On the Association between Corporate Governance and Earnings Quality*

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Abstract

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Abstract

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1 Introduction

A wave of corporate scandals has brought financial reporting practices of public companies under considerable scrutiny in recent years. Legislative actions such as the Sarbanes-Oxley (SOX) Act of 2002 have sought to improve the quality of financial reporting by requiring chief executives to certify what they report, and by strengthening corporate governance and improving auditor independence. Whether and to what extent these measures have been effective has been the subject of much research recently (e.g., Cohen, Dey, and Lys [2008], Li, Pincus, and Rego [2005], Zhang [2005]). For instance, Lobo and Zhou [2005] provide evidence that SOX has resulted in firms becoming more conservative in their reporting behavior. Cohen, Dey, and Lys [2008] provide evidence that firms have turned away from accounting earnings management to real earnings management after the passage of SOX.

More generally, these events raise a larger issue relating to the nature of the association between corporate governance and earnings quality. Does weak corporate governance necessarily lead to low earnings quality? Does weak corporate governance necessarily result in higher levels of earnings management? Answers to these questions can help us understand how the stipulations of SOX might differentially impact the reporting quality of firms. In this paper, we draw on agency theory to develop an empirical framework for examining the link between corporate governance and financial reporting behavior of firms. We use this framework to formulate and test specific hypotheses on the association between measures of earnings quality and corporate governance.

Agency theory provides a natural backdrop for our analysis because financial reporting concerns arise when there is a conflict of interests between managers and owners (shareholders) coupled with information asymmetries (e.g., Beatty and Harris [1998], Kim and Yi [2006], Richardson [2000]). Absent this agency problem, reporting quality is a non-issue because managers do not have any incentive to misreport or hide information (keeping aside reporting incentives that might arise from strategic product market considerations). The purpose of corporate governance in its various forms is to reduce this agency problem, suggesting a natural link between corporate governance and financial reporting. All else equal, effective corporate governance should result in high reporting/earnings quality. Indeed, Chtourou, Bédard, and Courteau [2001] provide evidence that effective boards and audit committees constrain earnings management activities.

Corporate governance mechanisms evolve over time. Some firms have strong corporate gover-

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1 In this paper, we use the terms earnings quality and reporting quality synonymously. Our empirical analysis focus narrowly on specific measures of earnings quality.
nance mechanisms in place as reflected, for example, in the number of independent members on the board, presence of large institutional shareholders, and absence of CEO duality. Other firms have weaker corporate governance. If markets are efficient, one could argue that in equilibrium, the evolved level of corporate governance in a firm is effective given the degree of the agency problem in the firm. And, if corporate governance mechanisms naturally evolve to their effective levels, reporting quality should not be an issue. Yet, many recent reporting scandals, such as Enron and WorldCom, have been attributed to corporate governance failures, raising the possibility that the degree of effectiveness of corporate governance mechanisms likely varies across firms. That is, corporate governance is likely to be more adequate for some firms than for others.

In this paper, we develop a framework which distinguishes between the strength of corporate governance and its adequacy. We view strength (or weakness) as reflecting the degree of corporate governance. A firm that has a greater number of independent directors in its board, large institutional shareholders, and absence of CEO duality, is viewed as having stronger corporate governance.

In contrast, corporate governance is adequate if it is effective in reducing the agency cost. Corporate governance can be weak but adequate if the agency problem is low to begin with. We would expect earnings quality to be less of an issue for such firms. Corporate governance can be strong but inadequate; for these firms, earnings quality is likely to be an issue despite strong corporate governance. Earnings quality is also likely to be an issue for firms with weak and inadequate governance.

Classifying firms along these two dimensions of corporate governance (i.e., strength and adequacy) allows us to generate an interesting set of hypotheses with respect to its impact on earnings quality. In particular, we hypothesize that firms with more adequate corporate governance will have higher earnings quality, regardless of the strength of corporate governance— it is the adequacy of corporate governance that has the first order effect on earnings quality. And, if the adequacy of corporate governance is the primary driver of earnings quality, it should be the case that its strength should not incrementally affect earnings quality. Accordingly, we test the null hypothesis that there is no difference in earnings quality between firms that have strong and weak corporate governance as long as it is adequate. On the other hand, it is possible that the strength of corporate governance might have an effect on earnings quality among firms with inadequate governance. That is, firms with strong but inadequate corporate governance and firms with weak but inadequate corporate governance may exhibit different levels of earnings quality, although it is difficult to offer definite directional predictions (as we describe later).

Following the literature, we use Gompers' index as a measure of the strength of corporate
governance. Gompers, Ishii, and Metrick [2003] construct a corporate governance index for each firm in their sample by adding one point for every provision that reduces shareholder rights: the larger the value of the score, the weaker is the corporate governance. Many studies use this score to proxy for corporate governance (e.g., Core, Guay, and Rusticus [2006], Gompers, Ishii, and Metrick [2003], Zhang [2005]).

The notion of adequacy is difficult to quantify. One approach to developing a construct for adequacy is to measure the level of the residual agency problem—the agency problem that remains despite whatever corporate governance is in place. The premise underlying this approach is that more adequate or effective is the corporate governance in place, the lower will be the residual agency problem. Indeed, Core, Holthausen, and Larcker [1999] provide evidence that firms with greater agency problems perform worse. Accordingly, we use past industry-adjusted performance as a measure of the residual agency problem, and therefore of the adequacy of corporate governance. Intuitively, if a firm is outperforming other firms in its industry on a consistent basis, the residual agency problem in the firm is likely low. The corporate governance in place, whether strong or weak, is more likely to be adequate for this firm than another firm that does not have a similar consistent performance record. That is, the corporate boards are likely more effective in their contracting and monitoring roles, managerial incentives are likely better aligned with shareholder interests, and these aspects are reflected in their superior performance. We provide a more detailed discussion of this measure in Section 3.

Overall, the empirical results strongly support our hypotheses. In particular, reporting/earnings quality (accrual quality, earnings persistence, and earnings predictability) is higher for firms that have consistently outperformed their industry counterparts in the past relative to other firms that have not been able to do so. Specifically, reporting/earnings quality is higher regardless of whether the corporate governance levels were strong or weak.

Our results indicate that it is the adequacy of corporate governance, and not just its strength, that determines the quality of financial reports. Recent reforms, including the Sarbanes-Oxley Act, have for the most part emphasized the strengthening of various corporate governance mechanisms to improve informativeness of financial reports and to reduce agency problems. But, at least from a financial reporting perspective, our results indicate that not factoring in the adequacy of existing levels of corporate governance in requiring firms to institute these reforms can be costly to shareholders and to society. To our best knowledge, this paper is among the first to develop the notion of adequacy of corporate governance (as opposed to its strength), and to propose and test an empirical framework to examine its impact on reporting quality.

As noted above, we measure adequacy of corporate governance based on the premise that firms
that consistently outperform other firms in their respective industries have less residual agency problems. Although Core, Holthausen, and Larcker [1999] provide some empirical basis for this premise, consistent past performance is admittedly an imperfect measure of the adequacy of corporate governance. However, even the evidence of a systematic association between consistent past performance and measures of earnings quality that are widely used in the literature is interesting in its own right, because it establishes past performance as a significant determinant of earnings quality.

The paper proceeds as follows. In the next section, we present our motivation and develop hypotheses. In Section 3, we present our methodology and discuss measurement issues. In Section 4, we discuss data and sample selection procedures. We present our results in Section 5. Finally, we provide a conclusion in Section 6.

2 Motivation and Hypotheses

2.1 Framework

Reporting quality refers to the extent to which financial reports of a company communicate its underlying economic state and its performance during the period of measurement in a representationally faithful manner (where representational faithfulness is as defined in FASB Concept Statement No. 2). In this paper, we focus narrowly on earnings quality, an aspect of reporting quality that is defined by Schipper and Vincent [2003] as the extent to which reported earnings measure the Hicksian notion of income.

A basic premise underlying our research is that in the absence of agency conflict between preparers of financial statements (managers) and users of financial statements (shareholders and outsiders), reporting quality is not a concern. There is no incentive for managers to misrepresent the state of the company to shareholders if their incentives are completely aligned or if there is no conflict of interest. In the presence of an agency conflict, informational asymmetries and unobservability of managerial actions can give rise to adverse reporting incentives (in addition to distortions in investment and operational decisions).

Most organizations use a combination of incentive and monitoring mechanisms to address this agency problem, including performance-contingent incentive schemes, formal and informal monitoring systems, corporate governance by a board of directors, independent verification of financial statements by auditors. To the extent that these mechanisms are successful in aligning incentives,

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2 We keep aside incentives with respect to strategic disclosure of information that arise from competition in product markets. Essentially, we are assuming information disclosed in financial statements is too aggregate that their representational faithfulness does not handicap the company in a competitive product market.
we would expect the reporting quality to improve. It seems reasonable to expect that some companies have more effective corporate governance than others. As a first step in developing framework, we explicate this crucial link between adequacy of corporate governance and the notion of residual agency problem next.

