Audit Committee Quality Indices, Firm value, Internal Control and Financial Reporting Quality

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Abstract
We investigate the relation between audit committee (AC, hereafter) quality indices derived from a principal component analysis (PCA) and firm value using a sample of 12,301 firms over the period 2002 to 2012. We also examine the usefulness of the indices in predicting the quality of a firm's internal controls, financial reporting, and audit quality. We report a significant positive (negative) relation between 'high' ('low') AC quality firms and future firm value, measured as industry-adjusted Tobin's q, supporting the view that AC characteristics have a significant impact on firm value. We show that low AC quality firms are significantly more likely to have internal control concerns disclosed by predecessor auditors, including accounting standard issues, financial restatements, audit opinion concerns, and deficiencies that undermine internal control effectiveness. We also show that low AC quality firms are more likely to manage earnings, be external auditor dependent with respect to non-audit tax services, and switch to a lower quality auditor. Further, they are also more likely to receive an audit report containing additional explanatory notes, consistent with a higher likelihood of future financial misstatements. Conversely, high AC quality firms are less likely to have accounting issues, dismiss an auditor after disagreements, have adverse restatements, and receive an audit report containing additional explanatory notes. Taken together, our findings support the view that the AC plays an important role in monitoring the financial reporting process. The results are robust to several econometric concerns primarily related to endogeneity, and to controls that capture broader firm-level governance characteristics, suggesting that AC quality has incremental value in driving better financial reporting, and internal control outcomes and, more importantly, firm value.

Keywords: Audit committee; firm value; internal controls; earnings management; principal component analysis

JEL Classification: M4; G3

1. Introduction

Several internal mechanisms and controls exist to help alleviate agency conflicts between firm management and shareholders, most notably, the board of directors, and institutional/activist blockholders (Jensen and Meckling, 1976; Fama and Jensen, 1983). While the constituents, structure, and diversity of the board of directors no doubt impacts on its effectiveness (see, e.g., Carcello, Hermanson, Neal, and Riley 2002; Dey 2008; Adams and Ferreira, 2009; Brick and Chidambaran 2010; and Masulis, Wang and Xie, 2012), the role of board committees is also likely to have a significant influence (see, e.g,. Abbott, Parker, Peters, and Raghunandan 2003a; Abbott, Parker, and Peters 2004; Bedard, Chtourou, and Courteau, 2004; and Archambeault, DeZoort, and Hermanson 2008), especially those whose role it is to provide oversight, such as the audit committee (AC, hereafter).

In this paper, we build an index using principal components analysis (PCA) to capture factors that measure the quality and effectiveness of the AC. We use PCA because our objective is to build a parsimonious index that can be more easily applied in several settings compared to using a set of potentially correlated variables to capture AC quality. To assess the usefulness of our AC index, we examine its ability to detect internal control weaknesses, earnings management, adverse restatements, auditor independence, and financial statement integrity concerns (i.e., auditor opinion). These are areas that have received much attention in the literature (see, e.g., Xie, Davidson, and DaDalt 2003; Bedard et al., 2004; Krishnan, 2005; Krishnan and Visvanathan, 2008; Goh, 2009; Lo, Wong, and Firth 2010; Czerney, Schmidt, and Thompson. 2014) and so provide a useful setting to test our indices. As far as we are aware, our study is the first attempt to condense the large number of AC characteristics into a parsimonious summary measure that captures overall AC quality, and to examine its relation with firm value, and metrics commonly used in the accounting literature to measure internal control and financial reporting quality.

To be effective, the AC needs to have members with the ability, talent and resources to provide oversight and guidance when required on financial reporting, internal controls, and risk management (DeZoort, Hermanson, Archambeault, and Reed, 2002; Brennan and Kirwan, 2015). Krishnan (2005)

shows that an independent AC with financial expertise is less likely to experience internal control problems, as reported by predecessor auditors. Prior research (e.g., Davidson, Xie, and Weihong, 2004; DeFond, Hann, and Hu, 2005) also shows that investors respond positively, and firm value increases after assigning a financial expert to the AC. Further, Brick and Chidambaran (2010) report that AC effectiveness and structure has a significant and positive impact on firm value, but only before the 2002 Sarbanes-Oxley (SOX) Act, suggesting SOX increased management effectiveness, on average. The evidence that the stock market reacts to changes in AC characteristics is also consistent with investors, on average, valuing the oversight role played by the AC (Defond et al., 2005; Farber 2005; and Karamanou and Vafeas 2005).

Our paper is related to prior literature on creating indices to capture corporate governance and board quality (see, e.g., Gompers, Ishii, and Metrick, 2003; Bebchuk, Cohen, and Ferrell, 2009), with several studies documenting a significant relation between governance indices (e.g., the G-Index and the E-Index based on the number and type of anti-takeover provisions (ATPs)) and firm value. More closely related to our study is Larcker, Richardson, and Tuna (2007), who also apply PCA to 39 structural measures of corporate governance (e.g., board characteristics, stock ownership, institutional ownership, activist stock ownership, and ATPs), and find that 14 factors best represent corporate governance. However, they report only a weak relation between PCA factors and measures of financial reporting quality.

We focus our analysis on AC quality because the literature supports a clearer *causal* link (e.g., Davidson et al., 2004; DeFond et al., 2005) between the membership and activities of the AC and different financial reporting outcomes compared to governance, more broadly. Further, more recent research (e.g., Larcker, McCall, and Ormazabal 2015; Cremers, Masconale, and Sepe 2016) has cast some doubt on the *causal* relationship between governance indices and firm value and future returns, after

correcting for coding errors in some ATP variables, and controlling for whether ATPs do, or do not require shareholder approval.[1]

The AC index developed in this paper is constructed using 82 AC variables merged from two datasets (Risk Metrics and GMI) covering the period 2002 to 2012. The approach used follows Larcker et al. (2007) and results in 15 factors from 32 underlying variables that capture AC quality. We estimate firm fixed effects panel regressions to identify the PCA factors that are significantly related to firm value, measured as industry-adjusted Tobin's q. The process results in three statistically significant factors, including 'AC director busyness' and 'AC foreign member',[2] which are negatively related to firm value, and 'AC overlapping board members', which we show is positively related to firm value (Habib and Bhuiyan 2016). We also show that the factors remain statistically significant after controlling for time-variant firm financial characteristics, including other corporate governance characteristics and indices, and non-firm time-invariant (i.e., fixed) industry and year effects, suggesting that AC characteristics have some incremental value, including over broader governance characteristics captured using the E-index.

We next use the three PCA factors to develop a more parsimonious index to better facilitate application in different empirical settings, including predicting the quality of internal controls, financial reporting and audit quality. Specifically, we classify the three factors and their constituent variables into two indices that capture 'high' and 'low' AC quality, and show that these indices have a significant relation with future firm value. The impact of AC quality on future firm value is also economically significant. For example, a one standard deviation increase in our high (low) index is associated with a 2.65% (-2.19%) change in firm value, which is similar to Cremers and Ferrell (2014), who also report a 2% decrease in firm value for each 1-point increase in the G-index. We also show that the economic magnitude of our AC indices on firm value is larger and more significant than the E-index, confirming

[1] Cremers et al., (2016) finds that only ATPs that do not require shareholder approval (e.g., poison pills and golden parachutes) reduce firm value (Tobin's q). Conversely, those that do require shareholder approval (e.g., staggered board and supermajority voting provisions) are reported to increase firm value.
[2] A detailed description of the factors and their constituent variables are reported in Table 3.

that AC quality has some incremental economic impact over well-documented governance indices in explaining firm value.

In the final part of our analysis, we examine several empirical applications of our AC indices by testing if they predict the quality of a firm's internal controls, earnings and financial reporting quality, the level of auditor independence, and financial statement integrity (i.e., auditor opinion). The quality of a firm's internal controls is an integral factor in financial reporting quality (Dezoort, 1998; Cohen, Krishnamoorthy, and Wright 2004; Krishnan, 2005; Goh 2009; Naiker and Sharma 2009; Abbott, Parker and Peters 2010), as recognized and enshrined in SOX 2002, and highlighted after significant corporate failures, specifically, Enron. One of the key responsibilities of the AC is to monitor and provide oversight of the firm's internal controls. Using Form 8-K disclosures on internal control problems reported by predecessor auditors when firms change auditors and SOX302, we show a significant and positive relation between low AC quality and internal control problems - specifically, accounting issues, financial restatements, concerns about the audit opinion, and significant deficiencies as disclosed in SOX302. Conversely, we show that firms with high quality AC are less likely to have accounting issues and dismiss their auditor after disagreements (Carcello and Neal 2003a; Lee, Mande, and Ortman 2004). The results support the view that the AC plays an important role in supporting internal control quality.

Earnings and financial reporting quality, and maintaining an independent relationship with external auditors (to enforce financial statement integrity) are also argued to be key responsibilities of the AC. That is, an effective and higher quality AC is more likely to oversee the financial reporting process to ensure earnings better reflect firm performance Dhaliwal, Naiker, and Navissi, (2010). This is borne out in our findings. We report a significant and positive relation between the Kothari, Leone, and Wasley, (2005) accruals-based earnings management proxy and our low quality AC index, consistent with the view that firms with lower quality ACs are more likely to manage earnings (Xie et al., 2003; Bedard et al. 2004; Vafeas 2005; Piot and Janin 2007; and Dhaliwal et al 2010). We also show that high AC quality firms are significantly less likely to experience an adverse restatement, consistent with these firms having

higher quality financial reporting (Abbott et al. 2004; Song and Windram, 2004; Farber, 2005; Archambeault et al. 2008; and Lary and Taylor 2012).

Furthermore, we report a significant and positive relation between proxies for auditor dependence (i.e., non-audit fees and the ratio of non-audit to total fees) and the low AC index, suggesting that lower quality AC firms are more likely to utilize external auditors for non-audit services (specifically tax related), thereby possibly undermining auditor independence. Low AC quality firms are also more likely to reduce audit fees when they change auditors, signaling that these firms likely place less emphasis on future audit quality. We also show that lower (higher) AC quality firms are more (less) likely to receive an unqualified audit opinion that contains detailed explanatory notes, indicating possible financial statement integrity concerns, and according to prior research (Czerney et al., 2014), an increased future likelihood of financial reporting misstatements.[3] Lastly, we show that low AC quality firms are more likely to switch from a big 4 auditor to a non-big 4 auditor, consistent with the view that firms with lower quality ACs are more likely to associate with low auditor quality (Collier and Gregory 1999; Abbott and Parker 2000; Chen, Moroney, and Houghton 2005; Chen and Zhou 2007).

This paper develops a measure of AC quality and demonstrates this using several financial reporting outcomes, including internal control quality, audit quality, and financial reporting quality. While prior work has examined many separate measures of AC quality, this study is, we believe, the first attempt to construct a parsimonious index that captures aggregate AC quality. Most of the research undertaken so far has focused on the relation between specific AC characteristics (e.g., financial expertise) and external auditors, internal controls, and financial reporting, and so potentially ignoring the interrelationships between these characteristics.

The results in this paper contribute to our understanding of the relationship between AC quality and firm value, and provide a basis for utilizing our AC index in a number of useful ways, including, but not limited to, the detection of internal control weaknesses, earnings management, auditor dependence, and

[3] Qualified audit reports are very rare with only 1 case in our sample. This limits our analysis to include only unqualified and unqualified with explanatory notes observations.

financial statement integrity concners. The results also increase our knowledge and understanding of the specific factors that help drive the relation between AC quality and auditing and financial reporting outcomes - specifically, overlapping board members, director busyness, and the nationality the AC.

The rest of this paper is constructed as follow: Section 2 reports the sample construction and describes the methodology. Section 3 reports the multivariate regression results, and Section 4 examines several robustness tests. Section 5 concludes the paper.

2. Data and methodology

2.1 Sample construction

The dataset includes 82 AC variables sourced from two providers (Risk Metrics and GMI) over the time period 2002 to 2012. Financial data is obtained from COMPUSTAT and audit fees, change, and report and restatement are obtained from Audit Analytics. The initial sample consists of 18,000 US publically listed firms with governance data available on Risk Metrics. Merging these firms with GMI and COMPUSTAT reduces the sample to 13,301 firms, as reported in Table 1.

2.2. Audit committee indicators

AC indices are constructed using 82 different AC variables. In the first stage of the analysis, PCA is used to find the best components for representing AC attributes, and then in the second stage, we examine the relation between AC indices and firm value. Of the 82 AC variables, we only use 32 to build the indices due to collinearity and low variances and loadings, which is discussed in the next section. Indicators of AC quality are sub-categorized into eight general classifications based on: AC outside employment, AC independence, AC overlapped and multiple directorships, AC turnover, AC relative to the board, AC relative to the CEO, AC nationality, and AC education.

