveraged companies have strict debt covenants and are continuously at risk of violating these covenants (Klein, 2002). Executives would therefore be more inclined to manage earnings to prevent violation of such covenants. Anagnostopoulou and Tsekrekos (2016) also found that firm with high levels of debt are highly criticized which increases the pressure on managers to manage earnings to meet or beat analyst forecast. Hence, a significant and positive relation between LEVERAGE and earnings management is expected.

The third control variable used in this study is ROA. This is measured as net income divided by total assets and is used as a performance measure. Managers may be pressured to reach forecast returns and may be more inclined to manage earnings. Therefore, a significant and positive relation is expected between ROA and earnings management.

The fourth control variable used in this study is CEO TENURE, which is the length the CEO has been in office. Previous studies provide evidence that earnings management is greater in the early years of CEO appointment (Ali and Zhang 2015). Because the market is uncertain about their capability to manage the organization, these CEO's are more inclined to manage earnings upward to show better results (Ali and Zhang, 2015). Furthermore, Ali and Zhang (2015) argue that CEO's are more likely to manage earnings in the early years of tenure to avoid being labeled as low performing CEO's. Having unfavorable results in the early years of tenure may affect CEO's future compensation or his/her career as a whole (Zhang and Ali, 2015). Their study showed a significant and positive relation between the first three years of CEO Tenure and earnings management. Previous studies on the other hand provide evidence that the longer the tenure of a CEO the more power they have to pursue their own private interest (Hill & Phan, 1991). Finkelstein & Hambrick (1989) also argues that the longer the CEO is in office the more power they have to influence the board. They claim that it takes time for the CEO to acquire the desired power and after a certain length of tenure, CEO's are able to select the board members themselves (Finkelstein & Hambrick, 1989). These board members are therefore sympathetic to the CEO and are more likely to agree with their policies (Finkelstein & Hambrick, 1989). Based on the above this thesis controls for CEO Tenure and expects a positive and significant relation between CEO Tenure and earnings management.

The fifth control variable is CASH FLOW FROM OPERATIONS. According to Jiang, Lee & Anandarajan (2008) firms performing well in term of operating cash flow have less incentives to manipulate earnings through discretionary accruals. Showing a high amount of operating cash flow means, the firm generates a good amount of cash through its regular business activities in order to comply with debt obligations. On the other hand, firms not performing well in terms of operating cash

flow are more likely to engage into earnings management to assure the information sent to investors is optimistic. Based on these arguments a negative relation between discretionary accruals and cash flow from operation is expected.

The sixth variable, which is controlled for in this study is EQUITY ratio. This is calculated as total equity divided by the total assets. The EQUITY ratio shows how dependent a firm is on external financing, meaning the higher the equity ratio the less dependent the firm is on external financing. Therefore, it is expected that firms, which are less dependent on external financing, have less incentives to engage into earnings management, since the risk of breaching a debt covenant is lower. The expected relation between equity ratio and discretionary accruals is therefore a significant but negative one.

The seventh control variable is the audit firm. Previous studies provide evidence that firms audited by a BIG4 audit firm have less discretionary accruals because BIG4 firms offer higher quality audits compared to firms audited by a non-big4 audit firm (Deangelo, 1981; Becker, DeFond, Jiambalvo & Subramanyam, 1998; Francis and Yu, 2009). Because BIG4 audit firms possess more expertise and experience, they are more likely to detect and correct earnings management. Therefore, this variable is expected to be negatively correlated with discretionary accruals.