2.2 Corporate Governance and the Residual Agency Problem

Corporate governance encompasses many different aspects – the contracting and monitoring roles of the board of directors (BoD), the role of independent external auditors to authenticate financial reports, monitoring presence of large and institutional shareholders. A measure of adequacy of these mechanisms is how effective they are in reducing the agency conflict between capital providers and managers. As recent reporting scandals and routine SEC investigations into reporting practices of some firms suggest, incentive and governance mechanisms can sometimes be woefully inadequate.

We refer to the agency conflict that remains, despite the various corporate governance mechanisms in place, as the residual agency problem. More effective corporate governance is in reducing the agency conflict, the less pronounced will be the residual agency problem, and, from a shareholder perspective, firm performance is likely to be better and earnings quality will be less of an issue. A central purpose of the Sarbanes-Oxley Act enacted in 2002, is to require corporations to implement more stringent controls, and make corporate boards and audit committees more independent. In essence, these stipulations are intended to strengthen corporate governance, which, in turn, will likely improve earnings quality.

We note that given firm-specific costs and benefits of corporate governance, there is likely to be a variation in the extent of the residual agency problem across firms. In other words, optimal corporate governance levels need not entail the same low levels of residual agency problem for all firms. Thus, it is possible that the residual agency problem is relatively more pronounced in some firms than in others despite optimal corporate governance. But it is less likely that corporate governance is sub-optimal when residual agency problems are low. For this reason, we focus more on the notion of adequacy of corporate governance, rather than optimality, to identify firms for which corporate governance has effectively reduced agency problems to low levels.

It is important, however, to distinguish between the strength of corporate governance, and its adequacy. If the extent of the agency problem is small to begin with, strongly independent

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3 Many recent corporate scandals have been attributed to the failure of corporate boards to protect shareholder interests (Bebchuk and Fried [2003], Morgensen [2005]). Recent trends in practice and research reflect a recognition of the need to align directors incentives with shareholder interests in discharging their corporate governance duties (Gabrielle [2001]; Kumar and Sivaramakrishnan [2008]).
corporate boards and stringent monitoring mechanisms may not be necessary. In other words, weaker corporate governance with fewer monitoring mechanisms may well be adequate. On the other hand, if the extent of the agency problem is large, strong corporate governance may be warranted. Indeed, Gompers, Ishii, and Metrick [2003] do not find significant underperformance in firms with weak governance. Larcker, Richardson and Tuna [2005] only find a weaker relationship between governance and future firm performance. It actually implies that the typical measures of governance used in academic research and institutional rating services have limited ability to explain managerial behavior and organizational performance. In other words, the strength of corporate governance can not guarantee firm performance.

Strong corporate governance can be inadequate, and weak corporate governance can be adequate.\(^4\) Thus, strong corporate governance does not necessarily imply high earnings quality, and weak corporate governance does not necessarily imply low earnings quality. However, we can say that firms with adequate corporate governance, whether weak or strong, will have higher earnings quality than firms with inadequate corporate governance, whether weak or strong. Specifically, we have the following hypotheses:

**Hypothesis 1** Firms with adequate corporate governance will have higher earnings quality relative to firms with inadequate corporate governance, regardless of the strength of corporate governance.

**Hypothesis 2** Firms with adequate corporate governance will have higher earnings quality relative to firms with inadequate corporate governance, after controlling for the strength of corporate governance.

Furthermore, as long as corporate governance is adequate, its strength should not make a difference in terms of earnings quality. Therefore, we state the following hypothesis in its null form:

**Hypothesis 3** There is no difference in earnings quality between firms with strong corporate governance and firms with weak corporate governance, as long as the corporate governance is adequate.

### 3 Measurement and Research Design

In this section, we discuss issues relating to the measurement of our main variables of interest – strength of corporate governance, adequacy of corporate governance, and earnings quality, and the proxies we use for these variables. We restate our hypotheses in terms of the measured constructs of these variables and describe our research design.

\(^4\)A good analogy is crime deterrence. Whether the current police force is effective or adequate in a county can be determined by the number of crimes in that county. Thus, even if there is only a small or large police force, as long as the crime rate is minimal, surveillance is adequate in the county. We thank Scott Whisenant for this analogy.
3.1 Strength and Adequacy of Corporate Governance

3.1.1 Strength of Corporate Governance

Following the empirical literature on corporate governance, we use Gompers’ Index, GINDEX, as a measure of the level or the strength of corporate governance. Briefly, Gompers’ index is a composite ordinal measure that captures many different dimensions of corporate governance. The larger the GINDEX, the weaker is the corporate governance. The use of a composite index has several advantages over the use of measures of individual components that make up this index. First, we are interested in overall strength of corporate governance, and not in the relative strengths along individual dimensions. Second, these individual aspects of corporate governance structure are likely interrelated, ignoring which can lead to spurious inferences (Bhagat and Jefferris [2002]).

Nevertheless, we check the robustness of our results to a few selected dimensions of corporate governance making up the Gompers’ index that are likely to have a direct bearing on earnings quality.

Corporate governance can systematically vary from industry to industry, making it difficult to assess its relative strength across a broad sample of firms. For this reason, we define a firm as having weak corporate governance in a specific year if its Gompers’ Index is greater than or equal to the industry median score consistently over the rolling ten-years window. Let ADJGINDEX_AVG be the average of the firms’ yearly industry-adjusted governance index over the rolling ten-years window. Specifically, in period $t$, equation (1) is estimated using all available data from $t−9$ until year $t$. Then, for firm $i$ at time $t$,

$$\text{ADJGINDEX\_AVG}_{i,t} = \frac{\sum_{\tau=1}^{N} (GINDEX_{i,\tau}^{A} - \text{MEDIAN}(GINDEX_{\tau}^{A}))}{N}$$

where $N$ represents the total number of observations for each firm over the rolling ten-years window ($N=10$); $A$ represents the industry to which the firm belongs; $t \in (1990−2003)$; $\tau \in (1981−2003)$. For example, when $t = 1990$, $\tau \in (1981−1990)$; when $t = 1991$, $\tau \in (1982−1991)$. A high ADJGINDEX_AVG value indicates that, on average, firms have weaker corporate governance relative to the industry.

As an alternate measure, we use the frequency with which a firm’s Gompers’ Index falls above or below the industry median score over the rolling ten-years window. This measure is not affected

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5 Agrawal and Knoeber [1996] provide direct empirical evidence of interdependence among seven attributes of corporate governance (shareholdings of insiders, institutions, and large blockholders, use of outside directors, debt policy, the managerial labor market, the market for corporate control).
by the magnitude of the industry adjusted index. Specifically, let ADJGINDEXD_FREQ be the number of years in which the firms’ yearly industry-adjusted governance index, ADJGINDEX, is greater than or equal to zero over the rolling ten-years window:

\[
ADJGINDEXD\_FREQ_{i,t} = \frac{\text{YEARS} \left( \text{GINDEX}^4_{i,\tau} \geq \text{MEDIAN} \left( \text{GINDEX}^4_{\tau} \right) \right)}{N},
\]

where N represents the total number of observations for each firm over the rolling ten-years window (N=10); A represents the industry to which the firm belongs; \( t \in (1990 - 2003) \); \( \tau \in (1981 - 2003) \). Specifically, to measure the strength of corporate governance in period \( t \), equation (2) is estimated using all available data from \( t - 9 \) until year \( t \). That is, when \( t = 1990 \), \( \tau \in (1981 - 1990) \); when \( t = 1991 \), \( \tau \in (1982 - 1991) \); and so on.\(^6\) A higher value of ADJGINDEXD_FREQ would indicate that the firm has consistently weaker corporate governance compared to other firms in its industry.

### 3.1.2 Adequacy of Corporate Governance

As we noted at the outset, measuring the adequacy of corporate governance is a difficult task because it essentially requires the measurement of the residual agency cost. Recall that we define corporate governance as being adequate if the residual agency cost is minimal. All else equal, we would expect managers’ interests to be more aligned with shareholder interests for firms with more effective corporate governance. Consequently, they will take investment and operational actions that are more likely to maximize shareholder value. We would expect such firms to perform consistently better than firms with less adequate governance, all else equal. In other words, more effective governance must translate into greater value for shareholders.

Therefore, we use the firm’s over-time profitability relative to the industry as an inverse measure of the extent of the residual agency problem. We can restate our hypotheses in terms of this measure as follows:

**Hypothesis 1a** Firms with consistently superior profitability relative to the industry will have higher earnings quality relative to firms that are not doing as well, regardless of the strength of corporate governance.

**Hypothesis 2a** Firms with consistently superior profitability relative to the industry will have higher earnings quality relative to firms that are not doing as well, after controlling for the strength of corporate governance.

**Hypothesis 3a** There is no difference in earnings quality between firms with strong corporate gov-

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\(^6\) We will address issues regarding the availability of the Gompers’ index data to compute ADJGINDEXD_FREQ using the rolling ten-year window later in the data section.
ernance and firms with weak corporate governance, as long as firms are consistently outperforming other firms in the industry.

