EARNINGS QUALITY AND CORPORATE GOVERNANCE

Vasiliki Athanasakou
Saint Mary's University

Per Olsson
ESMT Berlin

Vasiliki Athanasakou, Department of Accounting, Saint Mary's University, Vasiliki.Athanasakou@smu.ca. Per Olsson, ESMT Berlin, per.olsson@esmt.org. We appreciate helpful comments from workshop participants at Bristol University, Cass Business School, Cardiff University, Copenhagen Business School, Duke University, Edinburgh Business School, Erasmus University, ESMT Berlin, Exeter University, Free University Berlin, the German Economics Association meeting, HEC Lausanne, Kings College London, London School of Economics, Ohio State University, Stockholm School of Economics, Tilburg University, the Tsinghua University International Corporate Governance Conference, University of Maastricht, and University of Memphis.

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Abstract:
We develop and test the proposition that earnings quality reflects both the scope for moral hazard (when associated mainly with volatile business fundamentals) and the outcome of moral hazard (when associated with management's discretionary reporting choices). As a consequence, earnings quality can exhibit opposite sign associations with corporate governance structures depending on its source: business fundamentals (innate quality) and managerial incentives (discretionary quality). We provide consistent evidence in broad samples, using a methodology that splits earnings quality into an innate and discretionary component, and in subsamples likely to be dominated by either source of earnings quality. We further document interaction effects, i.e., corporate governance structures being increasingly effective on discretionary earnings quality as innate quality worsens. The study highlights the importance of specifying the source of earnings quality effects when researching associations with corporate governance, as a theoretical matter as well as in the empirical design.

Keywords: earnings quality, business model, corporate governance, earnings management, accruals.

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1. Introduction

The relation between corporate governance and earnings quality is an issue that has proved elusive and often contentious among accounting researchers.[1] One reason is that the empirical literature examining earnings quality and corporate governance has found weak and inconsistent results (Larcker, Richardson, and Tuna 2007). A perhaps more fundamental reason is the difficulty in identifying linkages in situations where various information structures can both affect governance structures and be affected by them (Armstrong, Guay, and Weber 2010; Ferreira, Ferreira, and Raposo 2011).

In this study we develop and test the proposition that earnings quality reflects both the outcome of moral hazard (earnings quality issues associated with management's discretionary reporting choices) and the scope for moral hazard (earnings quality issues associated with volatile business fundamentals). As a consequence, earnings quality and corporate governance are likely to exhibit both a positive and a negative association. Specifically, more effective monitoring and governance can restrain hazardous outcomes, including financial reporting outcomes, and therefore lessen earnings quality issues associated with managerial intent; i.e., stricter governance is associated with better discretionary earnings quality. Information issues associated with the volatility of the operating environment and the business model increases the scope for moral hazard in the first place, however, and therefore create a need for stricter monitoring and governance (Demsetz and Lehn 1985); i.e., poorer innate earnings quality is associated with stricter governance.

To the extent, therefore, that a particular earnings quality measure is influenced both by management's reporting incentives and by factors in the operating environment, discretionary and innate portions of earnings quality can exhibit opposite and offsetting individual associations with

[1] We recognize the challenge in using very broad concepts such as 'earnings quality' and 'corporate governance' (e.g., Larcker et al. 2007, Brickley and Zimmerman 2010, Nelson and Skinner 2013). While we use such broad terms to discuss the initial motivation and general hypotheses, we conduct actual tests using context-specific operational constructs.

corporate governance structures, leading to the appearance of no *overall* association between earnings quality and governance (or alternatively a weak positive or negative association if the earnings quality measure is dominated by discretionary or innate determinants). The basic structure is set out in Figure 1.

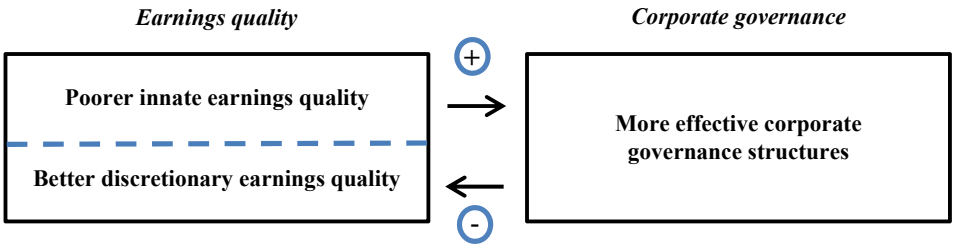

Figure 1: Basic predicted relations between earnings quality (EQ) and governance

Similarly, sample characteristics can matter. In situations where samples are biased – for example where incentives for opportunistic earnings management are particularly strong – all else equal, we would expect the effect of governance structures on discretionary earnings quality to dominate so that the overall association between earnings quality and governance is positive. However, holding "all else equal" (e.g., holding the innate earnings quality effect constant) may be easier said than done, because it is precisely in situations characterized by noisy operating environments and poor innate earnings quality where there is more scope for moral hazard in the first place (e.g., Demsetz and Lehn 1985).

An important implication of these observations is the critical role of the operational earnings quality measure, especially the extent to which it is influenced by volatility in business fundamentals versus managerial discretion. Commonly used measures in the literature, such as abnormal accruals, earnings persistence, earnings smoothness, accruals quality, etc., are influenced by a company's business model and operating environment as well as by discretionary financial reporting choices

(Dechow Ge, and Schrand 2010). Also measures originally designed to isolate managerial discretion, such as abnormal accruals, are substantially influenced by, or even dominated by, business model volatility (Hribar and McNichols 2007; Zimmerman 2013; Owens, Wu, and Zimmerman 2017). Isolating managerial discretion by simply controlling away the effect of volatile fundamentals is likely to be suboptimal, because it can bias results towards zero (since governance is expected to be more effective precisely in situations where there is higher scope for moral hazard, i.e., where fundamental business model volatility is high). Conversely, if the researcher is interested in the other part of the relation, i.e. the effect of earnings quality on governance, earnings quality measures partially influenced by managerial discretion may exhibit weak or inconsistent associations with governance. In sum, specifying the source of earnings quality and tailoring the earnings quality measure appropriately are likely to be a first order research design consideration in governance research.

An additional implication of the structure proposed in Figure 1 is the existence of an offsetting interaction effect, which has been ignored in much governance research, i.e. the influence and effectiveness of governance structures over discretionary earnings quality should increase with business model volatility. In other words it is in situations when innate earnings quality already suffers from volatile business fundamentals that we expect corporate governance to exert a higher influence on discretionary earnings quality.

To test this proposed structure we develop a methodology to identify and create empirical measures for two major forces that shape earnings quality, volatility in business fundamentals and managerial incentives. This allows us to simultaneously examine both types of associations between earnings quality measures and governance structures, as well as investigate interaction effects between the two. The empirical design starts with a very broad and generic earnings quality (*EQ*)

measure, essentially capturing volatility in earnings and accruals.[2] Next, we regress *EQ* on two vectors of economic determinants, based on economic theory and prior literature. The first vector captures firm fundamentals and the second vector captures incentives for discretionary reporting choices. For the vector of fundamental variables we rely on prior literature and use firm size, cash flow volatility, sales volatility, capital and intangibles assets intensity, the length of the operating cash cycle and loss intensity. For the vector of managerial incentives we rely on the Fields, Lys, and Vincent's (2001) taxonomy of earnings management incentives and include variables that prior literature has used to proxy for contractual arrangements, asset pricing considerations, and influencing external parties. On the single equation that models *EQ* on the two vectors, the fitted value of *EQ* on fundamental variables is the measure of innate earnings quality, i.e., variation in earnings quality associated with the firm's fundamentals. The fitted value of *EQ* on incentive variables is the measure of discretionary earnings quality, i.e., variation in earnings quality associated with managerial incentives. The residuals from the *EQ* regression represent noise.

We first conduct construct validity tests on our earnings quality measures. We begin with a governance-related regulatory event affecting all firms, the passage of the Sarbanes-Oxley legislation (SOX) in 2002. SOX aimed to restrict managerial discretion in financial reporting choices to restore investors' confidence in the integrity of external financial reporting; there was no explicit purpose to affect business fundamentals. Consequently, we expect discretionary earnings quality to significantly improve in the post-SOX period but innate earnings quality to remain unaffected. Results confirm these predictions. We next test accounting restatements, distinguishing between intentional misstatements (fraud, irregularities and misrepresentations) and errors (remaining restatements). We find that intentional misstatements are significantly associated with poor discretionary earnings quality but unrelated to innate earnings quality, whereas misstatements

[2] Our main earnings quality measure, *EQ*, is the common factor score of accruals quality (Dechow and Dichev 2002), absolute abnormal accruals from the modified Jones model, and earnings variability. The exact details are in Section 3.2 and Appendix B.

due to errors are associated with poor innate earnings quality but unrelated to discretionary quality. Finally, we document that innate earnings quality is significantly more stable over time than is discretionary earnings quality, consistent with the more stable (dynamic) nature of the business model (managerial discretion).

We next test the basic hypothesis that innate and discretionary earnings quality have opposite-sign associations with corporate governance in a simple design that is held constant for both innate and discretionary quality. We follow prior literature in identifying corporate governance variables, either direct monitoring measures such as board structure variables, or inverse measures, such as variables capturing managerial entrenchment. We form a composite corporate governance score (comprised of board structure variables and ownership variables) and find that higher levels of the governance composite score are associated with better discretionary earnings quality and with *poorer* innate earnings quality (all results are significant at the 5% level or better, depending on the specification).

We continue the analysis by not splitting earnings quality into an innate and discretionary part, but instead using subsamples that are likely to be dominated by firms with innate and discretionary earnings quality issues, respectively. In subsamples where the volatility of business fundamentals is likely to dominate, i.e., when the firm experiences operational shocks, we find that poor earnings quality is positively associated with the governance score. In subsamples where earnings management incentives are likely to be the dominating force for variation in earnings quality, e.g. when the firm issues equity or just meets analyst forecasts, we find that poor earnings quality is inversely related with the governance score. We believe these results support our basic theoretical proposition while mitigating measurement error concerns when splitting earnings quality constructs into an innate and discretionary component.

We next disaggregate corporate governance into five variables: *BoardSize* (proximity to firm-size-quartile average board size), *OutsideDirectors* (fraction of outside directors), *DirectorExpertise* (board members with industry expertise), *InsiderOwnership*, and *ShareholderConcentration* (a composite variable capturing dispersed ownership in general as well as institutional holdings and block holdings).[3] In the test of discretionary earnings quality on governance variables, all five variables are significant at the five percent level or better in the expected direction, one of them (*OutsideDirectors*) loses significance when controlling for innate earnings quality. To test for interaction effects, we interact governance factors with quartile ranks of innate earnings quality. With the exception of *OutsideDirectors* all interaction effects are significant (at the five percent level or better), indicating that as innate earnings quality worsens, governance becomes more effective in improving discretionary earnings quality.

Finally, we compare our results regarding discretionary earnings quality and corporate governance with results using various existing construct used to proxy for managerial discretion in the literature. Associations between governance variables and existing constructs are generally weak and inconsistent. This finding suggests that existing measures of earnings quality contain elements of managerial discretion as well as of fundamental volatility and also noise, a concern also noted by Dechow et al. 2010, Owens et al. 2017, among others.

We view the contribution of the study as follows. First, we combine and further develop arguments from two relatively distinct strands in the literature, the first one examining the effects of information structures on governance and the second one examining the effect of governance on financial reporting outcomes. Our analysis provides a combined economic framework and associated evidence on how earnings quality can exhibit opposite sign associations with corporate

[3] We use these variables because they have been use in both strands of the literature (viewing earnings quality as endogenous and viewing corporate governance as endogenous, respectively). We are aware of the debate about the validity of certain corporate governance variables (e.g., Larcker et al. 2007, Armstrong et al. 2010, Brickley and Zimmerman 2010). We discuss disagreements about the interpretation as we present results.

governance depending on its source. As such, our study extends research that stresses the role of business fundamentals in shaping earnings quality (e.g., Owens, Wu and Zimmerman 2017) with a view to revisiting the association of earnings quality with corporate governance. Prior research attributes conflicting hypotheses and mixed and inconsistent results in this association to the endogeneity of the governance structures (Armstrong et al. 2010) and to measurement error in the governance constructs (Larcker et al. 2007). Our analysis suggests that the complex construct of earnings quality also plays an important role. When researching associations with corporate governance it is important to specify the source of earnings quality effects both at a theoretical and an empirical level; earnings quality and corporate governance can act as both *substitutes* and *complements* depending on the source. This is an important insight for corporate governance research, and potentially also for other settings involving earnings quality.