The last control variable added to the regression model is INDUSTRY. As stated before managers use discretionary accruals to manage earnings to smooth earnings, avoid reporting a loss or increase share prices. According to Almeida, Costa, Lopes & Toniato (2005) levels of earnings management differs per industry because profits are also influenced by INDUSTRY specific factors. Karuna, Subramanyam & Tian (2015) concluded that the level of industry competition (measured as degree of product replicability, market size and cost to enter the market) does influence the level of earnings management managers engage in. They believe that managers in highly aggressive industries are more inclined to manage their earnings to show positive short term performance, smooth out profits due to volatility and cover underperformance (Karuna et al 2015). Jiao, Roosenboom, & Mertens (2007) also concluded that firms in highly valued industries are also more inclined to manage earnings because they experience a stronger reaction from the market when underperforming. Based on the Standard Industrial Classification (SIC) code, the sampled firms have been classified into four widely defined industry groups. The SIC-codes were obtained from WRDS. Based on the first two digit of the SIC-code the four groups identified in the sampled firms are manufacturing and Mining (SIC: 10-39), Utilities (SIC: 40-49), Trade (SIC: 50-59) and Services and Public Administration (SIC: 70-99).

### 5.3.3 Governance independent variables

This model also includes a few governance independent variables to measure their effects on level of discretionary accruals and therefore earnings management.

The first governance variable is BOARDINDEPENDENCE. Due to the differences between the one-tier and the two-tier board structure independence of the board cannot be perfectly compared. For the two-tier boards, for example, based on item 5.4.1 of the German Corporate Governance, member are deemed independent if they do not have any personal or business relationship with the company, its board of management, a shareholder with controlling interest in the company and such a relationship which can constitute a material conflict of interest. Therefore, by default all members of the supervisory board are deemed independent despite the fact that some members are employee representatives (the employee representatives are also deemed independent from the executive board members). For the one-tier boards, members are deemed independent based on their job-descriptions. Therefore, to have a comparable estimate of board independence, the independence of the two-tier boards are measured by the dividing the total directors on the supervisory board by the total directors of both boards added together. For the one-tier boards independence is measured as the percentage of non-executive director on the board of directors. According to Chen, Cheng & Wang (2015) independent board members are not easily influenced by managers. Consequently, a highly independent board is a better monitoring mechanism compared to boards with the high percentage of executives. This increased level of monitoring and supervision results in less earnings management by executives (Chen et al, 2015). Chen et al (2015) adds however that this monitor advantage is only achieved if independent directors are equally informed as the executive directors. Again, independent directors are in most cases not allowed to own shares of the company, have an income limitation and have a material relationship with the company. This reduces the agency dilemma and self-interest issues executive directors experience. Thus resulting in non-executive directors to be more objective and consequently reduces manager's incentives to manage earnings. Therefore based on the above a significant and negative relation between BOARDINDEPENDENCE and discretionary accruals is expected.

Another governance variable in the models is BOARDSIZE, which is the total number of board members for the one-tier boards and the amount of directors on both the supervisory board and the executive board added together. As stated in previous paragraph, due to differences between the two board models, board size can neither be perfectly compared. Therefore, for the two-tier boards the board size is calculated by adding the two board together. Alves (2012) argues that managers are better able to influence large boards which results in reduction of the monitoring effectiveness of this governance mechanism (Alves, 2012). She concludes that as boards become larger and larger this brings communication, coordination and decision-making obstacles with them (Alves, 2012). Kyereboah-Coleman & Biekpe (2006) also argues that larger boards are more difficult to dominate. However, Alves

(2011) offers an opposite view that boards with a large number of members are better able to monitor management activities and therefore reduce probability of earnings management. They also found that boards with a great number of members have a higher range of expertise and experience among them and are therefore able to assist manager in their decision making process and monitor their activities more effectively. Considering these arguments this study expects a negative and significant relation between BOARDSIZE and earnings management.

## **5.4 Conclusion**

In this chapter the sampling selection and the methodology to be used was motivated. The sample consists of the largest 75 US and the largest 75 German firms over a two-year period for a total of 300 firm year observation. The model used to calculate discretionary accruals is the modified Jones model (1995). Furthermore the dependent, independent and control variables where discussed. In the next chapter, the results of this study will be discussed.

## Chapter 6: Empirical Results

### 6.1 introduction

This chapter discusses the results obtained from the regression models used to test the hypothesis studied in this thesis. First, the descriptive statistics will be explained. Thereafter the results will be discussed. Stata will be used to run the OLS-regression and to get the information related to correlation between the several independent variables.