Our use of firm performance to assess residual or unresolved agency problem has some empirical support from prior literature. Core, Holthausen, and Larcker [1999] provide evidence that firms with greater agency problems perform worse. In addition, Berger and Patti [2006] observe that the best-practice firm is the closest approximation to how a firm would behave if agency costs were minimized. Brown and Caylor [2004] use firm performance as a benchmark to determine the effectiveness of corporate governance.

A drawback of this measure is that consistently superior firm performance (relative to the industry) may simply be indicative of managerial talent, and not necessarily of adequate corporate governance. That is, substantial agency problems might still exist despite observed superior performance arising from managerial talent. However, in this case, there is no reason to expect a systematic association between firm performance and earnings quality.

We use return on equity (ROE) as the measure of firm performance. Lambert and Larcker [1987] argues that ROE “has a natural interpretation as a measure of the firm’s performance from the perspective of shareholders.” ROE is widely used to measure the firm overall performance (i.e., Ittner, Larcker, and Rajan [1997], Indjejikian and Nanda [2002], Cheng [2004]). We compute ROE as income before extraordinary items over average total equity.

We define firms with ROE consistently greater than or equal to industry median ROE, as firms with low agency costs. This implies that firms with consistent good performance have adequate corporate governance. ROE_AVG is the average of a firm’s ROE over the rolling ten-years window, while ADJROE_AVG is the average of the firm’s yearly industry-adjusted ROE (ADJROE) over the same period:

$$ADJROE_{AVG_{i,t}} = \frac{\sum_{\tau=1}^{N} \left( ROE_{A盟,t}^{i} - MEDIAN \left( ROE_{A盟}^{\tau} \right) \right)}{N},$$

where N represents the total number of observations for each firm over the rolling ten-years window (N=10); A represents the industry to which the firm belongs. A high ADJROE_AVG value indicates that, on average, the firm has better performance relative to the industry. Alternatively, we also use a frequency measure. ADJROED_FREQ is the number of years in which the firm’s yearly industry-adjusted ROE, ADJROE, is greater than or equal to zero over the rolling ten-years window:

$$ADJROED_{FREQ_{i,t}} = \frac{YEARS \left( ROE_{A盟,t}^{i} \geq MEDIAN \left( ROE_{A盟}^{\tau} \right) \right)}{N},$$
where \( N \) represents the total number of observations for each firm over the rolling ten-years window (\( N=10 \)); \( A \) represents the industry to which the firm belongs. Specifically, to measure the adequacy of corporate governance in period \( t \), equation (4) is estimated using all available data from \( t - 9 \) until year \( t \). That is, for \( t = 1990 \), \( \tau \in (1981 - 1990) \); for \( t = 1991 \), \( \tau \in (1982 - 1991) \); and so on. A high \text{ADJROED\_FREQ} value is indicative of the adequacy of corporate governance.

### 3.1.3 Earnings Quality

We use three alternate proxies for earnings quality widely used in the accounting literature: accrual quality, persistence, and predictability (Francis, LaFond, Olsson, and Schipper [2004]). As Schipper and Vincent [2003] note, each of these constructs is affected by the firm’s business model, industry conditions and economic environment, as well as the choice of reporting policies and procedures by its management. Our interest lies in the latter – the impact of managerial reporting behavior on earnings quality. Consequently, these constructs measure earnings quality with error. However, we do not have any \textit{a priori} reason to believe that this measurement error will bias our tests in any systematic way.

Following Dechow and Dichev [2002], we develop the accrual quality from the model regressing current accruals to lagged, current, and future cash flows from operations:

\[
\frac{TACC_{i,t}}{ASSETS_{i,t}} = \beta_{0,i} + \beta_{1,i} \frac{CFO_{i,t-1}}{ASSETS_{i,t-1}} + \beta_{2,i} \frac{CFO_{i,t}}{ASSETS_{i,t}} + \beta_{3,i} \frac{CFO_{i,t+1}}{ASSETS_{i,t+1}} + \nu_{i,t},
\]

where \( \text{TACC} \) is the total current accruals scaled by total assets,

\[
\text{TACC} = \Delta CA - \Delta CL - \Delta Cash + \Delta STDEBT.
\]

Cash flow from operations, \( \text{CFO} \), is calculated as net income before extraordinary items (COMPUSTAT #18) less total accruals (ACCBS):

\[
\text{ACCBS} = \Delta CA - \Delta CL - \Delta Cash + \Delta STDEBT - \text{DEPN},
\]

where \( \Delta CA \) is firm’s change in current assets (COMPUSTAT #4); \( \Delta CL \) is the change in current liabilities (COMPUSTAT #5); \( \Delta Cash \) is the change in cash (COMPUSTAT #1); \( \Delta STDEBT \) is the change in debt in current liabilities (COMPUSTAT #34); and DEPN is depreciation and amortization expense (COMPUSTAT #14). For each firm-year, we estimate equation (5) using rolling ten-year windows. We define the standard deviation of firm j’s estimated residuals as the inverse of accrual quality, \( \text{INVACCQ} = \sigma(\hat{\nu}_i) \). Large values of \( \text{INVACCQ} \) represent poor accrual
quality.

Following Francis, LaFond, Olsson, and Schipper [2004], we develop the earnings persistence and predictability from estimating equation (8) below. Earnings persistence is the $AR(1)$ slope coefficient estimate. EARN is measured as firm’s net income before extraordinary items in year $t$ divided by the weighted average number of outstanding shares during year $t$ (COMPUSTAT #18 over average #25).

$$EARN_{i,t} = \lambda_{0,i} + \lambda_{1,i}EARN_{i,t-1} + \epsilon_{i,t}. \quad (8)$$

For each firm-year, we estimate equation (8) using maximum likelihood estimation and rolling ten-year windows. This procedure yields firm- and year-specific estimates of $\lambda$, which captures the persistence of earnings. Values close to one imply persistent earnings, while values close to zero imply highly transitory earnings. To be consistent with other measures of earnings quality in a directional sense, we define an inverse of persistence, $INVPERS = -\lambda$, the negative of the $AR(1)$ parameter, so that larger values of $INVPERS$ represent less persistent earnings.

By the same token, we define an inverse of predictability as the square root of the error variance estimated from equation (8), $INVPRED = \sigma(\epsilon_{t,i})$. Large values of $INVPRED$ imply less predictable earnings. Thus, the higher values of $INVACCQ$, $INVPERS$, and $INVPRED$ indicate poor earnings quality.

3.1.4 Research Design

Our hypotheses relate to the association between the two dimensions of corporate governance – strength and adequacy – and earnings quality. To examine the association between each dimension of corporate governance while controlling for the other, we use a simple two-by-two design to classify sample observations along the two corporate governance dimensions.\(^7\) Figure 1 illustrates this classification.

(Insert figure 1 about here)

To classify firms into high or low adequacy groups, we use the frequency measure of consistent profitability performance, $ADJROED\_FREQ$, defined in equation (4). $ADJROED\_FREQ$ is the number of years in which the firm’s yearly industry-adjusted ROE, $ADJROE$, is greater than or equal to zero. A high $ADJROED\_FREQ$ value is indicative of the adequacy of corporate governance. Consequently, over the sample period, if a firm’s $ADJROED\_FREQ$ is ranked in the

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\(^7\)The underlying assumption of the two-by-two design is the independence of strength and adequacy of corporate governance. Assuming the strength and adequacy are dependent, there would be cell(s) without any observations. However, we did not observe such a pattern.
top 50% of the sample, we classify that firm as having adequate governance (referred as good-performance firms); otherwise we classify it as having (relatively) inadequate corporate governance (referred as bad-performance firms).

Similarly, we use the frequency measure of governance index, ADJGINDEXD_FREQ, defined in equation (2), to classify firms into strong- or weak-governance firms. Higher value of ADJGINDEXD_FREQ would indicate that the firm has consistently weaker governance compared to other firms in its industry. Therefore, over the sample period, if a firm’s ADJGINDEXD_FREQ is ranked in the top 50% of the sample, we classify that firm as having weak governance (hereafter weak-governance firms); otherwise we classify it as having strong governance (hereafter strong-governance firms).

This structure allows us to test our hypotheses by making intergroup comparisons of earnings quality. Referring to Figure 1, Group 1 comprises firms with adequate but weak governance (hereafter ‘good-performance/weak-governance firms’). Relatively speaking, weak governance is adequate in controlling the agency problem for these firms, because they have low monitoring needs. Group 2 denotes the firms with adequate but strong governance (hereafter ‘good-performance/strong-governance firms’). Thus, by design, firms in both Group 1 and Group 2 have adequate governance, although they have different levels of governance.

Firms in Group 3 have inadequate weak governance (hereafter ‘bad-performance/weak-governance firms’). For these firms, strengthening governance is arguably beneficial from a shareholder perspective. Finally, firms in Group 4 have inadequate strong governance (hereafter ‘bad-performance/strong-governance firms’). For these firms, prevailing governance levels (despite being strong) are likely to be less adequate (relatively speaking).