As a secondary contribution, we develop earnings quality measures that incorporate business model effects and effects of management incentives and that allow for interactions between the two types of variation in earnings quality. Directly modelling earnings quality on managerial incentives has the potential to offer increased power compared to traditional measures of managerial discretion as it draws directly from theories of discretionary accounting choice and reduces the effect of noise or measurement error which ends up being included in residual based measures. The potential downside is that the methodology requires a reasonable set of incentive variables, about which there is unlikely to be consensus. Finally, our methodology provides an avenue for future research investigating interaction effects, i.e. potential co- or counter-movements of the two sources of variation in earnings quality.

The study continues as follows. Section 2 briefly discusses prior literature and develops the expectations for relations among innate and discretionary earnings quality and corporate governance

structures. Section 3 outlines the research design. Section 4 describes the sample and the main results. Section 5 concludes.

2. The role of earnings quality and the role of corporate governance

2.1. Theoretical framework

Information and properties of information play a crucial role in the literature on moral hazard. Moral hazard issues are likely to be more acute in less-than-stable business environments. For example, Demsetz and Lehn (1985) argue that when business models and operating environments are characterized by volatility and complexity, the scope for moral hazard is high because of information frictions, which creates a need for (and payoff to) stricter corporate governance. At the same time, it is precisely in volatile and complex situations that managerial discretion is likely to matter substantially for the firm's economic outcomes.[4] For investigations of associations between earnings quality and corporate governance this observation is important, because earnings quality reflects issues associated with business volatility as well as managerial discretion (e.g., Dechow et al. 2010; Dichev, Graham, Harvey, and Rajgopal 2013). Following such arguments, one would expect poor earnings quality, when caused by business volatility, to reflect the scope of moral hazard and to be associated with better governance. At the same time, if governance structures are effective in restraining hazardous outcomes, one would expect better governance to be associated with better earnings quality through the governance effect on managerial discretion. In addition, interaction effects are likely, since it is precisely when the underlying volatility is high, and innate earnings quality is poor, that it can pay off for firms to have effective monitoring. In the

[4] Demsetz and Lehn phrase it as follows: "Firms that transact in markets characterized by stable prices, stable technology, stable market shares, and so forth are firms in which managerial performance can be monitored at relatively low cost. In less predictable environments, however, managerial behavior simultaneously figures more prominently in a firm's fortunes and becomes more difficult to monitor. Frequent changes in relative prices, technology, and market shares require timely managerial decisions concerning redeployment of corporate assets and personnel. Disentangling the effects of managerial behavior on firm performance from the corresponding effects of these other, largely exogenous factors is costly, however. Accordingly, we believe that a firm's control potential is directly associated with the noisiness of the environment in which it operates. The noisier a firm's environment, the greater the payoff to owners in maintaining tighter control."

limit, corporate governance could even cancel out earnings quality effects associated with a volatile business environment; however, we believe that to be unlikely as a practical matter.

Both researchers and practitioners have long acknowledged that there are more fundamental, or innate, elements in earnings quality as well as important discretionary elements (see, for example, Francis, Olsson, and Schipper 2008 and Dechow et al. 2010 for research overviews, and Dichev et al. 2013 for a survey of practitioner views). Following prior literature, we term earnings quality effects associated with business fundamentals *innate earnings quality* and earnings quality effects associated with managerial intent *discretionary earnings quality*. Following the arguments above, we expect firms to invest in more effective governance structures when innate earnings quality is poor, and we expect discretionary earnings quality to be better when corporate governance is more effective. Interaction effects between innate and discretionary earnings quality arise because innate earnings quality effects caused by business fundamentals, e.g., revenue and cash flow volatility or operating losses, can both enable and create incentives for earnings management.[5] Absent corporate governance we expect discretionary earnings quality to be poor (for example, because of earnings management) when innate quality is poor. In summary, we expect (i) stronger corporate governance to be associated with better discretionary earnings quality, (ii) the association between corporate governance and discretionary earnings quality to be more pronounced when innate earnings quality is poor, and (iii) poor innate earnings quality to be associated with stronger corporate governance.

2.2. Implications and prior research

Prior research has examined both directions of causality, corporate governance on earnings quality and earnings quality on corporate governance, but mostly examined causal links separately and generated predictions accordingly. Much prior research has assumed a positive association

[5] Consider, as a simple example, cash flow volatility (a firm fundamental). It enables earnings management such as earnings smoothing (a discretionary decision) because there is volatility to smooth in the first place, and it motivates earnings management because a majority of managers believe that showing volatile earnings has adverse capital market consequences (Graham, Harvey, and Rajgopal 2005).

between corporate governance and earnings quality, with some more recent research considering the possibility of either a positive or a negative association, although not a simultaneous/joint effect.

Arguments for a positive association between corporate governance and earnings quality mainly flow from the bulk of studies investigating whether stronger governance structures constrain exercise of discretion to manage earnings, i.e., studies hypothesizing that better earnings quality is associated with stronger corporate governance structures (e.g., Holthausen, Larcker, and Sloan 1995; Klein 2002; Larcker and Richardson 2004; Peasnell, Pope, and Young 2005; Larcker et al. 2007; Bowen, Rajgopal, and Venkatachalam 2008; Schroeder and Shepardson 2016). Arguments for a negative association between corporate governance and earnings quality mainly comes from few studies that set out to investigate how earnings quality shapes governance structures. For example, Bushman, Chen Engel, and Smith (2004) argue that firms with information quality issues (in their case low earnings timeliness) have higher monitoring needs and therefore build governance structures to enforce internal and external monitoring.[6]

In their review article about information environments, corporate governance and debt contracting, Armstrong et al. (2010) highlight the endogenous nature of corporate governance as a source of the conflicting hypotheses about the role of the information environments and the role of corporate governance. So far the literature has responded to this challenge by focusing on one direction of causality and working with econometric techniques (Ferreira et al. 2011) or natural experiments where there are exogenous shocks to governance (Armstrong et al. 2012).[7] We follow an alternative way, by building a single theoretical framework and develop an empirical methodology that accommodates both linkages simultaneously: information affecting governance

[6] Similar arguments for other types of information attributes (and other determinants of corporate governance) can be found in Linck, Netter, and Yang (2008), Duchin, Matsusaka, and Ozbas (2010), and Ferreira et al. (2011), who consider costs and benefits of corporate governance arrangements in response to issues with information structures.

[7] Ferreira et al. (2011) conclude that price informativeness affects governance structures (that is, the primary link is information affecting governance), and they test for endogeneity and reverse causality using various econometric techniques. Armstrong et al. (2012) use the change in states' takeover legislation in the late 1980s and investigate its effect on information structures (that is, the primary link is governance affecting information).

and governance affecting information. In so doing, we tailor the earnings quality definitions and framework to fit the theory behind each test, thereby following the recommendations in Dechow et al. (2010) to use test- and/or context-specific measures of earnings quality.

From an empirical perspective our framework implies that the result of an association test between earnings quality and corporate governance will depend crucially on the extent to which the earnings quality measure is dominated by effects of fundamentals or the effects of managerial discretion, or whether it is a mix of the two. Dechow et al. (2010) survey several widely used earnings quality measures (abnormal accruals, earnings persistence, accruals quality, smoothness, timeliness, being-close-to-benchmarks, etc.) and comment that a downside to such measures is that they contain the effects of both the fundamental earnings process and the effects of intentional manipulation, i.e., they will be a mix of innate and discretionary earnings quality. To the extent that different quality measures are differentially influenced by innate and discretionary determinants (or if studies have otherwise to varying degrees controlled for them), one would expect mixed results in association tests depending on the earnings quality metric, and generally weak results if the effects of fundamentals and discretion on earnings quality cancel each other out to some degree.

Extant empirical studies provide conflicting evidence on the association between corporate governance and information structures (Armstrong et al. 2012). For example, Larcker et al. (2007; 964) summarize the literature that investigates the effects of governance on earnings quality and other accounting outcomes as follows: "The results are frequently contradictory and a consistent set of empirical results has yet to emerge regarding the importance of corporate governance for understanding accounting outcomes and organizational performance." In their own study, Larcker et al. also find mixed results when investigating the effects of various corporate governance measures on abnormal accruals.[8] Results are also mixed in the more limited literature that

[8] Most empirical studies do not report results on multiple earnings quality measures while holding corporate governance constructs constant, making it hard to get indications from prior literature on this issue. An exception is Bowen et al. (2008, Table 3), who for a

investigates the effects of information structures on governance. Bushman et al. (2004) find only partial evidence of an association between poor earnings timeliness and stronger internal and external monitoring.[9] While Ferreira et al. (2011) also find that poor earnings informativeness induces more internal monitoring, Linck et al. (2008) document a negative association between proxies for information acquisition costs (such as stock return volatility) and board monitoring. Larcker et al. (2007) ascribe mixed results in part to difficulties with corporate governance measures. We conjecture that differences in results in prior literature may, at least in part, be a consequence of different earnings quality measures containing effects of both fundamentals and managerial discretion, which, as argued above, have different-sign predicted associations with governance structures.

3. Earnings quality and corporate governance variables

In this section we first define the empirical earnings quality measures, next we describe how we obtain the innate and discretionary measures of earnings quality, and finally we describe the corporate governance variables.

3.1. Measuring earnings quality

Prior literature uses various metrics for earnings quality, several based on earnings attributes and others on accruals properties, with each measures capturing different properties of the financial reporting outcome and reflects various managerial incentives (Dechow et al. 2010). Ideally, we want a comprehensive measure as a starting point, because we will further derive innate and discretionary portions through the additional fitting process described in the next section. As such, we use a

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sample of S&P firms 1992-1995 document associations between three commonly used earnings quality measures meant to capture managerial discretion (abnormal accruals, smoothing, and small earnings surprises) as well as a composite quality measure and ten corporate governance proxies (capturing board characteristics, ownership, executive compensation and auditing). For none of the ten governance proxies are associations significant and consistent across earnings quality proxies (for four of the governance proxies the earnings quality association is even both significantly positive and significantly negative depending on the earnings quality proxy, holding all else constant). We believe this result indicates that the choice of earnings quality measure can be important in corporate governance research. It should be noted Bowen et al.'s research questions are different from ours, and Table 3 is not the central part of their article.

[9] For a sample of Fortune 1000 firms in 1994, Bushman et al. (2004) use earnings timeliness as an exogenous earnings quality measure, and find that four out of eight governance variables are significantly associated with it.

combined measure (*EQ*) based on the common factor score obtained from a factor analysis of three common earnings quality measures: accruals quality (*AQ*), absolute abnormal accruals (*AbsAA*), earnings variability (*EarnVar*).[10] Exact definitions for all variables are listed in Appendix A. Higher values of *AQ*, *AbsAA,* and of *EarnVar* indicate poorer earnings quality.[11] The common factor, *EQ*, has the same ordering as the underlying variables, so larger values of *EQ* indicate poorer earnings quality.

3.2. Measuring innate and discretionary earnings quality

We distinguish between variation in earnings quality driven by business fundamentals and variation driven by managerial incentives, by fitting *EQ* directly on a set of variables capturing firm fundamentals and a set of variables capturing managerial incentives:

$$EQ_{it} = \boldsymbol{x}'_{it}\boldsymbol{\alpha} + \boldsymbol{z}'_{it}\boldsymbol{\beta} + e_{it} \tag{1}$$

EQ is our earnings quality measure, $\boldsymbol{x_{it}}$ is a vector of the innate variables, $\boldsymbol{z_{it}}$ is a vector of variables proxying for managerial incentives, and e_{it} is the error term. The fitted value of *EQ* on the vector of innate variables in equation (1) is the measure of innate earnings quality (*InnateEQ*), i.e., variation in earnings quality associated with the firm's business model and operating environment. The fitted value of *EQ* on the vector of managerial incentive variables in Equation (1) is the measure of discretionary earnings quality (*DiscEQ*), i.e., variation in earnings quality associated with managerial incentives. The residuals of equation (1) represent noise.

For the vector of innate variables, we follow the set of firm fundamentals identified in Dechow and Dichev (2002) and Francis et al. (2004, 2005): *firm size, cash flow variability, sales*

[10] Accruals quality, *AQ*, is based on the Dechow and Dichev (2002) model, as extended by McNichols (2002), which measures over-time volatility in the extent to which working capital accruals map into cash flows in the current, prior, and future periods and changes in revenues and property, plant and equipment. We estimate the absolute value of abnormal accruals, *AbsAA*, based on the modified Jones (1991) model. The standard deviation of earnings, *EarnVar*, has been shown to work as an instrument for various earnings quality measures, such as earnings smoothness, earnings predictability, accruals quality, poor matching of revenue and expenses, etc. (e.g., Francis, LaFond, Olsson, and Schipper 2004; Dichev and Tang 2008, 2009). We define earnings as earnings before extraordinary items, scaled by total assets.

