The Quality of Boards Decisions and Corporate Governance

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Abstract

The objective of many corporate governance reforms related to the board of directors is to provide greater transparency and control over the actions of management, strengthening shareholder rights and firm performance. However, the main challenge is how to measure board's performance and evaluate the effectiveness of these governance mechanisms. Existing literature identifies well-functioning boards based on the extent to which corporations comply with good governance recommendations. In contrast to these measures of board performance that are mostly static in nature, this paper introduces a top-down approach for evaluating the board's effectiveness in a more dynamic context focusing on empirical outcomes of the decisions they make. A Principal Component Analysis is employed to constructs an index for evaluating the quality of boards' performance. Consistent with much empirical research on the relationship between firm performance and corporate governance, we find that after controlling for endogeneity, our governance performance measure does not show any significant relationship with standard best practice board characteristics .

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1. Introduction

Board of Directors as the governing body of every organisation play an active role in overseeing management and control of the corporation (Adams, Hermalin, & Weisbach, 2010, p. 1417) and have the authority to make important decisions about the future direction of the business. Shareholders are the owners of the company, and in principle, the board's duty is to ensure that the corporation and its management are acting in the best interest of its stakeholders. However, if we accept the notion that individuals are utility maximisers, there is a good reason to believe that the agent (managers) will not always act in the best interests of the principal (shareholders); a phenomenon that is referred to as "agency problems" (Jensen & Meckling, 1976). Morck (2004) distinguishes between two types of agency problems; Type I agency problem that is what Jensen and Meckling (1976) define as agency problem that occurs when managers act opportunistically based on their self-interest, rather than being faithful agents of the shareholders. Type II agency problem occurs when directors fail to perform their duty in monitoring the management and fall into line behind their CEO, mainly due to the presence of some forms of social ties between them.

From a theoretical perspective, corporate governance provisions are expected to be beneficial in mitigating the agency conflicts by increasing the transparency and providing greater monitoring and control over the actions of the company executives (Hermalin & Weisbach, 2007). Based on commonly accepted codes of corporate governance practice, corporate management team is considered to be effective if possessing the following characteristics: a higher proportion of independent directors, separation of the CEO and board chair roles, frequent meetings, more diversified executives in terms of gender and ethnicity, and a higher level of stock ownership in the company. Theoretically, if these mechanisms are implemented effectively, they should align the interest of corporate managers with those of the shareholders, increasing the firm's value and leading to better financial performance.

However, the main issue is how to evaluate the effectiveness of these mechanisms in shaping good governance, recognising when it comes to empirical investigations there are several obstacles to studying the internal dynamics of the board. For example, characteristics based measures cannot assess ongoing improvements in the quality of governance due to the unobservability of the decision-making process (Schwartz-Ziv & Weisbach, 2013) or link its effectiveness to firm performance measures. Most research on boards begins with the assumption that the boards' effectiveness is a function of its composition or its independence

from management (Hermalin & Weisbach, 2003). The concept of independent directors is aimed at improving the board's efficiency by limiting the likely social and business connections that might exist between the CEO and board. In reality, however, it is almost impossible to eliminate all the social relations that might exist between the CEO and board of director and as Tung (2011) argues "existing independent directors are simply not independent enough." On the other hand, there are those who believe in the concept of "friendly directors", namely that social bonds and connections between the executives and directors could even be beneficial, particularly when it comes to the advisory role of the board (Hwang & Kim, 2009). Consequently, much uncertainty still exists about the channels through which different characteristics of the boards might impact their efficacy.

Hermalin and Weisbach (2003) refer to these ambiguous findings being the result of endogeneity issues and measurement errors. They consider boards as an institution that has arisen endogenously in response to agency problems inherent in any organisation, and highlight the need to employ innovative models for testing the implications of particular models, rather than focusing on whether independent directors are "good" or "bad." Likewise, Renée B Adams et al. (2010) review several aspects of board performance and confirm that there is no reason to consider the boards' structure to be exogenous.

As Hermalin and Weisbach (2003) suggest, "One way to evaluate the board's effectiveness is to look at the quality of the decisions they make." We capture this notion and following the work of Baker and Wurgler (2006), introduce a top-down approach for evaluating the board's performance and construct an index representing the boards' effectiveness by looking at the outcomes of the decisions they make. We also consider the relationship between our measure and different board characteristics that have been historically used as measures of good corporate governance. .

To begin this process, based on the previous literature, we first identify the most important firm outcomes that are being directly affected by boards' decisions. We, then, introduce some proxies in each of these categories to demonstrate the quality of the board's decisions, particularly from a governance viewpoint, controlling for factors that may confound the effect os of good governance. Following this, a Principal Component Analysis (PCA) is employed to identify the orthogonal components that account for most of the variability in the data. These principal components are used as indicators of board performance and aggregated as an index to measure performance across firms and industries. This is in contrast to existing measures of

board performance that are static in nature. The new measure is then regressed on different board characteristics recommended in corporate governance best practices.

This study contributes to the existing knowledge by providing a new setting for evaluating board of director's performance in a more dynamic context. To the best of our knowledge, there is no prior study quantifying boards' behaviour based on their decision outcomes. Nonetheless, there have been several attempts to construct different governance indexes to evaluate firm's corporate governance quality. For example, in their well-known study, Gompers, Ishii, and Metrick (2003) construct a governance index (G-score) as a proxy for the balance of power between shareholders and managers focusing on anti-takeover provisions; firms in the highest decile of their index are referred to as having the "highest management power" or the "weakest shareholder rights" and shown to be significantly underperformed firms with the strongest shareholder rights (low values of G). In addition to the governance measures that are being used by the academics, there are also other governance ratings calculated by corporate governance rating companies.

These governance indexes are, however, being criticised for either capturing an incomplete view of corporate governance or summing up too many variables rather than focusing on what really matters which makes it even more challenging to have a meaningful interpretation (Aguilera, Desender, Bednar, & Lee, 2015). Moreover, these measures are generally constructed by questioning whether or not a particular governance standard is met. Nevertheless, it is apparent that compliance with corporate governance provisions does not necessarily reflect a well-governed firm.

Furthermore, due to the complexity of the boards' decision-making process, prior research has considered either a managerial role Adams & Ferreira, 2007; Harris & Raviv, 2008) or a supervisory role (Hermalin & Weisbach, 1998) when analysing the boards' behaviour. In a more recent study, Schwartz-Ziv and Weisbach (2013) refer to boards as "active monitors" and conclude that the supervisory and managerial models are complements and both can partially explain what boards do. However, most of the board-related governance recommendations being used in constructing governance indexes aimed at improvements in the monitoring ability of the boards. The present study extends prior studies by considering a holistic view covering both monitoring and supervisory duties of boards, but without necessarily separating them.

The remainder of the paper is organised as follows. Section 2 overviews the role of board of directors in firms and details the different proxies that have been used to construct a governance index, paying attention to potential principal-agent problems and the role of the boards in minimising these conflicts. Section 3 describes the methodology, data and variables used in the econometric analysis. Section 4 explains how we constructed our governance index and reports the findings. Section 5 concludes the paper.

2. Appraising Board of Directors Performance

Recent evidence suggests that the role of the boards has changed from solely supervising and monitoring the management into more active roles in the day-to-day operation of the business such as interfering in the project selection (Adams & Ferreira, 2007), acquiring information and choosing the scale of investments (Harris & Raviv, 2008). Based on the previous literature, the main responsibilities of the boards could be summarised into the following activities (Adams et al., 2010; Bear, Rahman, & Post, 2010; Larcker, 2011):

- Ensuring the integrity of published financial statements
- Approving major investment activities, mergers, and acquisitions
- Determining and approving financing methods and firm capital structure
- Monitoring the management performance and compensation schemes
- Setting business model, identifying key performance measures and representing the interest of shareholders regarding firm performance
- Protecting company reputation and integrating social and environmental concerns in business operations decisions

In order to evaluate the quality of firms' corporate governance and the overall performance of their boards, we have defined proxies representing the effectiveness of the boards' decision making in each of these activities. These proxies are then gathered into an index representing the overall performance of the boards.

2.1. Information Disclosure, and Financial Reporting Quality

Previous studies have emphasised the role of board of directors in protecting shareholders' interests by monitoring the CEOs' performance and the financial information being generated by the firm. Entrenched managers might have several incentives such as reputational concerns, delay in disclosing bad news and insider trading opportunities, for disclosure distortions (Ajinkya, Bhojraj, & Sengupta, 2003, p. 2).

Numerous studies have attempted to explain the agency conflicts that might encourage management to withhold, delay or bias the disclosure using the concept of accruals management and accounting restatements. Gongmeng Chen, Firth, Gao, and Rui (2006) note that earnings management, although not necessarily illegal, is considered as being opportunistic (p. 430). As Xie, Davidson, and DaDalt (2003, p. 296) argue, accrual accounting provides managers with a great deal of control over the timing of recognising revenues and expenses. The managers have the incentives to alter these timings due to several reasons. First, management compensations schemes are often based on their companies' financial performance, motivating them to give the appearance of better performance. This could also occur to meet the expectations of investors and market analysts. Further, in capital markets, managers might engage in earnings management activities with the aim of improving investors' expectations of future performance or for their own contractual incentives. For example, managers might have incentives to inflate earnings prior to a management buyout or in case that there is a hostile takeover threat.

The increased number of accounting fraud, often referred to as misstatements of financial statements, have led to a great deal of corporate governance reforms to be devoted to the transparency of financial reporting and information disclosure. The most important ones require publicly traded firms to have a board of directors consisting of a majority of independent directors and also audit committees with all independent directors that at least one has financial expertise (Agrawal & Chadha, 2005, p. 372).

To date, several studies have emphasised the importance of different forms of diversity in the proportion, gender, and experience of independent directors. Traditionally, it is believed that firms with more independent executives who are more gender-diversified and financially sophisticated are less likely to engage in earnings management and fraudulent business behaviour (Xie et al., 2003). The background of the independent directors is another important factor that should be taken into account when examining the monitoring abilities of the independent board of directors. Xie et al. (2003) argue that directors with stronger financial backgrounds have a better understanding of the ways that the earnings might be managed and therefore are more capable of detecting earnings manipulation by managers. Similarly, Park and Shin (2004) confirm that outside directors would be effective in recognising earnings management only if they possess a finance or accounting background. In the same vein, Cumming, Leung, and Rui (2015) examine the effects of top executive gender diversity on

earnings management and show that the presence of women occupying senior positions on the board can moderate the frequency and severity of fraud. Lai (2010) examine the merit of corporate governance regulations in China and conclude that some of these mandated regulations like board independence can be efficient in reducing earnings management only if adopted voluntarily (p. 6).