Table 2 (panel A) provides an overview of the eight sub-classifications and reports descriptive statistics for the 32 AC variables. Under the sub-classification 'AC overlapped and multiple directorships', the medians for the percentage of AC members that are also members of the nominating and corporate governance committees are 33.3% and 33.3%, respectively. This indicates that overlapping is very common between these committees, and so their characteristics and effectiveness are likely similar. The occurrence of overlapped members is often debated as a positive influence on the integrity of financial reporting. For example, Habib and Bhuiyan (2016) report that overlapping membership improves financial reporting quality, especially when overlapping directors own equity.

The median (mean) of AC average tenure is 3.75 (4.34) years, with shorter tenure argued to be an indicator of greater professionalism, and so independence from management (Vafeas, 2003). The median AC chairperson holds about 8.98% more equity, on average, than the board of directors. Martinez and Fuentes (2007) report a positive relation between the equity held by AC members and financial reporting quality, consistent with the view that equity ownership increases monitoring and oversight incentives. The median AC size is 4 members, and relative to the overall board size, is about 75%. Larger AC size is predicted to impact positively on earnings quality (Yang and Krishnan, 2005; Kent, Routledge, and Stewart, 2010). The median proportion of AC members who joined the committee before the current CEO is 80%, with larger values argued to increase independence (Cassell, Myers, Schmardebeck, and Zhou (2016). Panel B of Table 2 reports some summary statistics for the key financial, governance and auditor variables. The average Tobin's q is 1.75, and the mean (median) number of ATPs (E-index) is 2.68 (3), which is similar to the 2.49 reported by Bebchuk et al., (2009).

2.3 Index construction

The construction of the indices is largely based on the process followed by Larcker et al. (2007). PCA is applied to 82 AC variables and produces 15 factors (with an eigenvalue greater than unity) that retain 77% of the total variance in the original data. An oblique rotation method is then applied that enhances

the interpretability of the factors (Larcker et al., 2007).[4] Of the 82 AC variables in the initial sample, 50 are excluded because of collinearity, low variances or their loadings do not exceed 0.40 in absolute value in any factor, which is a common PCA procedure. Each of the 32 remaining variables is allocated to one of the 15 factors, which represents different underlying dimensions of AC quality. The overall sample adequacy score for the indices is 0.55 using Kaiser-Meyer-Olkin (KMO), which tests if the partial correlations among the variables are small. The KMO value should be greater than 0.5 for sampling adequacy to hold (Hair, Anderson, Tatham, and Black, 1998).

For ease of interpretation, a name is assigned to each of the 15 factors based on the characteristics of the variables that are related to that factor. For example, the first factor, which we name 'AC US member', has two indicators that are measures of the proportion of AC members that are either from the US, or other nationality (not North America). The variables that are associated with each factor are summarized in Table 3.

We follow Larcker et al. (2007) and compute the AC PCA scores using the average equally weighted sum of the standardized indicators associated with each factor (see appendix A for a more detailed description). We next classify the 15 AC factors into 'high' and 'low' quality buckets based on the expected effect of each factor on accounting and economic outcomes for firms. For example, we expect the factors 'AC US member', ' AC independent, 'AC equity relative to the CEO', 'AC equity relative to the board', 'AC overlapped board members', 'AC multiple directorships', 'AC compensation committee,' 'AC financial expert', and 'AC academic' as increasing in higher AC quality, and so be positively related to firm value. Prior studies show that foreign independent directors are less active and associated with lower financial reporting quality. For example, Masulis et al., (2012) show that foreign independent directors attend less board meetings, and are linked to more intentional financial misreporting, higher CEO compensation, and a lower sensitivity of CEO turnover to performance. Prior studies also report a

[4] In the PCA literature, rotation is a procedure in which the eigenvectors are rotated in an effort to achieve simple interpretable factors (Yaremko, Harari, Harrison, and Lynn 1986; Bryant and Yarnold 1995). Rotation is employed based on whether the factors are assumed to be correlated (oblique) or uncorrelated (orthogonal) Vogt (1999).

positive association between higher levels of AC independence and positive economic and accounting outcomes, including audit and financial reporting quality, and effective internal controls (e.g., Klein, 2002; Carcello and Neale, 2003b; Martinez and Fuentes, 2007; Vafeas and Waegelein, 2007; Zaman et al. 2011).

AC members with high equity ownership are more motivated to increase firm performance (Shivdasani, 1993). However, Carcello and Neal (2003b) provide some evidence that high AC equity holding firms are more likely to dismiss an external auditor after receiving a going concern report, supporting the view that high equity holdings might compromise the independence of the AC. To counter this, Vafeas (2005) and Martinez and Fuentes (2007) report a positive association between equity held by AC members and financial reporting quality, suggesting that on balance, most studies support a positive link between AC equity holdings and governance.

The presence of overlapped board members who serve on more than one committee is often argued to be a positive influence to the integrity of a firm's financial reporting. For example, Habib and Bhuiyan (2016) report a positive relation between overlapping membership of committees and improvements in financial reporting quality, especially when overlapping directors' hold equity. Furthermore, the size of the AC is generally associated with higher financial reporting quality (e.g., Abbott et al. 2003a; Vafeas and Waegelein, 2007; Hoitash, Hoitash, and Bedard, 2009; Zaman, Hudaib, and Haniffa, 2011). Multiple directorships are also likely to have a positive influence on the integrity of firm financial reporting and firm value, as reported by prior studies (e.g., Carcello et al. 2002; Ferris, Jagannathan, and Pritchard 2003; Bedard et al. 2004). This supports earlier work by Fama and Jensen (1983), who show that additional directorships are positively related with the reputation of directors as monitoring experts.

Finally, AC members with financial expertise and a higher educational background (i.e., PhD or academic) are expected to be able to better manage technical issues related to financial reporting (e.g., Davidson et al., 2004). Xie et al., (2003), Abbott et al. (2004), and Bedard et al. (2004) also show that the presence of financial expertise on the AC has a significant and positive association with financial

reporting quality measures. The descriptive statistics and correlations for the computed factor scores are presented in Table 4 (Panel A and B).

The factor 'AC joined after CEO' is classified as low quality because they contain indictors that most likely compromise the independence of AC members, which is a fundamental characteristic for effective oversight of the financial reporting process. Cassell et al (2016) report a positive relation between AC members who join the committee after the CEO and misstatements and absolute discretionary accruals, suggesting that those AC members are less independent, and therefore less effective. We expect the factor 'AC tenure' to be related to low AC quality as length of tenure is predicted to have a negative effect on AC effectiveness, with longer tenure associated with lower quality financial reporting (Vafeas, 2005). Further, Chan, Liu, and Sun (2012) report a negative association between AC members tenure and audit quality, proxied using audit fees.

Finally, we expect that 'AC employment', 'AC director busyness' and 'AC foreign member' to be associated with lower firm value as effective board monitoring requires substantial time and effort. Core, Holthausen, and Larcker (1999) find that older and busier directors are likely to be less active monitors relative to younger and less busy directors.

Table 5 reports Spearman correlations between the 15 AC factors and financial variables.[5] Most of the correlations are fairly low with the most pronounced involving the factors 'AC US member' and 'AC age relative to CEO' (-0.25), and 'AC financial expert' and 'AC director busyness' (0.31).

3. AC quality and firm value regressions

This section examines the relation between our AC indices and firm value. Specifically, we estimate panel fixed effects regressions of firm value, measured as industry-adjusted Tobin's q, on our three alternative AC indices (AC individual factors, and AC 'high' and 'low' indices), and a set of control variables.

[5] The results from using Pearson correlations are very similar to Spearman.

$$y_{it} = \alpha + \beta I_{it} + \theta \boldsymbol{x}_{it} + \lambda_t + \delta_{i(k)} + \alpha_i + \varepsilon_{it} \quad (1)$$

where, y_{it} is industry-adjusted Tobin's q for firm i in year t; I_{it} is a measure of AC quality (i.e., individual factors or high and low indices) in year t, $\boldsymbol{x}_{it}$ is a vector of time-varying control variables, λ_t represents a year dummy, $\delta_{i(k)}$ is an industry dummy for firm i being in industry k, α_i is the unobserved time-invariant firm effect, and ε_{it} denotes the error terms, which are clustered at the firm level.

Industry-adjusted Tobin's q is calculated as the firm market value of assets scaled by the book value of assets less the mean value for the firm's SIC 2-digit industry (see Appendix A for detailed definitions of all variables).[6] The control variables capture factors typically used by prior studies to control for firm-specific financial characteristics known to influence firm value. These include firm size (size), growth in sales (sales growth), R&D expenditures (R&D/sales), liquidity (cash/assets), capital expenditures (capex/assets), profitability, measured as earnings before interest and taxes (EBIT/assets), asset tangibility (PPE/assets), and book leverage (leverage). We also include variables that capture external auditor quality (Big 4 auditor and audit fees), which may have an impact on firm value and AC quality. Including these variables helps to reduce the likelihood of possible endogeneity concerns arising from omitted correlated variables (i.e., auditor quality). To reduce the impact of outliers, all continuous variables are winsorized at the 1% and 99% percentiles.

Table 6 presents the results of panel fixed effects regressions for the 2002–2012 period. Model 1 is estimated without control variables (base model) and shows that 4 AC factors are significant in explaining firm value (industry-adjusted Tobin's q). The factors 'AC overlapped board members' is positive and statistically significant, while factors 'AC equity relative to the board', 'AC academics', and 'AC foreign member' are negative and statistically significant. Including firm-specific financial control variables (model 2) shows that only factors 'AC overlapped board members', 'AC director busyness ', and 'AC foreign member' remain statistically significant. As predicted, 'AC overlapped board members' is

[6] Using the industry medians (as opposed to means) provides similar results.

positively and significantly related to firm value. Overlapping allows a director to obtain information that can assist coordination between the committees (Hermanson, Tompkins, Veliyath, and Ye, 2012). Moreover, Laux and Laux (2009) and Chandar, Chang, and Zheng (2012) find that overlapping committees improve financial reporting quality. Prior studies also find that firms with AC members sitting on compensation committees are more likely to employ incentive-based executive compensation plans (Hoitash and Hoitash 2009; Xiaochuan and Cullinan 2010; Zheng and Cullinan 2010; Chang, Luo, and Sun 2011). Furthermore, 'AC director busyness', and 'AC foreign member' are negative and significant as predicted. Core, et al. (1999) shows that older and busier directors are likely to be less active monitors relative to younger and less busy directors. Also, Masulis et al., (2012) and Hahn and Lasfer (2016) show that foreign independent directors attend less board meetings, and are linked to more intentional financial misreporting, higher CEO compensation, and a lower sensitivity of CEO turnover to performance.

Turning to the control variables, the results largely correspond to those reported by Aggarwal, Erel, Stulz, and Williamson (2009). Specifically, firm size and book leverage are negative and significantly related to firm value, whereas growth in sales, liquidity, capital expenditures, and profitability are positively and significantly related to firm value.

The results reveal a strong association between three AC factors and firm value, after controlling for firm, industry and year factors, and suggest that these AC characteristics have a significant impact on firm value. To summarize, firms with more good quality AC characteristics (i.e., 'overlapped board members'), and fewer bad quality characteristics (i.e., 'busyness', and 'foreign memebr'), have significantly higher value.

3.1 AC 'high' and 'low' quality indices and firm value regressions

We develop 'high' and 'low' AC quality indices using the sign on the coefficients for the significant factors from the regressions reported in Table 6 (model 2). For example, the factor 'AC overlapped board members' is positive and significant, so is assigned to the 'high' quality AC index. On the other hand, the

factors 'AC director busyness', and 'AC foreign member' are negative and significant, and are assigned to the 'low' quality AC index. We construct the indices by giving each of the related variables in a factor equal weight. Specifically, we calculate the high AC index by summing all the standardized variables in the 'high' quality 'AC overlapped board members' factor (i.e., member of nominating + member of corporate governance). Similarly, the low quality AC index is calculated by summing all the standardized variables related to the 'low' quality 'AC director busyness' and 'AC nationality and family of the CEO' factors (i.e., secretary + treasurer + senior VP +(foreign member 1 - joined with CEO). We expect the high (low) quality AC index to be positively (negatively) related to firm value.[7] Table 7 presents descriptive statistics for the high and low quality indices. The maximum score for the high index (low index) is 2.24 (15.74).

Table 8 reports the regression results and shows that high (low) indices are significantly positively (negatively) and related to firm value. In terms of economic significance, the coefficient estimate on the high (low) index shows that a one-point change in the indices is equivalent to a 2.7% (-2.3%) change in firm value (Tobin's q). To put it another way, a one standard deviation change in the high or low index equates to a 2.65% (2.7% * 0.98) increase or a 2.19% (2.3%*0.95) decrease respectively, in firm value. As far as we are aware, no prior research has examined the economic impact of AC quality on firm value, so making comparisons difficult. However, Cremers and Ferrell (2014) report an increase (worse governance) in their governance index (G-index) results in a decline in firm value (Tobin's q) of 2% for their US sample spanning over 30 years. Chhaochharia and Laeven (2009) find that a one standard deviation increase in their governance index (good governance) is associated with a 5.5% increase in firm value, measured using Tobin's q. Taken together, the economic impact of AC quality on firm value is at least equivalent to the impact reported using broader governance-based indices. In the next section, we examine more directly if our AC index simply proxies for governance quality more generally.