### 6.2 Descriptive statistics

Table 1 shows the distribution of the sampled firms among the four industries. Firms operating in the Manufacturing & Mining industry dominate the sample (53%). 27% of the remaining sampled firms operate in the Utilities industry, 8% are trading companies while 12% belong to Service & Public Administration. However, since STATA omitted several two-digit SIC codes due to collinearity, the control variable will not be further discussed in the results paragraph.

**Table 1: Industry Classification**

<b>Industry</b>	<b>Percentage</b>
Manufacturing & mining	53%
Utilities	27%
Trade	8%
Service & Public Administration	12%
Total	100%

The descriptive statistics for the sample of 300 firm-years observation are shown in Table 2 below. 50% of the firms in the sample have a one-tier board composition and 50% a two-tier board composition, hence the sample consists of 75 US firms and 75 German firms based on a two-year period.

Table 2 shows that the average board size of German firms is larger compared to US-firms (14 vs 10). However, the largest board from this sample is of a US firm consisting of 26 members while the smallest board, consisting of 3 members, is a German firm.

As already explained in chapter 5.3.3, independence of the board cannot be perfectly compared between the two board structures. The independence of the two-tier boards is measured by dividing the total directors on the supervisory board by the total directors on both boards added together and the independence of the one-tier boards is measured as the percentage of non-executive director on the board of directors. Table 2 shows that the sampled firms, on average, the boards of US firms are comprised of more independent members (85%) compared to German firms (72%). In addition, the boards of the sampled firms are at least for 50% composed of independent members.



Furthermore on average CEO's of US-firms have been longer with the company (9,23 years) compared to German firms (6,11 years). The longest period a CEO has been with the company is 40 years.

When it comes to firm size based on total assets, table 2 shows that the average total assets of the sampled US firms are 3,3 times larger (\$82,340 million) than the average total assets of the sampled German firms (\$24,972 million).

The average cash flow from operations of the US firms is 6,65 times larger than the German firms. The mean cash flow from operations of the US sampled firms is \$9,763 million with a minimum of \$0,733 million and maximum \$56,170 million, while the mean cash flow from operations regarding the German sampled firms is \$1,466 million, with a minimum of -\$1,768 million and a maximum of \$13,577 million.

Furthermore, the sampled firms have an average leverage ratio of 0,25, which means that on average the total assets are 4 times their total debts. This means that most of the firms in the sample are healthy/mature firms. The average ROA of the total sample is 5%, with a minimum of -12% and a maximum of 25%. The average equity ratio of the total sample is 0,37, with a minimum of -0,16 and a maximum of 0,97.

At last all the sampled US firms are audited by a big4 audit firm, while four of the sampled German firms (5%) are audited by a firm other than a Big4 audit firm.

**Table 2: Discriptive statistics**

<b>Corporate Governance Variables</b>	<b>USA</b>	<b>Germany</b>	<b>Total sample</b>	
BoardSize (person)	Mean	10,22	14,16	12,19
	SD	2,60	4,50	
	Min.	6,00	3,00	
	Max.	26,00	23,00	
Board independence (%)	Mean	85%	72%	79%
	SD	8%	7%	
	Min.	54%	50%	
	Max.	95%	86%	
tenure (years)	Mean	9,23	6,11	7,67
	SD	7,93	5,92	
	Min.	0,00	0,00	
	Max.	37,00	40,00	
<b>Control Variables</b>				
Total Assets (Million \$)	Mean	82,340	24,972	53,656
	SD	60,109	48,040	
	Min.	35,742	1,501	
	Max.	346,808	324,333	
Leverage (%)	Mean	25%	26%	25%
	SD	13%	17%	
	Min.	0%	0%	
	Max.	73%	122%	
ROA (%)	Mean	6%	4%	5%
	SD	5%	5%	
	Min.	-12%	-18%	
	Max.	24%	25%	
Equity_ratio	Mean	0,39	0,36	0,37
	SD	0,16	0,18	
	Min.	-0,16	-0,65	
	Max.	0,79	0,97	
Cash flow from operations (Million \$)	Mean	9,763	1,466	5,615
	SD	10,488	2,504	
	Min.	0,733	-1,768	
	Max.	56,170	13,577	
Big4 (%)	Mean	100%	95%	97%
	SD	0%	23%	
	Min.	100%	0%	
	Max.	100%	100%	
	n	150	150	300