4 Data

4.1 Sample

To construct our sample, we start with the entire time period for which financial data are available in Annual COMPSTAT database (1950-2005). Given that we estimate earnings quality measures using rolling ten-year windows, we include a firm in year t sample if data are available for years $t-9$ to $t$. We require that the firm should have the relevant financial information in Standard & Poor’s Annual COMPSTAT Merged Industrial Research File for the sample period. We exclude firm-year observations affected by mergers and/or acquisitions in order to mitigate the impact of

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8To maximize the sample size, the sample period starts in year of 1950, which is the earliest year covered in Compustat. The sample period ends in year of 2005, since there is no available value of future cash flow in year of 2006 or afterwards.
these activities on firm performance. Finally, we delete firms in the financial sector because they have different financial reporting characteristics. We winsorize the financial variables at the one percent and ninety-nine percent level. We also require a minimum of ten sample observations in each year within each industry in order to enable industry-level estimations. These steps yield a sample of 3,060 unique firms and 49,506 firm-year observations (hereafter, the ‘full sample’). Panel A of table 1 provides a summary of the sample selection procedure for this full sample.

(Insert table 1 about here)

We obtain data regarding corporate governance index from the Investor Responsibility Research Center’s (IRRC) corporate governance file. To be included in the sample, we require that a firm have Governance Index value in one of the years for which IRRC provides this index (1990, 1993, 1995, 1998, 2000, or 2002), and relevant financial information in the Annual COMPUSTAT database described above. Following other studies in the literature that have employed Gompers’ index, we replace the missing values of GINDEX by the value of the most recently reported GINDEX in IRRC.9

This index sample period spans 23 years from 1981 to 2003. The index sample period commences in 1981 because we require ten years of GINDEX data to compute ADJGINDEXD_FREQ on a rolling basis, and the earliest year covered in IRRC dataset is the year of 1990. We are limited in our ability to compute ADJGINDEXD_FREQ on a rolling basis because of GINDEX is only available in discrete intervals after 1990. For instance, since GINDEX is only available from 1990 onward, calculation of ADJGINDEXD_FREQ for 1990 is based only on one year of data and so on. Finally, GINDEX data is also available for year of 2004 and 2006. However, due to the unknown impact of SOX on corporate governance, we did not use GINDEX in 2004 or 2006. Therefore, the index sample period ends in 2003.

Our final sample for which we have GINDEX data consists of 409 firms with 5,806 firm-year observations (hereafter, the ‘index sample’). Panel B of table 1 provides a summary of the sample selection procedure for this index sample.

4.2 Classification

As described in Section 3, we first classify firms by ADJROED_FREQ. Table 2 presents key descriptive statistics for the full sample. Panel A provides the statistics for the entire sample, and panel B characterizes subsamples consisting of good- or bad-performance firms. As we can

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9 We first replace the missing values of GINDEX by the value of the most recently reported GINDEX in previous periods. If there are still some remaining missing values, then we replace them by the first non-missing value in the following periods.
see from panel B, these two groups have distinctly different characteristics. By design, good-performance firms have higher values of ROE_AVG, ADJROE_AVG, and ADJROED_FREQ than bad-performance firms. Note that good-performance firms are also larger in size (LOGSIZE), price-to-earnings ratio (PE), market-to-book ratio (M/B) and leverage (LEVERAGE) than bad-performance firms. The differences in values of the above variables are statistically significant. These distinct profiles suggest that partitioning the sample based on consistent past performance appears to result in groups that differ in the extent of the residual agency problem.

(Insert table 2 about here)


We use cross-sectional median values of ADJGINDEXD_FREQ, defined in equation (2), to classify firms into strong governance (below the median) and weak governance (above or equal to the median); and ADJROED_FREQ, defined in equation (4), to classify firms into bad performance (below the median) and good-performance firms (above or equal to the median).

(Insert Table 3 about here)

Panel A of table 3 reports the descriptive statistics for the overall index sample. The results reported in panel B, table 3 indicate that strong- or weak- governance firms and good- or bad-performance firms have distinct profiles.

Testing Hypotheses 2a requires that there be no significant difference in the strength of corporate governance between Group 1 and Group 3 (given weak governance) and between Group 2 and Group 4 (given strong governance). Referring to panel C of table 3, notice that the mean (median) values of GINDEX_AVG, ADJGINDEX_AVG, and ADJGINDEXD_FREQ do not differ statistically across Groups 1 and 3.10 Panel C of table 3 also reports that, on average, GINDEX_AVG, ADJGINDEX_AVG, and ADJGINDEXD_FREQ values do not differ statistically between Groups 2 and 4.

Similarly, tests involving comparisons of Groups 1 and 2 require that there be no significant difference in consistent past performance between these two groups (i.e., tests of Hypothesis 3a). Referring to panel C of table 3, the differences in ROE_AVG, ADJROE_AVG and ADJROED_FREQ across these two groups are not statistically significant.

---

10 In computing these means (medians), we first compute the over-time mean (median) for each firm in the group, and then compute the cross-sectional mean (median) value for the group.
5 Results

5.1 Past Performance and Earnings Quality

In Hypothesis 1a, we posited that earnings quality should be higher for good-performance firms than for bad-performance firms. Table 4 reports the results relating to this hypothesis.

(Insert table 4 about here)

In panel A, we report estimates of the inverses of accrual quality (INVACCQ), earnings persistence (INVPERS), and earnings predictive ability (INVPRED) for the full sample. These estimates are comparable in magnitude to the corresponding estimates presented in Francis, LaFond, Olsson, and Schipper [2004], although our estimates of INVPRED is little on the higher side. Panel B reports that good-performance firms have lower values of INVACCQ, INVPERS, and INVPRED relative to bad-performance firms. In particular, the mean value of INVACCQ is 0.0294 for good performance firms which is significantly lower than the mean value of 0.0414 for bad performance firms (t-statistic for difference (bad-good) = 20.75, p < 0.01). The mean value of INVPERS for good performance firms is −0.4380 which is significantly lower than the mean value −0.3589 for bad performance firms (t-statistic for difference (bad-good) = 14.78, p < 0.01). Finally, the mean value of INVPRED for good performance firms is 0.9592, which is also significantly lower than the mean value of 1.1722 for bad performance firms (t-statistic for difference (bad-good) = 8.89, p < 0.01). Since lower values of these variables indicate high reporting/earnings quality, these results support Hypothesis 1a. Further, to the extent that consistent past performance reflects the residual agency problem, these results suggest that earnings quality is higher for firms with adequate corporate governance.

5.2 Governance Strength, Past Performance, and Earnings Quality

5.2.1 Univariate Analysis

Table 5 presents descriptive statistics on the three inverse measures of earnings quality: INVACCQ, INVPERS, INVPRED. Panel A, table 5 reports the statistics for the index sample. These values are somewhat different from the statistics for the full sample reported in panel A of table 4. One reason for this difference between the index sample and the full sample is that the index sample consists of S&P 1500 firms because the IRRC dataset only covers these firms. Since S&P 1500 firms tend to be larger and better performing firms, Hypothesis 1a would imply that the earnings quality would be better for these firms. Indeed, the values of INVACCQ and INVPRED reported in

\[11\] The results of the median tests follow the same pattern as those of the mean tests.
panel A, table 5 are lower than those reported in panel A, table 4, indicating that earnings quality is on average higher for firms in the index sample relative to firms in the full sample. However, the INVPERS measure does not support this inference because the value of INVPERS reported in panel A of table 5 is higher than that reported in panel A of table 4.

(Insert table 5 about here)

Referring to panel B of table 5, the mean value of INV\text{PRED} is 0.7799 for strong-governance firms, which is lower than the mean value 0.8778 for weak-governance firms. However, the mean values of INV\text{ACCQ} and INVPERS for firms with strong-governance firms are not significantly different from the mean values for weak-governance firms. Surprisingly, the median value of INV\text{ACCQ} is 0.0153 for strong-governance firms, which is statistically significantly higher than the mean value 0.0140 for weak-governance firms. The mixed results in fact suggest that strong-governance firms do not necessarily have high earnings quality relative to weak-governance firms, since the higher values of INV\text{ACCQ}, INVPERS, INV\text{PRED} indicate low earnings quality.

Bad-performance firms have significantly higher values of INV\text{ACCQ}, INVPERS, and INV\text{PRED} than good-performance firms. Because the higher values of these variables indicate low earnings quality, this result implies that good-performance firms have higher earnings quality than bad-performance firms. Coupled with results in panel B of table 4, the results support our Hypothesis 1a, and therefore Hypothesis 1. That is, firms with adequate governance, or firms with consistently superior profitability relative to the industry, are associated with higher earnings quality relative to firms that are not doing as well, regardless of the strength of governance.

Hypotheses 2a states that earnings quality should be higher for good-performance firms relative to bad-performance firms, controlling for the strength of corporate governance. Panel C of table 5 shows that there is a statistically significant negative difference in INV\text{PRED} between good-performance/weak-governance firms (Group 1) and bad-performance/weak-governance firms (Group 3) \((t = -7.20, p\text{-value}< 0.001)\), and between good-performance/strong-governance firms (Group 2) and bad-performance/strong-governance firms (Group 4) \((t = -6.37, p\text{-value}< 0.001)\) (see table 5, panel C). The results are similar with INV\text{ACCQ} and INVPERS measures as well, and support Hypothesis 2a.

