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## Understanding earnings quality: A review of the proxies, their determinants and their consequences<sup>☆</sup>

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### ABSTRACT

Researchers have used various measures as indications of “earnings quality” including persistence, accruals, smoothness, timeliness, loss avoidance, investor responsiveness, and external indicators such as restatements and SEC enforcement releases. For each measure, we discuss causes of variation in the measure as well as consequences. We reach no single conclusion on what earnings quality is because “quality” is contingent on the decision context. We also point out that the “quality” of earnings is a function of the firm’s fundamental performance. The contribution of a firm’s fundamental performance to its earnings quality is suggested as one area for future work.

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### 1. Introduction

Statement of Financial Accounting Concepts No. 1 (SFAC No. 1) states that “Financial reporting should provide information about an enterprise’s financial performance during a period.” Borrowing language from SFAC No. 1, we define *earnings quality* as follows:

Higher quality earnings provide more information about the features of a firm’s financial performance that are relevant to a specific decision made by a specific decision-maker.

There are three features to note about our definition of earnings quality. First, earnings quality is conditional on the decision-relevance of the information. Thus, under our definition, the term “earnings quality” alone is meaningless; earnings quality is defined only in the context of a specific decision model. Second, the quality of a reported earnings number depends on whether it is informative about the firm’s financial *performance*, many aspects of which are unobservable. Third, earnings quality is jointly determined by the relevance of underlying financial performance to the decision and by the ability of the accounting system to measure performance. This definition of earnings quality suggests that quality could be evaluated with respect to *any* decision that depends on an informative representation of

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financial performance. It does not constrain quality to imply decision usefulness in the context of equity valuation decisions.<sup>1</sup>

Consistent with this broad definition of earnings quality, we review over 300 studies of characteristics or attributes of *earnings*, generally defined.<sup>2</sup> We do not require that the researcher state that the earnings measure in the study is a “proxy” for earnings quality, although many do. For each paper, we identify the “proxy” for earnings quality, if one is indicated, or the earnings measure, more generally, that is the focus of the analysis.<sup>3</sup> We evaluate the totality of the evidence about each identified proxy in order to understand its ability to capture the latent construct of earnings quality. This process follows the approach that Cronbach and Meehl (1955) suggest to assess the validity of a latent construct by taking a 360° view of it.<sup>4</sup>

We organize the earnings quality proxies into three broad categories: properties of earnings, investor responsiveness to earnings, and external indicators of earnings misstatements. Category 1, properties of earnings, includes earnings persistence and accruals; earnings smoothness; asymmetric timeliness and timely loss recognition; and target beating, in which the distance of earnings from a target (e.g., small profits) is viewed as an indication of earnings management, and earnings management is assumed to erode earnings quality. Category 2, investor responsiveness to earnings, includes papers that use an earnings response coefficient (ERC) or the  $R^2$  from the earnings-returns model as a proxy for earnings quality and that relate the ERC to another construct such as auditor quality. Category 3, external indicators of earnings misstatements, includes Accounting and Auditing Enforcement Releases (AAERs), restatements, and internal control procedure deficiencies reported under the Sarbanes Oxley Act, all of which are viewed as indicators of errors or earnings management.

Table 1 provides an outline of the review. Section 2 is a commentary on the general state of this expansive literature. We start by providing a framework for thinking about reported earnings, recognizing that a firm's reported earnings depends on both the financial performance of the firm and on how the accounting system measures performance. This framework provides a basis for explaining our two broad observations on the earnings quality (EQ) literature.

Our first general observation is that although the quality of a firm's earnings depends on *both* the firm's financial performance and on the accounting system that measures it, we have relatively little evidence about how fundamental performance affects earnings quality. The literature often inadequately distinguishes the impact of fundamental performance on EQ from the impact of the measurement system. We can cite only a few papers to support this observation, which underscores our point that we need *more* research on this topic. In addition, while we identify several potential sources of distortions that affect the ability of an accounting system to capture fundamental performance in reported earnings, our research generally focuses on distortions associated with implementation errors and earnings management.

Our second general observation about the state of the literature viewed in its entirety is that there is no measure of earnings quality that is superior for all decision models. Our method of analyzing the evidence following the Cronbach and Meehl approach forms the basis for this conclusion. We classify each paper into one of two groups according to whether it provides evidence on the *determinants* or the *consequences* of the earnings quality proxy it examines. The *determinants* papers propose or test theories about features of a firm (e.g., compensation contracts) or of the accounting measurement system (e.g., accrual choices) that cause an earnings outcome; the earnings quality proxy is the dependent variable in the analysis. The *consequences* papers propose or test theories about the impact of earnings quality on an outcome (e.g., cost of capital); the earnings quality proxy is the independent variable in the analysis. We then review the papers within each category of determinants or consequences, but across the various earnings quality proxies. If earnings quality were a single construct and the proxies just measured it with varying degrees of accuracy, then we would expect to observe convergent validity across EQ proxies for the same determinant and to find that all the EQ proxies would have similar consequences. Juxtaposing the papers against other papers that examine the same determinant or the same consequence draws attention to mixed evidence in the literature. If a particular determinant is not associated with all proxies, or if various proxies do not have the same consequences, then the proxies are measuring different constructs.

We emphasize the uniqueness of the proxies for two reasons. First, over time the term “earnings quality” has evolved such that some researchers use it as if its meaning is clear and unambiguous. The term was used as early as 1934 by Graham and Dodd in *Security Analysis*, when they describe the Wall Street equity valuation model as earnings per share

<sup>1</sup> A number of survey papers of earnings quality and/or earnings management predate this review: Healy and Wahlen (1999); Dechow and Skinner (2000); McNichols (2000); Fields et al. (2001); Imhoff (2003); Penman (2003); Nelson et al. (2003); Schipper and Vincent (2003); Dechow and Schrand (2004); Francis et al. (2006); Lo (2008). These reviews typically provide a definition of earnings quality in an equity valuation context and discuss only the literature related to that definition.

<sup>2</sup> We searched four journals starting with the first issue (in parentheses) through 2008: Contemporary Accounting Research (1984), Journal of Accounting and Economics (1980), Journal of Accounting Research (1964), and Review of Accounting Studies (1996). We searched The Accounting Review from 1970 through 2008. We added articles from other journals and working papers to the extent that we are aware of them, but we did not perform a systematic review to find them.

<sup>3</sup> For convenience throughout the review, we use the term “proxy” or “measure” interchangeably to describe the various earnings attributes that are studied. In fact, the breadth of this review is motivated in part by the fact that many papers, especially older studies, provide evidence on an earnings measure that is helpful for evaluating its decision usefulness, but they do not use the term “earnings quality.” We identify up to three proxies/measures per paper.

<sup>4</sup> Using the terminology of Cronbach and Meehl (1955), we learn about a construct by elaborating the *nomological network* in which it occurs. The nomological network is the interlocking system of laws which may relate (a) observable properties or quantities to each other, (b) theoretical constructs to observables, or (c) different theoretical constructs to one another, which set forth the laws in which the construct occurs.

**Table 1**

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times a “coefficient of quality.” Their description of the quality coefficient implies their definition of quality: the coefficient reflects dividend policy, as well as firm-specific characteristics such as “size, reputation, financial position and prospects,” and the nature of the firm’s operations, as well as macroeconomic factors including “temper of the general market” (Graham and Dodd, 1934, p. 351). O’Glove re-introduced the term in his practitioner-oriented financial statement analysis textbook, *Quality of Earnings*, published in 1987 (O’Glove, 1987). Lev (1989) popularized “quality” as a descriptive characteristic of earnings for academic researchers when he stated that one explanation for low  $R^2$ s in earnings/returns models is that: “No serious attempt is being made to question the **quality** of the reported earnings numbers prior to correlating them with returns” (p. 175, emphasis added). Studies shortly following Lev (1989) carefully specified the relation between quality characteristics and equity valuation decision models. Over time, however, earnings attributes that were found to indicate quality in one decision model were treated generically as measures of quality in others.<sup>5</sup> The studies that do treat the earnings metrics as substitute proxies for earnings quality report that their results are *robust* to using alternative measures. But in some cases, results should *not* be robust, and so we question what the robustness implies.

Our second reason for emphasizing the point that the EQ proxies are not substitutes is more optimistic. The distinctions among them represent a research opportunity. Our research should exploit the unique features of the earnings proxies to provide more compelling evidence that identifies the determinants and consequences of quality for a given research question.

Section 3 provides a detailed analysis of each of the earnings quality proxies. We describe how the proxy is commonly measured and outline our *variable-specific* conclusions about the unique features of the variable as a proxy for earnings quality. The studies that support these conclusions are described in each sub-section. While we narrow down the 300+ individual findings from the papers we review to a smaller set of variable-specific conclusions, we emphasize again that we reach no conclusion about a single best measure of earnings quality.

Section 4 provides a detailed analysis of studies that examine cross-country variation in earnings quality. We separately discuss these studies due to the unique features of the data. The discussion highlights what we can learn only from cross-country studies and not from studies that use firm-level data within one country, and it identifies findings that conflict with those based on analyses of U.S. firms.

<sup>5</sup> This evolution of a term such as “earnings quality” to its current state of ambiguity is not unique. Schelling (1978) describes the phenomenon: “Each academic profession can study the development of its own language. Some terms catch on and some don’t. A hastily chosen term that helps meet a need gets initiated into the language before anybody notices what an inappropriate term it is. People who recognize that a term is a poor one use it anyway in a hurry to save thinking of a better one, and in collective laziness we let inappropriate terminology into our language by default. Terms that once had accurate meanings become popular, become carelessly used, and cease to communicate with accuracy.”

Sections 5 and 6 contain a review of many of the same papers discussed in Sections 3 and 4, but organized by the hypothesized determinant of the earnings measure (Section 5) or by the hypothesized consequence (Section 6). While at first this might seem like an unnecessary redundancy, discussing the papers a second time, but organized in a different way, is an important element of this review. As noted previously, reviewing the literature organized by the determinants and consequences draws attention to the mixed evidence across the EQ proxies. We can readily identify cases in which the EQ proxies do not exhibit convergent validity, which they should if they measure the same construct. For example, managerial ownership is associated with lower earnings quality using asymmetric timeliness as the proxy but with higher earnings quality using discretionary accruals or investor responsiveness proxies. This inconsistency in the results across EQ proxies is far more apparent in the discussions in Sections 5 and 6 than in Sections 3 and 4.

In addition to clearly presenting the evidence that supports our observation that there is no single best measure of earnings quality, Sections 5 and 6 serve a practical purpose as well. Simply identifying and classifying the papers that we review was a significant task and is an important contribution of our survey. The classification of the papers by the determinant or consequence examined is a useful reference for researchers who are exploring a new field. The key insight about earnings quality based on the reorganized discussion is that the mixed evidence across proxies suggests that each individual proxy measures distinct features of the decision-usefulness of earnings; these proxies do not measure the same fundamental construct. These sections also provide some conclusions about the determinants and consequences being examined as well as research design issues specific to studying them.

Section 7 concludes. During the review process, we identified five additional research opportunities. These additional observations are not about earnings quality *per se*, but about methodological issues in the EQ studies or about open questions for future research. The conclusion includes these proposals.

## 2. Commentary on the state of the literature

In order to provide a commentary on the state of the literature, we begin by presenting a framework for thinking about earnings quality. For expositional convenience, we define reported earnings as follows:

$$\text{Reported Earnings} \equiv f(X).$$

$X$  is the "...enterprise's financial performance during a reporting period," which SFAC No. 1 states is what earnings, a primary focus of financial reporting, should represent.<sup>6</sup> The function  $f$  represents the accounting system that converts the unobservable  $X$  into observable earnings. One implication of this definition is that earnings, and the decision usefulness of earnings, is a function of performance itself, and not just the measurement of  $X$ , which is an important point that we will return to later.

We borrow the term "financial performance" directly from SFAC No. 1 to define  $X$ , but we recognize that the meaning of "performance" is ambiguous. For a one-period model of a firm, "performance" is observable and consists of the cash flows generated during the period plus the change in the liquidation value of net assets. When a firm exists over multiple reporting periods, performance represents three components: (i) cash flows generated during the current period; (ii) the present value of cash flows that will be generated in future periods that are a result of actions taken in the current period; and (iii) the present value of the change in the liquidation value of net assets that are a result of actions taken in the current period. Penman and Sougiannis (1998) describe a primitive construct like  $X$ , specifically in the context of equity valuation, as "...attributes within the firm, which are said to capture value-creating activities" (p. 348).

To shed additional light on the nature of what we mean by performance, we turn to a specific example in Graham and Dodd's advice to analysts about the use of financial information:

Most important of all, the analyst must recognize that the value of a particular kind of data varies greatly with the type of enterprise which is being studied. The five-year record of gross or net earnings of a railroad or a large chain-store enterprise may afford, if not a conclusive, at least a reasonably sound basis for measuring the safety of the senior issues and the attractiveness of the common shares. But the same statistics supplied by one of the smaller oil-producing companies may well prove more deceptive than useful, since they are chiefly the resultant of two factors, viz., price received and production, both of which are likely to be radically different in the future than in the past. (p. 33–34)

In this example, price received and production are the types of factors that will determine the firm's unobservable financial performance ( $X$ ).

Two features of our definition of reported earnings are noteworthy. First, the unobservable component  $X$  is defined without reference to a particular stakeholder (e.g., equityholder or debtholder). However, the relevance of a specific element of a firm's performance, such as production or pricing, can vary across stakeholders and decision models. For example, an important decision model input for a long-term debtholder may be liquidation values of assets in the period when principal payments are due, while the relevant decision model input for a short-term debtholder is near-term expected cash flows, and performance ( $X$ ) can differentially affect these two outcomes. A compensation committee may

<sup>6</sup> We use the terms "fundamental performance," "financial performance," and "performance" interchangeably throughout the review.

care only about the elements of performance that are under management's control. Defining  $X$  without respect to a decision model is intentional and is consistent with a long-standing debate in the accounting literature on what earnings should represent. Should earnings measure changes in fair value (current or exit prices) of an enterprise (e.g., Chambers, 1956; Sterling, 1970), or should earnings measure "sustainable" cash flows (e.g., Paton and Littleton, 1940; Ohlson, 2000), such that it can be annuitized to reflect value? The debate over the quality of earnings, as opposed to the quality of the balance sheet, is another important question, and it underscores a significant message of the review: the decision usefulness of accounting information is jointly determined by the decision model and by the accounting information that is used as an input to the model.

The second noteworthy feature of our definition of reported earnings is that reported earnings does not equal  $X$ ; it is a function of  $X$ . We distinguish three explanations for why an accounting measurement system ( $f$ ) would not perfectly measure performance:

- (1) *Multiple decision models*: An accounting system that produces a single reported earnings number cannot produce a representation of  $X$  that is equally relevant in all decision models. In U.S. GAAP: "The objectives are directed toward the common interests of many users in the ability of an enterprise to generate favorable cash flows but are phrased using investment and credit decisions as a reference to give them a focus" (SFAC No. 1). Ultimately, the standard setters make trade-offs in setting standards across anticipated users' needs, and in the end *no* individual decision-maker gets a representation of firm performance that is perfectly relevant for his or her decision.<sup>7</sup>
- (2) *Variation in  $X$* : Firms choose among a limited set of pre-determined measurement principles (e.g., accounting standards) to measure  $X$ . No single standard will perfectly measure  $X$  for any given firm.<sup>8</sup> Consider, for example, cost of goods sold (COGS), which represents the reportable measure of a firm's unobservable inventory production performance during the period. GAAP defines the costs to be included in COGS and the timing of the recognition of the costs. However, the resulting "standardized" measure of COGS will not be an equally good measure of decision-relevant performance across all  $X$ s (e.g., retail chains versus oil producing companies, to use the Graham and Dodd example), and it will not be a perfect representation of any  $X$ .
- (3) *Implementation*: An accounting system that measures an unobservable construct ( $X$ ) inherently involves estimations and judgment, and thus has the potential for unintentional errors and intentional bias (i.e., earnings management).

The definition of reported earnings as  $f(X)$  provides a foundation to discuss our two general observations about the state of the literature on earnings quality that were described briefly on page 3 of the introduction. Our first general observation is that we have made considerable progress in researching *implementation issues* that affect the measurement of  $X$  (#3 above) relative to research on the other two explanations for the effect of  $f$  on reported earnings and, in particular, relative to research on the effect of  $X$  itself on reported earnings. The majority of the studies we identified for this review, in terms of the sheer volume of published papers, are about the determinants and consequences of *abnormal accruals* derived from accrual models, with the idea that abnormal accruals, whether they represent errors or bias, erode decision usefulness. A second set of frequently researched proxies for earnings quality is external indicators such as AAERs and restatements, which also provide evidence specifically about implementation.

Our observation that we have made considerable progress researching implementation issues does not imply that further work is unnecessary. For example, studies of abnormal accruals could progress toward better differentiating the impact of the measurement of  $X$  on earnings from the impact of performance itself. The commonly used models for measuring abnormal accruals attempt to control for the accruals that are related to the firm's performance, calling them normal, non-discretionary, or innate accruals (see Exhibit 2). But the variables used to model normal accruals are themselves measured by *reported* accrual-based earnings associated with performance (e.g., growth in reported sales revenue). Thus, while the accrual models may distinguish normal accruals from the component that represents discretion, the "normal" or innate accruals do not necessarily measure unobservable performance. Even studies that measure whether total accruals are superior to cash flows do not isolate the effect of the measurement system on decision usefulness from the effect of  $X$  itself because cash flows do not represent performance as we have defined it.<sup>9</sup>

Researchers will need to go beyond the examination of abnormal accruals derived from accrual models in order to gain insight into measurement rather than implementation effects of the accounting system. Examples of studies of this type are Lev and Sougiannis (1996), who capitalize and expense R&D and evaluate the impact on investor responsiveness to earnings; Landsman et al. (2008), who attempt to record the off-balance sheet assets and liabilities related to securitizations and

<sup>7</sup> The issue of multiple users of financial reports is also discussed in Kothari et al. (2010).

<sup>8</sup> Moreover, there may be a feedback loop: the accounting measurement system could influence management's behavior that in turn changes "fundamental" earnings and its quality. For example, not requiring the expensing of stock options could result in greater stock option usage than otherwise would occur, which could affect risk taking behavior, which will in turn affect the fundamental earnings process. See also Ewert and Wagenhofer (2010).

<sup>9</sup> As noted by DeFond (2010), however, developing a model of accrual quality that separates  $f$  from  $X$  is a problem that will never be "solved" *per se* because  $X$  is unobservable. While we identify this deficiency of the accruals models, we underscore that accruals models have been evolving in the direction we suggest with the intent of differentiating fundamental performance from its measurement (e.g., Dechow and Dichev, 2002; Francis et al., 2005).

examine investor responsiveness; Ge (2007), who capitalizes operating leases and examines the impact on earnings persistence; and Dutta and Reichelstein (2005), who provide theoretical work on optimal capitalization policies.

While studies on implementation issues are strongly represented in the literature, research on the impact of fundamental financial performance on earnings quality is limited. Fundamental performance is likely to vary in cross-section and has its own inherent properties, such as persistence. Thus, the quality or decision usefulness of reported earnings is a function of the quality or decision usefulness of performance itself. As accountants, we have focused on the measurement of the process ( $f$ ), and in particular on the implementation issues. More research on the impact of performance on reported earnings is essential to our understanding of earnings quality. Examples of studies in this genre are Biddle and Seow (1991) and Ahmed (1994), both of which examine ERCs as a function of fundamental firm characteristics. The significant difficulty with this research, of course, is to develop proxies for  $X$  that are observable and not a function of the accounting system.

Our second general observation about the state of the literature is that the properties of earnings that are often used as proxies for EQ are not substitute measures for the decision usefulness of a firm's (or country's) earnings. The various properties, such as persistence and smoothness, are properties of the same reported earnings number. Thus, all of them are affected both by the firm's fundamental performance ( $X$ ) and by the ability of the accounting system to measure performance, but the various properties are not equally affected by these two factors.<sup>10</sup> Correlations between the earnings properties demonstrate this point. Table 2 shows that the correlations between the earnings properties are generally positive and statistically significant but not economically significant.<sup>11</sup> The correlation between timely loss recognition and persistence, for example, is less than 2%. Moreover, smoothness is negatively correlated with the other properties.

The low and even negative correlations should come as no surprise. As noted, while the proxies represent properties of the same reported earnings number, the quality proxies measure different attributes of earnings. The point of presenting the correlations is to emphasize that empirical tests should exploit variation across the measures to make predictions about the specific features of earnings that make them decision useful. The testable hypotheses about determinants and consequences of decision usefulness derive from decision models that imply a *specific* earnings characteristic that would improve the decision outcome. Most theories would not predict a relation with all earnings properties, or at least would not predict an equally strong relation with all. Predictions about the *specific* property of earnings that will be affected by a determinant variable or predictions about the consequence of a *specific* property will allow better identification of the tests of the underlying theory. Studies that instead treat the earnings properties as substitutes generally cannot reject the hypothesis that the determinant or consequence is correlated with the effect of firm performance ( $X$ ) on the earnings property, rather than with the measurement of the process. Such studies report that their results are *robust* to alternative measures of earnings quality, although they typically do not address whether theory would predict that they should be.

We document cases of mixed evidence throughout the literature potentially related to using the proxies as substitutes. An example is the mixed evidence on internal controls as a determinant of accrual quality (see Section 5.3). A predicted association between internal control *procedures* and accrual quality is fairly direct, and the evidence of an association is strong. The predicted association between other control mechanisms, such as a more independent board of directors, and accrual quality is more tenuous. Outside directors at some firms may not play any role in the accounting reporting process, in general, and in the accrual process, in particular. Not surprisingly, the evidence on board composition as a determinant of accrual quality is mixed.<sup>12</sup> Thus, based on the finding that accrual quality is related to internal control procedures, it appears that accrual quality captures meaningful variation in the effects of implementation of the accounting system ( $f$ ) to fundamental performance ( $X$ ), which is the third explanation above for why an accounting measurement system ( $f$ ) would not perfectly measure performance. However, based on the finding that accrual quality is not systematically related to board characteristics, it does not appear to be a good proxy for the effects of fundamental performance on quality, or for the first two explanations for how the accounting system might affect quality. Use of the proxies as substitutes, and the resulting mixed evidence in some cases, limits our ability to make more variable-specific statements about whether a particular earnings measure is a good proxy for earnings quality. Further tests of theories that predict a relation of a determinants or consequence to a specific earnings quality proxy, but not others, would be useful.

We should point out, however, that our examination of the determinants and consequences of the proxies showed consistent results across proxies, particularly related to abnormal accruals. For example, high accrual firms also tend to have high "discretionary" accruals, have less persistent earnings, be more subject to SEC enforcement action, have more restatements, have poorer internal controls, have less investor responsiveness to earnings (when investors are aware of the extreme accruals), and appear to beat benchmarks more often. There is more ambiguity in the relation between accruals

<sup>10</sup> Ewert and Wagenhofer (2010) provide a thoughtful analysis to quantify this statement. They model a firm's accounting choices over a single earnings process and determine the rational expectations equilibrium reported earnings in two periods. They then compute commonly used proxies for the quality of the modeled earnings choice including smoothness, persistence, and value relevance, and they evaluate these proxies relative to a construct in their model that represents the unobservable reduction in the variance of the firm's terminal value.

<sup>11</sup> For illustrative purposes, we measure each variable using a common model specification, and we sign the variable such that it is increasing in earnings "quality" as the term is typically used in the literature. For example, we use the additive inverse of the Dechow/Dichev abnormal accruals measure because larger absolute errors are typically assumed to represent lower quality.

<sup>12</sup> Construct validity of internal control procedures is a separate issue. SOX reports provide a means of identifying internal control procedure weaknesses. Identifying measures of "good" and "bad" governance, however, is more difficult (Armstrong et al., 2010a).

**Table 2**

Spearman correlations between earnings quality proxies (Sample period: 1987–2007).

This table reports the Spearman correlation coefficients between commonly used specifications of the earnings measures, as defined in Exhibit 1. *Persistence* is measured as the estimated  $\beta$  in the firm-level regression:  $Earnings_{t+1} = \alpha + \beta Earnings_t + \varepsilon_t$ . *Total accruals* is defined as the difference between earnings and cash flows from operations.  $|Accruals|$  is the absolute value of *Total accruals*. *Estimation errors* is defined as the firm-level mean absolute value of the residual from  $\Delta WWC = \alpha + \beta_1 CFO_{t-1} + \beta_2 CFO_t + \beta_3 CFO_{t+1} + \varepsilon_t$ .  $\sigma(residual)$  is the firm-level standard deviation of the residual from the above regression.  $\sigma(EARN)/\sigma(CFO)$  is the firm-level standard deviation of earnings divided by the standard deviation of cash flow from operations.  $Corr(\Delta ACC, \Delta CFO)$  is the firm-level correlation between change in total accruals and change in cash flow from operations. *Timely loss recognition* (TLR) is defined as  $(\beta_0 + \beta_1)/\beta_0$  from the firm-level regression:  $Earnings_{t+1} = \alpha_1 + \alpha_2 D_t + \beta_0 Ret_t + \beta_1 D_t Ret_t + \varepsilon_t$  where  $D_t = 1$  if  $Ret_t < 0$ . ERC is defined as the estimated  $\beta$  from the firm-level regression of annual returns on earnings:  $Ret_t = \alpha + \beta Earnings_t + \varepsilon_t$ . The sample consists of 3,733 firms (47,187 firm-years) with eight or more consecutive annual observations. Significance levels are shown in italics. Each earnings attribute is winsorized at 1% and 99%. *Timely loss recognition* is trimmed at the value of  $-5$  and  $5$ , resulting in 2,487 firms. *Total accruals*,  $|Accruals|$ , *Estimation errors*, and  $\sigma(residual)$  represent the additive inverse of these variables such that all variables are increasing in their hypothesized quality.

	Accruals				Smoothness		TLR	ERCs	
	Total accruals	Accruals	Estimation errors	$\sigma(residual)$	$\sigma(Earn)/\sigma(CFO)$	Corr( $\Delta ACC, \Delta CFO$ )		Coefficient	R <sup>2</sup>
<i>Persistence</i>	0.082 < 0.0001	0.128 < 0.0001	0.128 < 0.0001	0.129 < 0.0001	-0.151 < 0.0001	-0.254 < 0.0001	0.014 0.485	0.191 < 0.0001	0.079 < 0.0001
<i>Total accruals</i>		0.700 < 0.0001	-0.080 < 0.0001	-0.079 < 0.0001	-0.214 < 0.0001	-0.275 < 0.0001	0.003 0.880	0.128 < 0.0001	0.032 0.052
$ Accruals $			0.308 < 0.0001	0.303 < 0.0001	-0.241 < 0.0001	-0.264 < 0.0001	-0.0007 0.742	0.174 < 0.0001	0.030 0.069
<i>Estimation errors</i>				0.993 < 0.0001	-0.299 < 0.0001	-0.250 < 0.0001	0.026 0.202	0.214 < 0.0001	0.048 0.004
$\sigma(residual)$					-0.297 < 0.0001	-0.249 < 0.0001	0.029 0.149	0.217 < 0.0001	0.053 0.001
$\sigma(EARN)/\sigma(CFO)$						0.709 < 0.0001	-0.059 0.004	-0.339 < 0.0001	-0.152 < 0.0001
<i>Corr</i> ( $\Delta ACC, \Delta CFO$ )							-0.072 < 0.0001	-0.321 < 0.0001	-0.125 < 0.0001
<i>Timely loss recognition</i> (TLR)								0.200 < 0.0001	0.172 < 0.0001
<i>ERC coefficient</i>									0.551 < 0.0001

and other earnings quality proxies such as timely loss recognition, smoothness, and target beating. Disentangling the role of fundamental performance from the role of the measurement system is a challenge in interpreting the convergence (and divergence), and we encourage further research to clarify the role each plays in the documented findings.

### 3. Evidence on the individual proxies for earnings quality

Up to this point, we have drawn only broad conclusions about the literature taken as a whole. We now provide a discussion of the specific proxies for earnings quality. We discuss three categories of EQ proxies—properties of earnings, investor responsiveness to earnings (i.e., ERCs), and external indicators of earnings misstatements. We discuss the use of each proxy for earnings quality and summarize the evidence from studies that examine its determinants or consequences. Exhibit 1 lists each of the earnings quality proxies and reports the most common specification(s) of the variable. The exact specification of the measures can vary by study. Exhibit 1 also summarizes the theory for the use of each measure as a proxy for quality and provides an abbreviated summary of its strengths and weaknesses. The discussions of specific papers that support these summary conclusions follow in Sections 3.1–3.3. There is no common theme to the organization of the sections. Each section is organized according to the issues that are important to the specific proxy.

#### 3.1. Properties of earnings

The properties of earnings that we examine include earnings persistence (Section 3.1.1), abnormal accruals derived from modeling the accrual process (Section 3.1.2), earnings smoothness (Section 3.1.3), asymmetric timeliness and timely loss recognition (Section 3.1.4), and target beating (Section 3.1.5). The “target beating” studies use measures of earnings relative to any target (or benchmark) as a proxy for earnings quality.

##### 3.1.1. Earnings persistence

Although our definition of earnings quality is decision usefulness in general, much of the research on persistence focuses on the usefulness of earnings to equity investors for valuation. There are two broad streams to this research. The first stream is motivated by an assumption that more persistent earnings will yield better inputs to equity valuation models, and hence a more persistent earnings number is of higher quality than a less persistent earnings number. The goal

**Exhibit 1**

Summary of earnings quality proxies

Exhibit 1 lists the earnings measures identified in the review as commonly used proxies for or indicators of earnings quality and the most common specification(s) of the variable. The exact specification of the measures can vary by study. For each measure, we summarize the theory for its use as an indicator of quality and we provide an abbreviated summary of its strengths and weaknesses. The discussions of specific papers that support these summary conclusions are in Section 3.