### 6.3 Multicollinearity test

Before performing a regression analysis, it is important to perform a multicollinearity test in order to detect if variables in the regression model are highly associated to one other. If there is a multicollinearity problem, it will lead to biased results.

Stata is used to perform a collinearity test using Pearson Correlation matrix. The Pearson Correlation analysis is a test of strength of linear correlation between one or more variables. It can have a value of -1 and +1 (Bryman and Cramer, 2005). According to Bryman and Cramer (2005) if the coefficient is larger than 0,7, the risk of having a multicollinearity problem is higher. Table 2a shows the Pearson Correlation matrix for the sample of firms studied. Only operating cash flow has e coefficient higher than 0,7.

**Table 2a: Pearson Correlation Matrix**

Variable	Absolute_DACC	Tier	BoardIndep	FrimSize	Leverage	SBSize	ROA	tenure	Log_OCF	Equity_ratio	Big4
Absolute_DACC	1,000										
Tier	-0,215 **	1,000									
BoardIndep	-0,113	0,634 **	1,000								
FrimSize	0,023	-0,084	-0,151 **	1,000							
Leverage	0,142 *	-0,020	-0,094	0,157 **	1,000						
BoardSize	0,053	-0,474 **	0,009	0,061	-0,007	1,000					
ROA	-0,073	0,214 **	0,137 *	-0,125 *	-0,205 **	-0,178 **	1,000				
Tenure	-0,056	0,219 **	-0,033	0,022	0,028 *	-0,182 **	0,021	1,000			
Log_OCF	-0,128 *	0,731 **	0,448 **	-0,052	0,005	-0,172 **	0,344 **	0,087	1,000		
Equity_ratio	-0,093	0,082	0,032	-0,167 **	-0,673 **	-0,125 *	0,325 **	0,127 *	0,078	1,000	
Big4	0,030	0,166 **	0,012	-0,049	0,001	0,028	-0,032	-0,019	0,225 **	-0,059	1,000

\*Significant at 0,05 level  
\*\*Significant at 0,01 level

In addition, a Variance inflation factor (VIF) analysis is also executed to determine if a variable is correlated to one another. Table 2b, shows the VIF values. As a rule of thumb the VIF value should not be greater than 10 and the tolerance (1/VIF, used to check on the degree of collinearity) should not be lower than 0,1. Based on the output in Table 2b, no multicollinearity risk are present in the regression analysis.

**Table 2b: Variance Inflation Factor**

Variable	VIF	1/VIF
Tier	5,820	0,172
Log_OCF	2,860	0,350
BoardIndep	2,490	0,402
Equity_ratio	2,100	0,476
BoardSize	2,000	0,500
Leverage	1,950	0,513
ROA	1,330	0,751
tenure	1,170	0,856
Big4	1,130	0,887
FrimSize	1,070	0,933
Mean VIF	2,190	

## 6.4 Empirical results

The results of the OLS regression analysis for the period 2012-2013 for the 300 firm-year observations are shown in table 3a (Full model) and table 3b (modified model). Due to of the differences in board characteristics between the one-tier and the two-tier board structure, two regression analyses are performed, one analysis based on the full model and one analysis excluding the variables board size (BoardSize) and board independence (BoardIndep).

