**Charles University in Prague**

Faculty of Social Sciences

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# MASTER THESIS

# The Relationship of Corporate Governance with Firm performance and Tax Fees

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# Declaration of Authorship

The author hereby declares that he compiled this thesis independently, using only the listed resources and literature.

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Prague, May 10, 2011 Signature _____

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# Abstract

The aim of this thesis is to examine the relationship of all corporate governance indicators with firm performance (proxied by price to book value) and tax fees. Using a sample of 133 large U.S firms, in a single model, we explore the correlation of price to book value with board of director's structure (composition and size). Our results show that smaller and younger boards with less independent directors lead to a higher firm performance. We further find that presence of women on board is important rather than their number. The outcome of the study shows also that financial expertise of audit committee members has a significant and positive influence on the amount of tax fees.
Overall, the results suggest that board characteristics are important and they influence firm performance.

**Keywords**: board of directors, firm performance, price to book value, governance indicators, tax fees.

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# Acronyms

**ROA – return on assets**
**NYSE – New York Stock Exchange**
**US – United States**
**CEO – Chef Executive Officer**
**OLS – Ordinary Least Squares**
**ROE – return on equity**
**S&P 500 – Standard & Poor 500**
**DEF – Definitive Proxy Statement**

# Chapter 1

# Introduction

Corporate governance and particularly the role of board of directors, represents an important topic of many academic researches. But it had probably never been as important to understand the fundamental role of the board, as it was during the financial crisis. One of the key factors contributing to the crisis is related to the weaknesses in corporate governance system and particularly to the ineffectiveness of the corporate boards. Not being aware of the risk facing their firms, many boards of directors failed to deal with it. (Kirkpatrick, 2009) in a report about corporate governance lessons from the crisis states as follows:

*"Boards had to be clear about the strategy and risk appetite of the company and to respond in a timely manner, requiring efficient reporting systems"*

From this point of view, it is of special interest to explore the characteristics of boards, in order to find the ways of improving their effectiveness. In this study we aim to find the optimal structure of the board of directors that leads to a higher firm performance, and consequently to build a model of strong corporate governance characterized by transparency, integrity, high quality of financial reporting and less agency problems.

An impressive set of prior researches have explored the impact of corporate governance structure on firm profitability or firm performance. The governance structure is broadly represented by board size and its composition. In addition, the overall board composition includes board independence, insider ownership, gender diversity and average age of members in the board. Various empirical researches focus on the association between board size and firm performance. (Yermack, 1996) recommends the limiting of board

size as a way of improving the market valuation of the firm. The author finds an inverse and significant relationship between board size and firm value using a sample of major U.S corporations. These results are consistent with the findings of (Hermalin and Weisbach, 1988), who conduct an analysis on a large sample of NYSE-traded companies**.** On the other hand, an extensive empirical literature evaluates the linkage between board composition and firm performance. (Rosenstein and Wyatt, 1990) report that the appointment of independent directors on board increases firm value. Additionally, (Adams and Ferreira, 2009) suggest that female directors influence significantly the firm outcomes and (Wiersema and Bantel, 1992) report that boards characterized by a lower average age of its members, have better performance.

This study is a contribution to the ongoing debate on the examination of the relationship between governance indicators and firm performance. Previous studies in this research stream have focused in one indicator of corporate governance, overlooking the others. The present paper will add to the literature by including all governance indicators (board activity, size, independence, gender diversity etc) in a single model. We attempt to provide a complete and accurate model of good corporate governance capturing all characteristics that influence board effectiveness and its performance. In addition, while several previous studies utilize market measures of firm performance such as Tobin's Q (Yermack, Adams and Mehran, Bgahat and Black, Morck, Shleifer and Vishny) and price to book ratio (Vafeas), in the present study we will try to combine two different measures, the market and the accounting performance measure. Our results appear to be sensitive to the choice of the proxy of firm performance.

Applying the fixed effect specification in a sample of 133 major US firms over the period 2005 to 2009, the findings of this study appear to be quite promising. We report a negative association between firm performance and board size, board independence and average age of directors on board; and a positive and significant relation between firm performance and insider ownership. On the other hand, no significant association is found for gender diversity and board activity (represented by the number of meetings held during the fiscal year). Of a special interest is also the significance of the control variables. Firm size and leverage appear to be significant and positively related to firm performance.

Besides the investigation on the relationship between corporate governance and firm performance, an important part of the study will be dedicated to the testing of the link between governance indicators and tax fees. Previous authors have provided few researches that discuss the association between corporate governance variables and the amount of tax fees. In the present study will examine the direct interaction of tax fees with corporate governance variables paying special attention to the Audit Committee characteristics (audit committee meetings, size and number of financial experts on the committee). Our results suggest that the amount of tax fees paid to auditors is positively correlated to the number of financial experts in the committee and negatively correlated with committee meetings. Meanwhile, audit committee size does not influence significantly the tax fees.

A separate chapter of the paper is dedicated to the development of alternative models that relate corporate governance variables with firm performance. We first investigate the influence of female directors on firm value by introducing gender as a dummy variable. We obtain some remarkable results; the presence of women is found to be significant and positively related to firm performance. Hence, having at least one woman in the board improves the firm performance. However, the appointment of another woman in board is not followed with any increase in firm value.

Of a special interest is the usage of an accounting performance measure as a dependent variable when exploring the interaction between firm performance and governance indicators. Introducing ROA as a proxy of firm performance in a new model, we find that the regression estimates change substantially. The number of board meetings is proved significant and positively associated with firm performance. Nevertheless, all other corporate governance variables are no longer significant.

Importantly, we follow the method of (Vafeas, 1999) by estimating the regression using the means of the variable and giving to the data a cross sectional interpretation. Consistent with expectations, board size and age are proven to be significant and negatively related with firm performance. On the other hand, board independence is significant and positively associated with firm value. Other governance variables are proven to be insignificant.

In the last alternative model, we present evidence by estimating the relationship corporate governance-firm performance on the other way around. Consistent with the findings of (Hermalin and Weisbach, 1988), firms appoint additional independent directors on board in response to past poor performance. However, the board size remains unchanged because of other director's departure.

The remainder of this paper is organized in the following way. Chapter 2 provides an overview of corporate governance framework by comparing the Anglo-Saxon governance model with the Continental one and gives insights on the role of corporate boards. Chapter 3 discusses prior empirical researches on corporate governance indicators, firm performance and tax management. Based on the discussion of previous literature, Chapter 4 introduces a set of hypotheses to be tested. Chapter 5 is about methodology and description of variables. Chapter 6 reports descriptive statistics and results of the econometric models. In Chapter 7 we develop some alternative models on corporate governance indicators and firm performance. Chapter 8 summaries the results obtained from the present study and concludes by addressing some limitations.

# Chapter 2

# Basic framework of Corporate Governance

There is a huge and expanding literature in the area of corporate governance. In the ongoing studies about this topic, different authors have given different definitions about it. According to (Shleifer and Vishny, 1997) definition "Corporate governance deals with the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment". They study corporate governance taking as a viewpoint the agency theory, which is usually referred to the division of ownership and control. (Wolfensohn, 1999) provides a more broaden definition. He states that "Corporate governance is about promoting corporate fairness, transparency and accountability". In addition to this, (Charkman, 1994) also recognizes accountability to be essential and necessary for the stakeholders. In this framework, the author identifies two main principles of corporate governance applied in most cases:

- That management must be able to drive the enterprise forward free from undue constraint caused by government interference, fear of litigation, or fear of displacement.

- That this freedom – to use managerial power or patronage – must be exercised with a framework of effective accountability. Nominal accountability is not enough. Accountability implies transparency (page 363).

Nevertheless, at the macro level corporate governance, the principal-agent perspective, as introduced by (Shleifer and Vishny, 1997) above, is distinguished broadly in the

governance debate. Moreover, most approaches toward corporate governance point out the separation of ownership and control which often is the source of problems between managers and shareholders. This can be demonstrated by what Adam Smith's early notes, published on his book "Wealth of Nations":

"The directors of such companies, however, being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance with which the partners in a private co-partnery frequently watch over their own. Negligence and profusion, therefore, must always prevail, more or less in the management of the affairs of such a company" (p.700)

However, these potential problems, known as conflicts of interest between shareholders (who provide the capital) and managers (who use the capital) depend on the ownership structure of the company and on the allocation of power within it. The primary condition that guarantees good corporate governance is the proper separation of authorities and responsibilities among the company's management, its shareholders and other stakeholders ( such as employees). A clear identification of roles is crucial because it helps ensuring transparency, accountability and integrity in management structures. However, at this point, it is essential to distinguish different approaches of companies to corporate governance. (Xu and Wang, 1997) make a difference between "control-oriented" models and "arm's-length" financing models. According to the authors, in "control-oriented" financing model the ownership is concentrated in the hand of the major investors. Also the management is under the control of these investors.

On the other hand, in the "arm's-length" financing model, the ownership is broadly among shareholders, who do not have a major influence on management. However, managers are strongly motivated to improve the corporate performance because otherwise they will be sanctioned by hostile takeovers.

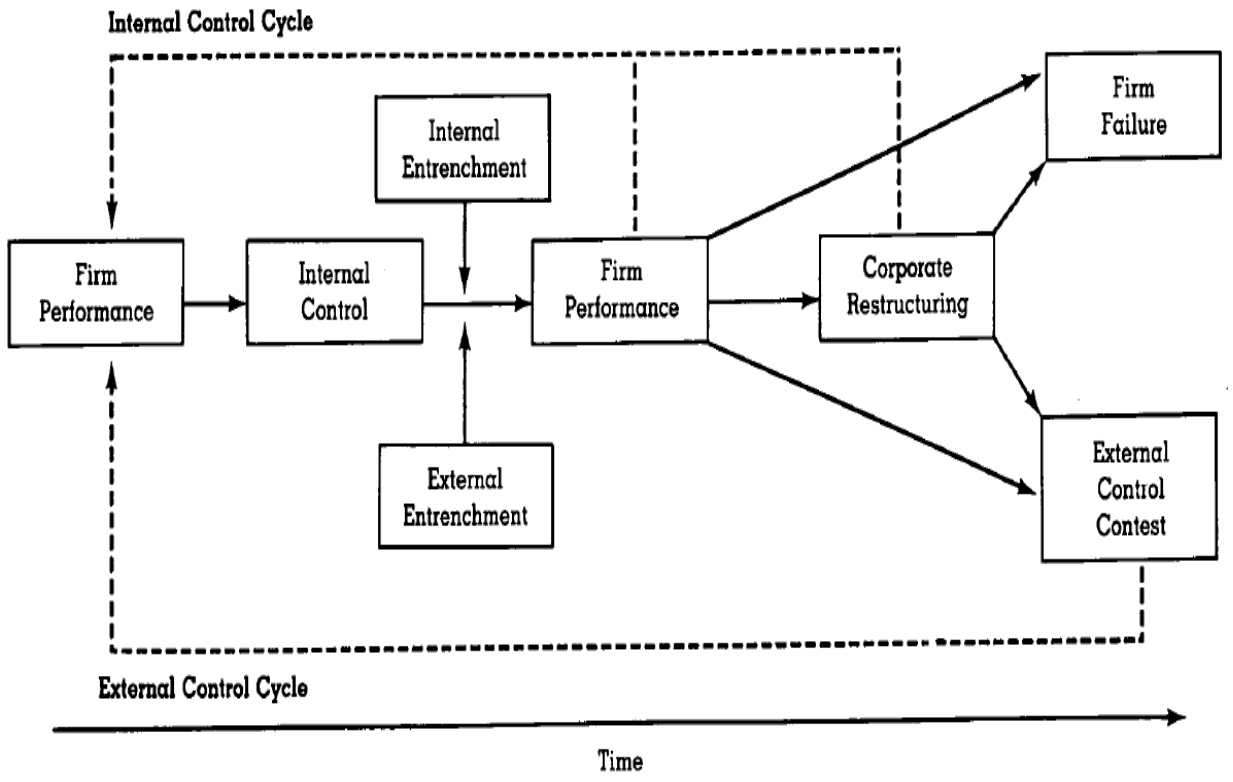
(Walsh and Seward, 1990) bring on focus the importance of aligning these conflicts of interest between shareholders and managers through management control.

Figure 1 below, illustrates the relationship between the two groups of management control: the internal mechanisms and the external ones. The internal control cycle reflects

the monitoring and controlling activity of board of directors, meanwhile the external control cycle refers to the company control by the market. External and internal entrenchment practices present all frictions that prevent the efficient operation of these mechanisms, such as practices adopted by managers in order to ensure themselves from being dismissed.

It can be observed that the firm performance depends on the efficiency of internal control mechanisms associated or not with internal entrenchment practices. Nevertheless, because a well entrenched management can bring the failure of the firm, it is crucial to adopt various internal controls combined with corporate reconstructing in order to improve the firm performance.

**Figure 1**: The relationship between internal and external corporate control mechanisms




**Source**: Walsh and Seward, 1990

Coming now to the models of corporate governance, (Ooghe and De Vuyst, 2001) compare the Anglo-Saxon model (known as shareholders model of corporate governance) being a characteristic model of Anglo-Saxon countries and the Continental European model (known as stakeholders model of corporate governance) as typical model of Continental Europe countries. These models appear to be very different observed from the business perspective; implying that in different countries, ownership and control of companies are organized in different ways. According to (Ooghe and De Vuyst, 2001) one of the main distinctions between two models is the low level of ownership concentration in Anglo-Saxon countries comparing with the one in Continental Europe countries. This implies that Anglo-Saxon countries shareholder groups hold low proportions of the publicly traded shares. The reasons behind this rely on the fact that companies of Anglo-Saxon countries are larger in terms of capital compared with companies of Continental Europe countries. Furthermore, companies of Anglo-Saxon countries are broadly listed in stock exchanges, and this allows shareholders to spread their ownership over more companies but in the meantime leads to less personal relationship between companies and their shareholders. On the other hand, only few companies in Continental Europe countries are publicly traded which allows strong personal rapport between company's managers and shareholders.

Beside the shareholder concentration, the paper of (Ooghe and De Vuyst, 2001) provides another difference between the two main governance models: the shareholders identity. According to the authors, in the Anglo-Saxon countries, because of regulations, companies are obliged to use agents of financial institutions to manage their trading. The contrary appears to be in Continental Europe countries as the companies operate directly, without using agents. For example, in United States, taken as example from Anglo-Saxon countries, most of shares are kept by agents of financial institutions rather than private individuals but the opposite pattern is shown in Germany and Italy, as examples from Continental Europe countries, where most of the shares are kept by private individuals. Moreover, the mutual shareholding appears to cause other differences between the models. As a consequence, the ownership structure appears to be more transparent in Anglo-Saxon countries rather than in the Continental ones.

## 2.1 The board of directors

Board of directors represents an important mechanism of the corporate governance system and it is considered to be a traditional solution to the agency problem. Besides, legal requirements for incorporation ask for the set up of the board of directors (Hermalin and Weisbach, 2003). In Anglo-Saxon countries, the principal role of the board is to make sure that shareholders have accurate and transparent information about firm profitability, risks and future objectives. Additionally, the board ensures that the management actions are taken to maximize shareholder's wealth. However, the question of what determines the board effectiveness in carrying out its roles and responsibilities remains in the centre of many research agendas. Prior studies find out that board characteristics represent an essential element influencing they way the board realizes its functions and makes its decisions. When assessing board characteristics, special interest is given to its composition and size. The corporate governance literature points out that the composition of the board of directors represents an important component in protecting the interests of shareholders, particularly in cases when there is a divergence of interests between managers and shareholders. Various empirical researches report as proxies for board composition the number of independent directors, gender diversity and average age of directors on board. The boards of most major U.S corporations are composed of different types of directors. First, the board consists of inside or executive directors who have full-time executive responsibilities; typically in the role of the insider is the CEO. Second, the board has independent or outside directors that have no material or contractual relationship with the company and do not have executive responsibilities. The level of presentation of independent directors on board is higher than the one of inside directors. Typically, the Corporate Governance guidelines of each company require that a majority of directors should meet the criteria of independence. Companies appoint independent directors in their boards because this category of directors is thought to facilitate the process of monitoring, controlling and financial reporting ( Peasnell, Pope and Young, 1998). Moreover, a higher proportion of independent directors on board can improve firm performance (Hsu and Wu, 2009)

Beside the insider and outsiders, gray directors represent a third category of directors who are not full time employees. Typically, they are called as non-executive and non independent directors.