Empirical proxy	Theory	Strengths and weaknesses
<p><b>Persistence</b>  <math>Earnings_{t+1} = \alpha + \beta Earnings_t + \varepsilon_t</math>  <math>\beta</math> measures persistence</p>	<p>Firms with more persistent earnings have a more “sustainable” earnings/cash flow stream that will make it a more useful input into DCF-based equity valuations</p>	<p><i>Pros:</i> Fits well with a Graham and Dodd view of earnings as a summary metric of expected cash flows useful for equity valuation.  <i>Cons:</i> Persistence depends both on the firm’s fundamental performance as well as the accounting measurement system. Disentangling the role of each is problematic. Persistence may be achieved in the short run by engaging in earnings management</p>
<p><b>Magnitude of accruals</b>  <math>Accruals = Earnings_t - CF_t</math>  <math>Accruals = \Delta(\text{noncash working capital})</math>  <math>Accruals = \Delta(\text{net operating assets})</math>            Specific accrual components</p>	<p>Extreme accruals are low quality because they represent a less persistent component of earnings</p>	<p><i>Pros:</i> The measure gets directly at the role of an accruals-based accounting system relative to a cash-flow-based system  <i>Cons:</i> Fundamental performance is likely to differ for firms with extreme accruals versus less extreme accruals. Thus the lower persistence of the accrual component could be driven by both fundamental performance and the measurement rules</p>
<p><b>Residuals from accrual models</b>            Error term from regressing accruals on their economic drivers (see Exhibit 2)</p>	<p>Residuals from accrual models represent management discretion or estimation errors, both of which reduce decision usefulness</p>	<p><i>Pros:</i> The measure attempts to isolate the managed or error component of accruals. The use of these models has become the accepted methodology in accounting to capture discretion  <i>Cons:</i> Tests of the determinants/consequences of earnings management are joint tests of the theory and the abnormal accrual metric as a proxy for earnings management            Correlated omitted variables associated with fundamentals, especially performance, are of concern given the dependence of normal accruals on fundamentals and the endogeneity of the hypothesized determinants/consequences with the fundamentals</p>
<p><b>Smoothness</b>  <math>\sigma(Earnings) / \sigma(Cash\ flows)</math>            A lower ratio indicates more smoothing of the earnings stream relative to cash flows</p>	<p>Smoothing transitory cash flows can improve earnings persistence and earnings informativeness. However, managers attempting to smooth permanent changes in cash flows will lead to a less timely and less informative earnings number</p>	<p><i>Pros:</i> Income smoothing appears to be a common corporate practice in many countries around the world  <i>Cons:</i> It is difficult to disentangle smoothness of reported earnings that reflects smoothness of the (i) fundamental earnings process; (ii) accounting rules; and (iii) intentional earnings manipulation</p>
<p><b>Timely loss recognition (TLR)</b>  <math>Earnings_{t+1} = \alpha_0 + \alpha_1 D_t + \beta_0 Ret_t + \beta_1 D_t \times Ret_t + \varepsilon_t</math>            where <math>D_t = 1</math> if <math>Ret_t &lt; 0</math>. A higher <math>\beta_1</math> implies more timely recognition of the incurred losses in earnings.</p>	<p>There is a demand for TLR to combat management’s natural optimism. TLR represents high quality earnings</p>	<p><i>Pros:</i> Aims at disentangling the measurement of the process from the process itself by assuming that returns appropriately reflect fundamental information  <i>Cons:</i> The net effect of TLR on earnings quality is unknown because TLR results in lower <i>persistence</i> during bad news periods than during good news periods (Basu, 1997). Both persistence and TLR affect the decision usefulness of earnings. TLR is a return-based metric; see comments on ERCs</p>
<p><b>Benchmarks</b></p> <ul style="list-style-type: none"> <li>• Kinks in earnings distribution</li> <li>• Changes in earnings distribution</li> <li>• Kinks in forecast error distribution</li> <li>• String of positive earnings increases</li> </ul>	<p>Unusual clustering in earnings distributions indicates earnings management around targets. Observations at or slightly above targets have low quality earnings</p>	<p><i>Pros:</i> The measure is easy to calculate, the concept is intuitively appealing, and survey evidence suggests earnings management around targets  <i>Cons:</i> In addition to statistical validity issues, evidence that kinks represent opportunistic earnings management is mixed, with credible alternative explanations including non-accounting issues. It is difficult to distinguish firms that are at kinks by chance versus those that have manipulated their way into the benchmark bins</p>
<p><b>ERCs</b>  <math>Ret_t = \alpha + \beta(Earnings\ Surprise_t) + \varepsilon_t</math>            More informative components of earnings will have a higher <math>\beta</math>.</p>	<p>Investors respond to information that has value implications. A higher correlation with value implies that</p>	<p><i>Pros:</i> The measure directly links earnings to decision usefulness, which is quality, albeit specifically in the context of equity valuation decisions</p>

Exhibit 1 (continued)

Empirical proxy	Theory	Strengths and weaknesses
More value relevant earnings will have a higher $R^2$	earnings better reflect fundamental performance	<i>Cons:</i> Assumes market efficiency. In addition, inferences are impaired by correlated omitted variables that affect investor reaction (including endogenously determined availability of other information), measurement error of unexpected earnings, and cross-sectional variation in return-generating processes
<b>External indicators of earnings misstatements</b>		
<ul style="list-style-type: none"> <li>• AAERs identified by SEC</li> <li>• Restatements</li> <li>• SOX reports of internal control deficiencies</li> </ul>	Firms had errors (AAERs and restatement firms) or are likely to have had errors (internal control deficiencies) in their financial reporting systems, which implies low quality	<i>Pros:</i> Unambiguously reflect accounting measurement problems (low Type I error rate). The researcher does not have to use a model to identify low quality firms <i>Cons:</i> For AAERs: small sample sizes, selection issues, and matching problems due to Type II error rate. For restatements and SOX firms: problems with distinguishing intentional from unintentional errors or ambiguities in accounting rules that lead to errors

of the studies is to identify financial characteristics associated with persistent earnings. These studies are limited in their contribution to evaluating persistence as a proxy for earnings quality because of the maintained assumption that more persistent earnings are more decision useful for equity valuation. Therefore, a second stream of research attempts to address the broader issue of whether earnings is decision useful in that it improves equity valuation outcomes. This line of research is discussed in Section 3.1.1.3. An important issue in this literature is the benchmark used to evaluate the equity market outcomes.

Related to the first stream of research, a simple model specification estimates earnings persistence as:

$$Earnings_{t+1} = \alpha + \beta Earnings_t + \varepsilon_t \quad (1a)$$

Earnings are typically scaled by assets, although some researchers examine margins (scale by sales) or scale by the number of shares. A higher  $\beta$  implies a more persistent earnings stream. Intuitively, the logic behind earnings persistence being a quality metric is as follows: If firm A has a more persistent earnings stream than firm B, in perpetuity, then (i) in firm A, current earnings is a more useful summary measure of future performance; and (ii) annuitizing current earnings in firm A will give smaller valuation errors than annuitizing current earnings in firm B. Thus higher earnings persistence is of higher quality when the earnings is also value-relevant.

A common extension is to decompose total earnings into components and determine whether such a decomposition helps in predicting earnings persistence. An instrumental paper in this area of research is Sloan (1996) who decomposes total earnings into the cash flow component and total accruals:

$$Earnings_{t+1} = \alpha + \beta_1 CF_t + \beta_2 Accruals_t + \varepsilon_t \quad (1b)$$

and documents that  $\beta_2 < \beta_1$ , which implies that the cash flow (CF) component of earnings is more persistent than the accrual component. The literature has evolved to further examine the persistence of the *components* of total accruals and cash flows. A further extension is to determine whether other financial statement elements or variables beyond the financial statements (e.g., disclosures from the footnotes) are incremental over current earnings in predicting future earnings:

$$Earnings_{t+1} = \alpha + \delta_1 Earnings_t + \delta_2 Financial\ statements\ components + \delta_3 Other\ information_t + \varepsilon_t \quad (1c)$$

This evolution from the analysis of the persistence of total earnings to the persistence of cash flows versus accruals to the persistence of components of cash flows and accruals occurred in both the literatures that studied the determinants of persistence and the consequences of it as will be discussed below.

Before we examine the literature on accruals as a determinant of persistence, however, we note one area of the literature on persistence that requires more extensive study in order to make a reasonable evaluation of persistence as a measure of quality. We have limited evidence on the extent to which the persistence of a firm's fundamental performance affects the persistence of reported earnings. Our definition of reported earnings emphasizes that the earnings properties are determined both by fundamental performance and by the accounting system. This is consistent with the notions expressed in the Graham and Dodd definition of quality, which acknowledges that persistence is likely to be driven to a large extent by the business in which the firm operates. We believe that it would be interesting to distinguish the relative contributions of fundamental performance ( $X$ ) versus the measurement rule ( $f$ ) on the persistence of reported earnings. An example of a study that takes a very direct approach to evaluating the role of fundamental performance on persistence is Lev (1983), who associates persistence with product type, industry competition, capital intensity, and firm size.<sup>13</sup> Other

<sup>13</sup> Early studies that analyzed the statistical process that underlies earnings include Foster (1977); Watts and Leftwich (1977); Albrecht et al. (1977); Beaver (1970); and Griffin (1977). Baginski et al. (1999) emphasize that time-series modeling assumptions can create significant differences in parameter estimates, and lead to different economic conclusions about persistence. They argue that the relations documented in Lev (1983) are weak when

examples include studies that investigate whether earnings are more sustainable for firms that follow a differentiation strategy associated with higher margins and lower turnover versus a cost leadership strategy associated with lower margins and higher turnover (e.g., Nissim and Penman, 2001; Fairfield and Yohn, 2001; Soliman, 2008). Overall, the results suggest that creating barriers to entry by having a technology that allows the firm to sell its product at lower cost is more sustainable than creating a unique product that is sold at high margins. The benefits of cost leadership are likely to depend on the industry the firm operates in, growth, competition, and the proportion of costs that are fixed. Future research can attempt to better identify and isolate those circumstances and their implications for earnings persistence.

*3.1.1.1. Determinants of earnings persistence.* Accruals as a component of earnings are the most studied determinant of persistence. One confusing aspect of this area of research, particularly for Ph.D. students as they enter the field, is that the definition of “accruals” has changed over time. In early research done prior to mandatory reporting of the statement of cash flows, accruals were frequently defined as non-cash working capital and depreciation. These numbers were backed out of the statement of working capital or the balance sheet. Sloan (1996), Jones (1991), and Healy (1985) use this type of definition of accruals. Since the introduction of the statement of cash flows, accruals are more often defined as the difference between earnings and cash flows where cash flows are obtained from the statement of cash flows. The motivation for the use of this measure stems from research by Hribar and Collins (2002), who suggest that this definition mitigates error induced by mergers and acquisitions.

The definition of accruals is still evolving. Realizing that all balance sheet accounts (except cash) are the result of the accrual accounting system, Richardson et al. (2005) provide a more comprehensive measure of accruals (intuitively, the change in net operating assets other than cash) with the change in the cash balance reflecting “cash earnings.” This definition is more consistent with research that assumes clean surplus (often necessary for research focusing on valuation) since it is necessary to reconcile the change in equity from the balance sheet with earnings and dividends (see Ohlson, 2010). Mergers and acquisition and other non-cash transactions result in a wedge between numbers reported in the statement of cash flows and changes in consecutive balance sheet accounts. These differences could be relevant for forecasting future cash flows or future earnings. For example, increases in inventory that are the result of an acquisition will not be reflected in changes in inventory reported in the statement of cash flows. However, such increases, which could be relevant for predicting future write-offs, would be reflected in the change in inventory from consecutive balance sheets. Future research could therefore consider the circumstances when it is better to calculate accruals from the balance sheet versus accruals from the statement of cash flows.

Armed with this caveat about the definition of accruals, and keeping in mind the maintained assumption of the studies that more persistent earnings are more decision useful inputs to equity valuation models, we start with a discussion of the association between *accruals* and persistence.

One explanation for the lower persistence of the accruals component as documented by Sloan (1996) is that it is the result of measurement problems with the accounting system ( $f$ ), either because of how it reflects fundamental performance or because of the discretion allowed in the accounting system. However, other research has argued instead that the lower persistence of accruals is related to the effect of fundamental performance ( $X$ ) on persistence and in particular growth in fundamental performance. For example, Fairfield et al. (2003a) argue that there are diminishing marginal economic returns to increased investment, suggesting that as industries expand it is more difficult to maintain the same sales price on goods, so prices drop, which then affects profit margins.<sup>14</sup> Fairfield et al. show that the change in PPE has similar implications for earnings persistence as working capital accruals, and they interpret this finding as evidence that growth explains the lower persistence of accruals.

This inference is based on the assumption that growth in PPE proxies for fundamental expansion and that it is not itself an accrual. But the change in PPE on the balance sheet is a product of the accrual accounting system, and it represents both fundamental expansion ( $X$ ) and *measurement* of fundamental expansion ( $f$ ). Thus their results do not unequivocally support the diminishing returns story. There are several alternative explanations for the decline in future return on assets: (a) a decline in sales prices (as suggested by the diminishing returns story), (b) an increase in costs that then causes a decline in margins, or (c) a decline in efficiency (turnover ratios) that then affects margins. An example will help clarify the issue. If a firm grows its asset base and depreciates it too slowly or over-capitalizes assets (e.g., Worldcom), then future “return-on-assets” measured using the accounting system could decline relative to current rates of return due to the growth in “assets” rather than a decline in the price for which goods are sold.

The fact that we require a measure of the unobservable  $X$  in order to operationalize empirical tests of the source of persistence in cash flows and accruals, and that most measures will use outputs from the accounting system, is a problem that is difficult to resolve. When growth is measured as the change in net operating assets, there is no difference between “accruals” and growth. Other proxies for “growth” such as the increase in PPE or sales revenue, as well as market-to-book

(footnote continued)

persistence metrics from lower-order time series models are used but exist when the measure of persistence is based on a differenced, higher order model.

<sup>14</sup> Richardson et al. (2006), however, point out that while Fairfield et al. (2003a) measure growth at the firm level, the Stigler (1963, p. 54) reference to the role of diminishing returns is made at the industry level. Therefore, Fairfield et al.’s argument requires firm-level growth to influence industry-level output either because the firm is a large proportion of the industry or because there is strong correlation of growth within the industry.

ratios, are also measured via the outputs of the accrual accounting system. Thus, they are not measures of  $X$  independent of the measurement system. We believe that thoughtfully designed tests that analyze proxies for growth in fundamental performance ( $X$ ) with different measurement implications in earnings will help make progress in this area of research.

For example, Richardson et al. (2006) argue that if accruals reflect real investment growth, then the growth will lead to higher sales, whereas if accruals increase with no change in sales, then this finding would suggest that the accrual increase is due to declines in efficiency either because of accounting distortions or the less efficient use of capital. The diminishing marginal returns explanation for accruals predicts a relation between accrual increases and sales growth but does not predict a relation between accrual increases and declines in efficiency. They decompose the change in net operating assets (total accruals) into a growth component, measured by sales growth, and an efficiency component, measured by the net operating asset turnover ratio, and an interaction effect. They show that firms with high accruals have an increase in sales (consistent with the diminishing returns story) and a decrease in efficiency (consistent with the measurement error story). They interpret their findings as evidence that the lower persistence of earnings in high accrual firms cannot be purely due to high (fundamental) growth firms facing diminishing economic margins for their products. In addition, they show that extreme accrual firms are more likely to be subject to SEC enforcement releases, further suggesting that measurement problems are a contributing factor to the lower earnings persistence. Nissim and Penman (2001) also provides insights in this area. They decompose return on assets into an operating leverage component and a financial leverage component. They suggest that an increase in operating leverage is likely to depress current earnings but lead to future improvements in earnings. An increase in financial leverage, however, tends to have an incrementally negative effect on future earnings (scaled by equity).

Zhang (2007) is another example of research that attempts to differentiate the effects of growth in  $X$  from the accruals that measure it. He investigates whether the low earnings persistence of extreme accruals firms reflects growth using growth proxies other than those measured by the accounting system (e.g., employee growth).<sup>15</sup> His focus, however, is on the mispricing aspect of the accrual anomaly. He does not include a regression with cash flows, accruals and employee growth as independent variables and future earnings as the dependent variable and then show that accruals have a coefficient equal to that of cash flows after controlling for growth. Therefore, his tests do not directly address whether “growth” explains the lower persistence of the accrual component of earnings.

It is important to highlight the interpretation of the lower persistence of the accrual component relative to the cash component of earnings, since it is an issue that we will return to in later sections of the paper. The lower persistence of the accrual component *does not* imply that accruals are not useful. The result simply tells us that when earnings are composed predominantly of accruals, they will be less persistent than when earnings are composed predominantly of cash flows. Interpreting this result as evidence that accruals do not improve earnings quality, however, does not allow accruals to be decision useful except through their impact on persistence. To clarify, researchers have shown that earnings produce smaller forecast errors than cash flows in valuation models, that earnings are more strongly associated with stock returns than are cash flows, that earnings are more persistent than cash flows, and that earnings are less volatile than cash flows (see Section 3.1.1.3). Such results suggest that accruals can improve the decision usefulness earnings despite the fact that they have lower persistence. Thus the lower persistence of the accrual component of earnings should be put in context. Accrual adjustments are useful, even though factors such as measurement error, managerial discretion, and growth affect their relation to persistence.

Having decomposed earnings into total accruals and cash flows, another natural direction for the literature to take is to examine the specific *types of accruals* that are more or less persistent.<sup>16</sup> Richardson et al. (2005) decompose the financial statements into short and long-term operating assets and liabilities and financial assets and liabilities. They show that short-term accrual components are less persistent than long-term components and that financial accruals are more persistent than operating accruals. They interpret this evidence as consistent with reliability and measurement error concerns being greater for operating assets and, in particular, greater for short-term operating assets than for financial assets.

Other studies have focused on decomposing working capital accruals into receivables and inventory. Two examples of studies in this area are Lev and Thiagarajan (LT) (1993) and Abarbanell and Bushee (AB) (1997). Both studies examine a variety of accruals; we focus our discussion only on the results for inventory and accounts receivable. With respect to accounts receivable accruals, the studies find conflicting evidence. Lev and Thiagarajan (1993) find a *negative* relation between abnormal accounts receivable (i.e., receivables changes less sales changes) and contemporaneous returns, and they interpret this result as evidence that disproportionate receivables changes indicate difficulties in selling the firm's products, related credit extensions, and premature revenue recognition.<sup>17</sup> Abarbanell and Bushee (1997), however, find an unexpectedly *positive* relation between abnormal receivables and one-year ahead earnings changes, which they interpret as evidence that receivables growth indicates sales growth and not reliability or customer collection problems. The point of discussing this example is that we learn little about earnings quality from it because of the conflicting results, yet we could not find research that attempts to reconcile the evidence.

With respect to inventory accruals, LT and AB find that firms with indicators of poor quality inventory accruals have *positive* future changes in EPS (Abarbanell and Bushee, 1997) and contemporaneous returns (Lev and Thiagarajan, 1993).

<sup>15</sup> Zhang (2007) provides a useful discussion of the issue we raised previously about the fact that researchers' measures of “growth” are generally based on variables like sales growth, which are themselves products of the accounting system.

<sup>16</sup> See Melumad and Nissim (2008) for a detailed analysis of specific accrual line items.

<sup>17</sup> LT also find no relation between the abnormal component of the provision for doubtful receivables and contemporaneous returns, which they describe as surprising.

Moreover, Thomas and Zhang (2002) document that the change in inventory is the strongest driver of accrual anomaly hedge returns.<sup>18</sup> However, they do not directly investigate whether changes in inventory had a lower coefficient than other accrual components in the persistence regression (1b or 1c). Recent work by Allen et al. (2009) suggests that inventory accruals result in less persistent earnings because of measurement error related to the write-downs of inventory. This suggests that measurement error plays a role in the lower persistence of the inventory component.

Researchers have also specifically analyzed the role of write-downs and other accrual type adjustments that result in special items. The general finding is that special items are accrual adjustments that reduce the persistence of earnings and also explain the lower persistence of the accrual component (Fairfield et al., 1996; Nissim and Penman, 2001; Dechow and Ge, 2006; Allen et al., 2009). Again this result should be put in context. Special items may not be helpful for predicting future earnings, since they are by their nature transitory. However, they could be very relevant for evaluating management's performance and prior decision-making.<sup>19</sup>

There are also studies that have investigated the role of other information in predicting earnings persistence. For example, Li (2008) documents that firms that have more readable financial reports have more persistent earnings. He recognizes causality as an unanswered question, and acknowledges that the explanation for the relation is beyond the scope of his paper. The causality is an interesting question. Is it that a firm with a more stable business model, that as a consequence has more persistent earnings, has less detail to discuss in their financial reports? Or is it that a less readable financial report is indicative of management that is engaging in earnings management through complex transactions or other accounting shenanigans that they then need to explain (in a complicated way to hide the earnings management) that subsequently leads to earnings reversals and less persistent earnings?

Likewise, researchers have investigated the role of earnings persistence in management guidance. The results generally suggest that managers of firms with more volatile earnings are less likely to provide guidance (see, for example, Verrecchia, 1990; Waymire, 1985), although in the empirical analysis, the causality is not always easy to determine. Thus the role of other information and the causality links to persistence appear to be interesting areas for future research.

**3.1.1.2. Consequences of persistence.** The vast majority of papers on consequences of persistence examine equity market consequences. Only a few papers discuss consequences that we refer to collectively as other-than-equity-market consequences.<sup>20</sup>

*Equity market consequences:* Researchers hypothesize two distinct equity market consequences of persistence. The first prediction is that more persistent earnings will yield a higher equity market valuation and, therefore, that increases in estimates of persistence will yield positive (contemporaneous) equity market returns. Early research by Kormendi and Lipe (1987), Collins and Kothari (1989), and Easton and Zmijewski (1989) provide evidence that more persistent earnings have a stronger stock price response.

The second prediction concerning equity market consequences relaxes the assumption of market efficiency and takes a financial analysis perspective. Specifically, the researcher attempts to use variables to help predict earnings persistence and then investigates whether investors are aware of the differential impact of the variables on earnings persistence. The review by Richardson et al. (2010) focuses on examining accounting-based anomalies and their underlying causes, so we do not go into detail in this review. For our purposes, a key result is that of Sloan (1996), who shows that investors are not fully aware of the differing persistence levels of the accrual and cash flow components of earnings. Sloan (1996) documents that a hedge trading strategy that is long in low accrual firms and short in high accrual firms earns approximately a 12% return per year. Subsequent studies have provided several explanations for the hedge returns (the accrual anomaly) including (i) investor misunderstanding of abnormal accruals (Xie, 2001); (ii) investor misunderstanding of errors in accruals or reliability (Richardson et al., 2005; Hirshleifer and Teoh, 2003); (iii) investor misunderstanding of the growth reflected in accruals (Desai et al., 2004; Fairfield et al., 2003a; Zhang, 2007); and (iv) mismeasurement of expected returns or other research design issues (Khan, 2008; Kraft et al., 2006).

Studies further disaggregate accruals and examine how specific accruals relate to earnings persistence and the implications for investors. One area that has been extensively examined is the implications of *write-offs* (i.e., large negative special items) for earnings persistence. Bartov et al. (1998) summarize the findings from the literature on write-offs through 1998. The early research documented negative stock market reactions to the announcement of special items, but the negative reactions were small (around 1%), and announcement period returns were positive if the write-off was associated with a restructuring or an operational change. Bartov et al. (1998) question the small stock price response at the announcement date and examine a sample of 317 write-offs in 1984 and 1985. They find annualized negative abnormal returns of –21% over a two-year period following the announcements of the write-off, robust to various risk adjustments. Dechow and Ge (2006), however, find that firms with large negative accruals driven by special items have positive future returns, which suggests that investors tend to overweight special item accruals. The contrasting results could stem from the way that special items

<sup>18</sup> LaFond (2005) also documents that inventory accruals explain hedge returns in 13 out of 17 countries.

<sup>19</sup> Researchers have also focused on the cash flow component and identified the drivers of its higher persistence (relative to the accrual component). Dechow et al. (2008) show that retained cash flows have implications for persistence similar to those of accruals. Cash flows related to the payment or issuances of equity are the major determinant of the higher persistence of the cash flow component of earnings relative to accruals.

<sup>20</sup> Francis et al. (2005a) find that firms with more persistent earnings have a lower cost of debt and equity capital. Francis et al. (2005a) examine the consequences of other EQ proxies as well, and it is part of a larger literature that requires more extensive discussion due to some methodological issues. Therefore, we leave a detailed discussion of this study to Section 6, where we cover the literature on the impact of earnings quality on the cost of capital.

affect future earnings. If managers take big baths that set them up for healthy rebounds that are not predicted by investors, then future returns could be positive (see also McVay, 2006). In contrast, if a firm continues to take future write-downs and write-offs and the special item is the first of a series such that more bad news could follow, then future returns could continue to decline if the news is unanticipated by investors. In summary, the reason for the write-off, a choice variable, is an important factor in understanding whether the effect of the write-off on persistence improves or hinders decision-usefulness.

A further group of studies of the consequences of accruals examines *industry-specific loss accruals*. Beaver and Engel (1996) find that the normal component of banks' allowances for loan loss reserves is negatively priced and the abnormal component is incrementally positively priced. They interpret the positive coefficient on abnormal accruals as follows: "... positive effects on security prices can occur because discretionary behavior alters the market's assessment of the expected net benefits of discretionary behavior or conveys management's beliefs about the future earnings power of the bank." Beaver and McNichols (2001) find that investors correctly price the loss reserve accrual even though they incorrectly price other accruals in a manner consistent with Sloan (1996). Their finding suggests that the extensive disclosures about loss reserve accruals of P&C insurers help investors to estimate the persistence and valuation implications of this component. This result is consistent with the findings discussed above that the accrual anomaly is less likely to occur when investors are more informed, suggesting that the persistence associated with this particular accrual is decision useful.

Another element of the research on investor responsiveness to earnings persistence focuses on specific activities and the implications of their accounting treatment for future earnings. For example, investors appear to view expensed R&D expenditures as assets, but they do not perfectly price the full implications of the R&D investment (Lev and Sougiannis, 1996). In addition, investors do not appear to be fully aware that a cut in R&D will temporarily boost current earnings at the expense of future earnings (Penman and Zhang, 2002). Ge (2007) finds that information in footnote disclosures on the growth in leases is incrementally useful over accruals for predicting the persistence of earnings. However, investors do not fully incorporate these implications about earnings persistence into prices. In a similar vein, Lee (2010) finds that information reported in management's discussion and analysis on future purchase obligations is useful for predicting future sales and earnings but that this information is not fully incorporated into prices. Interestingly, his paper helps identify high accrual firms that will continue to report superior performance.

Research that examines the treatment of specific transactions/activities helps us better understand the implications of accounting rules for valuation. This type of research provides a fruitful way for researchers to distinguish the role of fundamental performance ( $X$ ) from the measurement system ( $f$ ) used to report a transaction/activity.

Finally, researchers have examined whether equity market consequences of the persistence of the accrual component of earnings vary with an investor's information processing ability or with the availability of other information. The motivation for this research is to understand if investors who are more informed about the accrual component and its implications for the persistence of earnings price earnings correctly. Generally, the take-away from this line of research is that more informed investors better process the information in the financial statements, which results in less mispricing. Heterogeneity in investor informedness may be related to a characteristic of the investor, either due to exogenous information endowments or due to the investor's endogenous information acquisition activities. Heterogeneity may also be related to a characteristic of the firm, either due to an exogenous feature of the financial reporting system that affects its ability to provide value-relevant information or due to the firm's endogenous information production decisions, including its decisions to manage earnings or make voluntary disclosures.

Some examples of such studies include the following: Louis and Robinson (2005) who find that stock split announcements add credibility to accruals; Levi (2008) who finds that the accrual anomaly exists only for firms that delay the release of accrual information to their 10-Q and do not include cash flow and balance sheet information in press releases; and Collins et al. (2003) who find that firms with a high level of institutional investors and a minimum threshold level of active institutional traders have stock prices that more accurately reflect the persistence of accruals. Another example is Richardson (2003), who finds *no* evidence that short-sellers are clustered in high-accrual firms. However, his sample period is 1990–1998, and the accrual anomaly did not become widely known until after the publication of Sloan (1996). Therefore, short-sellers may not have been trading on the accrual anomaly prior to 1996. Consistent with this interpretation, Green et al. (2010) find that returns to the accrual anomaly have declined over time, particularly after the publication of Sloan (1996). In summary, if researchers use the behavior of *informed* investors as a benchmark for evaluating the decision usefulness of earnings persistence, there is evidence supporting the assumption that persistence is a decision useful characteristic of earnings.

*Other than-equity-market consequences:* The evidence on whether greater persistence is of higher quality for other decision users is limited. This is perhaps not surprising given the maintained assumption that persistence is a useful attribute for investors because it makes earnings a more useful input into *equity* valuation models. Motivating persistence as a decision useful property of earnings in other decision contexts requires a decision-specific explanation.

Two papers examine *compensation decisions* as a function of earnings persistence. Baber et al. (1998) find that earnings persistence increases the positive relation between unexpected earnings and the annual change in various components of compensation. In other words, compensation is more sensitive to earnings when earnings are more persistent. Thus, conditional on the compensation contract containing a variable cash component, more persistent earnings are more decision useful to compensation committees in establishing total compensation. Nwaeze et al. (2006) find that firms with less persistent earnings have lower weight placed on earnings relative to cash flows in compensation. This result implies that compensation committee's decisions are affected by earnings persistence, and thus persistence is decision useful information. Both papers attempt to distinguish persistence driven by firm fundamental performance from persistence

associated with accounting measurement. Nwaeze et al. (2006) measure earnings persistence relative to cash flow persistence. Baber et al. (1998) include stock returns in the model. However, not all papers find that compensation committees adjust compensation based on the reliability of earnings components. For example, Gaver and Gaver (1998) find that managers are compensated for gains, while losses are ignored. In summary, while compensation committees appear to recognize that earnings persistence is a useful attribute for rewarding executives, the context appears to be important.

Evidence on consequences other than compensation is limited. Bradshaw et al. (2001) document that sell-side analysts' forecasts do not fully incorporate the predictable earnings declines associated with high-accrual firms. In addition, high-accrual firms are not more likely to get qualified *audit opinions* or to have auditor changes. Bradshaw et al. confirm that the high-accrual firms indeed have subsequent earnings declines. Thus, they interpret their findings as evidence that analysts and auditors do not appear to be aware of quality issues for high-accrual firms. Bhojraj and Swaminathan (2007) find that, like equity investors, *bond investors* misprice high and low accrual firms. These results suggest that stakeholders other than equity investors can also misunderstand earnings persistence. We view this evidence (together with equity market mispricing) as suggesting that rule making is important. How accounting rules are designed and their subsequent impact on earnings persistence (as a proxy for quality) have consequences for many decision users.

**3.1.1.3. Linking earnings persistence to equity valuation.** Up to this point we have focused on earnings persistence studies that are motivated by the maintained assumption that a more persistent earnings number is indicative of higher earnings quality. In particular, when earnings are more persistent and sustainable, it is assumed to better indicate future cash flows, and so be a more useful input for valuation. However, a quagmire for researchers is that predicting next period's earnings is not equivalent to predicting the stream of future cash flows. Ultimately, for earnings to be of high quality, we would want it to reflect this future cash flow stream, rather than just next period's earnings. What if current cash flows were actually a better indicator of the future cash flow stream than current earnings? Such a result would reduce the validity of earnings persistence as a quality proxy. Therefore it is important to know whether earnings are actually more value relevant than cash flows because this in turn supports research examining earnings persistence as a desirable quality attribute.

The difficult research design issue is how to measure the "true" value of the firm based on the expected future cash flow stream since it is not observable. The use of actual future cash flows is problematic due to problems with survival biases. The use of short-term cash flows is problematic because these may be a poor and untimely indicator of expected future cash flows, particularly in growth firms. The use of future earnings (aggregated over several years) is also problematic for the same reasons. Finally, the use of market values and stock returns is problematic because it assumes market efficiency. If investors fixate on earnings, then earnings could be found to be superior even when they are not a better indicator of future cash flows. The use of future market values is also problematic because of survival biases. Therefore, all approaches have shortcomings, so it is interesting to determine whether results are consistent or inconsistent across different proxies of fundamental value. We discuss the different approaches below.

Penman and Sougiannis (1998) compare earnings to cash flows as summary inputs into various valuation models. They conclude that over various time horizons, in models with and without a terminal value assumption, models that apply simple forecasting assumptions to earnings provide a better forecast of current market value than models based on cash flow or dividend forecasts.<sup>21</sup> Thus unconditionally, accruals appear to improve the ability of earnings to reflect value relative to cash flows. They document firm characteristics that affect the decision usefulness of the models. One important conclusion of their analysis is that the more that the valuation is weighted towards the terminal value assumptions, the larger are forecast errors using any valuation approach. Consider high growth firms that are not paying dividends, have negative cash flows (due to investments), and have low earnings (due to expensing of investments such as R&D). In these firms most of the valuation will be driven by assumptions concerning the terminal value. As a consequence, the valuation will be subject to considerable measurement error because neither cash flow nor earnings-based inputs are very good at reflecting future cash flows. In such firms earnings persistence is also likely to be low.

Another approach that researchers have used is to examine the relation between contemporaneous stock returns and various fundamental attributes such as earnings before and after depreciation (Ball and Brown, 1968) or earnings and cash flows (Dechow, 1994). Stock-based measures generally find that accruals help improve the ability of earnings to reflect value except when earnings include large write-downs or special items. Thus, using market values as the benchmark yields consistent results. Earnings appear to be a more useful measure than cash flows at reflecting value.

Other researchers have evaluated the relative abilities of earnings and cash flows to reflect expected future cash flows using non-market based measures. However, not surprisingly, given the different measures used to evaluate earnings, and the myriad of approaches used to perform the analysis, results are mixed. For example, some researchers use future cash flows (measured for  $t+1$  or up to  $t+4$ ), while others have used future earnings (aggregated over some period of time). The definition of cash flows varies based on when the study was written (whether the statement of cash flows was in existence). The definition of earnings can also vary (earnings before depreciation and taxes could be compared to bottom line earnings). Barth et al. (2001) find that cash flows are superior to earnings at predicting future cash flows, while

<sup>21</sup> Note that under clean surplus accounting, as long as the same set of forecasting assumptions are applied, a DCF model and a residual income model will yield equivalent valuations (e.g., Penman, 1998; Penman and Sougiannis, 1998; Lundholm and O'Keefe, 2001). The different valuation results obtained in Penman and Sougiannis stem from their research objective being to determine which measures are more useful summary inputs in simple valuation models.