The full model, as shown in Table 3a, has an adjusted R-squared of 0,0629, which means that only 6,3% of the absolute discretionary accruals are explained by the explanatory variables. This score is relatively low since the model explains only 6.3% of the discretionary accruals. The modified model (Table 3b.) has an adjusted R-squared of 0,0459, meaning that only 4,6% is being clarified by the model. Comparing the adjusted R-squared of both models one can conclude that the full model has a slightly higher adjusted R-squared meaning it is better in approximating the real data points.

A normality check has been performed on the regression residuals in Appendix A. Based on the results it can be concluded that the residuals of the regression analysis do not meet the OLS assumption of normal distributed residuals and homogeneous errors. Therefore, the results obtained from the OLS regression analysis should be interpreted carefully since the results might not be bias free.

### 6.4.1 Results of the full OLS regression model

The coefficient corresponding to ROA in this sample shows a positive but not significant relation between ROA and absolute discretionary accruals, which means that firm performance does not significantly trigger managers to manage earnings.

The degree of board independence has a positive but significant relation, at a 10% level, with the absolute discretionary accruals, which means that a higher degree of board independence leads to higher earnings management. As discussed in chapter 5 it was expected that the relation between board independence and discretionary accruals would be the other way around. However, as Chen et al. (2015) claimed, the effectiveness of an independent board may depend on the knowledge and the amount of information about the entity that the independent directors possess. This is also being argued by the proponents of the stewardship theory, who claim that the executive directors provide more direct working knowledge to the board. Requiring the majority of the board to be independent may reduce firm value and therefore reduce the effect of the monitoring mechanism. Furthermore, CEO may also have an influence in selecting the independent directors leading to independent directors not being effective in their monitoring duties.

Inconsistent with Alves (2012) and consistent with Kim et al (2003) and Lluklani (2013) the coefficient FIRMSIZE is in the predicted negative direction. However, in this analysis the coefficient is not significant. This means that in this sample of German and U.S. firms the size of the company did not have a significant effect on the level of discretionary accruals. The results therefore do not support the hypothesis that larger firms are more pressured to manage earnings downward to reduce political cost or upwards to meet or beat analyst predictions. Also inconsistent with the expectations, the control variable TENURE is not significant although in the predicted direction. This means that the number of years since being appointed did not have a significant influence on firm's degree of managed earnings through discretionary accruals.

**Table 3a: Ordinary least squares regression analysis (Complete Model)**

Absolute_DACC	Coef,	Std, Err,	t	P>t
Tier	-0,049064	0,013447	-3,65	0,000 ***
BoardIndep	0,084752	0,044621	1,90	0,059 *
FrimSize	0,000824	0,015342	0,05	0,957
Leverage	0,053852	0,025856	2,08	0,038 **
BoardSize	-0,001958	0,000948	-2,07	0,040 **
ROA	-0,034792	0,063993	-0,54	0,587
tenure	0,000076	0,000421	0,18	0,857
Log_OCF	0,003919	0,003174	1,23	0,218
equity_ratio	0,011086	0,023837	0,47	0,642
Big4	0,027569	0,018367	1,50	0,134
_cons	-0,048227	0,074119	-0,65	0,516

n= 300

R-Squared= 0,0881

Adjusted R-Squared= 0,0565

\*\*\*= significant at 1 percent level

\*\*= significant at 5 percent level

\*= significant at 10 percent level

Control variable LEVERAGE is consistent with the expectations. In this study, the relation between LEVERAGE and discretionary accruals is positive and significant at a 5% level. Consistent with Klein (2002) and Finkelstein & Hambrick (1989) firms in this sample, who are heavily leveraged, are more likely to manage earnings using discretionary accruals. A possible explanation for these results are that analyst, investors and banks consider these highly leveraged firms as being risky with a higher probability of failing and will therefore pay more attention to these organizations. Not meeting analyst forecast or violating debt covenants can result in even worse adverse effect for these “risky” companies

compared to healthy companies. With this in mind, highly leveraged companies would be even more inclined to manage earnings to prevent violating covenants and miss analyst predictions.