Although it is expected that independent directors can monitor the management more efficiently, empirical research has not reached any consensus regarding the effectiveness of the board structure-related governance practices. Agrawal and Chadha (2005) use earnings misstatements in their analysis and claim that earnings misstatements are "direct admission by the managers of past earnings manipulation" which occur rarely and often lead to serious problems for the firm. They demonstrate that there is not any relationship between board and audit committee independence and the probability of restatements; however, a board member with financial expertise could negatively impact the likelihood of restatements (p. 374). As an explanation for their findings, the authors argue that the board of directors is often busy with many other responsibilities such as CEO hiring, firing, and compensation as well as monitoring the overall business strategy, rather than solely overseeing the firm's financial reporting. They argue that as the audit committee is not very active and often meet infrequently, it could be difficult for them to detect problems in financial reporting behaviour especially for a large corporation in such a short time (p. 375).

Habib and Jiang (2015) distinguish between three categories of proxies that have been employed by previous studies to operationalise financial reporting quality: properties of earnings (e.g. earning persistence, accruals, and earnings conservatism), investors responsiveness to earnings (e.g. future earning responsiveness coefficient), and financial reporting manipulation (e.g. accruals management and accounting restatements). They claim that most of the previous studies investigate one of these categories, and only a few studies use a comprehensive framework to analyse financial reporting quality (p. 35). This view is supported by Salleh and Dunmore (2009) who uses disclosure quality and earnings quality as two main groups of proxies for financial reporting quality and argues that considering only one of the financial reporting quality measures could be misleading. They argue that there is a substitution between disclosure quality and earnings quality, and thus, a high-quality disclosure for a firm does not imply that it also has high-quality earnings (p. 38).

Several other factors such as CEO duality and his influence on outside directors can impact the directors' monitoring effectiveness. Therefore, investigating the relationship between board characteristics and the financial reporting quality or the likelihood of occurring accounting frauds as a measure of boards' monitoring effectiveness would be quite challenging. This study uses a top-down approach arguing that high-quality financial reporting, information disclosure, and fewer fraudulent behaviours are signals of well-functioning boards with regards to monitoring management and protecting shareholders' interests.

2.2. Capital Expenditures, Mergers, and Acquisitions

Evidence suggests that all M&A activities might not be initiated with the aim of shareholder wealth maximisation and that self-interested managers might have other motives to get involved in acquiring other firms. Damodaran (2012, pp. 710-711) classifies managerial motivation for initiating mergers and acquisitions in three categories of 'empire building', 'managerial ego' and 'compensation and side-benefits.' Empire building is explained as the situation where managers want their firms to be the largest and the most dominant company in the market. Managerial ego, also described as managerial overconfidence in some studies, refers to the power struggle between managers when there are multiple bidders for a target, and none of them wants to lose the battle even if winning can only be achieved at the expense of shareholders. Mergers and acquisitions might also have positive private gains for managers since for example, managerial compensation is often a function of firm size.

Haller (2013) use the concept of envious CEOs (i.e. CEOs comparing their compensation with their peers) to argues that corporate governance might affect M&A outcomes negatively. Good corporate governance improves information transparency. CEOs are more likely to be informed about their peers' compensation which increases the envy among them. Thus, they might get involved in deals only to achieve higher compensation (p. 146). Therefore, acquisitions become more likely to be value-destroying rather than value-enhancing for the acquiring firm's shareholders (Guoli Chen, Crossland, & Huang, 2014).

A great deal of previous research on corporate governance has focused on the impacts of board of directors' characteristics on acquisition behaviour. In an important study in this area, Giroud and Mueller (2011) identified firms' investment activities by their capital expenditures and acquisitions. They, then, examined the relationship between corporate governance effectiveness and investment decisions and demonstrated that companies with weak

governance have higher capital expenditures and make more acquisitions compare to companies with good corporate governance. In the same vein, Guoli Chen et al. (2014, p. 303) show that companies with more gender diversified board of directors (which are often known as firms with better governance) make fewer acquisitions and conditional on doing a deal, make smaller deals. Large acquisitions are, therefore, suggested to be representing executives self-dealing, and decision-making biases resulting from executive's hubris (Hayward & Hambrick, 1997, p. 106). Similarly, Levi, Li, and Zhang (2014) confirm that there is a negative relationship between the number of female directors seated on the boards and both the likelihood of making acquisitions and the size of acquisitions (p. 185). Other studies on the buy-side of the M&A reported that firms with more effective board make better deals and experience lower stock price drops following the announcement of the acquisition (Byrd & Hickman, 1992).

Much of the available literature on takeovers deals with the issues of the firms on the sell-side of takeovers. Hermalin and Weisbach (2003, p. 15) suggest that board of directors might influence the takeover process both directly and indirectly throughout affecting the quality of governance and thus, firm's attractiveness as a target. It has also been suggested that board of targeted companies might resist a takeover bid due to their pecuniary incentives regardless of considering its effects on shareholder's wealth. The target directors might eventually lose their seats and their pay, and the gain from the equity they hold is not often enough to compensate their loss. Moreover, firms with good corporate governance where the boards have the ability to monitor CEOs more efficiently are less likely to be taken over by hostile takeovers or activists hedge funds (e.g.Giroud & Mueller, 2011). Their shareholders also receive higher returns if an acquisition occurs. As documented by Cotter, Shivdasani, and Zenner (1997), firms with more independent directors receive 20% higher returns than their peers without a majority of independent directors.

Most of these studies focus on boards of directors' characteristics that aim at improving the monitoring function of the board (i.e. concepts like independent directors). However, contrary to the popular belief, independent boards of directors are not always beneficial, and in some circumstances when the advisory role of the board is more important than their monitoring duties, less independent boards (more friendly boards) can benefit shareholders (Adams & Ferreira, 2007; Harris & Raviv, 2008). Faleye, Hoitash, and Hoitash (2011) suggest that intense focus on insight duties of the board improves their monitoring quality, albeit at the expense of

deterioration in their advising function. They consider acquisitions as firm functions demanding significant board inputs and demonstrate that overall, the negative advising effects of monitoring intensity outweigh its positive monitoring effects. Similarly, Schmidt (2015) constructs two separate indexes to distinguish between acquisitions that require either more monitoring or advisory contribution of the board. He found that when boards have valuable information about the deal, companies with more friendly boards would have higher returns after the acquisitions announcement. This is particularly the case in complex firms with higher advising requirements which reduce the boards' effectiveness and result in worse acquisition performance and lower firm value.

Therefore, describing boards as being effective based on their structure and characteristics and examining their impacts on firm outcomes has the potential to be misleading. We use acquirers' stock returns around the announcements of their major acquisition to evaluate board's effectiveness with regards to their M&A decisions. In our top-down approach, we refer to the firms which have higher acquisition returns as firms with the more efficient board of directors.

2.3. Capital Structure

Firm financing and capital structure decisions have generally been recognised as one of the most vital functions of the companies' management team. Based on the trade-off theory, firms seek to achieve an optimal capital structure considering the cost and benefits of issuing debt. The advantages of debt financing are mainly related to the tax deductibility of interest payments; while the costs of debt are referred to the risks imposed through the higher possibility of bankruptcy, and the agency conflicts that might arise between the managers, debtholders, and shareholders. Jensen and Meckling (1976) show that this agency conflicts could be due to "asset substitution problem" which assumes that managers can freely substitute more debt for equity, creating chances for managers to manipulate capital structure by selecting the riskier investment (i.e. higher payoffs) after issuing debt at the expense of debtholders. However, the new investment imposes a greater risk of bankruptcy and increases the likelihood of financial distress, and as Jensen and Meckling (1976) show, the whole costs are ultimately incurred by shareholders.

The pecking order theory suggests that managers have a preference for using retained earnings over debt and debt over equity for financing their investments. The theory reflects

information asymmetry and adverse selection problems that might exist between corporate managers and shareholders. As Myers and Majluf (1984) point out, when there are profitable investment opportunities, internal financing would be the best option. However, in case that the firm does not possess enough internal sources to invest in the new opportunity, and if low-risk debt financing is not available, managers might pass the new investment opportunity up (p. 219-220). The reason is that issuing new equity would be considered a negative sign from investors' perspective who have less information about the firm's value than managers and might request a discounted price for buying the newly issued equity. In this situation, issuing more equity would not be much desirable for managers, as it can transfer wealth from current shareholders to the new shareholders (Alves, Couto, & Francisco, 2015, p. 4).

Empirical research following the pioneering study of Jensen and Meckling (1976) considers leverage as a monitoring tool which can mitigate the agency conflicts by constraining managers from wasting free cash flow and forcing them to make better investment decisions (because of the high possibility of bankruptcy). Grossman and Hart (1982) refer to issuing more debt as being "a pre-commitment or bonding behaviour" which signals that the interests of the management are aligned with those of the shareholders in terms of pursuing higher market value (p. 109, 110). Thus, according to this theory, we expect to see firms with low governance quality to have a higher leverage (Nadarajah, Ali, Liu, & Huang, 2016, p. 2). Some authors, on the other hand, have proposed a takeover defence role for debt financing. According to Berger, Ofek, and Yermack (1997), self-served managers can use more debt as a protection against takeovers when there is a threat to their job security, without taking into account its impacts on shareholders' wealth.

The existing literature recognises the importance of corporate governance for capital structure analysis and emphasises its critical role in minimising the agency problems and reducing the cost of capital. Effective corporate governance can lessen the cost of equity by providing direct protection for shareholders and preventing entrenched management from making inefficient investment decisions at the expense of shareholders. Further, the reduced information asymmetry could lower the monitoring costs of the equity holders. High-quality corporate governance, on the other hand, can result in a more efficient use of resources by the managers which will, in turn, reduce the probability of default and lower the cost of debt financing (Mande, Park, & Son, 2012).

However, consistent with the pecking order theory, Alves et al. (2015) show that equity financing is more sensitive to agency problems in terms of information asymmetry and managerial entrenchment. This is because debt holders can use debt protective mechanisms such as debt contract to secure their interests. They, therefore, conclude that an improvement in corporate governance quality that will result in lower information asymmetry will have more impacts on equity financing compared to debt financing, more precisely, "firms with strong governance show a preference for equity when compared to debt." Further, Chang, Chou, and Huang (2014) suggest that compared to equity, "debt is more likely to be used as a tool for gaining personal benefits by the managers" (p. 383).