[11] We use the terms "poor" and "good" earnings quality to remain consistent with (most) prior literature, but we do not mean to imply a judgement. The reason we do not use 'high' and 'low' earnings quality is that the ordering of earnings quality variables varies across studies.

variability, length of operating cycle, incidence of negative earnings realizations, intangibles intensity, and *capital intensity*. For the vector of managerial incentive variables we use incentives discussed and identified in the survey article about accounting choice by Fields et al. (2001), who in turn draw from the theoretical foundations of accounting choice (e.g., Modigliani and Miller 1958; Watts and Zimmerman 1986). Fields et al. sort incentives into three categories: contractual arrangements, asset pricing considerations, and influencing external parties. We operationalize these incentives using fourteen variables: *compensation*, *proximity to financial default* (using the Merton 1974 distance to default model), *equity offerings, shares for shares acquisitions, debt issues, meeting analyst forecasts, reporting earnings increases, reporting profits, firm listing age, growth, negative stock returns, tax considerations, competition,* and *public visibility*. For each incentive variable we follow prior empirical literature that has examined the related earnings management incentive.

Appendix B provides detailed definitions of all variables, a cross reference to relevant empirical literature for each variable, and shows how the earnings quality measure, *EQ*, loads on innate factors and on managerial incentives.[12] The innate factors and managerial incentives explain 53.25% of the variation in *EQ*.[13] Six of the innate factors are significant at conventional levels in the expected direction. Eight of the incentive variables are significant at the 10% level or better and in the expected direction.

[12] Results of our empirical implementations are robust to additional specifications of *EQ* that include alternative measures of incentive variables especially with regards to compensation incentives (for details see Appendix B).

[13] When repeating equation (1) for the individual earnings quality measures, *AQ*, *EarnVar* and *AbsAA*, results are qualitatively similar for all measures, except that the explanatory power is somewhat weaker for *AQ* (R^2=36.65%) and substantially weaker for *AbsAA* (R^2=12.61%). We also repeat equation (1) for absolute performance adjusted abnormal accruals, *AbsPAAA*, (Kothari, Leone, and Wasley 2005) a measure which was built on a model originally designed to capture managerial discretion controlling for innate variation attributed to operating performance. Innate factors and incentive variables combined explain 12.15% of the variation in *AbsPAAA*. For all earnings quality measures, including the ones originally designed to isolate managerial discretion, the innate variables dominate the incentive variables in terms of explanatory power. Thus, traditional measures of discretionary earnings quality are all more strongly related to business fundamentals than they are to incentive variables identified in prior literature. Owens et al. (2017) similarly comment on the fact that abnormal accruals measures are strongly influenced by business model characteristics. We also repeat equation (1) excluding incentive variables that are not significant in the expected direction in Table A (Appendix B), i.e. *PosΔEarn, PosEarn, NegRet* and *S&PMember.* Empirical results in the corporate governance tests are similar, both in terms of magnitudes and statistical significance.

To the extent the identification of innate factors and managerial incentives affecting earnings quality is reasonably complete, the structure of equation (1) offers two potential benefits for our investigation. First, it offers measures for both innate and discretionary earnings quality and allows investigation of their individual and interaction effects. Second, unlike residual-based measures of managerial discretion such as the many implementations of the Jones (1991) model or the discretionary accruals quality measure in Francis et al. (2005), it separates out noise in earnings that is unrelated to managerial incentives and often reduces the power of tests. The downside risk is misclassification between innate and discretionary variables. For example, being close to financial distress may cause inherent uncertainty in accruals estimation, and may therefore capture volatility in earnings properties not necessarily driven by managerial intent. We have deliberately not taken a stance on the "correct" identification of factors that capture business fundamentals and managerial incentives; rather, we have chosen to include variables commonly used in prior literature. At the end of the day, however, such choices remain subjective, and it rests with empirical evidence to provide construct validity. We probe the construct validity of *InnateEQ* and *DiscEQ* using three construct validity tests as reported in Section 4.2.

3.3. Corporate governance variables

There are a large number of governance variables in the literature. Since the motivation for this study comes from both strands of the corporate governance literature (investigations of the effect of governance on discretionary earnings quality and investigations of the effect of innate quality on governance structures), our decision rule has been to include governance variables common to both types of studies. Our starting point is the literature examining the information-based attributes that shape corporate governance structures (Bushman et al. 2004; Coles, Daniel, and Naveen 2008; Linck et al. 2008; Ferreira et al. 2011). A central theme in this literature is the corporate board structure with an emphasis on board efficiency, independence and expertise. Our

board structure measures are board size (*BoardSize*), the proportion of outside directors (*OutsideDirectors*) and outside director industry expertise (*DirectorExpertise*). Appendix C provides detailed definitions of all corporate governance measures and an overview of the relevant arguments and evidence in the literature on how each measure behaves, i.e. more like a monitoring or entrenchment variables Further to board structure we consider stock ownership by inside directors (*InsiderOwnership*) and concentration of stock ownership by outside shareholders (*Shareholder Concentration*).

We also construct a combined corporate governance variable, *CG*, as the common factor score of the five governance variables: *BoardSize*, *OutsideDirectors*, *DirectorExpertise*, *InsiderOwnership*, and *ShareholderConcentration*. We recognize arguments in the literature that empirical corporate governance variables capture different dimensions, which begs the question whether they can be meaningfully combined into a single composite or index (e.g., Larcker et al. 2007, Brickley and Zimmerman 2010). Such arguments notwithstanding, we believe that a basic test on a combined corporate governance measure is useful to test our hypotheses and set the stage for further the empirical analyses. Appendix C reports the Pearson (above the diagonal) and Spearman (below the diagonal) correlations among *CG* and the individual corporate governance variables. *BoardSize*, *OutsideDirectors* and *DirectorExeprtise* are positively correlated with each other and negatively correlated with *InsiderOwnership* and *ShareholderConcentration* (the exception is an insignificant correlation between *BoardSize* and *ShareholderConcentration*). *InsiderOwnership* and *ShareholderConcentration* are positively correlated with each other. To the extent, therefore, that each variable captures a valid dimension of governance, *BoardSize*, *OutsideDirectors* and *DirectorExpertise* behave like straight governance variables, whereas *InsiderOwnership* and *ShareholderConcentration* are inverse indicators, i.e., they behave like entrenchment variables. The correlations between *CG* and the individual governance variables

reinforce the individual correlations; *CG* is positively associated with *BoardSize*, *OutsideDirectors* and *DirectorExeprtise* and negatively associated with *InsiderOwnership* and *Shareholder-Concentration*. The high absolute correlations with all variables indicate that *CG* includes dimensions from all five individual variables. The associations also imply that the *CG* variable is ordered such that a higher value means stronger governance.

4. Sample and results

4.1. Sample

To compute the earnings quality measures we obtain accounting data from Compustat, stock market data from CRSP, executive compensation data from ExecuComp, mergers and acquisition data from SDC Platinum, and analyst forecast data from I/B/E/S. Since *AQ* requires five annual residuals of a model that includes both lead and lag cash flows, and we also need time series of accounting data for firm-specific volatility variables, we restrict the sample to firms with at least seven years of data. Executive compensation data are available for the firms in the S&P 1500 Index (active, inactive, current and previous members) from 1992 and onwards. Our sample before requiring corporate governance data is 13,741 observations for 1,823 distinct firms for fiscal years 1992-2010. We obtain board and insider ownership data from Risk Metrics (data availability from 1996 onwards) and institutional ownership data from Thomson Reuters. The final sample has 9,496 observations for 1,511 firms over the fiscal years 1996-2010.

Panel A of Table 1 contains descriptive statistics for the earnings quality measures. Generally, the mean and median earnings quality measures are somewhat lower (indicating slightly better earnings quality) compared to studies that use less restrictive samples. For example, our mean [median] *AQ*, 0.035 [0.029] is slightly lower than Francis et al. (2005), who report 0.044 [0.031] for their sample of firms, which is unconstrained by requirements about I/B/E/S, ExecuComp, Risk Metrics, and Thomson Reuters coverage. The comparison is consistent with our firms being larger

and more stable because of sample requirements (with correspondingly better earnings quality). For example, the mean (median) size, defined as log of total assets, in our sample is 7.677, (7.541); Francis et al. report 4.805 (4.625). All earnings quality metrics in our sample exhibit a substantial standard deviation compared to the mean, however, indicating that meaningful cross-sectional variation exists.[14]

The corporate governance variables in our sample also display non-trivial cross-sectional variation. Because samples are so different in the empirical governance literature, comparisons across studies can be difficult. For example, Bushman et al. (2004) study Fortune 1000 firms in 1994, Bowen et al. (2008) study firm-years on ExecuComp 1992-1995, Ferreira et al. (2011) study IRRC firms 1990-2001. Such sample differences notwithstanding, our sample seems reasonably comparable in terms of descriptive statistics. Our mean (median) proportion of independent directors is 69.6% (72.7%). Ferreira et al. report 75.3% (77.8%), and Bushman et al. report 78% (80%). Our average (median) number of directors is 9.6 (8.0), Ferreira et al. report 9.8 (10.0), Bushman et al. report 11.2 (11.0).

Panel B of Table 1 shows the correlation between the four earnings quality measures. *EQ*, the common factor of *AQ*, *EarnVar*, and *AbsAA*, is highly correlated with all three components (50% or higher in both Pearson and Spearman correlation), indicating that all three measures are meaningfully related to the common factor.

4.2. Innate and discretionary earnings quality measures – construct validity

Before proceeding to the main tests, we perform three construct validity tests for the innate and discretionary earnings quality measures. The first test is based on a regulatory event affecting all firms but with differential expected effects on innate and discretionary earnings quality. An

[14] Other studies with data-imposed sample restrictions show descriptive *EQ* statistics that are similar to ours or better on average. For example, Dechow and Dichev (2002), who restrict their sample to manufacturing firms 1987-1999 and have time-series requirements slightly more stringent than ours, report an average *AQ* of 0.028 (we report 0.035) with a standard deviation of 0.025 (we report 0.023).

implication of the linkages between innate and discretionary earnings quality is that exogenous shocks to business fundamentals would affect both innate and discretionary earnings quality, whereas shocks to reporting discretion should affect discretionary earnings quality but leave innate earnings quality largely unaffected.[15] The passage of the Sarbanes-Oxley legislation (SOX) in 2002 is an example of the latter, because its aim was to partially restrict managerial discretion in financial reporting and disclosure choices to restore investors' confidence in the integrity of external financial reporting.[16] Consequently we predict better discretionary earnings quality in the post-SOX period, and we predict no effect on innate earnings quality.[17] While there is disagreement in the literature on the interpretation of certain individual corporate governance variables, we believe that the predictions for this governance-related regulatory event are (more) unambiguous.

To test these predictions, similar to Cohen et al. (2008), we regress the earnings quality proxies on a time trend and an indicator of the post-SOX period:

$$DiscEQ_{j,t} = a_0 + a_1 Time_t + a_2 SOX_{i,t} + u_{j,t} \tag{2a}$$

$$InnateEQ_{j,t} = \beta_0 + \beta_1 Time_t + \beta_2 SOX_{i,t} + u_{j,t} \tag{2b}$$

where *Time* is a trend variable equal to the difference between the current year and 1996, and *SOX* is a dummy variable for reporting periods after 2002. We expect the coefficient on *SOX*, $\square_2$, to be zero for *InnateEQ* (indicating no change), and negative for *DiscEQ* (indicating an improvement in discretionary earnings quality). We remove observations of accounting periods ending in 2002 in this test.

[15] While one cannot rule out that at least some firms would make business model changes because of financial reporting outcome considerations, we believe such changes are relatively less likely because of their costliness, and substantial business model changes would also take multiple years to effect.

[16] By exogenous, we mean exogenous relative to the individual firm and its management. Obviously, there were forces that triggered increased financial regulation such as SOX at the time (including, but not limited to, perceived aggregate corporate financial reporting behavior).

[17] Cohen et al. (2008) offer two explanations for the higher cost of aggressive accrual choices in the post-SOX period: more scrutiny of accrual choices by auditors and regulators after the passage of SOX, and more severe sanctions facing managers if accused of questionable or fraudulent reporting practices.