Governance variable **BOARDSIZE** is in line with the expectation. A significant and negative relation with discretionary accruals at a 5 % level is observed. This means that the larger the board of a firm, the less earnings management through discretionary accruals is noticed. This is according to Alves (2012) who argues that a larger board is better able to monitor the activities of the management. Furthermore, a larger board has a higher range of expertise and experience, therefore they are more effective in assisting managers on their decision making process and monitor their activities.

The main hypothesis tested in this thesis was if a two-tier board structure is a more effective mechanism in reducing earnings management. The results from the OLS-regression analysis presented in table 3a show that a one-tier board structure has a negative significant relation with the absolute discretionary accruals. The coefficient has a negative value, meaning that a one-tier board structure is negatively associated to earnings management. An explanation for this result could be the fact that the executive and the non-executive directors work together and are jointly responsible for the day-to-day operations. In the one-tier board structure decision management and decision control are integrated. Based on this the non-executive directors possess more key information concerning the firm, meaning less information asymmetry. With this in mind, the non-executive directors can therefore perform their monitoring task more effectively. Therefore based on the results the hypothesis tested can be rejected. Another explanation that could clarify the results is that the two countries prepare their financial statements based on different accounting principles. US-firms prepare their financial statements based on US-GAAP while German-firms based on IFRS. The main differences between these two accounting principles is that the US-GAAP is more rule based while IFRS is more principle based. Principle based accounting allows more room for managerial discretion.

#### **6.4.2 Results of the modified OLS regression model**

The results of the modified OLS regression analysis as shown in table 3b. shows no significant differences compared to the results of the full model. The variables **Tier** and **Leverage** remains significant associated with discretionary accruals, meaning that the hypothesis is also rejected based on the results of the modified model. This means that the variables **BOARDSIZE** and **BOARDINDEPENDENCE** does not significantly influence the association between board structure and discretionary accruals. However, the coefficient and the adjusted R-squared are slightly lower compared to the full model.

**Table 3b: Ordinary least squares regression analysis (Modified Model)**

Absolute_DACC	Coef,	Std, Err,	t	P>t
Tier	-0,02513	0,00849	-2,96	0,003 **
FrimSize	-0,00348	0,01527	-0,23	0,820
Leverage	0,05414	0,02568	2,11	0,036 *
ROA	-0,01244	0,06336	-0,2	0,844
tenure	-0,00009	0,00041	-0,21	0,837
Log_OCF	0,00145	0,00296	0,49	0,624
equity_ratio	0,01223	0,02375	0,51	0,607
Big4	0,01954	0,01808	1,08	0,281
_cons	0,02163	0,06105	0,35	0,723

n= 300  
R-Squared= 0,0715  
Adjusted R-Squared= 0,0459  
\*\*= significant at 1 percent level  
\*= significant at 5 percent level

## 6.5 Conclusion

This chapter discussed the results of the OLS regression analysis based on the 300 firm-year observations. The regression analysis was executed on a full model and a modified model, which excluded the variables board independence and board size from the full model. In the full model the variables Tier, Leverage, Boardindep and BoardSize are significantly associated with discretionary accruals. In the modified model the variables Tier and Leverage remains having a significant P-value. However, the hypothesis tested through this study, that a firm comprised by a one-tier board structure tend to engage in more earnings management by means of more discretionary accruals, is rejected since the results shows a significant but negative association with discretionary accruals, while a significant but positive association was expected. This means that a one-tier board structure is a better monitoring mechanism when it comes to earnings management by means of discretionary accruals.

## Chapter 7: Limitations and further recommendations

One of the limitation of this research is the difference in accounting standards and regulations between Germany and the United States. US-firms prepare their financial statements using the US-GAAP and German-firms use the IFRS. The difference between these two accounting standards could influence the results. This because IFRS is more principle based whereas US GAAP is more rule based. Future studies could control for this influence by sampling countries, which has the same accounting standards.