Looking at the issue from a different perspective, Nadarajah et al. (2016) argue that corporate governance can impact capital structure in favour of equity by improving stock liquidity. More precisely, they show that firms with more liquid stocks will have lower floatation costs when issuing equity, making it a more appealing financing option compared to debt. Thus, good corporate governance promotes stock liquidity which in turn results in lower levels of leverage (p. 2). Accordingly, in our study, a higher level of equity financing is considered as a sign of effective managerial behaviour and lower agency conflicts in the firm.

2.4. Executive Compensation

The dramatic rises in CEO compensations during the past few decades which were not necessarily accompanied by better firm performances brought about a general suspicion about the efficiency of these compensation packages. Since then, several scholars have tried to explain the compensation increases by evaluating the determinants of executive compensations. In an attempt to analyse the long-run trends in executive compensations, Frydman and Saks (2010) categorise compensation determinant theories into four groups of incentive provisions, managerial power, firm characteristics, and managerial skills.

In principal-agent theories where compensation packages are typically considered a solution for mitigating the conflicting interest between the managers and shareholders, firms are encouraged to pay their executives in the forms of restricted stocks and stock options (Conyon, 2014, p. 26). In connection with these lines of arguments, several studies argue that the upward trends in executive remunerations can be explained by simultaneous increases in contingent pay as firms should compensate their executives for bearing greater risk (Conyon, Core, & Guay, 2010).

On the contrary, managerial power explanations look at compensation as an agency conflict itself providing entrenched managers with the chance to skim profit from the firm. Therefore, it is the board of directors' responsibility to determine executive compensation and ensure that the compensation schemes align the interest of managers and shareholders. As CEO pay is under the direct control of the boards and their compensation committees (Conyon, 2014), a lot of studies in the field of corporate governance linked firms' executive pay to their quality of corporate governance. Well-governed firms are expected to have lower levels of excess executive compensation, more incentive pay and higher pay-performance sensitivity (Renneboog & Zhao, 2011, p. 1136).

The experimental data, however, are rather controversial, and there is no general agreement on the association between different governance practices and the level and structure of executive pay. For instance, although CEO pay in firms with more independent directors is expected to be lower and positively related to their firm's performance, several studies could not find such an association (Conyon, 2014; Core, Holthausen, & Larcker, 1999; Frydman & Saks, 2010). As an explanation for these findings, the authors argue that independent directors are not really 'independent' and the CEO often has a great influence on outside directors who are being appointed by the CEOs themselves (Core et al., 1999, p. 3). Some researchers even report a positive relationship between the number of independent directors and CEO pay increases. CEOs should be compensated for the greater effort they put and higher job security risk imposed on them. This is because independent directors provide greater monitoring over the actions of the CEO leading to higher incentives and greater efforts on the side of the CEO. Further, low-quality CEOs are more likely to be discovered and thus, need to be compensated for the greater risk imposed on their job security (Conyon, 2014, p. 5).

Some studies have also linked executive pay to firm characteristics and managerial skills. According to Gabaix and Landier (2008), large firms have to pay their executives substantially more compare to smaller firms to cover for greater managerial talent required to lead large companies. In a similar way, but from a different perspective, Dicks (2012) evaluates the relationship between firm size and executive pay. He considers governance and compensation as being substitutes, allowing well-governed firms to lower executive compensation. Because small firms find governance expensive, they have to solve agency problems by offering higher incentive pay and therefore, higher compensation to their executive. This generates greater

competition for executive talents and forces large firms to offer higher compensation to their executives to make sure they will stay in the firm.

In any way and by accepting any of these theories on executive compensation, the common target of all the discussions is to define a reasonable compensation structure which can align the interest of managers with those of the shareholders. Therefore, in our top-down approach, lower levels of excess executive pay will be considered as a signal for better board performance regarding their decision on CEO pay. The amount of this excess pay can be calculated as part of the executives' total compensation that cannot be explained by other accepted determinants of pay such as firm performance, executive's individual characteristics and firm fixed effects (Berger et al., 1997, p. 1417).

2.5. Firm's General Financial Outcomes

Shleifer and Vishny (1997) define corporate governance as "the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment." It is clear from this definition that achieving financial returns is one of the key objectives of introducing the concept of governance. Therefore, historically, research investigating corporate governance effectiveness has focused on different financial outcomes such as firms' stock and operating performance, competitiveness, and corporate reputation. Although the findings are mixed, a high firm performance is likely to be the result of a well-functioning management team who make all the important decisions for running the business. Here, we argue that better financial performance in a firm implies the existence of well-functioning directors.

2.6. Non-financial Performance: Corporate Social Responsibility (CSR) and Reputation

The failure of high-profile companies such as Enron and WorldCom in the 2000s along with the growing interest in sustainable development practices put companies' governance under scrutiny, calling for a greater need for ethical behaviour and environmental and social responsibilities of the firms towards a broad range of stakeholders (Mallin & Michelon, 2011, p. 2). Accordingly, the concept of CSR has received considerable attention in corporate governance studies. European Commission (2011) defines CSR as "the responsibility of enterprises for their impacts on society" and more specifically "to have a process in place to integrate social, environmental, ethical human rights and consumer concerns into their business operations and core strategy in close cooperation with their stakeholders." Within this framework, firms make decisions and allocate their resources in a way that not only maximise

the financial interest of their shareholders but also satisfy various other stakeholders such as customers, suppliers and employees (Pérez, 2015).

In addition to the agency theory which focuses on the monitoring function of the board of directors, modern governance literature introduces another organisation theory called 'resource dependence theory' which highlights the role of boards in providing legitimacy and critical resources such as human capital (i.e. experience, expertise and reputation) and relational capital (i.e. social connection and networks with firm's external environment) for the firm (Mallin & Michelon, 2011). As discussed by Bear et al. (2010), these board resources enable the corporation to understand and respond to its environment which ultimately results in better management of CSR issues (p. 209).

Here, a question arises concerning why companies' management should care about CSR? The answer lies in the concept of corporate reputation where CSR reporting is considered as a management tool for signalling corporate governance quality and enhancing corporate reputation. Corporate reputation has long been considered as an intangible asset enhancing competitive advantages for the firm. It can be defined as "perceptions of how the firm behaves towards its stakeholders and the degree of informative transparency with which the firm develops relations with them." CSR and reputation are two interrelated concepts. It is clear from the definition of reputation that it involves both a behavioural and an informative component (Pérez, 2015, p. 7). Firms that are perceived to be socially responsible to their stakeholders can end up having a more positive reputation for future performance. The informative component of reputation is also consistent with the main purpose of agency theory where information exchange and greater transparency reduces information asymmetry.

Empirical studies also linked corporate governance to CSR and reputation. Corporate governance provisions, especially the ones concerning board's structure, are expected to improve CSR reporting which in turn positively impacts corporate reputation (Bear et al., 2010). Mallin and Michelon (2011) found that a higher proportion of independent directors is associated with better corporate social performance. The theoretical argument behind these findings is that independent directors often establish external links to the stakeholders and are more likely to be knowledgeable about critical external issues surrounding the firm. They are more likely to be concerned about CSR activities to avoid penalties, negative media exposure and subsequent loss of reputation (p. 5).

Based on these line of arguments, in addition to financial measures of performance, this study also includes non-financial components of performance when evaluating the corporate governance quality. In this regard, better CSR activities are considered to be signs of a well-functioning board in the firm.

3. Data and Methodology

3.1. Sample Selection and Data

This study uses a sample of firms in the S&P 1500 Super Composite index (*GVKEY*: 031855 and *Ticker*: I0020) during the period of 1992–2015. We use CRSP/Compustat Merged (CCM) provided by Wharton Research Data Services as our main database. This database combines stock market data from Centre for Research in Security Prices (CRSP) and accounting and fundamental data from Compustat. This main dataset is then merged with Compustat Executive Compensation (ExecuComp), Securities Data Company (SDC), Institutional Shareholder Service (ISS) Directors and MSCI KLD databases.

The S&P1500 index which combines all the S&P 500, Mid-Cap 400 and Small-Cap 600 companies covers more than 80 per cent of US market capitalisation. The central idea behind choosing this sample is to ensure that sufficient data is available for most of the governance sub-indexes. The ExecuComp database which is used for calculating CEOs' excess compensation only contains information on S&P1500 companies starting from the year 1992. The MSCI KLD database provides CSR data for S&P 500 for each year beginning with 1991 and expands its coverage to include the largest 1000 and 3000 US companies in 2001 and 2003, respectively. Finally, the Institutional Shareholder Service (ISS) Directors Database which is employed to obtain information on board of directors' characteristics covers the universe of S&P1500 companies.

To ensure that the firms are US-based and publicly traded companies, following previous research, we restrict our sample to include firms with CRSP share code of 10 and 11[1] (Fama &

[1] 86% of the CRSP observations have a share code equal to 10 or 11. As summarised by Ince and Porter (2006), CRSP variable of share code "SHRCD" can take other values as follows which are now eliminated from the sample:

12	=	Common Stock, incorporated outside US
13	=	Common stocks, Americus trust components
14-15	=	Closed end funds
18	=	REITs

French, 2001; Ince & Porter, 2006). For firms with more than one issue of common shares, the issue with the longest history and largest market capitalisation (*MV*) is selected. To be consistent with prior studies, firms with negative book-to-market ratio are excluded from the sample (Lee, 1997), leaving us with the final sample of 48,598 firm-year observations on 3,097 unique firms.

3.2. Measuring Corporate Governance

Firm's governance quality is not straightforward to measure, but as discussed in the previous section, we have identified six proxies that can assist us to evaluate the quality of board's decisions and governance quality in firms. This section discusses how these proxies are measured in detail. To rule out the possibility that these indices are driven by other market or firm-specific characteristics rather than governance quality, each sub-index is first regressed on relevant market or firm characteristics and new governance variables are created using the value of the residuals. These new variables are then used in the governance index calculation. All regressions are estimated with fixed effects specifications, year dummies and robust standard errors, and all variables are winsorised at 1% and 99% levels to limit the impact of outliers. Summary statistics of the employed variables and the results of our sub-index regressions can be found in the appendix.