Another element that represents board composition is gender diversity. Many companies are dominated by the presence of men; however, in recent years the number of female directors serving on firm's boards has increased significantly. It appears that the presence of women has an important influence on board governance. (Adams and Ferreira, 2009) find evidence that gender diverse boards improve the monitoring process and firm performance.

The board of directors makes up a diverse unit also in terms of age. In accordance to the directors retirement policy of each company, directors must retire when they attain age 72 or 74, depending on the company. The director's age is found to be negatively associated to changes in corporate strategy (Wiersema and Bantel, 1992). A potential explanation of this is that young directors have more confidence in their decision and are more disposed to undertake risks and major changes in their companies. In addition, young directors are considered to creative and innovative in decision making process.

Besides the board composition, the literature points out the crucial impact of board size. Even if companies consider that the quality of members is more important than their number, typically a board size of 6 to 9 directors ensures flexibility and better functioning.

# Chapter 3

# Literature Review

A plethora of diverse researches have explored the association between corporate governance measures and firm performance. Different studies have identified as a priority different aspects of corporate governance such as board size, outside directors or the percentage of stock ownership. In addition, only few papers have examined the impact of corporate governance in tax management and for this reason we will try to bring some evidence whether there any relationship between these two indicators.

Below we provide brief summaries of the main papers within the literature concentrating on both theoretical and empirical findings. We will be focused in different approaches toward the important influence of corporate governance measures on firm performance and tax fees. The literature reviews that will be explored in this section represent the key studies that link several corporate governance variables with firm performance and tax management. Below we provide a brief introduction of the principal literature and their central issue. This is followed by a more complete analyze in the continuation of the paper. For example (Yermack 1996) examined whether the board size determines firm performance and found a higher market value for firms with small boards. The same study is undertaken also by (Jensen, 1993), who reports the same inverse relationship between board size and firm performance. On the other hand, in a prior empirical research, (Hermalin and Weisbach, 1988) examined the influence of firm performance on board composition, highlighting the importance of outside directors. Furthermore, (Vafeas, 1999) presented the measurement of the influence of board activity (board meeting frequency) on firm performance.

According to the association of tax management and governance indicators, the principal study that we will follow is the one of (Noga and Minnick, 2010) that provides insights on the impact of governance characteristics on tax management.

## 3.1 Board size impact on firm performance

Prior empirical studies have widely investigated the structure and efficiency of corporate governance systems. Much of the research spotlight the crucial role of board of directors, considering it as a mechanism that enhances corporate and economic performance. According to (Jensen, 1993), the board of directors can be considered as an effective control mechanism that can provide advance caution to the company before problems reach the crisis phase. One of the main findings of the paper is related with the size of the board of directors. Companies that limit the number of members in the board are more likely to have a better performance; meanwhile oversized boards tend to become less effective. In consensus with this conclusion, the author states that:

*"When boards get beyond seven or eight people they are less likely to function effectively and are easier for the CEO to control".*

The above conclusion which highlights the significance of board size is supported by the empirical research of (Yermack 1996), who presents the same result on his paper. According to the author, having small boards enhances company's performance and influences positively the investor's behavior. Moreover, the study's empirical findings show that there is a negative association between board size and company value. Additionally, large board of directors are characterized by poor communication among the member and moreover the decision making process in less effective comparing with the firms that have smaller boards. In order to analyze the impact of small boards on market valuation of companies, the author undertakes a cross-sectional analysis by using a sample of 452 leading U.S public corporations over the period 1984 to 1991, published in Forbes Magazine. In order to estimate the relationship, the least squares regression is run by taking Tobin's Q (representing market value of total assets over replacement costs of assets) as a dependent variable and board size (represented by the number of directors

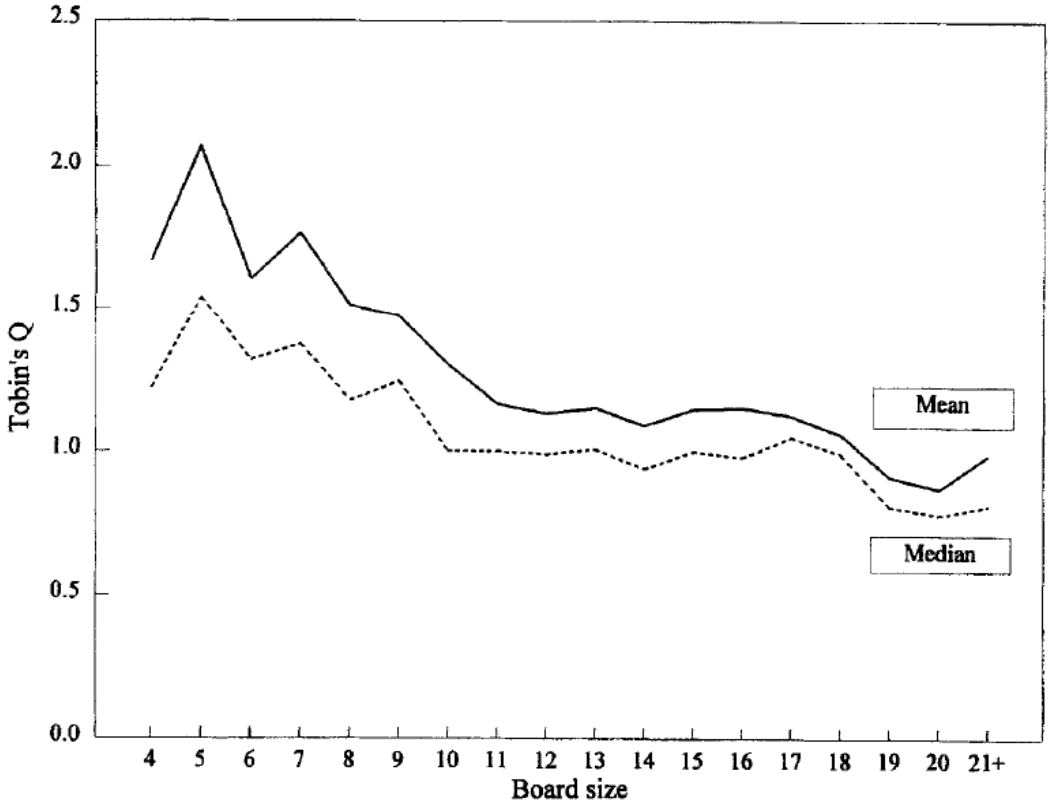
set on each company's board) as independent variable. The findings of the paper demonstrate that the association between board size and firm performance appears to be quite significant as it shows that the larger the board size the lower the profitability. Moreover, the effectiveness of small boards is reflected also in financial ratios because the higher the profitability of companies with small boards, the higher is the efficiency of asset utilization.

In addition, the board size influences the CEO compensation incentives as the compensation programs represent an important responsibility of the board of directors. The author finds that CEO receives higher compensation incentives in firms with smaller boards. The analyzes is followed by estimating how the change in board size impact the market value of a company as this change spreads possible reactions among investors. The results obtained verify that investors approve a decrease in board size, and they react negatively in case of board expansions. Moreover, changes in boards of directors are influenced by the company's performance. For example, companies that perform poorly are characterized by more changes in the board of directors, by more departures and more appointments than other good performing companies. However, the research does not support the evidence that companies adjust the board of director's size as a result of the past performance.

Figure 2 below shows the Tobin's Q value for different board sizes using sample means and medians. In this case Tobin's Q is used a proxy for the firm value.

It can be observed that Tobin's Q value decreases, as the size of board increases. For example, a board with 6 directors has a mean Tobin's Q of 1.65; meanwhile a board of 12 directors has a mean Tobin's Q of 1. This indicates a significant decrease in firm value as the size of the board doubles. The optimal board size ranges between 5 to 7 members as it corresponds to the highest value of Tobin's Q.

**Figure 2:** Board size and Tobin's Q: Sample Means and medians.




**Source:** Yermack, 1996

Converse results are reported by (Adams and Mehran, 2008). The authors conduct a survey using a sample of 480 banking firms over the period 1986 to 1999. The difference between this study and prior ones is in the investigation of the relationship between board size and performance for the banking industry. Motivated by the subprime mortgage crisis, they try to find the impact of board size and composition on bank performance. By using a large range of data regarding the bank governance, the study identifies as financial performance variables Tobin's Q and ROA and as corporate governance variables the board size, board composition (inside and outside directors) and other governance variables.

The empirical results report a positive relationship between board size and Tobin's Q. The authors provide two possible explanations why their findings are not consistent with

previous literature. First, the increase in board size is attributed to an increase in merger and acquisition activity and secondly such result can be attributed to the presence of endogeneity due to the exclusion of organizational structure variables. Moreover, the paper reports a strong association between performance and the size of the board meeting fee and it states that the relationship between performance and the number of committees is negative.

## 3.2 Board of director's activity impact on firm performance

On the other hand (Kaplan and Reishus, 1990), investigate the interplay between the firm performance and top executives' activity on other boards of directors. Instead of Tobin's Q or other profitability ratios, the analysis uses the dividends cuts as a measure of firm performance. The findings provide evidence on the significant correlation between the firm performance and the outside directorship activity. This is consistent with the evidence that low performance firms that reduce their dividends are more likely to be managed by directors that are not involved as outside directors. The testing results demonstrate that it is six times more likely for managers of poor performing firms to loose their seats in the board of directors in comparison with the managers of good performing firms. Furthermore, the good performance firm's managers are two times likely to obtain outside activity than those of poor performing firms. The empirical investigation suggests that managers that serve in outside boards are perceived to be better monitors, which leads to an improvement of their reputation and also influences the firm's performance.

(Vafeas, 1999) presents another empirical research of great interest. He explores the relationship of another corporate governance measure with firm performance. More specifically, in the center of his study is the measurement of the influence of board activity on firm performance. In this case, as a proxy for measuring the intensity of board activity is used the board meeting frequency which refers to the number of meetings of board of directors each fiscal year. Meanwhile, the price to book ratio is used as a proxy of firm performance. The study is undertaken by using a sample of 307 companies

published in Forbes magazine over the period 1990 – 1994. The relationship between the variables is measured by using OLS regression equations and Two – Stages Least squares estimation method.

The results reveal that firms with lowest number of board meetings exhibit the highest price to book value. This implies a negative relationship between the board meeting frequency and firm performance. An explanation of this can be that the decisions of boards that meet more frequently need more time to be taken. Moreover, in such cases the communication and the contact between the directors are less efficient than in boards that meet more rarely. Further testing of the study shows that there is a positive relationship between the frequency of board meetings and board size. This implies that large boards of directors meet more often. As a result, more frequent board meetings means larger board size which leads to a negative relation of board size with firm performance. This conclusion is consistent with the study of (Yermack, 1996), who suggests higher firm value for small board sizes. The empirical testing indicates also that companies, whose boards of directors meet very frequently, are less valued in the market and this leads to a decline in the level of share prices. On the other hand, the decline in share prices is followed by an increase in the board meeting frequency.

Additional findings of the study suggest that the operating performance gets better after years of abnormal board activity. These enhancement in performance are characteristic of firms with poor past performance. The board activity measured by frequency of board meetings is negatively related with the stock ownership but positively associated with the number of committees inside the firm.

## 3.3 Board composition impact on firm performance

Board composition has taken great interest because it influences the way board functions. Typically, it refers to the type of directors that represent the board such as independent directors and inside directors. Many prior studies have explored the associated between board independence and firm performance. Nevertheless, they have not established a clear correlation between these two variables. (Rosenstein and Wyatt, 1990) report that

the appointment of an additional independent director on boards composed mostly of independent directors results in an increase in firm value. This finding supports the idea that independent directors are chosen in accordance with the interest of shareholders.

(Bhagat and Black, 2001) conduct a research using a sample of 934 large U.S companies over the period 1985 to 1995. The authors examine the relationship between board independence, measured by the fraction of independent directors on board, with long term performance measured by ROA and Tobin's Q. The main result of the study is that firms react in situations of low profitability by increasing the number of independent directors on board. Additionally, the role of independent directors is important but it is more likely that increasing their number does not lead to an improvement in firm performance. Two reasons that support this argument are: first, involving inside directors in the board can add value and secondly, independent directors should be given a part of the stock ownership in order to motivate them to be more effective.

However, no strong evidence is found that firms with a higher proportion of independent directors have a higher profitability and performance.

(Peng, 2004) addresses the same issue on the influence of a greater representation of independent directors in the board, on firm performance. The author investigates whether the appointment of independent directors in a given year is affected by the prior poor performance of the firm and prior firm size. The research is conducted using a sample of 530 Chinese firms quoted on the Shanghai and Shenzhen stock exchange during the period 1992-1996. The findings suggest two conclusions based on the proxy of firm performance used as a dependent variable; ROE and sales growth. When ROE is included in the regression, board independence has no significant impact on firm performance. But when using sales growth as dependent variables, board independence has a significant positive influence on firm performance. On the other hand, the findings show strong support about a significant positive relationship between number of independent directors and prior firm performance and size. Nevertheless, the effect appears to be stronger for the period 1992-1994 and than decreases sharply during 1995-1996.

(Hayes, Mehran and Schaefer, 2005) analyze cross-sectional variations on the boards of directors' committee structure over the period 1997 – 1998 for S&P 500 companies. According to the findings of the paper, there is a positive relationship between number of

committees and company size. Moreover, the more outside directors the board of directors has, the higher is the number of committees. This result implies also a higher frequency of committee meetings as the boards becomes larger and the functions that committees should fulfill increase. Another interesting result of the study is related with dividend paying companies that appear to have more committee functions. Meanwhile, in companies where the percentage of CEO ownership is higher, the committee performs fewer tasks. This conclusion implies that because of the ownership being concentrated in the CEO level, the number of tasks to be forwarded and be performed by the committees does not increase. Furthermore, when involving the firm performance as a variable represented by price to book value, the authors find a positive relationship with the portion of stocks held by the CEOs but a negative association with the fraction of stocks held by outside directors serving in other committees.

Additionally, other empirical researches have found no significant linkage between board of director's composition and firm performance. More specifically, (Klein, 1998) brings evidence on the relationship between board committee structures and firm profitability. The analysis suggests that the percentage of inside directors as part of the whole board does not influence the firm performance. Nevertheless, positive association is found among the number of inside directors on finance committee and the accounting performance indicator. In continuance to this result, the main outcome of the research is that inside directors can be more valuable and effective if the companies use them in a proper way.

(Hermalin and Weisbach, 1988) undertake an analysis on the opposite direction. They examine the influence of firm performance on board composition. The study is undertaken by gathering data on the board of directors and earnings for a sample of about 300 companies traded in NYSE. The main findings of the paper are obtained by estimating separate equations for each of the arrivals and departures from the board of directors. The empirical results suggest that after a poor performance of the company, in most cases it happens that the outside directors join the board of directors and inside directors leave it. There are two reasons for this result. First, firms tend to fire the inside directors that might have caused the poor performance. As a result, the vacancy position created because of inside director's departure is filled by the taking the outside directors

in the board. The second reason is related with the principal – agent theory. (Fama and Jensen, 1983), suggest that management payoffs should be linked to their performance. This implies that in case a firm performs poorly it gives signals of poor management; therefore this indicates that the firm needs to improve its management and monitoring. Outside directors are the ones that are added to the board of directors with the purpose of monitoring the insiders.

An important insight is also given by (Abidin and Kamal, 2009) who presents the association of board structure and firm performance in Malaysia. The study can be distinguished because it demonstrates the importance of intellectual capital as an important resource which greatly determines the company's performance. On this context, the author measures the firm performance as "the value added (VA) efficiency of the firm's physical and intellectual resources" in comparison with other prior research that use Tobin's Q or other profitability ratios. The VA efficiency is computed by employing the Value Added Intellectual Coefficient (VAIC). Consistent with previous literature, the empirical testing defines a positive association between the board characteristics (measured by the proportion of independent non-executive directors) and the VA efficiency. This implies that the board characteristics have a positive influence on firm value according to the VAIC measurement. However, a less significant association is found between board size and firm performance.