Panel A of Table 2 reports the results. As expected, the *SOX* coefficient for *DiscEQ* is significantly negative (−0.036, t=−3.83), and the SOX coefficient for *InnateEQ* is close to zero (0.005, t=0.19). The *Time* coefficient for *DiscEQ* is significantly positive (0.003, t=3.13), consistent with the general deterioration in discretionary earnings quality over time (e.g., Rajgopal and Venkatachalam 2011). As a sensitivity test (not tabulated) we omit the *Time* trend from equation (2a); the *SOX* coefficient remains significant, albeit with a lower t-statistic (t=−2.09). The *Time* coefficient for *InnateEQ* is zero (0.000, t=0.02), consistent with firms' fundamentals and the associated innate earnings quality on average being stable over time, which we believe lends further support to the construct validity of our separation of earnings quality into its innate and discretionary portions. As a sensitivity test, we also add *InnateEQ* as a control variable in the test of the SOX effect on *DiscEQ* (equation 2a). The results, which are reported in the last column of Panel A in Table 2, indicate that the explanatory power is greatly increased, but the *SOX* coefficient for *DiscEQ* remains unaffected (−0.036, t=−4.42). We view these results as supporting the construct validity of the discretionary and innate earnings quality measures.

Our next test involves accounting restatements. Restatements include both errors (unintentional misstatements) and irregularities (intentional misstatements). Distinguishing between errors and irregularities is important if the purpose of the test is to detect aggressive accounting choices (Palmrose, Richardson, and Scholz 2004; Hennes, Leone, and Miller 2008). The distinction is also useful for the identification of innate and discretionary earnings quality. We expect firms dealing with innate earnings quality issues to be prone to making accounting errors. We expect firms with issues in reported earnings due to managerial incentives and intent to be concentrated within the irregularities sample. Consequently, we expect poor innate earnings quality to be associated with errors, and poor discretionary earnings quality to be associated only with irregularities.

We collect data on restatements from Audit Analytics. The database covers all SEC registrants that have disclosed a financial statement restatement in the regulatory filings (8K, 10K, 10Q, 20F, 40F). The database identifies cases of irregularities (restatements classified as fraud, irregularities and misrepresentations) by searching for the reasons of the restatement within audit opinions. This is consistent with the identification approach followed by prior research (Hennes et al. 2008). We conduct separate logit regressions for the misstatements caused by irregularities (*Irreg*=1), and remaining misstatements (*Errors*=1). The model includes our two earnings quality measures, *InnateEQ* and *DiscEQ*, and other determinants of accounting restatements (firm size, financial leverage, operating performance, the book-to-market ratio, sales growth and sales volatility; Srinivasan, Wahid, and Yu 2015). We expect the coefficient *DiscEQ* to be positive only for irregularities while that on *InnateEQ* to be positive for errors.

Over our sample period we count 43 restatements being classified as fraud, irregularities and misrepresentations (*Irreg*=1), and 867 as remaining cases (*Errors*=1). Panel B of Table 2 presents the results. In the first column we model just irregularities (*Irreg*=1). The coefficient on *DiscEQ* is significantly positive (4.953, t=2.72), consistent with irregularities being associated with poor discretionary earnings quality. The coefficient on *InnateEQ* is insignificant (−0.318, t = −0.29). When modelling remaining restatements (*Errors*=1) in the next column, it is only the coefficient on *InnateEQ* that is significantly positive (0.881, t=2.16), consistent with errors being associated mainly with poor innate earnings quality. We view these results as lending further support to the construct validity of the innate and discretionary earnings quality measures.

As an additional validity test of innate and discretionary earnings quality measures, we also investigate over-time changes in each measure. We expect *InnateEQ* to be relatively more stable over time compared to *DiscEQ*, since *InnateEQ* represents earnings quality tied to the business model, which is unlikely to change majorly from year to year. *DiscEQ* is, we believe, more likely

(in a relative sense) to change as incentives can change from year to year. Note that *EQ* itself is relatively stable by design (estimated over a seven year period). So the question is whether the year-by-year fitting process on fundamental variables versus incentive variables makes *InnateEQ* more stable than *DiscEQ*. We examine the percentage year-to-year absolute change in *InnateEQ* and *DiscEQ* on the firm level. Using a paired-sample test of these changes, we find that the mean / median firm level year-on-year absolute change in *DiscEQ* (172% / 50.1%) is significantly larger than the mean / median change in *InnateEQ* (36.5% / 16.3%). We view this result as supportive of our method of identifying innate and discretionary earnings quality.

4.3. Earnings quality and corporate governance

This section describes empirical tests of the basic relation between earnings quality and corporate governance. Section 4.3.1 lists results using our measures of *DiscEQ* and *InnateEQ*. Section 4.3.2 contains results of tests where we do not rely on fitted earnings quality values, but instead conduct earnings quality tests on deliberately biased samples, where there are strong a priori reasons to believe that samples are dominated by firms with innate and discretionary earnings quality issues, respectively.

4.3.1. Results using fitted values

Table 3 lists results from a test of our basic hypothesis that innate and discretionary earnings quality have opposite-sign associations with corporate governance in a simple design that is held constant for both innate and discretionary quality. Specifically, we regress the composite corporate governance variable, *CG*, on *InnateEQ* and *DiscEQ*.

$$CG_{j,t} = a_0 + a_1 InnateEQ_{j,t} + a_2 DiscEQ_{j,t} + u_{j,t} \quad (3)$$

In the first column, the specification is parsimonious, controlling only for firm size (because governance is strongly related to firm size and *InnateEQ* is mechanically related to firm size through the fitting process). The results in the first column of panel B show that our basic hypothesis is

borne out by the data. *CG* is positively associated with *InnateEQ* (t=2.11), indicating that governance is stronger in poor innate earnings quality environments. *CG* is negatively associated with *DiscEQ* (t=−5.51), indicating that governance is associated with better discretionary earnings quality. *Size* is, as expected, strongly positively associated with *CG*. We obtain similar results in the next column where we include further variables that affect governance, e.g. the number of years a firm has been public (*YrsListed*), the book-to-market ratio (*BM*), return on equity (*ROE*)), and indicators of firms operating in regulated industries (*Financials* and *Utilities*).[18] Columns 3 and 4 repeat the analyses from Columns 1 and 2 using firm fixed effects. Firm fixed effects estimation controls for unobserved time-invariant factors that may simultaneously determine corporate governance structures and discretionary earnings quality. Firm fixed effects estimation is also equivalent to looking only at within-firm changes of earnings quality and as such may offer additional insights on how such changes may affect corporate governance. *InnateEQ* remains positively associated with *CG*, while *DiscEQ* remains negatively associated with *CG*.[19] Overall, we view these results as providing support for the thesis that the association between governance and earnings quality differ predictably depending on the source of earnings quality, firm fundamentals or managerial incentives.

A potential issue with our methodology is that the measure of discretionary earnings quality is statistically fitted on incentive variables and thus contains information about both earnings quality and incentives, raising concerns about whether the corporate governance associations with *DiscEQ* are due, not to earnings quality associated with incentives, but to the incentives themselves. In other words, is it possible that *DiscEQ* is simply a summary variable for incentives? While economic arguments linking corporate governance to incentives are, we believe, less direct than the links to discretionary earnings quality, governance-incentives links certainly cannot be ruled out on

[18] We follow Bushman et al. (2004), Linck et al. (2008), and Ferreira et al. (2011) in choosing control variables.
[19] The significance for *InnateEQ* becomes marginal. Recall, however, that *InnateEQ* moves only slowly over time, making any type of change-related specification weak-powered.

theoretical grounds. To investigate this issue empirically, we first create a 'pure' summary variable for incentives by forming a common factor of all incentive variables, *CF*(*Incentives*). Similarly, while all specifications in Table 3 includes firm size as a control variable, no specification has a full set of innate factors. Consequently, we also form a common factor of all (but firm size) innate factors, *CF*(*InnateFactors*). We next repeat the tests in Table 3 adding *CF*(*Incentives*) and *CF*(*InnateFactors*) (not tabulated). In no case is *CF*(*Incentives*) or *CF*(*InnateFactors*) significant and the coefficients on *InnateEQ* and *DiscEQ* remain significantly positive and negative, respectively.[20] We interpret this result as indicating that it is the fitted earnings quality variables that have predicted associations with governance, rather than the underlying variables themselves.

4.3.2. Results not using fitted values

In this section we present test results that do not rely on our measures of discretionary and innate earnings quality, but instead relies on the original (total) earnings quality measure, *EQ*, and deliberately biased subsamples that are likely to be dominated by firms with innate and discretionary earnings quality issues, respectively. Identifying contexts where the incentives to manage earnings are particularly strong has been a common approach in the earnings management literature to enhance the power of tests (e.g., McNichols 2000; Dechow et al. 2010). The benefit of this approach is that it is less affected by measurement error potentially coming from splitting earnings quality constructs into an innate and discretionary component.

We identify cases where volatility in business fundamentals is likely to be the dominating force, by focusing on firms that experience operational shocks, on the assumption that, ceteris paribus, such shocks escalate innate earnings quality issues. Similar to Owens et al. (2017), we identify operational shocks using economic events that are observable in financial statements and relate to changing firm economics such as major expansions, major merger or reorganizations,

[20] To control for potential collinearity, we also construct orthogonalized 'earnings quality-free' incentive and innate measures by re regressing *CF*(*Incentives*) and by regressing *CF(InnateFactors)* on *EQ* and retaining the residuals. Results are very similar when using the orthogonalized measures.

discontinued operations, restructuring activities, or changes in industry code classification. We create a *BusinessShocks* indicator variable equal to 1 if the firm has (a) an expansion in geographical segments, (b) a major merger or reorganization, (c) discontinued operations (discontinued operations higher than 5% of sales), (d) a restructuring (restructuring charges higher than 5% of sales), or (e) a change in industry code classification (the four digit SIC differs from year t-1 to t). The subsample represents 21% of our full sample. We expect that volatility in firm fundamentals dominates the variation in earnings quality for firms experiencing such operational shocks. As a result in this subsample, we expect the aggregate earnings quality measure, *EQ*, to exhibit a positive association with the aggregate corporate governance score, *CG*.

We identify cases where managerial incentives are likely to dominate as a determinant of earnings quality by focusing on firm-years where the firms issue equity or just meet or beat analyst expectations, as these are common contexts that prior research identifies where the incentives to manage earnings are particularly strong (e.g., Rangan 1998, Teoh, Welch and Wong 1998a, 1998b; Erickson and Wang 1999; Shivakumar 2000; Matsumoto 2002; McVay 2006; Cohen and Zarowin 2010). We create an *EMIncentives* indicator variable equal to 1 if the firm (a) increases equity capital or (b) reports basic EPS that just meets or slightly exceeds the analyst consensus forecast. This subsample represents 34% of our full sample. In this context, if earnings quality is dominated by these incentives we expect a restraining effect by stronger governance, and therefore *EQ* to exhibit a negative association with *CG*.

To test these basic predictions, we first regress *CG* on *EQ* for the subsample of firms experiencing operational shocks, controlling in this parsimonious specification for firm size. Panel A of Table 4 presents the results. In the first column we present – for comparison – the unconditional results based on the entire sample. The coefficient on *EQ* is insignificant (0.005, t=0.13), consistent with a positive and negative association between earnings quality and corporate governance

cancelling each other out. Once we focus on the subsample of firms with operational shocks, *BusinessShocks*=1 that are also not experiencing explicit earnings management incentives (*EMIncentives*=0), the coefficient on *EQ* becomes positive and significant (0.181, t=2.54). To test the significance of the differential loading on *EQ*, we repeat the analysis on the pooled sample introducing the *BusinessShocks* indicator and an interaction with *EQ*. The coefficient on the interaction term *BusinessShocks x EQ* is positive and significant (0.174, t=2.85).

We then test the corporate governance-earnings quality association by regressing *EQ* on *CG* for firms facing strong earnings management incentives, again controlling for firm size. Panel B of Table 4 presents the results. In the first column we present for comparison the unconditional results on the entire sample. When we focus on the subsample of firms with earnings management incentives (*EMIncentives*=1) that do not experience operational shocks (*BusinessShocks*=0) the coefficient becomes negative (−0.016, t=−1.91). In the final column, we repeat the analysis on the pooled sample introducing the *EMIncentives* indicator and an interaction with *EQ*. The coefficient on the interaction term *EMIncentives x EQ* is negative and significant (−0.024, t=−2.15), confirming the significance of the differential loading of *EQ* when firms face earnings management incentives.

In summary, we believe the results in Table 4 lend further support to the hypothesis that earnings quality exhibits opposite sign associations with corporate governance depending on its source, business volatility or incentives, and that such results are not driven by our methodology when we split earnings quality into an innate and a discretionary part.