[7] If we combine high and low indices into one index, the results produce inconsistent and generally insignificant associations with firm value. This is not surprising given the likely 'noise' introduced by averaging across all good and bad factors. Furthermore, including only the 'high' or 'low' index in separate regressions does not alter our findings, with both indices having similar estimated coefficients and statistical significance to those reported in Table 8.

3.2 Does the AC index have incremental value over governance factors more broadly?

Our AC firm fixed effects value regressions control for potential omitted time-invariant factors, but are by no means a comprehensive solution to the well documented omitted variables problem. Clearly, one could argue that an AC index is likely to be correlated with broader governance factors in general, so giving rise to a possible omitted correlated variable problem. This is a more serious issue since the exclusion of correlated variables will result in biased coefficient estimates for explanatory variables (including the AC indices) that are correlated with the omitted variable (Roberts and Whited, 2013) – i.e., other governance factors in this case.

To examine this issue, and provide a useful test of whether the AC indices have incremental explanatory power beyond other commonly used governance measures, we re-estimate our regressions controlling for a broad range of ownership and board characteristics. These include the percentage of outstanding shares held by top management and directors (insiders equity%), the percentage of shares held by block holders (block equity%), indicators of whether the 'outside' (i.e., fully independent) and 'outside-related' directors (i.e., have or had a financial relationship, or a former employee) of a board constitute a majority (boardout), and an indicator of whether or not the firm has a formal governance policy (governance policy) that sets out an explicit code of conduct and ethics for directors as recommended by the Securities Exchange Commission (SEC, 2003). More importantly, we also control for corporate governance characteristics that capture shareholder rights by including the E-index, which sums the presence of the six anti-takeover provisions (ATPs) reported by Bebchuk et al. (2009) to be the most important in explaining firm value (i.e., staggered board, limits to shareholder bylaw amendments, supermajority requirement for mergers, supermajority requirements for charter amendments, poison pills, and golden parachutes). Bebchuk et al (2009) argue that these provisions significantly impact on shareholder rights, and prior studies provide evidence to support the view that ATPs lead to managerial entrenchment and shareholder value destruction (see, e.g., Masulis, Wang and Xie, 2007; Harford, Humphery-Jenner and Powell 2012).

The results are reported in Table 9. We report 3 regression models: Model 1 includes only governance and control variables; model 2 adds the AC factors to model 1, and model 3, which adds our AC high and low indices to the baseline model 1. The results show that the 3 AC factors 'AC overlapped board members', 'AC director busyness ', and 'AC foreign member' remain statistically significant (and consistent with those reported in Table 8) in explaining firm value. Furthermore, model 3 in Table 8 further shows that the high (low) indices remain positive (negative) and statistically significant, suggesting that AC quality has some incremental power in explaining firm value over typical governance factors, including those that affect shareholder rights, as reflected in the E-index. Interestingly, the E-index is insignificant in all model specifications, suggesting that in our sample, the preponderance of ATPs has no measurable impact on firm value. While this is inconsistent with Bebchuk et al. 2009 (who report a significant negative relation), it is consistent with more recent research (e.g., Larcker et al., 2015; Cremers et al., 2016) that examines more recent time periods (i.e., post 1999).

4. Do AC quality indices drive better internal control, financial reporting, and audit quality?

In this section we examine the relation between the AC indices, internal control quality, financial reporting and audit quality. It is a well known requirement (SOX 2002) that a key responsibility of the AC is overseeing the accounting and financial reporting process and audits of the financial statements, and so maintaining the integrity of firm financial statements more generally. It is also expected that the AC provide oversight of the firm's internal controls, which help ensure greater financial statement integrity. Subsequently, an effective AC is more likely to prevent management from making intentional or unintentional mistakes resulting in misleading stakeholders about firm economic performance (Dhaliwal et al., 2010). Furthermore, higher quality AC firms are likely to protect auditor independence (a requirement of SOX) by relying less on external auditors for providing non-audit services, including tax advice (Abbott et al., 2003a; Abbott, Parker, Peters, and Raghunandan, 2003b; Lee, 2008; Hoitash et al., 2009; Engel, Hayes, and Wang, 2010; Zaman et al., 2011; Beck and Mauldin 2014).

Prior literature shows that AC financial expertise (e.g., Dezoort, 1998; Xie et al., 2003; Bedard et al., 2004; Krishman, 2005; Zhang, Zhou and Zhou, 2007; Krishnan and Visvanathan, 2008; Barua, Rama, and Sharma, 2010; Lo et al., 2010; Keune and Johnstone 2012; Bryan, Liu, Tiras, and Zhuang, 2013; Badolato, Donelson, and Ege 2014), AC independence levels (e.g., Carcello and Neal 2000; Klein, 2002; Garcello, and Neal 2003; Xie et al., 2003; Bedard et al., 2004; Krishman, 2005; Vafeas, 2005; Yang and Krishnan, 2005; Davidson, Goodwin-Stewart and Kent 2005; Koh, LaPlante and Tong 2007; Lo et al., 2010; Kent et al., 2010; Carcello, Neal, Palmrose, and Scholz, 2011; Bruynseels, and Cardinaels, 2014), and the frequency of AC meetings (e.g., Xie et al., 2003; Abbott et al., .2004; Vafeas, 2005; Bronson, Carcello and Raghunandan, 2006; Koh et al., 2007; Kent et al., 2010; Anderson, Christ, Johnstone, and Rittenberg, 2012) have a positive influence on firms internal controls, earnings quality, and financial statement integrity.

4.1. AC indices and internal control quality

To measure internal control problems, we examine firms' 8-K disclosures to establish if they had any internal control problems that were highlighted during the audit, but subsequently made public via form 8-K when a change of auditor occurred.[8] We use three internal control dummy measures (equal to 1 if a positive response, and 0 otherwise) as dependent variables in probit regressions: accounting issues, internal control reportable conditions, financial restatement, and audit opinion concerns. Accounting issues are issues related to accounting treatments and/or disagreements about accounting principles. Second, financial restatements indicate that a restatement of the financials either occurred or will occur.

Lastly, audit opinion concerns indicate that there are questions regarding the veracity or applicability of previous or upcoming audit opinions. We also examine whether firms dismiss the auditor after disagreements, and if they report internal control significant deficiencies as disclosed in SOX 302. A

[8] We use more measures of internal control quality from form 8-k (after audit disengagement) rather than using the annual report, as the external auditor would be at the highest level of independence relative to the report prepared by management on the firm's internal control over financial reporting. One drawback of using Form 8-k is the smaller sample size, but the greater integrity of Form 8-k, we believe, provides for a stronger test.

significant deficiency is defined as "a control deficiency, or a combination of control deficiencies, that adversely affects the company's ability to initiate, authorize, record, process, or report external financial data reliably in accordance with generally accepted accounting principles such that there is more than a remote likelihood that a misstatement of the company's annual or interim financial statements that is more than inconsequential will not be prevented or detected" (AU 325). The regression models include similar controls as in Table 9. Given some concerns (e.g., Acito, Hogan and Imdieke, 2014; and Schroeder and Shepardson 2016) about the effectiveness of more recent changes to auditing standards on internal control over financial reporting (ICFR), we also include a dummy variable (equal to 1) if the time period is post audit standard (AS) number 5 (and 0 otherwise).[9]

The results of the internal control regressions are reported in Table 10, and suggest that firms with lower AC quality (low index) are significantly more likely to have accounting issues (model 1), a financial restatement (model 2), issues regarding the veracity or applicability of previous or upcoming audit opinions (models 3), and significant deficiencies in the design or operation of internal controls (model 5). On the other hand, we find that firms with higher quality AC are less likely to have accounting issues (model 1), and dismiss the auditor after disagreements (model 4). Noteworthy also is the significant positive relation between the post AS5 period and internal control issues, consistent with the view that the regulation change introduced in 2007 has resulted in weaker internal controls, as evident from our findings of greater restatements, and internal control significant deficiencies. This supports more recent findings that also raise concerns about the effectiveness of the regulation change (e.g., Acito et al., 2014; Schroeder and Shepardson, 2016).

The results also suggest that more profitable firms (EBIT/assets) and innovative firms (R&D) are less likely to experience internal control problems, whereas, a larger percentage of outstanding shares

[9] AS5 was implemented in November 2007 and adopts a 'top-down risk-based' approach in internal control audits so focusing on the most important issues and simplifying audit procedures and reducing costs (PCAOB, 2007). It was introduced as a response to concerns about the cost and over regulatory burden of AS2. However, questions have arisen about the effectiveness of AS5 (see, e.g., Acito, Hogan and Imdieke, 2014; and Schroeder and Shepardson 2016) given the declining number of adverse internal control opinions from 16.9% in 2004 to only 2.4% in 2009 (Audit Analytics, 2010).

held by top management and directors appears to negatively influence internal control quality, suggesting possible entrenchment or agency concerns. Overall, the results provide some support for the view that lower quality AC firms are more likely to have internal control weaknesses. Furthermore, the results are consistent with Krishnan (2005), who reports that AC independence and financial experts are negatively associated with the presence of internal control problems in form K-8 (reportable condition and material weakness).

4.2. AC indices and financial reporting quality and integrity

In this section we examine the relation between AC quality indices and financial reporting quality and integrity. We measure quality using metrics that detect the presence of earnings management and auditor independence. For financial statement integrity, we examine audit opinions in respect of detailed explanatory notes.

We use two accruals-based earnings management models to measure earnings quality. First, we measure earnings quality by employing the model proposed by Ball and Shivakumar (2006), which is a modification of the original Dechow and Dichev (DD) (2002) model. Ball and Shivakumar (2006) improve the DD model by resolving timing and matching problems in working capital cash flows and recognizing economic gains and losses in a timely manner. Second, we adopt the modified Jones (1991) model of Kothari et al., (2005). Specifically, accruals quality is measured by estimating the following equations:

$$ACC_{i,t} = \alpha + \beta CF_{i,t} + \varphi CF_{i,t-1} + \gamma CF_{i,t+1} + \delta DCF_{i,t} + \theta DCF_{i,t} * CF_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where ACC_{it} is total accruals for firm i, scaled by average total assets for year t. Total accruals is measured as earnings before extraordinary items less operating cash flows, scaled by average book assets. CF is operating cash flows scaled by average total assets, measured as lagged (t-1), contemporaneously (t), and lead (t+1); DCF_t is a dummy variable equal to 1 if the change in cash flows at t is less than 0 (i.e.,

CF_t-CF_{t-1}<0), and 0 otherwise; $DCF_t * CF_t$ is an interaction term that captures economic losses, and εit is an error term.

The Kothari et al., (2005) model is given as follows:

$$ACC_{i,t} = \alpha + \beta \Delta REV_{t,t} - \Delta REC_{i,t} + \gamma PPE_{i,t} + ROA_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

Where ACC_{it} is total accruals for firm i, year t, scaled by average total assets. Total accruals is measured as earnings before extraordinary items less operating cash flows, scaled by book assets; ΔREV is the *change* in revenues scaled by average total assets; ΔREC is the change in net receivables scaled by average total assets; PPE is gross property, plant and equipment scaled by average total assets; and ROA_{t-1} is lagged return on assets.

We estimate the coefficients for each firm separately using cross-sectional regressions using all the constituent firms in each firm's 2-digit SIC industry-year. Similar to prior studies, we require at least ten observations in each industry-year when estimating the regressions coefficients. The absolute values of the residuals (i.e., abnormal accruals) from the models are used as the dependent variables for our earnings management tests. We use the absolute value because earnings management can be either income increasing accruals or income decreasing accruals to meet earnings goals (Klein 2002; Reynolds and Francis 2000). A greater value means a higher level of earnings management, and so lower earnings quality.

To measure auditor independence, we follow prior work and use the value of non-audit services (mostly related to tax) and the percentage of non-audit services to audit services.[10] Larger dollar (and %) non-audit services suggest a greater reliance on the auditor, and so possibly compromising independence as required by SOX. We predict that higher (lower) AC quality firms are likely to be more independent

[10] Non-audit services mostly relate to tax services, which is the only service exempt from the list of prohibited auditor services as set out in Section 201, SOX. The PCAOB strengthened this positon in July 26, 2005. Specifically, Rule 3522 bars audit firms from selling 'aggressive' tax services to audit clients. Further, Rule 3523 forbids audit firms from selling tax services to executives in a financial reporting role. A tax scheme is considered 'aggressive' if "…tax avoidance is a significant purpose of the scheme, and the tax treatment is less likely than not to be allowable under applicable tax laws" (PCAOB, 2005).