3.2.1. Information Disclosure and Financial Reporting Quality:

To evaluate the performance of the boards with respect to their firm's financial reporting quality, we use discretionary accruals arguing that firms with good financial reporting quality are expected to have lower discretionary (unexpected) accruals. Discretionary accruals are calculated as the absolute value of the residuals of the following regression model which isolates the amount of total accrual that can be considered unexpected (adapted from Larcker, Richardson, and Tuna (2007)):

$$TA_{it}=\alpha + \beta_1(\Delta Sales_{it} - \Delta Rec_{it}) + \beta_2 PPE_{it} + \beta_3 OCF_{it} + \beta_4 BM_{it} + \varepsilon \quad (1)$$

In this mode, *TA* is the total accruals for each firm in year t, measured as the difference between cash flow from operating activities (operating activities, net cash flow minus extraordinary items and discontinued operations) and income before extraordinary items.

20-78 = Certificates, ADRs, SBIs, & Units

$\Delta Sales$, ΔRec, PPE and OCF account for the change in sales and accounts receivables, gross amount of Property, Plant, and Equipment (PPE) and operating cash flows, respectively. Finally, variable BM represents the book value of equity over the market value of equity (MV). The market value of equity is calculated by multiplying the number of shares outstanding and share price. All variables are scaled to total assets. The residuals of this regression create a new variable named *Accruals* which will be employed as a proxy for corporate governance quality in further analysis.

3.2.2. Capital Expenditures, Mergers, and Acquisitions

Recalling previous discussions on mergers and acquisitions, firms with better corporate governance are assumed to make fewer and smaller acquisitions and pay higher returns to their shareholders. The shareholder's return around the acquisition announcement seems to be a proper measure to evaluate the quality of board's decision making when it comes to M&As. We calculate the Cumulative Abnormal Returns (CARs) of the firm's major acquisitions and argue that acquiring firms with better governance quality are expected to provide higher abnormal returns for their shareholders.

Abnormal return is defined as the difference between the actual ex-post return of securities and the normal return of the firm over the event window. The event window is considered to be seven days from three days before to three days after the acquisition announcement (-3 +3). The abnormal return for firm i and announcement date t are calculated as (MacKinlay, 1997):

$$AR_{it} = R_{it} - ER_{it} \quad (2.1)$$

Where AR_{it}, R_{it} and ER_{it} are abnormal, actual and expected returns, respectively. The normal returns are the expected returns of securities without the condition of the event occurring.

Prior research on asset pricing models suggests that apart from the overall market performance, stock returns may be influenced by systematic factors such size and value of the firm. More specifically, historical data on average returns show that small firms with high book-to-market ratio tend to perform better (Fama & French, 1993). Furthermore, stock prices show a tendency to continue rising if they are going up and to declining if they are going down (i.e. momentum) (Carhart, 1997). To account for these systematic risks that can impact stock returns, expected returns are calculated using Fama-French-Carhart four-factor model (Carhart, 1997; Fama & French, 1993); with the estimation period of 60 days to 30 days (-60 -30) before

the acquisition announcement date (i.e. event date). For each firm *i* on day *t*, this model is specified as:

$$ER_{it} = R_{ft} + \beta_1(Mkt_{it} - R_f) + \beta_2 SMB_{it} + \beta_3 HML_{it} + \beta_4 UMD_{it} + \varepsilon \quad (2.2)$$

Where ER_{it} and R_{ft} are expected return on assets and risk free rates. $Mkt_{it}, SMB_{it}, HML_{it}$ and UMD_{it} are risk factors representing return on stock market (to capture market effect), Small Minus Big (to capture size effect), High minus Low (to capture value effect) and Up Mines Down (to capture momentum effect), respectively.

Cumulative abnormal returns *(CARs)* are computed as the sum of the daily abnormal returns for the seven-day event period:

$$CAR_{i\,(t1-t7)} = \sum_{t=t1}^{t7}(AR_{it}) \quad (2.3)$$

Apart from systematic risks, deal characteristics can also impact acquisition returns. Larger deals, for instance, are often associated with higher returns (Schmidt, 2015). We regress CAR of acquisitions on their deal size (measured as the value of the deal over the market value of the acquirer) and use the regression residuals to construct a new variable named *CARs*. This variable will be employed in constructing our governance index.

Data on M&As are obtained from SDC and matched with CRSP daily return files. Following (Schmidt, 2015), only completed deals with values greater than US$10 million have been included where the acquirer controlled less than 50 per cent of the target before the announcement and owns 100 per cent of the target's shares after the transaction. Data on Fama-French and Carhart risk factors are retrieved from Kenneth French's website[2].

3.2.3. Capital Structure:

To measure governance quality in capital structure category, we use the ratio of stockholder equity to firm's total capital *(Equity Financing)* to establish what proportion of firm's total capital is achieved throughout equity financing. We hypothesise that higher proportions of equity financing indicate good governance of the firms. Using this ratio in further analysis, however, might raise the issue that not all of the capital structure decisions are associated with the quality of governance. To isolate the effect of governance on capital structure decisions,

[2] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

one way is to regress *Equity Financing* on other factors that might influence firms' choice of financing.

Previous research has documented that firm characteristics such as size, profitability, growth opportunities and asset tangibility can all affect its capital structure decisions. Chang et al. (2014) demonstrated that larger firms tend to have higher leverage ratios, as they have better access to debt markets because of their high level of transparency and low asset volatility (p. 378). The impacts of profitability on leverage, however, is not as straightforward. On the one hand, higher earnings reduce the need for debt resulting in lower leverage ratios. On the other hand, debt can be more affordable for profitable firms considering their relatively high cash flows. Thus, profitable firms are more likely to opt for leverage (Chang, Chen, Chou, & Huang, 2015, p. 48).

Alves et al. (2015) use two agency theories of asset substitution and underinvestment problems to show that firm's with higher growth opportunities use more external equity as compared with debt. They argue that these firms are more able to replace low-risk assets with high-risk investments (asset substitution) or forgo valuable investment opportunities (underinvestment), thereby passing the unforeseeable risk on bondholders (p. 10). With regards to the tangibility of assets, firms with more tangible (fixed) assets should probably have relatively higher debt capacity due to their greater credibility and lower bankruptcy risk (Chang et al., 2014). Firms' industry characteristics might also influence their capital structure. According to Frank and Goyal (2009), firms opt for more leverage in industries in which the median firm is highly leveraged. To account for industry effects, we classify firms into 48 categories using Fama-French 48-industry classification scheme based on their historical Standard Industrial Classification (SIC) codes and calculate firms' industry median leverage.

We, therefore, use the following model to segregate the part of capital structure decisions that cannot be explained by the expected firm and industry characteristics and thus refer to the residuals of this regression as being the result of firms governance quality. This generates a new variable "*Equity*" which in the next part will be used to construct the governance index.

$$Equity\ Financing_{it} = \alpha + \beta_1 Size + \beta_2 Profitability_{it} + \beta_3 Growth_{\ it} + \beta_4 Tangible_{it} + \beta_5 Ind - leverage_{it} + \varepsilon \quad (3)$$

Equity Financing is the ratio of the common/ordinary equity to firm's total capital. Size is the natural logarithm of total assets. As a measure of profitability, we use Return on Assets

(*ROA*) measured as the natural logarithm of firms' operating income over total assets. *Growth* represents firm's sales growth, measured the ratio of current minus previous year's sales, all divided by previous year's sales. *Tangible* is the sum of net Property, Plant and Equipment (*PPE*) and inventories over total assets. Finally, *Ind-Leverage* is firms' industry median leverage calculated based on Fama-French 48 industry classification.

3.2.4. Executive Compensation:

In executive compensation category, we use the variable excess compensation arguing that firms with effective boards pay lower levels of excess compensation to their CEOs. As discussed earlier, excess compensation can be defined as part of the executives' total compensation that is not associated with their firm and individual characteristics. To calculate the amount of excess compensation, we regress CEOs' total annual compensation on different firm and CEOs' individual characteristics influencing their pay and consider the residual as being the result of firm's governance quality.

We include firm size, performance and book-to-market value to control for firm characteristics that affect executive pay arguing that executives of the larger firms with better financial performance and higher growth potentials receive higher compensation (Renneboog & Zhao, 2011; Schwartz-Ziv & Weisbach, 2013). As proxies for executives' individual characteristics, we use executives' tenure and equity incentives. We expect CEOs with longer tenure receive higher pay as they need to be compensated for their company-specific experience. They also might have more influence on their pay (Renneboog & Zhao, 2011, p. 1135). However, as Armstrong, Ittner, and Larcker (2012) demonstrate, CEOs' equity incentives may impact their overall compensation level in two different ways; Compensation level may be lower in situations where the CEO's existing equity incentives are high enough and thus there is no need to provide additional incentives using annual compensation. Yet, there is also the possibility that the executives' equity incentives provide them with additional power over the board of directors leading to higher compensation levels (p. 330).

The regression model is specified as follows:

$$Compensation = \alpha + \beta_1\, Size_{it} + \beta_2\, Profitability_{it} + \beta_3 BM_{it} + \beta_4 CEO\ Tenure_{it} + \beta_5\, Incentives_{it} + \varepsilon \quad (4)$$

Compensation is CEOs' total compensation which includes salary, bonus, other annual pay, the value of restricted stock and options granted, long-term incentive payouts and all other

compensation. *Size*, *Profitability* and *BM* are measured as the natural logarithm of total assets, Return on Assets (ROA) and book value of equity over the market value of equity. *CEO Tenure* is measured as the number of years the CEO has held the title of chief executive officer. *Incentives* is executives' firm-specific wealth. This is the sum of the value of CEOs' option portfolio calculated using Black-Scholes formula, and equity portfolio estimated by multiplying the number of shares held by share price[3]. The residuals of model (4) generate a new variable called "*Excess Comp"* and will be used to construct our governance index.

3.2.5. Firm's General Financial Outcomes:

Following Larcker et al. (2007), we use firm's ROA as a proxy for their overall financial performance and hypothesise that firms with more effective corporate governance experience a better financial performance. To isolate the impacts of governance on operating performance, we first regress firms' ROA on firm and industry-specific factors that are, according to the literature, expected to influence their financial performance.

Following previous research on operating performance, we use firm size, book-to-market value, age and capital expenditure to control for cross-sectional differences that are correlated with profitability (Core, Guay, and Rusticus (2006); Gompers et al. (2003); Conheady, McIlkenny, Opong, and Pignatel (2015); and Schultz, Tan, and Walsh (2010)). The model is specified as:

$$Profitability = \alpha + \beta_1 Size_{it} + \beta_2 BM_{it} + \beta_3 Age_{it} + \beta_4 CAPEX_{it} + \varepsilon \quad (5)$$

Size and *BM* are measured as the natural logarithm of total assets and book value of equity over the market value of equity. *Age* is calculated as the natural logarithm of firms' age in years from the first date the firm appeared in the CRSP database. *CAPEX* is firms' capital expenditure divided by its total sales.