## 3.4 Insider ownership and firm performance

(Hayes, Mehran and Schaefer, 2005) explore the interaction between the percentage of shares held by the directors and firm performance. Using a sample of S&P 500 firms for the period 1997 and 1998, the authors report a significant negative relationship between the percentage of shares held by independent directors and firm performance, but a significant positive association between the fractions of shares held by CEOs and firm performance, as measured by price to book value.

## 3.5 Gender diversity in the boardroom and its impact on firm performance

In their survey, (Campbell and Minguez-Vera, 2007) consider another element of corporate governance, specifically the gender composition of the board of directors. The authors identify whether there is a relationship between the fraction of women in the board and Tobin's Q value, by bringing evidence on the influence of women presence on the board on firm value. Empirical testing on Spanish board of directors, identify that the percentage of women on the board of directors has a significant, positive impact on Tobin's Q value. (Adams and Ferreira, 2009) obtained similar results when analyzing the influence of female directors on firm outcomes on 1939 firms included in S& P 500, S&P MidCap, and S&P SmallCap. Accordingly, the authors draw attention to the importance of gender diversity in the boardroom. Consistent with the idea that women in board of directors have a substantial influence on board composition; they show that the gender composition of boards influences positively the efficiency and effectiveness of the board and generally it leads to a better performance for firms that suffer from a weak corporate governance. Moreover, the authors find evidence that the presence of women in the board of directors improves the attendance records and their behavior influences positively the monitoring process.

In the same line, are the conclusions given by (Carter, Simkins and Simpson, 2003) who determine a significant and positive association between the percentage of women on the board of directors and firm value for a sample of 1000 firms taken from "Fortune" magazine.

Further evidence that support this line of reasoning is given by (Shrader, Blackburn and Iles, 1997). In their empirical research, the authors conduct an investigation on 200 firms published by the Wall Street Journal for year 1992. For the firms taken in consideration, about 25 % of top management positions were held by women. The analysis brings evidence on how an increase in the percentage of women in board of directors improves the financial performance outcomes of a company. According to the findings, the firms should perform well if they employ a higher number of women in the position of "manager". This is due to the fact that women are perceived to be strong on bringing new

contributions, ideas and innovations in the company. Moreover, the atmosphere and organizational learning improves as more women are seated in the boards of directors. On the other hand, the relationship between the women proportion in the management team and firm performance is more significant in cases when women are assigned duties that have great impact on the firm.

Motivated by the fact that women have been holding an increasing number of board seats in U.S companies, (Dobbin and Jung, 2010) analyze whether the presence of female directors in the board affects company's profit and stock performance. The findings suggest that companies that add women in the board of directors do not experience any increase or decrease in profits, implying that women directors have no impact in profits. On the other side, the change in the number of female board membership appears to be significant for institutional investors. This is explained by the adverse effect of women directors on stock price as institutional investors are more likely to sell their stocks in response to appointments of new female directors. As a result, women in the board of directors have a significant negative impact on stock value of the firm. Furthermore, the influence of female directors on the performance of the firm depends on how long they stay in the board of directors. This implies that other observable characteristic should be controlled and taken in consideration in order to address properly any potential endogeneity problem.

## 3.6 The average age of directors and firm performance

(Wiersema and Bantel, 1992) focus on the demographic characteristics of the board and their influence on firm strategic decisions. Age of board members represents on of the demographic variables chosen for the study. Using a sample of 100 firms for the year 1983, the paper reports a negative relationship between average age of board members and the changes in corporate strategies. This result shows strong support for the positive impact of young boards which tend to be proactive, creative and innovative. Moreover, young directors on board are more likely to undertake risks and accept major changes in the process of decision-making compared to older directors. As a consequence, a low average age of board members is necessary to provide major strategic changes that lead

to outcomes and performance improvements for the firm. Nevertheless, no significant association is found between age diversity and the strategic change.

## 3.7 Tax management

The audit committee assists the Board of directors in accomplishing its roles and responsibilities toward the shareholders. Moreover, the audit committee is assigned the responsibility for managing risks and reviewing the financial reporting of the firm, its internal and disclosure control, tax compliance etc. Firms characterized by better quality of financial reporting and disclosure transparency are more likely to diminish their agency problems. Taking in consideration the crucial position of the audit committee in a firm, the Blue Ribbon Committee (1999) published a guideline on the importance of the audit committee and on ways to improve its performance and effectiveness. A significant part of the report is dedicated to the committee composition and competencies that its members should posses such as independence, experience and financial literacy. However, few studies have focused on the important role of the audit committee in a firm. (Karamanou and Vafeas, 2005), provide an empirical research that links the board of directors and audit committee with financial disclosure practices and management forecast. The testing is conducted using a sample of 275 firms published in Fortune 500 for the period 1995 to 2000. Audit committee activity, size, and independence, together with the audit committee financial experts represent the variables of audit committee. The authors provide evidence that firms consisting of large audit committee size, higher proportion of financial experts and higher committee activity are more likely to make less precise management forecast. Hence, effective board and audit committee are related with less precise forecast. Possible explanations of this result are firstly, well governed firms try not to misinform the shareholders and secondly, these firms are aware of the threat of legal procedures against the board of directors. However, effective audit committee with a higher proportion of financial experts and independent members, lead to a higher level of forecast accuracy and positive market reactions. This implies also a higher financial disclosure.

But how does tax management affect firm value? (Desai and Dharmapala, 2005) examine the effect of tax avoidance on firm value. As a measure of firm value is used Tobin's Q and book-tax gap is used as a measure of tax avoidance. The empirical testing rejects the hypothesis that corporate tax avoidance increases firm value. Moreover, the findings predict that the influence of tax avoidance activity on firm value is higher in well-governed firms and lower in less well-governed firms. This implies that in well-governed firms, the managers with undertake tax avoidance activities only if it is sufficiently profitable for the firm. Meanwhile, in poorly-governed firms, managers are less motivated to carry out tax avoidance activities as they have higher opportunities to be engaged in renting process.

(Minnick and Noga, 2010) present broader insights on how executive and directors compensation drive managers toward a better performance and how the improved performance influences tax management, in a long run perspective. Throughout the paper, the authors focus on pay-performance sensitivity which represents the change in manager's wealth for a unit change in equity value. According to the empirical findings, pay-performance sensitivity offers incentives for executives and directors to concentrate their attention on finding better strategies to improve tax management. Nevertheless, tax management strategies are developed in accordance to the specific characteristics of the governance structure of the firm. Firm with independent boards give priority and rely more on foreign tax management, meanwhile other firms with larger board of directors favor more domestic tax management. Importantly, the analysis is driven by observing the long term influence of incentive compensation on long term tax management. The empirical findings show that better tax managements bring advantages for shareholders and increase their returns in the long run.

# Chapter 4

# Research Hypothesis

The purpose of this paper is to explore the relationship of corporate governance measures with firm performance and tax fees. A large body of previous literature is consistent with the finding that corporate governance mechanisms influence top manager's decisions. When these decisions are not in line with the shareholder's interest, they might lead to a conflict of interests between shareholders and managers, referred as the agency problem. A serious conflict between these two parties may damage the effectiveness of corporate governance and brings negative impacts for the company such as reduction of shareholder's wealth and increase of agency costs which are certainly not consistent with the objective of maximizing the firm value. On the other hand, when a given governance mechanism influences the managers' decisions to be in accordance with shareholders' interests, than this might lead to a better performance for the company and can positively impact its value.

As corporate governance indicators we will examine how the board of directors' size, activity and composition influences the effectiveness of the company's corporate governance. Many previous empirical studies have overlooked each of these indicators separately; instead we will evaluate all of them in order to bring more complete explanations. However, consistent with the prior findings, we expect the size of board of directors to be inversely related with the firm performance and its activity to be negatively associated with profitability indicators. As a result, a well governed firm is characterized by a small board and lower frequency of board of director's meeting (lower board activity). In addition to this, we will highlight some other aspects of corporate

governance indicators concerning financial reporting and audit services. Fewer researches present the impact of Audit committee composition and diversity in the amount of tax fees. In accordance with previous literature, we expect that the audit committee activity and size is negatively related with the amounts of tax fees. Meanwhile, the number of financial experts in the audit committee is assumed to impact positively the tax fees.

In the following part, we will draw some hypothesis and will try to prove their validity conducting the respective regression analysis.

**Hypothesis 1.** *Board of director's size is negatively related with firm performance*

Board size is a variable that influences the firm value. (Yermack, 1996) showed that there is an inverse relationship between board size and firm performance. He found that small boards of directors are more effective and they demonstrate better values of financial ratios. Moreover, it is more likely that the smaller is the board, the better is the communication and the easier is to reach an agreement.

**Hypothesis 2.** *Board of director's activity (number of board meetings) affects negatively firm performance.*

Board activity measured by the number of board meetings is also another variable that influences firm performance. (Vafeas, 1999) found that firms with lowest number of board meetings demonstrate the highest price to book value, which implies a negative relationship between the board meeting frequency and firm performance. In this view, boards that meet more frequently are likely to reflect that the firm is experiencing problems. In addition, board of directors increases the activity in response to past poor performance.

**Hypothesis 3.** *Insider ownership is positively related with firm performance.*

The higher is the insider ownership, the higher is the percentage of stocks held by directors and executives. This implies that the more this group participates in the equity, the higher are their incentives to have a better firm performance.

**Hypothesis 4.** *Younger boards of directors lead to an increase in firm performance.*

(Wiersema and Bantel, 1992) showed that boards characterized by lower average age have better performance. This finding is explained by the fact that young boards are more willing to undertake innovative strategies and risky investments; therefore they result in a higher firm value. Hence, we assume that there is a negative relationship between average age of the directors that serve on the board and firm performance.

**Hypothesis 5.** *The proportion of independent directors is positively related with firm performance.*

Boards of directors with a high proportion of independent are an indication of strong management and governance mechanisms. In addition, having independent directors in the board reduces agency problems and tends to improve monitoring and controlling. When firms have lower profitability, they are more likely to add independent directors in the board and remove insiders (Hermalin and Weisbach, 1988). In accordance with this result, we expect a positive relationship between board independence and firm performance. Firms that survived the crisis had a higher fraction of independent directors on board ( Byrd, Fraser, Lee and Williams, 2001)

**Hypothesis 6.** *The percentage of women on the board of directors has a positive impact on firm value.*

The presence of women in the board of directors is assumed to improve the attendance records and their behavior influences positively the monitoring process. (Adams and Ferreira, 2009) found that female directors significantly influence the firm outcomes. This pattern is consistent with the interpretation that female directors are focused more on quality strategies and productivity and their presence improves the monitoring and controlling process.

**Hypothesis 7.** *Board of directors' activity and audit committee activity are positively related with tax fees.*

According to this hypothesis, we expect that a higher frequency of board and audit committee meetings implies higher tax fees to be paid.

**Hypothesis 8.** *The proportion of financial experts in the audit committee is positively related with tax fees.*

According to the regulations of the Securities and Exchange Commission, at least one member of the Audit Committee in a firm should be an "audit committee financial expert". Firms with a high number of financial experts in the audit committee are associated with higher financial disclosure which reflects effective corporate governance (Karamenou and Vafeas, 2005).

**Hypothesis 9:** *Board of director's size and audit committee size are positively related with tax fees*

Firms with small boards are assumed to have better performance which might indicate fewer amounts of fees paid to auditors. The same can be concluded for the audit committee size.

# Chapter 5

# Methodology

## 5.1 Sample and data description

In the present research paper, we will focus on the corporate governance model of Anglo-Saxon countries because our analysis will be conducted using a sample of firms from S&P 500 index. This index includes 500 public American corporations considered as leaders in the industries in which they operate. The present study will be focused on a sample of 680 observations for 136 firms of the above index between 2005 and 2009.

Corporate governance of these companies is adopted in accordance with their Corporate Governance guidelines and charters of the Board committee. Charters of the Board committee provide the framework of the leadership structure. Most of these companies have four main Committees: Compensation, Audit, Finance, and Nominating and Governance; which present an integral part of the governance structure. Each of the committee reports and recommends any possible change in relation with the matters for which they are responsible.

We should note here that companies of S&P 500 index operate in different industries such as Health Care, Materials, Utilities, Energy, Information Technology, Telecommunications Services, Consumer Discretionary, Consumer Staples and Financials. In order to have more consistent results, our study will not include the companies that offer financial services with the Standard Industrial Classification codes 6000-6999. For example we exclude insurance companies since they have a special type of activity and operate in a different regulated environment, which is likely to influence their performance and reduce the importance of the corporate governance mechanisms.

## 5.2 Source of data

### *5.2.1 Definitive Proxy Statement - DEF 14A*

Under the regulation rules that conduct securities industry in the U.S, investors and other participants in capital markets should have access to market information before they carry out their investment decisions. For this purpose, public companies are required by U.S. Securities and Exchange Commission to release accurate financial and non-financial information to the public. Being the most important regulator authority in the U.S securities market, the U.S. Securities and Exchange Commission aims to promote transparency and efficiency which is very crucial for the country's economy. In this perspective, public companies submit period reports with the Commission. Most of these reports and other forms have to be filed electronically through EDGAR database (the Electronic Data Gathering, Analysis, and Retrieval system) which is the largest source of the information disclosed by companies.

According to the purpose of our research, we will examine the DEF 14A Form which contains useful information about the Proxy Statement, published by the companies prior to their annual meeting. This proxy statement is filed in accordance with the solicitation of proxies by the company's Board of Directors. For this reason, the company furnishes the shareholders with proxy materials and other information that describe the issues to be discussed upon at the meeting. This notice is considered to be very useful for shareholders before the voting process because it introduces the nominees for election as directors and other important matters that have to be approved by the board.

Additionally, DEF 14A Form provides detailed information about the governance of the company. The framework of corporate governance is built based on the company's corporate governance guidelines in combination with Board Committee charters. The committee charters give information about the roles and responsibilities of Board of Directors, Compensation committee, Audit committee, Finance committee and Nominating and Governance committee. Moreover, each of these committees assists the board in fulfilling its functions by providing specific annual reports with respect to their roles.

### *5.2.2 Corporate Governance variables*

Having the information provided in DEF 14A forms, filed by each company of S&P500 index on a yearly basis, we will create a database consisting of number of directors on the board, number of meeting during the fiscal year, the proportion of shares owned by the directors and executives as a group, the proportion of insiders and independent directors, the average age of directors, gender diversity on board and other information regarding the audit committee characteristics such as number of financial experts and committee size and additionally number of meetings per fiscal year.

Using this database which allows us to present the governance indicators as explanatory variables, we will examine the influence of board of director's structure (size and composition) on the firm performance. Definitions of all governance variables used in this study are given below:

- *Board of Directors Size*

  This variable refers to the total number of members in the board of directors (inclusive independent directors) attending the annual meetings held during each fiscal year.

- *Board of Directors Meetings*

  This variable measures the number of regular meetings held by the board of directors during each fiscal year. This is the variable that mainly represents the board of director's activity. The meetings refer only to those held in person, excluding the telephonic ones.

- *Insider Ownership*

  This variable measures the percentage of common stock, relative to the common stock outstanding, beneficially owned by all directors and executive officers as a group.

- *Audit Committee Meetings*

  This variable measures the number of regular meetings held by the Audit Committee during each fiscal year.

- *Audit committee financial experts*

  Under the Securities and Exchange Commission's rules, in public companies at least one member of the audit committee should be a financial expert. In case the public company does not have a financial expert in its audit committee, according to the rule, the public company is required to disclose this fact and explain why it does not have an audit committee financial expert. The Blue Ribbon Committee (1999) recommends the presence of a member with accounting or related financial management expertise for having an effective audit committee.

- *Audit Committee size*

  This variable refers to the total number of members (insiders and independent) in the Audit Committee.

- *Average age of Board members*

  This variable measures the average age of board of director's members as a potential variable that might influence the decision making and monitoring process of firms.

- *Gender diversity*

  This variable gives information about the gender composition of the board. In the present study it will show the proportion of women in the Board of Directors.

- *Insider Directors*

  Insiders are the directors that participate in the day to day running of the company. They work full time in the company and are responsible for the achievement of operational and strategic objectives. For example, the CEO represents an inside director.