A larger sample size and period could also mitigate a limitation of this research. Larger sample size and period increase the external validity of the results obtain from the research. Larger sample size makes the results more representable for the original population and larger sample periods mitigate the influence of incidental factors happening that concerning year that might influence the results.

Thirdly, this study did not control for the differences in ownership structure between the two countries. Shares of US-firms are widely distributed among individual shareholders, while German-firms are known for their concentrated ownership. Therefore, future research could add a control variable for ownership structure.

At last, earnings management was proxied based on discretionary accruals calculated based on the Modified Jones model. For future research, it may be interesting to investigate if the same results are obtained based on one of the other models discussed in chapter 3.



## Chapter 8: Conclusion

Publicly held companies are most of the time managed by a board of directors, as shareholders do not exercise the managing tasks of these companies themselves. Due to this separation of ownership and control, as explained by the Agency Theory, where shareholders delegate their managerial tasks to the executive directors, there is a need of a good corporate governance. Good corporate governance is needed to mitigate the conflict of interest between the agent and the principle that is created by the information asymmetry resulting from the separation of ownership and control (Berle and Means, 1932). A good corporate governance depends on a couple of institutional factors Hayes et al. (2014). One of them is the firm's board structure. A firm's board may be structured according to the one-tier model or the two-tier model. The main differences between these two board structures is the way they separate the decision management from the decision control (Maassen, 1999). This study therefore investigates whether a two-tier board structure is a more effective monitoring mechanism of the executive board than a one-tier board structure measured by earnings quality. This study was operationalized by sampling 75 US-firms and 75 German-firms over a two year period. These countries were selected due to the fact that US-firms are only allowed to have a one-tier board structure and German-firms are only allowed to have a two-tier board structure. This study proxied earning quality based on the level of absolute discretionary accruals used by managers. A high degree of discretionary accruals indicates low earnings quality, since these discretionary accruals may not be explained by an economic factor, but might be used by management to opportunistically manipulate earnings. The modified Jones model was used to calculate the discretionary accruals.

This study hypothesized the theory that firms with a corporate governance comprised by a one-tier board structure tends to engage in more earnings management compared to firms composed of a two-tier board structure. Several board and earnings management control variables were added to the regression model in order to mitigate the influence of these factors on the main hypothesis. The results provided empirical evidence that a one-tier board structures is associated with less earnings management by means of discretionary accruals. This contradicts the expectations, therefore  $H_1$  is rejected. A possible explanation for this result could be the fact that the executive and the non-executive directors in a one-tier board structure work together and are jointly responsible for the day-to-day operations of the company. In the one-tier board structure decision management and decision control are integrated. Therefore, the non-executive directors possess more key information concerning the firm which results in less information asymmetry. All this considered, the non-executive directors could therefore perform their monitoring task more effectively.

This study also found empirical evidence that firms, which are highly leveraged, are more likely to manage earnings by means of discretionary accruals. Highly leveraged firms are believed to be at a

higher risk of failing and often have debt covenants to consider. If a firm is at risk of breaching these debt covenants, it may be more inclined to manage earnings to prevent violating these agreements.

Furthermore, evidence was found that a larger board size leads to less earnings management. Larger boards are better in monitoring the executive directors since it enjoys a higher range of expertise and experience. Therefore, larger boards are more effective in assisting managers on their decision making process and monitor their activities.

Finally, evidence was found that a higher amount of independent board members leads to higher earnings management. This might be explained by the fact that the effectiveness of independent board members depends on the amount of information the independent members possess about the company. In addition, a majority of independent members may lead to misalignment with the firm's values and therefore reducing the effect of the monitoring mechanism.

Based on the empirical results, this study contributes to the existing literature by providing evidence that a one-tier board structure functions as a better monitoring mechanism for earnings management, leading to higher earning quality. This is the first time that an analysis was executed based on this setting, by comparing association between discretionary accruals and the two board structures based on US-firms and German-Firms. As discussed in the limitations, for a future research, a larger sample would be appropriate to increase the external validity of the results obtained.