Whether these factors can influence performance in a positive or negative way is still subject to controversy. Smaller firms may have higher operational performance because of their greater growth potential. Larger firms, however, have diverse capabilities, can benefit from economies of scale and scope and are more likely to adopt better corporate governance practices which

[3] Data for *Incentives* variable is retrived from Coles, Daniel, and Naveen (2013): https://sites.temple.edu/lnaveen/data/

can lead to better performance (Conheady et al. (2015, p. 294); Majumdar (1997, p. 233)). With respect to the impacts of age, theory suggests that old firms can take advantage of their greater experience to achieve superior performance. At the same time, their limited bureaucratic flexibility makes it harder for them to make rapid adjustments to changing circumstances and thus, can lead them to lose out to their younger competitors (Majumdar, 1997).

Greater capital expenditure can bring about future growth opportunities and result in better financial outcomes. On the contrary, Titman, Wei, and Xie (2004) found evidence that firms with more investment expenditures tend to underperform their benchmarks. They argue that high levels of investment expenditures can be linked to managers' empire building tendencies where they invest based on their own rather than the shareholders' interests.

Moreover, Fama and French (1995) show that firms with a high book to market ratio (i.e. low stock price relative to book value) are relatively distressed and less profitable compared to low book-to-market ratio firms who enjoy sustained profitability (p. 154). We eventually estimate the model and use the residuals to create a new variable called "*Performance.*" This variable is used in the next stage towards constructing the governance index.

3.2.6. Non-financial Measures of Performance: Corporate Social Responsibility (CSR)

We expect firms with good corporate governance to have better CSR activities and higher positive reputation. To assess board's effectiveness in terms of CSR issues, we use KLD sustainability rankings. KLD Socrates Database provides rankings for companies in seven social performance areas: Community, Corporate Governance, Diversity, Employee Relations, Environment, Human Rights and Product Quality and Safety. For each area, KLD assigns 'strengths' and 'concerns' on a 5-point scale. Following Filatotchev and Allcock (2010), we compute the final score in each category by subtracting the concerns scores from the strength score and use the average of these seven final scores to have a unique value for each firms' CSR. Higher values for the overall score indicate better performance in terms of corporate social responsibility values.

Apart from governance attributes, a number of firm-related characteristics including firms' accounting performance, growth, size and leverage ratio have been established to influence the adoption of CSR practices. We, therefore, regress firms' total CSR score on these firm-specific factors and use the residuals as part of CSR values that can be linked to governance quality of

firms. We create a new variable called "*Non-financial*" using the residuals which is then employed to construct the governance index. The model is specified as:

$$CSR = \alpha + \beta_1 Size_{it} + \beta_2 Profitability_{it} + \beta_3 BM_{it} + \beta_4 Leverage_{it} + \varepsilon \quad (6)$$

Size, *Profitability* and *BM* are measured as the natural logarithm of total assets, Return on Assets (ROA) and book value of equity over the market value of equity. *Leverage* is calculated as the ratio of firms' total liabilities over its total assets. Better financial performance could assist firms in undertaking costly programs that are related to social demands (Mallin & Michelon, 2011). Large growing firms are probably more diversified across different markets and, thus, are more likely to be under their different stakeholder groups' scrutiny. Size can also be viewed as a measure of public visibility. Therefore, large firms are more likely to adopt CSR activities and disclosure to improve their reputation (Branco & Rodrigues, 2008). Leverage has been argued to influence CSR disclosure in a positive way where firms that are highly leveraged may voluntarily disclose more social information in order to reduce their agency costs and therefore, their cost of capital (Reverte, 2009, p. 375). On the contrary, companies with higher levels of debts are more susceptible to insolvency risks and may be reluctant to pay the additional costs of CSR activities and disclosures.

3.3. Principal Component Analysis (PCA)

Corporate governance is often referred to as a complex concept caused by several contributing factors each of which offers a limited picture of the overall governance quality. Therefore, when analysing corporate governance, one is dealing with numerous supervision and control structures that need to be taken into account. However, as Tarchouna, Jarraya, and Bouri (2017) argue, simultaneous introduction of many variables into the model can cause statistical problems (p.646).

Prior literature, therefore, mainly focused on generating single additive indices using different governance attributes. Further, although there is no well-developed conceptual basis on how much each governance element contributes to the overall index, the most common procedure is to provide equal weights for each attribute (e.g. Gompers et al., 2003). Other studies, on the other hand, recognised PCA as an appropriate method for evaluating the entire governance system. Larcker et al. (2007), for instance, argue that a PCA-based governance index is as a more reliable measure compare to individual or equal weighted additive indices.

We follow Larcker et al. (2007) and use PCA to construct our governance index. The outcome of this analysis is a new set of uncorrelated variables called, the Principal Components (PCs). The first principal component is simply the linear combination of the variables with the maximum variance that capture most of the variations in the original data set. Correspondingly, the second and third principal components cover as much of the remaining variation as possible.

This is an accepted technique for reducing the dimensions of a dataset with a large number of interrelated variables while retaining the utmost variation present in the data (Jolliffe, 2002). This method could be especially advantageous for studying corporate governance, as endogeneity and correlation between the variables are inseparable parts of almost all corporate governance discussions. Another advantage of using PCA is that using statistical procedures, it automatically produces weights for each governance attribute in a way that the final index captures as much of the variance in individual governance attributes (Florackis & Ozkan, 2009).

Before conducting PCA, however, it is important to check the validity of this method using two statistical tests of Bartlett's sphericity and Kaiser-Meyer-Oklin's (KMO's) sampling adequacy. Bartlett's test examines whether the correlation matrix is statistically significant from zero (i.e. the correlation matrix is different from the identity matrix). The p-value of this test should be less than 5% in order to reject the null hypothesis that the variables are uncorrelated and the correlation matrix is not factorable. KMO measure of sampling adequacy, on the other hand, is an index valued between 0 and 1 representing the degree of common variance among the original variables. This statistic should be above 0.5 to ensure that PCA produces reliable results, otherwise, the correlation matrix is not applicable (Tarchouna et al., 2017).

After conducting PCA, following Florackis and Ozkan (2009) and Tarchouna et al. (2017) the first principal component is taken as a governance index, hereafter called *Governance Index* (*GI*), given that it explains the largest percentage of common variation among our governance sub-indices.

4. Results:

4.1. Corporate Governance Index

Sections 3.1 and 3.2 explain the construction of our six governance sub-indices in details. Table 1.1 summarises these governance proxies and indicates their expected sign in good governance. As mentioned before, we classify acquisition returns, equity financing and financial and non-financial performance as increasing in "good" governance; while abnormal accruals and CEO's excess compensation are expected to be lower as governance quality of firms improves.

Table 1.1. Correlation among Governance Sub-indices

Panel A: Corporate Governance Sub-indices and their expected sign in good governance		
Variable	**Proxy for**	**Expected Sign**
Accruals	Financial Reporting Quality	-
CARs	Acquisition Performance	+
Equity	Capital Structure and Financing Decisions	+
ExcessComp	CEOs Excess Compensation	-
Performance	Financial Performance	+
Non-financial	Non-financial Performance	+

Before conducting PCA, two statistical tests of Bartlett's sphericity and Kaiser-Meyer-Oklin's (KMO's) sampling adequacy are performed to ensure the validity of PCA. The results of Bartlett's sphericity test reject the null hypothesis that the correlation matrix is not factorable and KMO's sampling adequacy index is also above 0.5 confirming the appropriateness of PCA.

Table 1.2. Results of Bartlett Sphericity and KMO's Sampling Adequacy Tests

Bartlett Test of Sphericity	
Chi-square	93388.013
Degree of freedom	15
p-value	0.000
H0: Variables are not intercorrelated	
Kaiser-Meyer-Oklin Measure of Sampling Adequacy	
KMO	0.500

We employ the loadings of the first principal component to form our index for corporate governance. Component loadings represent the relationship between each variable to the underlying factor. In other words, they show how much of the variation in the original variable is explained by each component. The resulting index is:

$$Governance\ Index\ (GI) = -0.172\ Accruals + +0.462\ CARs + 0.520\ Equity - 0.579\ Excess\ Comp + 0.380\ Perfromance + 0.076\ Non - financial \quad (7)$$

Our results indicate that the first principal component being a linear combination of all of our six governance sub-indices and explains 28 per cent of the variance of data. The loadings' signs of the first component are, also, mainly consistent with what has been expected. *Accruals* appears with a negative loading confirming our expectation that well-governed firms have lower discretionary accruals and therefore better financial reporting quality. *CARs* has a positive weight in our governance index implying that well-governed firms pay higher returns to their shareholders when it comes to M&As. The large positive loading of the variable *Equity* is also consistent with our expectation that firms with better governance quality have a preference to choose equity financing. *ExcessComp* contributes negatively to the governance measure. This is again consistent with prior literature that firms with effective boards can determine CEO compensation plans more efficiently and thus, pay lower levels of excess compensation to their CEOs. Variables *Performance* and *Non-financial* (although its contribution is minor) appear to be positively related to the corporate governance measure in a way that firms with more effective corporate governance expected to perform better both financially and non-financially in terms of CSR values.

In the governance index, higher values are associated with greater governance quality of firms. Table 1.3 summarises and correlates the governance measures. The final index is highly correlated with each governance measure with correlation signs being as expected. Pearson and Spearman correlations among the index components are, also, quite similar but small in value. The relatively low values of correlation coefficients among the sub-indices suggest that these governance measures are statistically distinct and each capture different features of the firms' governance system.

Table 1.3. Summary Statistics of Governance Index and its Correlation with Sub-indices

This table presents summary statistics for the constructed governance index (*Index*) and reports its correlation with each governance measure as well as the correlation among governance sub-indices. The first sub-index (*Accruals)* represents financial reporting quality in firms and is measured by the value of abnormal accruals. The second measure (*CARs*) represents acquisition performance as cumulative abnormal returns three days before and after the acquisition announcements. The third measure (*Equity*) is the ratio of equity financing in firms representing capital structure and financing decisions of the firms. The fourth measure (*ExcessComp*) is the amount of excess compensation paid to the CEOs. Excess compensation is defined as part of the total compensation that cannot be explained by firm or CEO characteristics. The fifth and sixth measures (*Performance* and *Non-financial*) are firms' ROA and corporate social responsibility scores representing financial and non-financial performance, respectively.