5. Individual governance variables

5.1. Discretionary earnings quality and corporate governance

The bulk of prior literature on earnings quality and corporate governance literature focuses on the effect that governance mechanisms have on earnings quality, with the explicit or implicit focus on earnings management (or other managerial accounting choices). To facilitate comparisons

with prior literature, we next conduct additional analyses focusing on corporate governance and discretionary earnings quality, specifically allowing for individual governance variables rather than a governance score.

The basic model of *DiscEQ* on the five governance variables is:

$$DiscEQ_{j,t} = a_0 + a_1 BoardSize_{i,t} + a_2 OutsideDirectors_{i,t} + a_3 DirectorExpertise_{i,t}$$
$$+a_4 InsiderOwnership_{i,t} + a_5 ShareholderConcentration_{i,t} + u_{j,t} \quad (4)$$

We start with this very basic specification to enhance comparability with prior studies. The first column of Table 5 shows significant results in the expected direction for the five governance variables, albeit marginal for *OutsideDirectors* (*DirectorExpertise* [t=−4.60], *OutsideDirectors* [t=−1.72], *BoardSize* [t=−2.28], *InsiderOwnership* [t=3.83], and *ShareholderConcentration* [t=11.49]).[21] The R^2 is 0.1207. The next columns of Table 5 introduce innate earnings quality (second column) and innate earnings quality and firm size (third column) as additional independent variables. The explanatory power increases substantially (R^2=0.2735 and R^2=0.2950 respectively). Four out of the five governance variables remain significant at conventional levels whereas *OutsideDirectors* is now no longer statistically associated with *DiscEQ*. Discretionary earnings quality thus improves with optimal board size and directors' industry expertise, and it worsens with insider ownership and ownership concentration. These results provide more detail to our core finding of a negative association between *DiscEQ* and *CG*, attributing it to individual governance mechanisms.

[21] Warfield et al. (1995) acknowledge the entrenchment effect of insider ownership, but they also find that managerial ownership can also be beneficial for earnings quality, specifically at low levels of managerial ownership. To test for this (not tabulated), we split up *InsiderOwnership* into three equal-sized groups: low, medium and high insider ownership. We find that *InsiderOwnership* continues to behave as an entrenchment variable for medium and high insider ownership, whereas there is no effect in the low insider ownership group.

5.2. Corporate governance and discretionary earnings quality conditional on innate earnings quality

We next explore the interaction between innate earnings quality and discretionary earnings quality when investigating the governance effects on discretionary quality. Following the reasoning in Demsetz and Lehn (1985), the scope for moral hazard is greater due to information issues caused by more volatile environments (what we term poor innate earnings quality), which should have an impact on the effectiveness of corporate governance mechanisms. Specifically, we expect the effect of corporate governance on discretionary quality to be more pronounced when the underlying innate quality is poor.

To test this assertion, we construct a quartile-ranked variable, *InnateEQ*(*Q*) with innate earnings quality worsening as we move from the first to the fourth quartile and interact *InnateEQ*(*Q*) with each of the corporate governance variables . We perform this test using the individual governance mechanisms because some mechanisms behave like straight governance variables, while others behave like entrenchment variables; we expect more effective governance and less entrenchment in environments characterized by poor innate earnings quality. The results are in Column 4 of Table 5. Consistent with our hypothesis, the interaction effects are significantly negative for all variables except *OutsideDirectors* (consistent with the insignificant result for *OutsideDirectors* in Column 2 when controlling for *InnateEQ*). The results are robust to controlling for firm size. This means that as *InnateEQ* worsens (indicating a more volatile business and operating environment), the effect on discretionary earnings quality of monitoring variables such as *BoardSize* and *DirectorExpertise* is more pronounced, and the deteriorating effect of entrenchment (*InsiderOwnership* and *ShareholderConcentration*) is less pronounced (t-statistics on the four interaction variables range from –1.83 to –3.02 in the two specifications).

On balance, we view the results in Table 5 as being consistent with hypotheses. Variables capturing stronger monitoring (entrenchment) are associated with better (poorer) discretionary earnings quality, and the effects of monitoring (entrenchment) on discretionary earnings quality are stronger (weaker) when innate quality is poor.

5.3. Implications for research on earnings quality and corporate governance

Our framework and analysis imply that the result of an association test between earnings quality and corporate governance depends on the extent to which the earnings quality measure is dominated by effects of firm fundamentals or the effects of managerial discretion (or a mix of the two). In broad samples, our methodology allows for explicit measures of innate and discretionary earnings quality and testing of the governance association of each component. An alternative way to address this issue is to focus on subsamples where each relevant force shaping earnings quality is expected to dominate. Unless one of the two methods is followed, one would expect mixed results in broad sample tests depending on the earnings quality metric (different quality measures are differentially influenced by innate and discretionary determinants), and generally weak results if the effects of fundamentals and discretion on earnings quality cancel each other out to some degree. In this section we consider this implication in detail by repeating analysis of the discretionary earnings quality-corporate governance association using traditional measures of earnings quality used in prior research.

Table 6 reports of results of the tests of individual governance variables on discretionary earnings quality using traditional earnings quality measures. The most common approach in the literature is to regress an earnings quality measure on governance variables and additional variables proxying for business fundamentals. Following this approach, we control for all innate factors (firm size, cash flow volatility, operating cycle, cumulative losses, intangible assets and capital intensity) in all specifications. The first column includes our measure, *DiscEQ*. Similar to Table 5 (columns

2 and 3) four out of the five governance variables are significant at conventional levels. The second column uses signed abnormal accruals based on the modified Jones (1991) model (AA), as in Xie, Davidson, and Dadalt (2003) and Larcker et al. (2007). In this model none of the governance indices are significant. The next two measures are absolute abnormal accruals, *AbsAA* (e.g., Klein 2002; Larcker et al. 2007) and absolute performance-adjusted abnormal accruals (*AbsPAAA*; Kothari et al. 2005). Two out of the five governance variables are significant in the predicted direction, but not the same two governance variables. One can also note that the R^2 is substantially higher for *DiscEQ* (0.3243) compared to the three abnormal accruals measures (0.0294, 0.1031, and 0.0888, respectively).

The next column contains the results when using *ResDEQ*, the residual from a regression of *EQ* on the set of innate factors (following Francis et al. 2005). None of the governance variables is significant in the predicted direction. When using total *EQ* and keeping innate factors as controls (the results in the first column of the lower panel in Table 6), only one governance variable is weakly significant.

We next consider some further earnings quality metrics common in prior research. The next column of uses a smoothing ratio, *Smoothness*, based on the standard deviation of operating cash flows divided by the standard deviation of earnings as in Pincus and Rajgopal (2002), Leuz, Nanda and Wysocki (2003), Jayaraman (2008), and Dechow et al. (2010). This measure is also affected by accrual choices, yet centers on smoothness instead of the level of reported earnings. In the *Smoothness* model, no governance variable is showing significance. When redefining smoothness to focus on firms reporting excess values of the smoothness ratio, *Smoothing*, as in Bowen et al. (2008), two governance mechanisms become significant in the expected direction. The next measure captures the frequency of reporting consecutive small positive earnings surprises, *Freq*, based on evidence that managers use accounting discretion to avoid negative earnings surprises (Burgstahler

and Dichev 1997; Degeorge, Patel, and Zeckhauser 1999; Matsumoto 2002). This measure also focuses on an earnings pattern, but does not directly use accruals as an explicit mechanism of accounting discretion. *Freq* captures the frequency of small positive prior quarterly earnings surprises over the last 12 quarters, as in Leuz et al. (2003) and Bowen et al. (2008). In the *Freq* regression one governance variable is significant in the predicted direction, with three out of the five governance variables actually exhibiting opposite associations (a result that may suggest that *Freq* primarily reflects business environment stability and therefore a lower need for monitoring). In the final column we use an index of accounting discretion, *ADIndex*, that combines the measures of *AbsAA*, *Smoothing*, and *Freq* to allow for trade-offs among different types of discretion. In the *ADIndex* regression none of the governance variables exhibit significance, and as with *Freq* three out of the five governance variables exhibit opposite associations.

In summary, results Table 6 show that many traditional measures of earnings quality exhibit weak, no, or inconsistent associations with governance variables (echoing the observation made by Larcker et al. 2007). Some measures, specifically absolute abnormal accruals and absolute performance-adjusted abnormal accruals, exhibit some consistent associations, but many measures exhibit no or even opposite associations with governance variables. The results also echo the concern raised by Dechow et al. (2010) that common measures of earnings quality in prior research are driven to a non-trivial extent by the business conditions in which the firm operates. At the same time this analysis affirms that a possible explanation for the mixed and sometimes inconsistent results in the earnings quality–corporate governance literature is insufficient specification the type of earnings quality considered, and the use of various earnings quality measures that contain more or less of either the innate or discretionary component.

6. Summary and conclusions

We attempt to provide a relatively comprehensive economic framework for the associations between earnings quality and corporate governance. Earnings quality issues associated with the volatility of the business model and operating environment increase the scope for moral hazard and therefore the need for better monitoring and governance. More effective monitoring, in turn, restrains hazardous outcomes and therefore earnings quality issues associated with managerial intent. Consequently, earnings quality can exhibit opposite sign association with corporate governance depending on whether it is primarily innate or discretionary. Governance should also be more effective when innate earnings quality is poor, i.e., when there is a greater payoff for firms to institute more monitoring. We test this framework by developing a methodology to identify and measure innate and discretionary earnings quality which allows us to simultaneously examine both types of associations between earnings quality measures and governance structures. Results confirm the predictions.

The analysis shows the main relations between earnings quality and corporate governance, and how the complex nature of earnings quality warrants considering the source of earnings quality effects when investigating relations with corporate governance, both as a theoretical matter and in the empirical design. Earnings quality and corporate governance can act as both substitutes and complements depending on the source of earnings quality: firm fundamentals or managerial incentives. We believe this is an important insight for corporate governance research, and for other settings involving earnings quality, as earnings quality reflects both the scope for moral hazard and the hazardous outcome.

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Appendix A Definition of variables in alphabetical order

Variable	Description
AA	Abnormal accruals based on the Jones (1991) model.
AbsAA	Absolute abnormal accruals based on the Jones (1991) model.
AbsPAAA	Absolute performance adjusted abnormal accruals based on Kothari et al. (2005).
AQ	The standard deviation of the firm's residuals from years *t−4* to year *t* from annual cross-sectional estimations of the modified Dechow and Dichev (2002) model, i.e. regressions of the firm's year *t* working capital accruals (TCA) on year *t*, *t−1*, and *t+1* cash flows from operations (CFO), the year *t* change in revenues (ΔREV) and the year *t* property, plant, and equipment (*PP&E*) (all variables scaled by average total assets), where the regression is estimated using data from *t* = 1961–2010. Because of the lead term in cash flows from operations the measure is matched to one year data to ensure there is no conditioning on future information (e.g. AQ of 2009 is calculated on 2010 cash flows, and matched to 2010 data).
ADIndex	Accounting discretion index that combines the three measures, *AbsAA*, *Smoothing*, and *Freq* (see Bowen et al. 2008, Leuz et al. 2003). We rank each measure from least to most discretion and then scale the ranks by the total number of observations (fractional ranks that lie between 0 and 1 where 0 is least discretion and 1 is most discretion).
BM	The firm's book-to-market ratio.
BoardSize	The total number of directors on the board minus the average number of directors of firms belonging to the same firm size quartile (formed each year based on the natural logarithm of total assets). For consistency with the ordering of other board structure variables, we multiply by -1 to capture proximity to the board size of similar sized entities.
BusConcentration	The sum of the squares of firm sales in each industry segment divided over total sales.
BusinessShocks	Equals 1 if the firm undergoes economic events (or business shocks) that are observable in financial statements and relate to changing economic conditions i) an expansion in geographic segments, ii) major merger/reorganization (Sale_Fn =AB, the firm restates sales to reflect a major merger or reorganization resulting from the formation of a new company), iii) discontinued operations (the income effect of discontinued operations is greater than five percent of sales), iv) restructuring charges (the magnitude of restructuring charges is greater than five percent of sales) or v) changes in the four-digit SIC industry code (the four digit SIC differs in years *t-1* and *t*), 0 otherwise.
CapIntensity	Net book value of PP&E to total assets.
CF(Incentives)	A common factor score of of all incentive variables, i.e. executive compensation *(Compensation)*, distance to default *(MertonDD)*, seasoned equity offerings (*SEO)*, shares for shares acquisitions *(ShareDeals)*, debt issues *(DebtIssues)*, meeting or beating earnings targets *(MBE, POSΔEARN*, *POSEARN)*, years listed (*YrsListed)*, business life cycle stage (*BLifecycle)*, negative contemporaneous returns *(NegRet)*, tax aggressiveness *(BookTax)*, industry concentration *(IndConcentration)*, and S&P500 membership *(S&PMember)* (see Appendix B for definitions)
CF(InnateFactors)	A common factor score of innate factors: operating cash flow volatility (σ(*CFO*)), sales volatility σ(*Sales*), operating cycle *(OperCycle)*, cumulative losses (*NegEarn*), intangible assets intensity (*IntIntensity*) and capital intensity (*CapIntensity* - see Appendix B for definitions).
CG	Common factor score obtained from a factor analysis of *BoardSize*, *OutsideDirectors*, *DirectorExpertise*, *InsiderOwnership* and *Shareholder Concentration.*
DirectorExpertise	Fraction of outsider directors with industry expertise, i.e. above five years of industry specific experience. We evaluate industrial expertise based on the 4-digit SIC code (48) industry classifications identified in Fama and French (1997).
DiscEQ	*EQ* fitted on managerial incentives: executive compensation, distance to default, seasoned equity offerings, shares for shares acquisitions, debt issues, meeting or beating earnings targets, years listed, business life cycle stage, negative contemporaneous returns, tax aggressiveness, industry concentration, and S&P500 membership (see Appendix B for definitions and the *EQ* model).
EarnVar	Standard deviation of the firm's net income before extraordinary items (NIBE) scaled by total assets over years *t−6 to t*.
EQ	Common factor score obtained from a factor analysis of *AQ*, *AbsAA*, and *EarnVar*.
Errors	Equals 1 when the firm has disclosed a financial statement restatement in one of its regulatory forms and Audit Analytics has classified the restatement as any other category other than financial fraud, irregularities or misrepresentations (e.g. clerical, other restatements), 0 otherwise.
EMIncentives	Equals 1 if the firm raises equity (the change in the firm's common stock from year t−1 to year t is higher than 5%, 0 otherwise), or just meets or beats analyst forecasts (the earnings surprise falls in the interval [0,1]), 0 otherwise.
Freq	The fraction of the last 12 quarterly earnings surprises that were small positives. A small positive surprise occurs when the change in seasonally lagged quarterly earnings ($E_q - E_{q-4}$) scaled by total assets at the end of quarter *q-5* falls within the range if 0.00 to 0.0025 (similar to Bowen et al. 2008).