Bowen et al. (1986) find that cash flows do not appear to be superior to earnings. In contrast, Greenberg et al. (1986) find that the predictive ability of aggregate earnings is superior to that of cash flows, while Finger (1994) finds that earnings and cash flows have similar predictive ability for longer horizons, but cash flows are slightly superior to earnings for short horizons. However, cash flow prediction models that disaggregate the working capital and other accrual components of earnings result in lower cash flow forecast errors and improve predictability (Dechow et al., 1998; Barth et al., 2001). Therefore, the results are quite contextual and dependent on research design and variable definitions.

In summary, the objective of this section is to examine research that provides insights into whether earnings persistence is a reasonable proxy for earnings quality. The issue of concern is that current earnings could be a good indicator of next period's earnings, which is what the persistence parameters measure, but that understanding next period's earnings is not decision useful because it does not adequately reflect the future stream of cash flows that the firm will generate. In addition, current cash flows may better predict the expected future cash flow stream even though they may not predict next period's earnings as well as do current earnings. Therefore, validation of earnings usefulness in predicting expected future cash flows helps us better understand benefits and costs of using persistence as a quality proxy. The results from the literature are a little more mixed than one might expect. As noted above, while earnings in general appear to be a reasonable proxy for expected future cash flows, the relation depends on the type of accruals included in earnings.

### 3.1.2. Abnormal accruals and modeling the accrual process

A distinct and significant area of research distinguishes “abnormal” from “normal” accruals by directly modeling the accrual process.<sup>22</sup> The normal accruals are meant to capture adjustments that reflect fundamental performance, while the abnormal accruals are meant to capture distortions induced by application of the accounting rules or earnings management (i.e., due to an imperfect measurement system).<sup>23</sup> These measures attempt to directly capture problems with the accounting measurement system and so are particularly relevant to accounting researchers. The general interpretation is that if the “normal” component of accruals is modeled properly, then the abnormal component represents a distortion that is of lower quality.

Below we discuss various models of accruals (Section 3.1.2.1). An important point to remember when reviewing these models is that the measures of abnormal accruals obtained from the models tend to be positively correlated with the level of accruals. In other words, a firm with *extreme accruals* also has *extreme abnormal accruals*. This observation is important for interpreting results in the literature. The correlation raises concerns about whether abnormal accruals reflect accounting distortions or whether they instead are the result of poorly specified accruals models and include a component that measures fundamental performance.

We first summarize the accruals models that generate a measure of abnormal accruals (Section 3.1.2.1). Next, in Section 3.1.2.2 we discuss the literature on the determinants and consequences of abnormal accruals and persistence. We do not discuss the extensive literature that documents the determinants of abnormal accruals and the consequences to firms and managers that produce abnormal accruals in Section 3.1.2.2. To reduce the amount of repetition we discuss the determinants of abnormal accruals in Section 5 and the consequences in Section 6. Section 3.1.2.2 discusses only the studies that specifically link abnormal accruals to persistence.

**3.1.2.1. Accruals models.** Exhibit 2 summarizes the most widely used accruals models. The focus of our discussion is on the potential of the model to identify abnormal accruals that represent a distortion. Misclassification errors can include Type I errors, which classify accruals as abnormal when they are a representation of fundamental performance (i.e., a false positive), and Type II errors, which classify accruals as normal when they are not. We evaluate each model in terms of its ability to separately identify the normal and abnormal components of accruals and mitigate Type I and Type II errors.

Jones (1991) defines the accrual process (working capital accruals and depreciation) as a function of sales growth and PPE. While sales growth and investment in PPE are reasonable and intuitive drivers of firm value, and the estimation of the Jones model confirms a correlation between these fundamental firm attributes and accruals, the explanatory power of the Jones model is low, explaining only about 10% of the variation in accruals. One interpretation of the low explanatory power is that managers have considerable discretion over the accrual process, which they use to mask fundamental performance. Consistent with the assumption that the residual represents greater discretion, Xie (2001) documents that the residuals from the Jones model have lower predictive ability for year-ahead earnings than the non-discretionary (i.e., “normal”) accruals. However, the residuals are highly (80%) positively correlated with total accruals (Dechow et al., 2003), and they are positively correlated with earnings performance and negatively correlated with cash flow performance (Dechow et al., 1995). These patterns are suggestive of a high Type I error rate. In addition, Dechow et al. (forthcoming) show that discretionary accruals are generally less powerful than total accruals at detecting earnings management in SEC enforcement releases, which indicates that use of the Jones model residuals as a proxy for poor quality accruals due to earnings management is subject to Type II errors.

Dechow et al. (1995) modify the Jones model to adjust for growth in credit sales in an attempt to reduce Type II errors. Credit sales are frequently manipulated; thus this modification increases the power of the Jones model to yield a residual

<sup>22</sup> Abnormal accruals have been the focus of much empirical research in accounting. Almost one hundred papers in our database use “abnormal” accruals generated from an accruals model as a measure of earnings quality. Abnormal accruals have been used as a proxy for earnings quality to test predictions in almost all of the determinants and consequences categories.

<sup>23</sup> We use “discretionary accruals” interchangeably with abnormal accruals, even though it is a somewhat loaded term that seems more associated with an active choice rather than an outcome of the measurement system or error.

**Exhibit 2**

Summary of widely used models of accruals

This table summarizes commonly used models to estimate normal levels of accruals. Residuals from the models are used as a measure of “abnormal” accruals.

Accrual model	Theory	Notes
<b>Jones (1991) model</b> $Acc_t = \alpha + \beta_1 \Delta Rev_t + \beta_2 PPE_t + \varepsilon_t$	Accruals are a function of revenue growth and depreciation is a function of PPE. All variables are scaled by total assets	Correlation or error with firm performance can bias tests. $R^2$ around 12%. Residual is correlated with accruals, earnings and cash flow
<b>Modified Jones model (Dechow et al., 1995)</b> $Acc_t = \alpha + \beta_1 (\Delta Rev_t - \Delta Rec_t) + \beta_2 PPE_t + \varepsilon_t$	Adjusts Jones model to exclude growth in credit sales in years identified as manipulation years	Provides some improvement in power in certain settings (when revenue is manipulated)
<b>Performance matched (Kothari et al., 2005)</b> $DisAcc_t - Matched\ firm's\ DisAcc_t$	Matches firm-year observation with another from the same industry and year with the closest ROA. Discretionary accruals are from the Jones model (or Modified Jones model)	Can reduce power of test. Apply only when performance is an issue
<b>Dechow and Dichev (2002) approach</b> $\Delta WC = \alpha + \beta_1 CFO_{t-1} + \beta_2 CFO_t + \beta_3 CFO_{t+1} + \varepsilon_t$	Accruals are modeled as a function of past, present, and future cash flows given their purpose to alter the timing of cash flow recognition in earnings	$\sigma(\varepsilon_t)$ or absolute $\varepsilon_t$ proxies for accrual quality as an unsigned measure of extent of accrual “errors.” Focuses on short-term accruals does not address errors in long-term accruals
<b>Discretionary estimation errors (Francis et al., 2005a)</b> $TCA_t = \alpha + \beta_1 CFO_{t-1} + \beta_2 CFO_t + \beta_3 CFO_{t+1} + \beta_4 \Delta Rev_t + \beta_5 PPE_t + \varepsilon_t$ $\sigma(\varepsilon_t) = \alpha + \lambda_1 Size_t + \lambda_2 \sigma(CFO)_t + \lambda_3 \sigma(Rev)_t + \lambda_4 \log(OperCycle)_t + \lambda_5 NegEarn_t + v_t$	Decomposes the standard deviation of the residual from the accruals model into an innate component that reflects the firm's operating environment and a discretionary component ( $v_t$ ) that reflects managerial choice	Innate estimation errors are the predicted component from $\sigma(\varepsilon_t)$ regression

that is uncorrelated with expected (i.e., normal) revenue accruals and better reflects revenue manipulation. However, the modified Jones model still suffers from Type I errors, perhaps even more than the original Jones model.<sup>24</sup>

Holthausen et al. (1995) and Kothari et al. (2005) suggest ways to combat concerns about the correlations between performance and the residuals from the Jones model and modified Jones model. They both suggest controlling for the normal level of accruals conditional on ROA. Kothari et al. (2005) identify a firm from the same industry with the closest level of ROA to that of the sample firm and deduct the control firm's discretionary accruals (i.e., residuals) from those of the sample firm to generate “performance-matched” residuals. Because the models of normal accruals that generate the residuals explain only 10–12% of the variation in accruals, this approach is likely to add noise to the measure of discretionary accruals, and it is best applied when correlated performance is an important concern. In addition, the performance matching can extract too much discretion when earnings are being managed, resulting in low power tests.<sup>25</sup>

Taking a different perspective, Dechow and Dichev (2002) view the matching function of accruals to cash flows as being of primary importance and thus model accruals as a function of current, past, and future cash flows because accruals anticipate future cash collections/payments and reverse when cash previously recognized in accruals is received/paid. They focus on short-term working capital accruals and do not attempt to model long-term accruals and their relation to cash flows. The  $R^2$ s from their specification are higher than those of the modified Jones model: 47% at the firm level, 34% at the industry level, and 29% at the pooled level. The standard deviation of the residuals from the model is their proxy for earnings quality. They show that firms with larger standard deviations have less persistent earnings, longer operating cycles, larger accruals, and more volatile cash flows, accruals and earnings; these firms are smaller and are more likely to report a loss. Their findings suggest that these firm characteristics are indicative of a greater likelihood of estimation error in accruals and thus lower accrual quality. Note that the Dechow and Dichev model is unsigned. Using an unsigned

<sup>24</sup> The modified Jones model has many variants and adaptations. DeFond and Jiambalvo (1994) estimate the regression by industry rather than by firm to lessen firm-year requirements. Chambers (1999) suggests adding lagged accruals to the model to capture predictable reversals. Dechow et al. (2003) estimate the normal relation between credit sales and total sales to control for nondiscretionary credit sales. They also add future sales growth to capture accruals made in anticipation of future growth. Their adjustments increase the  $R^2$  from around 9% to 20%. Guay et al. (1996) provide a comparison of various models.

<sup>25</sup> For example, assume ROA is 20% for firms A and B, with firm A using discretionary accruals to boost its ROA by 2% to report 20%. Firm B is not manipulating earnings; it has achieved 20% ROA because it has higher non-discretionary accruals than firm A. Matching firm B to firm A would suggest that firm A's level of non-discretionary accruals should be the same as firm B's, but this match is incorrect since the correct match should be a firm with ROA of 18%.

measure can reduce the power of tests when the researcher predicts accounting distortions in a particular direction (e.g., managers boosting earnings). In addition, their model cannot be used to identify distortions induced by long-term accruals. This is an important limitation of the model because impairments of PPE and goodwill are likely to reflect earnings management or accounting distortions that can be particularly important for evaluating the quality of earnings.

Francis et al. (FLOS) (2005a) modify and extend the Dechow and Dichev model in two ways. First, as suggested by McNichols (2002), they add growth in revenue in an attempt to reflect performance, and they add PPE, which expands the model to a broader measure of accruals that includes depreciation. However, FLOS do not investigate whether these adjustments help or hinder Type I or Type II misclassification errors. The second way they extend the Dechow/Dichev model is to decompose the standard deviation of the residual into firm-level measures of *innate* estimation errors and *discretionary* estimation errors. This allows the authors to make statements about “managerial choices” (i.e., intentional errors) avoided by Dechow and Dichev. Specifically, FLOS (2005) estimate their accruals prediction model by industry-year and calculate the standard deviation of the residuals for each firm  $j$  in year  $t$  [ $\sigma(\varepsilon_j)_t$ ] based on the value of  $\varepsilon_j$  in year's  $t-4$  through year  $t$  (five years). The standard deviation of the residuals  $\sigma(\varepsilon_j)_t$  is a measure of accrual quality (AQ); higher standard deviations are lower quality. To decompose AQ into an innate component and a discretionary component, FLOS model AQ as a function of firm characteristics identified in Dechow and Dichev (2002)

$$\sigma(\varepsilon_j)_t = \lambda_{0,j} + \lambda_{1,j} \text{Size}_{j,t} + \lambda_{2,j} \sigma(\text{CFO})_{j,t} + \lambda_{3,j} \sigma(\text{Sales})_{j,t} + \lambda_{4,j} \text{OperCycle}_{j,t} + \lambda_{5,j} \text{NegEarm}_{j,t} + v_{j,t}$$

The predicted value of  $\sigma(\varepsilon_j)_t$  represents the quality of the accrual system to capture the firm's fundamental performance, and the residual ( $v_{j,t}$ ) represents discretionary accrual quality. Note that the innate characteristics could also reflect estimation errors and corrections, which reduces the power of  $v_{j,t}$  to reflect intention (i.e., a Type I error). Alternatively it could induce bias (in an unknown direction) into the proxy for discretion (Type II error). Further research is needed to evaluate the importance of these concerns.

Finally, we emphasize that all of the accruals models can be estimated at the firm level, which allows variation across firms in the determinants of normal accruals. Firm-level estimation, however, assumes time-invariant parameter estimates and typically imposes sample survivorship biases. The models are therefore most frequently estimated at the industry level. This specification assumes constant coefficient estimates within the industry. Thus, some firms may have large residuals because of variation induced by industry classification rather than because of earnings management or errors. Measurement error in the residual will be related to industry characteristics, which can be a concern in some contexts. For example, the model may have a poorer fit in growth industries, and growth may be correlated with the hypothesized determinant or consequence of accrual quality.

Several studies develop models of specific accruals, often for samples of firms that are homogeneous in a way that allows the researcher to develop a better model of the normal component of an accrual which then generates a less noisy estimate of the abnormal component (i.e., model residual), resulting in more powerful tests. Consider the conflicting evidence in Miller and Skinner (1998) and Schrand and Wong (2003). Both studies model the economic determinants of the valuation allowance for deferred tax assets (DTAs) required under SFAS 109. Miller and Skinner (1998) do not find much evidence of earnings management using the residual from their model estimated for firms with large DTAs. Schrand and Wong (2003), however, are able to find evidence of earnings management using a model of the DTA allowance specifically designed for banks. Of course, the benefits of modeling specific accruals, especially within specific industries, come at the expense of generalizability.

**3.1.2.2. Studies of abnormal accruals and persistence.** Studies of abnormal accruals and persistence yield three general findings. **First**, abnormal accruals have positive persistence, albeit lower than that of non-discretionary accruals. Xie (2001) finds that discretionary accruals have a significantly positive persistence coefficient using the Jones model to decompose accruals into a normal and abnormal component. He finds that the persistence parameters on cash flows, normal accruals, and discretionary accruals are 0.73, 0.7, and 0.57, respectively.<sup>26</sup> Dechow and Dichev (2002) argue that large accrual adjustments are likely to contain more forecasts and involve more estimation. Therefore, earnings in firms with extreme accruals are likely to contain more estimation error that will need to be corrected/reversed in future periods. These error corrections are likely to reduce the persistence of earnings. Holding the magnitude of accruals constant, they show that firms with greater measurement errors (via their accrual quality proxy) have lower earnings persistence. Therefore, the results in both Dechow and Dichev (2002) and Xie (2001) suggest that reliability concerns play a role in explaining why extreme accrual firms have less persistent earnings.

Two studies examine the relation between “accrual errors” and persistence but do not use “abnormal” accruals derived from a model. Doyle et al. (2007a) examine violations under the Sarbanes Oxley Act to identify “abnormal accruals” with the idea that such violations are indicators of measurement error and problems with accruals. They find that firms that disclose at least one material weakness during the 2002–2005 period have less persistent earnings. Richardson et al. (2005)

<sup>26</sup> Return-based studies provide related evidence. Subramanyam (1996) uses the modified Jones model to measure abnormal accruals and finds incremental information content in abnormal accruals, which he interprets as evidence that abnormal accruals are not opportunistic but that they communicate private information about equity value. Also using the modified Jones model to measure abnormal accruals, Chaney et al. (1998) suggest that discretionary accruals smooth earnings, and they interpret their finding as evidence that discretionary accruals are not opportunistic but that they communicate information about the firm's long-term (permanent) earnings to equity markets. Subramanyam (1996) and Chaney et al. (1998) assume that investors are able to isolate the abnormal accrual component. If investors are naïve and fixate on earnings, then a positive stock price reaction could be documented even if the accrual component is not value relevant.

argue that operating assets and liabilities are less reliably measured than financial assets and liabilities. Consistent with their predictions, they find that working capital (operating) accruals have the lowest reliability, accruals related to financial assets and liabilities have the highest reliability, and long-term operating accruals are in the middle. Broadly speaking, they find a positive relation between their *ex ante* reliability rankings and return on assets. Taken together, the results from these studies suggest that measurement and reliability concerns play an important role in why extreme accrual firms have less persistent earnings.

**Second**, investors appear to recognize the distinction between abnormal accruals and normal accruals, but they do not fully incorporate the implications into price. DeFond and Park (2001) find that abnormal accruals suppress the magnitude of market reactions to earnings surprises, suggesting that investors do not find them as reliable as normal accrual components. However, even though investors realize that abnormal accruals are less reliable, they still overreact to the information (i.e., the abnormal accrual component is negatively associated with future stock returns). Xie (2001) finds that the accrual anomaly hedge returns are stronger for hedge portfolios based on abnormal accruals measured using the Jones model.

**Third**, research that examines the complete path from a determinant of abnormal accruals to the consequences for future period earnings have come to a different conclusion than many studies that independently study the links. Consistent with other studies, Bowen et al. (2008) find an association between lax governance and abnormal accruals.<sup>27</sup> Governance quality is measured by an overall governance score and by the “usual suspects” of individual governance characteristics. However, Bowen et al. (2008) also find that the accounting discretion associated with lax governance is *positively* related to future performance (ROA), which they interpret as evidence that abnormal accruals reflect future performance expectations, not opportunism.

Note that the persistence results presented above by Xie (2001) are suggestive of the complete path results documented by Bowen et al. (2008) related to future performance. A lower coefficient on abnormal accruals in a regression such as 1(b) or 1(c) *does not* imply that abnormal accruals are of no relevance for predicting future earnings or have no relevance for valuation. They simply imply that they are *less* relevant than other components of earnings. More research of this type would be useful to distinguish the sources of accrual quality and how they relate across various earnings quality proxies.

### 3.1.3. Earnings smoothness

A basic tenet of an accrual-based earnings system is that earnings smooth random fluctuations in the timing of cash payments and receipts, making earnings more informative about performance than cash flows. While the concepts statements do not state that “smoothness” is necessarily a desirable property of earnings or an objective of the accruals process, SFAC No. 1 does recognize that accrual earnings help mitigate problems associated with a “mismatch” of cash receipts and payments when reporting accounting information for finite periods. In addition, SFAC No. 1 concludes that accrual earnings will provide “... a better indication of an enterprise’s present and continuing ability to generate favorable cash flows than information limited to the financial effects of cash receipts and payments.” Thus, the standard setter’s goal is a representation of fundamental performance that improves cash flow predictability. Smoothness is an *outcome* of an accrual-based system assumed to improve decision usefulness; it is not the ultimate goal of the system.

In assessing smoothness as a measure of earnings quality, we first discuss the conceptual ability of smoothness to reflect decision usefulness absent consideration of a firm’s accounting choices in applying the measurement system. As noted, the standard setters have effectively made the choice to establish an accrual system of accounting rather than a cash-based system. An underlying assumption of the standard setter’s choice is that accrual earnings is a better measure of fundamental performance than is a measurement system based on cash receipts and payments. The assumption that accrual-based earnings will be a better representation of fundamental performance than cash receipts and payments seems intuitive for many business activities, but it is just an assumption. Accruals that lead to smoothness can hide or delay the measurement of changes in fundamental performance, which presumably would be decision useful if revealed. Thus, even absent accounting choice by firms with respect to accounting methods, estimates, or real activities, smoothness is not a *de facto* indication of greater decision usefulness or higher earnings quality.

The next layer to add to the assessment of smoothness as a measure of earnings quality is the impact of a firm’s accounting choices.<sup>28</sup> Empirical studies address two distinct questions. The first question is: When managers have accounting choices that can influence smoothness, do they make choices that result in greater earnings smoothness? The studies that address this question – which are studies of the *determinants* of smoothness – are generally neutral about whether the resulting smoothness is decision useful. They explore whether accounting choices reflect a goal of smoothness, but not whether a goal of smoothness would improve earnings quality. The focus of the determinants studies is on which choices firms make to achieve smoothness and cross-sectional variation in the firms that make these choices.<sup>29</sup> Hence, the evidence from these studies on earnings smoothness as a proxy for earnings quality is indirect at best.

<sup>27</sup> Bowen et al. (2008) use an aggregate index of accounting discretion. The use of abnormal accruals is one component of the index, along with a measure of accrual-based smoothing and the tendency to avoid negative earnings surprises.

<sup>28</sup> See Lambert (1984), Demski (1998), and Kirschenheiter and Melumad (2002) for analytical models of smoothing behavior.

<sup>29</sup> See, for example, White (1970), Dascher and Malcom (1970), Barefield and Comiskey (1971), Barnea et al. (1976), McNichols and Wilson (1988), Moses (1987), Dharan (1987), Chaney et al. (1998), Hand (1989), and Kanagaretnam et al. (2004). Early discussions and analyses of smoothing include Beidleman (1973) and Ronen and Sadan (1975). In the early studies, smoothing is treated as a period-specific accounting choice, thus these papers

The second question that the literature addresses, which is more pertinent to our understanding of smoothness as an indication of quality, is whether the smoothness of a firm's earnings reflects variation in informativeness about fundamental performance. On the one hand, smoother earnings may be more informative if the accrual-based measurement system in the absence of choice and the firm's implementation of an accrual-based system (both of which influence smoothness) better reflect fundamental performance than do other systems or choices. On the other hand, a firm's accounting choices may be opportunistically motivated and may not improve the decision usefulness of earnings.<sup>30</sup>

The findings of the *consequences* studies, which examine the relation between smoothness and decision outcomes such as equity market consequences, *should be* useful to address the question of informativeness and therefore to assess smoothness as a proxy for earnings quality. Unfortunately, evidence from the consequences studies provides no clear conclusion. The problem is that cross-sectional variation in smoothness can result from variation in the smoothness of fundamental performance ( $X$ ), from variation in the ability of an accrual-based accounting system absent any choice to capture fundamental performance, or from variation in accounting choice. Moreover, the accounting choice can be motivated either to increase decision usefulness or to distort it. Thus, using the consequences studies to understand smoothness as a proxy for earnings quality requires differentiating inherent or fundamental smoothness from smoothness related to accounting choice, and differentiating informative choices from opportunistic choices, as each element will have different implications for decision usefulness. Given the difficulty of this measurement problem, it is perhaps not surprising that there are a fairly limited number of consequences studies that provide evidence on smoothness as a measure of quality. In the end, whether smoothness indicates greater decision usefulness is very much an open question. Further work on measuring smoothness in a way that can distinguish the artificial component of smoothness will be necessary.

The majority of the evidence on the consequences of smoothness, which might be used to assess its use as a proxy for earnings quality, is from studies that use cross-country data and examine variation in the consequences of country-level rather than firm-level measures of smoothness. Section 4 discusses these studies. In the cross-country studies, the commonly used measures of earnings smoothness are a variant of the variability of earnings relative to cash flows from operations ( $\sigma(EARN)/\sigma(CFO)$ ) and the correlation between changes in accruals and changes in cash flows from operations ( $Corr(\Delta ACC, \Delta CFO)$ ). In both cases, cash flow smoothness is the benchmark. The presumption in the cross-country studies is that the cross-sectional variation in opportunistic component of these metrics dominates the variation in the component of smoothness that would make accrual-based earnings more informative about fundamental performance. Thus, in a cross-country study, these "abnormal smoothness" measures are assumed to be a proxy for the degree of earnings management across countries. Consistent with this presumption, as discussed more completely in Section 4, the broad conclusion from the cross-country studies is that smoothing lowers earnings quality based on evidence that it is associated with predicted determinants of low earnings quality such as low-quality country GAAP, less enforcement, or poor shareholder rights (e.g., Leuz et al., 2003).

In contrast, within U.S. firms, the use of discretionary accruals to smooth earnings is associated with more informative earnings, although this conclusion is based on only two studies and on different measures of smoothness than those used in the cross-country studies. Tucker and Zarowin (2006), for example, conclude that smoothness improves earnings informativeness based on an analysis that splits firms into a high smoothing group, defined as firms that have a stronger negative correlation between discretionary accruals and unmanaged earnings (total earnings – discretionary accruals), and a low smoothing group. The high smoothing group has greater earnings informativeness, measured as the extent to which changes in current stock returns are reflected in future earnings, following Collins et al. (1994). This result holds after various controls for the smoothness of fundamental performance. Their conclusion is that the net smoothing effect of accrual accounting, which they predict would lead to greater informativeness if accruals smooth noise but to reduced informativeness if managers artificially smooth earnings relative to fundamental performance, is to improve informativeness and not to garble earnings (see also Subramanyam, 1996).

While the consequences studies do not provide a clear conclusion about smoothness as a proxy for earnings quality, they do lead us to one conclusion: in order to understand the *consequences* of smoothness in terms of decision usefulness, we will need smoothness measures that better distinguish artificial smoothness from the smoothness of fundamental performance. Similar to the comment on accruals models, further development of empirical proxies to distinguish artificial smoothness from informative smoothness would be useful. The development of models of "normal" smoothness lags the development of models of normal accruals. Better models could help us to understand whether the mixed evidence in the cross-country studies versus the studies of U.S. firms are due to a real difference between U.S. and non-U.S. firms or due to differences in the ability of the empirical proxies for smoothness to differentiate artificial smoothness from informative smoothness.

(footnote continued)

typically measure smoothing as the negative correlation between a proxy for unmanaged earnings (e.g., non-discretionary accruals), and the "discretionary accrual" that is being used to smooth earnings. Beidleman (1973), for example, measures smoothness as the difference between reported earnings and "normal" earnings, where normal earnings is an average earnings level, estimated based on historical earnings and a constant growth rate.

<sup>30</sup> The debate over whether smoothness improves or diminishes decision usefulness is related to the long recognized question over whether accounting choices more generally are motivated by opportunism or efficient contracting (e.g., Christie and Zimmerman, 1994; Bowen et al., 2008). See Ewert and Wagenhofer (2010) for a detailed discussion and analysis of the complex effect of smoothing incentives, in particular, on the informativeness of earnings.

### 3.1.4. Asymmetric timeliness and timely loss recognition

This section discusses earnings measures that separately distinguish the timeliness of loss recognition and profit recognition. The most frequently used measure of timely loss recognition is the reverse earnings-returns regression from Basu (1997):

$$\text{Earnings}_{t+1} = \alpha_0 + \alpha_1 D_t + \beta_0 \text{Ret}_t + \beta_1 D_t \times \text{Ret}_t + \varepsilon_t,$$

where  $D_t = 1$  if  $\text{Ret}_t < 0$ . The model assumes that markets efficiently reflect losses in returns ( $\text{Ret}$ ) when such losses are incurred. A higher  $\beta_1$  implies more timely recognition of the incurred losses in earnings (see Exhibit 1). Basu (1997) provides a second measure of timely loss recognition that is not based on returns

$$\Delta \text{NI}_t = \alpha_0 + \alpha_1 \text{NEGDUM}_{t-1} + \alpha_2 \Delta \text{NI}_{t-1} + \alpha_3 (\text{NEGDUM}_{t-1} \times \Delta \text{NI}_{t-1}) + \varepsilon_t,$$

where  $\Delta \text{NI}_t$  is the change in income from year  $t-1$  to  $t$ , scaled by beginning book value of total assets, and  $\text{NEGDUM}_{t-1}$  is an indicator variable equal to one if  $\Delta \text{NI}_{t-1}$  is negative. If bad news is recognized on a more timely basis than good news, negative earnings changes will be less persistent and will tend to reverse more than positive earnings changes. This translates into a prediction that  $\alpha_3 < 0$ , and Basu (1997) finds support for this prediction.

We begin this section with a discussion of measurement issues associated with the asymmetric timeliness measures (Section 3.1.4.1). We then turn to the more salient discussion of asymmetric timeliness as a proxy for earnings quality (Section 3.1.4.2). An important distinction of the evidence in this section is that our database does not contain any papers that we would classify as studies of the “consequences” of asymmetric timeliness. As noted above, the most common measure of asymmetric timeliness is a return-based measure in which returns are generally assumed to precede the recognition of losses in earnings. No studies used the return-based measure to capture other capital market consequences in future periods. While there are no consequences studies, one subset of the determinants studies provides evidence on whether asymmetric timeliness is decision useful to capital markets by showing a correlation between asymmetric timeliness and variables that proxy for investor demand for asymmetric timeliness. Assuming that the degree of asymmetric timeliness in a firm’s earnings is controllable by managers, at least in part, and that managers rationally respond to demand through their reporting choices, the correlation between demand and asymmetric timeliness suggests that asymmetric timeliness is decision useful. Demand for asymmetric timeliness is discussed along with the other determinants in Section 3.1.4.2.

**3.1.4.1. Measurement issues.** A measurement concern with return-based asymmetric timeliness measures is that they speak to the ability of *returns* to reflect value-relevant information in addition to the quality of *earnings* for equity valuation. The return-based timely loss recognition measures assume market efficiency.<sup>31</sup> Hence, variation in asymmetric timeliness could be evidence of variation in the “quality” of the return generating process, rather than variation in earnings quality, across regimes with different standards, incentives, and enforcement. That is, the extent to which prices reflect information may not hold equally well across firms (or countries) within a sample, which creates a classic omitted correlated variable problem.

A second measurement issue associated with a return-based EQ proxy is that returns reflect *all* information, not just information in earnings. If accounting practices that result in more timely loss recognition in earnings are correlated with the production or dissemination of alternative information sources (e.g., Givoly and Hemmer, 2001; Givoly et al., 2007), then a return-based measure of asymmetric timeliness captures asymmetry not only in financial reporting but also in information availability. The assumption that returns provide an equal representation of timely loss recognition is especially problematic in cross-country studies where variation in market structures and information flow are significant. Researchers recognize this issue and attempt to control for country-level differences,<sup>32</sup> but it still poses a significant challenge to studies that use return-based proxies for quality.

Several recent papers discuss measurement issues associated with the “timely loss” coefficient. Dietrich et al. (2007) suggests that the reverse regression measure is biased. Ryan (2006) questions the magnitude of the bias but also provides some possible solutions.<sup>33</sup> See also Givoly et al. (2007), Beaver et al. (2008), and Patatoukas and Thomas (2010). Since the publication of Dietrich et al. (2007), in particular, as a criticism of the reverse regression measure of asymmetric timeliness, the use of Basu’s alternative “tendency-to-reverse” measure has increased. The tendency-to-reverse measure has been used in some papers when equity returns are not available (e.g., Ball and Shivakumar, 2005), and it is used in other papers to check the robustness of the results.

**3.1.4.2. Evidence on timeliness as a proxy for earnings quality.** We first summarize the studies that examine *accounting standards and enforcement*, either internal or external, as determinants of asymmetric timeliness. Loss recognition is more

<sup>31</sup> A market efficiency assumption also involves a well-known philosophical conundrum: if market prices reflect information, then the “quality” of the information – its decision usefulness – is irrelevant, at least to equity valuation decisions.

<sup>32</sup> Ball et al. (2003) emphasize the benefits of their sample, which includes firms within East Asia, to mitigate the concern that cross-country variation in ERCs reflects variation in the return generating process rather than differences in earnings quality.

<sup>33</sup> Ryan (2006) includes a discussion of measurement issues associated with the reverse regression measure, but more generally provides a recent and thorough review of the literature on conservatism.

timely in common law than code law countries (Ball et al., 2000, BKR) and for firms that use IAS (Barth et al., 2008).<sup>34</sup> Francis and Wang (2008) find that the positive association between common law countries, which is positively correlated with investor protection, and timely loss recognition is higher only for firms with Big-four auditors. García Lara et al. (2009) find a positive association between timely loss recognition and governance characteristics commonly associated with effective monitoring. Chung and Wynn (2008) find that D&O liability insurance coverage for Canadian firms is negatively associated with timely loss recognition. One paper provides negative evidence: within a sample of U.S. firms, Ruddock et al. (2006) find *no* relation between non-audit services, which could impede independence and reduce auditor monitoring, and timely loss recognition. These studies use the Basu (1997) reverse regression to measure timely loss recognition; Chung and Wynn (2008) and García Lara et al. (2009) additionally check the robustness of the results to the use of the Basu (1997) tendency-to-reverse measure.