					Correlation with Governance		Correlations with Governance sub-indices [a]					
	Mean	SD	Min	Max	*Index*		*Accruals*	*CARs*	*Equity*	*ExcessComp*	*Performance*	*Non-financial*
					(Pearson)	(Spearman)						
Accruals	0.052	0.056	-0.197	0.294	-0.222*	-0.189*		*0.074**	-0.117*	0.012	-0.175*	-0.110*
					(0.000)	(0.000)		*(0.000)*	(0.000)	(0.139)	(0.000)	(0.000)
CARs	0.125	0.051	0.014	0.237	0.596*	0.583*	-0.006		0.042*	-0.448*	0.290*	-0.215*
					(0.000)	(0.000)	(0.409)		(0.000)	(0.000)	(0.000)	(0.000)
Equity	0.455	0.089	0.163	0.680	0.671*	0.637*	-0.106	0.005*		-0.357*	0.314*	0.207*
					(0.000)	(0.000)	(0.000)	(0.488)		(0.000)	(0.000)	(0.000)
Excess Comp	7.947	0.685	5.659	10.045	-0.748*	-0.747*	0.029*	-0.453*	-0.385*		0.030*	-0.161*
					(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Performance	-2.506	0.351	-4.425	-1.784	0.492*	0.498*	-0.265*	0.246*	0.388*	0.008*		0.140*
					(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.209)		(0.000)
Non-financial	0.036	0.114	-0.251	0.438	0.099*	0.194*	-0.087*	-0.209*	0.333*	-0.153*	0.166*	
					(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

[a] *Pearson (Spearman) Correlations presented in the Lower (Upper) Diagonal*

[b] * *indicates significance at 5 per cent level.*

4.2. Corporate Governance and Board of Directors Characteristics

We employ the constructed governance to examine whether different characteristics of the board of directors can impact their efficacy (as measured by our index). We estimate the following model:

$$Governance\ Index_{it} = \alpha + \beta_1\ Board\ Characteristics_{it} + \beta_2\ Controls_{it} + \varepsilon \quad (8)$$

Drawing on prior studies Adams et al., 2010; Coles, Daniel, & Naveen, 2008; Larcker et al., 2007), the following variables are selected to represent boards' structure and their individual characteristics that may have an influence on their overall performance:

B-Size	=	Board size measured as the total number of directors serving on the board;
Indep	=	Fraction of board members comprised of independent directors;
Female	=	Fraction of board members comprised of female directors;
Busy	=	Fraction of directors holding three or more directorship appointments at different publicly traded firms;
Old	=	Fraction of directors who are older than 70 years old;
CEO-Dual	=	CEO duality; dummy variable equals to 1 if CEO is also the chairman and zero otherwise;
Dir-Own	=	Directors' stock ownership measured as the fraction of outstanding shares held by all directors over the total number of shares outstanding

To control for additional cross-sectional differences, we include variables measuring firm size, age, value and risk. *Size* is measured as the natural logarithm of firms' total assets. *Age* is the natural logarithm of firms' age in years from the first date the firm appeared in CRSP database. *MB* is the market value of equity (*MV*) over book value of equity and *Risk* is measured as the standard deviation of CRSP's monthly stock returns.

Table 1.4 provides summary statistics of the board's characteristics. According to the reported statistics, the median board has 9 members with near 75 per cent of the directors being independent. On average, around 12% of the directors are aged above 70 years old and 8% hold three or more directorship appointments at different publicly traded firms. Female directors represented 11% of board members, and around 66 per cent of the CEOs hold the position of the board chair, as well. Finally, an average board owns near 8% of the outstanding shares. These numbers are similar to those in recent studies. Sila, Gonzalez, and Hagendorff

(2016) report a median board of 9 members with 71% board independence and 10% female boardroom representation in their sample of US firms from 1996-2010. As Faleye, Hoitash, and Hoitash (2018) show, the median sample firm has 9 members where 75% of the directors are independent for the period of 2000-2009. They, also, find that on average boards own 8.7% of the outstanding shares and around 62% of the CEOs serve as board chair.

Table 1.4. Board of Directors Structure: Descriptive Statistics

This table provides summary statistics of the boards' characteristics variables. *B-Size* represents the total number of board members. *Indep* is the fraction of outside directors. In Risk Metric database, directors are required not to have any personal and financial connection to the company other than a board seat in order to be classified as independent. *Female* is the fraction of female directors. *Old* represents the fraction of directors who are older than 70 years old. *Busy* is the fraction of directors that hold three or more directorship appointments at different publicly traded firms. *CEO-Dual* is a dummy variable that equal to 1 if CEO is also the chairman; and zero otherwise. *Dir-Own* is the proportion of shares outstanding owned by directors.

Board Characteristics	Mean	SD	25th Percentile	50th Percentile	75th Percentile
B-Size	9.532	2.727	8.000	9.000	0.857
Indep	0.718	0.164	0.625	0.750	0.167
Female	0.106	0.099	0.000	0.100	0.200
Old	0.123	0.144	0.000	0.100	0.125
Busy	0.082	0.113	0.000	0.000	0.075
CEO-Dual	0.658	0.474	0.000	1.000	0.857
Dir-Own	0.072	0.150	0.007	0.024	1.000

What board characteristics can be considered "optimal" and whether they can bring about the desired firm outcome has long been subject to controversy. For example, one might expect large boards to be favourable, as they can bring different perspectives into the firm. Empirical research, however, seems to support the opposite view that smaller boards are better and criticise large boards for their higher costs of coordination and social loafing problems (Coles et al., 2008). Coles et al. (2008), on the other hand, find a U-shaped relationship between board size and firm value and show that depending on firm characteristics, either a small or large board can be optimal. In a similar vein, while independent directors possess greater propensity to monitor the management Adams et al., 2010), inside directors have been argued to be more valuable as they have more insight regarding the business day-to-day operation (Byrd & Hickman, 1992, p. 196). Theory, also, does not provide a clear prediction on how board members' share ownership can influence their firm value (Morck, Shleifer, & Vishny, 1988). Although a higher level of equity ownership is expected to provide board members with more

voting power and improved incentives towards value maximisation, Morck et al. (1988) found a nonlinear relationship between director's share ownership (with a positive relation in the 0 to 5% ownership range, a negative relation in the 5 to 25% and a further positive relation beyond 25%).

Prior literature links these contradicting findings to statistical difficulties in measuring governance and endogeneity issues (e.g. Adams et al. (2010); Hermalin and Weisbach (2003) and Wintoki, Linck, and Netter (2012)). Board size and structure, for instance, might be endogenously determined by other factors such as their firms' characteristics or CEO preferences. Complex firms, for example, tend to have larger boards with more independent directors due to their greater advisory needs (Coles et al., 2008) and good CEOs may want to please shareholders by dressing up their firms' boards with independent directors (Byrd & Hickman, 1992).

Wintoki et al. (2012) classify three potential sources of endogeneity: unobserved heterogeneity, simultaneity and dynamic endogeneity. Unobserved heterogeneity exists when the relation between the variables is affected by other *unobservable* factors. In this case, the estimate is not valid if the research design fails to control for these factors. In the governance-performance analysis, as it is very likely that unobserved firm-specific factors influence both governance and performance, an Ordinary Least Square (OLS) estimation probably provides spurious results. The issue of simultaneity arises when the dependent and the explanatory variables are simultaneously determined. In the governance-performance relation, this seems to be a relevant concern as firms often choose their optimum board structure with the aim of achieving an expected level of performance. Thus, although we expect board structure to influence their performance, performance itself can be a determinant of structure. The third source of endogeneity is related to the dynamic nature of governance, where the current governance quality is a function of previous periods' performance.

A fixed effect analysis can probably solve the issue of unobserved endogeneity. However, Schultz et al. (2010) argue that the fixed effect model is implemented under the strict assumption of exogeneity which presumes that the explanatory variables (board structure and control variables) are independent of the past, present or future values of performance. As discussed above, the issues of simultaneity and dynamic endogeneity in the governance-performance relation will result in this assumption to be violated. In this case, the fixed effect model estimates are not reliable.

Recent studies suggest that employing a Generalised Method of Moments (GMM) model can be beneficial for governance-related analysis where endogeneity is present. Schultz et al. (2010) argue that a system GMM estimator can provide consistent coefficients that are robust to the potential unobservable endogeneity, simultaneity and dynamic endogeneity. In this case, lags of the dependent variable are added as additional explanatory variables to capture the dynamicity, all variables are first differenced to eliminate unobserved firm characteristics, and the lagged values of the explanatory variables are included as instruments for the current explanatory variables.

Following Wintoki et al. (2012), this study performs two sets of tests to empirically examine the exogeneity assumption. First, we regress current board characteristics, on the historical values of governance and firm-specific (i.e. control) variables. The results, as shown in Table 1.5, indicate that most of the board characteristic and firm-specific variables are related to the historic values of governance, board characteristics or firm-specific factors. This highlights the fact that apart from our board structure variables, the potential control variables are also dynamically endogenous.

We, then, carry out a second test of strict exogeneity suggested by Wooldridge (2010, p. 285). In this test, we regress the current governance on current as well as future values of board characteristics and control variables. Under the null hypothesis of strict exogeneity, the future values of board structure and control factors should be independent from current governance. As shown in Table 1.6, governance, as our dependent variable can explain the future values of some of our board characteristics and firm-specific variables. For example, the future value of the variable *Dir-Own* has a significant coefficient of -0.270 in the final specification (M8), indicating that this variable is not strictly exogenous and adjusts to the past values of governance.

Table 1.5. The Relationship between Board Characteristics, firm-specific variables and past governance

This table reports the results of OLS regressions of the current values of board characteristics and firm-specific variables on the lagged values of governance (*GI*) and firm-specific variables. *B-Size* represents the total number of board members. *Indep* is the fraction of outside directors. In Risk Metric database, directors are required not to have any personal and financial connection to the company other than a board seat in order to be classified as independent. *Female* is the fraction of female directors. *Old* represents the fraction of directors who are older than 70 years old. *Busy* is the fraction of directors that hold three or more directorship appointments at different publicly traded firms. *CEO-Dual* is a dummy variable that equal to 1 if CEO is also the chairman; and zero otherwise. *Dir-Own* is the proportion of shares outstanding owned by directors. Firm-specific variables include *Size, Age, MB and Risk*. Year and industry dummies are included in all regressions.