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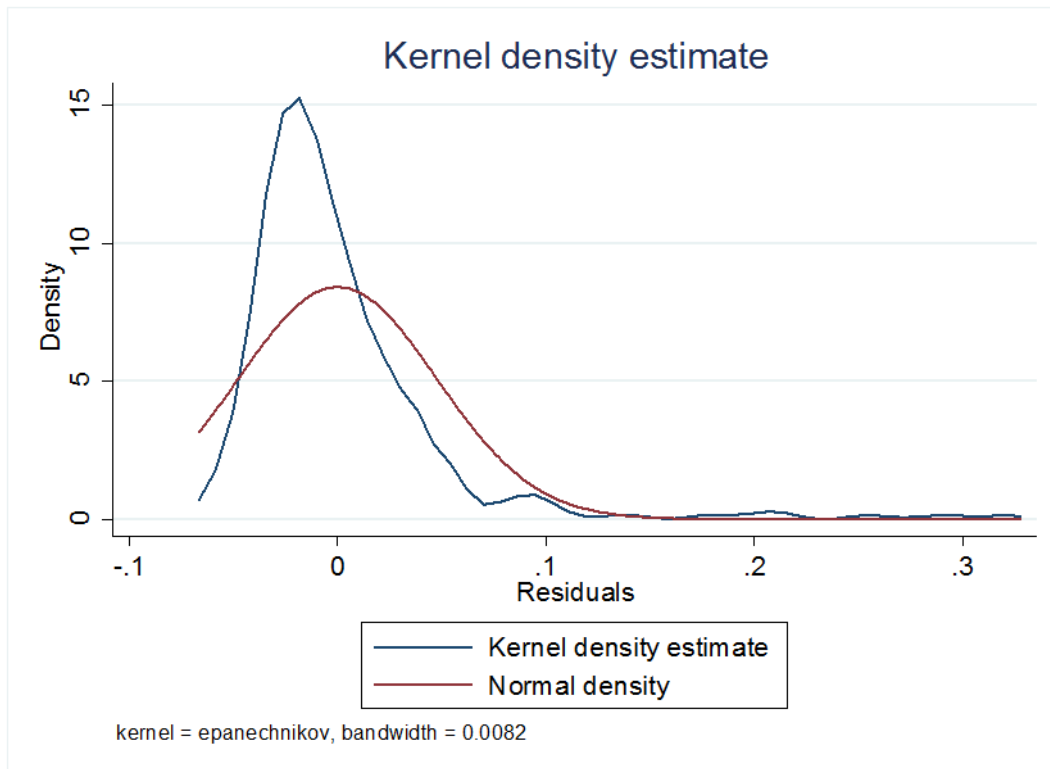
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## Appendix A: Check on normal distribution

The Kernel density plot below shows the distribution of the regression residual of the OLS- regression model. It shows that the residuals are positively skewed, meaning the residuals are not normal distributed.

Figure 1: Kernel density estimate



In addition, a Shapiro-Wilk W test is performed to determine based on a significance level if the residuals are not normal distributed. This test examines if the residuals are normal distributed. As shown in table 4 below, the p-value is 0,000, which indicates that the hypothesis is rejected meaning that the residuals are not normal distributed.

Table 4: Shapiro-Wilk W test for normal data

Variable	obs	W	V	z	Prob>z
r	300	0,7105	62	10	0,0000

At last, a check on Homoscedasticity was performed based on the Cameron & Trividi's decomposition of IM-test. The Cameron & Trividi's decomposition of IM-test examines the hypothesis that the variance of the residuals is not homogenous. Table 5 below, shows a total p-value of 0,0201, meaning that the hypothesis is being rejected. Therefore, it can be concluded that the residuals are heteroskedastic.

**Table 5: Cameron & Trivedi's decomposition of IM-test**

Source	chi2	df	p
Heteroskedasticity	74,18	61	0,1198
Skewness	20,40	10	0,0257
Kurtosis	4,13	1	0,0422
Total	98,70	72	0,0201