Financials	Equals 1 if the firm is in the banking business based on the 4-digit SIC code industry (48) classifications identified in Fama and French (1997).
GeogConcentration	The sum of the squares of firm sales in each geographic segment divided over total sales.
InnateEQ	*EQ* fitted on innate factors: firm size, operating cash flow volatility, sales volatility, operating cycle, cumulative losses, intangible assets intensity and capital intensity (see Appendix B for definitions and the *EQ* model).
InnateEQ(Q)	Quartiles of *InnateEQ* (ascending) by year.
InsiderOwnership	A composite variable representing the average within-sample and year percentile of *InsiderOwnershipPct and InsiderOwnershipVal* divided by 100. *InsiderOwnershipPct* is the percentage of stock held by insider directors. *InsiderOwnershipVal* is the number of shares held by insider directors multiplied by stock price at year end.
IntIntensity	The firm's reported R&D and advertising expense as a proportion of its sales revenues.
Irreg	Equals 1 when the firm has disclosed a financial statement restatement in one of its regulatory forms and Audit Analytics has classified the restatement as financial fraud, irregularities and misrepresentations, 0 otherwise.
Leverage	Total debt divided by total assets.
NegEarn	Proportion of losses (negative *NIBE*) for the firm over years $t-6$ to year t.
Noise_Term	The error term from regressions of *EQ* on vector variables of innate factors and managerial incentives (see equation 1 in Appendix B).
OperCycle	Log of the firm's average trade receivables period plus the average stockholding period. The trade receivables period is 360/(Sales/Average trade receivables) and the stockholding period is 360/(Cost of goods sold/average inventory).
OutsideDirectors	Fraction of outside directors on the board.
ResDEQ	The residual from a regression of *EQ* on the set of innate factors: firm size (*Size*), operating cash flow volatility (σ(*CFO*)), sales volatility σ(*Sales*), operating cycle *(OperCycle)*, cumulative losses (*NegEarn*), intangible assets intensity (*IntIntensity*) and capital intensity (*CapIntensity* - see Appendix B for definitions).
Restatements	Equals 1 when the firm has disclosed a financial statement restatement in one of its regulatory forms (source: Audit Analytics), 0 otherwise.
ROA	Net income before extraordinary items divided by total capital.
ROE	Net income before extraordinary items divided by average book value of equity.
σ(CFO)	Standard deviation of the firm's cash flow from operations (scaled by average total assets) from years $t-6$ to year t.
σ(Sales)	Standard deviation of the firm's sales revenues (scaled by average total assets) from years $t-6$ to year t.
Salesgrowth	Percent increase in sales revenues from year $t-1$ to year t.
SOX	Equals 1 for all accounting periods ending post-2002, 0 otherwise.
Shareholder Concentration	A composite variable representing the average within-sample and year percentile of *OutOwnVal, OwnConc*, *InstOwn* and *BlockInstOwn*. *OutOwnVal* is the market value of common stock minus the value of stock held by executive directors all divided by the number of shareholders at the end of the year. *OwnConc* is 1 divided by the number of common shareholders at the end of the year. *InstOwn* is the percentage of stock held by institutions. *BlockInstOwn* is the percentage of stock held by institutions owning more than 5% of the firm's shares.
Smoothness	Standard deviation of the firm's cash flow from operations (scaled by average total assets) from years $t-6$ to year t divided the standard deviation of the firm's net income before extraordinary items s (scaled by average total assets) from years $t-6$ to year t. Ratios in excess of one indicate more volatile cash flows compared to earnings consistent with the use of accruals to smooth earnings.
Smoothing	Equals 1 if the firm's *Smoothness* is higher than the industry average each year, 0 otherwise.
StdRet	Standard deviation of the firm's stock returns during year t.
Time	Trend variable equal to the difference between the contemporaneous year and 1996.
Utilities	Equals 1 if the firm is a utility firm based on the 4-digit SIC code industry classifications identified in Fama and French (1997).
YrsListed	The number of years between year t and the year that the firm had its first record on the CRSP files.

Appendix B Extracting innate earnings quality (*InnateEQ*) and discretionary earnings quality (*DiscEQ*)

We model earnings quality as a function of innate factors and managerial incentives. The detailed form of the model is:

$$\begin{aligned} EQ_{j,t} = {} & a_0 + a_1 Size_{j,t} + a_2 \sigma(CFO)_{j,t} + a_3 \sigma(Sales)_{j,t} + a_4 OperCycle_{j,t} + a_5 NegEarn_{j,t} + a_6 IntIntensity_{j,t} + a_7 CapIntensity_{j,t} \\ & + a_8 Compensation_{j,t} + a_9 MertonDD_{j,t} + a_{10} SEO_{j,t} + a_{11} ShareDeals_{j,t} + a_{12} DebtIssues_{j,t} + a_{13} MBE_{j,t} + a_{14} Pos\Delta Earn_{j,t} \\ & + a_{15} PosEarn_{j,t} + a_{16} YrsListed_{j,t} + a_{17} BLifecycle_{j,t} + a_{18} NegRet_{j,t} + a_{19} BookTax_{j,t} + a_{20} IndConcentration_{j,t} + a_{21} S\&PMember_{j,t} + e_{j,t} \end{aligned} \quad (1)$$

Grouping	*Variables*	*Definition*	*Relevant literature*
Innate factors	*EQ*	Common factor score obtained from a factor analysis of *AQ*, *AbsAA*, and *EarnVar*. Appendix A provides definitions for *AQ*, *AbsAA* and *EarnVar*.	
	Size	*N*atural logarithm of total assets	
	σ(CFO)	Standard deviation of the firm's cash flow from operations (scaled by average total assets) from years *t−6* to year *t*.	
	σ(Sales)	Standard deviation of the firm's sales revenues (scaled by average total assets) from years *t−6* to year *t*.	*Dechow and Dichev (2002), Francis et al. (2004,2005)*
	OperCycle	Log of the firm's average trade receivables period plus the average stockholding period. The trade receivables period is 360/(Sales/Average trade receivables) and the stockholding period is 360/(Cost of goods sold/average inventory).	
	NegEarn	Proportion of losses (negative *NIBE*) for the firm over years *t−6* to year *t*.	
	IntIntensity	The firm's reported R&D and advertising expense as a proportion of its sales revenues.	
	CapIntensity	Net book value of PP&E to total assets.	
Managerial Incentives \	***Contractual Arrangements***		
	Compensation	The firm's average executive compensation including the value of the option grants (e.g. salary, bonus, other annual, restricted stock grants, LTIP payouts, and value of options granted) for year *t* as a percentage over average total assets.	*Healy (1985), McNichols and Wilson (1988), Dechow and Sloan (1991), Chen and Lee (1995), Holthausen et al. (1995), Ittner et al. (1997), Guidry et al. 1999, Cheng and Warfield (2005), Bergstresser and Philippon (2006), Burns and Kedia (2006), Efendi et al. (2007)*
	MertonDD	The probability of default based on the Merton distance to default model (Merton 1974).	*Healy and Palepu (1990), Francis (1990), Sweeney (1994), Defond and Jiambalvo (1994), Dichev and Skinner (2002), Fischer and Louis (2008)*
	Asset pricing considerations		
	SEO	Equals 1 if the change in the firm's common stock from year *t−1* to year *t* is higher `than 5%, 0 otherwise.	*Rangan (1998), Teoh et al. (1998a, 1998b), Erickson and Wang (1999), Shivakumar (2000), Shleifer and Vishny (2003), Louis (2004), Louis and Robinson (2005), Meeks and Botsari (2008), Cohen and Zarowin (2010)*
	ShareDeals	Equals 1 if the firm engages in a share for share acquisition, where the purchase consideration is only stock and the deal value is at least $10m, 0 otherwise.	
	DebtIssues	Equals 1 if the change in the firm's total debt from year *t−1* to year *t* is higher than 5%, 0 otherwise.	*Ashbaugh et al. (2006), Bharath et al. (2008), Graham et al.(2008)*

MBE	Equals 1 if the median analyst earnings forecast outstanding at the firm's earnings announcement date is equal or higher than the I/B/E/S actual earnings per share, 0 otherwise.	*Bartov et al. (2002), Kasznik and McNichols (2002), Athanasakou et al. (2011)*
PosΔEarn	Equals 1 when change in firm's net income before extraordinary items (NIBE) from year $t-1$ to year t is non-negative, 0 otherwise.	
PosEarn	Equals 1 when the firm's net income before extraordinary items (NIBE) is non-negative, 0 otherwise.	
YrsListed	The number of years between year t and the year that the firm had its first record on the CRSP files.	*Beneish (1997), Dopuch et al. (1987)*
BLifecycle	Equals 1 if the stage of the firm's business life cycle is 1 (introduction) or 4−8 (shake-out or decline), and 2 if the stage of the business life cycle is 2 (growth) or 3 (mature), based on the 8 stages of the business life cycle identified by Dickinson (2011). Dickinson (2011) classifies firms by business life cycle phases using the signs of the firm's cash flows from operating activities (CFO), cash flows from investing activities (CFInv) and cash flows from financing activities (CFFin) as follows: Stage Signs of flows 1. Introduction CFO (−) CFInv(−) CFFin(+) 2. Growth CFO (+) CFInv(−) CFFin(+) 3. Mature CFO (+) CFInv(−) CFFin(−) 4. Shake−out CFO (−) CFInv(−) CFFin(−) 5. Shake−out CFO (+) CFInv(+) CFFin(+) 6. Shake−out CFO (+) CFInv(+) CFFin(−) 7. Decline CFO (−) CFInv(+) CFFin(+) 8. Decline CFO (−) CFInv(+) CFFin (−)	*Skinner and Sloan (2002)*
NegRet	Equals 1 if the firm's annual cumulative returns are negative, 0 otherwise.	*Beneish (1997)*
Influencing third parties		
BookTax	The firm's book-tax difference, i.e. the difference between pre-tax income and total taxes to the statutory corporate tax rate, divided by average total assets.	*Klassen et al. (1993), Guenther et al. (1997), Klassen (1997), Hanlon et al. (2008)*
IndConcentration	The proportion of the market share of the top five firms in each industry over the total industry sales.	*Jones (1991), Cahan (1992), Beatty et al.(1995), Han and Wang (1998)*
S&PMember	Equals 1 if the company is a member of the S&P500, 0 otherwise. Equals 1 if the company is a member of the S&P500, 0 otherwise.	