- *Gray Directors*

  This variable refers to those directors that have extensive business activities with the company but do work full time for it. This category of directors includes lawyers, company consultants etc. The proxy statements submitted by S&P 500 index firms do not provide any information about their gray directors. As a result, we will categorize the directors in two groups, insiders (non – independent) and outsider (independent) directors.

- *Independent Directors*

  Independent directors represent the category of directors that are not employed in the company and do not have any material relationship with it. These directors are in the role of monitors of the boards. They are also called outsiders or external directors. In the present study, board independence is measured by the proportion of independent directors to the board size.

The above definitions about the independence of directors have to be complemented also by the definition relating to corporate governance, given by NYSE and National Association of Securities Dealers (NASD). More specifically, according to NASD and NYSE Rulemaking, 2003[1] it is specified that a director of the board or of the audit committee from is disqualified from being independent when:

[1] Securities and Exchange Commission Release - No. 34-48745; File Nos. SR-NYSE-2002-33, SR-NASD-2002-77, SR-NASD-2002-80, SR-NASD-2002-138, SR-NASD-2002-139, and SR-NASD-2002-141

1- He is an employee, or whose immediate family member is an executive officer, of the company.

2- He receives, or whose immediate family member receives, more than $100,000 per year in direct compensation from the listed company, except for certain permitted payments.

3- He is affiliated with or employed by, or whose immediate family member is affiliated with or employed in a professional capacity by, a present or former internal or external auditor of the company.

4- He is employed, or whose immediate family member is employed, as an executive officer of another company where any of the listed company's present executives serve on that company's compensation committee.

5- He is an executive officer or an employee, or whose immediate family member is an executive officer of a company that makes payments to, or receives payments from, the listed company for property or services in an amount which, in any single fiscal year, exceeds the greater of $1 million or 2% of such other company's consolidated gross revenues.

Besides the corporate governance measures, we retrieve from EDGAR database also the following information about the variable related with the tax fees:

- *Tax fees*

This variable represents the fees and expenses for professional services rendered by the chosen independent auditors in accordance with U.S. and foreign tax compliance assistance, consultation and special advice on diverse foreign tax issues, transfer

pricing documentation for compliance matters and advice concerning to customs and other relevant duties.

### *5.2.3 Financial variables*

In our research, we will use two proxies of corporate performance, ROA as an accounting performance measure and price to book value ratio as a market measure. These financial data are collected from Reuter's database. The first ratio is taken as given in the table of historical ratios published by each company. Meanwhile, the price to book ratio is based on our own computation having given Book Value of Equity per Share and the share price in the end of each of fiscal year. On the other hand, the amount of tax fees will be taken as given in the proxy statements.

Below we define each of the variables that will measure respectively the firm's performance:

- ROA - Return on assets measures the profit that has been generated from company's assets. This performance indicator represents the accounting profit and shows what the management has achieved in a certain period of time. The higher the percentage of ROA, the more profitable is the company and the better is the usage of assets to turn them into profits:

$$ROA = \text{Net income} / \text{Average total assets}$$

- Price to Book ratio – compares the company's book value with its current share price. Higher price to book ratio is an indicator that the investors perceive the company as valuable. It is concerned to be one of the most widely quoted financial measures of firm's value. It represents a crucial figure for investors who

judge whether the firm is under or overvalued. To calculate price to book ratio we take the share price in the end of each fiscal year and divide by the Book Value of Equity per Share:

Price/Book ratio = Price Value per share / Book Value per share

### *5.2.4 Control variables*

In our study we will examine at what level the corporate governance indicators determine firm performance. However, the variation in firm performance is not fully explained by governance measures and we expect that other unobserved factors are contained in the error term. As a result, it is crucial to account for these factors that might be directly related with performance. In order to draw causal conclusions about the return on assets, price to book value or tax fees, which represent our dependent variables, we will include in the regression the following control variables:

- Leverage ratio – provides information about the debt amount used by a company to run its activity. This ratio is essential for determining the cost of capital of the company. As a result, we consider it to have a significant impact on profitability and performance.

  Leverage ratio = Total Debt / Total Assets

- Firm size – as a proxy for firm size we will use the volumes of sales for each firm divided by the total assets. We will use the ratio of sales to assets in order for the firm size variable to be a comparable measure with the ratio of price to book value and return to assets that are used as dependent variables. In the same line,

when we will examine the influence of governance indicators on tax fees, we will use as a proxy for firm size the volumes of sales.

In the present paper will make use of several empirical methods, frequently applied for panel data such as pooled OLS, random effect and fixed effect specification. In order to find the empirical model that best approximates the relationship of governance indicators with firm performance and tax fees, we apply first the pooled OLS method. On the obtained results we conduct several tests such as testing for heteroskedasticity and serial correlation. The results show that the pooled OLS is not an appropriate estimation method for the present study. We introduce random effect model as a method that corrects for heterosckedasticity and serial correlation. Nevertheless, when applying Hausman test we find out that the random effect estimates are not consistent. We also check for multicollinearity in order to ensure that there is no significant correlation among variables. We use the fixed effect specification and conclude that the results are more appropriate. Before applying the fixed effect estimation, we analyze the OLS residuals which indicate that for 3 firms the difference between the fitted and actual value is very high. Thus, out of 136, we remove 3 firms that have the residual in excess of 2.5 standard errors. As a result, the fixed effect specification is performed on a sample of 133 firms over the period 2005 to 2009. The fixed effect method is used mostly because it provides unbiased results and additionally it controls for any unobservable characteristic that is likely to affect the dependent variable. In this context, using the fixed effect method we determine the influence of unobserved components, others than board composition, board size, board of director's activity, on the firm performance and tax fees. As a result, we also correct the results provided by OLS, in case of existence of some individual-firm characteristics that are not taken in consideration in the model (as firms belong to different industries and operate in different regulated environment).

Previous researches on corporate governance utilize various estimation methods. The results obtained are usually sensitive to the method applied. (Yermack, 1996) estimates least square regressions to investigate the association between board size and firm value. In addition, he introduces the fixed-effect approach and compares the results with OLS

estimates. (Hermalin and Weisbach, 1988), utilizes the same methods when examining the determinants of board composition. On the other hand, (Vafeas, 1999) estimates the relation of board activity with firm performance using two-stage least squares (2SLS) framework. Instead, (Bhagat and Black, 2000) run both OLS and three-stage least squares (3SLS) regression. (Barnhard and Rosenstein, 1998) apply a three equation instrumental variables approach which is more general than 3SLS. The results appear to be sensitive according to changes in instruments. The usage of 2SLS or 3SLS is undertaken in cases when corporate governance indicators such as board composition or ownership are endogenous. As a result, when any of these variables in correlated with some unobservable factors included in the error term, the OLS results become inconsistent. Thus, a solution would be to find an instrument that is highly correlated with the variable but uncorrelated with the error term. However, it may be difficult to find highly relevant and valid instrument in all cases.

# Chapter 6

# Empirical results

## 6.1 Descriptive statistics of corporate governance and control variables

Appendix A, table 2 provides summary statistics on corporate governance and financial variables. The statistics are shown for each year separately and as totals for all 5 years. The board of directors holds on average 7.6 meetings per fiscal year with a standard deviation of 3 meetings. The minimum number of meetings in the sample is 3 and the maximum is 28. Throughout the 5 years period, the frequency of board meetings has remained almost constant. Only in year 2007, board activity was the highest probably in response to the necessity to find a solution for the difficulties caused by the global financial crisis.

On average, there are 11 directors that serve on the board with a standard deviation of 2 directors. The minimum size of the board is 5 members and the maximum is 18. In most firms, the number of elected directors should be within a range stated in advance by the shareholders. It can be observed that this number remained quite stable from 2005 to 2009.

About 85 % of members in the board are independent directors; this implies that the boards are predominated by outside directors. There are about 9 independent directors on average with a standard deviation of 2 directors. The minimum number of independent directors on board is 4 and the maximum is 8. A small percentage of members in board are insiders. There are on average 2 insiders in each board with standard deviation of 1 inside member. Some boards are composed only of independent directors and no insiders. During the period 2005-2009, the number of independent directors has remained almost unchanged.

The percentage of insider ownership has changed slightly from 2005 to 2009 with a mean of 7.6 % and standard deviation 13 %. There is a high difference between the minimum 0 and the maximum 85.4 %. This implies that board directors and executives as a group may own more than 50 % of the stocks in the firm which attributes them the majority of the ownership.

On average, the number of women on board does not exceed 2. Standard deviation is 1 showing that large changes in the gender composition of the board are not possible. According to this, most boards are dominated by men. There are boards that have no female directors and others that have a maximum number of 6.

Board members have an average age of 60 years with a standard deviation of 3 years. Most of directors are part of the board for long periods of 10 to 15 years. As a result, having the same directors in the board implies a constant average age during the 5 years period. The younger member is 48 years old and the older one about 70. In general, the directors are retired at the age of 72.

Next, the table displays the characteristics of audit committee. This committee held on average 9 meetings per fiscal year with a standard deviation of 3 meetings. This explains the important role of this committee taking in consideration that the board holds on average 7 meetings. The minimum number of meetings is 3 and the maximum 38. The larger difference between the minimum and maximum appears to be in year 2006. In other years, the audit committee activity remains the same.

Each audit committee has on average 2 members with financial expertise. It can be reviewed, that throughout the 5 years period the number of financial experts is not less than 1 which demonstrated accordance with the rule of Securities and Exchange Commission mentioned in previous chapter. The minimum number of financial experts in audit committee is 1 and the maximum is 7.

The audit committee size ranges from 1 to 9. The average number of members in the committee is 4 with a standard deviation of 1 member.

Tax fees exhibit high fluctuations through time. They have a mean of 1,216,516 and a high standard deviation of 2,344,251. The minimum tax fees paid is 0 and the maximum is 21,600,000.

The last part of the table provides descriptive analysis of financial variables. Price to book value exhibits high variation during the sample period. The mean value of this ratio is 4.2 and the standard deviation 4.9 reflecting the high dispersion of this financial measure. In addition, it varies from very low negative numbers to very high positive ones. The minimum value of price to book ratio is -17.27 and the maximum is 79.44. The negative price to book ratio is an indication that the respective firm has negative shareholder's equity, so called deficit.

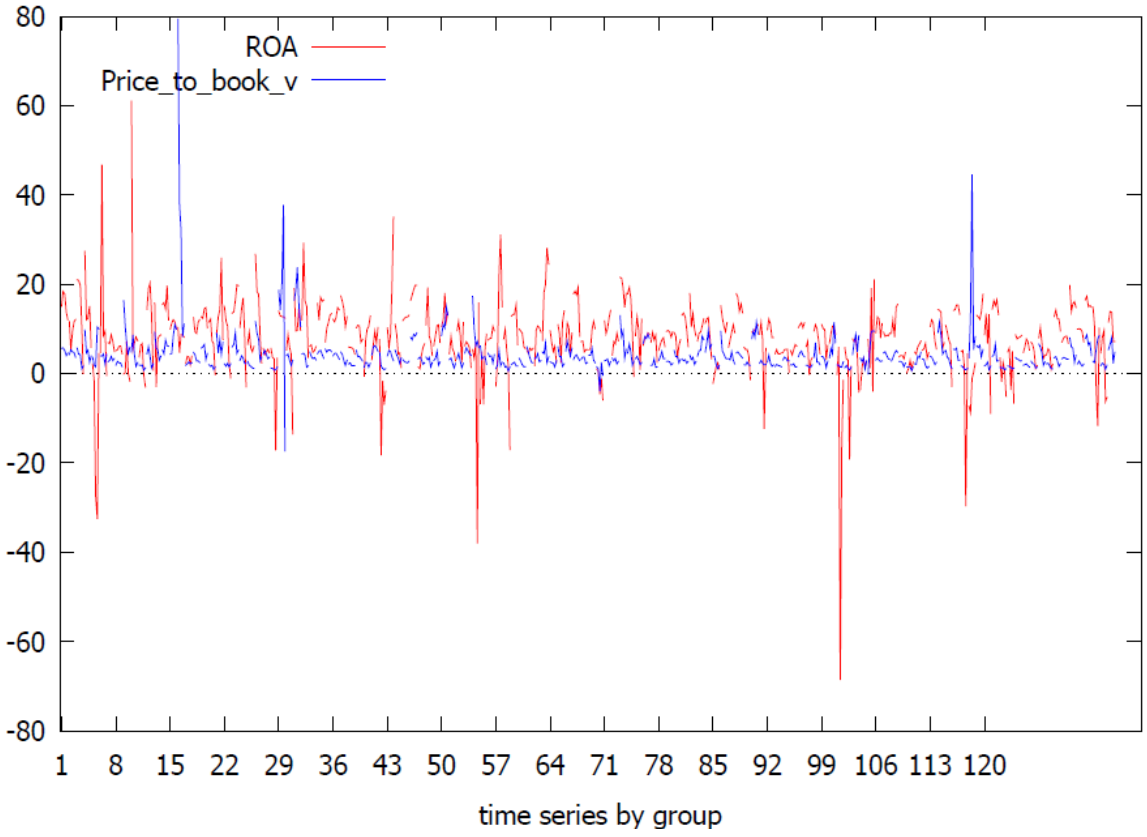
Return on assets reveals sharp fluctuations during the 5 years period. It varies from minus 68.61 to 61.06 while the average ratio is 8.12 and the standard deviation is 8.08. Such fluctuations could be the result of financial turmoil shocks that negatively impacted firm profits.

The capital structure of the sample firms is composed of 54 % debt with standard deviation of 18 %. This means that firms can increase further their leverage by relying more on debt than equity. However, there are firms that rely only on equity and others that choose debt as part of their capital structure. Firm size measured by sales to assets ratio appears to be stable from 2005 to 2009. The average ratio is 1.24 and standard deviation 0.92.

In order to enhance our understanding on how the financial variables fluctuate together during the period, we will plot the times series in one graph. Some interesting results are given in the below figure. Figure 3 shows price to book value and ROA in a time series plot. These ratios are both used as empirical proxies for firm performance but as we will discover in the next chapter their relationship with governance indicators is different. Price to book value represents a market performance measure; meanwhile ROA is an accounting based measure. From the figure, price to book value varies less and it reflects mostly the stock price of firms. It also can be observed the two extreme values of this ratio, the maximum 79.44 and the minimum -17.27, that we will exclude from the analysis as outliers. On the other hand, it can be observed that ROA exhibits sharp fluctuations throughout the 5 years period. Importantly, it goes from very low negative values to very high positive ones. This can be attributed to the recent financial turmoil which negatively impacted many major U.S companies. Years 2005 to 2007 were

considered to be a period of high profits and substantial growth for them, but 2008 brought radical recessions and as a consequence negative net incomes; displayed in the figure by negative values of ROA. Therefore, it is difficult to find a normal pattern of ROA that can be explained by corporate governance indicators. As a consequence, it would be hard to find a perfect fit between this measure of firm performance and the governance variables.