(dependent) from the external auditor (i.e., less reliant on non-audit services), and so predict a negative (positive) relation with our high (low) AC quality indices. We also use a dummy variable to capture the change in audit fees in a subsequent year to measure the decrease/increase in auditor independence.

To measure financial statement integrity, we examine each firm's audit report for each year to establish if it received an unqualified opinion with detailed explanatory notes. While added explanatory language per-se should not indicate lower financial statement integrity (or greater misstatement risk), auditors are unlikely to add explanatory notes that would strain the auditor-client relationship, suggesting that if this does occur, it likely signals auditor concerns about the client's financial statements. Further, prior research shows that firms that receive such audit opinions with explanatory notes are significantly more likely to report future misstatements (Czerney et al., 2014). Lastly, to measure audit quality change, we use a dummy variable equal to 1 if a firm changes from a big 4 auditor to a non-big 4 auditor.[11]

The results of the earnings quality tests are reported in Table 11, and provide some evidence (using the Kothari et al. 2015 model) that firms with lower AC quality (low index) have lower earnings quality (i.e., greater discretionary accruals), consistent with greater earnings management. We also show that high quality AC firms are significantly less likely to experience an adverse restatement, consistent with these firms having higher quality financial reporting. The results also suggest that more profitable firms (EBIT/assets) and hiring a big 4 auditor reduces earnings management, whereas more innovative firms (R&D) appear to have lower earnings quality. The results support the view that lower quality AC firms are more likely to have lower quality financial reporting.

Table 12 reports some additional evidence that AC quality influences auditor independence and auditor opinion. The results from models 1 and 2 indicate that lower quality AC firms have significantly larger expenditures on non-audit services, suggesting possible independence concerns. Not surprisingly, having a big 4 auditor also increases the level of spend on non-audit services, but larger equity holdings by insiders and blockholders significantly reduce the reliance on these services, suggesting a positive role

[11] The sample contains 162 cases of switching from a big 4 auditor to a non-big 4 auditor, and of these cases, only 16 are due to auditor dismissal due to disagreements.

by active monitors on auditor independence. We also find that firms with low quality AC are more likely to reduce audit quality by further reducing audit fees through renegotiate of the contract with the current auditor (Model 3). This provides some support for Beck and Mauldin (2014), who report smaller audit fee reductions for firms with more effective AC. Not surprisingly, firms with a big 4 auditor are less likely to reduce their audit fees.

Results from Model 4 in Table 12 also adds to this evidence, and show that higher (lower) quality AC firms are significantly less (more) likely to receive an auditor unqualified opinion with detailed explanatory notes. The absence of detailed notes to the audit report provides additional evidence that higher quality AC play a significant role in ensuring the financial statements are free from error, and so greater financial integrity (Czerney et al., 2014). Finally, we show that low quality AC firms are significantly more likely to reduce auditor quality by changing from a big 4 auditor to a non-big 4 auditor (model 5). Noteworthy also is the significant positive relation between the Bebchuk et al. (2009) E-index and the likelihood of additional explanatory notes, suggesting that a proxy for lower quality governance also has some ability to predict possible financial statement integrity concerns. More generally, firms with greater investment (i.e., R&D and CAPEX) and leverage are more likely to receive additional explanatory notes in their unqualified audit report. Taken together, the results in Table 12 provide some additional evidence to support the view that the AC plays an active role in ensuring higher quality financial reporting systems.

5. Robustness tests

5.1. Endogeneity

Endogeneity is a well-documented problem when investigating the effects of corporate governance on firm value (Roberts and Whited, 2013). The first step in addressing endogeneity is identifying the source of the problem. One possible concern about the regression results reported for the relation between our AC indices and firm value (Section 3) is omitted variables. Roberts and Whited (2013) argue that when the regression has low explanatory power, which is common problem in corporate finance and

governance research, firm fixed effects can capture any low frequency and unobservable explanatory variables. The fixed effects model controls for all time-invariant differences between the firms, so the estimated coefficients of the fixed-effects models should not be biased due to omitted time-invariant characteristics, as long as they are uncorrelated with the included (observed) explanatory variables. Since we mostly use firm fixed effects in models to control for unobservable differences across firms, this should go some way to reducing omitted variable bias in our regression models.[12]

5.2 Alternative approaches to developing AC indices

We also examine some alternative approaches to construct AC factors and indices (high and low). In the first approach (reported in Table 13, we adjust factors and indices (high and low) by the industry median. Specifically, for firm level factors and high (low) AC indices, we subtract the firm's SIC 2-digit industry-year median value to give industry-adjusted values. The results show that the 3 AC factors 'AC overlapped board members', 'AC director busyness', and 'AC foreign member' remain significant (and consistent with those reported in Table 6, 8 and 9 in explaining firm value.

In the second approach reported in Table 14 we use the *change* in industry adjusted Tobin's q as the dependent variable. We report results using high and low AC indices (model 1), industry adjusted indices (high and low) using the industry median (model 2), and the *change* in indices (model 4). We find all alternative approaches to construct AC indices remain statistically significant (with the expected signs) in explaining the *change* in firm value. Lastly, model 4 reports regression results replacing Tobin's q with a cash flow based measure of firm performance - operating cash flows (scaled by average assets). The results are broadly similar to those reported using Tobin's q in that lower quality AC firms have significantly worse performance. Since operating cash flows is argued (e.g., Beaver, 1966; Lee, 1982) to be a 'cleaner' measure of firm performance, and more importantly, less susceptible to earnings

[12] Furthermore, the explanatory variables are selected using PCA, which is a statistical procedure that deals with some aspects of endogeneity by reducing multicollinearity. We apply PCA to 82 different AC variables to reduce the number of variable into a smaller number of uncorrelated factors. Of the 82 AC variables, we only use 32 variables to build the indices due to collinearity and low variances and loadings.

smoothing, the results provide further support for the role of the AC in maintaining financial reporting integrity. More importantly, the results in Table 14 also provide some comfort that our findings are robust to different measures of firm performance and different AC constructs.

6. Conclusions

We develop a new set of indices that capture AC quality using PCA, and show that 3 factors are significantly related to firm value. Specifically, factors 'AC overlapped board members' has a positive and significant association with firm value, whereas 'AC director busyness ', and 'AC foreign member' have a negative and significant relation. We use these factors to develop more parsimonious indices to capture 'high' and 'low' AC quality, and show that these are significantly related to firm value. We also show that our AC indices have significant ability to predict internal control quality, financial reporting quality, and auditor quality, with 'low' AC quality firms significantly more likely to have internal control problems, engage in earnings management, and use the external auditor for non-audit services, thereby compromising independence. Furthermore, lower quality AC firms have a higher likelihood of receiving an unqualified audit opinion with detailed explanatory notes, consistent with lower financial reporting integrity.

Overall, our results are consistent with the view that the AC plays an important role in monitoring board activities, and overseeing the financial reporting process, including the quality of internal controls, financial reporting, and financial statement integrity. The significance of this study comes from the creation of a parsimonious index for AC quality that could be used in several settings, including financial reporting quality, risk management, M&A outcomes and investment/portfolio applications, to name a few. Our approach also provides a useful framework for investigating the usefulness and effectiveness of other board committees.

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Appendix A: Variable descriptions

Variables	Description
A: Audit committee variables	
AC outside employment	
CEO	Proportion of AC with employment title of CEO.
Chairman	Proportion of AC with employment title of chairman.
President	Proportion of AC with employment title of president.
Treasurer	Proportion of AC with employment title of treasurer.
CFO	Proportion of AC with employment title of CFO.
Secretary	Proportion of AC with employment title of secretary.
Executive VP	Proportion of AC with employment title of executive VP.
Senior VP	Proportion of AC with employment title of senior VP.
Academic	Proportion of AC with employment title as academic.
AC independence	
Independent	Proportion of AC classified as independent.
Linked	Proportion of AC classified as linked. AC that is former CEO, former non-CEO executives, family members, or transactional, professional, and financial relationships.
AC overlapped and multiple directorships	
Outside public boards	Proportion of AC that serve on outside public boards.
Four or more outside public boards	Proportion of AC who serve on 4 or more outside public boards.
Member of nominating	Proportion of AC that are members of a nominating committee.
Member of corporate governance	Proportion of AC that are also a member of the corporate governance committee.
Member of compensation committee	Proportion of AC that are members of the compensation committee.
AC turnover	
Tenure	AC average (mean) tenure.
Tenure 15≥ years	Proportion of AC with tenure of 15 years or more.
AC relative to the board	

Relative size	Relative size of the AC (AC size/board size).
Chair relative equity	AC chair relative equity holdings (AC chair equity/mean equity of the board).
Relative equity	AC relative equity holdings (AC mean equity/mean for the board).
AC relative to the CEO[13]	
Joined after CEO	Proportion of AC that was hired after the CEO.
Joined with CEO	Proportion of AC that was hired with the CEO in the same year.
Joined before CEO	Proportion of AC that was hired before the CEO.
Older than CEO	Proportion of AC older in age than the CEO.
Younger than CEO	Proportion of AC younger in age than the CEO.
Less equity than CEO	Proportion of AC with less equity than the CEO.
More equity than CEO	Proportion of AC with more equity than the CEO.
AC nationality	
US	Proportion of AC from the US.
Foreign member 1	Proportion of AC from Canada.
Foreign member 2	Proportion of AC nationality as others.
AC education	
PhD	Proportion of AC with a PhD.
B: Accounting Outcomes and Organizational Performance variables	
Tobin q	The market value of assets over book value of assets: (book value of assets + the market value of common stock - the sum of the book value of common stock and balance sheet-deferred taxes/book value of assets).
Industry-adjusted Tobi	Firm's Tobin's q - the mean Tobin's q in the firm's industry (2-digit SIC) in the observation year.
Size	The natural logarithm of total assets
Sales growth	Total sales in year t minus total sales in year t-1, scaled by total sales, t-1.
R&D/Sales	The ratio of research and development expenditures to sales.
Cash/Assets	The ratio of cash to total assets.

[13] Using three variables (i.e., Joined after CEO, Joined with CEO *and* Joined before CEO) instead of having one variable that equals one if a director joined the committee after the CEO and 0 otherwise, allows us to separately examine each variable and its relation with AC factors.

CAPEX/Assets	The ratio of capital expenditures to total assets.
EBIT/Assets	The ratio of earnings before interest and taxes to total assets.
PPE/Assets	The ratio of property, plant and equipment to total assets
Leverage	The ratio of total debt to total assets.
Audit fee	Audit fee is the natural logarithm of Audit fee
Big 4	Dummy variable=1 if audited by PricewaterhouseCoopers, KPMG, Deloitte or Ernst & Young, and 0 otherwise.
Insiders %	The % of outstanding equity held by top management and directors.
E-index	An index based on 6 antitakeover provisions: staggered board, poison pills, the supermajority requirement for mergers, limits to the shareholder bylaw amendments, limits to the charter amendments, and golden parachutes (Bebchuk et al., 2009).
Block	The % of equity held by block shareholders (≥5% equity)
Board Out	Dummy variable =1 if 'outside' directors constitute a majority on the board, and zero otherwise.
Governance policy	Dummy variable =1 if a firm's formal governance policy is available in Board Analyst, and zero otherwise.
Accounting issue	Dummy variable=1 if the predecessor auditor discloses (Form K-8) issues related to accounting treatments and/or disagreements about accounting principles, and zero otherwise.
Financial restatement	Dummy variable=1 if the predecessor auditor discloses (Form K-8) a restatement of the financials either occurred or will occur, and zero otherwise.
Audit opinion concerns	Dummy variable=1 if the predecessor auditor discloses (Form K-8) concerns regard audit opinion that there are questions regarding the veracity or applicability of previous or upcoming audit opinions, and zero otherwise.
Auditor dismissed	Dummy variable=1 if the departed auditor dismissed from the engagement after disagreements, and zero otherwise.
Internal control – significant deficiency	Dummy variable=1 if a company has significant deficiencies or disclosure issues regarding the effectiveness of internal controls, and 0 otherwise.
Ball and Shivakumar (2006)	Abnormal (unexpected) accruals measured as $ACC_{i,t} = \alpha + \beta CF_{i,t} + \varphi CF_{i,t-1} + \gamma CF_{i,t+1} + \delta DCF_{i,t} + \theta DCF_{i,t} * CF_{i,t} + \varepsilon_{i,t}$
Kothari et al (2005) model	Abnormal (unexpected) accruals measured as $ACC_{i,t} = \alpha + \beta \Delta REV_{t,t} - \Delta REC_{i,t} + \gamma PPE_{i,t} + ROA_{i,t-1} + \varepsilon_{i,t}$
Adverse restatement	Dummy variable=1 if a firm has an income-decreasing restatement, and zero otherwise.
Non-audit fee	Log of non-audit fees, where non-audit fees comprise of tax preparation fees.
Non-audit fee ratio	Log of non-audit fees, where non-audit fees comprise of tax preparation fees divided by audit fee.
Audit fees reduction	Dummy variable=1 if audit fees decrease in a subsequent year, and zero otherwise.
Audit opinion	Dummy variable=1 if the auditor issues an unqualified opinion with explanatory language, and zero otherwise.