From equation (1) the fitted values on the innate factors represent innate earnings quality (*InnateEQ*), while the fitted values on managerial incentive variables represent discretionary earnings quality (*DiscEQ*),

$$InnateEQ_{j,t} = \hat{a}_1 Size_{j,t} + \hat{a}_2 \sigma(CFO)_{j,t} + \hat{a}_3 \sigma(Sales)_{j,t} + \hat{a}_4 OperCycle_{j,t} + \hat{a}_5 NegEarn_{j,t} + \hat{a}_6 IntIntensity_{j,t} + \hat{a}_7 CapIntensity_{j,t} \quad \text{(b)}$$

$$\begin{aligned} DiscEQ_{j,t} = {} & \hat{a}_8 Compensation_{j,t} + \hat{a}_9 MertonDD_{j,t} + \hat{a}_{10} SEO_{j,t} + \hat{a}_{11} ShareDeals_{j,t} + \hat{a}_{12} DebtIssues_{j,t} + \hat{a}_{13} MBE_{j,t} + \hat{a}_{14} Pos\Delta Earn_{j,t} + \hat{a}_{15} PosEarn_{j,t} + \hat{a}_{16} YrsListed_{j,t} \\ & + \hat{a}_{17} BLifecycle_{j,t} + \hat{a}_{18} NegRet_{j,t} + \hat{a}_{19} BookTax_{j,t} + \hat{a}_{21} IndConcentration_{j,t} + \hat{a}_{20} S\&PMember_{j,t} \end{aligned} \quad \text{(c)}$$

Appendix B (cont'd)

Table A shows the regression results of (1). Customary caution is recommended against putting too much emphasis on statistical significance of individual coefficients in a situation with non-trivial collinearity among variables. Given the large sample size the coefficients are expected to be unbiased and should therefore produce unbiased fitted values of innate and discretionary earnings quality. We repeat equation (1) using alternative proxies for compensation incentives; i) the average bonus divided by average total assets; and following Cheng and Warfield (2005) ii) options granted during the period; iii) options exercised during the period; iv) unexercisable options and iv) shares owned by inside directors (all divided by shares outstanding). *EQ* is positively associated with bonus and option grants. Results of our empirical implementations are robust to this alternative specification of *EQ*.

Table A
The determinants of earnings quality: innate factors and managerial incentives

Innate Variables	Pred. Sign	*EQ* Coef./ (*t-stat*)	Managerial Incentives Variables	Pred. Sign	*EQ* Coef./ (*t-stat*)
Intercept		−0.505			
		(−9.94)	*Compensation*	+	0.119***
Size	−	−0.010***			(4.94)
		(−2.59)	*MertonDD*	+	0.004***
σ(CFO)	+	3.586***			(5.81)
		(20.58)	*SEO*	+	0.009**
σ(Sales)	+	0.383***			(2.05)
		(14.11)	*ShareDeals*	+	0.013
OperCycle	+	0.026***			(0.80)
		(4.18)	*DebtIssues*	−	−0.013**
NegEarn	+	0.345***			(−2.23)
		(11.77)	*MBE*	+	0.001
IntIntensity	+	−0.019			(0.26)
		(−2.29)	*PosΔEarn*	+	−0.011
CapIntensity	−	−0.199***			(−2.09)
		(−11.72)	*PosEarn*	+	−0.002
(continued in next column)					(−0.18)
			YrsListed	−	−0.001***
					(−2.85)
			BLifecycle	−	−0.021***
					(−4.69)
			NegRet	+	−0.003
					(−0.33)
			BookTax	+	0.100**
					(2.05)
			IndConcentration	+	0.094***
					(3.78)
			S&PMember	+	0.009
					(0.86)
			Observations		13,741
			Adj. R^2		0.5325

The sample consists of 13,741 observations over the period 1992−2009 for 1,823 US firms with available accounting data in Compustat, stock return data in CRSP, analyst forecast data in I/B/E/S, mergers and acquisition data in SDC Platinum and executive compensation data in ExecuComp. Definitions of variables are provided above. The */**/*** indicate significance at the 0.1/0.05/0.01 levels (one-tailed) in the predicted direction.

Appendix C Corporate Governance Variables

BoardSize

Prior literature suggests a non-linear association with firm performance, with smaller or larger boards being better, depending on firm's need for the monitoring role of the board (smaller boards can be more cohesive and effective monitors) versus the advisory role of the board (larger boards can offer better advice). Empirically, the trade-off is linked to firm size; for example, Linck et al. (2008; 316) show that board size varies considerably across small, medium and large firms. Consequently, we employ a relative measure of board size, *BoardSize*, using firm size groups as the benchmark. Appendix A provides detailed definitions of all variables. We expect *BoardSize* to act as a monitoring variable.

OutsideDirectors

To capture board independence, we use the proportion of outside directors, *OutsideDirectors* as in Beasley (1996) and Klein (2002). As pointed out by Klein (2002), several studies suggest a link between independence and firm performance. As for financial reporting outcomes, Dechow, Sloan, and Sweeney (1996) and Beasley (1996), among others, document a negative association between the proportion of outside directors and earnings manipulation. Consequently, we expect *OutsideDirectors* to work as a monitoring variable.

DirectorExpertise

To capture board expertise we use outside director industry expertise. To measure expertise, we count outside directors' years of industry-specific experience. We code outside directors as experts if they have had at least five years of experience as a director in the industry. *DirectorExpertise* is the proportion of expert outside directors on the board. We expect *DirectorExpertise* to work as a monitoring variable.

InsiderOwnership

Stock ownership by inside directors affects their interest alignment with outside shareholders. To capture the effects of inside directors' ownership, we include the average percentage of shares held by inside directors (*InsiderOwnershipPct*) and the average value of shares held by inside directors (*InsiderOwnershipVal*). Following Bushman et al. (2004), *InsiderOwnership* is a composite variable capturing the average within sample and year percentile of *InsiderOwnershipPct* and *InsiderOwnershipVal*. Cheng and Warfield (2005) and Warfield, Wild, and Wild (1995) allude to insider ownership acting as an entrenchment mechanism as it is associated with insider sales and managerial equity incentives to meet earnings benchmarks. We expect *InsiderOwnership* to work as an entrenchment variable.

Shareholder Concentration

Similar to Bushman et al. (2004), we capture shareholder concentration by combining information on the value of shares held by outside shareholders, the dispersion in the number of shareholders, and the existence and presence of institutional shareholders. *ShareholderConcentration* is a composite variable representing the average within-sample and year percentile of outside ownership (*OutOwnVal*), ownership concentration *(OwnConc*), institutional ownership (*InstOwn*) and blockholders ownership (*BlockInstOwn*). The economics literature has long discussed both positive effects of concentrated ownership and negative effects due to agency costs, etc. In a cross-country setting, Leuz et al. (2003) conclude that ownership concentration leads to more earnings management. Based on these findings, we expect *ShareholderConcentration* to work as an entrenchment variable.

CG (Corporate Governance Composite)

We construct a combined corporate governance variable, *CG*, as the common factor score of the five governance variables: *BoardSize*, *OutsideDirectors*, *DirectorExpertise*, *InsiderOwnership*, and *ShareholderConcentration*. The correlations between *CG* and the corporate governance variables are as follows (Pearson/Spearman above/below the diagonal):

Variables	*CG*	*Board Size*	*Outside Directors*	*DirectorExpertise*	*Insider Ownership*	*Shareholder Concentration*
CG	1	0.335	0.832	0.474	−0.599	−0.414
BoardSize	0.233	1	0.133	0.037	−0.040	0.016
OutsideDirectors	0.763	0.117	1	0.205	−0.256	−0.103
DirectorExpertise	0.491	0.028	0.232	1	−0.035	−0.095
InsiderOwnership	−0.620	−0.048	−0.263	−0.046	1	0.146
Shareholder Concentration	−0.419	0.010	−0.115	−0.101	0.152	1
N	9,496					

Table 1

Panel A: Distributional statistics of earnings quality and corporate governance variables

Variable	Mean	Std	Q1	Median	Q3
EQ	−0.318	0.312	−0.538	−0.388	−0.168
AQ	0.035	0.023	0.018	0.029	0.045
EarnVar	0.044	0.049	0.016	0.029	0.054
AbsAA	0.037	0.037	0.012	0.026	0.049
InnateEQ	0.245	0.206	0.107	0.205	0.348
DiscEQ	−0.060	0.045	−0.086	−0.061	−0.035
BoardSize	−1.567	1.228	−2.252	−1.344	−0.586
Directors(#)	9.557	2.380	8.000	9.000	11.000
OutsideDirectors	0.696	0.164	0.600	0.727	0.818
DirectorExpertise	0.255	0.286	0.000	0.143	0.500
InsiderOwnership	0.495	0.279	0.265	0.480	0.730
InsiderOwnershipPct	0.009	0.019	0.001	0.003	0.009
InsiderOwnershipVal	93.072	770.981	4.891	14.436	42.771
Shareholder Concentration	0.493	0.216	0.325	0.495	0.650
OutOwnVal	1,513.66	5,577.30	113.03	348.68	1,117.97
OwnConc	0.874	2.623	0.051	0.185	0.703
InstOwn	0.701	0.197	0.576	0.715	0.834
BlockInstOwn	0.151	0.139	0.000	0.132	0.240
Size	7.677	1.436	6.628	7.541	8.612
YrsListed	25.705	12.638	14.000	25.000	37.000
BusConcentration	0.744	0.784	0.493	0.805	1.000
GeogConcentration	0.726	0.268	0.488	0.762	1.000
BM	0.521	0.460	0.279	0.444	0.651
IntIntensity	0.059	0.377	0.000	0.013	0.052
ROE	0.113	1.142	0.059	0.125	0.192
Financials	0.022	0.148	0.000	0.000	0.000
Utilities	0.051	0.220	0.000	0.000	0.000

Panel B: Pairwise Pearson (above) and Spearman (below the diagonal) correlations between earnings quality measures

	EQ	*AQ*	*EarnVar*	*AbsAA*
EQ	1	0.828	0.613	0.553
		<.0001	<.0001	<.0001
AQ	0.836	1	0.319	0.195
	<.0001		<.0001	<.0001
EarnVar	0.601	0.376	1	0.178
	<.0001	<.0001		<.0001
AbsAA	0.506	0.203	0.197	1
	<.0001	<.0001	<.0001	
N	9,496			

The sample consists of 9,496 observations over the period 1996−2009 for 1,511 US firms with available accounting data in Compustat, stock return data in CRSP, analyst forecast data in I/B/E/S, mergers and acquisition data in SDC Platinum, executive compensation data in ExecuComp, corporate governance data on Risk Metrics and ownership data on Thomson Reuters. Appendix A defines all variables.

Table 2

Innate and discretionary earnings quality – construct validity

Panel A: Corporate governance constructs - the effect of SOX on innate and discretionary earnings quality

Variables	Pred. Sign	*DiscEQ* Coef. (*t*-stat)	*InnateEQ* Coef. (*t*-stat)	*DiscEQ* Coef. (*t*-stat)
Intercept		−0.073	0.239	−0.098
		(−10.67)	(10.35)	(−16.37)
SOX	−	−0.036***	0.005	−0.036***
		(−3.83)	(0.19)	(−4.42)
Time		0.003	0.000	0.003
		(3.13)	(0.02)	(3.43)
InnateEQ	+			0.105***
				(18.15)
Observations		8,811	8,811	8,811
R^2*adjusted.*		0.0208	0.0004	0.2434

Panel B: Accounting restatements, innate and discretionary earnings quality

Variables	Pred. Sign	*Irreg =1* Coef. (*t*-stat)	*Errors=1* Coef. (*t*-stat)
Intercept		−5.816	−2.719
		(−4.08)	(−4.55)
DiscEQ	+	4.953***	−1.717
		(2.72)	(−1.40)
InnateEQ	+	−0.318	0.881**
		(−0.29)	(2.16)
Size		0.104	0.015
		(0.56)	(0.26)
ROA		−0.623	−1.533
		(−0.61)	(−2.89)
ROAt-1		−0.954	−0.422
		(−1.56)	(−1.22)
Leverage		−0.071	0.249
		(−0.05)	(0.75)
BM		−0.187	0.096
		(−0.74)	(0.98)
Salesgrowth		0.152	0.045
		(0.38)	(0.25)
σ(Sales)		0.974	−0.322
		(0.60)	(−0.85)
Number of restatements		43	867
Non-restatements		9,453	8,629
Observations		9,496	9,496
LR ratio		−271.99	−2,869.34

Sample description and variables definition: see Table 1 and Appendix A. In Panel A, we report the coefficient estimates from ordinary least squares (OLS) regressions of discretionary earnings quality (*DiscEQ*) and of innate earnings quality (*InnateEQ)* on a *SOX* indicator and a time trend (*TIME*). *SOX* is a dummy variable for all accounting periods ending post-2002. Observations of accounting periods ending in 2002 have been removed in this test. In Panel B, we model the likelihood of restatements, distinguishing between the group of irregularities (*Irreg* = 1, fraud, irregularities and misrepresentations) and errors (*Errors*=1, remaining restatements), on discretionary earnings quality (*DiscEQ*), innate earnings quality (*InnateEQ*) and a set of control variables.