**Figure 3**: Time series plot price to book value, ROA



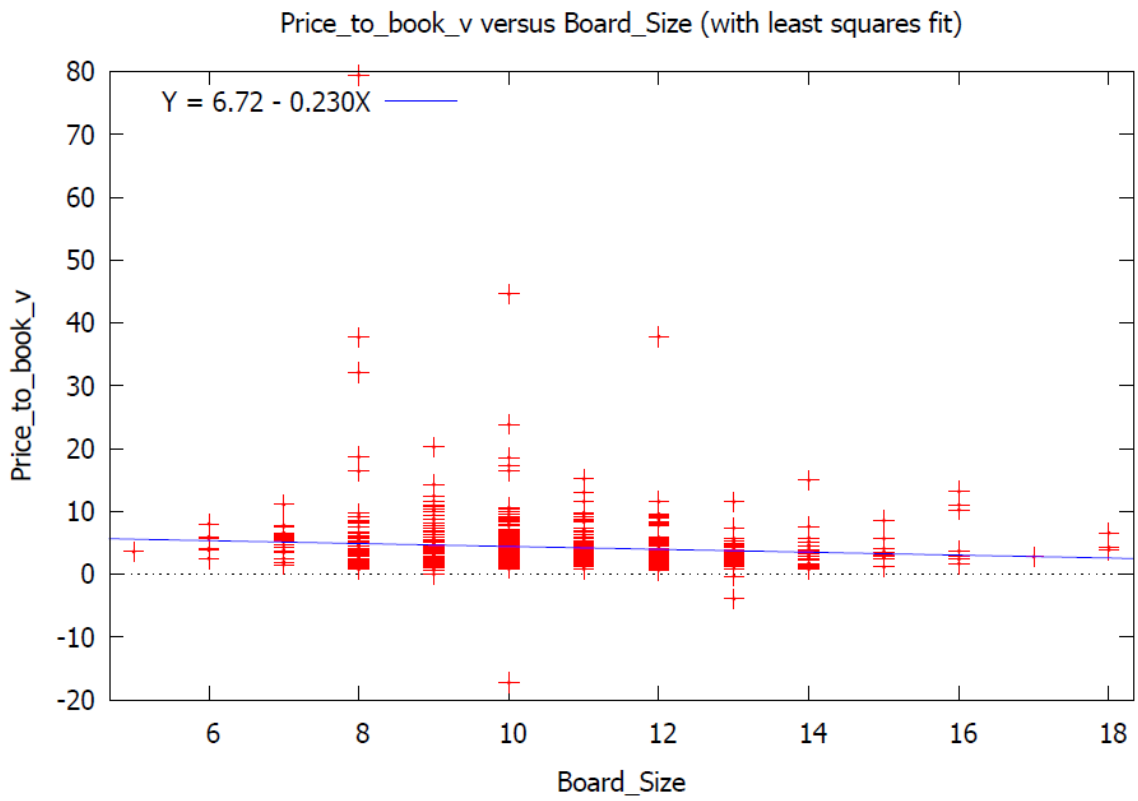

**Source**: Gretl

We will show in the continuance of the present paper, that using ROA instead of price to book value, as a proxy of firm performance, brings substantially different regression results.

The next figure shown below provides the scatter plot for the relationship between price to book value and one of the governance variables, board size. The information about the number of members on board was retrieved from the proxy statements published by the

firms in the end of each fiscal year for the period 2005 to 2009. It can be observed that for board with 7 to 10 directors, the price to book values range between 0 and 20. Meanwhile for board composed of more than 12 directors, the value of price to book ratio falls the interval between 0 and 10. The highest value of price to book ratio corresponds to a board composed of 8 to 10 directors. Importantly, any increase of the board by 2 or more directors when the board has reached the size of 10 members, leads to a continuous decrease in firm value. It can be pointed out that boards with more than 16 directors appear to have very low performance in terms of price to book value ratio.

**Figure 4:** Price to book value and board size




**Source**: Gretl

Figure 4 demonstrates to be is in the same line with the findings of previous researches. Firms with a small board of directors are more likely to exhibit higher values of price to book ratio, and as a consequence a higher performance.

## 6.2 Regression analysis – firm performance and corporate governance

In order to investigate whether corporate governance indicators influence firm performance and tax fees, we will estimate the empirical models by:

1) Pooled OLS

2) Random Effects Estimator (Generalized Least Squares)

3) Fixed Effect Estimator

In the beginning, we will examine the relationship between firm performance and corporate governance variables using price to book value as the dependent variable and board meetings, board size, insider ownership, gender and age as explanatory variables. In addition to governance measures, the regression includes two control variables that we expect to influence price to book to value. The general form of the regression is:

**Price to book value = $\beta_0$+$\beta_1$ Board_Meetings+$\beta_2$ Board_Size+$\beta_3$ Insider Ownership+ $\beta_4$ Age +$\beta_5$ Independent Directors + $\beta_6$ Gender + $\beta_7$ Firm size+ $\beta_8$ Leverage+ $\varepsilon$.**

- Price to book value – Dependent Variable
- $\beta_0$ – Price to book value when all variables are 0 meaning the firm value with no board of directors, no sales and no debt.
- $\beta_1$ - Parameter of board meetings
- $\beta_2$ - Parameter of board size
- $\beta_3$ - Parameter of insider ownership
- $\beta_4$ - Parameter of average age of directors in the board
- $\beta_5$ - Parameter of proportion of independent directors in the board
- $\beta_6$ - Parameter of proportion of women in the board
- $\beta_7$ - Parameter of firm size
- $\beta_8$ - Parameter of leverage

**Model 1: Pooled OLS, using 680 observations**

**Included 136 cross-sectional units**

**Time-series length = 5**

**Dependent variable: Price_to_book_value**

| | *Coefficient* | *Std. Error* | *t-ratio* | *p-value* | |
|---|---|---|---|---|---|
| const | 15.5181 | 3.76911 | 4.1172 | 0.00004 | *** |
| Board_Meetings | -0.00672987 | 0.0610728 | -0.1102 | 0.91229 | |
| Board_Size | -0.318157 | 0.092235 | -3.4494 | 0.00060 | *** |
| Insider_Ownersh | 0.0255642 | 0.0145762 | 1.7538 | 0.07992 | * |
| Age | -0.233505 | 0.057751 | -4.0433 | 0.00006 | *** |
| Independent Direct | 2.5534 | 1.92969 | 1.3232 | 0.18621 | |
| Gender | 3.75183 | 2.16166 | 1.7356 | 0.08309 | * |
| Firm_Size | 0.068514 | 0.200776 | 0.3412 | 0.73303 | |
| Leverage | 6.12159 | 0.998049 | 6.1336 | <0.00001 | *** |
| R-squared 0.110120 | | | Adjusted R-squared 0.099511 | | |
| Durbin-Watson 0.701009 | | | | | |

*** Significant with 99% confidence level
** Significant with 95% confidence level
* Significant with 90% confidence level

Using 680 observations, we estimated the following regression line by Pooled OLS method:

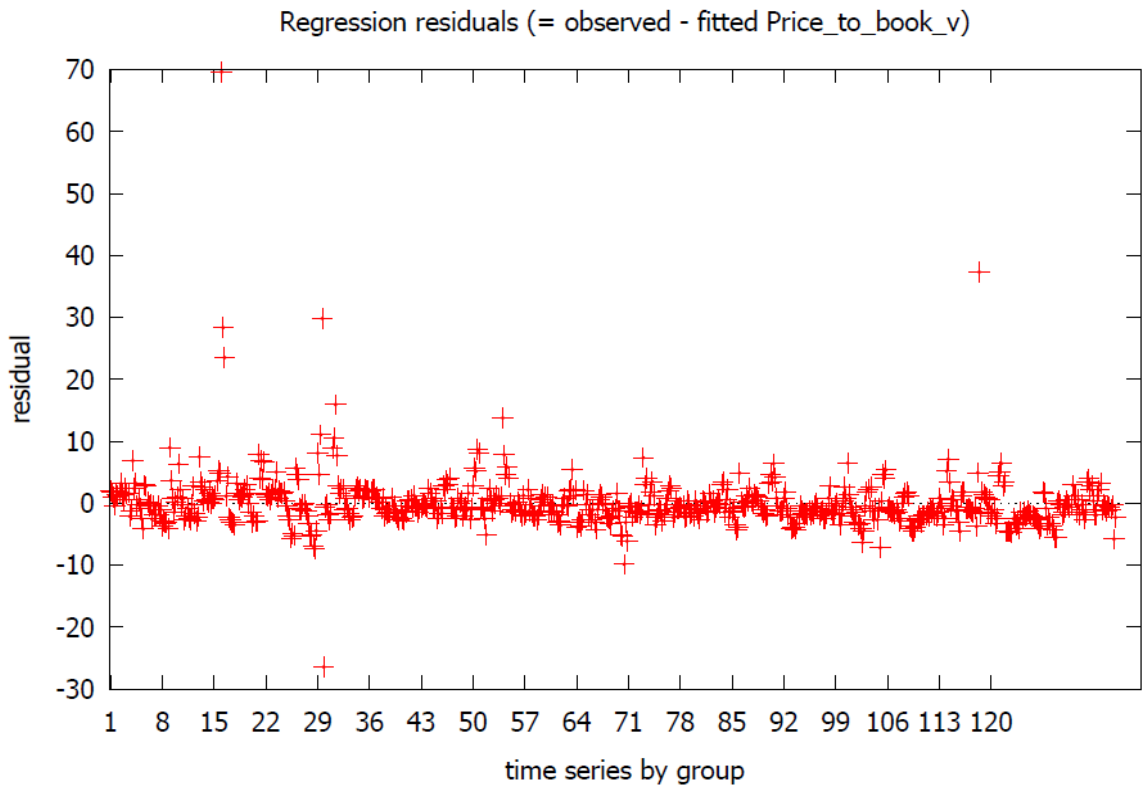
**Price to book value = 15.5181–0.0067*Board_Meetings–0.3181*Board_Size**
**+ 0.0255*Insider_Ownership – 0. 0.2335Age+2.5534*Independ_Director**
**+3.7518*Gender+0.0685*Firm_size+ 6.1215*Leverage+ ε**

According to the above results, it can be pointed out that the constant and coefficients of board size, age and leverage are significantly different from zero; more precisely they are different from zero with 99 % confidence level. Insider ownership and gender are significantly different from zero with 90 % confidence level. Other variables appear not to be significant. It can be observed that R-squared is very low and it explains about 11 % of the variation in price to book value.

The following graph plots the OLS residuals by observation number. It can be reviewed

that there is a high dispersion of residuals for some firms in the range 15-29. In addition, the analysis of actual and fitted values shows that the residuals for these firms are in excess of 2.5 standard errors. Hence, we will remove 3 firms considered as outliers in order to improve our model.

**Figure 5**: Regression residuals (actual versus fitted)




**Source**:Gretl

After the removal of the outliers we will estimate the OLS regression model on the remained 133 firms (665 observations) over a 5 years period. The results are presented below in Model 2. It can be observed that the constant, age and leverage are significantly different from zero with 99 % confidence level. Additionally, board size and gender appears to be significant with 95 % confidence level. Other variables such as board meetings, board independence and firm size are proven not to be significant.

R-squared is very low and it explains only 6.1 % of the variation in price to book value indicating that OLS provides a poor fit to the data.

**Model 2: Pooled OLS, using 665 observations**

**Included 133 cross-sectional units**

**Time-series length = 5**

**Dependent variable: Price_to_book_value**

| | Coefficient | Std. Error | t-ratio | p-value | |
|---|---|---|---|---|---|
| const | 10.1108 | 2.18168 | 4.6344 | <0.00001 | *** |
| Board_Meetings | 0.00530103 | 0.034525 | 0.1535 | 0.87802 | |
| Board_Size | -0.113883 | 0.052761 | -2.1585 | 0.03125 | ** |
| Insider_Ownersh | 0.00573927 | 0.00828126 | 0.6930 | 0.48853 | |
| Age | -0.115355 | 0.0336119 | -3.4320 | 0.00064 | *** |
| Independent_Dir | 0.360587 | 1.0946 | 0.3294 | 0.74194 | |
| Gender | 2.71793 | 1.22319 | 2.2220 | 0.02662 | ** |
| Firm_Size | -0.0831652 | 0.113445 | -0.7331 | 0.46377 | |
| Leverage | 2.42812 | 0.592547 | 4.0978 | 0.00005 | *** |
| Sum squared residuals 4481.358 | | | | | |
| R-squared 0.061413 | | Adjusted R-squared 0.049967 | | | |
| Durbin-Watson 0.355821 | | | | | |

*** Significant with 99% confidence level
** Significant with 95% confidence level
* Significant with 90% confidence level

It is useful at this point to establish whether the classical linear model assumptions are satisfied. This is important in order to determine that the above OLS estimator is best linear unbiased estimator. We conclude if OLS estimator is best linear unbiased estimator by relying crucially on the homoskedasticity assumption. In cases when heteroskedasticity is present, it possible to find more efficient estimators than those of OLS. In the present study, we will detect the presence of heteroskedasticity by reporting heteroskedasticity-robust standart error with the usual OLS and review the differences in the standard errors.

The results reveal differences in the significance of variables; variables are no longer significant. Substantial changes appear also between some of the usual standard errors and the robust standard errors. For example, the usual standard error for gender is 1.22 while the robust standard error is 3.35 and the usual *t* statistic is about 2.22, while the robust *t* is about 0.81. The same can be pointed out for board size variable; its usual standard error is 0.052 comparing with the robust standard error of 0.10 and the usual *t* statistic is -2.15, while the robust *t* is -1.12. Considerable differences appear also for the

leverage variable; its usual standard error is 0.59 while the robust standard error is 1.33 and the *t* statistic is about 4.09, while the robust *t* is 1.82.

**Model 3: Pooled OLS, using 665 observations**
**Included 133 cross-sectional units**
**Time-series length = 5**
**Dependent variable: Price_to_book_value**
**Robust (HAC) standard errors**

| | Coefficient | Std. Error | t-ratio | p-value | |
|---|---|---|---|---|---|
| const | 10.1108 | 4.00944 | 2.5217 | 0.01191 | ** |
| Board_Meetings | 0.00530103 | 0.0409833 | 0.1293 | 0.89712 | |
| Board_Size | -0.113883 | 0.101551 | -1.1214 | 0.26251 | |
| Insider_Ownersh | 0.00573927 | 0.0213536 | 0.2688 | 0.78819 | |
| Age | -0.115355 | 0.0537358 | -2.1467 | 0.03218 | ** |
| Independent_Dir | 0.360587 | 2.14146 | 0.1684 | 0.86633 | |
| Gender | 2.71793 | 3.35923 | 0.8091 | 0.41875 | |
| Firm_Size | -0.0831652 | 0.19495 | -0.4266 | 0.66981 | |
| Leverage | 2.42812 | 1.33325 | 1.8212 | 0.06903 | * |
| R-squared 0.061413 | | | Adjusted R-squared 0.049967 | | |

*** Significant with 99% confidence level
** Significant with 95% confidence level
* Significant with 90% confidence level

These results might be an evidence for presence of heteroskedasticity which makes OLS no longer the best linear unbiased estimator. In order to conclude about this we will test heteroskedasticity. For this purpose we will save the squared OLS residuals from the first equation output and regress it on the same variables:

$$\varepsilon^2 = \delta_0 + \delta_1 \text{Board_Meetings} + \delta_2 \text{Board_size} + \delta_3 \text{Insider_Ownership} + \delta_4 \text{age}$$
$$+ \delta_5 \text{ ratio_indep} + \delta_6 \text{ ratio_gender} + \delta_7 \text{firmsize} + \delta_8 \text{leverage}$$

Under the null hypothesis, heteroskedasticity is not present.

**$H_0$: $\delta_0 = \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = \delta_8 = 0$ (homoskedasticity)**

**$H_A$: at least one of the deltas is significant (heteroskedasticity)**

**Model 4: Pooled OLS, using 665 observations**

**Included 133 cross-sectional units**

**Time-series length = 5**

**Dependent variable: sq_residuals**

| | Coefficient | Std. Error | t-ratio | p-value | |
|---|---|---|---|---|---|
| const | -6.51306 | 16.2311 | -0.4013 | 0.68835 | |
| Board_Meetings | 0.0891651 | 0.256856 | 0.3471 | 0.72860 | |
| Board_Size | -0.758526 | 0.392526 | -1.9324 | 0.05374 | * |
| Insider_Ownersh | 0.128687 | 0.0616101 | 2.0887 | 0.03712 | ** |
| Age | -0.21742 | 0.250063 | -0.8695 | 0.38491 | |
| Independent_Dir | 22.0241 | 8.14348 | 2.7045 | 0.00702 | *** |
| Gender | 35.3273 | 9.10017 | 3.8820 | 0.00011 | *** |
| Firm_Size | -0.636816 | 0.843994 | -0.7545 | 0.45080 | |
| Leverage | 19.0031 | 4.40838 | 4.3107 | 0.00002 | *** |
| R-squared 0.081197 | | | Adjusted R-squared 0.069992 | | |

*** Significant with 99% confidence level
** Significant with 95% confidence level
* Significant with 90% confidence level

We reject the null hypothesis (reject homoscedasticity) if the test statistics is higher than the critical value**.**

$$F = \frac{R_u^2/k}{(1-R_u^2)/(n-k-1)} = \frac{0{,}081/8}{(1-0{,}081)/(665-8-1)} = 7{,}23$$

The *F* statistic is 7.23 and is higher the than critical value (the 1% critical value is 2.53). Thus we reject the null hypothesis of homoskedasticity. This means that heteroskedasticity is present and the usual standard errors reported in the first model are not reliable and OLS is not best linear unbiased estimator.