While the findings of these studies are important, their use in assessing asymmetric timeliness as a proxy for earnings quality is limited. These studies are a joint test of the hypotheses about which methods or enforcement mechanisms produce a more decision useful number and of the assumption that asymmetric timeliness is a decision useful feature of earnings. Under the assumption that producing a high quality earnings number is the goal of accounting standard setters (or auditors, principals, or law makers), the results suggest that timely loss recognition is the outcome of a process meant to produce a decision useful number. However, this conclusion about asymmetric timeliness as a proxy for earnings quality is subject to the strong assumption that these parties have the goal of producing a high quality earnings number.

The final group of determinants studies is more useful for assessing asymmetric timeliness as a proxy for earnings quality. Four studies provide evidence that proxies for *equity market demand* for decision useful earnings are a determinant of asymmetric timeliness. Ball and Shivakumar (2005), using the Basu (1997) tendency-to-reverse measure, find that loss recognition is more timely in U.K. public companies than in U.K. private companies. Ball et al. (2008), using the  $R^2$  and  $\beta_1$  coefficient estimate from the Basu (1997) reverse regression (as in BKR), find that loss recognition is more timely for firms in countries with greater prominence of debt markets relative to equity markets. Ball et al. (2003), also using the BKR metrics, find that East Asian countries, which share a common law origin but are asserted to have lower equity capital markets incentives, do *not* have more timely loss recognition than code law countries. The differences in timely loss recognition within countries (or regions) with the same standards or legal origin suggest that timely loss recognition has an endogenous component related to firms' reporting incentives. It is not driven purely by a country's accounting system. Pae et al. (2005), also using the BKR metrics, find that firm-level price-to-book ratios are a determinant of timely loss recognition and that the negative association is correlated with the accrual component of earnings. Taken together, all four studies suggest that timely loss recognition has an endogenous component related to firms' reporting incentives, primarily equity incentives. Thus, assuming that managers are responding to investor demand for decision usefulness, these studies suggest that equity markets perceive asymmetric timeliness as improving earnings quality.<sup>35</sup>

We offer a final caution. The findings in studies of equity market demand as a determinant of asymmetric timeliness imply only that equity markets *perceive* asymmetric timeliness as improving earnings quality. They cannot speak to whether equity markets *should* demand timely loss recognition. That is, they do not provide evidence on whether asymmetric timeliness improves decision outcomes. This latter question is related to the ongoing debate about accounting conservatism. A more timely recognition of losses is often associated with a conservative accounting system (Basu, 1997; Pope and Walker, 1999). Studies distinguish conditional conservatism, which is more timely recognition of bad news than of good news in earnings, from unconditional conservatism, which describes an *ex ante* policy that results in lower book values of assets (higher book values of liabilities) in the early periods of an asset or liability life.<sup>36</sup> Whether unconditional conservatism increases or decreases the decision usefulness of earnings is a controversial issue (see Watts, 2003a, 2003b; Givoly et al., 2010; Armstrong et al., 2010a).

### 3.1.5. Target beating

Researchers have documented a “kink” in the distribution of reported earnings around zero: a statistically small number of firms with small losses and a statistically large number of firms with small profits (Hayn, 1995; Burgstahler and Dichev, 1997). A common (but controversial) interpretation of this pattern is that firms with unmanaged earnings just less than the heuristic target of “zero” (i.e., firms with small losses) intentionally manage earnings enough to report a small profit. Based on this finding, earnings measures such as *small profits* and *small loss avoidance* have been identified as an indication of earnings management, as one specific dimension of earnings quality. Similarly, researchers have proposed that *small earnings increases* could indicate earnings management based on a statistically unusual number of firms with small decreases in earnings documented by Burgstahler and Dichev (1997) and that *meeting or beating* an analyst forecast

<sup>34</sup> Ball et al. (2000) also find that U.K. earnings are less timely than U.S. earnings in incorporating economic losses. Pope and Walker (1999), however, suggest that this result is sensitive to the consideration of extraordinary items. They find that earnings after extraordinary items in the U.K. are more timely than U.S. earnings.

<sup>35</sup> A related paper by Guenther and Young (2000) suggests that earnings quality is demand driven and that institutional factors such as the legal system and tax conformity affect earnings quality. They operationalize earnings quality as the association between cross-sectional average return on assets in a country and its real economic growth as measured by the percentage change in a country's real GDP. They document that this association is high in the U.K., U.S. and Japan, and low in France and Germany.

<sup>36</sup> Basu (1997) uses the term “conditional” to describe his measure of conservatism, but he does not specifically call it “conditional conservatism.”

is an indication of earnings management based on the “kink” in the distribution of forecast errors: reported earnings less consensus analyst forecasts (e.g., Degeorge et al., 1999).

The studies that examine the *determinants* of target beating are discussed in Section 3.1.5.1. The determinants studies provide evidence on whether target beating represents earnings management by examining whether target beating is correlated with variables that also are correlated with earnings management, primarily the incentives and opportunities to manage earnings. The studies that examine the *consequences* of target beating are discussed in Section 3.1.5.2. The consequences studies provide evidence on whether target beating represents earnings management by examining whether capital market responses (and analyst behavior) are consistent with earnings that meet or beat targets containing a managed component.

To summarize the more detailed discussions in Sections 3.1.5.1 and 3.1.5.2, findings on whether small profits and small loss avoidance represent earnings management based on the observed determinants is mixed, which is suggestive that small profits and small loss avoidance may not be an indication of earnings management. This indirect evidence is supported by more direct evidence including Dechow et al. (2003), who show that discretionary accruals are no different for small profit versus small loss firms; Beaver et al. (2007), who suggest that the “kink” in earnings around zero can be explained by asymmetric taxes, rather than opportunistic choices; and Durtschi and Easton (2005, 2009), who show that it is explained by statistical and sample bias issues related to scaling by price. The indirect evidence on whether meeting or beating *analyst forecasts* represents earnings management, based on both the observed determinants and the observed consequences, is somewhat more persuasive. Moreover, in contrast to the literature on the kink around zero, no studies in our database provide evidence in support of any alternative explanation to the earnings management explanation for the kink around the consensus analyst forecast. In addition, conflicting evidence (discussed below) on the *quarterly* patterns in the kink around zero and in the kink around the consensus analyst forecast also suggests that small profits and small loss avoidance and meeting or beating analyst forecast targets are not measuring the same construct.

The totality of the evidence indicates that the use of small profits as a proxy for earnings management more generally is unsubstantiated. An additional important caveat to the use of target beating as a proxy for earnings management is that meeting or beating a target is a censored measure of earnings management if firms are constrained in their ability to manage earnings (Barton and Simko, 2002).

**3.1.5.1. Determinants of target beating.** Studies on whether small profits and loss avoidance represent earnings management, motivated by the observed kink in earnings around zero, provide mixed evidence. Dechow et al. (2003) in a large-sample study find that discretionary accruals are similar in both the small profit group and the small loss group. If firms were managing earnings up to avoid a loss, discretionary accruals are expected to be higher in the small profit group. Studies of specific accruals, however, find evidence of an association. Beaver et al. (2003) find that small profits are associated with earnings management based on correlations between small profits and discretionary loss reserves at P&C insurers, and Phillips et al. (2003) find that deferred tax expense is useful in detecting earnings management to meet benchmarks such as avoiding losses. Small positive profits also are associated with greater *incentives* for earnings management in the fourth quarter (Kerstein and Rai, 2007; Jacob and Jorgensen, 2007) and with greater *opportunities* for earnings management because of low audit effort (Caramanis and Lennox, 2008) or because of the availability of aggressive revenue recognition techniques (Altamuro et al., 2005).

Evidence that earnings are likely managed when firms just meet or beat an external target (i.e., an analyst forecast) is more persuasive. This literature includes three types of analyses. The first type of analysis shows that the *mechanisms/tools* that firms use to produce earnings that just meet or beat a target are consistent with earnings management. Firms make accounting choices such as managing tax expense (Dhaliwal et al., 2004), managing the classification of items within the income statement (McVay, 2006), and managing the creation and reversal of restructuring charge accruals/cushions (Moehle, 2002). More generally, Ayers et al. (2006) find some evidence consistent with an association between discretionary accruals and meeting or beating analyst forecasts and reporting small earnings increases. Firms also make real decisions to meet analyst forecasts such as repurchasing stock (Hribar et al., 2006), selling fixed assets or marketable securities (Herrmann et al., 2003), or repurchasing shares (Bens et al., 2003).

The second type of analysis finds a relation between target beating and firms' equity market *incentives* to meet or beat a target, where equity market incentives derive from the ownership structure of the firm (Matsumoto, 2002; Beatty et al., 2002) or managers' compensation/stock ownership (Cheng and Warfield, 2005; McVay et al., 2006). Abarbanell and Lehavy (2003) indirectly link earnings management activities to equity market incentives, assuming that analyst stock recommendations – rather than meeting or beating a forecast – measure incentives.

The third type of analysis finds a relation between target beating and firms' *opportunities* to meet or beat a target. Frankel et al. (2002) document a correlation between target beating and lower audit quality, and Brown and Pinello (2007) document that small negative analyst forecast errors are more prevalent in interim (unaudited) quarters. The Brown and Pinello (2007) finding of a stronger kink in the distribution of earnings around the consensus analyst forecast in interim quarters conflicts with the previously discussed evidence of a stronger kink around zero in the fourth quarter (Kerstein and Rai, 2007; Jacob and Jorgensen, 2007). The first study suggests that because earnings management *opportunities* are greater in *interim quarters*, the quarterly pattern in the kink around the consensus analyst forecast implies that small negative analyst forecast errors represent earnings management. The latter two studies suggest that because earnings management

*incentives* are greater in the *fourth quarter*, the opposite quarterly pattern in the kink around zero implies that small profits represent earnings management.

In summary, unlike small profits, meeting or beating analyst forecasts is consistently associated with predicted determinants of earnings management behavior. Our interpretation of the consistency of the evidence is that this variable is a more reliable indicator of the earnings management dimension of earnings quality than are small profits. This conclusion, however, comes with three important caveats. First, if opportunities are constrained because net asset values are already overstated, target beating is moderated (Barton and Simko, 2002). In other words, meeting or beating a target is a censored measure of earnings management. Second, the analyst forecast target can be managed (Matsumoto, 2002). Finally, while some evidence shows a relation between discretionary accruals and meeting or beating analyst forecasts, firms can be managing earnings up or down to meet consensus forecasts, which poses a challenge to researchers attempting to link the two activities. It would be useful to have more evidence on whether small forecast errors suggest earnings management.

**3.1.5.2. Consequences of target beating.** The consequences studies generally support the conclusion that meeting or beating an analyst forecast *may* be an indication of earnings management, but there is some contradictory evidence that provides several important caveats to this general conclusion. The contradictory evidence is as follows. Bhojraj et al. (2009) find that firms that just beat analyst forecasts by using accruals or by cutting discretionary expenses experience short-term stock performance improvement. Assuming that the accruals adjustments diminish quality, and assuming market efficiency, these results suggest that the market does not view target beating as evidence of earnings management. Bartov et al. (2002) document a premium (a higher contemporaneous quarterly return) associated with meeting or beating analyst forecasts, again suggesting that the market does not view target beating as evidence of an erosion in decision usefulness, but rather may view it as an outcome of efficient contracting. Abarbanell and Lehavy (2003) and Burgstahler and Eames (2003) suggest that analysts do not detect/anticipate earnings management to meet or beat targets, although an alternative explanation for these findings is that the complicated incentives of analysts cause them to ignore earnings management (Libby et al., 2008).

In defense of target beating as an indication of earnings management, however, Gleason and Mills (2008) show that when target beating is associated with decreases in tax expense, the positive market consequences of target beating are diminished. One interpretation of this result, in contrast to the contradictory evidence cited above, is that specifically beating a target by managing tax expense represents diminished quality, while other mechanisms (e.g., accruals) do not diminish earnings quality. Another interpretation of this result assumes that tax expense decreases are a more obvious and detectable form of earnings management. In this case, the findings of Gleason and Mills (2008) suggest that target beating is an indication of earnings management, and the presumed contradictory results in other studies (i.e., Bhojraj et al., 2009; Bartov et al., 2002; Abarbanell and Lehavy, 2003; Burgstahler and Eames, 2003) are due to an errant assumption of market (or analyst) efficiency.

In addition, while there is some contradictory evidence that beating external targets such as analyst forecasts represents earnings management on average, studies provide compelling evidence that *consistently* meeting targets is important. Kasznik and McNichols (2002) find that meeting or beating earnings expectations based on analyst forecasts on an *ad hoc* basis does not lead to higher valuations, but that meeting or beating regularly does. Similarly, strings of earnings increases relative to the prior year or relative to the same quarter of the prior year receive a price premium (Barth et al., 1999; Myers et al., 2007).<sup>37</sup> Assuming that market participants assign a higher probability that earnings are managed when forecasts are met on an *ad hoc* basis, these results imply that *ad hoc* target beating is a good proxy for earnings management.

Finally, only one study addresses the market consequences of small profits or small loss avoidance, which limits the conclusions we can draw about the use of these measures as proxies for earnings quality. Bhattacharya et al. (2003b) show that loss avoidance is associated with a higher average cost of equity and a lower level of trade. While this evidence supports the assertion that loss avoidance diminishes quality, we emphasize that a conclusion based on one study is premature, especially given the mixed evidence from the determinants studies.

### 3.2. Investor responsiveness to earnings

The investor responsiveness to earnings category includes studies that examine an earnings response coefficient (ERC), most often short-window, or the  $R^2$  from the earnings–returns model, as a measure of investor responsiveness to earnings,<sup>38</sup> and the studies explicitly state (or at least strongly imply) that investor responsiveness to earnings is a direct proxy for earnings quality (or for earnings informativeness). The researchers commonly cite Holthausen and Verrecchia (HV) (1988) as the theoretical basis for this assertion. The studies that test theories of the determinants and consequences of ERCs, the most common empirical measure of investor responsiveness, can provide evidence on the use of the ERC as a proxy for earnings quality, but the conclusions are subject to the caveat that the supporting evidence comes from a joint test of the underlying theory and whether the ERC measures informativeness (i.e., earnings quality). Liu and Thomas (2000)

<sup>37</sup> Neither study addresses whether the strings are achieved by artificial smoothing.

<sup>38</sup> We use the terms “investor responsiveness to earnings,” “earnings response coefficient,” and “ERC” interchangeably. See Exhibit 1 for the regression model commonly used to estimate earnings response coefficients (ERCs).

is an important and distinct study that provides more direct evidence on ERCs as a proxy for earnings quality. We discuss the Liu and Thomas study in Section 3.2.1.

It should not be surprising that a return-based earnings response coefficient is used as a measure of earnings quality. Beginning with Beaver (1968) and Ball and Brown (1967, 1968), academic accounting researchers have used equity market responses to earnings to infer quality.<sup>39</sup> Because these studies show that earnings news is correlated with various equity market attributes (long-window returns and volume and volatility changes around earnings announcements) that result when investors change their equity valuations, the authors conclude that information in earnings is correlated with the information used by investors in their equity valuation decisions. The use of equity markets to infer earnings quality was clearly an important development in the literature, but it is worth emphasizing that these studies speak only to the decision usefulness of earnings in equity valuation. Whether the results have implications for the “quality of earnings” to other decision users (such as compensation committees or bondholders) is indeterminate from these studies, and we caution that the results may not be generalizable to decisions other than equity valuations.

### 3.2.1. Direct evidence on ERCs as a proxy for earnings quality

Liu and Thomas (2000) provide more direct evidence on the ERC as a proxy for earnings quality relative to the studies on the determinants of ERCs. In fact, LT specifically state that the ERC can be viewed as a measure of earnings quality (p. 73). They predict and find that the observed ERC (coefficient estimate) and the  $R^2$  of the ERC regression are high when the correlation between unexpected earnings and forecast revisions is high. Unexpected earnings is measured as actual earnings for  $t$  minus the forecast of period  $t$  earnings in  $t-1$ , and earnings forecast revisions for future periods are measured using information available at time  $t$ . Thus, when current period unexpected earnings are informative to analysts in that they cause a forecast revision, which LT suggest means that when the earnings are of higher quality, the ERC is also higher. However, LT also recognize that the degree to which the ERC captures decision usefulness is sensitive to the degree of heterogeneity in the correlation between unexpected earnings and forecast revisions within the sample, and they attribute low values of the regression  $R^2$  to this heterogeneity. Hence, sample specific characteristics that affect within-sample heterogeneity, such as growth, are important.

While LT conclude that the ERC is a measure of quality, it is important to remember how they qualify this conclusion. The LT definition of “quality” is *overall* decision usefulness for equity valuation. They cannot comment on any specific dimensions of quality, such as whether quality is eroded due to earnings management or due to low persistence of fundamental performance. Hence, LT’s conclusion about the ERC as a measure of earnings quality, broadly defined, should not be construed to mean that the ERC is an appropriate proxy to test predictions about all determinants or consequences of specific dimensions of quality. LT’s conclusion that the ERC is a measure of quality is also subject to their caveat regarding the importance of sample-specific characteristics that affect within-sample heterogeneity in the correlation between unexpected earnings and forecast revisions within the sample, such as growth.

### 3.2.2. Indirect evidence on ERCs as a proxy for earnings quality based on determinants

Investor responsiveness to earnings, commonly measured by ERCs, has been used to test a variety of predictions about the determinants of earnings informativeness including the effects of accounting methods, auditor quality and governance, firm fundamentals, and leverage. To help the reader put the results of the literature in context, we first provide an overview of the major findings. We then discuss our view about the implications of these studies for ERCs as a proxy for earnings quality.

**3.2.2.1. Accounting methods.** Five papers examine the cross-sectional or longitudinal relation between earnings measured under alternative accounting methods and the resulting ERCs.<sup>40</sup> The idea is that a more positive correlation with the ERC indicates that a method is more “informative” or “useful” to investors. One approach to comparing investor responsiveness across methods is to exploit a regime-shift from one mandatory method to another; however, this approach is subject to concerns about omitted correlated variables and the endogeneity of the standard setter’s decision to mandate new accounting rules. Another approach is to conduct a cross-sectional comparison of firms that make different method choices; however, these studies require a differences-in-differences approach or other design to control for endogeneity of the method decision. These caveats aside, some of the choices that have been examined are: revenue recognition pre-versus post-SAB 101 (Altamuro et al., 2005); R&D capitalization versus expensing (Loudder and Behn, 1995); foreign currency translation gains and losses under SFAS No. 52 (Collins and Salatka, 1993); and combinations of income increasing methods including, for example, accounting choices related to inventory, depreciation, investment tax credits,

<sup>39</sup> Prior to these studies, academic accounting research focused on evaluating the “quality of earnings” in terms of conformity to a consistent measurement system or conceptual framework. Much of the debate focused on whether earnings should be measured using historical cost with matching (e.g., Daines, 1929; Littleton, 1956; Paton and Littleton, 1940), replacement cost or entry values (e.g., Sterling, 1970), future discounted cash flows (e.g., Fisher, 1907, 1930), or net realizable values or exit costs (e.g., Chambers, 1956, 1965).

<sup>40</sup> Early papers examined differences in market responses to earnings measured under different accounting methods (Mlynarczyk, 1969; Gonedes, 1969; Ball, 1972; Cassidy, 1976), with a general notion of exploring the degree of market efficiency. They did not assert that the earnings number under one method or another was more decision useful. Rather, they assumed that both earnings numbers were different representations of the same firm performance, and the research question was whether markets understood this. These studies generally did not control for endogeneity of method choice.

and leases (Dharan and Lev, 1993; Pincus, 1993).<sup>41</sup> Hanlon et al. (2008) find that firms that switch to accrual-based accounting for tax reporting have a decrease in earnings informativeness of book earnings, suggesting that discretion is used to report less informative earnings.

Two studies suggest that changes in accounting methods may explain declining ERCs for U.S. firms over time.<sup>42</sup> Lev and Zarowin (1999) suggest that conservatism in accounting standards associated with intangible assets and the increase in intangible-intensive firms explain declining ERCs. Givoly and Hayn (2000) suggest as an explanation the increase in fair value accounting (e.g. asset impairments and the recognition of pension liabilities), which results in the recognition of more transitory losses in earnings.

**3.2.2.2. Auditor quality and governance.** Research on auditors as a determinant of earnings informativeness is motivated by the assumption that auditors provide a useful service that is “demanded” by investors. An implication is that higher audit quality should provide greater credibility to the financial statements. If this is the case, then holding everything else constant, better audits will be associated with higher ERCs. With respect to auditors, Teoh and Wong (1993) report higher ERCs for firms with Big-8 auditors, which they use as a measure of audit quality. Francis and Ke (2006) find that non-audit fees, which they assert indicate lower independence, are negatively related to ERCs. Hackenbrack and Hogan (2002) find that the average short-window (2-day) ERC for the two annual earnings announcements after an auditor change is lower than the ERC for the two annual pre-change earnings announcements. Possible interpretations of this result are that the credibility of the financial statements decreased because the change resulted in lower fees being paid to the new auditor, which suggests less effective auditing; or that the change revised investor beliefs about the firm’s commitment to quality financial reporting. They also show that the average ERC is higher for firms that switch for reasons that the authors classify as service related. This result helps identify the decrease in ERCs as evidence that conflict-related switches influence earnings informativeness. Manry et al. (2003) report that quarterly returns have a stronger association with contemporaneous earnings levels for firms that have timely auditor reviews of their interim earnings, but they have a stronger relation with lagged earnings for firms that have retrospective auditor reviews.<sup>43</sup>

With respect to governance, the hypotheses are based on the assumption that better governance leads to increased reliability and credibility of the financial statements, which will result in higher ERCs. Using both short and long-window ERCs, Francis et al. (2005b) find that earnings are less informative for firms with dual class shares. Further analysis suggests that markets view the earnings of firms with a dual class structure as less credible primarily because of the separation of voting rights from cash flow rights, although the firms with dual class shares also tend to have greater managerial ownership. Using long-window ERCs, Wang (2006) finds a positive association between founding family ownership and earnings informativeness, measured as the regression coefficient in an annual returns-earnings model.<sup>44</sup>

**3.2.2.3. Firm fundamentals.** There is very little evidence on firm fundamentals as a determinant of ERCs. A series of early papers following Ball and Brown (e.g., Kormendi and Lipe, 1987; Collins and Kothari, 1989) show that ERCs are positively related to earnings persistence. The motivation for this research is an assumption that more persistent earnings have greater implications for expected future cash flows associated with the firm’s fundamental performance. The findings are consistent with this assumption, on average, in large samples. As discussed extensively in Section 3.1.1, however, the assumption that persistence is a proxy for fundamental performance is subject to important caveats. For example, persistence can be managed, making it less informative about fundamental performance. In addition, growth may be negatively associated with persistence, but earnings may be more informative for high growth firms. Thus, these results, which are based on the view that persistence is a firm characteristic associated with fundamentals, provide only very indirect evidence on ERCs as a proxy for earnings quality. Research on the association between losses and ERCs also provides only indirect evidence on ERCs as a measure of quality. ERCs are lower for loss firms, which is consistent with losses being uninformative about future cash flows. This prediction follows because firms have an abandonment option and should not continue to engage in activities that generate losses (Hayn, 1995). While this relation is consistent with ERCs as a proxy for earnings quality, recent evidence in Li (2010) finds that investors tend to underweight losses, suggesting that they expect them to reverse more quickly than they actually do.

Two papers study the implications of fundamental performance on earnings quality more directly. Biddle and Seow (1991) examine cross-industry ERCs. Their analysis is a directed search of industry characteristics that will affect earnings informativeness. The underlying assumption of the cross-industry design is that industries are a “convenient” (p. 184) way to partition the data to obtain meaningful inter-industry heterogeneity and intra-industry homogeneity in fundamental

<sup>41</sup> Pincus (1993) is an example of a paper that specifically motivates his paper as one that investigates the “quality of earnings” and cites Lev (1989) as the source of his inspiration.

<sup>42</sup> Additional studies of the change in the role of financial reporting in the U.S. over time include Collins et al. (1997), Francis and Schipper (1999), Brown et al. (1999), Francis et al. (2002b), Landsman and Maydew (2002), Core et al. (2003), Ryan and Zarowin (2003), Dontoh et al. (2004), Beaver et al. (2005), Kim and Kross (2005), Collins et al. (2007), Jorion et al. (2007), and Dichev and Tang (2008).

<sup>43</sup> Due to data constraints, sample size limits the power of the tests. There are 328 observations with timely reviews and 84 retrospective reviews. The authors are unable to address selection issues and the authors acknowledge that the results are “mixed” across quarters and specification of the earnings variable in levels or changes.

<sup>44</sup> Warfield et al. (1995) document a similar relation between managerial ownership and an identical specification of the ERC, based on the same theoretical arguments; however, they use the term “earnings informativeness” rather than “earnings quality” to motivate the test.

performance. The industry characteristics they examine include product durability, operating leverage, and capital structure. Ahmed (1994) also measures the association between ERCs and firm characteristics including competition, cost structure, and growth. An important innovation of his analysis is the recognition that previous studies employ measures of fundamental firm characteristics that are outputs from the accounting system and therefore represent  $f(X)$  rather than  $X$ . Ahmed (1994) exploits R&D expenditures as a more primitive means of measuring the impact of fundamental performance on earnings informativeness.

Finally, two papers document a negative relation between analyst forecast dispersion and ERCs (Imhoff and Lobo, 1992; Burgstahler et al., 2002). They interpret analyst forecast dispersion as a measure of inherent uncertainty associated with the firm's operations. Thus, more uncertain operations are associated with lower earnings quality.

**3.2.2.4. Leverage.** Our database includes studies by Dhaliwal et al. (1991) and Core and Schrand (1999), who find that leverage is associated with non-linearities in ERCs.<sup>45</sup> Both papers recognize that equity is a call option on the value of the firm and predict that a firm's debt structure will affect the shape of the earnings-returns relation (ERC). The relation between leverage and ERCs appears to result from variation in the capitalization rate of earnings news into price as a function of leverage, rather than from an association between leverage and the decision usefulness of earnings for predicting expected cash flows. In other words, it is not that leverage affects the informativeness of earnings but rather it affects return reactions, which are the other element of an ERC. The predicted non-linearity in the relation between ERCs and leverage is consistent with the option-like characteristics of equity, which is not envisioned in the Holthausen and Verrecchia model. Plummer and Tse (1999) find that ERCs (contemporaneous returns and unexpected earnings) decrease as default risk increases for equity returns, but the opposite result holds for bond returns.

**3.2.2.5. Conclusions.** The studies on the determinants of investor responsiveness highlight several cautions for researchers who want to use investor responsiveness as a proxy for earnings quality. First, there is mixed evidence that the ERC captures intentional earnings management; thus its use as a proxy for this particular dimension of quality is questionable. For example, Hanlon et al. (2008) suggest that firms use accounting choices to manage earnings in the sense of Healy and Wahlen (1999). Dharan and Lev (1993) interpret their results as evidence that changing to income-increasing methods may be a warning sign that the firm is masking fundamental problems, which supports the bias story. Loudder and Behn (1995) and Altamuro et al. (2005), however, suggest that earnings measured under the more "aggressive" policy, in the sense that revenue recognition is earlier rather than later or expense recognition is delayed, are associated with a higher market response. These two studies challenge the premise that earnings aggressiveness should be viewed as *de facto* evidence of greater earnings management, and hence lower quality.

Second, while the ERC may be a representation of the "conditional" quality of reported earnings, it is not a proxy for "unconditional" earnings quality. For example, the studies of auditors as a determinant of quality suggest that earnings informativeness can be influenced by better monitoring. If firms engage in better monitoring when earnings would be "unconditionally" less informative because of the role of fundamental performance ( $X$ ) or because of non-controllable features of the accounting measurement system such as unbiased application of exogenously determined standards, and this better monitoring improves the informativeness of earnings, then the ERC represents the "conditional" quality of the earnings. That is, the ERC captures the overall quality of reported earnings and does not distinguish between the contributions of  $X$  and the accounting system that measures fundamental performance ( $f$ ) to overall decision usefulness. It is at best a noisy measure of either of these contributors to quality because it also embeds the effects of other determinants of quality (monitoring in the example above). The problem may be more severe if the other determinants of quality (again, monitoring in the example above) are endogenous, and related to the unconditional earnings quality.

Finally, the linear specification typically used to measure ERCs matches the linear specification of equity valuation in HV, but the option-like characteristics of equity suggest non-linearities in ERCs as a function of default risk. Thus, variation in ERCs may reflect cross-sectional variation in quality characteristics such as error-free measurement, but ERCs will also reflect variation in default risk, which is unrelated to the ability of earnings to measure fundamental performance.

### 3.2.3. The relation between ERCs and non-earnings information

This section reviews studies that document the relation between ERCs and non-earnings information. Understanding the relation between ERCs and other attributes of a firm's information environment is important because the observed ERC captures the informativeness of earnings holding constant other information that is available. Hence, as noted previously, the ERC may be a good proxy for the conditional informativeness of earnings to investors, but not for the unconditional informativeness of earnings to investors. Researchers, however, generally test theories that require a proxy for unconditional informativeness; that is, for the informativeness of earnings that does not depend on the availability of other information. For example, if one wanted to test whether auditors improve earnings quality by decreasing errors in the financial statements, then the ERC would not be an appropriate proxy for this notion of quality because it does not necessarily reflect variation in the types of errors that auditors can control or affect.

<sup>45</sup> See also Hayn (1995) and Burgstahler and Dichev (1997).

Empirical evidence suggests that there is a relation between ERCs and other attributes of a firm's information environment. Thus, studies that use the ERC as a proxy for earnings quality potentially suffer from an omitted variable bias if the variable of interest is correlated with a firm's information environment. Two studies suggest that non-earnings information complements and improves the decision usefulness of earnings, such that ERCs will be an overstated measure of the unconditional quality of earnings (i.e., in the absence of the other information). Lougee and Marquardt (2004), for example, find that concurrent disclosure of non-earnings information improves the earnings-returns relation for firms with poor earnings informativeness. Baber et al. (2006) find that the market discount that investors apply to earnings that are likely to be upwardly managed declines when balance sheet information is disclosed concurrent with the earnings announcement.<sup>46</sup> Hanlon et al. (2005) provide related evidence. They find that book income and taxable income have incremental explanatory power to each other in explaining returns. Thus, non-earnings information (i.e., taxable income that does not conform to book income) affects returns, which can affect the interpretation of the ERC as a measure of quality. Finally, two papers provide weak/mixed evidence. Amir et al. (1993) characterize their evidence as "mixed" on whether 20-F earnings reconciliations improve earnings informativeness using both long- and short-window ERCs. Francis et al. (2002a) find a significant positive cross-sectional association between aggregate abnormal returns to analyst announcements (aggregated over all announcements prior to the earnings announcement) and the market response to subsequent quarter earnings, but evidence on the association between mean abnormal returns and ERCs is mixed. They interpret the totality of their evidence as providing little support for the view that competing information from analysts erodes the informativeness of earnings.

In summary, while the exact nature of the relation between investor responsiveness to earnings and a firm's non-earnings information appears to be disclosure specific, non-earnings information is nonetheless a potential omitted variable. Investor responsiveness only indicates the informativeness of earnings conditional on other information available. It does not represent how investors would respond to new information in earnings, which would be a better indication of the quality of those earnings. This issue with the use of the ERC as a proxy for earnings quality is especially problematic if the hypothesized determinant in the study is correlated with a firm's information environment or disclosure choices.

This omitted correlated variable problem can be subtle. Collins and DeAngelo (1990) document that the market is more responsive to earnings during a proxy contest. This finding rejects one proposed hypothesis, which is that earnings during this period are less precise because they are likely to be opportunistically managed, in which case the ERC should be lower. Rather, they interpret their finding as evidence that a proxy contest is a period of heightened uncertainty and that the earnings number is especially useful for valuation. This evidence suggests that ERCs as a proxy for earnings quality may be specific to an event-period.

The implications of non-earnings information for using the ERC as a proxy for earnings quality are further complicated when the information environment is not just correlated with the ERC, but is endogenously determined by the firm's "earnings quality" in the absence of additional disclosure. Two studies find that when earnings are less informative, firms voluntarily disclose more non-earnings information such as balance sheet information in earnings announcements (Chen et al., 2002) and pro forma earnings (Lougee and Marquardt, 2004). A third study, however, finds that when earnings are more informative, firms are more likely to issue management forecasts of earnings (Lennox and Park, 2006). Their explanation for the result is that a manager's propensity to forecast is increasing in the manager's confidence about forecast accuracy, given reputation concerns. The contrasting results for endogenous voluntary disclosure decisions related to different types of disclosures make it difficult for a researcher to evaluate whether there is an endogeneity problem, and if so how to control for it.