Hypothesis 3a implies that as long as firms are consistently outperforming other firms in their respective industries (i.e., the governance is adequate), there is no reason to expect earnings quality to be different between weak-governance firms and strong-governance firms. Referring to panel C of table 5, the mean value of INV\text{ACCQ} is 0.0171 for good performance/weak-governance firms, which is significantly lower than the mean value 0.0192 for good performance/strong governance firms.
Meanwhile, the mean value of INVPRED is 0.7117 for good performance/weak-governance firms, which is marginally significantly higher than the mean value 0.6380 for good performance/strong governance firms. Again, the mixed results indicate that firms with weak governance may not necessarily have low earnings quality relative to firms with strong governance.

Overall, the results reported in table 5 support the conclusion that it is the adequacy rather than the strength of governance that is associated with earnings quality. In the next section, we perform a multivariate analysis to ascertain that these results hold after controlling for other determinants of earnings quality and firm performance.

5.2.2 Multivariate Analysis

A multitude of factors are likely to influence the association between earnings quality and corporate governance. In this section, we perform a multivariate analysis to control for the effects of some of these factors in investigating the impact of the strength and the adequacy of governance on earnings quality. Specifically, as shown in equation (9), we control for the impact of firm size (LOGSIZE), firm capital structure (LEVERAGE), the extent of firm growth (M/B) and industry effect (IND) on our results. We consider these variables for two reasons. First, as shown in table 2, there are significant differences in these variables between firms with good and bad consistent past performance.12 Second, these variables are identified in prior literature (Burgstahler and Dichev [1997], Hodgson and Stevenson-Clarke [2000], Lee, Li and Yue [2005]) as being associated with the extent of earnings management and earnings quality. Specifically, we estimate the following regression model:

\[
INVEQ_{i,t} = \theta_0 + \sum_{j=1}^{J} \theta_{1,j} IND_j + \theta_2 GROUP_{i,t} + \\
\theta_3 \text{LOGSIZE}_{i,t} + \theta_4 \text{LEVERAGE}_{i,t} + \theta_5 M/B_{i,t} + \epsilon_{i,t},
\]

where \(INVEQ\): represents the inverse of earnings quality—\(INVACQ, INVPERS,\) or \(INVPRED\); \(IND\) variables are industry dummy variables which assumes a value of one if a firm belongs to a specific industry (we follow the industry classification used in Barth, Cram and Nelson [2001]), zero otherwise; \(GROUP\): is the dummy variable which takes on a value of one (and zero otherwise) if (i) the firm belongs to Group 2 or Group 3 when the comparisons are between Groups 1 and 2, or Groups 1 and 3; (ii) the firm belongs to Group 4 when the comparisons are between Groups 2 and 4, or Groups 3 and 4; \(LOGSIZE\): represents firm size, calculated as the natural log of

---

12 In the untabulated descriptive statistics of the index sample, there are significant differences in these variables between good performance/weak governance firms and bad performance/weak governance firms.
lagged assets (COMPUSTAT #6); LEVERAGE: represents firm leverage ratio, calculated as the long-term debt (COMPUSTAT #9) over total assets (COMPUSTAT #6); M/B: represents firm’s market-to-book ratio, calculated as market value (COMPUSTAT #199 × #25) over book value (COMPUSTAT #60).

Evidence in Burgstahler and Dichev [1997] indicates that medium and large firms exhibit more pronounced earnings management. Thus, we expect the coefficient of LOGSIZE to be positive, \( \theta_3 > 0 \). The positive \( \theta_3 \) indicates low earnings quality or more earnings management as firm size increases. Hodgson and Stevenson-Clarke [2000] provide evidence that the likelihood of earnings management increases as the proximity to debt covenants increases. Thus, we expect the coefficient of LEVERAGE to be positive, \( \theta_4 > 0 \). The positive \( \theta_4 \) indicates low earnings quality or high earnings management as LEVERAGE increases. Lee, Li and Yue [2005] indicate that growth firms have low earnings quality. Using M/B as a proxy for growth, we expect its coefficient to be positive, \( \theta_5 > 0 \).

(Insert table 6 about here)

Table 6 reports the multivariate regression results and highlights several key points. First, Hypothesis 2a predicts a positive coefficient for GROUP (\( \theta_2 \)) in equation (9) when we compare Groups 1 and 3 (good-performance/weak-governance firms versus bad-performance/weak-governance firms). The results reported in table 6 support this prediction. For example, the null hypothesis that \( \theta_2 = 0 \) is rejected at conventional levels of significance when dependent variables are INVACCQ (\( t = 3.99, p < .0001 \)), INVPERS (\( t = 4.31, p < .0001 \)), and INVPRED (\( t = 6.78, p < .0001 \)).

Second, Hypothesis 2a also predicts a positive coefficient for GROUP (\( \theta_2 \)) in equation (9) when the comparison is Group 2 versus Group 4 (good-performance/strong-governance firms versus bad-performance/strong-governance firms). Again, the results in table 6 provide strong support to this prediction; the null hypothesis that \( \theta_2 = 0 \) is rejected at conventional levels of significance when dependent variables are INVACCQ (\( t = 3.24, p = 0.0012 \)), INVPERS (\( t = 2.46, p < 0.0141 \)), and INVPRED (\( t = 6.23, p < .0001 \)).

Finally, there is indeed no statistically significant difference in INVPERS and INVPRED between Groups 1 and 2 (good-performance/weak-governance firms versus good-performance/strong-governance firms). We fail to reject the null that earnings quality is not different between these two groups using INVPERS and INVPRED. Although there is a significant difference between these two groups in INVACCQ, the accrual quality of good-performance/strong governance firms is lower than that of good-performance/weak governance firms. Such results is contrary to our
intuition that strong governance associates with high earnings quality.

As reported in table 6, $\theta_3$ is positive as indicated in prior literature. The positive $\theta_3$ indicates more earnings management or low earnings quality as firm size increases. However, $\theta_3$ is negative when we use $INV\text{ACCQ}$ as dependent variable. Turning to $\text{LEVERAGE}$, the sign of $\theta_4$ is positive as predicted when we use $\text{INV\text{PRED}}$ as dependent variable. While, $\theta_4$ is negative when we use $INV\text{ACCQ}$ ($\text{INV\text{PERS}}$) as the dependent variable and compare bad-performance/weak-governance firms and bad-performance/strong-governance firms (good-performance/weak-governance firms and bad-performance/weak-governance firms). As reported in table 6, the signs of $\theta_5$ are mixed. We are not able to offer a good explanation for these results with respect to $M/B$.\footnote{In the untabulated descriptive statistics of the index sample, the average values of M/B are higher in good-performance firms than in bad-performance firms, regardless of (or controlling) the strength of corporate governance.}

6 Sensitivity Tests

6.1 Alternative Corporate Governance Measures

In the main tests, we use $\text{GINDEX}$ as a measure of the strength of corporate governance. As a robustness check, we use two components of $\text{GINDEX}$ to measure the strength of corporate governance; namely, the percentage of the independent board members, $\text{PCTONBD}$; the board size, $\text{BBSIZE}$.

6.1.1 Percentage of Independent Board

The percentage of independent board members is widely used by researchers interested in the association between governance and earnings management. For example, Beasley [1996] show that no-fraud firms have boards with significantly higher percentages of outside members than fraud firms. Peasnell, Pope and Young [2005] provide evidence that the incidence of earnings management depends on the proportion of outsiders on the board, using UK firms.

We use the frequency with which a firm’s $\text{PTCONBD}$ fall above or below the industry median score over the sample period. We define $\text{ADJPCTONBD}_\text{FREQ}$ be the number of years in which the firms’ yearly industry-adjusted $\text{PCTONBD}$, $\text{ADJPCTONBD}$, is greater than or equal to zero:

$$\text{ADJPCTONBD}_\text{FREQ}_{i,t} = \frac{\text{YEARS (PCTONBD}_{i,t}^A \geq \text{MEDIAN (PCTONBD}}_{i,t}^A))}{N},$$

where $N$ represents the total number of observations for each firm over the rolling ten-years window ($N=10$); $A$ represents the industry to which the firm belongs; $t \in (1990 - 2003)$; $\tau \in (1981 -$
2003). Specifically, to measure the strength of corporate governance in period $t$, equation (10) is estimated using all available data from $t - 9$ until year $t$. That is, when $t = 1990$, $\tau \in (1981 - 1990)$; when $t = 1991$, $\tau \in (1982 - 1991)$; and so on. A higher value of ADJPCTONBD_FREQ would indicate that the firm has consistently stronger corporate governance compared to other firms in its industry. Over the sample period, if a firm’s ADJPCTONBD_FREQ is ranked in the top 50% of the sample, we classify that firm as having strong governance; otherwise we classify it as having weak governance.