Additionally, we suspect some serial correlation when observing the value of Durbin Watson test that is equal to 0.35. This value is lower than 1.84 (lower bound) for number of observations n=665 and number of regressors k=8. Thus, it can be pointed out that there is serial correlation.

It is of special importance to detect also if multicollinearity problem is present. Hence, we will check if two or more explanatory variables are highly correlated with each other.

Using Appendix A, table 1 and 2 we can calculate the Variance Inflation Factor (VIF) that measures the degree of multicollinearity, according to the below formula:

**VIF(i) = 1/(1 - R(i)^2)** where R(i) is the multiple correlation coefficient between variable i and the other independent variables.

In Appendix C, table 1 we provide the values of VIF which appear to be less than 5. Hence, we can conclude that the degree of multicollinearity is not sufficient to cause any concern about the regression variables.

At this stage, the presence of heteroskedasticity and serial correlation invalidates the first OLS model. Thus, we should think of an alternative estimation method that corrects it and gives reliable and valid results. Generalized Least Squares is a method that accounts for heteroskedasticity in the errors serial correlation. Therefore, the Generalized Least Squares estimators are necessarily more efficient than the OLS estimators.

Using the same dependent and explanatory variables, the GLS estimates are given as below:

**Model 5: Random-effects (GLS), using 665 observations**
**Included 133 cross-sectional units**
**Time-series length = 5**
**Dependent variable: Price_to_book_value**

| | Coefficient | Std. Error | t-ratio | p-value | |
|---|---|---|---|---|---|
| const | 12.6294 | 2.47715 | 5.0983 | <0.00001 | *** |
| Board_Meetings | -0.0014757 | 0.0263157 | -0.0561 | 0.95530 | |
| Board_Size | -0.169106 | 0.0618035 | -2.7362 | 0.00638 | *** |
| Insider_Ownersh | 0.0181355 | 0.012089 | 1.5002 | 0.13405 | |
| Age | -0.106709 | 0.0365045 | -2.9232 | 0.00358 | *** |
| Independent_Dir | -3.86449 | 1.02389 | -3.7743 | 0.00017 | *** |
| Gender | 0.124871 | 1.28416 | 0.0972 | 0.92257 | |
| Firm_Size | 0.206692 | 0.197212 | 1.0481 | 0.29499 | |
| Leverage | 4.36652 | 0.773775 | 5.6431 | <0.00001 | *** |

***** Significant with 99% confidence level**
**** Significant with 95% confidence level**
*** Significant with 90% confidence level**

Analyzing the results of model 5, we can point out that the constant, board size, age, board independence and leverage are significantly different from zero with 99 %

confidence level. Other variables such as board meetings, gender and firm size appear not to be statistically significant.

The most questionable assumption of Random Effect model is the absence of correlation among the regressors and the individual invariant effects. Therefore is important to check whether this assumption is valid in order to have consistent estimators. The following results are obtained by running the Random Effects model in Gretl and calculating the Hausman test:

**$H_0$: GLS estimates are consistent**
**$H_A$: GLS estimates are inconsistent**

**Asymptotic test statistic: Chi-square(8) = 35.6676 with p-value = 2.01986e-005**

The critical value for $\chi^2_{0.99}$ is 20.0902 and it is lower that the test statistics of 35.6676. Hence the null hypothesis is rejected at 1 % significance level. Also, by analyzing the p-value (2.01986e-005), we can formulate the same conclusion. Based on the results from the Hausman test and the p-value it can be concluded that GLS estimates are not consistent.

An alternative specification model that does not assume uncorrelation among residuals is the Fixed Effect model. This model is very useful in cases when we are focusing in a set of individual; in the present study it would be an appropriate specification since we are analyzing a set of 136 firms.
In our study we include firms of different sizes and industries. According to this, we suspect that there might be some other unobservable factors capturing firms' characteristics that do not vary over time and affect firm performance. The unobserved effect contains things such as director's financial background, the retirement or resign of a chief director, firm diversification (as number of business segments in which it operates), the impact of financial crisis on firm's profits or any takeover. These are generally constant over the period of 5 years. Implementing Fixed Effect specification,

we will automatically add firm dummies in our regressions and estimate their influence on firm value.

The below regression output shows that the results change in an important way.

**Model 6: Fixed-effects, using 665 observations**

**Included 133 cross-sectional units**

**Time-series length = 5**

**Dependent variable: Price_to_book_value**

| | Coefficient | Std. Error | t-ratio | p-value | |
|---|---|---|---|---|---|
| const | 11.5257 | 2.98972 | 3.8551 | 0.00013 | *** |
| Board_Meetings | -0.000461772 | 0.0270365 | -0.0171 | 0.98638 | |
| Board_Size | -0.198489 | 0.0733226 | -2.7071 | 0.00701 | *** |
| Insider_Ownersh | 0.0495974 | 0.0191953 | 2.5838 | 0.01004 | ** |
| Age | -0.106793 | 0.0419306 | -2.5469 | 0.01115 | ** |
| Independent_Dir | -5.0608 | 1.09841 | -4.6074 | <0.00001 | *** |
| Gender | 0.0862395 | 1.47106 | 0.0586 | 0.95327 | |
| Firm_Size | 1.53288 | 0.418562 | 3.6623 | 0.00028 | *** |
| Leverage | 5.3718 | 0.998973 | 5.3773 | <0.00001 | *** |
| Sum squared resid 1134.654 | | | S.E. of regression 1.471520 | | |
| R-squared 0.762355 | | | Adjusted R-squared 0.698862 | | |

*** Significant with 99% confidence level
** Significant with 95% confidence level
* Significant with 90% confidence level

Before interpreting the obtained results it is important to test for the joint significance of fixed effects. In this case we will prove whether the intercept is same for all firms by performing an F test (comparing restricted with unrestricted model).

**$H_0$: $\mu_1 = \mu_2 = \ldots = \mu_{N-1} = 0$ (common intercept for all firms)**

**$H_A$: $\mu_i \neq 0$ at least for some i (intercept is different)**

Under the alternative hypothesis, i represents the firms and it can take values from 1 to 133.

Test statistics:

$$F = \frac{\frac{RRSS-URSS}{N-1}}{\frac{URSS}{NT-N-K}} = \frac{a}{\chi} F_{(N-1),(NT-N-K)}$$

RRSS refers to restricted residual sum of squares from pooled OLS that we estimated in the previous model.

URSS represents the unrestricted residual sum of squares from the fixed effects model.

N represents the number of FIRMS and is equal to 133.

K represents the number of coefficients and is equal to 8

T represents the number of years and is equal to 5

For our model: $N(T-1) - K$ = 133*(5-1)-8= 524 and N-1=132

As a result, F statistic value is:

$$F = \frac{\frac{(RRSS-URSS)}{N-1}}{\frac{URSS}{N(T-1)-K}} = \frac{\frac{4481.36-1134.65}{132}}{\frac{1134.65}{524}} = 11.7088$$

The F (132, 524) = 11.7088 with p-value = P (F(132, 524) > 11.7088) = 1.16456e-095 is higher than the critical value of ***1.36021 which has a F distribution with*** (132, 524) degrees of freedom and 1 % significance level. Therefore, we reject the null hypothesis that the intercept is same for firms. Hence, we can conclude that it cannot be the same effect across 133 firms.

Once we have tested the joint significance of the fixed effects and determined that firms do not have a common intercept, we form the regression equation based on the estimated fixed effect model.

**Price to book value = 11.5278–0.0004*Board_Meetings–0.1985*Board_Size**
**+ 0.0493*Insider_Ownership – 0.1068*Age-5.0579*Independ_Director**
**+0.0847*Gender+1.5321*Firm_size+ 5.3730*Leverage+ ε**

The results show that the number board meetings are proven to be not significant showing inconsistency with hypothesis 2. Nevertheless, the relationship between the frequency of board meeting and price to book value appears to be negative as indicated by previous literature (Vafeas, 1999).

The coefficient of board size is significantly different from zero with 99 % confidence level. This variable is inversely related to price to book value reflecting consistency with hypothesis 1. We can point out that a decrease in board size by one member leads to an increase of price to book ratio by approximately 0.198, holding other variables constant. Some possible explanations for this can be that boards with fewer members have better communication, organization and coordination; they are more flexible and efficient. Furthermore, the process of decision making in small size boards is assumed to be more effective and takes less time because the consensus among a group of less directors is achieved faster. However, it does not make sense to reduce the board to zero. All firms set in advance the range in which the board size should vary; typically is between 5 to 12 members.

Insider ownership is significantly different from zero with 95 % confidence level. The variable is positively associated with firm value proving right hypothesis 3. An increase of 1 % in the proportion of stocks held by board members and executives as a group leads to an increase of 0.05 in price to book value. Intuitively, the higher is the participation of board members in equity, the higher is their interest in seeing the stock price increase and the higher are their incentives for having better firm performance.

Average age is statistically significant and reflects consistency with hypothesis 4 since it is negatively related with firm performance. According to this result, it can be determined that the higher is the average age of the board the lower is the performance or alternatively we can say that young boards perform better than old ones. This result can be due to the fact that young executives are success oriented and tend to be more eager for undertaking risky initiatives. Meanwhile, old executives are more conservative and

are not willing to pursue drastic changes in the company. As a result, these managerial characteristics with surely be reflected in firm performance.

Board independence appears to be significantly different from zero with 99 % confidence level. The negative sign of the variable is not consistent with our assumption that board independence is positively related with firm performance. Thus, it does not prove right hypothesis 5.

Gender does not influence firm performance. Thus, hypothesis 6 is rejected. According to this result, having one more women in the board of directors does not have any impact on firm performance. In the present model, gender diversity is measured by the proportion of women in the board. Another alternative method of measuring the gender diversity effect on firm value will be presented in the next chapter.

Important conclusions can be drawn also about the financial variables. It can be reviewed that firm size and leverage are significantly different from zero with 99% confidence level. There is a positive relationship between firm size and firm performance. This implies that larger firms have higher sales and as a consequence they are likely to have higher profitability. In addition to this, it can be observed that the leverage is positively related with firm performance. Since leverage represents the percentage debt in the capital structure of the firm, it is common sense that it should be directly related with price to book value which takes in consideration the book value of shareholder's equity. The higher is the debt load of the firm, the higher is the price to book value. Also, increasing debt leads to a higher tax shield and higher savings from taxes for the firm. The fixed effect model has a high explanatory power with R-squared 76 % and adjusted-R squared 70 %. Thus, we can conclude that the model explains about 76 % of the variation in firm performance.

## 6.3 Regression analysis – tax fees and corporate governance

We will conduct the same analysis as above in order to explore the relationship of tax fees with corporate governance indicators. The empirical model will be estimated by using Pooled OLS and Fixed Effect specification.

In order to develop arguments whether governance mechanisms influence the amount of tax fees, we will examine the relationship between tax fees and audit committee characteristics. Using log of tax fees as the dependent variable and audit committee meeting, audit committee financial experts, audit committee members, board meetings, board size and insider ownership as explanatory variables we obtain the below relationship:

**Log Tax fees = $\beta_0$+$\beta_1$ Audit Commitee_Meetings+$\beta_2$ Audit C_Financial Expert +$\beta_3$ Audit Committee Members+ $\beta_4$ Board Meetings +$\beta_5$ Board Size + $\beta_6$ Insider Ownership + $\beta_7$ Firm size+ $\beta_8$ Leverage+ ε.**

In addition to governance measures, the regression includes two control variables that we expect to influence tax fees. Each of the regression coefficients is defined as follows:

- Log Tax fees – Dependent Variable
- $\beta_0$ – Tax fess value when all variables are 0 meaning there is no audit committee, no financial expert, no sales and no debt.
- $\beta_1$ - Parameter of Audit Committee Meetings
- $\beta_2$ - Parameter of Audit Committee Financial Expert
- $\beta_3$ - Parameter of Audit Committee Members
- $\beta_4$ - Parameter of board meetings
- $\beta_5$ - Parameter of board size
- $\beta_6$ - Parameter of insider ownership
- $\beta_7$ - Parameter of firm size measured by log sales
- $\beta_8$ - Parameter of leverage

**Model 7: Pooled OLS, using 609 observations**

**Included 133 cross-sectional units**

**Time-series length: minimum 1, maximum 5**

**Dependent variable: l_tax_Fees**

| | *Coefficient* | *Std. Error* | *t-ratio* | *p-value* | |
|---|---|---|---|---|---|
| const | 2.69353 | 1.25223 | 2.1510 | 0.03188 | ** |
| Audit_Committee meetings | -0.0388286 | 0.0224938 | -1.7262 | 0.08483 | * |
| Financial_experts | 0.119653 | 0.0524062 | 2.2832 | 0.02277 | ** |
| Audit_Commiteree members | 0.029475 | 0.0684592 | 0.4305 | 0.66695 | |
| Board_Meetings | 0.0974871 | 0.0239527 | 4.0700 | 0.00005 | *** |
| Board_Size | 0.119878 | 0.039369 | 3.0450 | 0.00243 | *** |
| Insider_Ownersh | -0.00644451 | 0.00496948 | -1.2968 | 0.19519 | |
| Leverage | 0.550776 | 0.379966 | 1.4495 | 0.14771 | |
| Firm_Size | 0.345733 | 0.0596924 | 5.7919 | <0.00001 | *** |
| R-squared 0.166594 | | Adjusted R-squared 0.155482 | | | |
| Durbin-Watson 0.236092 | | | | | |

*** Significant with 99% confidence level
** Significant with 95% confidence level
* Significant with 90% confidence level

The form of the regression equation based on the estimated OLS model is given below:

**Log Tax fees = 2.6935-0.0388*Audit Commitee_Meetings +0.1196*Audit_C_Financial_Expert+0.1196*Audit_Committee_Members +0.0974*Board_Meetings+0.1198*Board_Size-0.0064*Insider_Ownership +0.5507*Firm size+ 0.3457*Leverage+ ε.**

The results suggest that the coefficients of board meetings, board size and firm size are significantly different from zero with 99 % confidence level. Furthermore, the constant and the coefficient of financial experts in audit committee appear to be significantly different from zero with 95 % confidence level and the coefficient of audit committee meetings is significantly different from zero with 90 % confidence level. Audit committee meetings, insider ownership and leverage appear to be insignificant.

R squared shows that the model explains only 16.7 % of the variation in the amount of tax fees paid to auditors. We should also note that there are 609 observations taken in account. This is because 71 of them appeared to be 0 and were excluded from the model since it is not possible to calculate the logarithm of non-negative numbers.

Not consistent with hypothesis 7, audit committee is significant but negatively related to tax fees. This result shows that frequent meetings of audit committee lead to lower tax fees paid.

Members of audit committee that are financially literate appear to have a significant and positive influence on the amount of tax fees. Since these members have high expertise in accounting, this assures accuracy and clarity of financial disclosure in the financial statements. Thus, hypothesis 8 is proven right as more financial experts in audit committee are linked with higher tax fees.

The number of members in audit committee is proved to be insignificant. Meanwhile, board meeting is significant and positively related with tax fees. This result is in consistent with hypothesis 9.

Board size is also significant and positively linked to tax fees paid, demonstrating consistency with hypothesis 9.

The other variables of insider ownership and leverage are not statistically significant. Another important variable is the firm size measured by the log of sales. Used as a control variable, firm size is significant and positively related to the amount of tax fees paid. It is common sense to conclude that bigger companies pay more taxes than small ones.

In the section of descriptive statistics of corporate governance indicators we found out high correlations between some variables. More specifically, firm size appeared to be correlated with log of tax fees, leverage, and board size. In addition, board size was proven to be correlated with audit committee size. Hence, it is possible that some of the variables do not show significance because of these correlations. Thus, we will estimate another OLS regression including all variables except firm and board size.