In conclusion, whether the availability of non-earnings information is endogenous or exogenous, the fact that there is a correlation between ERCs and its availability implies that the ERC can be viewed as a proxy for earnings quality only when the availability of other information is homogeneous within the sample. This finding is consistent with the conclusion of Liu and Thomas (2000) that within-sample heterogeneity in the correlation between unexpected earnings and forecast revisions affects the degree to which the ERC is a reasonable proxy for earnings quality.

### 3.2.4. A final caution about ERCs as a proxy for earnings quality

A notable missing element of the literature that uses investor responsiveness (ERCs) as a proxy for earnings quality is consideration of variation in the ability of equity markets to reflect fundamental value.<sup>47</sup> Variation in the return generating process across firms (or countries) affects the variation in the "R" component of the ERC, and it is unrelated (or related in an unknown way) to the earnings or "E" component of the ERC, making statements about the ERC as a proxy for earnings quality impossible. Variation in returns may be a function of firm characteristics such as trading frequency of the firm's stock (e.g., Scholes and Williams, 1977), which is correlated with firm size and stock price. Returns can exhibit cross-sectional and time-series variation due to changes in macroeconomic factors (Johnson, 1999; Hoitash et al., 2002) and cross-country variation because of the relation between economic and market development (Frost et al., 2006).

<sup>46</sup> This analysis incorporates the findings of Chen et al. (2002), which models the firm's decision to voluntarily disclose balance sheet information in earnings announcements.

<sup>47</sup> The point that variation in the extent to which prices reflect value (assuming market efficiency) creates a potential omitted correlated variable is a general concern for all studies that use return-based measures as proxies for quality, such as timely loss recognition.

### 3.3. External indicators of earnings misstatements

The external indicators of earnings misstatements include (1) SEC Accounting and Auditing Enforcement Releases (AAERs), (2) restatements, and (3) internal control procedure deficiencies reported under the Sarbanes Oxley Act (SOX). All three are used as measures of earnings misstatements, either intentional (i.e., earnings management) or unintentional (i.e., errors).

External indicators have advantages and disadvantages as proxies for earnings quality. The most important advantage is that an outside source has identified a problem with “quality” (whether that be the SEC in the case of AAERs, the management team itself in the case of restatements, or the auditor in the case of SOX internal control deficiencies). Therefore, the samples are especially useful for identifying misstatements; the researcher does not need to specify a model to identify misstatements. Isolating misstatements as a particular dimension of quality is useful as the hypothesized determinants and consequences of misstatements are likely different from those of quality problems associated with proper application of an accounting system (*f*).<sup>48</sup> It is worth noting, however, that while the existence of a misstatement is more certain in all three samples, the restatement and internal control deficiency samples, in particular, can include both intentional and unintentional misstatements.

The fact that an external party identifies the misstatement is the source of their greatest advantage, but it is also the source of their greatest disadvantage: a potential bias induced by selection criteria used by the external party. AAER firms, restatement firms, and SOX firms may share other characteristics aside from the accounting misstatement that could be correlated with the stimuli investigated by the researchers.

We discuss each of the three external indicators that have been used as proxies for earnings misstatements separately in Sections 3.3.1–3.3.3, including comments on the selection issues specific to the proxy. Due to the number of studies and the significant overlap in the nature of the evidence, the discussions of the determinants and consequences in each section begin with a listing of the evidence. The conclusions, based on considering all of the listed findings together, are at the end of each determinant and consequence section.

#### 3.3.1. Firms subject to SEC enforcements: Accounting and auditing enforcement releases (AAERs)

Samples of AAERs used in accounting research typically consist of cases where the SEC alleges that the firm has misstated or overstated earnings and exclude pure disclosure cases. Almost half of the AAER firms have overstated revenue, and overstatements of inventory and other assets are also common (Dechow et al., forthcoming). In most AAER cases, the SEC accuses managers of intentionally misstating financial statements, which is the definition of fraud in SAS No. 99. In some cases, however, the SEC alleges that managers were negligent (i.e., “reckless in not knowing” of the misstatement).

A significant benefit of the AAER sample to identify firms with earnings quality problems is that the AAER sample is likely to have a lower Type I error rate in the identification of misstatements than samples that infer misstatement from earnings-based measures such as abnormal accruals. However, researchers should consider the following issues when using AAERs as a proxy for earnings quality. First, the SEC has limited resources that constrain its ability to detect and prosecute misstatements. Thus, the SEC may not pursue cases that involve ambiguity and that it does not expect to win. As a result, the AAER sample is likely to contain the most egregious misstatements and exclude firms that are aggressive but manage earnings within GAAP. Therefore, there are likely to be many manipulating firms that go undetected by the SEC (high Type II error rate). In addition, there is anecdotal evidence that the SEC scrutinizes firms that restate earnings because the firms have already admitted to making a mistake. Given constrained resources, this implies that fewer resources are available to detect misstatements by the firms that are not voluntarily disclosing them, which could be the most egregious offenders. Also, the SEC is concerned with the magnitude of the capital market impact because of its duty to protect investors. Therefore, it is likely to more closely scrutinize firms with large market capitalizations as well as IPO firms and firms raising public debt or equity. Finally, in some cases, the accused firm disagrees with the SEC about the accounting rules (as in the case of Prepaid Legal), which means that not all AAERs represent intentional misstatements outside of GAAP (Bonner et al., 1998).

**3.3.1.1. Determinants of AAERs.** We first discuss the evidence on *determinants* of AAERs. While AAERs may not represent intentional misstatements, as discussed above, the presumption in the majority of the studies is that the AAERs are an indication of earnings management, and the hypothesized determinants represent the incentives that might drive management to engage in earnings manipulation. We present our overall conclusions, which we base on a consideration of all of the findings, at the end of the section.

**Managerial compensation:** Dechow et al. (1996) and Beneish (1999) do not find an association between the *existence* of an earnings-based bonus plan and the likelihood of accounting manipulations. However, even though the AAER firms and control firms use bonus contracts to a similar extent, these tests do not tell us whether managers of AAER firms are more *sensitive* to earnings-based bonuses.

<sup>48</sup> Securitization rules, for example, allow for off-balance sheet entities whose risks may be relevant for equity valuation or assessing firm risk. Therefore, the current rules may reduce the quality of earnings as they are not a fair representation of the firm's underlying performance, which was the second reason we articulated in Section 2 for why an accounting measurement system (*f*) would not perfectly measure performance. However, firms correctly applying the securitization rules will not be in the AAER, restatement, or internal control deficiency samples.

Other researchers investigate whether managers manipulate earnings in order to affect investor perceptions and maintain current stock prices, which in turn could impact the value of the stock options and stock grants that often make up a larger proportion of management compensation. Johnson et al. (2009) find that managers of AAER firms face stronger incentives from unrestricted stocks than those of control firms. However, Erickson et al. (2006) and Armstrong et al. (2010b) do *not* find a positive association between stock-based incentive compensation and the likelihood of accounting fraud. This inconsistency could be due to differences in the compensation measures or differences in the control firms. For example, Armstrong et al. use a propensity matching score to create a matched sample that controls for many other characteristics in addition to industry and size. Related evidence suggests that managers engage in manipulation in order to make money by selling their stock at inflated prices (Summers and Sweeney, 1998; Beneish, 1999), although Dechow et al. (1996) do *not* find abnormally higher stock sale activities for the officers and directors of the AAER firms during the manipulation years.

*Debt covenants:* Another potential motivation for engaging in manipulation is to avoid debt covenant violation. Dechow et al. (1996) find that manipulation firms have higher leverage ratios and are more likely to violate debt covenants during and after the manipulation period than control firms. Beneish (1999), however, does *not* find statistically significant differences between manipulation firms and control firms in either leverage ratios or default risk.

*Capital market incentives:* The need to raise financing at favorable prices is also a potential reason for managers to window-dress the financial statements. Dechow et al. (1996) find that manipulation firms have higher *ex ante* external financing demands and higher *ex post* external financing activities than non-manipulation firms. Beneish (1999) provides conflicting evidence, but Dechow et al. (forthcoming) confirm the result using a more comprehensive sample of AAER firms.

Note that overall, the findings of Beneish (1999) are quite different from those of Dechow et al. (1996). One major difference between the research designs in these two papers is the method of matching to create their control samples. Beneish (1999) argues that the SEC likely focuses more on young growth firms. Therefore, he creates a control sample based on industry, year and firm age, whereas Dechow et al. (1996) match on industry, year, and firm size. In addition, the samples are different since Beneish's sample includes 10 "fraud" firms identified from a search of the financial press that were not the subject of AAERs, whereas Dechow et al.'s sample consists of just over 90 AAER firms, all of which overstate earnings. Finally, several of the key variables such as insider trading are measured differently.

*Corporate governance:* Researchers have also investigated whether "better" corporate governance reduces the likelihood of fraud. The idea behind such tests is that if managers are monitored more carefully, then they have less *opportunity* to engage in fraud given the incentive to do so. Note that in more recent times and particularly after 2000, we may expect less difference in governance features for AAER firms versus control firms because regulators and stock exchanges now require (and general public opinion effectively requires) *all* firms to have certain governance features as part of their listing requirements.

With respect to characteristics of the board of directors and CEOs, AAER firms tend to have a smaller percentage of outside members on the board of directors, are more likely to have a CEO who also serves as chairman of the board or founder of the company and are less likely to have an outside blockholder than control firms (e.g., Dechow et al., 1996; Beasley, 1996; Farber, 2005). These results suggest that greater monitoring does appear to reduce the ability to manipulate. In addition, Feng et al. (in press) provide evidence suggesting that CFOs become involved in misstatements mainly under CEO pressure rather than for their own immediate financial benefits.

With respect to audit committees and auditors, Dechow et al. (1996) find that AAER firms are less likely to have an audit committee, but Beasley (1996) does *not* find a significant association. Farber (2005) shows that fraud firms tend to have fewer audit committee meetings and fewer financial experts on the audit committee.<sup>49</sup> He does not, however, find an effect of audit committee independence on accounting fraud. This suggests that an active audit committee may be more important than an independent (but passive) audit committee. The underlying motivation for the hypotheses in these studies is that a well functioning audit committee helps empower the internal and external auditors and other employees since it provides a way to bypass top managers and communicate directly with directors.

With respect to external auditors, neither Dechow et al. (1996) nor Beneish (1999) finds a significant difference between misstatement firms and control firms, using Big-four status as an indication of audit firm quality, but using a more recent sample, Farber (2005) finds that fraud firms are less likely to have Big-four audit firms. High profile cases such as the manipulations at Enron that concurrently paid high fees to Arthur Andersen spurred regulation to increase auditor independence (i.e., reduce the ability of an audit firm to provide consulting services). However, interestingly, Geiger et al. (2008) do *not* find empirical evidence that auditor independence is associated with fraud, although Joe and Vandervelde (2007), using an experimental setting, suggest that it is.

In summary, intuitively it would seem that the low Type I error rate would make AAERs an excellent proxy for earnings management. However, the mixed evidence on opportunistic reporting incentives as a determinant of AAERs highlights two significant issues for researchers to confront. The first is a methodological issue. The samples are generally small, while the number of potential sources of incentives for misstatement is large, and the tests simply may not be powerful enough to detect a relation. Better matching could help, but matching is difficult. When researchers compare characteristics of AAER firms to those of control firms, they assume that the control firms are not engaging in earnings management and do

<sup>49</sup> Using an experimental setting, McDaniel et al. (2002) find that financial experts help audit committees focus on monitoring more important financial reporting issues.

not face incentives similar to those of fraud firms. However, issues of earnings manipulation and quality of earnings do appear to cluster by industry. For example, problems with off-balance sheet entities related to securitizations are clustered in the finance industry, problems with barter-revenue arrangements are clustered in internet industries, and problems with inventory are clustered in high growth businesses that subsequently decline. Thus, when researchers match on size and industry, they may unintentionally be matching on firms that had similar incentives to the AAER firm but just were not “caught” or did not push over the GAAP line. In addition, better measurement of the determinants variables could increase power, but executive-level compensation incentives and governance measures are noisy. In particular, current ways of measuring governance mechanisms cannot tell us how empowered directors are and whether they truly can influence managers’ decisions.

Second, keep in mind that these are joint tests of whether the AAERs are an indication of earnings management and the prediction about the hypothesized determinant; thus the mixed evidence may say more about the *prediction* than about AAERs as a proxy for earnings management. For example, certain governance mechanisms that might be associated with better monitoring of a manager, generally speaking, may not be associated with better monitoring of a manager’s financial reporting decisions. See further discussion of this issue in Section 5. In addition, in a world with efficient and “optimally” set contracts, we may not expect to see such variables differing across control and AAER firms (e.g., Armstrong et al., 2010b; Larcker et al., 2007).

**3.3.1.2. Consequences of AAERs.** We first summarize the evidence on *consequences* of AAERs. As with the determinants, the presumption in the majority of the studies is that the AAERs are an indication of earnings management, and the hypothesized consequences represent penalties for misstatements; that is, for misstatements that are caught. We provide our overall conclusions based on considering all of the findings together at the end of the section.

**Manager turnover:** Feroz et al. (1991) find that 42 of 58 AAER firms between 1982 and 1989 (72.4%) have management turnover (i.e., firing or resignation) after the public disclosure of the misstatement. Beneish (1999) documents that only 35.9% of misstatement firms have CEO turnover subsequent to the discovery of accounting misstatements (during the year of discovery and four years following the discovery) for AAER firms between 1987 and 1993. Karpoff et al. (2008a) focus on individuals identified by the SEC as the responsible party and find that 93% of them leave the company by the end of the enforcement period, and these culpable individuals suffer serious legal penalties (e.g., criminal charges) and monetary losses.

**Firm value:** A consistent result is that investors react negatively to news of misstatements. Feroz et al. (1991) and Dechow et al. (1996) find a negative stock return of  $-9\%$  to  $-10\%$  on the first announcement day of the accounting misstatements (see also Miller, 2006). Dechow et al. (1996) document a significant increase in bid-ask spreads and a significant decline in analyst following after the discovery of accounting misstatements. Karpoff et al. (2008b) find that the enforcement firms on average lose a total of 38% of their market values measured over all announcement dates related to the enforcement action. They suggest that two thirds of the decline represents lost reputation, which they define as “the decrease in the present value of future cash flows as investors, customers, and suppliers are expected to change the terms of trade with which they do business with the firm.” The remaining one-third represents legal penalties, and readjustments in valuations associated with the “restated” financial information. Farber (2005) finds that only firms that improve their corporate governance (e.g., by increasing the percentage of outside members on the board) experience improved stock market performance in the three-year post-detection period after controlling for changes in operating performance.

**Auditors:** Feroz et al. (1991) find that large auditors of the AAER firms are less likely to be censured by the SEC and generally suffer lighter penalties than small auditors. They suggest two explanations: large auditors are associated with less extreme cases, and/or large auditors can afford more resources to negotiate with the SEC to lower penalties. Bonner et al. (1998) document that auditors face litigation in 38% of AAER firms in their sample. The litigation risk for auditors is higher when the type of fraud occurs frequently across companies (i.e., common frauds) or when the fraud is caused by fictitious transactions.

Taken together, studies of the consequences of AAERs provide consistent and compelling evidence that investors react negatively to the discovery of a misstatement. The implications of these results for whether AAERs reflect earnings quality, however, is less clear. Keeping in mind that most samples of AAERs consist of firms that have *overstated* earnings, there are at least four explanations for a negative market reaction. First, an AAER could cause investors to adjust their forecasts of future cash flows if forecasts are based on historical earnings and the AAER reveals that historical earnings are lower than previously reported. Second, an AAER could cause investors to reassess the expected growth rate they apply to the cash flow forecasts. Third, an AAER could cause investors to increase their estimate of the discount rate applied to cash flows if the AAER causes them to revise downward their expectations about the precision of the firm’s accounting information. Finally, an AAER could cause investors to revise their expectations of future cash flows because they expect the AAER to create additional costs that the firm would otherwise not have incurred, such as litigation costs or reputation loss.

While the evidence consistently suggests that investors react negatively to the discovery of a misstatement, they do not distinguish among these four reasons. The third potential source of negative returns – that investors change their assessment of the precision of the accounting measurement and reporting system – should be of particular interest to accountants, but it is difficult to disentangle this explanation from the others. The market reactions to AAERs, however, would have empirical advantages for documenting revaluations due to changes in information risk. Many of the announcements are a surprise, the event window is fairly short, and the events are not clustered in calendar time. Karpoff et al. (2008b) took a useful first step

toward differentiating among the possible explanations for the negative stock market reactions, and we would encourage the use of AAERs to identify the specific implications of misstatements for earnings quality.

### 3.3.2. Restatements

The early studies that use a restatement as a proxy for an earnings misstatement identified the restatement sample using key word searches in the Lexis-Nexis News Library and SEC Filing Library (e.g., Palmrose et al., 2004). More recent papers use the GAO Financial Statement Restatement Database (e.g., Desai et al., 2006). This database was constructed using a Lexis-Nexis text search based on variations of the word 'restate' and contains approximately 2,309 restatements between January 1997 and September 2005.

As with the AAER sample, a significant benefit of using the restatement sample to identify firms with earnings quality problems is a lower Type I error rate in the identification of misstatements. In addition, the restatement sample has the added advantage of size; restatement samples are significantly larger than samples of AAER firms in any given year.<sup>50</sup> However, the increase in size comes at a cost. The restatement sample, in addition to misstatements, includes firms that are correcting unintentional errors, or applying new pronouncements retrospectively (e.g., SAB 101 required retrospective restatement). The SEC requires a restatement for any AAER that alleges a recognition misstatement (as opposed to a disclosure omission), but the GAO database also contains many restatements that do not trigger SEC investigations, including restatements required due to unintentional bookkeeping errors and restatements of immaterial or economically insignificant amounts (Plumlee and Yohn, 2010; Hennes et al., 2008). Hennes et al. (2008) document that the proportion of such restatements in the database has increased in recent years. Hence, restatements are a noisy proxy for *intentional* misstatements.

Like the AAER sample, the restatement sample is subject to concerns about potential selection bias, but the nature of the selection concern is different in the two samples, and it is not clear which is a bigger concern. Restatements can be triggered by the SEC, the firm, or the firm's auditor. On the one hand, having multiple sources that identify restatements might suggest that the selection issue simply creates noise in the analysis rather than bias. On the other hand, knowing the source of the selection bias in the AAER sample may make it easier to control for the potential bias.

**3.3.2.1. Determinants of restatements.** We first summarize the evidence on *determinants* of restatements. As in the AAER sample, the majority of the studies presume that a restatement indicates earnings management and assess whether the restatements are associated with incentives for (determinants of) earnings management. We provide our overall conclusions based on considering all of the findings together at the end of the section.

**Managerial compensation:** Burns and Kedia (2006) find that the sensitivity of the CEO's option portfolio to stock price is significantly positively associated with the likelihood of restatements, but the sensitivity of other components of CEO compensation (i.e., equity, restricted stock, long-term incentive payouts, and salary plus bonus) is not related. Efendi et al. (2007) find that the likelihood of restatements increases when the CEO has considerable holdings of in-the-money stock options.<sup>51</sup> However, Armstrong et al. (2010b) do not find a significant association between CEO equity incentives and restatements using a propensity matching score approach.

**Board of directors and auditors:** Restatement firms tend to have CEOs who serve as chairman of the board or have founder status and have board or audit committee directors with financial expertise (Agrawal and Chadha, 2005; Efendi et al., 2007). Independence of the board or audit committee is not a determinant of the likelihood of restatement (Agrawal and Chadha, 2005). Larcker et al. (2007) find that only two out of fourteen dimensions of governance (insider power such as percentage of insiders on board, and debt variables such as the ratio of book value of debt to the market value of equity) are associated with restatements.

Non-audit fees, which are presumed to affect auditor independence and hence may compromise auditor quality, are not associated with restatements on average (Agrawal and Chadha, 2005). Kinney et al. (2004) also find no association between fees for financial information systems design and implementation or internal audit services and restatements, but they find some association between fees for unspecified non-audit services and restatements. When using a sample of U.K. firms, Ferguson et al. (2004) find a positive association between non-audit fees and restatements.

The generally weak and mixed evidence across the determinants of restatements suggests that they are not a reliable indicator of *intentional* misstatements, which is a specific dimension of earnings quality that researchers might have thought restatements would indicate. In support of this conclusion, the compensation variables that would provide incentives for intentional earnings management and the monitors that would constrain intentional earnings management are not consistently associated with restatements.<sup>52</sup> The mixed evidence is perhaps not surprising. As noted previously, a disadvantage of the restatement sample is that it combines intentional and unintentional misstatements. Careful screening

<sup>50</sup> See Dechow et al. (forthcoming) for a detailed comparison of different databases related to accounting misstatements.

<sup>51</sup> Efendi et al. (2007) also find that restatements are more likely when firms are constrained by an interest-coverage debt covenant and when they raise external financing. This paper is the only one in our database that examines debt contracting and equity market incentives as determinants of restatements.

<sup>52</sup> Support for this conclusion also comes from a related study by Kinney and McDaniel (1989), which finds that firms that correct previously announced quarterly earnings are smaller, are less profitable, have higher debt, are more slowly growing, and face more serious uncertainties. They interpret their evidence as suggesting that accounting errors are the outcome of a weak accounting system (i.e., weak internal control procedures) rather than opportunistic earnings management.

of the sample has the potential to yield more powerful tests of the determinants and consequences of unintentional versus intentional misstatements (Hennes et al., 2008).

**3.3.2.2. Consequences of restatements.** We first summarize the evidence on *consequences* of restatements, then give our conclusions.

**Managers/Directors:** Managers at restatement firms experience significantly higher turnover (Desai et al., 2006; Hennes et al., 2008) and director turnover (Srinivasan, 2005) than control firms. Desai et al. (2006) also find that it is more difficult for these displaced managers to find subsequent employment than displaced managers of control firms. Srinivasan (2005) finds that the director turnover rate is higher for more severe restatements and for audit committee directors.

**Firm value:** Palmrose et al. (2004) document an average market-adjusted return of  $-9.2\%$  over a two-day restatement announcement window; the average is  $-20\%$  for restatements associated with fraud.<sup>53</sup> Lev et al. (2008) document that the restatements that significantly change the historical pattern of earnings (e.g., shortening histories of earnings growth) have more negative stock market consequences. Gleason et al. (2008) find that restatement announcements cause stock price declines for non-restatement firms in the same industry. Hribar and Jenkins (2004) document a significant increase in a firm's cost of equity capital, measured based on the residual income model, in the month following a restatement. Kravet and Shevlin (2010) document a significant increase in the pricing of information risk after restatement announcements.

**Litigation:** Palmrose and Scholz (2004) find that 38% of restatements are associated with litigation, including litigation actions against the company, officers, directors, and auditors. They document that the likelihood of litigation increases with the impact of restatements on earnings (magnitude) and the fraudulent nature of restatements. Restatements of core earnings (i.e., recurring earnings from primary operations) and restatements that involve a greater number of accounts tend to result in a higher likelihood of lawsuits and larger payments by defendants. Lev et al. (2008) find that restatements that curtail histories of earnings growth or positive earnings have a higher likelihood of class action lawsuits than other restatements.

In conclusion, researchers have made progress in identifying specific dimensions of quality, particularly through evidence on the market consequences of restatements. As with the AAERs, a negative market reaction to a restatement (an overstatement) would suggest that the restated earnings changed the market's decision about firm valuation. Thus, the earnings that were initially reported were less decision useful (of lower quality) in terms of equity valuation than the restated earnings. For the AAER firms, we were left with this broad conclusion, and we suggest that researchers attempt to disentangle *why* the equity valuation changed in order to gain more insights into why earnings are decision useful. Studies of restatements have made more progress in this direction, no doubt due to the larger sample size which allows for cross-sectional partitioning of the data and identification of the explanation for the restatement. For example, Hribar and Jenkins (2004) and Kravet and Shevlin (2010) suggest that restatements reflect errors that cause investors to revise their beliefs about information precision associated with the firm's earnings. Thus, they identify the effect of earnings on investor beliefs about information precision as an important feature of earnings that affects their decision usefulness.

### 3.3.3. Internal control weaknesses

The majority of the studies on internal control weaknesses as a proxy for earnings misstatements are conducted in the post-Sarbanes Oxley (SOX) regime. Under Section 302 of the Sarbanes Oxley Act of 2002, which became effective on August 29, 2002, management is required to certify in 10-Qs and 10-Ks their conclusions about the effectiveness of the firms' internal control procedures. Section 404 of SOX, which became effective on November 15, 2004 for accelerated filers, requires companies to include management's assessment of the effectiveness of the internal control structure and procedures in the annual report; the firm's public accountants must attest to this assessment.<sup>54</sup> Prior to these reports, companies (with the exception of the banking industry) were required to disclose significant internal control deficiencies in 8-Ks only when disclosing a change in auditors (Ge and McVay, 2005; Krishnan, 2005; Altamuro and Beatty, 2010).

Studies have shown a positive association between internal control quality and various earnings quality measures such as discretionary accruals and earnings persistence (e.g., Doyle et al., 2007a; Ashbaugh-Skaife et al., 2008). These association studies provide preliminary justification for using the internal control deficiencies reported under SOX as an indication of earnings quality.

However, like AAERs and restatements, internal control deficiency disclosures are subject to a potential selection bias that needs to be evaluated before they are used as a proxy for earnings quality. Internal control deficiency disclosures are affected by both manager and auditor incentives to discover and disclose the weaknesses. The relation between internal

<sup>53</sup> Desai et al. (2006) find that short sellers accumulate positions in restatement firms before restatement announcements and unwind these positions after stock prices decline due to the restatement. Their finding suggests that short sellers are able to identify firms that will likely restate in advance of the restatement announcement. It does not, however, explain short sellers' assumptions regarding market efficiency. One possibility is that the short sellers believe the stock is overpriced due to the valuation implications of the misstated earnings; they expect the restatement to reveal the mispricing and the price to correct. Another possibility is that the short sellers anticipate that markets will react negatively to restatements on average, regardless of the implications of the restatement for valuation. More research is needed to interpret the implications of this evidence for earnings quality.

<sup>54</sup> Internal control disclosures under Section 404 are available in machine readable form from Audit Analytics. The early papers collected the reports from Compliance Week or 10-K Wizard.

control procedures and these incentives affects interpretation of the results. For example, Hogan and Wilkins (2008) document that audit fees in the year *prior to* the disclosure of an internal control deficiency are higher than the fees for a matched sample that does not report deficiencies. One explanation for this finding is that auditors charge higher fees for the extra audit effort required to audit firms with weak controls. In this case, we would predict a positive association between fees and weak internal controls, but not necessarily between internal controls and earnings quality. If the auditor's extra effort results in detecting and reporting errors, then the fees should not be associated with the observed quality of the reported (and corrected) earnings. Another explanation is that auditors charge higher fees when the assessed audit risk is higher, and weak controls are correlated with audit risk assessments (i.e., the fees represent a pure risk premium). In this case, we would predict a relation between internal controls and earnings quality. Hogan and Wilkins emphasize the first explanation while acknowledging that they cannot rule out the risk premium story.

Although it is based on a small number of studies, evidence on the *determinants* of internal control deficiencies disclosed under SOX Section 302 is consistent, suggesting that such deficiencies measure the propensity for misstatements.<sup>55</sup> Ashbaugh-Skaife et al. (2007) and Doyle et al. (2007b) find that firms with higher control risk associated with organizational complexity and significant organizational changes are more likely to have internal control deficiencies. The weakness firms also appear to be more constrained in their resources to invest in internal control systems (i.e., firm size, financial strength).<sup>56</sup>

Evidence on the *consequences* of reported internal control weaknesses suggests that the Section 302 disclosures provide an indication of deficiencies, but Section 404 disclosures do not appear to be a *source* of information about financial reporting quality to investors. For internal control weaknesses reported under Section 302, Hammersley et al. (2008) and Beneish et al. (2008) find that disclosures of the weaknesses are associated with negative stock price reactions. Beneish et al. (2008) also find that Section 302 disclosures are associated with a decrease in analyst forecast revisions and an increase in cost of equity capital. However, disclosures of internal control weaknesses under Section 404 are *not* associated with a negative stock price reaction, a decrease in analyst forecast revisions, or an increase in cost of equity capital (Ogneva et al., 2007; Beneish et al., 2008). Only one study documents a significant increase in the cost of equity capital following Section 404 disclosures (Ashbaugh-Skaife et al., 2009), arguing that Ogneva et al.'s findings suffer from look-ahead bias in the classification of internal control quality.<sup>57</sup>

There are several explanations for the difference in the consequences of Section 302 and Section 404 reports. First, the threshold for Section 404 material weaknesses may be lower than that for Section 302. Second, the Section 404 samples examined are limited to accelerated filers that have a richer information environment. Third, there is ambiguity regarding whether disclosure of material weaknesses is mandatory under Section 302, and as a result, less severe material weaknesses may not be disclosed (Doyle et al., 2007a). Fourth, the Section 404 disclosures are made in the annual report, while the Section 302 disclosures can be made on dates without confounding announcements in the event window.

Variation in the types of errors reflected in the nature of internal control weaknesses (and for that matter restatements and SEC enforcement releases) provides an opportunity to examine the complete path from a predicted determinant (i.e., weak internal control procedures) to a particular type of earnings quality and then to a predicted consequence. For example, one could address whether the market consequences of a misstatement are different if an internal control weakness rather than an agency problem causes it. Such tests would help to clarify the types of implementation issues that erode the decision usefulness of earnings.

#### 4. Cross-country studies

This section discusses the papers in our database that examine cross-country variation in earnings quality proxies. The studies provide evidence on proxies for earnings quality similar to those discussed in Section 3, including earnings response coefficients (e.g., Alford et al., 1993; Ali and Hwang, 2000); smoothness (e.g., Leuz et al., 2003; Lang et al., 2006; Francis and Wang, 2008); accruals and discretionary accruals (Hung, 2000; Haw et al., 2004; Pincus et al., 2007); timely loss recognition (Ball et al., 2008)<sup>58</sup>; small positive profits (Leuz et al., 2003; Lang et al., 2006); and scores based on a combination of quality measures (e.g., Leuz et al., 2003). However, we discuss the above cross-country studies in this section separately due to unique features of the data that affect the measurement of the earnings quality proxies and the nature of the research approach to evaluate them.

<sup>55</sup> Early research on the determinants of internal control weaknesses were limited and provided weak evidence due to data availability. For example, Willingham and Wright (1985) survey audit firm partners and do not find an association between auditors' assessment of internal control effectiveness and financial statement errors detected by auditors. Kinney (2000) also notes that lack of access to data was a barrier to research on internal control procedures. Some very early work analyzed the design and tests of internal control systems (e.g., Cushing, 1974; Kinney, 1975). Krishnan (2005), also not using SOX data, finds that independent audit committees and audit committees with financial expertise are significantly less likely to be associated with the incidence of internal control problems.

<sup>56</sup> Studies that examine whether internal control procedures are a *determinant* of another earnings measure (e.g., discretionary accruals or persistence) are discussed in Section 5.3.

<sup>57</sup> A related study by Chang et al. (2006) finds that firms that have CEOs and CFOs certify their financial statements under SOX experience a decline in bid-ask spreads.

<sup>58</sup> Studies that examine asymmetric timeliness or timely loss recognition, whether they use country-level proxies or firm-level proxies for international firms, are discussed in Section 3.1.4.

The main methodological advantage of the cross-country studies for understanding the earnings quality proxies is greater heterogeneity across countries than within countries in determinant variables such as accounting standards, legal systems, and incentives provided by capital markets. This heterogeneity allows for tests of hypotheses that are not possible using data for a single country. This methodological advantage, however, has implications for interpretation of the results on earnings quality. For example, a finding that greater investor protection is associated with higher ERCs does not imply that ERCs are a good proxy for earnings quality, even under the maintained assumption that investor protection improves quality. The finding only suggests that ERCs are a good proxy for decision usefulness (i.e., quality) associated with decisions and decision-makers subject to good investor protection. As emphasized throughout this review, the definition of “quality” is decision-specific, and the decision environment in these studies is unique by design.