Auditor quality change	Dummy variable=1 if the departed auditor is a big 4 and the new auditor is not a big 4, and zero otherwise.
Change in Industry-adjusted Tobin's q	Industry-adjusted Tobin's q for year t, less industry-adjusted q in t-1.
Industry-adjusted operating cash flow (OCF)	Firm operating cash flow (scaled by average assets) - the mean operating cash flow in the firm's industry (2-digit SIC) in the observation year.
C: AC indices	
High index	The sum of the standardized variables in the factor 'AC overlapped board members' (member of nominating + member of corporate governance).
Low index	The sum of the standardized variables in the factors 'AC director busyness ', and 'AC foreign member' (secretary +treasurer + SVP + (foreign member 1 - joined with CEO).

Appendix B: Calculating AC factor scores

We follow Larcker et al. (2007) and compute the AC factors scores using the average equally-weighted sum of the standardized indicators associated with each factor, with the exception of the factors 'AC US member', 'AC joined after CEO' 'AC independent', 'AC equity relative to CEO', 'AC age relative to CEO' and 'AC foreign member' as they contain substitute mechanisms or exhibit a combination of positive and negative loadings.

First, we standardize the 32 variables before calculating the factors since the original data has different scales. Nine factors are calculated using the average equally weighted sum of the standardized indicators associated with each factor. For example, AC_PCA8 (AC employment) is calculated by taking the standardized values ((President + Chairman + CEO) / 3). The remaining 6 factors (the exceptions) are calculated by netting the substitute variables first, then using the average equally weighted sum of the standardized indicators. For example, the first factor 'AC US member' has two indicators that are measures of the percentage of AC members that are from the US, and foreign member 2. Because the indicators US and foreign member 2 exhibit substitute mechanisms, we net these two indictors (US – international member 2) before calculating the score of the factor. The score of the factor 'AC US member' equals to ((US – international member 2) /2). The factor can be interpreted as follows: the larger the factor, the more US members on the AC. Moreover, the factor 'AC foreign member' exhibits a combination of positive (foreign member1) and negative (joined with CEO) loadings therefore we calculate this factor by subtracting indicator (joined with CEO) from (foreign member1). The factor can be interpreted as follows: the larger the factor, the more foreign members on the AC. It should not be surprising to find some unpredicted results in the PCA as Larcker et al. (2007) shows that the indicator "shares held by affiliated directors" (negative loading) in the same factor with "anti-takeover provisions" adopted by the firm via poison pills and the presence of a staggered board. To address this, they subtract the indicator "shares held by affiliated directors" and name the factor 'Anti-Takeover I'.

Table 1: Sample distribution

The table reports the industry composition for the sample of 12,301 firm observations for the period 2002 to 2012.

2-digit SIC code	Industry name	Number	% of sample
1	Crops	11	0.09
2	Livestock	5	0.04
7	Agriculture Services	7	0.06
10	Ores	43	0.35
12	Coal	36	0.29
13	Oil & Gas	409	3.32
14	Quarry	34	0.28
15	Building-Light	106	0.86
16	Building-Heavy	52	0.42
17	Construction	28	0.23
20	Food	350	2.85
21	Tobacco	25	0.2
22	Textile Mill	27	0.22
23	Apparel	116	0.94
24	Lumber	72	0.59
25	Furniture	88	0.72
26	Paper	178	1.45
27	Printing	108	0.88
28	Chemicals	835	6.79
29	Petroleum	102	0.83
30	Rubber	116	0.94
31	Leather	68	0.55
32	Stone	53	0.43
33	Metal Work-Basic	193	1.57
34	Metal Work-Fabrication	168	1.37
35	Industrial	732	5.95
36	Electrical	901	7.32
37	Transport-Equipment	306	2.49
38	Instruments	685	5.57
39	Misc. Manufacturing	95	0.77
40	Railroad	41	0.33
42	Motor freight	83	0.67
44	Water Transport	42	0.34
45	Air Transport	71	0.58
47	Transport-Services	49	0.4
48	Communications	211	1.72
49	Utilities	785	6.38
50	Durables-Wholesale	292	2.37
51	Non-Durables-Wholesale	108	0.88
52	Garden	44	0.36
53	General Stores	130	1.06

54	Food Stores 9	43	0.35
55	Auto Dealers	97	0.79
56	Apparel-Retail	216	1.76
57	Home Equipment	60	0.49
58	Eating	215	1.75
59	Misc. Retail	189	1.54
60	Depositories	732	5.95
61	Non-depositories	62	0.5
62	Brokers	228	1.85
63	Insurance	499	4.06
64	Ins Agents	64	0.52
65	Real Estate	22	0.18
67	Trusts	460	3.74
70	Hotels	22	0.18
72	Personal Services	25	0.2
73	Business Services	1,029	8.37
75	Auto Repair	24	0.2
78	Movies	22	0.18
79	Amusements	49	0.4
80	Health	173	1.41
82	Educational	61	0.5
83	Social	6	0.05
87	Engineering—Retail	175	1.42
99	Non-classifiable	23	0.19
	Total	12,301	100

Table 2: Summary statistics

The table reports summary statistics for 32 AC variables under eight sub-categorizes (Panel A) and financial variables (Panel B) for a sample of 12,301 firms over the period 2002 to 20012. AC variables are defined in Appendix A. Tobin's q is defined as the market value of assets (the book value of assets + the market value of common stock - the sum of the book value of common stock and balance sheet-deferred taxes) / the book value of assets. Industry Tobin's q is defined as a firm's Tobin's q less the mean q for the firm's 2-digit SIC industry-year. Leverage is defined as the ratio of total book debt to total assets. Profitability is defined as EBIT scaled by book assets. Cash holdings is the ratio of cash holdings to total assets. CAPEX/assets is the ratio of capital expenditures to assets. R&D/sales is the ratio of research and development expenditures to sales, asset tangibility is defined as property, plant and equipment to book assets (PPE/assets), E-index is Bebchuk et al (2014) governance index, audit fee, and non-audit fee.

Variable	Mean	S.D.	0.25	Median	0.75
Panel A: AC variables					
AC outside employment					
CEO	7.47	15.22	0	0	0
Chairman	5.86	13.53	0	0	0
President	5.67	13.18	0	0	0
Treasurer	0.23	2.55	0	0	0
CFO	2.24	8.35	0	0	0
Secretary	0.13	1.9	0	0	0
Executive VP	1.56	7.01	0	0	0
Senior VP	1.24	6	0	0	0
Academic	4.04	10.65	0	0	0
AC independence					
Independent	97.23	9.78	100	100	100
Linked	2.74	9.73	0	0	0
AC overlapped and multiple directorships					
Outside public boards	91.09	68.44	33.33	80	133.33
Four or more outside public boards	3.09	9.28	0	0	0
Member of nominating	35.19	29.89	0	33.33	50
Member of corporate governance	33.14	29.96	0	33.33	50
Member of compensation committee	29.31	27.87	0	25	50
AC turnover					
Tenure	4.34	2.66	2.5	3.75	5.42
Tenure 15≥ years	14.39	21.02	0	0	25
AC relative to the board					
Relative size	86.97	65.21	55.56	75	100
Chair relative equity	43.35	2020.91	2.81	8.98	22.23
Relative equity	40.76	1019.57	3.93	10.71	24.77
AC relative to the CEO					
Joined after CEO	22.75	28.27	0	14.29	33.33
Joined with CEO	3.31	9.57	0	0	0
Joined before CEO	73.94	29.86	50	80	100
Older than CEO	44.01	36.99	0	40	75

Younger than CEO	46.81	36.99	12.5	41.43	75
Less shares than CEO	77.58	38.86	75	100	100
More shares than CEO	21.91	38.14	0	0	25
AC nationality					
US	83.96	22.55	66.67	100	100
Foreign member 1	0.32	3.19	0	0	0
Foreign member 2	14.61	21.79	0	0	25
AC education					
PhD	3.77	10.38	0	0	0
Panel B: Financial variables					
Tobin q	1.75	1.08	1.09	1.41	2
Industry-adjusted Tobin's q	-0.01	.83	-.48	-.12	0.2
Leverage/Assets	0.18	0.16	0.04	0.16	0.29
Profitability (EBIT/assets)	0.09	0.08	0.04	0.08	0.13
Cash holdings/assets	0.10	0.10	0.02	0.06	0.14
CAPEX/assets	0.04	0.05	0.01	0.03	0.06
R&D/sales	0.03	0.07	0	0	0.03
PPE/assets	0.42	0.64	0.1	0.18	0.39
E-index	2.68	1.41	2	3	4
Audit fee ($m)	3.5	1.2	0.77	1.5	3.4
Non-audit fee ($m)	0.482	1.7	0	0.085	3.66

Table 3: Exploratory principal component analysis (PCA)

The table reports the factor loadings for the 32 AC variables included in the 15 factors. We follow the approach proposed by Larcker et al. (2007) and calculate the equally weighted averages of standardized versions of the AC variables with the exception of the factors 'AC US member', 'AC joined after CEO' 'AC independent', 'AC equity relative to CEO', 'AC Age relative to CEO' and 'AC foreign member' as these factors contain substitute mechanisms, so are calculated by netting the substitute variables first, then using the average equally-weighted sum of the standardized indicators. The overall sample adequacy score for the factors is 0.55 using Kaiser-Meyer-Olkin (KMO).

AC US member	**Loadings**	**AC Tenure**	**Loadings**
US	-0.7046	Tenure 15 years or more	0.6933
Foreign member 2	0.7008	Tenure	0.695
AC Joined after CEO		**AC Multiple directorships**	
Joined before CEO	-0.6984	Outside public boards	0.6688
Joined after CEO	0.6866	Four or more outside boards	0.7257
AC Independent		**AC Financial Expert**	
Classification Independent	0.7062	CFO	0.685
Classification linked	-0.7061	Executive VP	0.7001
AC Equity relative to CEO		**AC Compensation committee**	
Less shares than CEO	-0.7058	Size larger than board size	0.6582
More shares than CEO	0.7057	Member of the compensation committee	0.6993
AC Equity relative to board		**AC Director busyness**	
Shares in excess of average board shares	0.7064	Secretary	0.5034
Chair shares in excess of average board shares	0.7066	Senior VP	0.5373
		Treasurer	0.6564
AC Overlapped board members		**AC Academics**	
Member of nominating committee	0.687	Ph.D.	0.6977
Member of corporate governance committee	0.7015	Academic	0.7076
AC Age relative to CEO		**AC Foreign member**	
Older than CEO	0.7017	Joined with CEO	-0.6246
Younger than CEO	-0.7088	Foreign member1	0.7612
AC Employment			
President	0.558		
Chairman	0.5588		
CEO	0.6024		

Table 4: Descriptive statistics and correlations for the factor scores

The table reports descriptive statistics (Panel A) and correlations (Panel B) for the computed AC factors scores for a sample of 12,301 firms over the period from 2002 to 20012.