The obtained results are shown below:

**Model 8: Pooled OLS, using 609 observations**

**Included 133 cross-sectional units**

**Time-series length: minimum 1, maximum 5**

**Dependent variable: l_tax_Fees**

| | *Coefficient* | *Std. Error* | *t-ratio* | *p-value* | |
|---|---|---|---|---|---|
| const | 10.7019 | 0.425685 | 25.1403 | <0.00001 | *** |
| Audit_Committee meetings | -0.0407513 | 0.0235078 | -1.7335 | 0.08352 | * |
| Financial_experts | 0.133925 | 0.0547194 | 2.4475 | 0.01467 | ** |
| Audit_Commiteree members | 0.206197 | 0.0651732 | 3.1638 | 0.00164 | *** |
| Board_Meetings | 0.0980418 | 0.0250324 | 3.9166 | 0.00010 | *** |
| Insider_Ownersh | -0.00144585 | 0.00513718 | -0.2814 | 0.77846 | |
| Leverage | 1.25069 | 0.381427 | 3.2790 | 0.00110 | *** |
| R-squared 0.086304 | | Adjusted R-squared 0.077197 | | | |
| Durbin-Watson 0.218960 | | | | | |

*** Significant with 99% confidence level
** Significant with 95% confidence level
* Significant with 90% confidence level

The results reported in the above regression exhibit considerable differences with the previous model. The coefficient of audit committee meetings appears to be significant with 90 % confidence level. However, the negative sign of the variable in this the new model is not consistent with hypothesis 8. Audit committee size coefficient is positive and significant with 99 %, proving right hypothesis 9. Another variable that exhibits significance in the model is leverage. Previously, we indicated that leverage was not influencing tax fees. This result was probably caused by the correlation of leverage with firm size. In this case, we can conclude leverage influences the amount of tax fees. In addition, the coefficient of the number of financial experts in the audit committee exhibits the same significance as in previous model. The same can be pointed out for board meetings as this variable is significant with 99 % confidence level.

R squared is smaller and it shows that the model explains only 8.6 % of the variation in tax fees.

An alternative model would be the fixed effect specification. As explained in previous section, firms have different size and they belong to various industries. As a result, we suspect that there might be some other individual firm effects that influence the amount

of taxes paid to auditors. Running fixed effect model excluding again the variables that appear to be correlated with each other, we obtain the following results:

**Model 9: Fixed-effects, using 609 observations**

**Included 133 cross-sectional units**

**Time-series length: minimum 1, maximum 5**

**Dependent variable: l_tax_Fees_**

| | *Coefficient* | *Std. Error* | *t-ratio* | *p-value* | |
|---|---|---|---|---|---|
| const | 12.9983 | 0.39832 | 32.6327 | <0.00001 | *** |
| Audit_Committee | -0.0149709 | 0.0167323 | -0.8947 | 0.37139 | |
| Financial_exper | -0.137387 | 0.0509859 | -2.6946 | 0.00730 | *** |
| Audit_Ca | 0.13973 | 0.0539225 | 2.5913 | 0.00986 | *** |
| Board_Meetings | 0.0158868 | 0.0141443 | 1.1232 | 0.26193 | |
| Insider_Ownersh | -0.0220337 | 0.00960243 | -2.2946 | 0.02220 | ** |
| Leverage | -0.293274 | 0.490069 | -0.5984 | 0.54984 | |
| R-squared 0.882255 | | | Adjusted R-squared 0.847683 | | |

*** Significant with 99% confidence level
** Significant with 95% confidence level
* Significant with 90% confidence level

The results from the new model change significantly with the earlier one. Audit committee activity is no longer significant. The same can be concluded about board meetings and leverage.

On the other hand, the number of financial experts is more significant than previously. In addition, the insider ownership is proven to be significant with 95 % confidence level. According to this, the percentage of stocks held by board directors and executives as a group seems to be negatively related with tax fees. This can be explained with the fact that the higher is the participation of this group on firm capital; fewer taxes will be paid by them.

# Chapter 7

# Alternative models of firm performance and corporate governance indicators.

## 7.1 Gender as a dummy variable

The previous model estimated by using Fixed Effect specification, the gender variable measured by the percentage of women in the board appeared to be insignificant. This result is not consistent with prior literature which shows that the presence of woman in board of directors makes difference in terms of performance. We will re-estimate the fixed effect model for the above equation by presenting gender as a dummy variable. Thus, we will assign the value 1 for boards that have at least one female director and value 0 for boards composed only of men. The regression output for the new model is presented below. The new regression estimates indicate improved results and significance for gender. The coefficient of this variable is positive and significantly different from zero with 95 % confidence level. This means that the presence of women in the board is important rather than their number; appointing another female director in the board has no subsequent influence on firm value. From the regression results, it can be observed that the difference in price to book value between boards with at least one female member with the ones with only men is about 0.77. As a result, we can conclude that gender diversity influences performance.

R-squared is slightly higher compared to the previous model and it explains about 76.5 % of the variation in price to book value.

**Model 10: Fixed-effects, using 665 observations**

**Included 133 cross-sectional units**

**Time-series length = 5**

**Dependent variable: Price_to_book_v**

| | *Coefficient* | *Std. Error* | *t-ratio* | *p-value* | |
|---|---|---|---|---|---|
| const | 10.9337 | 2.97166 | 3.6793 | 0.00026 | *** |
| Board_Meetings | 0.00517062 | 0.0269851 | 0.1916 | 0.84812 | |
| Board_Size | -0.218672 | 0.0735696 | -2.9723 | 0.00309 | *** |
| Insider_Ownersh | 0.052431 | 0.0191126 | 2.7433 | 0.00629 | *** |
| Gender | 0.786935 | 0.359345 | 2.1899 | 0.02897 | ** |
| Age | -0.108459 | 0.0417305 | -2.5990 | 0.00961 | *** |
| Independent_Dir | -4.99709 | 1.09317 | -4.5712 | <0.00001 | *** |
| Leverage | 5.43866 | 0.994529 | 5.4686 | <0.00001 | *** |
| Firm_Size | 1.59278 | 0.414144 | 3.8460 | 0.00013 | *** |
| R-squared 0.764509 | | | Adjusted R-squared 0.701591 | | |

*** Significant with 99% confidence level
** Significant with 95% confidence level
* Significant with 90% confidence level

Figure 6 below, illustrates price to book values for firms sorted by the proportion of women in the board. According to this scatter plot we can determine about the relationship between the two variables. Price to book value ranges between 0 and 10 for boards with no female directors. Meanwhile, in cases when women are standing in the board of directors, the price to book value ranges between 0 and 20 (not taking in consideration one case of negative value of price to book ratio). Thus, the presence or absence of women in the board matters in terms of firm performance. Can we conclude that a higher proportion of women in the board leads to a better firm performance? Not necessarily. From the figure above, it can be observed that increasing the proportion of female directors does not suggest an increase in firm performance. Nevertheless, it is clear that the presence of women in board but not their number influences firm performance. For firms with proportion of women in the board from 10 to 20 %, price to book value ranges from 0 to 18. As a result, these firms represent better performance than others whose boards are composed only of men. Also, adding more female directors or increasing their proportion in the board to 30 or 40 % is not followed by an increase in firm value as the price to book ratio remains within same interval 0 to 20 ( without

considering the firm whose price to book ratio is higher than 20 for proportion of women 20%). This is consistent with our regression results; the model where the gender diversity was represented by the proportion of women in the board showed no significance for the variable of gender. Meanwhile, when gender was introduced as a dummy one, it appeared to be significant with 95 % confidence level.

**Figure 6:** Price to book value and gender

**Source:**Gretl

## 7.2 ROA as a dependent variable

In Model 6, board meetings frequency was proven to be statistically insignificant when determining its influence on price to book ratio. This implies that the level of board activity is not valued as important by the market. In this section, we will develop a model

that links the intensity of board activity with another measure of firm performance; the return on assets. Return on assets represents an accounting measure of firm performance compared to price to book value which represents a market measure. Generally, institutional investors are the ones that are more interested on this profitability ratio in order to control the return of the stockholder's investment. To examine whether corporate governance indicators have a significant association with return to assets we estimate the following fixed effect model using ROA as the dependent variable and all other governance variables as explanatory ones.

**Model 11: Fixed-effects, using 680 observations**
**Included 136 cross-sectional units**
**Time-series length = 5**
**Dependent variable: ROA**

| | Coefficient | Std. Error | t-ratio | p-value | |
|---|---|---|---|---|---|
| const | 5.22304 | 12.0541 | 0.4333 | 0.66497 | |
| Board_Meetings | 0.227967 | 0.109102 | 2.0895 | 0.03713 | ** |
| Board_Size | -0.109499 | 0.294201 | -0.3722 | 0.70990 | |
| Insider_Ownersh | 0.0835323 | 0.0721047 | 1.1585 | 0.24718 | |
| Age | 0.00839255 | 0.168901 | 0.0497 | 0.96039 | |
| Independent Director | -4.9246 | 4.45604 | -1.1052 | 0.26959 | |
| Gender | -0.0515969 | 5.87387 | -0.0088 | 0.99299 | |
| Firm_Size | 13.4719 | 1.69212 | 7.9616 | <0.00001 | *** |
| Leverage | -21.1943 | 3.97061 | -5.3378 | <0.00001 | *** |
| R-squared 0.564406 | | | Adjusted R-squared 0.448194 | | |

*** Significant with 99% confidence level
** Significant with 95% confidence level
* Significant with 90% confidence level

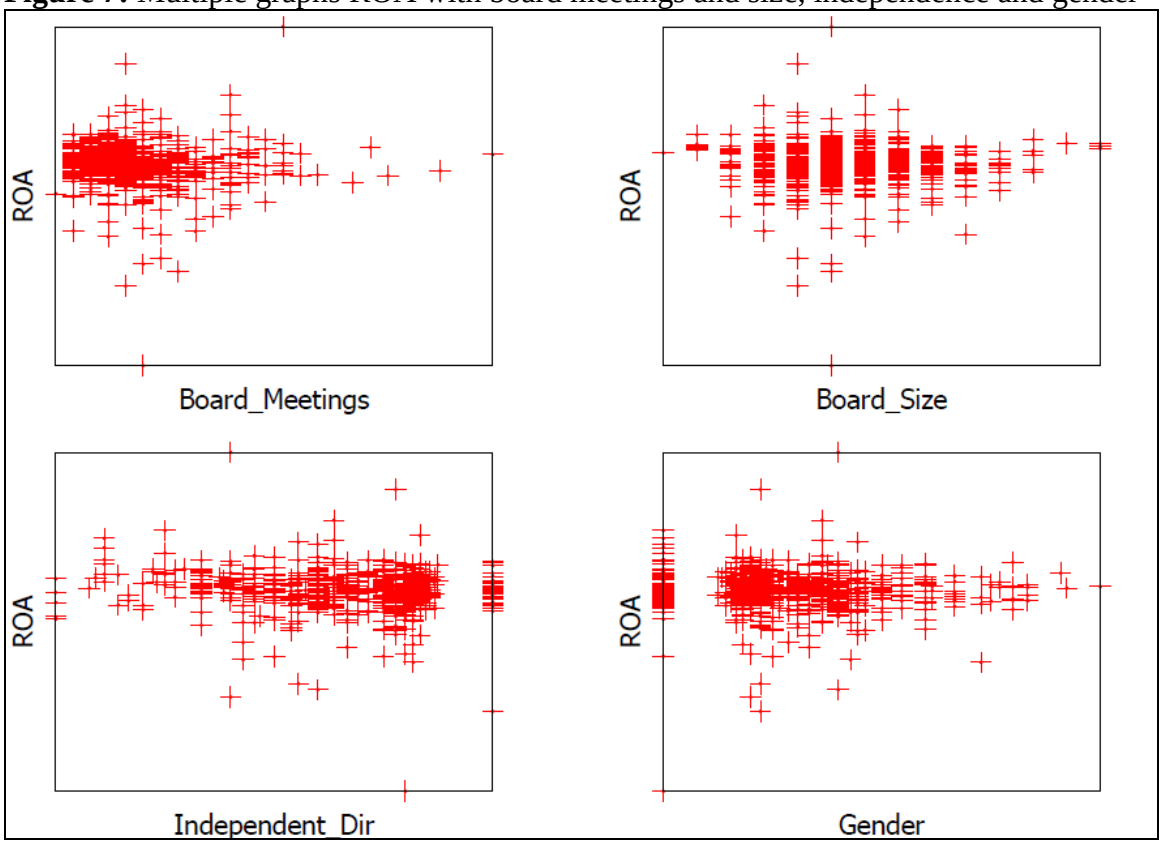
Inconsistent with our expectations and hypothesis, the number of board meetings is positively related with firm performance. It can be observed that this variable is significantly different from zero with 95 % confidence level. Thus, an increase in board activity by 1 meeting leads to an increase of ROA ratio by approximately 0.228. According to this result, higher frequency of board meetings improves firm performance measured by ROA.

Notably, all other corporate governance indicators are no longer significant. Only firm size and leverage appear to be significant with 99 % confidence level. Firm size is positively related with firm performance; the larger the size of the firm, the higher is its performance. Nevertheless, this is not true for the level of debt. The higher the value of debt, the lower is the firm performance.

Introducing this model with ROA as an accounting performance measure, we find out that only board activity is significant. Importantly, this governance variable appeared to be insignificant in previous chapter, when price to book value was taken as a dependent variable.

In order to examine the link between ROA and the governance variables we provide Figure 7 as below. It shows multiple scatterplots of the variables (except age and insider ownership that exhibit very small changes over the 5 years period) included in the above model.

**Figure 7:** Multiple graphs ROA with board meetings and size, independence and gender




**Source:**Gretl

ROA appears to increase slightly as board activity, measured by the number of meetings, increases. Additionally, the highest value of ROA corresponds to smaller boards but in consistency with the regression results, there are not significant changes in ROA due to board size changes. The same can be concluded about the last two graphs of the multiple scatterplots. ROA does not exhibit considerable changes in relation to board independence and gender. The values of ROA remain almost constant to changes of these variables.

## 7.3 Estimation of regression using the mean of variables

An alternative method for investigating the relationship between firm performance and governance structure is the estimation of a regression using the mean of variables over the period 2005-2009 for each firm. In this case, the data is given a cross sectional interpretation. The regression results are shown below:

**Model 12: OLS, using observations 1-136**

**Dependent variable: Price_to_book_v**

| | Coefficient | Std. Error | t-ratio | p-value | |
|---|---|---|---|---|---|
| const | 13.6701 | 6.82561 | 2.0028 | 0.04733 | ** |
| Board_Meetings | -0.000741137 | 0.149597 | -0.0050 | 0.99605 | |
| Board_Size | -0.381217 | 0.167736 | -2.2727 | 0.02472 | ** |
| Insider_Ownersh | 0.037064 | 0.0254159 | 1.4583 | 0.14723 | |
| Age | -0.24976 | 0.106106 | -2.3539 | 0.02011 | ** |
| Independent Direct | 6.94216 | 3.82627 | 1.8143 | 0.07199 | * |
| Gender | 3.5243 | 4.16323 | 0.8465 | 0.39885 | |
| Leverage | 5.53054 | 1.74403 | 3.1711 | 0.00190 | *** |
| Firm_Size | 0.0787768 | 0.336645 | 0.2340 | 0.81536 | |
| R-squared 0.190058 | | | Adjusted R-squared 0.139039 | | |

*** Significant with 99% confidence level
** Significant with 95% confidence level
* Significant with 90% confidence level

Consistent with previous findings, OLS regression output shows a negative and significant relationship between price to book value and board size. This result is in line with Model 1 (Pooled OLS) in Chapter 6, with a slight difference in significance. In the present model, board size is significant with 95 % confidence level. In addition, age appears to be negatively related with firm performance with 95 % confidence level, reflecting consistency with Model 1. The same can be concluded about the variable of leverage, which appears to be significant with 99 % confidence level. On the other hand, the number of independent directors appears to be significant in the model that uses the mean of variables, unlikely to Model 1.

The estimation of the OLS regression using mean of variables, results in a higher power of explanation of the relationship between the variables. R – Squared in the present model is 19 % compared to the one of Model 1 being 11 %.

Is the estimation using means of variables a reliable and consistent one? The answer to this question depends on the variability of data. In case the variables are fluctuating sharply from one year to another, than taking the mean would give us a value that does not truly represent the variable. For example, in the present study, price to book value exhibits a high variation from 2005 to 2009. This implies that the firms might have a higher ratio in 2005 and 2006 but a lower or even a negative in 2007 and 2008. The decrease in the value of price to book ratio can be attributed to the financial shocks that hit all major U.S firms. And taking the mean of a very low value and a high one leads to an average that might categorize the firm as good performing one even if it is not. As a consequence, we loose information and the results are no longer reliable.