We focus the discussion on what we can learn only from cross-country studies due to the methodological differences compared to studies of U.S. firms. It is beyond the scope of this review to comment on earnings quality in other countries, particularly relative to the U.S., or to comment on what optimal accounting policies should look like given a country’s institutional environment. We restrict our attention to observations about the evidence in these cross-country studies related to evaluating the proxies for earnings quality.

Our final observation before we proceed to a discussion of the studies is a reminder about the impact of well-recognized data limitations on the interpretation of the results. While access to machine readable firm-level financial data across countries outside the U.S. is improving, it is still relatively constrained, as is data required to measure the determinants and consequences. As a result, the increase in power afforded by greater heterogeneity in determinants of earnings quality is potentially offset by increased noise in the measurement of the EQ proxies as well as in the measurement of the determinants. For example, investor protection is often measured using indicator variables equal to one for common law countries (good protection) and zero otherwise or by broad indices (e.g., La Porta et al., 2006). Likewise, the definition and measurement of accruals as a proxy for earnings quality are constrained by data availability, and little effort is devoted to controlling for variation in the *return* component of the return-based proxies for earnings quality, despite evidence of variation in the relation between economic and capital market development (Frost et al., 2006). Focusing on a smaller set of countries for which data are more reliably available could reduce the noise, but this approach mitigates the benefits of cross-country heterogeneity.

We now proceed to a discussion of the papers, keeping in mind that our purpose is to exploit the methodological advantages of the cross-country studies for providing evidence on the ability of the earnings quality proxies to capture decision usefulness. The first significant component of the literature provides evidence on cross-country variation in *investor responsiveness to earnings*. Alford et al. (1993) document cross-country variation in long-window ERCs and earnings-based hedge portfolio returns for 17 countries. They do not test hypotheses about predictable differences in ERCs across countries. Rather, they provide the reader with a summary of important institutional cross-country differences (e.g., interim reporting frequency) to help interpret the results *ex post*. A later study by Ali and Hwang (2000) examines the two measures of investor responsiveness to earnings (ERCs and earnings-based hedge portfolio returns) from Alford et al. (1993) plus two additional measures – value relevance of accruals and combined value relevance of earnings and book value of equity – across partitions of 16 countries that they predict will exhibit variation in earnings informativeness *ex ante*. They investigate six country-level institutional factors, but they emphasize the following results: investor responsiveness to earnings is lower in countries where financial systems are bank-oriented rather than market-oriented and where the accounting rules are less likely to be tilted toward preferences of equity markets because of the standard-setting process. Hung (2000) investigates country-specific accrual accounting intensity as a country-level EQ determinant and uses earnings-based hedge portfolio returns to measure country-level investor responsiveness to earnings. She finds that across 21 countries, more extensive use of accrual accounting rather than cash accounting is associated with lower earnings responses only in countries with weak shareholder protection.<sup>59</sup>

In summary, we feel limited in our ability to draw conclusions about investor responsiveness as a proxy for earnings quality from the above studies. They are joint tests of the theory that a particular institution/regulation affects investor responsiveness to earnings and that the investor responsiveness proxy measures earnings quality. In our opinion, given the concerns noted previously regarding measuring the determinant variables, these studies speak more to the theories than to the assumption that investor responsiveness is a proxy for quality. The authors of these studies (and most cross-country studies) recognize the measurement problem of the determinant variables and many either use empirical methods to control for un-modeled sources of cross-country variation in the determinants or model expected sources of variation such as industry concentration. However, even observable variables such as natural resource endowments and the level of economic development are not frequently modeled and less consideration is given to unobservable cultural differences such as religion or trust in governance mechanisms (Guiso et al., 2009).

The second significant component of this literature is studies that focus on *earnings management* as a specific dimension of quality. Leuz et al. (2003) is an influential paper in terms of measuring country-level earnings management. Their score

<sup>59</sup> Hung (2000) develops her own country-specific accrual accounting intensity index based on the accounting treatment of (1) goodwill, (2) equity method investments, (3) depreciation, (4) purchased intangibles, (5) internally developed intangibles, (6) research and development costs, (7) interest capitalization, (8) lease capitalization, (9) percentage of completion allowances, (10) pensions, and (11) post-retirement benefits.

aggregates four individual measures of earnings management:

- (i) Opportunistic smoothness defined as the country's median ratio of the firm-level standard deviation of operating earnings divided by the firm-level standard deviation of cash flow from operations (where scaling by the cash flows is a control for differences in the variability of economic performance). A lower ratio indicates more smoothing.
- (ii) Opportunistic smoothness defined as the contemporaneous correlation between changes in accounting accruals and changes in operating cash flows obtained from pooled firm-year country observations. A stronger negative correlation indicates more smoothing.
- (iii) The country's median of the absolute value of firms' accruals scaled by the absolute value of firms' cash flow from operations. A larger ratio is indicative of more earnings management.<sup>60</sup>
- (iv) Small loss avoidance (ratio of small profits to small losses).

Using this score, Leuz et al. find less earnings management for countries with developed stock markets, dispersed ownership, strong investor rights, and strong legal enforcement.

Four later studies also document a negative association between investor protection and earnings management using different measures of earnings management. They predict that stronger protection reduces earnings management because it limits insiders' ability to acquire private benefits, which then reduces the firm's incentives to mask firm performance. The first study is that of Lang et al. (2006), who compare the extent of earnings management between a sample of non-U.S. firms that are cross-listed in the U.S. and a sample of U.S. firms. They document that the cross-listed non-U.S. firms exhibit more evidence of smoothness, a greater tendency to report small profits, and lower ERCs (all of which are assumed to proxy for earnings management) than U.S. firms, and that this difference is greater for firms from countries with poor investor protection.<sup>61</sup> The second study is that of Haw et al. (2004), who document that earnings management (measured by the unsigned magnitude of discretionary accruals) that stems from the conflicts between controlling shareholders and minority shareholders is lower in countries with strong protection of minority shareholders' rights and strong legal enforcement. The third study is that of Francis and Wang (2008), who find that earnings quality (measured by the magnitude of discretionary accruals, the likelihood of reporting a loss, and timely loss recognition) is positively related to country-level investor protection, but only for firms with Big-four auditors. They suggest that investor protection affects earnings quality through the incentives of Big-four auditors (i.e., litigation risk and reputation risk). Finally, Burgstahler et al. (2006) document interactions between the effects of institutions and public equity markets on earnings management. Using a sample of private and public firms from 13 European Union countries, they find that private companies manage earnings more, consistent with less pressure for earnings quality, and they suggest that stronger legal institutions curb earnings management in both private and public firms. The Burgstahler et al. (2006) earnings management measures are similar to those used in Leuz et al. (2003), but they are constructed at the industry level and include some additional control variables, which is a useful attempt to control for fundamental performance.

As with the cross-country investor responsiveness studies, the studies on investor protection and earnings management are joint tests of the theory that investor protection affects earnings management and that the Leuz et al. score or other proxies measure earnings management. The convergence of the results demonstrating a relation between investor protection and earnings management across the various proxies, including smoothness, small profits, loss avoidance, and discretionary accruals, suggests that these variables, when measured at the country level, are likely picking up the earnings management dimension of earnings quality. There was no such convergence documented in the investor responsiveness studies; they each examined different determinants (or were agnostic about the determinants in the case of Alford et al., 1993). Nonetheless, the conclusion that the country-level earnings management proxies are measuring earnings management is subject to the maintained assumption that the proxies used for investor protection are associated with investor protection and that such investor protection reduces earnings management.<sup>62</sup>

Like the majority of the determinants studies, the four papers in our database that examine consequences of country-level earnings quality provide evidence specifically on proxies for the *earnings management* dimension of earnings quality. Bhattacharya et al. (2003b) find that poor country-level earnings quality (measured as earnings aggressiveness using accruals, loss avoidance, and earnings smoothness) is associated with a higher country-level cost of equity capital and lower trading volume. They interpret this finding as evidence that earnings aggressiveness is associated with greater opacity. Pincus et al. (2007) find that the accrual anomaly, while a global phenomenon, is concentrated in four countries: Australia, Canada, the United Kingdom, and the U.S., all of which are common law countries. The accrual anomaly is

<sup>60</sup> The smoothness and accrual measures are different from those commonly used in studies of U.S. firms. For example, in studies of U.S. firms, the absolute value of accruals is typically scaled by assets.

<sup>61</sup> Lang et al. (2006) do not use the Leuz et al. (2003) measure of artificial smoothness. They develop their own measure of artificial smoothness that similarly attempts to control for smoothness of fundamental performance. They measure smoothness as the variance of the residuals from a regression of annual changes in net income scaled by total assets on control variables for fundamental firm characteristics. Their analysis also uses a matched sample design with matching based on past sales growth and industry, which reflects an effort to control for fundamental variability. Lang et al. also examine timely recognition of losses, but not as a proxy for earnings management.

<sup>62</sup> It is not universally accepted that investor protection will be associated with lower earnings management. For example, one could argue that when investors have no rights, managers would no longer need to manipulate earnings because they are fully entrenched. However, the data constraints associated with defining specific types of investor rights typically limit a researcher's ability to overcome this issue.

positively associated with the Hung (2000) index of accrual accounting intensity and negatively associated with share ownership concentration. Pincus et al. (2007) also provide somewhat weaker evidence suggesting that the accrual anomaly is negatively related to investor rights. They interpret the results, taken together, as suggestive that earnings management is associated with the accrual anomaly. Biddle and Hilary (2006), using the Leuz et al. (2003) measure, document that smoothness is associated with lower investment efficiency as measured by investment cash flow sensitivity metrics (see also Biddle et al., 2009). Finally, looking at 26 countries, DeFond et al. (2007) document a positive association between average country-level earnings quality, measured based on a score developed in Leuz et al. (2003), and abnormal return variance during a two day annual earnings announcement window. They also find that abnormal return variance around earnings announcements is higher in countries with better enforced insider trading laws, strong investor protection, and less frequent interim reporting.

These four studies again provide consistent evidence that the various earnings quality proxies, when measured at the country level, reflect variation in earnings management. The evidence on small profits as a proxy for earnings management contrasts with much of the evidence based on U.S. data. The evidence on accruals is not as incrementally valuable for understanding accruals quality in general, given the noise in the proxies for accruals in the cross-country studies compared to studies of U.S. firms.<sup>63</sup> The evidence on smoothness conflicts with evidence from studies of U.S. firms (e.g., Tucker and Zarowin, 2006; Subramanyam, 1996). One explanation for the conflict is differences in the measurement of smoothness, and in particular in the ability of the smoothness measures to identify the opportunistic element of smoothness. An alternative explanation, however, is that there are real differences in the decision-usefulness of smoothness across countries because of the different institutions. Future research could attempt to sort out these explanations.

Finally, we conclude this section with a reminder of an important caveat that we made at the beginning. The conclusions that the earnings management measure examined in these studies captures earnings management that would erode decision usefulness, and thus, earnings quality, are specific to decisions and decision makers made in the countries studied.

## 5. The determinants of earnings quality

In this section, we review the literature on the determinants of earnings quality. There are six categories of determinants: (1) firm characteristics, (2) financial reporting practices, (3) governance and controls, (4) auditors, (5) equity market incentives, and (6) external factors. Many of the papers were already discussed in Section 3, but in this section we have juxtaposed the studies according to the determinant of earnings quality that is examined. The purpose of this discussion is fourfold. First, and most importantly, this review highlights the convergent or divergent validity of the hypothesized determinants of earnings quality across the various EQ proxies. Second, we provide determinant-specific conclusions and insights that were absent from Section 3. In particular, research design issues tend to be determinant-specific, and our discussion highlights a number of such issues. Third, Section 3.1 did not discuss the determinants and consequences of abnormal accruals because there are almost one hundred papers using abnormal accruals to measure earnings quality. This literature is discussed here. Finally, this section provides a convenient reference tool for readers who are interested in reviewing the results related to a specific determinant of earnings quality.

### 5.1. Firm characteristics as determinants of earnings quality

Several studies provide descriptive evidence that firm operating characteristics, broadly defined, are associated with the various proxies for earnings quality, including a firm's choice of accounting principles (Hagerman and Zmijewski, 1979; Jung, 1989; Lindahl, 1989), properties of its earnings such as persistence and volatility (Lev, 1983), and accruals (Dechow, 1994). Insights about four *specific* firm characteristics deserve a separate discussion: (1) firm performance, (2) debt, (3) growth and investment, and (4) size.

*Firm performance:* Researchers have investigated whether firms that are performing poorly engage in accounting tactics to improve their earnings and hence lower earnings quality. Specifically, weak performance provides incentives to engage in *earnings management* (Petroni, 1992; DeFond and Park, 1997<sup>64</sup>; Balsam et al., 1995; Keating and Zimmerman, 1999; Doyle et al., 2007a; Kinney and McDaniel, 1989). However, Francis et al. (1996) do not find an association between weak performance and *write-offs*, and DeAngelo et al. (1994) suggest that sustained weak performance can limit opportunities to manage earnings.

*Debt:* If higher leverage is indicative of a firm that is closer to a debt covenant restriction, then managers in more highly levered firms could be taking action to boost income or manipulate the financial statements so as to avoid violating a covenant (Watts and Zimmerman, 1986). Such action could reduce the quality of earnings for other decisions. There is substantial evidence that debt levels are associated with various measures of earnings quality, including *income increasing accounting method choices* (e.g., Bowen et al., 1981; Zmijewski and Hagerman, 1981; Daley and Vigeland, 1983<sup>65</sup>; Johnson and Ramanan, 1988; Malmquist, 1990; Balsam et al., 1995; LaBelle, 1990), asset sales as a form of *real earnings management*

<sup>63</sup> We are not questioning the contributions of the results for other purposes; we are questioning only what they reveal about the proxies for earnings quality.

<sup>64</sup> Elgers et al. (2003) suggest that the results in DeFond and Park (1997) are sensitive to the method used to “back out” abnormal accruals.

<sup>65</sup> Daley and Vigeland (1983) also find that the firms that choose income increasing voluntary accounting methods have higher ratios of dividends to retained earnings, which is another proxy for the extent to which debt covenants are likely to be binding.

(Bartov, 1993), *ex post* proxies for poor quality such as earnings announcement corrections (Kinney and McDaniel, 1989), restatements (Efendi et al., 2007), and weak evidence with AAERs (Dechow et al., 1996; Beneish, 1999; Dechow et al., forthcoming). Studies that use more direct measures of proximity to covenant violation also generally support the debt covenant hypothesis for *accounting choices* (Sweeney, 1994), *abnormal accruals* (DeFond and Jambalvo, 1994), and *target beating* (Dichev and Skinner, 2002), although DeAngelo et al. (1994) find relatively little difference between *accruals* for firms with and without binding covenants.

Thus, higher leverage is associated with lower quality earnings using a multitude of proxies. However, whether the lower quality is due to closeness to covenants versus other incentives (e.g., bankruptcy concerns, financial distress, the need for financing) or more generally to differences in the investment opportunity set is a lingering question (e.g., Zimmer, 1986; Skinner, 1993). Studies that use more direct proxies for closeness to covenants do suggest that managers make accounting choices to avoid covenant violation, but this result does not necessarily imply that earnings quality is compromised. If decision makers adjust for the effects of the choices, either because they observe them or because they rationally infer that income-increasing accounting choices are taken to avoid covenant violations, then such actions may benefit all contracting parties.

*Firm growth and investment:* Researchers have investigated the role of growth and earnings quality on a number of dimensions. When growth is measured in terms of sales growth or net operating asset growth, then it appears that high growth firms have *lower earnings persistence* (Nissim and Penman, 2001; Penman and Zhang, 2002), as discussed extensively in Section 3.1.1. The negative relation between growth and earnings quality proxies is suggested by other proxies as well, including *measurement error* in earnings and *earnings management opportunities* (Richardson et al., 2005), *target beating* (McVay et al., 2006), AAERs (Dechow et al., forthcoming), and *internal control weaknesses* (Doyle et al., 2007b; Ashbaugh-Skaife et al., 2007). Lee et al. (2006), however, do not find evidence supporting the association between growth and restated amounts.

*Firm size:* Studies suggest a relation between firm size and several earnings metrics, but the relation is not the same across measures. Early papers predict that firm size would be *negatively* associated with earnings quality because larger firms would make income-decreasing accounting method choices in response to greater political/regulatory scrutiny (Jensen and Meckling, 1976; Watts and Zimmerman, 1986). The evidence is mixed and depends on the nature of the *accounting method choice* examined and the sample/setting (e.g., Hagerman and Zmijewski, 1979; Zmijewski and Hagerman, 1981; Bowen et al., 1981; Zimmer, 1986). Moreover, Moses (1987) finds that firm size and market share (marginally) are associated with accounting method changes to smooth (as opposed to decrease) earnings. However, more recent studies predict and find that size is *positively* associated with earnings quality because of fixed costs associated with maintaining adequate internal control procedures over financial reporting, as suggested by Ball and Foster (1982). Small firms are more likely to have *internal control deficiencies* and are more likely to *correct previously reported earnings* (Kinney and McDaniel, 1989; Ge and McVay, 2005; Doyle et al., 2007a; Ashbaugh-Skaife et al., 2007).

Taken together, the above studies that examine firm characteristics as determinants of earnings quality reveal that firm characteristics (e.g., firm size, performance, etc.) are most commonly documented to be associated with *accounting method choice*. This revelation is important for two reasons. First, studies that use accounting choices, including method choices and estimates, as an indication of earnings management and hence earnings quality must control for fundamental differences in firm characteristics before inferring opportunism.

Second, accounting method choices are relatively transparent compared to, for example, accrual earnings management. If the earnings management is transparent to decision makers, either because the accounting choices are obvious (e.g., accounting method changes) or because the decision makers rationally infer that income-increasing actions are taken to meet certain objectives (e.g., to avoid covenant violation), then earnings quality (its decision usefulness) is not impaired from the perspective of the decision-maker who detects it. However, there is limited evidence that investors are able to unwind incentives and to incorporate an expectation of rational earnings management into their pricing. Studies such as Aboody et al. (1999) and Shivakumar (2000) suggest that investors detect earnings management and view it as a value-maximizing activity that is the outcome of efficient contracting. However, their evidence is for debt and equity related incentives, which are among the strongest documented incentives for earnings management and potentially the most transparent to investors. The limited research on whether earnings management is detected turns out to be a common problem that we identify in other parts of Section 5 as well; thus we discuss this issue in more detail in the conclusion (Section 7).

## 5.2. Financial reporting practices as determinants of earnings quality

This section discusses three features of financial reporting practices that researchers predict to affect earnings quality:

- (1) accounting methods, broadly defined to include principles (e.g., full cost versus successful efforts), estimates associated with accounting principles (e.g., straight-line versus accelerated depreciation), or estimates (e.g., pension accounting assumptions),
- (2) other financial reporting practices including financial statement classification and interim reporting, and
- (3) principles based versus rules based methods.

There are only a small number of papers in the first category, likely due to research design issues such as endogeneity (i.e., firms choose to follow different methods). Early studies, while acknowledging the endogeneity issue, nonetheless provide evidence on the relation of specific accounting methods to *earnings smoothness* and to *earnings informativeness* (Gonedes, 1969; Barefield and Comiskey, 1971; Beidleman, 1973; Moses, 1987). When accounting methods are mandatory (i.e., exogenous), there is no cross-sectional variation to examine. An alternative is to study firms in different mandatory reporting regimes (i.e., different countries or different time periods), but this approach creates an omitted correlated variables problem. The small number of papers published after the mid-1970s either use simulations (Dharan, 1987; Healy et al., 2002) or examine specific accounting methods in specific settings or for specific samples allowing them to overcome the research design issues (Loudder and Behn, 1995; Lev and Sougiannis, 1996; Aboody et al., 1999; Sivakumar and Waymire, 2003; Altamuro et al., 2005), which improves internal validity but at the expense of generalizability.

Overall, the notion that accounting method choice, on average, leads to lower quality earnings because managers make opportunistic choices rather than choices that improve earnings informativeness does not have much support. For example, cash flow methods do *not* dominate accrual-based methods (that involve estimation) in forecasting cash flows (Dharan, 1987), and more “aggressive” income recognition methods are viewed as opportunistic by investors (Loudder and Behn, 1995; Altamuro et al., 2005). Moreover, investors appear to adjust their valuation decisions to reflect information that is not reported (e.g., R&D expenditure) (Lev and Sougiannis, 1996). Investors also appear to adjust their valuations when they anticipate earnings management (Aboody et al., 1999).

Regarding other financial reporting practices, prior research has examined the effects of financial statement classification and interim reporting on earnings quality. McVay (2006) suggests that firms opportunistically use discretion over income statement classification within a period to shift expenses into categories that might be perceived as less persistent (special items) to meet analyst forecasts. Related to interim reporting, several papers indicate that firms time income recognition across periods within a fiscal year, which affects the relative quality of interim versus fourth quarter earnings, but the papers provide mixed evidence on directionality. Kerstein and Rai (2007) and Jacob and Jorgensen (2007) document that *the kink in earnings* is strongest for fiscal years for which the incentives for earnings management are greatest relative to annual periods ending at the first three fiscal quarters. In contrast, Brown and Pinello (2007) suggest that firms use more earnings management to avoid *negative earnings surprises* at interim quarters than at fiscal years, because the financial auditing process increases opportunities for earnings management in interim periods.

Finally, the evidence on the impact of principles-based versus rules-based standards on earnings quality is mixed. Conceptually, a potential advantage of principles-based standards is that removing alternative accounting treatments for a transaction in favor of a single principle that reflects underlying performance would result in a more informative earnings number because it reduces opportunities for earnings management. Managers cannot opportunistically apply an inappropriate method or estimate but can claim that they were following stated accounting principles such as U.S. GAAP or IAS as a defense. A potential disadvantage is that principles-based standards constrain a manager's use of discretion allowed within the standards to provide relevant information.<sup>66</sup>

Two studies, a field experiment and a survey, conclude that principles-based standards likely will *not* diminish opportunistic earnings management (Cuccia et al., 1995; Nelson et al., 2002). However, two empirical analyses reach the opposite conclusion. Mergenthaler (2009) documents that accounting standards with more rule-based characteristics are associated with a greater dollar magnitude of misstatements using a sample of GAAP violation firms. Barth et al. (2008) argue that International Accounting Standards (IAS) are principles-based and find evidence that the use of IAS is associated with less *earnings management*, more *timely loss recognition*, and greater *value relevance*. They are careful to acknowledge that these *ex post* characteristics of earnings also are a function of differences in institutions, which affect the demand for information, enforcement, and fundamental firm characteristics of the IAS adopters. While they attempt to control for these differences, the results are still subject to this caveat.

### 5.3. Governance and controls as determinants of earnings quality

According to the terminology of Jensen and Meckling (1976), internal controls include monitoring mechanisms, optimally chosen by the principal in the principal-agent relationship, as well as bonding mechanisms, optimally chosen by the agent at some cost. The mechanisms we discuss in this section include characteristics of the Board of Directors (BOD), internal control procedures,<sup>67</sup> managerial share ownership, managerial compensation, and managerial change. Studies of the association between BOD characteristics and internal control procedures generally view these internal control mechanisms as monitors of the financial reporting system that constrain a manager's opportunity or ability to manage earnings, while managerial share ownership and managerial compensation are generally predicted to affect earnings quality because they provide incentives for earnings management.<sup>68</sup> In both cases, internal controls are predicted to affect *earnings management*, commonly proxied by *discretionary accruals* and *accounting misstatements*.

<sup>66</sup> See Barth et al. (2008) for a thorough discussion of the debate.

<sup>67</sup> We emphasize the distinction between “internal controls,” a term used broadly by Jensen and Meckling (1976) to include what researchers commonly refer to as corporate governance mechanisms as well as bonding mechanisms, and internal control “procedures.” We will use the term “internal control procedures” for the tasks performed to monitor the financial reporting system, for example, by an internal audit department.

<sup>68</sup> See Ng and Stoeckenius (1979), Lambert (1984), Verrecchia (1986), Dye (1988) and Liang (2004).

The evidence consistently suggests that internal control procedures are associated with less earnings management (Doyle et al., 2007a; Ashbaugh-Skaife et al., 2008) and that managerial turnover is a disciplining mechanism that mitigates earnings management (Moore, 1973; DeAngelo, 1988; Collins and DeAngelo, 1990; Dechow and Sloan, 1991; Pourciau, 1993<sup>69</sup>; Geiger and North, 2006). However, evidence on governance mechanisms other than internal control procedures is weak or mixed. Related to characteristics of the BOD, studies document that more independent boards (e.g., measured by a greater proportion of outsiders), and higher audit committee quality (e.g., measured by independence and meeting frequency) are associated with less earnings management (e.g., Beasley, 1996; Klein, 2002; Abbott et al., 2004; Krishnan, 2005; Vafeas, 2005; Farber, 2005). However, Larcker et al. (2007) find mixed evidence of associations between the fourteen governance factors and earnings quality as measured by *discretionary accruals* and *restatements*.

The evidence on ownership is even more mixed. Some studies suggest that greater managerial ownership has an *entrenchment effect* – controlling shareholders extrapolate private benefits at the expense of minority shareholders through *accounting method choice* (Smith, 1976; Dhaliwal et al., 1982) and *less conservatism* (LaFond and Roychowdhury, 2008). Other studies, however, support an *incentive alignment effect* of managerial ownership based on *discretionary accruals* and *ERCs* (Warfield et al., 1995; Gul et al., 2003), although Larcker et al. (2007) get opposite results for the relation between insider power, primarily measured by managerial ownership, and *discretionary accruals*. Likewise, two studies using data from countries with high ownership concentration (i.e., controlling shareholders relative to minority shareholders) suggest an entrenchment effect (Fan and Wong, 2002; Kim and Yi, 2006), while Wang (2006) provides evidence in support of the incentive alignment effect for founding family ownership in the U.S.<sup>70</sup>

Finally, evidence on the relation between characteristics of managerial compensation and earnings management is voluminous. The studies included in this literature are as follows: seven studies on bonus plans and earnings-based compensation as a determinant of accounting choices (Hagerman and Zmijewski, 1979; Bowen et al., 1981; Healy, 1985; Skinner, 1993; Holthausen et al., 1995; Gaver et al., 1995; Guidry et al., 1999)<sup>71</sup>; ten studies on equity-based compensation including executive stock options (Bergstresser and Philippon, 2006; Burns and Kedia, 2006; Efendi et al., 2007; Johnson et al., 2009; Balsam et al., 2003; Baker et al., 2003; Coles et al., 2006; McAnally et al., 2008; Erickson et al., 2006; Armstrong et al. (2010b)<sup>72</sup>; and three studies on insider trading (Beneish, 1999; Summers and Sweeney, 1998; Darrough and Rangan, 2005).

The results of these studies again are mixed. We make no attempt to summarize and compare them because each paper matches a specific form of compensation-related incentives (e.g., insider trading or equity incentives) to a specific earnings management objective (e.g., smoothing or meeting an earnings target), and each paper identifies a specific mechanism (e.g., discretionary accruals) that will be used to achieve the objective. Studies of incentives provided by contract-based compensation, for example, can predict that managers will manage any element of reported earnings except for those that can be easily observed by compensation committees or even those contractually excluded from the bonus calculation. In fact, the degree of mixed evidence across these studies likely reflects the difficulties of correctly matching the compensation incentives to the earnings management tools. The fact that the results are variable and decision specific is a point we have emphasized throughout the review.

As a whole, the literature on internal control mechanisms (other than internal control procedures) yields the following insights. First, not all internal control mechanisms should be predicted to have an equal impact on the various proxies for earnings quality. This insight supports our conclusion about the literature, taken as a whole, that the earnings quality proxies should not be treated as substitutes, as discussed in Section 2. The studies consistently suggest a negative association between audit committee quality and earnings management (with the exception of Larcker et al., 2007). This result is not surprising because the audit committee's primary responsibility is to oversee the financial reporting process. Thus, inferences from studies that predict an association between audit committee quality and accruals quality have the greatest internal validity among all the governance mechanisms, *ceteris paribus*. The explanation for an association between BOD quality and earnings management, however, is weaker. Directors are usually involved with decisions at a high level, such as setting overall strategy (Adams et al., 2008). Hence, while it may be reasonable to argue a correlation between BOD quality and the quality of M&A decisions, for example, the argument that BOD characteristics can explain cross-sectional variation in earnings management is less compelling. Tests based on an overall governance score as a proxy

<sup>69</sup> Dechow and Sloan (1991) and Pourciau (1993) find conflicting evidence about the association between the use of income increasing *accruals* and management turnover. A key difference between the studies is that Dechow and Sloan (1991) study retirees with expected departure dates, while Pourciau (1993) studies non-routine executive turnover. The conflicting results emphasize the difficulty of identifying whether and when managers expect to depart.

<sup>70</sup> The findings for the Asian firms are different from the findings based on U.S. data. There could be two explanations for the differences between Wang's results and those in Fan and Wong (2002). First, founding family firms could be different from other firms with concentrated ownership because of the incentive to protect the family's reputation. Second, Wang's findings are based on data from the U.S., where legal protection for minority shareholders is stronger than in other countries (e.g., Korea).

<sup>71</sup> See Christie (1990) for a meta-analysis of early research that examined whether managers choose accounting methods to maximize earnings-based compensation.

<sup>72</sup> Several studies suggest that managers attempt to deflate the firm's stock price, and hence the ESO's strike price, prior to a grant via the *timing of disclosures* around grant dates. Aboody and Kasznik (2000) examine firms' voluntary disclosures and find that under a fixed granting schedule, bad news tends to precede grant dates and good news tends to follow. They also find that stock returns are systematically lower prior to grant dates and increase afterwards (Chauvin and Shenoy, 2001; Yermack, 1997). A related line of research examines *backdating*, in which grant dates are retroactively assigned to historically low share prices (Heron and Lie, 2006; Narayanan et al., 2006).

for internal controls that might constrain earnings management must assume that variation in the score is *correlated with* the quality of mechanisms that specifically affect earnings management opportunities or incentives.

A second significant issue in this literature is that many internal control mechanisms are substitutes or complements. Krishnan (2005), for example, emphasizes the complementarity of two internal control mechanisms (i.e., audit committees and internal control procedures). Using only a limited set of corporate governance measures results in econometric problems (e.g., inconsistent coefficient estimates) that can lead to invalid inferences. To address this issue, Larcker et al. (2007) start with a comprehensive list of 39 governance variables and use principal component analysis to extract fourteen governance factors. They find mixed evidence of associations between the governance factors and earnings management.

A third notable deficiency of this literature is that our database does not contain any studies that attempt to predict that equity-based compensation will have consequences for EQ proxies other than earnings management. This omission is surprising given that variation in compensation contract form is commonly predicted to affect variation in investment risk-taking (e.g., Rajgopal and Shevlin, 2002), which in turn should affect earnings persistence.

Lastly, despite the long-standing recognition that optimal contracts may lead to accounting choices that benefit the agent at the expense of the firm or, alternatively, to efficient accounting choices that maximize the value of the firm, the debate over which effect is dominant is still open.<sup>73</sup> Christie and Zimmerman (1994) and Bowen et al. (2008) both conclude that contracting efficiency is the main explanation. Their findings raise the question of whether and when equityholders recognize that discretionary accounting choices are *ex post* efficient versus opportunistic. Likewise, Coles et al. (2006) provide evidence that equity investors infer that earnings may be managed after ESO cancellations and that they are not misled by the discretionary accruals. However, research that explores the extent to which equity investors infer rational earnings management and view it as an efficient contracting choice, and perhaps react favorably to it, is limited.

#### 5.4. Auditors as determinants of earnings quality

Researchers hypothesize that auditors are a determinant of earnings quality because of their role in mitigating intentional and unintentional misstatements. The ability of an auditor to mitigate misstatements is a function of the auditor's ability both to detect a material misstatement and to adjust for or report it (DeAngelo, 1981). Researchers predict that an auditor's ability to detect errors is a function of auditor effort and effectiveness and that an auditor's incentives to report or correct errors depend on factors such as litigation risk, reputation costs, and auditor independence.<sup>74</sup>

While the basic premise that auditors could mitigate misstatements is straightforward, compelling empirical evidence is limited because auditor effort/effectiveness and incentives are unobservable, and data to create proxies for these constructs are often unavailable. The most direct empirical proxies for effort/effectiveness include hours spent auditing (Caramanis and Lennox, 2008) and auditor industry expertise (Krishnan, 2003), and both are negatively associated with *discretionary accruals*. Evidence on the relation between auditor tenure as a proxy for effort/effectiveness and *discretionary accruals* is mixed (Johnson et al., 2002; Chen et al., 2008), as is the evidence on the relation between *misstatements* and revolving-door auditors, who may lack effort/effectiveness because of their potentially compromised independence (Menon and Williams, 2004; Geiger et al., 2008). When audit effort is *inferred* from the auditor's incentives or abilities to detect misstatements, greater effort deters *ex post* observed financial reporting irregularities (e.g., Phillips, 1999; Schneider and Wilner, 1990; Barron et al., 2001; Hirst, 1994), although perceived aggressiveness of the auditor does not deter *ex ante* earnings management behavior (Uecker et al., 1981). Moreover, greater effort may not result in higher quality earnings, but rather in low quality earnings accompanied by a qualified audit opinion (Whittred, 1980).