Variable	Standardized Mean	S.D.	Min	0.25	Median	0.75	Max
Panel A: Descriptive statistics							
AC US member	0	1.15	-7.52	-0.7	0.8	0.8	1.24
AC joined after CEO	0	0.96	-1.17	-0.85	-0.29	0.49	2.5
AC independent	0	0.96	-9.53	0.29	0.29	0.29	1.27
AC equity relative to CEO	0	0.9	-0.91	-0.67	-0.67	-0.09	1.68
AC equity relative to board	0	1.05	-0.03	-0.03	-0.03	-0.01	115.99
AC overlapped board members	0	0.98	-1.12	-1.12	0	0.56	2.24
AC age relative to CEO	0	0.97	-1.34	-0.89	0.01	0.82	1.36
AC employment	0	0.8	-0.45	-0.45	-0.45	0.27	4.9
AC tenure	0	0.91	-1.16	-0.66	-0.32	0.39	8.15
AC multiple directorships	0	0.89	-0.83	-0.58	-0.24	0.15	6.16
AC financial expert	0	0.91	-0.23	-0.23	-0.23	-0.23	13.46
AC compensation committee	0	0.58	-1.77	-0.32	-0.06	0.27	4.4
AC director busyness	0	0.65	-0.12	-0.12	-0.12	-0.12	11.14
AC academics	0	0.79	-0.37	-0.37	-0.37	-0.37	6.01
AC foreign member	0	0.71	-3.79	0.12	0.12	0.12	15.85

Table 4 continued (Panel B: Spearman correlations)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AC US member (1)	1							
AC joined after CEO (2)	0.0859*	1						
AC independent (3)	-0.0275*	0.0169	1					
AC equity relative to CEO (4)	-0.0226*	-0.1239*	-0.0600*	1				
AC equity relative to board (5)	-0.1078*	-0.0580*	0.2126*	-0.0371*	1			
AC overlapped board members (6)	-0.0081	0.0419*	0.0612*	-0.0139	0.0055	1		
AC age relative to CEO (7)	-0.2571*	0.0193*	0.1225*	-0.0292*	0.2331*	0.0198*	1	
AC employment (8)	0.0831*	0.2278*	0.0353*	-0.1454*	-0.0598*	0.0250*	0.0581*	1
AC tenure (9)	-0.0708*	-0.0206*	0.0054	-0.0377*	0.1378*	0.0391*	0.1920*	-0.1112*
AC multiple directorships (10)	-0.0962*	-0.0576*	-0.0472*	0.0441*	-0.0414*	-0.0018	0.0978*	0.1450*
AC financial Expert (11)	0.0953*	0.0762*	0.0278*	-0.0091	0.0136	-0.0616*	-0.0244*	0.0645*
AC compensation committee (12)	0.0455*	0.0524*	0.0315*	-0.0489*	-0.0463*	0.1888*	-0.0151	0.0999*
AC director busyness (13)	0.0617*	0.0583*	0.0231*	-0.0142	0.0096	-0.0018	-0.0035	0.0528*
AC academics (14)	-0.0303*	-0.0743*	-0.0203*	0.0439*	-0.0355*	0.0276*	-0.0104	-0.0627*
AC foreign member (15)	-0.2076*	-0.0375*	0.0206*	0.0125	0.0223*	0.004	0.0646*	-0.0193*

Table 4 continued (Panel B: Spearman correlations)

Variable	(9)	(10)	(11)	(12)	(13)	(14)	(15)
AC tenure (9)	1						
AC multiple directorships (10)	-0.1411*	1					
AC financial Expert (11)	-0.1063*	-0.0376*	1				
AC compensation committee (12)	-0.0962*	-0.0279*	0.0034	1			
AC director busyness (13)	-0.0682*	-0.0397*	0.3190*	0.0165	1		
AC academics (14)	-0.0065	0.0978*	-0.0301*	0.0074	0.0016	1	
AC foreign member (15)	0.0309*	0.0087	-0.0291*	-0.0400*	-0.0241*	0.0155	1

Table 5: Spearman Correlations: AC Factors with Accounting Outcomes and Organizational Performance.

The table reports Spearman bivariate correlations between the 15 AC factors and set of outcome variables. Tobin's q is calculated as the market value of assets scaled by total book assets. Industry-adjusted Tobin's q is firm q less the mean q in the firm's 2-digit SIC industry. Leverage is the ratio of total debt to total assets, EBIT/assets is the ratio of earnings before interest and taxes to assets, Cash/assets is the ratio of cash flow to total assets, CAPEX/assets is the ratio of capital expenditures to assets, R&D/sales is the ratio of research and development expenditures to sales, and asset tangibility is (PPE) is property, plant and equipment scaled by assets.

Variable	Adjusted Tobin's q	Leverage	EBIT/ assets	Cash/ assets	CAPEX/ assets	R&D/ sales	PPE
AC US member	0.0101	-0.005	0.0284*	-0.0173	0.0204*	-0.0294*	0.0159
AC joined after CEO	0.0181	-0.0159	0.0033	-0.0253*	0.0413*	-0.0115	0.0194*
AC independent	-0.0152	-0.0829*	-0.0682*	0.0736*	-0.0456*	0.0607*	-0.0235*
AC equity relative to CEO	-0.0126	0.0007	-0.0049	0.0304*	-0.0197*	0.0024	-0.0394*
AC equity relative to board	-0.0240*	-0.0076	-0.0856*	-0.0003	-0.0231*	0.0923*	0.0183
AC overlapped board members	-0.0101	-0.001	-0.0002	0.0004	0.0165	-0.0154	-0.0057
AC age relative to CEO	-0.0446*	0.0237*	-0.0043	-0.0189*	-0.0007	0.0265*	0.0213*
AC employment	-0.011	0.0755*	0.0260*	-0.0673*	0.0663*	0.0297*	0.0928*
AC tenure	0.0299*	-0.0689*	-0.0023	0.0001	-0.0297*	0.0002	-0.0012
AC multiple directorships	0.0103	0.1181*	0.0912*	0.0324*	0.0479*	0.1043*	0.0157
AC financial expert	-0.0019	0.0048	0.0196*	0.0215*	0.0077	0.0570*	-0.0185*
AC compensation committee	0.0044	0.004	-0.0005	-0.0446*	0.0413*	-0.0264*	0.0487*
AC director busyness	-0.007	0.016	0.0105	-0.0103	0.0011	0.0175	-0.0214*
AC academics	-0.0132	-0.0043	-0.0025	0.0256*	-0.0318*	0.0651*	0.0038
AC foreign member	-0.0265*	-0.0111	-0.0117	0.0236*	-0.0027	0.0429*	-0.0061

Table 6: **Firm value regressions**

The table reports fixed effects panel regressions of industry-adjusted Tobin's q on 15 AC factors and control variables for the period 2002 to 2012. Firm size is the natural logarithm of total assets (Size), growth in sales is measured over the prior 2 years (Sales growth), R&D/sales is the ratio of research and development expenditures to sales, Cash/Assets is the ratio of cash holdings to total assets, Capex/Assets is the ratio of capital expenditures to book assets, profitability is measured as the ratio of EBIT to assets where earnings is measured before interest and taxes, PPE/Assets is the ratio of property, plant and equipment to total assets, leverage is defined as the ratio of total debt to total assets (Leverage), Audit fee is the natural logarithm of Audit fee, and Big 4 is a dummy variable equal to 1 if audited by PricewaterhouseCoopers, KPMG, Deloitte or Ernst & Young, and 0 otherwise. All continuous variables are winsorized at the 1% and 99% percentiles. All regressions include firm, industry and year fixed effects. The p-values (in parentheses) are based on clustered standard errors at the firm level. ***, **, * denotes statistical significance at the 1%, 5%, 10% level.

	Base model	Firm Controls
Variables	(1)	(2)
AC US member	-0.002	0.005
	(0.880)	(0.642)
AC joined after CEO	0.011	0.003
	(0.345)	(0.812)
AC independent	-0.011	-0.005
	(0.231)	(0.591)
AC equity relative to CEO	-0.004	0.001
	(0.700)	(0.940)
AC equity relative to board	-0.010***	0.014
	(0.000)	(0.547)
AC overlapped board members	0.023*	0.027**
	(0.055)	(0.019)
AC age relative to CEO	-0.009	-0.013
	(0.438)	(0.203)
AC employment	-0.002	0.011
	(0.884)	(0.407)
AC tenure	-0.001	0.004
	(0.973)	(0.795)
AC multiple directorships	0.000	-0.002
	(1.000)	(0.856)
AC financial expert	-0.002	0.001
	(0.787)	(0.934)
AC compensation committee	-0.015	-0.038
	(0.637)	(0.324)
AC director busyness	-0.011	-0.020**
	(0.152)	(0.021)
AC academics	-0.032*	-0.028
	(0.060)	(0.118)
AC foreign member	-0.029***	-0.024**
	(0.008)	(0.039)

Size		-0.314***
		(0.000)
Sales growth		0.133***
		(0.002)
R&D/SALES		0.952
		(0.126)
Cash /assets		0.437***
		(0.005)
CAPEX /assets		0.908**
		(0.012)
EBIT/assets		3.518***
		(0.000)
PPE/assets		0.121***
		(0.002)
Leverage		-0.305**
		(0.024)
Audit fee		0.010
		(0.334)
Big 4		0.014
		(0.791)
Constant	0.101***	1.916***
	(0.000)	(0.000)
Observations	12,231	9,677
Number of firms	1,881	1,668
R-squared	0.02	0.17
F-statistic	9.62***	10.34***

Table 7: Descriptive Statistics for 'high' and 'low' indices

The table reports descriptive statistics for the computed high (positive) and low (negative) indices for a sample of 12,301 over the period 2002 to 2012.

Variable	Standardized Mean	S.D.	Min	0.25	Median	0.75	Max
High index	0	0.98	-1.12	-1.12	0	0.56	2.24
Low index	0	0.95	-3.9	0	0	0	15.74

Table 8: Regressions on high and low quality AC indices

The table reports fixed effects panel regressions of industry-adjusted Tobin's q on 'high' and 'low' AC quality indices and control variables for the period 2002 to 2012. Firm size is the natural logarithm of total assets (Size), growth in sales is measured over the prior 2 years (Sales growth), R&D/sales is the ratio of research and development expenditures to sales, Cash/Assets is the ratio of cash holdings to total assets, Capex/Assets is the ratio of capital expenditures to book assets, profitability is measured as the ratio of EBIT to assets where earnings is measured before interest and taxes, PPE/Assets is the ratio of property, plant and equipment to total assets, leverage is defined as the ratio of total debt to total assets (Leverage), Audit fee is the natural logarithm of Audit fee, and Big 4 is a dummy variable equal to 1 if audited by PricewaterhouseCoopers, KPMG, Deloitte or Ernst & Young, and 0 otherwise. All continuous variables are winsorized at the 1% and 99% percentiles. All regressions include firm, industry and year fixed effects. The p-values (in parentheses) are based on clustered standard errors at the firm level. ***, **, * denotes statistical significance at the 1%, 5%, 10% level.

Variables	Base model (1)	Firm Controls (2)
High index	0.022*	0.027**
	(0.073)	(0.024)
Low index	-0.022***	-0.023***
	(0.003)	(0.003)
Size		-0.311***
		(0.000)
Sales growth		0.133***
		(0.002)
R&D/SALES		0.956
		(0.129)
Cash /assets		0.445***
		(0.004)
CAPEX /assets		0.919**
		(0.013)
EBIT/assets		3.519***
		(0.000)
PPE/assets		0.119***
		(0.002)
Leverage		-0.299**
		(0.028)
Audit fee		0.009
		(0.366)
Big 4		0.017
		(0.743)
Constant	0.117***	1.919***
	(0.000)	(0.000)
Observations	12,231	9,677
Number of firms	1,881	1,668
R-squared	0.02	0.17
F-statistic	5.25***	15.01***

Table 9: Regressions on 15 AC factors and high and low quality AC indices

The table reports fixed effects panel regressions of Industry-adjusted Tobin's q on 15 AC factors, 'high' and 'low' quality AC indices and control variables for the period 2002 to 2012. Firm size is the natural logarithm of total assets (Size), growth in sales is measured over the prior 2 years (Sales growth), R&D/sales is the ratio of research and development expenditures to sales, Cash/assets is the ratio of cash holdings to total assets, Capex/assets is the ratio of capital expenditures to book assets, profitability is measured as the ratio of EBIT to assets where earnings is measured before interest and taxes, PPE/Assets is the ratio of property, plant and equipment to total assets, leverage is defined as the ratio of total debt to total assets (Leverage), Audit fee is the natural logarithm of Audit fee, Big 4 is a dummy variable equal to 1 if audited by PricewaterhouseCoopers, KPMG, Deloitte or Ernst & Young, and 0 otherwise, Insiders % is the percentage of outstanding shares held by top management and directors, E-index is Bebchuk et al (2014) governance index, Block is the percentage of shares held by shareholders with 5% or greater shareholders, BoardOut is a dummy equal to 1 if 'outside' directors constitute a majority on the board, and 0 otherwise, and Governance policy is a dummy equal to 1 if a firm's formal governance policy is available in Board Analyst, and 0 otherwise. All continuous variables are winsorized at the 1% and 99% percentiles. All regressions include firm, industry and year fixed effects. The p-values (in parentheses) are based on clustered standard errors at the firm level. ***, **, * denotes statistical significance at the 1%, 5%, 10% level.