*(Insert table 7 about here)*

As shown in panels A of table 7, the results are again consistent with our main results: the mean values of $INVACCQ$, $INVPERS$ and $INVPRED$ for good-performance/weak-governance firms are significantly lower than the mean values for bad-performance/weak-governance firms. The mean values of the inverse of earnings quality, except for $INVACCQ$, for good-performance/strong-governance firms are significantly lower than the mean values for bad-performance/strong-governance firms. The results imply that given same level of governance, the earnings quality is a function of consistent past performance - the adequacy of governance. Also, as before, we are not able to reject the null hypothesis that Groups 1 and 2 have the same reporting/earnings quality, except for the earnings predictability.

### 6.1.2 Board Size

The size of the board of director is the other factor popularly used by researchers to proxy the strength of corporate governance (Denis [2001], Wilkinson and Clements [2006]). Thus, we use the board size as an alternative measure of the strength of corporate governance in our robustness test.

We define $ADJBDSIZE_FREQ$ be the number of years in which the firms’ yearly industry-adjusted BDSIZE, $ADJBDSIZE$, is greater than or equal to zero:

$$ADJBDSIZE_FREQ_{i,t} = \frac{\text{YEARS}(\text{BDSIZE}^{A}_{i,\tau} \geq \text{MEDIAN}(\text{BDSIZE}^{A}_{\tau}))}{N},$$

where $N$ represents the total number of observations for each firm over the rolling ten-years window ($N=10$); $A$ represents the industry to which the firm belongs. A higher value of $ADJBDSIZE_FREQ$ would indicate that the firm has *consistently* stronger corporate governance compared to other firms in its industry. Again, over the sample period, if a firm’s $ADJBDSIZE_FREQ$ is ranked in the top 50% of the sample, we classify that firm as having strong governance; otherwise we classify it as having weak governance.
As shown in panel B of table 7, the mean values of INVACCQ, INVPERS and INVPRED for good-performance/strong-governance firms are significantly lower than the mean values for bad-performance/strong-governance firms (Group 2 versus Group 4). Although the mean value of INVPRED for good-performance/weak governance firms is significantly lower than the mean value for bad-performance/weak-governance firms (Group 1 versus Group 3), the mean values of INVACCQ and INVPERS for these two groups are not significantly different. Interestingly, the mean values of the inverse of earnings quality, INVACCQ, for good-performance/weak governance firms are significantly higher than the mean values for good-performance/strong governance firms (Group 1 versus Group 2). However, the mean values of INVPRED for good-performance/weak-governance firms are significantly lower than the mean values for good-performance/strong governance firms (Group 1 versus Group 2). The mixed results indicate that we can not reject the null hypothesis 3(a) in one of the directions.

Many studies argue that the notion that larger board size represents strong governance may be misplaced. On one hand, the costs of coordination and free riding are less for smaller boards. Many studies also indicate lower earnings management as board size decreases. On the other hand, many studies argue for larger size boards in firms. For example, Adams and Mehran [2005] documents that banking firms with larger boards do not underperform their peers in terms of Tobin’s Q. Consequently, given good performance, the comparison of weak and strong governance could be affected by classification errors. However, such classification errors only affect our ability to control for the strength of governance. Therefore, the results involving comparisons of Groups 1 and 3, and Groups 2 and 4 should still hold.

7 Conclusion

In this paper, we provide evidence on the link between firm’s report/earnings quality and corporate governance. Specifically, we investigate whether accrual quality, earnings persistence and earnings predictive ability are affected by the adequacy rather than the strength of governance. A key aspect of our study is the distinction that we draw between the adequacy of governance and the strength of governance (as measured by Gompers’ Index). Based on agency theory, we treat existing levels of corporate governance in firms as being more adequate, if residual agency problems are less.

Our results can be summarized as follows. First, regardless of strength of corporate governance, we find firms that have consistently outperform their industry rivals have high accrual quality, high earnings persistence, and high earnings predictive ability. Our results suggest that as the corporate
governance is adequate, regardless of the strength of governance, earnings quality is high.

Second, we find that firms with adequate governance tend to have high accrual quality, high earnings persistence, and high earnings predictive ability, given the same level of corporate governance. This suggests that weak governance can be adequate some times in controlling the agency problem, such as when firms have low monitoring needs or less of an agency problem to begin with. Thus, our results suggest adequacy of corporate governance is a significant determinant of earnings quality. These results appear robust to alternative proxies for strength of governance.

Finally, an important aspect of our analysis is the use of past industry-adjusted performance as a measure of the residual agency problem, and therefore of the adequacy of corporate governance. We choose this measure based on the finding in Core, Holthausen, and Larcker [1999] that firms with greater agency problems perform worse. Our purpose here has been to offer a first step in proposing and testing an empirical framework linking adequacy of corporate governance and reporting quality. Clearly, an avenue for future research is to explore ways in which to refine the adequacy measure.
References


Figure 1: Classification of firms based on strength and adequacy of corporate governance
<table>
<thead>
<tr>
<th>Panel A: The Full Sample</th>
<th>Firm Year</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm year observations in COMPUSTAT for years 1950-2006</td>
<td>788,304</td>
<td>26,945</td>
</tr>
<tr>
<td>Firm year observations after deleting firm year observations with mergers and acquisitions</td>
<td>744,871</td>
<td>26,945</td>
</tr>
<tr>
<td>Firm year observations after deleting financial industries and other industry</td>
<td>582,394</td>
<td>20,701</td>
</tr>
<tr>
<td>Firm year observations without missing financial variables</td>
<td>124,953</td>
<td>15,248</td>
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<tr>
<td>Firm year observations after deleting firms without 10 continuous firm year observations</td>
<td>49,813</td>
<td>3,077</td>
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<tr>
<td>Firm year observations after deleting industries with less than 10 observations in each year from 1950 to 2005</td>
<td>49,506</td>
<td>3,060</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>49,506</strong></td>
<td><strong>3,060</strong></td>
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<table>
<thead>
<tr>
<th>Panel B: The Index Sample</th>
<th>Firm Year</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firms year observations in IRRC datasets with the size of board of directors and the percentage of independent board of directors for years 1997-2003 except for year 2001</td>
<td>8,379</td>
<td>2,654</td>
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<td>Firm year observations covered in IRRC, and COMPUSTAT (1950-2004)</td>
<td>59,307</td>
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<td>Firm year observations after deleting firm year observations with mergers and acquisitions</td>
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<td>2,667</td>
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<tr>
<td>Firm year observations after deleting financial industries and other industry</td>
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<td>Firm year observations without missing financial variables</td>
<td>23,463</td>
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<tr>
<td>Firm year observations after deleting firms without 10 continuous firm year observations</td>
<td>13,456</td>
<td>626</td>
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<tr>
<td>Firm year observations after deleting observations before 1990</td>
<td>6,547</td>
<td>456</td>
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<tr>
<td>Firm year observations after deleting industries with less than 10 observations in each year from 1990 to 2003</td>
<td>5,806</td>
<td>409</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>5,806</strong></td>
<td><strong>409</strong></td>
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### TABLE 2
The Descriptive Statistics of the Sample – Full Sample

#### Panel A: The Full Sample

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<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Std</th>
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<tbody>
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<td>0.1003</td>
<td>0.2252</td>
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#### Panel B: The Comparison of Firms with Good or Bad-Performance

<table>
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<tr>
<th></th>
<th>Bad-Performance</th>
<th>Good-Performance</th>
<th>Bad Minus Good</th>
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<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>Median</td>
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</tbody>
</table>

Table 2 reports descriptive statistics by performance. We also report results of univariate tests of differences between firms with good- and bad-performance. ROE represents income before extraordinary items over average total equity (COMPUSTAT #18 over average #216). ROE_AVG is the average of a firm’s ROE over the ten-years rolling window, while ADJROE_AVG is the average of the firm’s yearly industry-adjusted ROE (ADJROE) over the ten-years rolling window. ADJROED_FREQ is the number of years in which the firm’s yearly industry-adjusted ROE, ADJROE, is greater than zero (divided by the number of firm observations). Over the ten-years rolling window, if a firm’s ADJROED_FREQ is ranked in the top 50% of the sample, it is assumed to have good performance and adequate corporate governance, whether weak or strong. ROA is the return on assets (COMPUSTAT #18 / average #6). CFO, cash flow from operations, is calculated as net income before extraordinary items (COMPUSTAT #18) less total accruals (ACCBS), where ACCBS = ΔCA - ΔCL - ΔCash + ΔSTDEBT - DEPN; ΔCA is firm’s change in current assets (COMPUSTAT #4); ΔCL is firm’s change in current liabilities (COMPUSTAT #5); ΔCash is firm’s change in cash (COMPUSTAT #1); ΔSTDEBT is firm’s change in debt in current liabilities (COMPUSTAT #34); and DEPN is firm’s depreciation and amortization expense (COMPUSTAT #14). EARN is measured as firm’s net income before extraordinary items in year t divided by the average number of outstanding shares during year t (COMPUSTAT #18 over average #25). LEVERAGE is the leverage ratio, measured as long-term debt (COMPUSTAT #9) over total assets (COMPUSTAT #6). M/B is the market-to-book ratio, measured as market value (COMPUSTAT #199 * #25) over book value (COMPUSTAT #60). PE is the price-to-earnings ratio, measured as price (COMPUSTAT #199) over earnings per share (COMPUSTAT #58). LOGSIZE is the log of lagged total assets (COMPUSTAT #76). The t-value represents the t-statistic of the mean test. Z-value represents the z-statistic of the two-sided median test. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.
### Panel A: The Index Sample