The */**/*** indicate significance at the 0.1/0.05/0.01 levels (one-tailed) in the predicted direction. There are no predictions for control variables. *t*-statistics in parentheses are based on robust standard errors clustered by year and firm.

Table 3
Governance constructs and innate and discretionary earnings quality

Regressions of discretionary earnings quality (*DiscEQ*) on the corporate governance common factor score (*CG*) and of *CG* on innate earnings quality (*InnateEQ*).

Variables	Pred. Sign	*CG* Coef. (*t*-stat)	*CG* Coef. (*t*-stat)	*CG* Coef. (*t*-stat)	*CG* Coef. (*t*-stat)
Intercept		−1.316	−1.368	-5.307	-1.817
		(−13.25)	(−11.71)	(-9.14)	(-8.58)
InnateEQ	+	0.143**	0.198***	0.243*	0.149*
		(2.11)	(2.75)	(1.82)	(1.71)
DiscEQ	−	−2.063***	−0.822**	−1.222***	−0.869***
		(−5.51)	(−2.16)	(−3.11)	(−2.62)
Size		0.151	0.112	0.445	0.042
		(14.41)	(9.23)	(8.94)	(1.55)
YrsListed			0.015		0.067
			(8.72)		(5.85)
BM			0.056		0.071
			(1.44)		(3.33)
ROE			0.001		0.003
			(0.29)		(1.49)
Financials			0.024		-0.043
			(0.34)		(-0.39)
Utilities			−0.059		0.772
			(−0.86)		(2.57)
Firm fixed effects		No	No	Yes	Yes
Observations		9,496	9,496	9,496	9,496
R^2 *adjusted.*		0.1711	0.2401	0.6857	0.7590

Sample description and variables definition: see Table 1 and Appendix A. The table reports the coefficient estimates from ordinary least squares (OLS) corporate governance common factor score (*CG*) on innate earnings quality (*InnateEQ*), discretionary earnings quality (*DiscEQ*), and other known determinants affecting corporate governance (Bushman et al. 2004, Linck et al. 2008).
The */**/*** indicate significance at the 0.1/0.05/0.01 levels (one-tailed) in the predicted direction. There are no predictions for control variables. *t*-statistics in parentheses are based on robust standard errors clustered by year and firm.

Table 4

Governance constructs and earnings quality – sub-sample tests

Panel A Regressions of the corporate governance common factor score (*CG*) on earnings quality *EQ*).

Variables	Pred. Sign	*CG* Entire Sample	*CG* *BusinessShocks*=1 & *Incentives* = 0	*CG* Entire Sample
		Coef. (*t*-stat)	Coef. (*t*-stat)	Coef. (*t*-stat)
Intercept		−1.284	−1.242	−1.281
		(−15.35)	(−11.32)	(−15.49)
EQ	+	0.005	0.181***	−0.032
		(0.13)	(2.54)	(−0.65)
Size		0.167	0.174	0.167
		(17.93)	(10.44)	(17.69)
BusinessShocks				−0.011
				(−0.18)
EQ x BusinessShocks	+			0.174***
				(2.85)
Observations		9,496	1,085	9,496
R^2*adjusted.*		0.1536	0.1694	0.1565

Panel B: Regressions of earnings quality (*EQ*) on the corporate governance common factor score (*CG*).

Variables	Pred. Sign	*EQ* Entire Sample	*EQ* *EMIncentives*=1& *BusinessShocks*=0	*EQ* Entire Sample
		Coef. (*t*-stat)	Coef. (*t*-stat)	Coef. (*t*-stat)
Intercept		0.212	0.206	0.209
		(5.86)	(4.44)	(5.81)
CG	−	0.001	−0.016**	0.012
		(0.13)	(−1.91)	(1.05)
Size		−0.069	−0.068	−0.069
		(−14.49)	(−11.56)	(−14.53)
EM_Incentives				0.017
				(1.77)
EQ x EMIncentives	−			−0.024**
				(−2.15)
Observations		9,496	2,538	9,496
R^2*adjusted.*		0.1004	0.0967	0.1014

Sample description and variables definition: see Table 1 and Appendix A. In Panel A we report the coefficient estimates from ordinary least squares (OLS) corporate governance common factor score (*CG*) on earnings quality (*EQ*) and firm size for the entire sample and sub-samples where firms are subject to business shocks. Similar to Owens, Wu and Zimmerman (2016) we define *BusinessShocks* as an indicator variable equal to 1 if the firm undergoes economic events (or business shocks) that are observable in financial statements and relate to changing economic conditions i) an expansion in geographic segments, ii) major merger or reorganization (firm restates sales to reflect a major merger or re-organization resulting from the formation of a new company), iii) discontinued operations (the income effect of discontinued operations is greater than five percent of sales), iv) restructuring charges (the magnitude of restructuring charges is greater than five percent of sales) or v) changes in the four-digit SIC industry code (the four digit SIC differs in years *t-1* and *t*). In Panel B we report the coefficient estimates from OLS regressions of earnings quality (*EQ*) on the corporate governance common factor score (CG) and firm size for the entire sample and sub-samples where firms face earnings management incentives. *EMIncentives* indicates firm year observations where firms raise equity (common stock from year *t−1* to year *t* is higher than 5%, 0 otherwise) or just meets or beats analyst forecasts (the earnings surprise falls in the interval [0,1]).

The */**/*** indicate significance at the 0.1/0.05/0.01 levels (one-tailed) in the predicted direction. There are no predictions for control variables. *t*-statistics in parentheses are based on robust standard errors clustered by year and firm.

Table 5
Corporate governance and discretionary earnings quality

Regressions of discretionary earnings quality (*DiscEQ*) on corporate governance mechanisms (board structure, insider directors' ownership and shareholders concentration).

Variables	Pred. Sign	*DiscEQ* Coef. (*t*-stat)	*DiscEQ* Coef. (*t*-stat)	*DiscEQ* Coef. (*t*-stat)	*DiscEQ* Coef. (*t*-stat)
Intercept		−0.080	−0.094	−0.048	−0.052
		(−11.39)	(−15.22)	(−4.98)	(−4.00)
BoardSize	−	−0.001***	−0.001***	−0.002***	−0.001
		(−2.28)	(−2.78)	(−3.82)	(−1.08)
OutsideDirectors	−	−0.011**	−0.007	−0.001	0.003
		(−1.72)	(−1.05)	(−0.10)	(0.26)
DirectorExpertise	−	−0.026***	−0.022***	−0.018***	−0.009
		(−4.60)	(−4.41)	(−3.55)	(−1.13)
InsiderOwnership	+	0.012***	0.011***	0.005**	0.009**
		(3.83)	(3.72)	(1.71)	(1.95)
Shareholder Concentration	+	0.053***	0.029***	0.024***	0.036***
		(11.49)	(7.88)	(6.55)	(7.29)
InnateEQ	+		0.089***	0.075***	
			(14.04)	(11.71)	
Size				−0.006	−0.006
				(−7.07)	(−7.69)
InnateEQ(Q)	+				0.018***
					(5.08)
DirectorExpertise × *InnateEQ(Q)*	−				−0.006**
					(−2.20)
OutsideDirectors × *InnateEQ(Q)*	−				−0.002
					(−0.44)
BoardSize ×*InnateEQ(Q)*	−				−0.001**
					(−2.28)
InsiderOwnership × *InnateEQ(Q)*	−				−0.004**
					(−1.83)
Shareholder Concentration × *InnateEQ(Q)*	−				−0.006**
					(−2.21)
Observations		9,496	9,496	9,496	9,496
R^2*adj.*		0.1207	0.2735	0.2950	0.2690

Sample description and variables definition: see Table 1 and Appendix A. The table reports the coefficient estimates obtained from ordinary least squares (OLS) regressions of discretionary earnings quality (*DiscEQ*) on corporate governance mechanisms, controlling for firm size and innate earnings quality (*InnateEQ*).
The */**/*** indicate significance at the 0.1/0.05/0.01 levels (one-tailed) in the predicted direction. There are no predictions for control variables. *t*-statistics in parentheses are based on robust standard errors clustered by year and firm.

Table 6
Corporate governance and earnings quality − existing constructs

		DiscEQ Coef. (*t*−stat)	*AA* Coef. (*t*−stat)	*AbsAA* Coef. (*t*−stat)	*AbsPAAA* Coef. (*t*−stat)	*ResDEQ* Coef. (*t*−stat)
Intercept		-0.040	-0.037	0.027	0.032	−0.032
		(-4.24)	(-3.59)	(4.87)	(4.78)	(−1.06)
BoardSize	−	-0.002***	0.000	0.000	0.000	0.000
		(-4.10)	(0.95)	(1.62)	(0.47)	(0.01)
Outside Directors	−	-0.002	0.002	-0.007*	-0.007	0.049
		(-0.26)	(0.37)	(-1.52)	(-1.18)	(1.44)
Director Expertise	−	-0.019***	0.005	-0.005***	-0.007***	−0.003
		(-3.62)	(3.24)	(-2.60)	(-2.83)	(−1.22)
Insider Ownership	+	0.009***	0.000	0.003	0.006***	0.019
		(3.10)	(0.09)	(1.13)	(2.83)	(1.13)
Shareholder Concentration	+	0.025***	0.003	0.001	0.002	−0.029
		(6.77)	(1.07)	(0.71)	(0.84)	(−1.38)
Innate Factors		YES	YES	YES	YES	NO
Observations		9,496	9,496	9,496	9,496	9,496
R^2*adj.*		0.3243	0.0294	0.1031	0.0888	0.0019

		EQ Coef. (*t*−stat)	*Smoothness* Coef. (*t*−stat)	*Smoothing* Coef. (*t*−stat)	*Freq* Coef. (*t*−stat)	*ADIndex* Coef. (*t*−stat)
Intercept		−0.516	2.873	0.311	0.350	0.689
		(−8.82)	(5.51)	(3.11)	(8.80)	(27.03)
DirectorExpertise	−	−0.004	0.031	0.012	0.001	0.004
		(−0.14)	(1.17)	(1.98)	(0.40)	(2.46)
OutsideDirectors	−	0.045	0.028	-0.040	0.029	0.020
		(1.37)	(0.12)	(-0.85)	(1.42)	(1.56)
BoardSize	−	−0.002	0.075	0.027	-0.018*	0.016
		(−0.72)	(0.83)	(1.16)	(-1.38)	(2.52)
InsiderOwnership	+	0.022*	-0.101	0.047*	-0.027	0.008
		(1.29)	(-0.62)	(1.56)	(-2.71)	(0.99)
Shareholder Concentration	+	−0.010	-0.908	0.079**	-0.070	-0.013
		(−0.53)	(-3.42)	(2.16)	(-4.76)	(-1.18)
Innate Factors		YES	YES	YES	YES	YES
Observations		9,496	9,496	9,496	9,349	9,496
R^2*adj.*		0.4771	0.1190	0.1287	0.1534	0.0042

Sample description and variables definition: see Table 1 and Appendix A. The table reports the coefficient estimates from ordinary least squares (OLS) regressions of discretionary earnings quality (*DiscEQ*) and of existing measures of earnings quality, *AA*, *AbsAA*, *AbsPAAA, ResDEQ, Smoothness, Smoothing, Freq,* and of a discretion index, *ADIndex*, on corporate governance mechanisms. Innate factors are firm size, operating cash flow volatility (σ(*CFO*)), sales volatility σ(*Sales*), operating cycle *(OperCycle)*, cumulative losses (*NegEarn*), intangible assets intensity (*IntIntensity*) and capital intensity (*CapIntensity* - see Appendix B for definitions).
The */**/*** indicate significance at the 0.1/0.05/0.01 levels (one-tailed) in the predicted direction. There are no predictions for control variables. *t*-statistics in parentheses are based on robust standard errors clustered by year and firm.