Evidence based on auditor size also suggests a relation with accruals quality. With few exceptions,<sup>75</sup> studies suggest that firms with Big-X auditors<sup>76</sup> have significantly lower *discretionary accruals* than firms with non-Big-X auditors (Becker et al., 1998; DeFond and Subramanyam, 1998; Francis et al., 1999; Kim et al., 2003). However, the voluminous evidence on the relation between audit fees and accruals quality is mixed and depends heavily on the type of fees (e.g., audit versus nonaudit), sample firms, and specific measure of accruals quality (Frankel et al., 2002; Ashbaugh et al., 2003; Chung and Kallapur, 2003; Gul et al., 2003; Ferguson et al., 2004; Larcker and Richardson, 2004; Francis and Ke, 2006; Ruddock et al., 2006; Gul and Srinidhi, 2007).

In summary, reviewing the above literature on auditors yields the following conclusions. First, for both auditor size and fees, one must use caution when interpreting the evidence. The auditor size results do not identify whether the findings are driven by detection ability or reporting incentives because both are correlated with auditor size. Even in the fee and tenure studies, it is still difficult to disentangle the reason for the auditor's impact on quality. Audit fees and auditor tenure are predicted to be positively correlated with auditor expertise, and hence with detection ability, but they are also predicted to be negatively associated with auditor independence and hence with decreased reporting incentives (DeAngelo, 1981).

<sup>73</sup> See Dye and Verrecchia (1995), Fischer and Verrecchia (2000), and Stocken and Verrecchia (2004). These studies use varied modeling techniques to yield predictions about accounting method choice and conditions that affect efficiency.

<sup>74</sup> See Nelson et al. (2002) for survey evidence that auditors *do* adjust for attempted earnings management, especially when attempted earnings management increases current-year earnings.

<sup>75</sup> See Beasley (1996), along with Gaver and Paterson (2001), and Dechow et al. (1996).

<sup>76</sup> Big-eight, Big-six, or Big-five, depending on the timing of the study.

Second, evidence on the auditors' role in affecting earnings quality is limited to the conclusion that auditors constrain income-increasing *discretionary accruals*, which is sensible given the auditor's role in the financial reporting process. However, the empirical evidence also suggests a positive relation between auditor effort and ERCs and earnings properties (e.g., Francis and Wang, 2008; Teoh and Wong, 1993; Hackenbrack and Hogan, 2002). Such studies must deal with substantial concerns about alternative explanations for results, including auditor self-selection and omitted correlated variables. In particular, ERCs and earnings properties are affected by the ability of the accounting system to capture the firm's fundamental performance, which is not a dimension of quality that auditors control or affect.

Third, a notably underrepresented element of the literature is research that recognizes the important roles of entities other than auditors, such as actuaries, venture capitalists, or underwriters, who are directly involved in the financial reporting process or affect financial reporting incentives. Examples of such studies include Gaver and Paterson (2001), Morsfield and Tan (2006), Jo et al. (2007), and Bushee (1998).

### 5.5. Capital market incentives as determinants of earnings quality

This section summarizes studies that examine the influence of capital market incentives on firms' accounting choices, making them potential determinants of earnings quality.

#### 5.5.1. Incentives when firms raise capital

A large collection of studies hypothesize that the cost/benefit trade-offs of accounting choices change during periods when a firm raises capital. Greater litigation risk, for example, may increase the costs of opportunistic accounting choices. Greater utility associated with the availability or price of capital may increase the benefits of opportunistic accounting choices. Hence, the firm's accounting choices, and thus its earnings quality, may differ when a firm is raising capital.

Reviewing these studies together yields the following conclusions. First, incentives to influence equity market valuations affect firms' accounting choices, in particular their *accrual choices*. This conclusion is based on four studies in our database of accruals around a firm's initial public offering (Aharony et al., 1993; Friedlan, 1994; Teoh et al., 1998a; Morsfield and Tan, 2006), and six studies around other types of issues (DeAngelo, 1986; Perry and Williams, 1994; Teoh et al., 1998b; Rangan, 1998; Erickson and Wang, 1999; Haw et al., 2005). Two additional studies infer capital market incentives from cross-listing status or around the cross-listing event (Lang et al., 2003; Ndubizu, 2007). Results using outcome-based measures of earnings management such as *AAERs* and *restatements* also suggest that capital raising activities are associated with earnings management (Dechow et al., 1996; Efendi et al., 2007; Dechow et al., forthcoming).

Overall, while the studies provide fairly consistent evidence of accruals management when firms raise capital, they do not expand the analysis to examine cross-sectional variation in accruals management, across either firms or specific accrual choices, based on variation in the degree to which the accruals management is detectable. These studies assume that equity markets provide incentives for these accounting choices, but that assumption is reasonable only if equity market participants cannot detect the earnings management (or if the earnings management is not costly).<sup>77</sup>

Second, the studies generally focus on event-driven incentives for accounting choices (e.g., IPOs). These one-time accounting choices, however, can have long-term consequences, including a diminished reputation for credible reporting.<sup>78</sup> Adverse selection models of voluntary disclosure predict that a commitment to credible disclosure reduces a firm's cost of capital. That is, a firm's reputation for high quality disclosures would be negatively affected by one-time, event-specific opportunistic accounting choices, which in turn may negatively affect equity valuation due to decreased reporting credibility. Yet the empirical research on event-specific accounting choices does not incorporate the impact of these costs or consider the trade-off between the short-term benefits of the accounting choice at the time of the event (e.g., the IPO) and the potential long-term reputation loss due to these one-off earnings management decisions.

Third, only one paper in our database examines whether raising capital in debt markets provides incentives for accounting choice (Dietrich et al., 2000). More work within public debt markets and on the trade-offs between debt and equity market incentives would be interesting.

#### 5.5.2. Incentives provided by earnings-based targets<sup>79</sup>

A number of studies provide evidence of earnings management to meet or beat earnings targets (Kasznik, 1999; Das and Zhang, 2003; Roychowdhury, 2006). Targets undoubtedly provide incentives for earnings management, but the

<sup>77</sup> Two exceptions are Shivakumar (2000), who suggests that investors undo earnings management at seasoned equity offerings, and Armstrong et al. (2010c), who find that, after controlling for cash flows, discretionary accruals at the time of the IPO do not predict future returns.

<sup>78</sup> Motivated by a somewhat similar observation, Christie and Zimmerman (1994) find that takeover targets are more likely to use income increasing accounting choices than an industry matched sample. The choices they examine have only a small effect on income but have a substantial impact on retained earnings over long periods. They argue that these choices reflect "economic Darwinism." Firms are more likely to be taken over if they use suboptimal accounting choices or select the accounting rules for opportunistic reasons rather than signaling reasons.

<sup>79</sup> Section 3.1.5 also reviews evidence related to benchmarks/targets. In that section, we review studies that use meeting a target as a *proxy* for earnings quality. Those studies test the determinants of reporting earnings that meet a target or the consequences of doing so. The papers in this section, in contrast, treat meeting a target as the independent variable and examine the incentives that targets provide for earnings management.

contribution of these studies is to provide evidence on specific tools, such as *discretionary accruals*, *working capital accruals* and *real earnings management*, that firms use to manage earnings to meet particular targets. However, the studies do not provide evidence on how firms choose among earnings management tools. Barton and Simko (2002) pursue the idea that a firm's choice with respect to a particular tool might be constrained. Also, as noted in Section 3.1.5, a well-recognized problem with studies that use analyst forecasts as the target is that beating an analyst forecast depends not only on the firm's accounting choices, but also on the analyst's forecasting actions.

### 5.6. External factors as determinants of earnings quality

Considerable evidence suggests that external factors, including capital requirements, political processes, and tax and non-tax regulation, are associated with accounting choices.<sup>80</sup> We catalogue eight studies that document that firms engage in *income-decreasing* earnings management, commonly measured by *discretionary accruals*, across a wide variety of settings in which profits would generate costly regulatory intervention or political outcomes (Jones, 1991; Cahan, 1992; Mensah et al., 1994; Key, 1997; Han and Wang, 1998; Navissi, 1999; Monem, 2003; Johnston and Rock, 2005).

The single most commonly researched regulation is capital requirements. Muller (1999), for example, examines incentives provided by the London Stock Exchange shareholder approval requirements. However, most researchers have focused on capital regulations within the banking and insurance industries, and the most commonly studied accrual used to meet these regulations is the *loan loss provision*. Four papers focus exclusively on the incentives provided by capital regulations (Petroni, 1992; Kim and Kross, 1998; Ahmed et al., 1999; Schrand and Wong, 2003). An additional five papers study the impact of capital requirements relative to other incentives (Moyer, 1990; Beatty et al., 1995; Mensah et al., 1994; Chen and Daley, 1996; Gaver and Paterson, 1999). The general conclusion based on these studies is that other incentives are of second-order importance when capital requirements are likely to be binding. In particular, equity market incentives receive little support as a determinant of accounting choices when measured relative to incentives provided by external factors.

We caution that although the evidence that capital requirements are associated with earnings management is strong, this conclusion may not generalize to firms in other settings. The financial services industry provides a setting for tests with greater power to detect specific earnings management responses to regulations given the direct link between the capital requirements and the loss provision accounts and the significance and variation of the loss provision accounts across banks/insurance carriers.

Tax regulations are another commonly studied determinant of earnings quality, again because the regulations affect accounting choices. Several studies specifically examine the impact of the LIFO conformity rule in the U.S. tax system on *accounting method choice* (Lee and Hsieh, 1985; Hunt, 1985; Dopuch and Pincus, 1988). Evidence on other (non-inventory) accounting choices comes from tests that use natural experiments and is more limited (Keating and Zimmerman, 1999; Guenther et al., 1997). Five papers in our database examine whether rate changes associated with the TRA caused income shifting from the pre- to post-TRA period. Three of these conclude that the TRA had a one-time impact on *accrual choices* around the period of the change (Scholes et al., 1992; Guenther, 1994; Maydew, 1997), but two papers provide inconsistent evidence on income shifting in the opposite direction to avoid the U.S. corporate alternative minimum tax (Boynton et al., 1992; Choi et al., 2001).<sup>81</sup>

The third most commonly studied regulation is SOX. Preliminary evidence suggests that earnings management activities using *accruals* declines following SOX, but that firms substitute other mechanisms such as real earnings management activities and "expectations management" (Cohen et al., 2008; Koh et al., 2008). Thus, the overall effect of SOX on the decision usefulness of earnings is ambiguous. These results reinforce a point we have made in previous sections: accruals management, *ceteris paribus*, may impair earnings quality, but it represents only one choice within the firm's portfolio of financial reporting choices. Within the studies discussed in this section, Hunt et al. (1996) and Beatty et al. (1995) are two examples of studies that examine both multiple tools and multiple incentives.

Three papers in our database study other external factors that provide incentives for earnings management but do not fit into the categories defined above. Hall and Stammerjohan (1997) examine potential litigation awards; Bowen et al. (1995) examine ongoing implicit claims with third parties including customers, suppliers, employees, and short-term creditors; and Rosner (2003) examines incentives to avoid bankruptcy. All three papers document accruals choices that respond to these incentives.

Taken together, an important insight from reviewing the studies of external factors is that earnings quality will be time-varying if the external factors lead to *accruals management*. However, if external factors affect *accounting method choice* or induce changes in firm behavior (e.g., SOX inducing firms to improve internal controls), then the effect on EQ will be ongoing (Calegari, 2000; Klassen et al., 1993). In either case, external factors that are clustered in calendar time

<sup>80</sup> Regulators and regulation may be viewed as monitors like auditors and boards, discussed in Sections 5.3 and 5.4. However, regulation is imposed on a firm and as such is distinct from controls that are optimally chosen by a principal, such as compensation, and by an agent, such as debt covenants (Kose and Kedia, 2006). Consistent with the Kose and Kedia framework, we treat regulation as a distinct control mechanism and discuss it separately.

<sup>81</sup> See Hanlon and Heitzman (2010) for a detailed review of financial reporting for tax purposes.

(e.g., the TRA or bank capital requirement changes) will lead to variation in earnings quality that is clustered in calendar time as well.<sup>82</sup>

Finally, we propose several opportunities for future research. It would be interesting to investigate whether/how firms communicate to equity markets during periods of regulatory scrutiny to offset the message sent to regulators/politicians by the “managed” earnings.<sup>83</sup> Do equity market participants rationally infer the earnings management without assistance by the firm in the form of voluntary disclosure? Do firms assume markets also are fooled by the earnings management and forgo accessing capital during these periods, or possibly access additional capital? It would also be interesting to investigate macroeconomic conditions as a determinant of earnings quality. Although we initially defined a category for such papers, our journal search found only one paper that focuses primarily on macroeconomic factors (e.g., business cycle) as a determinant of earnings quality (Liu and Ryan, 2006) and one paper that gives them significant albeit secondary attention (Aboody et al., 1999).<sup>84</sup> Both studies predict that macroeconomic factors are correlated with incentives for earnings management. We did not find any studies that hypothesize macroeconomic conditions as a determinant of earnings quality for other reasons, for example, because the conditions affect the ability of accruals to capture fundamental performance.

## 6. The consequences of earnings quality

In this section, we review the literature on the consequences of earnings quality. There are nine categories of consequences: (1) litigation propensity, (2) audit opinions, (3) market valuations, (4) real activities including disclosure, (5) executive compensation, (6) labor market outcomes, (7) a firm's cost of equity capital,<sup>85</sup> (8) a firm's cost of debt capital, and (9) analyst forecast accuracy. Thus, the decision makers considered include plaintiffs, auditors, capital market participants, boards/compensation committees, and analysts.

The feature that the consequence studies have in common is that an earnings quality proxy is the *independent* variable. The papers are a subset of those discussed in Section 3, but organized by the consequence (dependent variable) rather than by the earnings quality proxy (independent variable). Similar to the objective of Section 5, which organizes the papers by the determinant, the objectives of this section are to highlight the convergent or divergent validity of the hypothesized consequences of earnings quality across the various EQ proxies, to provide consequence-specific conclusions/insights, to discuss the consequences of abnormal accruals, and to provide a convenient reference tool for readers who are interested in reviewing the results related to a specific consequence of earnings quality.

A number of studies have returns (long- or short-window) as a consequence (dependent variable). The independent variable in the majority of these studies is earnings persistence (or accrual persistence), and this literature was discussed extensively in Section 3.1.1. Since there are only a few studies that use other EQ proxies, there is no added benefit to discussing them again. The category of market valuations above is an exception because the EQ proxy is typically related to different types of earnings management variables, offering some variation to compare the consequences across EQ measures.

One noteworthy feature of the consequences examined is that many of them are also the determinants variables discussed in Section 5, which emphasizes the importance of considering causality when interpreting the evidence.

### 6.1. Litigation propensity

Studies that examine the consequences of restatements conclude that restatements increase litigation propensity (Palmrose and Scholz, 2004), specifically restatements that change the previous pattern of reported earnings (Lev et al., 2008). They argue that a restatement is the type of evidence about earnings quality that increases the likelihood that plaintiffs will prevail in shareholder litigation. Moreover, studies that focus on high-risk settings (e.g., IPOs), in which abnormal accruals are likely to represent misstatements outside the boundaries of GAAP, also find a negative relation between EQ and litigation propensity (Gong et al., 2008; Ducharme et al., 2004). However, there is no evidence that

<sup>82</sup> See Shackelford and Shevlin (2001) for a comprehensive review of income shifting by multinationals, particularly following the TRA.

<sup>83</sup> Two studies provide related discussions/evidence. Aharoni and Ronen (1989) develop a model that shows that higher tax rates are associated with choices of income-increasing accounting methods, excepting accounting methods subject to book tax conformity. A key assumption of the model is that equity market participants will see through the earnings management and value the firm's equity correctly. Beatty and Harris (1999) compare security gains and losses in public banks to those in private banks, both of which are subject to capital requirements, to determine how earnings management differs under the assumption that public banks have greater incentives to engage in earnings management than private banks due to equity market incentives. However, this paper does not test how and when banks trade off the equity market incentives against other earnings management incentives that firms face.

<sup>84</sup> Wilson (1987) finds that his results are driven by two observations (1981 and 1982) and conjectures that the cause might be a “macroeconomic phenomenon,” given that both were years of significant economic downturn. Bernard and Stober (1989), however, find no evidence for this conjecture.

<sup>85</sup> Measures of the cost of capital include a firm's bid-ask spread, beta, and an implied or *ex ante* cost of equity capital, which is the discount rate that equates current market value with the sum of the present value of expected future cash flows in an equity valuation model. See Frankel and Lee (1998), Botosan and Plumlee (2002), Kasznik (2004), Brav et al. (2005), Easton and Monahan (2005), and Botosan and Plumlee (2005) for specifications and discussions of implied cost of equity capital metrics. See Callahan et al. (1997) and Mohanram and Rajgopal (2009) for discussions of spreads (and PIN) as measures of the adverse selection component of the cost of capital.

abnormal accruals within the boundaries of GAAP or other measures of poor earnings quality increase the likelihood of litigation.

## 6.2. Audit opinions

High-accrual firms are more likely to get modified audit opinions (Francis and Krishnan, 1999), but abnormally high working capital accruals are not associated with adverse audit opinions or auditor turnover (Bradshaw et al., 2001). There are two explanations for the mixed results. One explanation is that Francis and Krishnan (1999) examine reports in 1987 and 1988, whereas Bradshaw et al. (2001) examine reports after the issuance of SAS 58 and 59 (American Institute of Certified Public Accountants (AICPA), 1988a,b). Bradshaw et al. (2001) also provide a second explanation: "...earnings quality issues of the type that we investigate are beyond the scope of the audit. In other words, auditors may understand that inflated accruals imply a greater likelihood of future earnings declines and GAAP violations, but are not required to communicate this information to investors through their audit opinions." (p. 46/47) The second explanation is supported by evidence that the association between abnormal accruals and audit opinions is primarily driven by a relation between large negative accruals and going concern opinions (Butler et al., 2004).

## 6.3. Market valuations

Firms that consistently meet or beat prior period earnings targets or analyst expectations are rewarded with higher valuations (Barth et al., 1999; Kasznik and McNichols, 2002; Myers et al., 2007), even if there is evidence of earnings management to achieve the results (Myers et al., 2007). However, firms that manage earnings through discretionary loss reserves are not rewarded with higher valuations (Petroni et al., 2000; Beaver and McNichols, 1998; Beaver and Engel, 1996). When firms subsequently miss a target, they are likely to lose the extra valuation immediately (e.g., Skinner and Sloan, 2002; Myers et al., 2007). We can think of several explanations for this combination of results: (1) the market rewards some types of earnings management and not others, (2) greater market mispricing of less transparent earnings management, and (3) "rational bubbles" caused by an association between reported growth and investor synchronization risk (see, for example, Abreu and Brunnermeier, 2002). More research on this observed phenomenon is necessary to disentangle these explanations and provide others.

In contrast to the above findings, firms subject to AAERs, as an indicator of extreme earnings management and likely fraud, incur substantial losses in market value that include reputational penalties for the misstatement. Reputational penalties presumably capture the negative effects of detected misstatements on the firm's future cash flows due to lower sales and higher contracting and financing costs (Karpoff et al., 2008b).

## 6.4. Real activities

Researchers have documented an association between earnings quality proxies and investment efficiency, but the explanations are different. Biddle and Hilary (2006) propose that high accounting quality (i.e., conservatism, loss avoidance, and earnings smoothing) reduces information asymmetry between managers and outside suppliers of capital and therefore improves investment efficiency (see also Biddle et al., 2009). Two other papers instead propose that accounting choices, and the resulting earnings number, affect the inputs to a manager's internal investment decision model (McNichols and Stubben, 2008; Jackson et al., 2009). For example, McNichols and Stubben (2008) find that restatement firms overinvest during the misstatement period. They provide two interpretations: (1) managers believe in the misreported growth trends, which responds to the question of why the quality of the externally reported earnings number would affect internal decision making; or (2) managers are aware of the misstatement but decide to effectively bet the ranch in order to improve firm performance. They do not attempt to disentangle these two interpretations. They suggest that in either case, the misstatement "distorts" investment decisions. Future research could attempt to distinguish explanations for why lower quality reported earnings would be associated with poor internal decisions.

Three studies suggest that voluntary disclosure decisions are endogenously determined by earnings quality (Lougee and Marquardt, 2004; Chen et al., 2002; Lennox and Park, 2006). Assuming that equity market participants set prices based on all available information, not just earnings, these findings raise questions about the validity of inferences from tests that measure the association between earnings quality proxies and market consequences without considering the endogenously determined availability of non-earnings information. This concern is complicated by the fact that some disclosures are inversely related to commonly used proxies for earnings quality (Lougee and Marquardt, 2004; Chen et al., 2002), while management forecasts are positively related (Lennox and Park, 2006).

## 6.5. Executive-level compensation

Pay-for-performance sensitivities, on average, are positively associated with various measures of earnings persistence (Balsam, 1998; Baber et al., 1998; Nwaeze et al., 2006). The average hides an important pattern, however. Dechow et al. (1994) find that special items, which are most frequently negative, are filtered out when determining executive

compensation. However, Gaver and Gaver (1998) find that transitory gains, which also decrease earnings persistence, are treated as regular income. Similarly, Dechow et al. (2009) find that compensation is as sensitive to highly discretionary securitization gains as it is to other components of earnings. One interpretation of these results is that the negative special items are more observable, and the Board understands their lower persistence. This interpretation suggests that Boards, like other decision makers, adjust for lower quality when earnings quality is observable, but there is heterogeneity in the degree of observability across earnings quality determinants.

Studies also suggest that expected earnings quality, measured primarily by *timeliness*, is associated with *ex ante* compensation contract design, while changes in earnings quality, measured by the incidence of *restatement*, are associated with *ex post* recontracting (Bushman et al., 2004; Cheng and Farber, 2008).

#### 6.6. Executive-level labor market outcomes

Four studies suggest significant negative labor market consequences for individuals at firms with low earnings quality (Desai et al., 2006; Karpoff et al., 2008a; Srinivasan, 2005; Menon and Williams, 2008).<sup>86</sup> These studies use *restatements*, *misstatements* or *auditor resignations* to measure EQ, all of which are highly transparent indicators of poor quality. Therefore, it is not clear whether it is poor quality itself or fear of the perception of poor quality that motivates a Board's turnover decision. In addition, these EQ proxies capture extreme cases of poor earnings quality. Therefore, whether a CEO would be fired for manipulating earnings within GAAP (which is less transparent or observable) is an open question. Engel et al. (2003) is the only study that provides evidence on the turnover consequences of earnings informativeness rather than extreme, publicly reported earnings management. They find a stronger sensitivity of turnover decisions to accounting information when earnings are more informative, measured by *asymmetric timeliness*.

Taken together, the results across the above consequences emphasize the importance of considering the context when determining the appropriate proxy for decision-usefulness. For example, an investor's decision to litigate depends on whether an earnings misstatement is severe or transparent enough to increase the probability of prevailing as a plaintiff. The auditor's reporting decision, in contrast, depends on whether an earnings misstatement is severe or transparent enough to decrease the probability of prevailing as a defendant. A Board's compensation contract design problem depends on the *ex ante* informativeness of available signals of the agent's performance, while its variable cash compensation and recontracting decisions depend on the *ex post* informativeness of the available signals. The Board's turnover decision may also depend on the extent to which firm credibility is impaired. The above findings reinforce our earlier conclusion that the EQ proxies are not substitutes, as their decision usefulness depends on the decision context.

#### 6.7. Cost of equity capital

Evidence on the consequences of earnings properties as proxies for earnings quality is as follows. Earnings persistence is negatively associated with the implied cost of equity capital, but earnings predictability is not (Francis et al., 2004). Earnings predictability, however, is associated with bid-ask spreads (Affleck-Graves et al., 2002). Smoothness is associated with the implied cost of equity capital at the firm level and country level (Francis et al., 2004; Bhattacharya et al., 2003b). Jayaraman (2008) finds a U-shaped relation between smoothness and spreads and suggests that when earnings are too smooth relative to cash flows or much more volatile, then market prices appear to reflect greater asymmetry. However, McInnis (2010) documents that the association between earnings smoothness and the cost of equity capital documented in prior research is driven by optimism in analysts' long-term earnings forecasts. Petroni et al. (2000) find a positive association between loss reserve revisions of P&C insurers as a measure of discretionary accruals and beta.

Studies on earnings quality as a priced risk factor represent an emerging literature with a somewhat controversial interpretation of the results; thus we discuss these studies in relatively more detail. Francis et al. (2005a) rank their measure of accrual quality (discussed in Section 3.1.2) into quintiles and show variation across the quintiles in the cost of debt (interest to average debt), industry adjusted EP ratios, and betas from CAPM type regressions. They also calculate the difference in returns each month between the top two quintiles and the bottom two quintiles to determine whether the AQ factor is priced (has a significant coefficient):

$$R_{j,m} - R_{f,m} = \alpha_j + \beta_j(R_{M,m} - R_{f,m}) + s_jSMB_m + h_jHML_m + e_jAQfactor_m + \varepsilon_{jm}$$

FLOS find a significant coefficient on  $e_j$ . When the AQ factor is decomposed into the innate and discretionary component, they find that the result is driven mainly by the innate component, although the discretionary component is still significant. FLOS's interpretation is that accrual quality plays an economically meaningful role in determining the cost of equity capital.

The theoretical underpinnings for the analysis as well as the empirical methods for documenting that accrual quality is a priced risk factor have generated controversy. FLOS motivate the prediction that information uncertainty risk is priced using a model by Easley and O'Hara (2004), but Lambert et al. (2007) and Hughes et al. (2005) challenge the Easley and

<sup>86</sup> Beneish (1999) found no evidence of abnormal turnover for CEOs or executives of the misstatement firms, but he did not identify whether the specific executives were implicated in the fraud.

O'Hara predictions. In addition, Core et al. (2008, p. 7) suggest that the tests are insufficient to establish accrual quality as a priced risk factor. Other studies attempting to sort out the pricing of accrual quality include Aboody et al. (2005), Liu and Wysocki (2006), and Kravet and Shevlin (2010). Empirical evidence on the relation between earnings quality and the cost of equity capital will surely evolve along with the theories that relate information precision about diversifiable and non-diversifiable sources of risk to the cost of capital.

With respect to the consequences of external indicators such as restatements and AAERs as a proxy for earnings management, the evidence suggests that firms with low earnings quality experience an increase in cost of equity capital (Hribar and Jenkins, 2004; Dechow et al., 1996). The only inconsistent evidence is in Palmrose et al. (2004), who do not find a significant change in bid-ask spreads following restatements. In addition, CEO/CFO certifications (required by SOX) are associated with lower spreads (Chang et al., 2006), and auditor independence is associated with a lower implied cost of equity capital for the audit client (Khurana and Raman, 2006). However, there is mixed evidence on whether revelations of internal control deficiencies under SOX 404 affect a firm's cost of equity capital (Beneish et al., 2008; Ogneva et al., 2007; Ashbaugh-Skaife et al., 2009).

To summarize, each study provides statistically significant evidence of a negative association between one or more earnings quality proxies and a firm's cost of capital, but it is difficult to compare the economic significance of the findings across studies and hence across proxies. The results emphasize the substitutability problem. It appears that all of the proxies are measuring decision-usefulness to equity markets to some extent, but that is a fairly weak statement. Francis et al. (2004) run more of a horse race across the EQ proxies and find that accrual quality, among all the EQ measures they examine, has the largest effect on the implied cost of equity capital, but it is still not clear whether it should be the largest and how much larger it should be. Future research should attempt to identify the distinct contributions of each proxy. Such research must provide clear theoretical arguments to explain exactly how a specific EQ proxy affects information asymmetry, and how that specific type of information asymmetry affects a firm's cost of equity capital.

#### 6.8. Cost of debt capital

While only four papers in our database examine debt market consequences of earnings quality, the limited evidence is nonetheless consistent with evidence from equity markets. Overall, the cost of debt seems to be higher when EQ proxies indicate low earnings quality. Francis et al. (2005a) find that firms with lower quality accruals have a higher ratio of interest expense to interest-bearing outstanding debt and lower S&P Issuer Credit Ratings. Anderson et al. (2004) find that firms with higher board independence, higher audit committee independence, and larger board size have lower costs of debt measured as the yield spread. Graham et al. (2008) document that banks use tighter loan contracting terms following their client firms' restatements. Bhojraj and Swaminathan (2007) find that firms with high operating accruals have significantly lower one-year-ahead bond returns, consistent with bond investors mispricing high and low accrual firms in much the same way that equity investors do.

Debt markets not only provide a useful opportunity to validate the findings in equity markets, but also provide two additional opportunities: 1) to examine accounting choices that are irrelevant to quality characteristics of interest to equity markets, and 2) to assess trade-offs between multiple incentives for producing high-quality earnings.

#### 6.9. Analysts

Four studies in our database examine analyst forecasting as a function of earnings quality. The studies assume that analysts are unbiased and qualified predictors of future earnings. Under this assumption, variation in their forecast accuracy reflects attributes of earnings that are related to quality. This methodology is akin to that of studies that use market returns to infer earnings quality. Thus, similar to inferences about earnings quality from returns-based studies that are subject to the caveat that they rely on an assumption of *market efficiency*, inferences about earnings quality from these tests are subject to the caveat that they rely on an assumption of *analyst efficiency*.

The four studies are Brown (1983) and Elliott and Philbrick (1990), who provide evidence on specific accounting methods that improve predictability (i.e., reduce analyst forecast error); Ashbaugh and Pincus (2001), who suggest that IAS is of higher quality than a firm's home country GAAP; and Bhattacharya et al. (2003a), who show that *pro forma* earnings are of higher quality than GAAP operating earnings. Further, Kim and Schroeder (1990) show that analysts are not misled by discretionary accruals that managers use to maximize bonus compensation. This result is consistent with previously documented findings that earnings management, when recognized by equityholders, is discounted. But if the decision-maker (i.e., the analyst) recognizes it in his decision model (i.e., forecast), then it is a question of semantics whether "quality" is affected.

Using analyst forecasts to infer earnings quality rather than using market prices has the advantage that the analyst forecast relates only to *earnings*, while a market price reflects information other than earnings. Hence, tests that infer earnings quality using market prices and assuming market efficiency confound interpretation of the impact of earnings quality alone on decision usefulness. A disadvantage of using analyst forecasts, however, is the necessary assumption that analysts are unbiased and expert forecasters, given that evidence on the validity of these assumptions is questionable. Several studies conclude that when analysts can rationally anticipate accruals management, they appropriately

incorporate the implications of accruals into their forecasts (Kim and Schroeder, 1990; Coles et al., 2006; Burgstahler and Eames, 2003).<sup>87</sup> However, Bradshaw et al. (2001) and Elliott and Philbrick (1990) provide contradictory evidence. Abarbanell and Lehavy (2003) possibly reconcile these results. They show that analysts fundamentally understand the implications of accruals for earnings predictability, as evidenced by their recommendation decisions, but that forecasts are nonetheless biased.<sup>88</sup>

## 7. Conclusion

Our approach in this review is to define earnings quality broadly to be decision usefulness—in any decision by any decision maker. Thus the number of relevant articles is over 300, and by necessity our discussion is broad.

We emphasize two significant conclusions based on our survey of the earnings quality literature as a whole. First, because all of the proxies for earnings quality that involve earnings (i.e., properties such as persistence, timely loss recognition, smoothness, and small profits, as well as the ERCs) have at their core the reported accrual-based earnings number, these proxies are affected both by the firm's fundamental performance and by the measurement of performance. Future research could more clearly recognize the distinction between performance and performance measurement when making predictions and evaluating results. This would help us as a profession to determine the contribution of the accounting measurement system to the quality of reported earnings.