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROE_AVG</td>
<td>2,110</td>
<td>0.1055</td>
<td>0.1152</td>
<td>0.1190</td>
</tr>
<tr>
<td>ADJROE_AVG</td>
<td>2,110</td>
<td>-0.0161</td>
<td>-0.0067</td>
<td>0.1114</td>
</tr>
<tr>
<td>ADJROED_FREQ</td>
<td>2,110</td>
<td>0.5095</td>
<td>0.5000</td>
<td>0.3112</td>
</tr>
<tr>
<td>GINDEX_AVG</td>
<td>2,110</td>
<td>8.4581</td>
<td>8.0000</td>
<td>2.7392</td>
</tr>
<tr>
<td>ADJGINDEX_AVG</td>
<td>2,110</td>
<td>0.2222</td>
<td>0</td>
<td>2.7266</td>
</tr>
<tr>
<td>ADJGINDEXD_FREQ</td>
<td>2,110</td>
<td>0.5705</td>
<td>0.9000</td>
<td>0.4676</td>
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</tbody>
</table>

### Panel B: The Comparisons of Strong versus Weak Corporate Governance, and Bad versus Good Performance

<table>
<thead>
<tr>
<th></th>
<th>Strong (N=253)</th>
<th>Weak (N=309)</th>
<th>Strong Minus Weak</th>
<th>Bad (N=283)</th>
<th>Good (N=279)</th>
<th>Bad Minus Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (Median)</td>
<td>t-value</td>
<td>Mean (Median)</td>
<td>t-value</td>
<td>z-value</td>
<td>t-value</td>
<td>z-value</td>
</tr>
<tr>
<td>ROE_AVG</td>
<td>0.0897 (0.1148)</td>
<td>-0.57 (0.7624)</td>
<td>0.0320 (0.8040)</td>
<td>-12.67***</td>
<td>(-14.0768***)</td>
<td>8.0000 (0.1144)</td>
</tr>
<tr>
<td>ADJROE_AVG</td>
<td>-0.028 (-0.008)</td>
<td>-0.56 (0.593)</td>
<td>-0.0853 (-0.0435)</td>
<td>-35.16***</td>
<td>(-22.4419***)</td>
<td>8.0000 (0.7000)</td>
</tr>
<tr>
<td>ADJROED_FREQ</td>
<td>0.5045 (0.5000)</td>
<td>0.47 (0.6005)</td>
<td>0.2678 (0.3000)</td>
<td>8.5596 (8.3000)</td>
<td>8.3099 (8.0000)</td>
<td>1.12 (1.1733)</td>
</tr>
<tr>
<td>GINDEX_AVG</td>
<td>6.2706 (6.1500)</td>
<td>-26.95*** (-17.3794***)</td>
<td>8.5596 (8.3000)</td>
<td>8.3099 (8.0000)</td>
<td>1.12 (1.1733)</td>
<td>10.208 (10.0000)</td>
</tr>
<tr>
<td>ADJGINDEX_AVG</td>
<td>-1.969 (-1.7500)</td>
<td>-28.97*** (-21.1188***)</td>
<td>0.3336 (0.0167)</td>
<td>0.0884 (0.0000)</td>
<td>1.13 (1.1805)</td>
<td>1.9972 (1.5000)</td>
</tr>
<tr>
<td>ADJGINDEXD_FREQ</td>
<td>0.132 (0.0000)</td>
<td>-57.09*** (-21.432***)</td>
<td>0.6196 (1.0000)</td>
<td>0.5783 (0.8500)</td>
<td>1.08 (1.433)</td>
<td>0.9816 (1.0000)</td>
</tr>
</tbody>
</table>
Table 3 reports the degree of corporate governance and the performance of the four groups. Specifically, we report the descriptive statistics of strength of corporate governance and consistent performance for the index sample in panel A. In panel B, we report univariate test results regarding the differences between firms with different degree of corporate governance, and between firms with different levels of consistent performance. In panel C, we report univariate test results regarding differences among the four groups. Please note that Group 1 represents good-performance/weak-governance firms; Group 2 represents good-performance/strong-governance firms; Group 3 represents bad-performance/weak-governance firms; and Group 4 represents bad-performance/weak-governance firms. ROE represents income before extraordinary items over average total equity (COMPUSTAT #18 over average #216). ROE_AVG is the average of a firm’s ROE over the ten-years rolling window, while ADJROE_AVG is the average of the firm’s yearly industry-adjusted ROE (ADJROE) over the ten-years rolling window. ADJROE_FREQ is the number of years in which the firm’s yearly industry-adjusted ROE, ADJROE, is greater than zero (divided by the number of firm observations). Over the ten-years rolling window, if a firm’s ADJROE_FREQ is ranked in the top 50% of the sample, it is assumed to have good performance and adequate corporate governance, whether weak or strong. GINDEX_AVG represents the average of firms’ GINDEX over the ten-years rolling window, while ADJGINDEX_AVG is the average of the firms’ yearly industry-adjusted governance index (ADJGINDEX) over the ten-years rolling window. ADJGINDEXD_FREQ is the number of years in which the firms’ yearly industry-adjusted governance index, ADJGINDEX, is greater than zero (divided by the number of firm observations). Over the ten-years rolling window, if a firm’s ADJGINDEXD_FREQ is ranked in the top 50% of the sample, it is assumed to have weak corporate governance. In computing the mean (median) for each group, we first compute the overtime mean for each firm in the group, and then compute the cross sectional mean (median) value of the group. The t-value represents the t-statistic of the mean test. Z-value represents the z-statistic of the two-sided median test. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.
### TABLE 4
The Inverses of Accrual Quality, Earnings Persistence, and Earnings Predictive Ability
– Full Sample

#### Panel A: The Full Sample

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>INVACCQ</td>
<td>21,111</td>
<td>0.0353</td>
<td>0.0202</td>
<td>0.0421</td>
</tr>
<tr>
<td>INVPERS</td>
<td>21,111</td>
<td>-0.3991</td>
<td>-0.4006</td>
<td>0.3903</td>
</tr>
<tr>
<td>INVPRED</td>
<td>21,111</td>
<td>1.0638</td>
<td>0.5506</td>
<td>1.7349</td>
</tr>
</tbody>
</table>

#### Panel B: The Comparison of Good and Bad-Performance

<table>
<thead>
<tr>
<th></th>
<th>Bad Performance (N=10,367)</th>
<th>Good Performance (N=10,744)</th>
<th>Bad Minus Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>Median</td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td>INVACCQ</td>
<td>0.0414</td>
<td>0.0294</td>
<td>0.0174</td>
</tr>
<tr>
<td>INVPERS</td>
<td>-0.3589</td>
<td>-0.4380</td>
<td>-0.4418</td>
</tr>
<tr>
<td>INVPRED</td>
<td>1.1722</td>
<td>0.9592</td>
<td>0.5354</td>
</tr>
<tr>
<td>t-value</td>
<td></td>
<td></td>
<td>20.75***</td>
</tr>
<tr>
<td>Z-value</td>
<td></td>
<td></td>
<td>18.9086***</td>
</tr>
</tbody>
</table>

Table 4 reports the inverses of accrual quality, earnings persistence and earnings predictive ability of the full sample. Specifically, we report the values of the above variables for the full sample in panel A. In panel B, we report univariate test results regarding the differences in above three earnings attributes between firms with different levels of performance. \textit{INVACCQ}, \textit{INVPERS} and \textit{INVPRED} are the inverses of the accrual quality, earnings persistence, and earnings predictability. The t-value represents the t-statistic of the mean test. Z-value represents the z-statistic of the two-sided median test. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.
Table 5 reports the inverses of accrual quality, earnings persistence and earnings predictive ability of the index sample. Specifically, we report the values of the above variables for the whole index sample in panel A. In panel B, we report univariate test results regarding the differences in above three earnings attributes between firms with different levels of governance and performance. In panel C, we report the mean of the three variables for the four groups, and the test results of differences in above three earnings attributes among the four groups. Please note that Group 1 represents good-performance/weak-governance firms; Group 2 represents good-performance/strong-governance firms; Group 3 represents bad-performance/weak-governance firms; and Group 4 represents bad-performance/weak-governance firms. \( \textit{INVACCQ} \), \( \textit{INVPERS} \) and \( \textit{INVPRED} \) are the inverses of the accrual quality, earnings persistence, and earnings predictability. The T-value represents the t-statistic of the mean test. Z-value represents the z-statistic of the two-sided median test. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.
Table 6 reports the regression results using the inverses of accrual quality, earnings persistence and earnings predictive ability as dependent variables. The first line represents the coefficients of the variables. The second line represents the t-value of the coefficients. Please note that Group 1 represents good-performance/weak-governance firms; Group 2 represents good-performance/strong-governance firms; Group 3 represents bad-performance/weak-governance firms; and Group 4 represents bad-performance/weak-governance firms. INVACCQ, INVPERS and INVPRED are the inverses of the accrual quality, earnings persistence, and earnings predictability.