	B-Size	*Indep*	*Female*	*Old*	*Busy*	*CEO-Dual*	*Dir-Own*	*Age*	*MB*	*Risk*	*Size*
GI (t-1)	0.018	0.001	0.001	0.000	0.002	0.004	-0.007***	0.002	0.023	-0.017***	0.049***
	(0.032)	(0.002)	(0.001)	(0.002)	(0.002)	(0.01)	(0.002)	(0.001)	(0.044)	(0.002)	(0.006)
B-Size (t-1)	0.822***	0.000	0.000	0.001	0.001*	-0.005**	0.000	0.000**	-0.007	-0.001***	-0.001
	(0.010)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.007)	(0.000)	(0.001)
Indep (t-1)	0.000	0.766***	0.003	-0.021***	0.020***	0.079**	-0.016*	0.014***	0.087	-0.003	-0.030
	(0.095)	(0.008)	(0.004)	(0.006)	(0.006)	(0.027)	(0.007)	(0.003)	(0.134)	(0.004)	(0.018)
Female (t-1)	0.225	0.034***	0.870***	-0.046***	-0.007	0.129***	-0.005	0.022***	0.372*	-0.003	-0.106***
	(0.127)	(0.008)	(0.006)	(0.009)	(0.009)	(0.039)	(0.007)	(0.004)	(0.158)	(0.005)	(0.023)
Old (t-1)	0.094	-0.019***	-0.003	0.831***	-0.006	0.006	0.006	-0.009***	-0.050	-0.006*	0.019
	(0.082)	(0.005)	(0.003)	(0.007)	(0.005)	(0.026)	(0.005)	(0.002)	(0.102)	(0.003)	(0.015)
Busy (t-1)	0.098	0.031***	0.004	0.020**	0.743***	0.018	-0.004	0.014***	0.194	-0.003	-0.034
	(0.107)	(0.007)	(0.004)	(0.007)	(0.009)	(0.027)	(0.005)	(0.003)	(0.127)	(0.004)	(0.018)
CEO-Dual (t-1)	0.020	0.000	-0.001	0.001	0.000	0.727***	-0.001	0.001	0.014	0.000	0.006
	(0.022)	(0.002)	(0.001)	(0.002)	(0.001)	(0.008)	(0.001)	(0.001)	(0.03)	(0.001)	(0.004)
Dir-Own (t-1)	0.070	-0.070***	-0.005	0.021**	-0.009	-0.021	0.850***	0.004	0.241	-0.013***	-0.024
	(0.111)	(0.007)	(0.005)	(0.007)	(0.006)	(0.029)	(0.027)	(0.003)	(0.128)	(0.003)	(0.016)

Age (t-1)	0.045**	0.001	0.001	-0.001	-0.001	0.004	0.001	0.927***	0.051*	-0.003***	-0.020***
	(0.017)	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.001)	(0.001)	(0.023)	(0.001)	(0.003)
MB (t-1)	0.013**	0.000	0.000	0.000	0.001*	-0.002	0.001*	0.001**	0.806***	0.001***	0.014***
	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.016)	(0.000)	(0.001)
Risk (t-1)	0.539*	-0.030	-0.014	-0.017	0.014	0.004	-0.031*	0.019*	-2.275***	0.454***	-0.160**
	(0.268)	(0.020)	(0.011)	(0.018)	(0.018)	(0.078)	(0.015)	(0.008)	(0.442)	(0.013)	(0.053)
Size (t-1)	0.123***	0.001	0.003**	-0.001	0.006***	0.013*	-0.004***	0.003***	-0.006	-0.011***	1.013***
	(0.019)	(0.001)	(0.001)	(0.001)	(0.001)	(0.006)	(0.001)	(0.000)	(0.026)	(0.001)	(0.004)
R-squared	0.823	0.793	0.808	0.722	0.655	0.597	0.811	0.999	0.726	0.539	0.986

[a] **, **, *** indicates significance at the 10 per cent, 5 per cent, and 1 per cent, respectively.*

[b] *Numbers in parentheses represent robust standard errors.*

Table 1.6. Test of Strict Exogeneity

This table reports the results Wooldridge test of strict exogeneity. The aim is to understand whether board characteristics and firm-specific factors adjust to past governance quality. The dependent variable, *GI (t),* is the governance index, and in addition to board characteristic and control variables, future values of board characteristics and control variables are added as explanatory variables. *B-Size* represents the total number of board members. *Indep* is the fraction of outside directors. *Female* is the fraction of female directors. *Old* represents the fraction of directors who are older than 70 years old. *Busy* is the fraction of directors that hold three or more directorship appointments at different publicly traded firms. *CEO-Dual* is a dummy variable that equal to 1 if CEO is also the chairman; and zero otherwise. *Dir-Own* is the proportion of shares outstanding owned by directors. Firm-specific variables include *Size, Age, MB and Risk*. Year and industry dummies are included in all regressions.

	M1	*M2*	*M3*	*M4*	*M5*	*M6*	*M7*	*M8*
B-Size	0.007*	0.007*	0.007*	0.007*	0.007*	0.007*	0.007*	0.008**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Indep	-0.055	-0.041	-0.055	-0.054	-0.054	-0.054	-0.061	-0.045
	(0.048)	(0.044)	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)	(0.043)
Female	-0.126	-0.125	-0.11	-0.127	-0.127	-0.13	-0.129	-0.098
	(0.073)	(0.073)	(0.068)	(0.073)	(0.073)	(0.073)	(0.072)	(0.065)
Old	-0.049	-0.049	-0.049	-0.044	-0.049	-0.048	-0.049	-0.058
	(0.041)	(0.041)	(0.041)	(0.04)	(0.041)	(0.041)	(0.041)	(0.04)
Busy	-0.067	-0.067	-0.067	-0.067	-0.058	-0.066	-0.069	-0.053
	(0.046)	(0.046)	(0.046)	(0.046)	(0.042)	(0.046)	(0.046)	(0.041)
CEO-Dual	-0.005	-0.005	-0.005	-0.005	-0.005	-0.01	-0.004	-0.007
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.009)	(0.01)	(0.009)
Dir-Own	-0.259**	-0.261**	-0.259**	-0.259**	-0.260**	-0.260**	-0.131	-0.147*
	0.08	0.08	0.08	0.08	0.08	(0.08)	(0.069)	(0.072)
Age	-0.104***	-0.103***	-0.104***	-0.104***	-0.102***	-0.103***	-0.106***	0.474
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.286)
MB	0.059***	0.059***	0.059***	0.059***	0.059***	0.059***	0.059***	0.063***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)

Risk	-0.897***	-0.898***	-0.897***	-0.897***	-0.895***	-0.898***	-0.903***	-0.700***
	(0.122)	(0.122)	(0.122)	(0.122)	(0.122)	(0.122)	(0.122)	0.116
Size	-0.465***	-0.465***	-0.465***	-0.465***	-0.466***	-0.466***	-0.467***	-0.582***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.020)
B-Size (t+1)	0.000							-0.002
	(0.003)							(0.003)
Indep (t+1)		-0.024						-0.039
		(0.047)						(0.048)
Female (t+1)			-0.028					-0.026
			(0.070)					(0.070)
Old (t+1)				-0.009				-0.005
				(0.038)				(0.038)
Busy (t+1)					-0.018			-0.01
					(0.040)			(0.041)
CEO-Dual (t+1)						0.013		0.012
						(0.010)		(0.010)
Dir-Own (t+1)							-0.292***	-0.270***
							(0.068)	(0.071)
Age (t+1)								-0.702*
								(0.349)
MB (t+1)								-0.010***
								(0.003)
Risk (t+1)								-0.797***
								(0.123)
Size (t+1)								0.135***
								(0.020)
R-squared	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.889

[a] **, **, *** indicates significance at the 10 per cent, 5 per cent, and 1 per cent, respectively.*

[b] *Numbers in parentheses represent robust standard errors.*

Overall, the results of the two sets of exogeneity tests suggest that our board characteristics and control variables are not strictly exogenous. We, now, estimate model (8) using simple OLS, fixed-effect, dynamic OLS and GMM specifications.

Table 1.7 reports the regression results of our governance quality measure (*GI*) on different board characteristics and firm-specific factors. The results of the static models suggest a negative relationship between directors' share ownership (*Dir-Own*) and CEO duality (*CEO-Dual)* and their effectiveness. Contrary to previous studies which have suggested a positive relationship between female directors and firm outcomes (e.g. Levi et al., 2014), the significant negative coefficient of the variable *Female* in the effect model seems to show that the presence of female directors on the board can adversely influence their efficiency.

Although OLS estimation is used by many authors and is appealing for its simplicity, it can only produce reliable results under certain assumptions. More specifically, the OLS specification requires the explanatory variables to be independent from the error term and that the error terms to be identically and independently distributed. Schultz et al. (2010, p. 147) argue that the OLS regressions will be biased if there is at least one source of endogeneity. The results of the fixed effect model can also unreliable if some variables are endogenously determined in the model.

As static models cannot adequately control for persistence issues, we now turn to use dynamic models. In the first step, a dynamic OLS is estimated where the past (i.e. lagged) values of governance index are added to the model as additional explanatory variables[4]. The coefficients of first and second lags of governance (β=0.6 and β=0.033) are statistically significant at 1% and 10% levels which show that past values of governance can significantly explain variations in current governance. The results of the dynamic OLS regression with regards to directors share ownership and CEO duality remains unchanged from what we found

[4] To determine how many lags of governance are needed to capture the dynamic effects, a regression of current governance on four lags of past governance is estimated, controlling for other firm-specific characteristics. The result of this estimate also confirms that only the first two lags of governance are statistically significant, and thus, inclusion of two lags of governance is sufficient to ensure dynamic completeness. All older lags of governance are exogenous and can be used as instruments when applying the dynamic panel GMM model.

in static models. However, once we control for the impact of past governance quality, the variable *Female* appears with a significant positive coefficient which is now consistent with our expectations. Still, the dynamic OLS model cannot control for unobserved heterogeneity.

We, finally, move forward to use a dynamic panel GMM model, which according to Wintoki et al. (2012) enables us to account for unobserved heterogeneity, simultaneity and dynamic endogeneity. Again, we use two lags of governance in the model and include variables lagged three and four periods as instruments for our endogenous variables. The results show that when we control for potential sources of endogeneity by using a system GMM model, all board characteristics coefficients become insignificant. These results are also consistent with the findings of Wintoki et al. (2012).

In table 1.7, we also report the results of three GMM estimator validity tests to confirm that our GMM results are reliable: the Arellano-Bond Test for second-order serial correlation (AR (2) test), the Hansen J Test of over-identification and difference-in-Hansen test of endogeneity. First, the AR (2) test has yielded a p-value of 0.69 which cannot reject the null hypothesis of no second-order serial correlation. Similarly, the p-value of 0.17 for the Hansen J Test of over-identification, means that we cannot reject the null hypothesis that our instruments are valid. Finally, with regards to the difference-in-Hansen test of endogeneity, the null hypothesis is that subsets of the instruments are economically exogenous. The p-value of 0.143 cannot reject this hypothesis.