Variables	Base model (1)	Firm & Gov. Controls (2)	Firm & Gov. Controls (3)
High index			0.026**
			(0.027)
Low index			-0.023***
			(0.004)
AC US member		0.004	
		(0.685)	
AC joined after CEO		0.003	
		(0.801)	
AC independent		-0.006	
		(0.564)	
AC equity relative to CEO		-0.000	
		(0.979)	
AC equity relative to board		0.012	
		(0.593)	
AC overlapped board members		0.027**	
		(0.021)	
AC age relative to CEO		-0.014	
		(0.193)	
AC employment		0.011	
		(0.401)	
AC tenure		0.004	
		(0.772)	
AC multiple directorships		-0.002	
		(0.858)	
AC financial expert		0.001	
		(0.942)	

AC compensation committee		-0.037	
		(0.324)	
AC director busyness		-0.020**	
		(0.023)	
AC academics		-0.028	
		(0.119)	
AC foreign member		-0.024**	
		(0.041)	
Size	-0.317***	-0.318***	-0.315***
	(0.000)	(0.000)	(0.000)
Sales growth	0.136***	0.133***	0.134***
	(0.002)	(0.002)	(0.002)
R&D/sales	0.930	0.935	0.939
	(0.137)	(0.132)	(0.135)
Cash /assets	0.427***	0.431***	0.438***
	(0.006)	(0.006)	(0.005)
CAPEX /assets	0.936**	0.908**	0.918**
	(0.011)	(0.012)	(0.013)
EBIT/assets	3.501***	3.502***	3.504***
	(0.000)	(0.000)	(0.000)
PPE/assets	0.122***	0.122***	0.120***
	(0.002)	(0.002)	(0.002)
Leverage	-0.291**	-0.303**	-0.296**
	(0.032)	(0.025)	(0.029)
Audit fee	0.005	0.007	0.005
	(0.678)	(0.569)	(0.629)
Big 4	0.014	0.011	0.014
	(0.793)	(0.837)	(0.785)
Insiders %	-0.124*	-0.106	-0.108
	(0.092)	(0.154)	(0.142)
E-index	0.011	0.012	0.011
	(0.258)	(0.212)	(0.245)
Block	-0.034	-0.034	-0.033
	(0.614)	(0.608)	(0.623)
BoardOut	-0.105	-0.114	-0.108
	(0.527)	(0.501)	(0.522)
Governance policy	0.015	0.013	0.014
	(0.605)	(0.665)	(0.634)
Constant	2.134***	2.108***	2.109***
	(0.000)	(0.000)	(0.000)
Observations	9,677	9,677	9,677
Number of firms	1,668	1,668	1,668
R-squared	0.17	0.17	0.17
F-statistic	13.27***	9.61***	12.88***

Table 10: Internal audit quality regressions

The table reports probit regressions of accounting issues (model 1), financial restatement (model 2), audit opinion concerns (model 3), auditor dismissed (model 4), and Internal control – significant deficiency (model 5) on 'high' and 'low' indices and control variables for the period 2002 to 2012. Accounting issues is a dummy variable equal to 1 if the predecessor auditor discloses (Form K-8) issues related to accounting treatments and/or disagreements about accounting principles, and 0 otherwise. Financial restatement is a dummy variable equal to 1 if the predecessor auditor discloses (Form K-8) a restatement of the financials either occurred or will occur, and 0 otherwise. Audit opinion concerns is a dummy variable equal to 1 if the predecessor auditor discloses (Form K-8) concerns regard audit opinion that there are questions regarding the veracity or applicability of previous or upcoming audit opinions, and 0 otherwise. Auditor dismissed is a dummy variable equal to1 if the departed auditor was dismissed from the engagement after disagreements, and 0 otherwise. Internal control- significant deficiency is a dummy variable equal to 1 if a company has deficiencies or disclosure issues regarding the effectiveness of internal controls, and 0 otherwise. Post Audit Standard No. 5 is a dummy variable equal to 1 if year is 2008 or later, and 0 otherwise. Firm size is the natural logarithm of total assets (Size), growth in sales is measured over the prior 2 years (Sales growth), R&D/sales is the ratio of research and development expenditures to sales, Cash/assets is the ratio of cash holdings to total assets, Capex/assets is the ratio of capital expenditures to book assets, profitability is measured as the ratio of EBIT to assets where earnings is measured before interest and taxes, PPE/assets is the ratio of property, plant and equipment to total assets, leverage is defined as the ratio of total debt to total assets (Leverage), Big 4 is a dummy variable equal to 1 if audited by PricewaterhouseCoopers, KPMG, Deloitte or Ernst and Young, and 0 otherwise. Insiders % is the percentage of outstanding shares held by top management and directors, E-index is Bebchuk et al (2014) governance index, Block is the percentage of shares held by shareholders with 5% or greater shareholders, BoardOut is a dummy equal to 1 if 'outside' directors constitute a majority on the board, and 0 otherwise, and Governance policy is a dummy equal to 1 if a firm's formal governance policy is available in Board Analyst, and 0 otherwise. All continuous variables are winsorized at the 1% and 99% percentiles. The p-values (in parentheses) are based on clustered standard errors at the firm level. ***, **, * denotes statistical significance at the 1%, 5%, 10% level.

	Accounting issues	Financial restatement	Audit opinion concerns	Auditor dismissed	Internal control significant deficiency
Variables	(1)	(2)	(3)	(4)	(5)
High index	-0.050*	0.000	0.004	-0.033*	-0.029
	(0.097)	(0.989)	(0.731)	(0.076)	(0.215)
Low index	0.057**	0.011*	0.012*	-0.014	0.151***
	(0.034)	(0.071)	(0.072)	(0.442)	(0.000)
Post Audit Standard No. 5	0.119	0.152***	0.148***	0.443***	0.367***
	(0.387)	(0.006)	(0.008)	(0.000)	(0.004)
Size	-0.069**	-0.000	0.005	-0.071***	0.013
	(0.048)	(0.971)	(0.659)	(0.000)	(0.609)
Sales growth	0.201*	0.039	0.022	-0.111	0.389***
	(0.085)	(0.266)	(0.551)	(0.296)	(0.000)

R&D/sales	-0.142	-0.910**	-0.820**	0.409	-0.069
	(0.816)	(0.030)	(0.041)	(0.126)	(0.826)
Cash /assets	-0.229	-0.174	-0.136	0.019	-0.649**
	(0.500)	(0.247)	(0.391)	(0.932)	(0.013)
CAPEX /assets	0.774	0.306	0.316	0.303	-0.567
	(0.258)	(0.148)	(0.149)	(0.548)	(0.367)
EBIT/assets	-0.099	-0.482***	-0.471***	-0.564**	-1.205**
	(0.778)	(0.004)	(0.010)	(0.046)	(0.022)
PPE/assets	-0.003	-0.028	-0.025	-0.026	0.293***
	(0.952)	(0.211)	(0.275)	(0.658)	(0.000)
Leverage	0.226	0.027	0.028	0.209*	-0.751***
	(0.305)	(0.760)	(0.752)	(0.077)	(0.000)
Audit fee	0.014	0.018	0.008	0.086***	-0.002
	(0.646)	(0.273)	(0.613)	(0.006)	(0.949)
Big 4	0.116*	-0.049	-0.046	-0.002	-0.191***
	(0.054)	(0.189)	(0.247)	(0.963)	(0.004)
Insiders %	-0.482**	0.161**	0.176**	0.352***	-0.765***
	(0.046)	(0.019)	(0.016)	(0.008)	(0.002)
E-index	0.001	-0.002	0.000	0.008	0.033
	(0.958)	(0.786)	(0.994)	(0.638)	(0.108)
Block	0.179	-0.067	-0.040	-0.044	0.303*
	(0.424)	(0.489)	(0.673)	(0.776)	(0.090)
BoardOut	-	-0.212***	-0.061	-0.074	-
		(0.000)	(0.431)	(0.582)	
Governance policy	-0.180***	-0.067**	-0.061*	-0.018	0.025
	(0.004)	(0.034)	(0.051)	(0.723)	(0.673)
Auditor dismissed		-	-	-	-0.111
					(0.133)
Constant	0.348	-2.477	-3.481	-6.681***	-0.762
	(0.910)	(0.301)	(0.209)	(0.004)	(0.871)
Observations	130	337	337	356	226
Pseudo R-squared	0.34	0.32	0.27	0.31	0.61
Likelihood ratio	-26.43***	-47.58***	-49.14***	-104.41***	-34.48***

Table 11: Financial reporting quality regressions

The table reports fixed effects panel regressions of Ball and Shivakumar (2006) (model 1) and Kothari et al (2005) (model 2) models of abnormal (unexpected) accruals and probit adverse restatement (model 3) regressions on high and low AC quality indices and control variables for the period 2002 to 2012. The dependent variable is abnormal accruals, measured as $ACC_{i,t} = \alpha + \beta CF_{i,t} + \varphi CF_{i,t-1} + \gamma CF_{i,t+1} + \delta DCF_{i,t} + \theta DCF_{i,t} * CF_{i,t} + \varepsilon_{i,t}$ in models 1, and $ACC_{i,t} = \alpha + \beta \Delta REV_{t,t} - \Delta REC_{i,t} + \gamma PPE_{i,t} + ROA_{i,t-1} + \varepsilon_{i,t}$for model 2. Adverse restatement is a dummy variable equal to1 if a firm has an income-decreasing restatement, and 0 otherwise. Firm size is the natural logarithm of total assets (Size), growth in sales is measured over the prior 2 years (Sales growth), R&D/sales is the ratio of research and development expenditures to sales, Cash/assets is the ratio of cash holdings to total assets, Capex/assets is the ratio of capital expenditures to book assets, profitability is measured as the ratio of EBIT to assets where earnings is measured before interest and taxes, PPE/assets is the ratio of property, plant and equipment to total assets, leverage is defined as the ratio of total debt to total assets (Leverage), Audit fee is the natural logarithm of Audit fee, Big 4 is a dummy variable equal to 1 if audited by PricewaterhouseCoopers, KPMG, Deloitte or Ernst & Young, and 0 otherwise, Insiders % is the percentage of outstanding shares held by top management and directors, E-index is Bebchuk et al (2014) governance index, Block is the percentage of shares held by shareholders with 5% or greater shareholders, BoardOut is a dummy equal to 1 if 'outside' directors constitute a majority on the board, and 0 otherwise, and Governance policy is a dummy equal to 1 if a firm's formal governance policy is available in Board Analyst, and 0 otherwise. All continuous variables are winsorized at the 1% and 99% percentiles. All regressions include firm, industry and year fixed effects. The p-values (in parentheses) are based on clustered standard errors at the firm level. ***, **, * denotes statistical significance at the 1%, 5%, 10%

Variables	Ball and Shivakumar (1)	Kothari et al. (2)	Adverse restatement
High index	0.001	0.003	-0.042**
	(0.325)	(0.110)	(0.012)
Low index	0.001	0.002*	-0.028
	(0.142)	(0.086)	(0.131)
Size	-0.003	-0.010	0.031
	(0.331)	(0.223)	(0.118)
Sales growth	-0.007	-0.020**	-0.097
	(0.157)	(0.033)	(0.265)
R&D/ Sales	0.177**	0.226	-0.064
	(0.013)	(0.167)	(0.789)
Cash/assets	-0.002	-0.015	0.169
	(0.871)	(0.308)	(0.443)
CAPEX/assets	0.048	0.143**	0.310
	(0.142)	(0.010)	(0.459)
EBIT/assets	-0.072***	-0.151***	0.450*
	(0.002)	(0.000)	(0.084)
PPE/assets	-0.002	-0.019	-0.056
	(0.621)	(0.136)	(0.197)
Leverage	0.003	-0.012	0.399***
	(0.769)	(0.666)	(0.001)

Audit fee	0.000	0.000	-0.051*
	(0.763)	(0.767)	(0.059)
Big 4	-0.011***	0.007	0.091
	(0.005)	(0.263)	(0.172)
Insiders %	0.005	-0.011	-0.021
	(0.510)	(0.151)	(0.866)
E-index	-0.000	-0.001	-0.014
	(0.791)	(0.607)	(0.316)
Block	0.004	-0.000	-0.294**
	(0.561)	(0.965)	(0.015)
BoardOut	0.004	0.007	0.170
	(0.647)	(0.424)	(0.301)
Governance policy	-0.003	-0.002	0.056
	(0.290)	(0.533)	(0.157)
Constant	0.052	0.126*	-0.390
	(0.111)	(0.050)	(0.833)
Observations	3,166	6,344	577
Number of firms	1,237	1,306	392
R-squared/Psudo R-squared	0.12	0.08	0.17
F-statistic/Likelihood ratio	4.30***	6.85***	-210.74***

Table 12: Audit quality regressions

The table reports regressions of non-audit fee (model 1), non-audit fee ratio (model 2), audit fees reduction (model 3), auditor opinion (model 4) and change auditor rank (mode 5) on 'high' and 'low' indices and control variables for the period 2002 to 2012. Model 1 and 2 are estimated using firm fixed effects OLS regressions, and model 3, 4 and 5 are estimated using probit (partial effects reported). Non-audit fee is log of non-audit fees, where non-audit fees comprise of tax preparation fees. Non-audit fee ratio is log of non-audit fees, where non-audit fees comprise of tax preparation fees divided by audit fee. Audit fees reduction is a dummy variable equal to 1 if audit fees decreases in a subsequent year, and zero otherwise. Auditor opinion is a dummy variable equaling to 1 if the auditor issues an unqualified opinion with explanatory language, and zero otherwise. Auditor quality change is a dummy variable equal to 1 if the departed auditor is a big 4 audit firm and the new auditor is not a big 4 audit firm. Firm size is the natural logarithm of total assets (Size), growth in sales is measured over the prior 2 years (Sales growth), R&D/sales is the ratio of research and development expenditures to sales, Cash/assets is the ratio of cash holdings to total assets, Capex/assets is the ratio of capital expenditures to book assets, profitability is measured as the ratio of EBIT to assets where earnings is measured before interest and taxes, PPE/assets is the ratio of property, plant and equipment to total assets, leverage is defined as the ratio of total debt to total assets (Leverage), Big 4 is a dummy variable equal to 1 if audited by PricewaterhouseCoopers, KPMG, Deloitte or Ernst & Young, and 0 otherwise, Insiders % is the percentage of outstanding shares held by top management and directors, E-index is Bebchuk et al (2014) governance index, Block is the percentage of shares held by shareholders with 5% or greater shareholders, BoardOut is a dummy equal to 1 if 'outside' directors constitute a majority on the board, and 0 otherwise, and Governance policy is a dummy equal to 1 if a firm's formal governance policy is available in Board Analyst, and 0 otherwise. All continuous variables are winsorized at the 1% and 99% percentiles. All regressions include firm, industry and year fixed effects. The p-values (in parentheses) are based on clustered standard errors at the firm level. ***, **, * denotes statistical significance at the 1%, 5%, 10% level.