In other cases, when variables do not show significant changes from one year to another, the method of estimation using the means of variables can generate reliable and effective results.

## 7.4 Past firm performance and current board composition

In the previous chapter we found out that, corporate governance characteristics represented by board size, number of independent directors, insider ownership, gender

diversity etc, influence firm performance. More specifically, the results indicated that greater insider ownership, fewer independent directors in the board and smaller board size lead to better performance. But what can be said if we examine this relationship the other way around? Does the firm adjust the board composition according to its performance? According to (Hermalin and Weisbach, 1988), firms respond to past poor performance by adding independent directors in the board. In this section, we will regress the number of independent directors on return to assets, insider ownership, board and firm size. We will consider as poor performance the one that is associated with lower profitability for the firm. As a result, we will take as an explanatory variable the return to assets and will show whether the low profits in prior year affect board composition in the current year. In the new model, we will take the lagged values for the return to assets and other explanatory variables as given in the current year.

Estimating by Pooled OLS method and using 544 observations (as time series length is reduced from 5 to 4), we obtain the following regression results:

**Model 13: Pooled OLS, using 544 observations**
**Included 136 cross-sectional units**
**Time-series length = 4**
**Dependent variable: Independent Directors**

| | *Coefficient* | *Std. Error* | *t-ratio* | *p-value* | |
|---|---|---|---|---|---|
| const | 0.550931 | 0.0714222 | 7.7137 | <0.00001 | *** |
| ROA_1 | -0.000884451 | 0.000462121 | -1.9139 | 0.05616 | * |
| Board_Size | 3.11244e-05 | 0.00206825 | 0.0150 | 0.98800 | |
| Insider_Ownersh | -0.00243889 | 0.000281343 | -8.6687 | <0.00001 | *** |
| Firm_Size | 0.0135804 | 0.00332856 | 4.0800 | 0.00005 | *** |
| R-squared 0.151891 | | | Adjusted R-squared 0.145597 | | |

*** Significant with 99% confidence level
** Significant with 95% confidence level
* Significant with 90% confidence level

The regression estimates for the above model show an inverse relationship between the proportion of independent directors and return on assets in prior year. The coefficient of lagged return to assets variable is significant with 90 % confidence level. Consistent with the study of Hermalin and Weisbach, it can be observed that the firms appoint more independent directors in the board as a reaction to past poor performance. A decrease in return to assets by 1 % leads to an increase of 0.088 % in the proportion of independent directors. Nevertheless, the model indicates that the board size remains the same as this variable appears insignificant. This implies that as new directors are added, others are removed from the board causing no changes in the board size.

In the same line with (Bhagat and Black, 2001), higher insider ownership is associated with a lower proportion of independent directors. This indicates that firms with a higher proportion of stocks held by directors and executives as a group have less independent directors in their boards. The insider ownership variable is significant with 99 % confidence level. In addition, firm size is positively and significantly related to proportion of independent directors. This suggests that larger firms have a higher number of independent directors than small firms.

R squared is relatively small and it explains about 15 % of the variation in board independence.

# Chapter 8

# Conclusions

The relationship between board of director's characteristics and firm performance has been a central issue of various empirical studies. The last financial turmoil brought again into the focus of attention the important role of corporate boards on helping firms to survive in periods of crisis. In this context, we conduct the present study in order to find an optimal and accurate model of good corporate governance capturing all characteristics that influence board effectiveness and its performance.

Using price to book value as a proxy of firm performance and board size, independence, insider ownership, gender diversity and average age of directors as governance variables we find some plausible results. In a sample of 133 large S&P firms over the period 2005 to 2009, we use fixed effects as an estimation method. The results show that firm performance, measured by price to book value, is negatively related to board size, independence and average age of board members but positively associated with the proportion of stocks held by directors and executives as a group. However, gender diversity, proxied by proportion of women on board and board activity measured by number of board meetings appear to be insignificant. A strong interaction between firm performance and gender diversity appears when gender is introduced in the model as a dummy variable. This result implies that the presence of women in the board is important rather than their number and appointing another female director in the board has no subsequent influence on firm value.

Our study increases the understanding of the effect of board structure on firm performance by introducing ROA as an accounting-based performance measure, beside price to book value that represents a market-based performance measure. We find a less significant relationship when the firm performance is measured by return on assets. More precisely, board activity appears to be the only significant variable of the model. Other alternative models that link governance indicators with firm performance suggest very important results. We find evidence that prior firm performance affects current board composition. In the same line with (Hermalin and Weisbach, 1988), we show that firms appoint more independent directors in the board as a reaction to past poor performance.

In the present paper, we also introduce new models that explore the relationship of audit committee characteristics and the amount of tax fees. The main results suggest that members of audit committee that are financially literate influence positively the tax fees paid. The high expertise in accounting of the members of audit committee leads to more accurate and clarified financial disclosure of the financial statements.

Besides the remarkable results of the present study, there are some limitations that have to be considered. When evaluating the influence of board structure on firm performance, it should be taken into account that board characteristics and firm performance can be endogenously determined. This implies that firms may choose their board structure in response to the situations they face, which are not observed in the study. Furthermore, the current firm performance can be the product of the actions taken by prior directors that might have left the firm, as well as the present performance can influence the way the board will be composed. Another limitation that should be addressed is the sensitivity of corporate governance models to various empirical models. The present study shows that the results differ significantly across different estimation methods.

Overall, the study provides strong results on the importance of governance indicators on firm performance and gives insights on how firms can improve their board effectiveness and performance.

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APPENDIX A

**Table 1**

**Correlation coefficients of board characteristics**

(obs=680)

| | Price to book value | Board meetings | Board size | Insider ownership | Age | Independent directors | Gender | Firm size | Leverage |
|---|---|---|---|---|---|---|---|---|---|
| **Pricetobookvalue** | 1.0000 | | | | | | | | |
| **Boardmeetings** | -0.0009 | 1.0000 | | | | | | | |
| **Boardsize** | -0.0938 | -0.0244 | 1.0000 | | | | | | |
| **Insiderownership** | 0.0869 | -0.1352 | 0.0292 | 1.0000 | | | | | |
| **Age** | -0.1768 | 0.0884 | 0.0788 | -0.3170 | 1.0000 | | | | |
| **Indepen.directors** | 0.0278 | 0.0694 | 0.0651 | -0.3430 | 0.1940 | 1.0000 | | | |
| **Gender** | 0.1350 | 0.0942 | 0.1846 | 0.1500 | -0.1935 | 0.0316 | 1.0000 | | |
| **Firmsize** | 0.0641 | -0.1580 | 0.0472 | 0.0942 | -0.0918 | -0.0345 | 0.1015 | 1.0000 | |
| **Leverage** | 0.2201 | 0.0679 | 0.1256 | -0.1119 | 0.0900 | 0.1631 | 0.1958 | 0.1276 | 1.0000 |

**Table 2**

**Correlation coefficients of audit committee characteristics**

| | l_Tax_Fees | Board meetings | Board size | Audit Committee meetings | Financial experts | Audit Comm.size | Insider Ownership | l_Firm_Size | Leverage |
|---|---|---|---|---|---|---|---|---|---|
| **l_Tax_Fees** | 1.0000 | | | | | | | | |
| **Board meetings** | 0.1532 | 1.0000 | | | | | | | |
| **Board size** | 0.2427 | -0.0244 | 1.0000 | | | | | | |
| **Audit_Committee** | -0.0372 | 0.2368 | -0.0569 | 1.0000 | | | | | |
| **Financial_expert** | 0.1275 | -0.0080 | 0.1029 | 0.0772 | 1.0000 | | | | |
| **Audit Comm.size** | 0.1781 | 0.0304 | 0.4086 | -0.0740 | 0.1829 | 1.0000 | | | |
| **Insider Ownership** | -0.0676 | -0.1352 | 0.0292 | -0.0515 | -0.0884 | -0.1523 | 1.0000 | | |
| **l_Firm_Size** | 0.3267 | -0.0000 | 0.3816 | -0.0367 | 0.0815 | 0.2609 | 0.0156 | 1.0000 | |
| **Leverage** | 0.1763 | 0.0679 | 0.1256 | -0.0562 | 0.1141 | 0.1569 | -0.1119 | 0.3184 | 1.0000 |

APPENDIX B

**Table 1**

| | 2005 | | | | | 2006 | | | | | 2007 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variable** | Obs | Mean | Std. Dev. | Min | Max | Obs | Mean | Std. Dev. | Min | Max | Obs | Mean | Std. Dev. | Min | Max |
| **Board Meetings** | 136 | 7.26 | 2.71 | 3.00 | 16.00 | 136 | 7.64 | 3.25 | 4.00 | 25.00 | 136 | 8.15 | 3.44 | 4.00 | 28.00 |
| **Board Size** | 136 | 10.43 | 2.01 | 5.00 | 18.00 | 136 | 10.51 | 2.03 | 6.00 | 18.00 | 136 | 10.73 | 2.09 | 6.00 | 18.00 |
| **Insiders** | 136 | 1.89 | 1.25 | 0.00 | 8.00 | 136 | 1.79 | 1.11 | 0.00 | 7.00 | 136 | 1.81 | 1.09 | 0.00 | 7.00 |
| **Independent directors** | 136 | 8.54 | 2.06 | 4.00 | 14.00 | 136 | 8.72 | 1.97 | 4.00 | 15.00 | 136 | 8.92 | 2.01 | 4.00 | 15.00 |
| **Insider ownership** | 136 | 8.29 | 14.56 | 0.34 | 82.30 | 136 | 7.91 | 14.26 | 0.21 | 83.10 | 136 | 7.64 | 14.10 | 0.01 | 85.40 |
| **Woman** | 136 | 1.46 | 0.91 | 0.00 | 5.00 | 136 | 1.51 | 0.93 | 0.00 | 5.00 | 136 | 1.64 | 1.04 | 0.00 | 5.00 |
| **Age** | 136 | 59.86 | 3.45 | 48.72 | 67.54 | 136 | 60.00 | 3.28 | 49.50 | 68.54 | 136 | 60.25 | 3.40 | 50.40 | 69.42 |
| **Audit commit.meetings** | 136 | 9.01 | 3.23 | 3.00 | 19.00 | 136 | 9.47 | 4.12 | 3.00 | 38.00 | 136 | 8.97 | 2.81 | 3.00 | 15.00 |
| **Financial experts** | 136 | 2.09 | 1.27 | 1.00 | 6.00 | 136 | 2.18 | 1.25 | 1.00 | 6.00 | 136 | 2.32 | 1.32 | 1.00 | 7.00 |
| **Audit committee size** | 136 | 4.18 | 1.18 | 1.00 | 8.00 | 136 | 4.17 | 1.15 | 2.00 | 9.00 | 136 | 4.24 | 1.12 | 2.00 | 7.00 |
| **Tax fees** | 136 | 1,372,390 | 2,805,827 | 0 | 16,800,000 | 136 | 1,292,360 | 2,482,662 | 0 | 18,500,000 | 136 | 1,248,081 | 2,582,144 | 0 | 21,600,000 |
| **Price to book v.** | 136 | 5.00 | 7.14 | 0.00 | 79.44 | 136 | 4.68 | 3.94 | 1.03 | 37.71 | 136 | 4.84 | 5.21 | -3.92 | 44.60 |
| **ROA** | 136 | 9.26 | 7.27 | -7.28 | 61.07 | 136 | 9.36 | 6.73 | -18.31 | 46.84 | 136 | 8.33 | 9.08 | -68.62 | 22.57 |
| **Leverage** | 136 | 0.53 | 0.18 | 0.08 | 0.96 | 136 | 0.53 | 0.19 | 0.08 | 0.97 | 136 | 0.55 | 0.18 | 0.10 | 1.01 |
| **Firm size** | 136 | 1.26 | 0.91 | 0.23 | 4.74 | 136 | 1.27 | 0.91 | 0.26 | 5.03 | 136 | 1.26 | 0.91 | 0.21 | 5.23 |

| | 2008 | | | | | 2009 | | | | | 5 Years | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variable** | Obs | Mean | Std. Dev. | Min | Max | Obs | Mean | Std. Dev. | Min | Max | Obs | Mean | Std. Dev. | Min | Max |
| **Board Meetings** | 136 | 7.64 | 2.51 | 4.00 | 16.00 | 136 | 7.64 | 3.10 | 4.00 | 22.00 | 680 | 7.66 | 3.02 | 3.00 | 28.00 |
| **Board Size** | 136 | 10.71 | 1.94 | 6.00 | 17.00 | 136 | 10.56 | 1.94 | 6.00 | 16.00 | 680 | 10.59 | 2.00 | 5.00 | 18.00 |
| **Insiders** | 136 | 1.68 | 1.11 | 0.00 | 7.00 | 136 | 1.60 | 1.06 | 0.00 | 6.00 | 680 | 1.75 | 1.13 | 0.00 | 8.00 |
| **Independent directors** | 136 | 9.03 | 1.96 | 4.00 | 13.00 | 136 | 8.96 | 1.95 | 4.00 | 14.00 | 680 | 8.83 | 2.00 | 4.00 | 15.00 |
| **Insider ownership** | 136 | 7.43 | 14.00 | 0.00 | 83.70 | 136 | 6.72 | 12.23 | 0.04 | 70.86 | 680 | 7.60 | 13.82 | 0.00 | 85.40 |
| **Woman** | 136 | 1.61 | 1.06 | 0.00 | 5.00 | 136 | 1.65 | 1.06 | 0.00 | 6.00 | 680 | 1.57 | 1.00 | 0.00 | 6.00 |
| **Age** | 136 | 60.65 | 3.19 | 51.40 | 69.00 | 136 | 61.01 | 3.42 | 51.67 | 69.72 | 680 | 60.35 | 3.37 | 48.72 | 69.72 |
| **Audit commit.meetings** | 136 | 9.13 | 2.55 | 3.00 | 15.00 | 136 | 8.93 | 2.53 | 3.00 | 15.00 | 680 | 9.10 | 3.10 | 3.00 | 38.00 |
| **Financial experts** | 136 | 2.41 | 1.34 | 1.00 | 6.00 | 136 | 2.49 | 1.31 | 1.00 | 6.00 | 680 | 2.30 | 1.30 | 1.00 | 7.00 |
| **Audit committee size** | 136 | 4.24 | 1.13 | 3.00 | 7.00 | 136 | 4.21 | 1.09 | 1.00 | 7.00 | 680 | 4.21 | 1.13 | 1.00 | 9.00 |
| **Tax fees** | 136 | 1,085,544 | 1,747,751 | 0 | 9,796,000 | 136 | 1,084,204 | 1,953,411 | 0 | 15,000,000 | 680 | 1,216,516 | 2,344,251 | 0 | 21,600,000 |
| **Price to book value** | 136 | 3.50 | 4.02 | 0.59 | 37.82 | 136 | 3.38 | 2.97 | -17.27 | 13.16 | 680 | 4.28 | 4.91 | -17.27 | 79.44 |
| **ROA** | 136 | 6.88 | 9.62 | -38.07 | 31.12 | 136 | 6.79 | 7.01 | -17.02 | 35.08 | 680 | 8.12 | 8.08 | -68.62 | 61.07 |
| **Leverage** | 136 | 0.57 | 0.20 | 0.11 | 0.98 | 136 | 0.55 | 0.19 | 0.11 | 1.08 | 680 | 0.54 | 0.19 | 0.08 | 1.08 |
| **Firm size** | 136 | 1.28 | 0.96 | 0.28 | 5.72 | 136 | 1.16 | 0.91 | 0.17 | 5.56 | 680 | 1.25 | 0.92 | 0.17 | 5.72 |

## APPENDIX C

**Table 1 Variance of Inflation Factor**

| | Variance Inflation Factor |
|---|---|
| Board_Meetings | 1.064 |
| Board_Size | 1.08 |
| Insider_Ownersh | 1.275 |
| Age | 1.192 |
| Independent_Dir | 1.18 |
| Gender | 1.172 |
| Firm_Size | 1.062 |
| Leverage | 1.134 |