Table 1.7. Corporate Governance and Board Structure

This table contains static OLS, Fixed-effects, dynamic OLS and system GMM estimations of the relationship between governance quality and board structure. Year dummies and industry fixed-effects are included in all specifications.

Dependent Variable: Governance Index	Static Models		Dynamic Models	
	OLS	Fixed Effects	Dynamic OLS	System GMM
B-Size	0.001	0.006	0.002	0.016
	(0.002)	(0.003)	(0.001)	(0.017)
Indep	-0.016	-0.053	0.02	0.296
	(0.030)	(0.046)	(0.026)	(0.219)
Female	0.015	-0.141*	0.073*	0.04
	(0.042)	(0.072)	(0.036)	(0.227)
Old	-0.043	-0.032	-0.017	0.096
	(0.027)	(0.041)	(0.021)	(0.108)
Busy	0.015	-0.082	0.040	-0.133
	(0.029)	(0.044)	(0.024)	(0.170)
CEO-Dual	-0.030***	-0.007	-0.014*	0.077
	(0.007)	(0.010)	(0.006)	0.05
Dir-Own	-0.266***	-0.234***	-0.070**	-0.354
	(0.036)	(0.070)	(0.026)	0.205
Age	0.003	-0.101***	0.015**	0.068
	(0.005)	(0.030)	(0.005)	0.044
MB	0.081***	0.061***	0.038***	0.030*
	(0.002)	(0.004)	(0.002)	0.012
Risk	-1.638***	-0.869***	-1.011***	-0.547
	(0.107)	(0.115)	(0.113)	0.867
Size	-0.501***	-0.460***	-0.191***	-0.375***
	(0.003)	(0.015)	(0.007)	0.082
GI (t-1)			0.600***	0.492*
			(0.018)	(0.225)
GI (t-2)			0.033*	-0.038
			(0.016)	(0.122)
R-squared	0.925	0.882	0.958	
AR(1) test (p-value)				(0.048)
AR(2) test (p-value)				(0.690)
Hansen test of over-identification (p-value)				(0.170)
Diff-in Hansen test of exogeneity (p-value)				(0.143)

[a] **, **, *** indicates significance at the 10 per cent, 5 per cent, and 1 per cent, respectively.*

[b] *Numbers in parentheses represent robust standard errors.*

5. Conclusion

This paper introduces a new approach for evaluating firm's corporate governance and the performance of its board of directors by looking at the outcomes of the board of directors' decisions in different areas. This is in contrast to existing approaches focussing on largely time invariant board characteristics. The first step is to define firm's most important outcomes that are affected by their board's decision making. For a sample of S&P1500 companies, we, then, employ a principal component analysis to construct a governance index representing the overall performance of the boards ensuring in the process that our measure is not confounded by effects that may not be related to corporate governance. The new governance measure is, then, used to explore its association with different board characteristics recommended in codes of corporate governance best practices.

Our analysis revealed that endogeneity is an important issue that needs to be accounted for when studying corporate governance. We regress the constructed governance index on different board characteristics and firm-specific variables using OLS, fixed effects, dynamic OLS and GMM estimators, the latter being more appropriate in the presence of endogeneity. Our results do not show any significant association between board characteristics and their efficiency when we account for possible sources of endogeneity.

Although the sample employed in this paper involves mostly publicly listed US companies, it would be interesting if these investigations could also be expanded to firms from other countries, for example in a European context. There are often fundamental differences between European companies the US and UK firms in terms of their investor protection, legal requirements, ownership structure and corporate governance recommendations (Renders, Gaeremynck, & Sercu, 2010, p. 89). For example, when determining the corporate governance quality with existing methods, US firms are often categorised as high-quality firms; while, their compliance with governance recommendations might have simply occurred with the aim of fulfilling mandatory requirements. On the other hand, European countries mostly possess a voluntary compliance system which could provide them with the opportunity to signal their governance quality (Isakov & Weisskopf, 2014). Therefore, evaluating European firms' corporate governance quality by assessing the level of compliance with the recommendations could be even more challenging. Clearly, their non-compliance with governance recommendations might simply show that the company has chosen a different approach and

therefore should not be necessarily interpreted as weak governance. This issue will be investigated in future research.

6. Appendix: Descriptive Statistics and Regression Results Governance Sub-indices

Table 1.8. Summary Statistics of the variables employed to generate sub-indices

Variables	Obs	Mean	SD	P 25th	P 50th	P 75th
Age (Log)	48519	2.571	1.171	1.981	2.813	3.373
BM	48417	3.318	602.238	0.299	0.480	0.715
CAPEX	45578	0.092	0.453	0.021	0.040	0.081
CAR	48598	0.069	0.124	0.000	0.000	0.127
CEO Tenure	40546	7.420	7.511	2.000	5.000	10.000
Compensation	34584	7.875	1.209	7.124	7.891	8.656
CSR	21983	-0.001	0.393	-0.200	0.000	0.200
Deal Size	26604	0.171	0.303	0.027	0.070	0.181
Equity Financing	48442	0.459	0.229	0.296	0.450	0.628
Growth	45241	0.163	1.236	0.002	0.084	0.203
Incentives	29305	9.689	1.674	8.672	9.665	10.707
Ind-Leverage	48598	0.557	0.163	0.441	0.535	0.629
Leverage	48350	0.537	0.229	0.368	0.545	0.699
OCF	46006	0.089	0.103	0.044	0.089	0.138
PPE	43654	0.528	0.405	0.207	0.434	0.782
Profitability (Log ROA)	44350	-2.562	0.860	-2.977	-2.416	-1.987
Size	48461	7.137	1.940	5.783	7.024	8.387
TA	45955	0.050	0.114	0.010	0.042	0.079
Tangible	46955	0.381	0.265	0.137	0.370	0.592
Volatility	48325	0.111	0.070	0.066	0.094	0.136
ΔSales-ΔRec	39710	0.100	0.360	0.001	0.072	0.191

Table 1.9. Summary Statistics of the variables employed to generate sub-indices

(After 1% winsorisation)

Variables	Obs	Mean	SD	P 25th	P 50th	P 75th
Age (log)	48519	2.582	1.123	1.981	2.813	3.373
BM	48417	0.564	0.393	0.299	0.480	0.715
CAPEX	45578	0.080	0.126	0.021	0.040	0.081
CAR	48598	0.068	0.113	0.000	0.000	0.127
CEO Tenure	40546	7.366	7.277	2.000	5.000	10.000
Compensation	34584	7.893	1.066	7.124	7.891	8.656
CSR	21983	-0.003	0.375	-0.200	0.000	0.200
Deal Size	26604	0.165	0.254	0.027	0.070	0.181
Equity Financing	48442	0.459	0.228	0.296	0.450	0.628
Growth	45241	0.133	0.267	0.002	0.084	0.203
Incentives	29305	9.690	1.606	8.672	9.665	10.707
Ind-Leverage	48598	0.557	0.162	0.441	0.535	0.629
Leverage	48350	0.537	0.228	0.368	0.545	0.699
OCF	46006	0.090	0.085	0.044	0.089	0.138
PPE	43654	0.524	0.385	0.207	0.434	0.782
Profitability (Log ROA)	44350	-2.556	0.820	-2.977	-2.416	-1.987
Size	48461	7.135	1.901	5.783	7.024	8.387
TA	45955	0.048	0.075	0.010	0.042	0.079
Tangible	46955	0.381	0.265	0.137	0.370	0.592
Volatility	48325	0.110	0.063	0.066	0.094	0.136
ΔSales-ΔRec	39710	0.101	0.224	0.001	0.072	0.191

Table 1.10. Regression results of the Governance Sub-indices

This table represents the results of our six sub-index regressions where each sub-index is regressed on different firm or market characteristics other than governance. These regression models are as follows: $TA_{it} = \alpha + \beta_1(\Delta Sales_{it} - \Delta Rec_{it}) + \beta_2 PPE_{it} + \beta_3 OCF_{it} + \beta_4 BM_{it} + \varepsilon$ (1); $CAR_{it} = \alpha + \beta_1 Deal\ Size_{it} + \varepsilon$ (2); $Equity\ Financing_{it} = \alpha + \beta_1 Size_{it} + \beta_2 Profitability_{it} + \beta_3 Growth_{it} + \beta_4 Tangible_{it} + \beta_5 Ind - Leverage_{it} + \varepsilon$ (3); $Compensation = \alpha + \beta_1 Size_{it} + \beta_2 Profitability_{it} + \beta_3 BM_{it} + \beta_4 CEO\ Tenure_{it} + \beta_5 Incentives_{it} + \varepsilon$ (4); $ROA = \alpha + \beta_1 Size_{it} + \beta_2 Age_{it} + \beta_3 BM_{it} + \beta_4 CAPEX_{it} + \varepsilon$ (5); $CSR = \alpha + \beta_1 Size_{it} + \beta_2 Profitability_{it} + \beta_3 BM_{it} + \beta_4 Leverage_{it} + \varepsilon$ (6).

	(1)	(2)	(3)	(4)	(5)	(6)
Age (Log)					0.008	
					(0.009)	
BM	0.034***			-0.216***	-0.867***	0.000
	(0.002)			(0.025)	(0.019)	(0.012)
CAPEX					-0.288***	
					(0.075)	
CEO Tenure				-0.008***		
				(0.001)		
Deal Size		-0.017				
		(0.009)				
Growth			-0.026***			
			(0.003)			
Incentives				0.111***		
				(0.009)		
Ind-Leverage			-0.310***			
			(0.032)			
Leverage						-0.066
						(0.039)
OCF	0.428***					
	(0.013)					
PPE	0.074***					
	(0.004)					
Profitability (Log ROA)			0.035***	0.119***		0.015**
				(0.002)		(0.006)
Size			-0.022***	0.282***	-0.018	-0.018
			(0.003)	(0.003)	(0.011)	(0.012)
Tangible			-0.037*			
			(0.016)			
ΔSales-ΔRec	-0.093***					
	(0.003)					
R-squared	0.323	0.182	0.097	0.373	0.195	0.202

[a] **, **, *** indicates significance at the 10 per cent, 5 per cent, and 1 per cent, respectively.*

[b] *Numbers in parentheses represent robust standard errors.*

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