	Non-audit fees	Non- audit fees ratio	Audit fees reduction	Auditor opinion	Auditor quality change
Variables	(1)	(2)	(3)	(4)	(5)
High index	-0.024	-0.001	-0.001	-0.012***	-0.040
	(0.324)	(0.544)	(0.790)	(0.006)	(0.328)
Low index	0.045**	0.002*	0.011**	0.008*	0.239***
	(0.012)	(0.062)	(0.015)	(0.073)	(0.000)
Size	0.215***	0.005	-0.089***	0.029***	-0.175***
	(0.000)	(0.241)	(0.000)	(0.000)	(0.001)
Sales growth	-0.152	0.001	-0.213***	0.036	-0.271
	(0.102)	(0.928)	(0.000)	(0.148)	(0.123)
R&D/sales	-0.833	0.016	0.019	0.118	0.591
	(0.359)	(0.783)	(0.837)	(0.154)	(0.434)
Cash /assets	-0.130	-0.003	-0.021	-0.069	-0.115
	(0.635)	(0.851)	(0.722)	(0.179)	(0.798)

CAPEX /assets	-0.032	-0.013	0.139	-0.102	-1.448
	(0.963)	(0.768)	(0.345)	(0.456)	(0.328)
EBIT/assets	0.140	0.036	-0.062	-0.229***	2.998***
	(0.704)	(0.124)	(0.365)	(0.000)	(0.003)
PPE/assets	0.039	0.011*	0.023*	-0.014	0.019
	(0.668)	(0.063)	(0.074)	(0.243)	(0.884)
Leverage	0.144	0.017	0.109***	0.078**	1.418***
	(0.491)	(0.220)	(0.003)	(0.023)	(0.003)
Audit fee	-	-	0.144***	0.022***	0.154**
			(0.000)	(0.000)	(0.013)
Big 4	0.616***	0.030***	-0.068***	0.003	0.373***
	(0.000)	(0.002)	(0.001)	(0.857)	(0.001)
Insiders %	-1.058***	-0.006	0.059*	0.052	-0.775*
	(0.000)	(0.666)	(0.084)	(0.112)	(0.086)
E-index	-0.006	-0.000	0.002	0.009**	-0.051
	(0.762)	(0.759)	(0.581)	(0.021)	(0.261)
Block	-0.542***	-0.008	0.082**	0.044	-0.563**
	(0.000)	(0.356)	(0.026)	(0.194)	(0.049)
BoardOut	0.407	0.046**	-0.041	0.005	-
	(0.212)	(0.029)	(0.613)	(0.934)	
Governance policy	0.462***	-0.006	-0.016	0.005	-0.086
	(0.000)	(0.193)	(0.285)	(0.688)	(0.409)
Constant	9.789***	0.798***	-5.248***	-0.846*	-4.589
	(0.000)	(0.000)	(0.000)	(0.090)	(0.216)
Observations	7,054	7,054	9,242	9,675	131
Number of firms	1,493	1,493	1635	1672	96
R-squared/Pseudo R-squared	0.05	0.16	0.14	0.28	0.33
F-statistic/likelihood ratio	12.22***	45.04***	-5238.42***	-4784.63***	-52.25***

Table 13 Regressions on industry adjusted AC factors and high and low AC quality indices.
The table reports fixed effects panel regressions of industry-adjusted Tobin's q on industry-adjusted factors and indices ('high' and 'low') by the industry median and control variables for the period 2002 to 2012. Firm size is the natural logarithm of total assets (Size), growth in sales is measured over the prior 2 years (Sales growth), R&D/sales is the ratio of research and development expenditures to sales, Cash/assets is the ratio of cash holdings to total assets, Capex/assets is the ratio of capital expenditures to book assets, profitability is measured as the ratio of EBIT to assets where earnings is measured before interest and taxes, PPE/assets is the ratio of property, plant and equipment to total assets, leverage is defined as the ratio of total debt to total assets (Leverage), Audit fee is the natural logarithm of Audit fee, Big 4 is a dummy variable equal to 1 if audited by PricewaterhouseCoopers, KPMG, Deloitte or Ernst & Young, and 0 otherwise, Insiders % is the percentage of outstanding shares held by top management and directors, E-index is Bebchuk et al (2014) governance index, Block is the percentage of shares held by shareholders with 5% or greater shareholders, BoardOut is a dummy equal to 1 if 'outside' directors constitute a majority on the board, and 0 otherwise, and Governance policy is a dummy equal to 1 if a firm's formal governance policy is available in Board Analyst, and 0 otherwise. All continuous variables are winsorized at the 1% and 99% percentiles. All regressions include firm, industry and year fixed effects. The p-values (in parentheses) are based on clustered standard errors at the firm level. ***, **, * denotes statistical significance at the 1%, 5%, 10% level.

Variables	Firm & Gov. Controls (1)	Firm & Gov. Controls (2)
High index		0.024**
		(0.030)
Low index		-0.022***
		(0.006)
AC US member	0.009	
	(0.388)	
AC joined after CEO	-0.002	
	(0.882)	
AC independent	-0.006	
	(0.531)	
AC equity relative to CEO	-0.008	
	(0.330)	
AC equity relative to board	0.006	
	(0.810)	
AC overlapped board members	0.025**	
	(0.023)	
AC age relative to CEO	-0.017*	
	(0.085)	
AC employment	0.009	
	(0.482)	
AC tenure	0.006	
	(0.680)	
AC multiple directorships	-0.006	
	(0.637)	
AC financial expert	0.000	
	(0.990)	

AC compensation committee	-0.032	
	(0.396)	
AC director busyness	-0.022**	
	(0.012)	
AC academics	-0.030*	
	(0.089)	
AC foreign member	-0.022*	
	(0.075)	
Size	-0.315***	-0.315***
	(0.000)	(0.000)
Sales growth	0.133***	0.135***
	(0.002)	(0.002)
R&D/sales	0.933	0.936
	(0.131)	(0.136)
Cash /assets	0.435***	0.436***
	(0.005)	(0.005)
CAPEX /assets	0.907**	0.927**
	(0.013)	(0.012)
EBIT/assets	3.499***	3.503***
	(0.000)	(0.000)
PPE/assets	0.123***	0.121***
	(0.002)	(0.002)
Leverage	-0.301**	-0.295**
	(0.025)	(0.030)
Audit fee	0.007	0.005
	(0.557)	(0.647)
Big 4	0.012	0.015
	(0.814)	(0.768)
Insiders %	-0.108	-0.110
	(0.145)	(0.136)
E-index	0.012	0.011
	(0.223)	(0.248)
Block	-0.037	-0.032
	(0.581)	(0.627)
BoardOut	-0.120	-0.107
	(0.476)	(0.527)
Governance policy	0.013	0.014
	(0.656)	(0.629)
Constant	2.094***	2.100***
	(0.000)	(0.000)
Observations	9,677	9,677
Number of firms	1,668	1,668
R-squared	0.17	0.17
F-statistic	9.57***	12.73***

Table 14 Robustness regressions

The table reports fixed effects panel regressions of the 'change' in industry adjusted Tobin's q on 'high' and 'low' AC quality indices (model 1), industry adjusted indices ('high' and 'low'; model 2), the 'change' in indices (model 3), and industry-adjusted operating cash flow (OCF) scaled by average assets (model 4) on 'good' and 'bad' indices and control variables for the period 2002 to 2012. Firm size is the natural logarithm of total assets (Size), growth in sales is measured over the prior 2 years (Sales growth), R&D/sales is the ratio of research and development expenditures to sales, Cash/assets is the ratio of cash holdings to total assets, Capex/assets is the ratio of capital expenditures to book assets, profitability is measured as the ratio of EBIT to assets where earnings is measured before interest and taxes, PPE/assets is the ratio of property, plant and equipment to total assets leverage is defined as the ratio of total debt to total assets (Leverage), Audit fee is the natural logarithm of Audit fee, Big 4 is a dummy variable equal to 1 if audited by PricewaterhouseCoopers, KPMG, Deloitte or Ernst & Young, and 0 otherwise, Insiders % is the percentage of outstanding shares held by top management and directors, E-index is Bebchuk et al (2014) governance index, Block is the percentage of shares held by shareholders with 5% or greater shareholders, BoardOut is a dummy equal to 1 if 'outside' directors constitute a majority on the board, and 0 otherwise, and Governance policy is a dummy equal to 1 if a firm's formal governance policy is available in Board Analyst, and 0 otherwise. All continuous variables are winsorized at the 1% and 99% percentiles. All regressions include firm, industry and year fixed effects. The p-values (in parentheses) are based on clustered standard errors at the firm level. ***, **, * denotes statistical significance at the 1%, 5%, 10% level.

	Change in Industry-adjusted Tobin's q			Industry-adjusted OCF
	AC indices Levels	Industry Adjusted Indices	Change in AC Indices	AC indices Levels
Variables	(1)	(2)	(3)	(4)
High index	0.042**			-0.000
	(0.028)			(0.687)
Low index	-0.018**			-0.002***
	(0.018)			(0.006)
Industry adjusted high index		0.029*		
		(0.092)		
Industry adjusted low index		-0.019**		
		(0.014)		
Change in high index			0.028**	
			(0.010)	
Change in low index			-0.011*	
			(0.074)	
Size	-0.319***	-0.320***	-0.347***	-0.008**
	(0.000)	(0.000)	(0.000)	(0.014)
Sales growth	0.114	0.115	0.087	0.020***
	(0.143)	(0.139)	(0.334)	(0.000)
R&D/sales	0.902	0.898	0.919	-0.331***
	(0.303)	(0.304)	(0.371)	(0.000)
Cash /assets	0.698**	0.694**	0.843**	0.117***
	(0.012)	(0.012)	(0.011)	(0.000)
CAPEX /assets	0.849	0.855	0.721	0.233***
	(0.124)	(0.121)	(0.257)	(0.000)

EBIT/assets	3.807***	3.807***	3.897***	
	(0.000)	(0.000)	(0.000)	
PPE/assets	0.135**	0.136**	0.154**	-0.013***
	(0.011)	(0.011)	(0.011)	(0.000)
Leverage	-0.479**	-0.476**	-0.469**	-0.084***
	(0.013)	(0.014)	(0.034)	(0.000)
Audit fee	0.004	0.003	-0.001	-0.003***
	(0.838)	(0.856)	(0.959)	(0.002)
Big 4	0.026	0.026	0.096	-0.007*
	(0.758)	(0.763)	(0.236)	(0.088)
Insiders %	-0.048	-0.052	-0.007	-0.009
	(0.705)	(0.681)	(0.957)	(0.154)
E-index	0.007	0.007	0.013	0.000
	(0.677)	(0.675)	(0.468)	(0.768)
Block	-0.006	-0.007	0.032	-0.004
	(0.958)	(0.944)	(0.790)	(0.431)
BoardOut	0.203	0.206	0.237	0.010
	(0.340)	(0.335)	(0.261)	(0.261)
Governance policy	0.033	0.033	0.036	0.002
	(0.483)	(0.484)	(0.450)	(0.272)
Constant	1.911***	1.907***	2.083***	0.116***
	(0.001)	(0.001)	(0.001)	(0.000)
Observations	8,372	8,372	7,103	9,710
Number of firms	1,574	1,574	1,512	1,678
R-squared	0.09	0.09	0.09	0.11
F-statistic	8.40***	8.35***	7.22***	15.53***