**GROUP:** is defined as following:
- The dummy variable equals to 1 if firm belongs to Group 2 when the comparisons are Group 1 vs. Group 2, 0 otherwise;
- The dummy variable equals to 1 if firm belongs to Group 3 when the comparisons are Group 1 vs. Group 3, 0 otherwise;
- The dummy variable equals to 1 if firm belongs to Group 4 when the comparison is Group 2 vs. Group 4 and Group 3 vs. Group 4; 0 otherwise.

**LEVERAGE** is the leverage ratio, measured as long-term debt (COMPSTAT #9) over total assets (COMPSTAT #6). **M/B** is the market-to-book ratio, measured as market value (COMPSTAT #199 * #25) over book value (COMPSTAT #60). **LOGSIZE** is the log of lagged total assets (COMPSTAT #6). Industry dummy variables included in the model are defined based on Barth, Cram, and Nelson [2001]. The industry dummy variables are omitted in the table. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

<table>
<thead>
<tr>
<th>Group No.</th>
<th>INVACCQ</th>
<th>INVPERS</th>
<th>INVPRED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 vs. 2</td>
<td>1 vs. 3</td>
<td>2 vs. 4</td>
</tr>
<tr>
<td>INTERCEPT</td>
<td>0.0267</td>
<td>0.0465</td>
<td>0.0324</td>
</tr>
<tr>
<td>(θ₀, ?)</td>
<td>4.59***</td>
<td>6.41***</td>
<td>5.02***</td>
</tr>
<tr>
<td>GROUP</td>
<td>0.0016</td>
<td>0.0040</td>
<td>0.0030</td>
</tr>
<tr>
<td>(θ₀, +)</td>
<td>2.04**</td>
<td>3.99***</td>
<td>3.24***</td>
</tr>
<tr>
<td>LOGSIZE</td>
<td>-0.0027</td>
<td>-0.0044</td>
<td>-0.0041</td>
</tr>
<tr>
<td>(θ₀, +)</td>
<td>-9.48***</td>
<td>-12.5***</td>
<td>-11.97***</td>
</tr>
<tr>
<td>LEVERAGE</td>
<td>0.0153</td>
<td>0.0028</td>
<td>0.0098</td>
</tr>
<tr>
<td>(θ₀, +)</td>
<td>4.57***</td>
<td>0.78</td>
<td>2.84***</td>
</tr>
<tr>
<td>M/B</td>
<td>0.0003</td>
<td>0.0007</td>
<td>-0.0002</td>
</tr>
<tr>
<td>(θ₀, +)</td>
<td>1.63</td>
<td>3.36***</td>
<td>-0.91</td>
</tr>
<tr>
<td>Adj R-Sq</td>
<td>0.3761</td>
<td>0.3774</td>
<td>0.4792</td>
</tr>
</tbody>
</table>
## Table 7
Sensitivity Tests – Comparisons among Four Groups

### Panel A: The Percentage of Independent Board Members on Board

<table>
<thead>
<tr>
<th>Group</th>
<th>Group</th>
<th>Group</th>
<th>Group</th>
<th>Group</th>
<th>Group</th>
<th>Group</th>
<th>Group</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Minus</td>
<td>Minus</td>
<td>Minus</td>
<td>Minus</td>
</tr>
<tr>
<td>(N=350)</td>
<td>(N=488)</td>
<td>(N=344)</td>
<td>(N=446)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.0169</td>
<td>0.0179</td>
<td>0.0220</td>
<td>0.0191</td>
<td>-1.02</td>
<td>-4.1***</td>
<td>-1.16</td>
<td>2.13**</td>
</tr>
<tr>
<td>Median</td>
<td>(0.0130)</td>
<td>(0.0134)</td>
<td>(0.0148)</td>
<td>(0.0138)</td>
<td>(0.6909)</td>
<td>(1.2632)</td>
<td>(-0.2415)</td>
<td>(0.9339)</td>
</tr>
<tr>
<td>INVACCQ</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.4257</td>
<td>-0.4149</td>
<td>-0.3332</td>
<td>-0.3571</td>
<td>-0.44</td>
<td>-3.78***</td>
<td>-2.25**</td>
<td>0.92</td>
</tr>
<tr>
<td></td>
<td>(-0.4453)</td>
<td>(-0.4664)</td>
<td>(-0.3587)</td>
<td>(-0.3570)</td>
<td>(-0.6909)</td>
<td>(3.2915***)</td>
<td>(-3.6646***)</td>
<td>(-0.0718)</td>
</tr>
<tr>
<td>INVPERS</td>
<td>0.5764</td>
<td>0.7212</td>
<td>0.9444</td>
<td>0.9916</td>
<td>-3.73***</td>
<td>-6.92***</td>
<td>-5.38***</td>
<td>-0.76</td>
</tr>
<tr>
<td></td>
<td>(0.4138)</td>
<td>(0.5119)</td>
<td>(0.7085)</td>
<td>(0.6955)</td>
<td>(4.0073***)</td>
<td>(6.7685***)</td>
<td>(-5.71708***)</td>
<td>(0.2155)</td>
</tr>
</tbody>
</table>

### Table 7 reports the results of the sensitivity tests. We use the percentage of the independent board members (PCTONBD) and the board size (BBSIZE) to proxy the strength of corporate governance separately in the sensitivity tests. Please note that Group 1 represents good-performance/weak-governance firms; Group 2 represents good-performance/strong-governance firms; Group 3 represents bad-performance/weak-governance firms; and Group 4 represents bad-performance/weak-governance firms. INVACCQ, INVPERS, and INVPRED are the inverses of the accrual quality, earnings persistence, and earnings predictability. The t-value represents the t-statistic of the mean test. Z-value represents the z-statistic of the two-sided median test. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

### Panel B: Board Size

<table>
<thead>
<tr>
<th>Group</th>
<th>Group</th>
<th>Group</th>
<th>Group</th>
<th>Group</th>
<th>Group</th>
<th>Group</th>
<th>Group</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Minus</td>
<td>Minus</td>
<td>Minus</td>
<td>Minus</td>
</tr>
<tr>
<td>(N=434)</td>
<td>(N=404)</td>
<td>(N=339)</td>
<td>(N=451)</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Mean</td>
<td>0.0204</td>
<td>0.0152</td>
<td>0.0218</td>
<td>0.0192</td>
<td>5.27***</td>
<td>-1.04</td>
<td>-4.19***</td>
<td>1.87*</td>
</tr>
<tr>
<td>Median</td>
<td>(0.0165)</td>
<td>(0.0120)</td>
<td>(0.0148)</td>
<td>(0.0140)</td>
<td>(3.3602***)</td>
<td>(-1.0621)</td>
<td>(1.9642**)</td>
<td>(0.7171)</td>
</tr>
<tr>
<td>INVACCQ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.4017</td>
<td>-0.4340</td>
<td>-0.3701</td>
<td>-0.3289</td>
<td>1.33</td>
<td>-1.17</td>
<td>-4.48***</td>
<td>-1.57</td>
</tr>
<tr>
<td></td>
<td>(-0.4297)</td>
<td>(-0.4786)</td>
<td>(-0.3652)</td>
<td>(-0.3543)</td>
<td>(1.5401)</td>
<td>(2.1243**)</td>
<td>(4.4522***)</td>
<td>(-0.5737)</td>
</tr>
<tr>
<td>INVPERS</td>
<td>0.5563</td>
<td>0.7107</td>
<td>0.8040</td>
<td>1.1065</td>
<td>-4.09***</td>
<td>-5.28***</td>
<td>-7.48***</td>
<td>-5.01***</td>
</tr>
<tr>
<td></td>
<td>(0.4115)</td>
<td>(0.4985)</td>
<td>(0.6298)</td>
<td>(0.8224)</td>
<td>(-2.8001***)</td>
<td>(5.9176***)</td>
<td>(6.8092***)</td>
<td>(-4.3027***)</td>
</tr>
</tbody>
</table>

Table 7 reports the results of the sensitivity tests. We use the percentage of the independent board members (PCTONBD) and the board size (BBSIZE) to proxy the strength of corporate governance separately in the sensitivity tests. Please note that Group 1 represents good-performance/weak-governance firms; Group 2 represents good-performance/strong-governance firms; Group 3 represents bad-performance/weak-governance firms; and Group 4 represents bad-performance/weak-governance firms. INVACCQ, INVPERS, and INVPRED are the inverses of the accrual quality, earnings persistence, and earnings predictability. The t-value represents the t-statistic of the mean test. Z-value represents the z-statistic of the two-sided median test. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.