Second, although all of the proxies based on reported earnings are affected by both fundamental performance and its measurement, the proxies are not equally affected by these two factors. Therefore, the proxies do not measure the same underlying construct. In addition, because the proxies focus on different elements of decision usefulness, we should not expect the proxies to work equally well in all circumstances investigated by researchers. We hope the breadth of the discussion of each proxy has shed light on the context-specific dimensions of quality captured by each proxy and on the sometimes subtle distinctions between them.

As part of our review process, we noted five areas of research that have received relatively little attention; we believe that further research on these topics would substantially enhance our understanding of earnings quality.

(1) When making choices that affect reported earnings, a manager's objective function can include multiple, and perhaps competing, objectives. These objectives could relate to compensation or debt contract provisions, litigation risk, proprietary costs, or incentives to influence stock price, to name a few. There are two noteworthy features of the manager's decision problem. First, managers are constrained to report only one earnings number, but the existence of multiple objectives may require trade-offs. Second, managers choose a *set* (or portfolio) of accounting choices, not just one, that determines earnings, which suggests that they might have the flexibility to tailor individual elements of the set to different objectives.<sup>89</sup> Two interesting paths for future research are (i) to examine how managers choose between competing objectives and (ii) to examine choices about the portfolio of accounting choices, specifically within the context of meeting multiple objectives.

The existing literature includes empirical studies that examine competing multiple incentives (most commonly financial reporting, tax and regulatory objectives for financial institutions), but these studies typically examine a *single accounting choice* (e.g., loan loss provisions). The literature also includes empirical studies that examine multiple accounting choices to achieve a *single objective* (e.g., using real earnings management versus discretionary accruals), but studies of this type are relatively limited. The literature includes almost no evidence on whether firms optimize over a set of accounting choices to meet multiple objectives, despite variation in the ability of specific accounting choices to meet specific objectives.<sup>90</sup> All types of accrual choices, for example, may enable a firm to avoid debt covenant violation, but they might differ in their transparency to equity markets, and hence in their impact on equity valuation decisions.

Theory papers have examined the impact of multiple incentives on accounting choice (e.g., Demski, 1973; Evans and Sridhar, 1996; Liang, 2004; Chen et al., 2007) and analyzed the effect of variations in optimal contracts (Sridhar and Magee, 1996). These models, however, are generally concerned with the implications of multiple objectives on a single accounting choice; they do not address the issue of the firm making a portfolio of accounting choices that in the aggregate affect earnings. Christensen et al. (2005) specifically recognize the potential for an interaction between competing incentives and individual accounting choices: *"Increasing the persistent components and reducing the reversible components are generally desirable for valuation, but not for contracting. Eliminating transitory components of earnings is generally desirable for valuation, but not necessarily for contracting."* (p. 265) Kirschenheiter and Melumad (2002) make a related point. Assuming an objective of equity value maximization, they show that the nature of the manager's private information about cash flows ("good" news or "bad" news) determines whether the outcome of her accounting choices will be smoother earnings or big baths. This result has implications for unconditionally interpreting smoothness as a proxy for earnings management.

Researchers also can think about "multiple" incentives as changes in incentives through time. Do managers trade off the immediate benefits of opportunistic accounting choices at the time of an event such as an IPO or SEO against the potential long-term reputation loss due to these one-off earnings management decisions?

<sup>87</sup> See also Hirst and Hopkins (1998).

<sup>88</sup> See Francis et al. (2004) for a summary of evidence on analysts' incentives to issue accurate and unbiased forecasts.

<sup>89</sup> See Sivakumar and Waymire (2003) for a well-articulated discussion of this issue.

<sup>90</sup> Notable exceptions are Beatty et al. (1995) and Hunt et al. (1996), who examine both multiple tools and multiple incentives.

(2) Studies consistently find that when investors are able to observe, or rationally infer, increased estimation error (intentional or unintentional), they internalize its effect on price. For example, investors discount upward earnings management when banks are highly levered and close to capital market constraints. Investors discount downward earnings management when they are aware that managers will be issued repriced options. Investors discount the discretionary accrual component of earnings when information on accruals is disclosed at the earnings release. Investors correctly price property and casualty insurers' future payout accruals because of the nature of related mandatory footnote disclosures. Meeting or beating analyst forecasts on an *ad hoc* basis does not lead to higher valuations, but meeting or beating regularly does.<sup>91</sup> These results are consistent with predictions from partially revealing equilibrium models of earnings management with imperfect information (e.g., Fischer and Verrecchia, 2000).

This documented relation is a challenge to researchers making inferences about the decision usefulness of earnings for equity valuation from an analysis of the association between a single incentive (such as capital regulation) and a single accounting choice (such as a loan loss provision). If equity investors undo the effects of earnings management, then the earnings management does not reduce “earnings quality” as we have defined it. In fact, an accounting choice to meet regulatory requirements, which would qualify as “earnings management” according to Healy and Wahlen (1999), could be viewed as a value-maximizing activity from the perspective of an equity holder, even if it distorts the ability of earnings to reflect the firm's fundamental performance.

Recognizing that equity investors might infer rational earnings management to meet other objectives raises opportunities for future research. First, there are opportunities to research complementary accounting choices. For example, managers may be more willing to provide earnings guidance, informally or through additional supplemental disclosure within the financial statements, to equity investors when they face multiple objectives. For example, firms that make accounting choices to prevent debt covenant violation might supplement these choices with additional disclosure that makes the earnings management *transparent* to equity investors so as not to erode the decision usefulness of earnings in equity valuations. See Zechman (2010) for an analysis of this type. Second, there are opportunities to investigate the factors that allow equity investors to understand a firm's incentives for reporting.

(3) We are not aware of studies about a firm's earnings-related accounting choices when the anticipated impact of the choice on earnings properties is limited because the property is primarily driven by the firm's fundamental performance. For example, if a firm *cannot* produce a persistent earnings number given the nature of operations, does it bother to make choices to produce the most persistent number possible? Or, does the firm give up on producing a persistent earnings stream and instead optimize over accounting choices that achieve another goal? Does the firm substitute for fundamentally low persistence earnings with additional disclosure, along the lines examined in Francis et al. (2008)? This comment is related to our observation on multiple objectives (comment #1 above). It suggests that a firm's incentives across objectives may vary with its fundamental performance.

(4) Several studies have attempted to validate an earnings metric by showing that it is correlated in a predictable way with another measure, for example, characterizing discretionary accruals and total accruals at SEC enforcement firms (Beneish, 1997; Bayley and Taylor, 2007; Dechow et al., forthcoming). Other studies have run “horse races” across accruals models (e.g., Guay et al., 1996; Jones et al., 2008), or have considered extensions and improvements to specific models (e.g., Dechow et al., 1995, and Kothari et al., 2005, of the Jones model; McNichols, 2002, Francis et al., 2005, and Wysocki, 2008, of the Dechow/Dichev model). In addition, researchers casually apply the approach of Cronbach and Meehl by examining the convergent and divergent validity of the earnings metrics in a particular setting. Few papers, however, employ classical methods for construct validation. Ecker et al. (2006), who perform a construct validity analysis of their “e-loading” variable for accrual (earnings) quality, is the only study in our database.<sup>92</sup> Additional formal analysis on construct validity would be useful.

(5) Most of the empirical papers test a prediction about either a determinant of quality or a consequence of quality, but not both. However, the source of earnings quality is likely to affect its consequences. For example, external auditors and internal controls may both affect abnormal accruals, and abnormal accruals may affect the cost of capital, but an open question is whether the impact of accruals on the cost of capital is the same when external auditors rather than internal controls mitigate the errors. Bowen et al. (2008), Xie (2001), and Liu and Thomas (2000) provide good examples of this type of research. Their “complete path” approach offers insights that are not available from studies that examine only one side (i.e., determinant or consequence) of earnings quality.

## References

- Abarbanell, J., Bushee, B., 1997. Fundamental analysis, future earnings, and stock prices. *Journal of Accounting Research* 35, 1–24.
- Abarbanell, J., Lehavy, R., 2003. Can stock recommendations predict earnings management and analysts' earnings forecast errors? *Journal of Accounting Research* 41, 1–31.
- Abbott, L., Parker, S., Peters, G., 2004. Audit committee characteristics and restatements. *Auditing* 23, 69–87.
- Aboody, D., Barth, M., Kasznik, R., 1999. Revaluations of fixed assets and future firm performance: evidence from the UK. *Journal of Accounting and Economics* 26, 149–178.

<sup>91</sup> Specific citations for these examples, as well as additional examples, can be found in Section 3.1.5.

<sup>92</sup> Njoroge (2009), a working paper that is not in our database, provides formal construct validity tests of accrual quality.

- Aboody, D., Hughes, J., Liu, J., 2005. Earnings quality, insider trading, and cost of capital. *Journal of Accounting Research* 43, 651–673.
- Aboody, D., Kasznik, R., 2000. CEO stock option awards and corporate voluntary disclosures. Working Paper, UCLA and Stanford University.
- Abreu, D., Brunnermeier, M., 2002. Synchronization risk and delayed arbitrage. *Journal of Financial Economics* 66, 341–360.
- Adams, R., Hermalin, B., Weisbach, M., 2008. The role of boards of directors in corporate governance: a conceptual framework and survey. Working Paper, University of Queensland, Ohio State University, and University of California, Berkeley.
- Affleck-Graves, J., Callahan, C., Chipalkatti, N., 2002. Earnings predictability, information asymmetry, and market liquidity. *Journal of Accounting Research* 40, 561–583.
- Agrawal, A., Chadha, S., 2005. Corporate governance and accounting scandals. *Journal of Law and Economics* 48, 371–406.
- Aharoni, A., Ronen, J., 1989. The choice among accounting alternatives and management compensation: effects of corporate tax. *The Accounting Review* 64, 69–86.
- Aharony, J., Lin, C., Loeb, M., 1993. Initial public offerings, accounting choices, and earnings management. *Contemporary Accounting Research* 10, 61–81.
- Ahmed, A., 1994. Accounting earnings and future economic rents: an empirical analysis. *Journal of Accounting and Economics* 17, 377–400.
- Ahmed, A., Takeda, C., Thomas, S., 1999. Bank loan loss provisions: a reexamination of capital management, earnings management and signaling effects. *Journal of Accounting and Economics* 28, 1–25.
- Albrecht, W., Lookabill, L., McKeown, J., 1977. The time-series properties of annual earnings. *Journal of Accounting Research* 15, 226–244.
- Alford, A., Jones, J., Leftwich, R., Zmijewski, M., 1993. The relative informativeness of accounting disclosures in different countries. *Journal of Accounting Research* 31, 183–223.
- Ali, A., Hwang, L., 2000. Country-specific factors related to financial reporting and the value relevance of accounting data. *Journal of Accounting Research* 38, 1–21.
- Allen, E., Larson, C., Sloan, R., 2009. Accrual reversals, earnings and stock returns. Working Paper, University of California, Berkeley, Washington University in St. Louis.
- Altamuro, J., Beatty, A., 2010. How does internal control regulation affect financial reporting? *Journal of Accounting and Economics* 49, 58–74.
- Altamuro, J., Beatty, A., Weber, J., 2005. The effects of accelerated revenue recognition on earnings management and earnings informativeness: evidence from SEC Staff Accounting Bulletin No. 101. *The Accounting Review* 80, 373–401.
- American Institute of Certified Public Accountants (AICPA), 1988a. Statement on Auditing Standards No. 58. Reports on Audited Financial Statements. AICPA, New York.
- American Institute of Certified Public Accountants (AICPA), 1988b. Statement on Auditing Standards No. 59. The Auditor's Consideration of an Entity's Ability to Continue as a Going Concern. AICPA, New York.
- Amir, E., Harris, T., Venuti, E., 1993. A comparison of the value-relevance of U.S. versus non-U.S. GAAP accounting measures using Form 20-F reconciliations. *Journal of Accounting Research* 31, 230–264.
- Anderson, R., Mansi, S., Reeb, D., 2004. Board characteristics, accounting report integrity, and the cost of debt. *Journal of Accounting and Economics* 37, 315–342.
- Armstrong, C., Guay, W., Weber, J., 2010a. The role of information and financial reporting in corporate governance and debt contracting. Working Paper, University of Pennsylvania and MIT.
- Armstrong, C., Jagolinzer, A., Larcker, D., 2010b. Chief executive officer equity incentives and accounting irregularities. *Journal of Accounting Research* 48, 225–271.
- Armstrong, C., Foster, G., Taylor, D., 2010c. Earnings management around initial public offerings: a re-examination. Working Paper, University of Pennsylvania and Stanford University.
- Ashbaugh, H., LaFond, R., Mayhew, B., 2003. Do nonaudit services compromise auditor independence? Further evidence. *The Accounting Review* 78, 611–639.
- Ashbaugh, H., Pincus, M., 2001. Domestic accounting standards, international accounting standards, and the predictability of earnings. *Journal of Accounting Research* 39, 417–434.
- Ashbaugh-Skaife, H., Collins, D., Kinney, W., 2007. The discovery and reporting of internal control deficiencies prior to SOX-mandated audits. *Journal of Accounting and Economics* 44, 166–192.
- Ashbaugh-Skaife, H., Collins, D., Kinney, W., LaFond, R., 2008. The effect of SOX internal control deficiencies and their remediation on accrual quality. *The Accounting Review* 83, 217–250.
- Ashbaugh-Skaife, H., Collins, D., Kinney, W., LaFond, R., 2009. The effect of SOX internal control deficiencies on firm risk and cost of equity. *Journal of Accounting Research* 47, 1–43.
- Ayers, B., Jiang, J., Yeung, P., 2006. Discretionary accruals and earnings management: an analysis of pseudo earnings targets. *The Accounting Review* 81, 617–652.
- Baber, W., Chen, S., Kang, S., 2006. Stock price reaction to evidence of earnings management: implications for supplementary financial disclosure. *Review of Accounting Studies* 11, 5–19.
- Baber, W., Kang, S., Kumar, K., 1998. Accounting earnings and executive compensation: the role of earnings persistence. *Journal of Accounting and Economics* 25, 169–193.
- Baginski, S., Branson, B., Lorek, K., Willinger, G., 1999. The relationship between economic characteristics and alternative annual earnings persistence measures. *The Accounting Review* 74, 105–120.
- Baker, T., Collins, D., Reitenga, A., 2003. Stock option compensation and earnings management incentives. *Journal of Accounting, Auditing, and Finance* 18, 557–582.
- Ball, R., 1972. Changes in accounting techniques and stock prices. *Journal of Accounting Research* 10, 1–38.
- Ball, R., Brown, P., 1967. Some preliminary findings on the association between the earnings of a firm, its industry, and the economy. *Journal of Accounting Research* 5, 55–80.
- Ball, R., Brown, P., 1968. An empirical evaluation of accounting income numbers. *Journal of Accounting Research* 6, 159–178.
- Ball, R., Foster, G., 1982. Corporate financial reporting: a methodological review of empirical research. *Journal of Accounting Research* 20, 161–234.
- Ball, R., Kothari, S., Robin, A., 2000. The effect of international institutional factors on properties of accounting earnings. *Journal of Accounting and Economics* 29, 1–51.
- Ball, R., Robin, A., Sadka, G., 2008. Is financial reporting shaped by equity markets or by debt markets? An international study of timeliness and conservatism. *Review of Accounting Studies* 13, 168–205.
- Ball, R., Robin, A., Wu, J., 2003. Incentives versus standards: properties of accounting income in four East Asian countries. *Journal of Accounting and Economics* 36, 235–270.
- Ball, R., Shivakumar, L., 2005. Earnings quality in UK private firms: comparative loss recognition timeliness. *Journal of Accounting and Economics* 39, 83–128.
- Balsam, S., 1998. Discretionary accounting choices and CEO compensation. *Contemporary Accounting Research* 15, 229–252.
- Balsam, S., Chen, H., Sankaraguruswamy, S., 2003. Earnings management prior to stock option grants. Working Paper, Temple University, Arizona State University, and National University of Singapore.
- Balsam, S., Haw, I., Lilien, S., 1995. Mandated accounting changes and managerial discretion. *Journal of Accounting and Economics* 20, 3–29.
- Barefield, R., Comiskey, E., 1971. Depreciation policy and the behavior of corporate profits. *Journal of Accounting Research* 9, 351–358.
- Barnea, A., Ronen, J., Sadan, S., 1976. Classificatory smoothing of income with extraordinary items. *The Accounting Review* 51, 110–122.
- Barron, O., Pratt, J., Stice, J., 2001. Misstatement direction, litigation risk, and planned audit investment. *Journal of Accounting Research* 39, 449–462.
- Barth, M., Cram, D., Nelson, K., 2001. Accruals and the prediction of future cash flow. *The Accounting Review* 76, 27–58.

- Barth, M., Elliott, J., Finn, M., 1999. Market rewards associated with patterns of increasing earnings. *Journal of Accounting Research* 37, 387–413.
- Barth, M., Landsman, W., Lang, M., 2008. International accounting standards and accounting quality. *Journal of Accounting Research* 46, 467–498.
- Barton, J., Simko, P., 2002. The balance sheet as an earnings management constraint. *The Accounting Review* 77, 1–27.
- Bartov, E., 1993. The timing of asset sales and earnings manipulation. *The Accounting Review* 68, 840–855.
- Bartov, E., Givoly, D., Hayn, C., 2002. The rewards to meeting or beating earnings expectations. *Journal of Accounting and Economics* 33, 173–204.
- Bartov, E., Lindahl, F., Ricks, W., 1998. Stock price behavior around announcements of write-offs. *Review of Accounting Studies* 3, 327–346.
- Basu, S., 1997. The conservatism principle and the asymmetric timeliness of earnings. *Journal of Accounting and Economics* 24, 3–37.
- Bayley, L., Taylor S., 2007. Identifying earnings overstatements: a practical test. Working Paper, ABN Amro Sydney and University of New South Wales.
- Beasley, M., 1996. An empirical analysis of the relation between the board of director composition and financial statement fraud. *The Accounting Review* 71, 443–465.
- Beatty, A., Chamberlain, S., Magliolo, J., 1995. Managing financial reports of commercial banks: the influence of taxes, regulatory capital, and earnings. *Journal of Accounting Research* 33, 231–261.
- Beatty, A., Harris, D., 1999. The effects of taxes, agency costs and information asymmetry on earnings management: a comparison of public and private firms. *Review of Accounting Studies* 4, 299–326.
- Beatty, A., Ke, B., Petroni, K., 2002. Earnings management to avoid earnings declines across publicly and privately held banks. *The Accounting Review* 77, 547–570.
- Beaver, W., 1968. The information content of annual earnings announcements. *Journal of Accounting Research* 6, 67–92.
- Beaver, W., 1970. The time series behavior of earnings. *Journal of Accounting Research* 8, 62–99.
- Beaver, W., Engel, E., 1996. Discretionary behavior with respect to allowances for loan losses and the behavior of security prices. *Journal of Accounting and Economics* 22, 177–206.
- Beaver, W., Landsman, W., Owens, E., 2008. Asymmetry in earnings timeliness and persistence: a simultaneous equations approach. Working Paper, Stanford University.
- Beaver, W., McNichols, M., 1998. The characteristics and valuation of loss reserves of property casualty insurers. *Review of Accounting Studies* 3, 73–95.
- Beaver, W., McNichols, M., 2001. Do stock prices of property casualty insurers fully reflect information about earnings, accruals, cash flows, and development? *Review of Accounting Studies* 6, 197–220.
- Beaver, W., McNichols, M., Nelson, K., 2003. Management of the loss reserve accrual and the distribution of earnings in the property-casualty insurance industry. *Journal of Accounting and Economics* 35, 347–376.
- Beaver, W., McNichols, M., Nelson, K., 2007. An alternative interpretation of the discontinuity in earnings distributions. *Review of Accounting Studies* 12, 525–556.
- Beaver, W., McNichols, M., Rhie, J., 2005. Have financial statements become less informative? Evidence from the ability of financial ratios to predict bankruptcy. *Review of Accounting Studies* 10, 93–122.
- Becker, C., DeFond, M., Jiambalvo, J., Subramanyam, K., 1998. The effect of audit quality on earnings management. *Contemporary Accounting Research* 15, 1–24.
- Beidleman, C., 1973. Income smoothing: the role of management. *The Accounting Review* 48, 653–667.
- Beneish, M., 1997. Detecting GAAP violations: implications for assessing earnings management among firms with extreme financial performance. *Journal of Accounting and Public Policy* 16, 271–309.
- Beneish, M., 1999. Incentives and penalties related to earnings overstatements that violate GAAP. *The Accounting Review* 74, 425–457.
- Beneish, M., Billings, M., Hodder, L., 2008. Internal control weaknesses and information uncertainty. *The Accounting Review* 83, 665–703.
- Bens, D., Nagar, V., Skinner, D., Wong, M., 2003. Employee stock options, EPS dilution, and stock repurchases. *Journal of Accounting and Economics* 36, 51–90.
- Bergstresser, D., Philippon, T., 2006. CEO incentives and earnings management. *Journal of Financial Economics* 80, 511–529.
- Bernard, V., Stober, T., 1989. The nature and amount of information in cash flows and accruals. *The Accounting Review* 64, 624–652.
- Bhattacharya, N., Black, E., Christensen, T., Larson, C., 2003a. Assessing the relative informativeness and permanence of pro forma earnings and GAAP operating earnings. *Journal of Accounting and Economics* 36, 285–319.
- Bhattacharya, U., Daouk, H., Welker, M., 2003b. The world price of earnings opacity. *The Accounting Review* 78, 641–678.
- Bhojraj, S., Swaminathan, B., 2007. How does the corporate bond market value capital investments and accruals? *Review of Accounting Studies* 14, 31–62.
- Bhojraj, S., Hribar, P., Picconi, M., McInnis, J., 2009. Making sense of cents: an examination of firms that marginally miss or beat analyst forecasts. *Journal of Finance* 64, 2361–2388.
- Biddle, G., Hilary, G., 2006. Accounting quality and firm-level capital investment. *The Accounting Review* 81, 963–982.
- Biddle, G., Hilary, G., Verdi, R., 2009. How does financial reporting quality relate to investment efficiency? *Journal of Accounting and Economics* 48, 112–131.
- Biddle, G., Seow, G., 1991. The estimation and determinants of associations between returns and earnings: evidence from cross-industry comparisons. *Journal of Accounting, Auditing & Finance*, 183–232.
- Bonner, S., Palmrose, Z., Young, S., 1998. Fraud type and auditor litigation: an analysis of SEC accounting and auditing enforcement releases. *The Accounting Review* 73, 503–532.
- Botosan, C., Plumlee, M., 2005. Assessing alternative proxies for the expected risk premium. *The Accounting Review* 80, 21–53.
- Botosan, C., Plumlee, M., 2002. A re-examination of disclosure level and the expected cost of equity capital. *Journal of Accounting Research* 40, 21–40.
- Bowen, R., Burgstahler, D., Daley, L., 1986. Evidence on the relationships between earnings and various measures of cash flow. *The Accounting Review* 61, 713–725.
- Bowen, R., DuCharme, L., Shores, D., 1995. Stakeholders' implicit claims and accounting method choice. *Journal of Accounting and Economics* 20, 255–295.
- Bowen, R., Lacey, J., Noreen, E., 1981. Determinants of the corporate decision to capitalize interest. *Journal of Accounting and Economics* 3, 151–179.
- Bowen, R., Rajgopal, S., Venkatachalam, M., 2008. Accounting discretion, corporate governance, and firm performance. *Contemporary Accounting Research* 25, 310–405.
- Boynton, C., Dobbins, P., Plesko, G., 1992. Earnings management and the corporate alternative minimum tax. *Journal of Accounting Research* 30, 131–153.
- Bradshaw, M., Richardson, S., Sloan, R., 2001. Do analysts and auditors use information in accruals? *Journal of Accounting Research* 39, 45–74.
- Brav, A., Lehavy, R., Michaely, R., 2005. Using expectations to test asset pricing models. *Financial Management* 34, 31–64.
- Brown, L., 1983. Accounting changes and the accuracy of analysts' earnings forecasts. *Journal of Accounting Research* 21, 432–443.
- Brown, L., Pinello, A., 2007. To what extent does the financial reporting process curb earnings surprise games? *Journal of Accounting Research* 45, 947–981.
- Brown, S., Lo, K., Lys, T., 1999. Use of  $R^2$  in accounting research: measuring changes in value relevance over the last four decades. *Journal of Accounting and Economics* 28, 83–115.
- Burgstahler, D., Dichev, I., 1997. Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics* 24, 99–126.
- Burgstahler, D., Eames, M., 2003. Earnings management to avoid losses and earnings decrease: are analysts fooled? *Contemporary Accounting Research* 20, 253–294.
- Burgstahler, D., Hail, L., Leuz, C., 2006. The importance of reporting incentives: earnings management in European private and public firms. *The Accounting Review* 81, 983–1016.
- Burgstahler, D., Kinney, W., Martin, R., 2002. Earnings surprise materiality as measured by stock returns. *Journal of Accounting Research* 40, 1297–1329.
- Burns, N., Kedia, S., 2006. The impact of performance-based compensation on misreporting. *Journal of Financial Economics* 79, 35–67.

- Bushee, B., 1998. The influence of institutional investors in myopic R&D investment behavior. *The Accounting Review* 73, 305–333.
- Bushman, R., Chen, Q., Engel, E., Smith, A., 2004. Financial accounting information, organizational complexity and corporate governance systems. *Journal of Accounting and Economics* 37, 167–201.
- Butler, M., Leone, A., Willenborg, M., 2004. An empirical analysis of auditor reporting and its association with abnormal accruals. *Journal of Accounting and Economics* 37, 139–165.
- Cahan, S., 1992. The effect of antitrust investigations on discretionary accruals: a refined test of the political-cost hypothesis. *The Accounting Review* 67, 77–95.
- Calegari, M., 2000. The effect of tax accounting rules on capital structure and discretionary accruals. *Journal of Accounting and Economics* 30, 1–31.
- Callahan, C., Lee, C., Yohn, T., 1997. Accounting information and bid-ask spreads. *Accounting Horizons* 11, 50–60.
- Caramanis, C., Lennox, C., 2008. Audit effort and earnings management. *Journal of Accounting and Economics* 45, 116–138.
- Cassidy, D., 1976. Investor evaluation of accounting information: some additional empirical evidence. *Journal of Accounting Research* 14, 212–229.
- Chambers, R., 1956. Some observations on “Structure of accounting theory”. *The Accounting Review* 31, 584–592.
- Chambers, R., 1965. Edwards and Bell on business income. *The Accounting Review* 40, 731–741.
- Chambers, D., 1999. Earnings management and capital market misallocation. Working Paper, Kennesaw State University.
- Chaney, P., Jeter, D., Lewis, C., 1998. The use of accruals in income smoothing: a permanent earnings hypothesis. *Advances in Quantitative Analysis of Finance & Accounting* 6, 103–135.
- Chang, H., Chen, J., Liao, W., Mishra, B., 2006. CEOs'/CFOs' swearing by the numbers: does it impact share price of the firm? *The Accounting Review* 81, 1–27.
- Chauvin, K., Shenoy, C., 2001. Stock price decreases prior to executive stock option grants. *Journal of Corporate Finance* 7, 53–76.
- Chen, C., Lin, C., Lin, Y., 2008. Audit partner tenure, audit firm tenure, and discretionary accruals: does long auditor tenure impair earnings quality? *Contemporary Accounting Research* 25, 447–471.
- Chen, P., Daley, L., 1996. Regulatory capital, tax, and earnings management effects on loan loss accruals in the Canadian banking industry. *Contemporary Accounting Research* 13, 91–128.
- Chen, Q., Hemmer, T., Zhang, Y., 2007. On the relation between conservatism in accounting standards and incentives for earnings management. *Journal of Accounting Research* 45, 541–565.
- Chen, S., DeFond, M., Park, C., 2002. Voluntary disclosure of balance sheet information in quarterly earnings announcements. *Journal of Accounting and Economics* 33, 229–251.
- Cheng, Q., Farber, D., 2008. Earnings restatements, changes in CEO compensation, and firm performance. *The Accounting Review* 83, 1217–1250.
- Cheng, Q., Warfield, T., 2005. Equity incentives and earnings management. *The Accounting Review* 80, 441–476.
- Choi, W., Gramlich, J., Thomas, J., 2001. Potential errors in detecting earnings management: reexamining studies investigating the AMT of 1986. *Contemporary Accounting Research* 18, 571–613.
- Christensen, P., Feltham, G., Sabac, F., 2005. A contracting perspective on earnings quality. *Journal of Accounting and Economics* 39, 265–294.
- Christie, A., 1990. Aggregation of test statistics: an evaluation of the evidence on contracting and size hypotheses. *Journal of Accounting and Economics* 12, 15–36.
- Christie, A., Zimmerman, J., 1994. Efficient and opportunistic choices of accounting procedures: corporate control. *The Accounting Review* 69, 539–566.
- Cronbach, L., Meehl, P., 1955. Construct validity in psychological tests. *Psychological Bulletin* 52, 281–302.
- Chung, H., Kallapur, S., 2003. Client importance, nonaudit services, and abnormal accruals. *The Accounting Review* 78, 931–955.
- Chung, H., Wynn, J., 2008. Managerial legal liability coverage and earnings conservatism. *Journal of Accounting and Economics* 46, 135–153.
- Cohen, D., Dey, A., Lys, T., 2008. Real and accrual-based earnings management in the pre- and post-Sarbanes-Oxley periods. *The Accounting Review* 83, 757–787.
- Coles, J., Hertzfel, M., Kalpathy, S., 2006. Earnings management around employee stock option reissues. *Journal of Accounting and Economics* 41, 173–200.
- Collins, D., DeAngelo, L., 1990. Accounting information and corporate governance: market and analyst reactions to earnings of firms engaged in proxy contests. *Journal of Accounting and Economics* 13, 213–247.
- Collins, D., Gong, G., Hribar, P., 2003. Investor sophistication and the mispricing of accruals. *Review of Accounting Studies* 8, 251–276.
- Collins, D., Kothari, S., Shanken, J., Sloan, R., 1994. Lack of timeliness and noise as explanations for the low contemporaneous return-earnings association. *Journal of Accounting and Economics* 18, 289–324.
- Collins, D., Li, O., Xie, H., 2007. What drives the increased informativeness of earnings announcements over time? *Review of Accounting Studies* 14, 1–30.
- Collins, D., Maydew, E., Weiss, I., 1997. Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics* 24, 39–67.
- Collins, D., Salatka, W., 1993. Noisy accounting earnings signals and earnings response coefficients: the case of foreign currency accounting. *Contemporary Accounting Research* 10, 119–159.
- Collins, D., Kothari, S., 1989. An analysis of the cross-sectional and intertemporal determinants of earnings response coefficients. *Journal of Accounting and Economics* 11, 143–181.
- Core, J., Guay, W., VanBuskirk, A., 2003. Market valuations in the new economy: an investigation of what has changed. *Journal of Accounting and Economics* 34, 43–67.
- Core, J., Guay, W., Verdi, R., 2008. Is accruals quality a priced risk factor? *Journal of Accounting and Economics* 46, 2–22.
- Core, J., Schrand, C., 1999. The effect of accounting-based debt covenants on equity valuation. *Journal of Accounting and Economics* 27, 1–34.
- Cuccia, A., Hackenbrack, K., Nelson, M., 1995. The ability of professional standards to mitigate aggressive reporting. *The Accounting Review* 70, 227–248.
- Cushing, B., 1974. A mathematical approach to the analysis and design of internal control systems. *The Accounting Review* 49, 24–41.
- Daines, H., 1929. The changing objectives of accounting. *The Accounting Review* 4, 94–110.
- Daley, L., Vigeland, R., 1983. The effects of debt covenants and political costs on the choice of accounting methods: the case of accounting for R&D costs. *Journal of Accounting and Economics* 5, 195–211.
- Darrrough, M., Rangan, S., 2005. Do insiders manipulate earnings when they sell their shares in an initial public offering? *Journal of Accounting Research* 43, 1–33.
- Das, S., Zhang, H., 2003. Rounding-up in reported EPS, behavioral thresholds, and earnings management. *Journal of Accounting and Economics* 35, 31–50.
- Dascher, P., Malcom, R., 1970. A note on income smoothing in the chemical industry. *Journal of Accounting Research* 8, 253–259.
- DeAngelo, H., DeAngelo, L., Skinner, D., 1994. Accounting choice in troubled companies. *Journal of Accounting and Economics* 17, 113–143.
- DeAngelo, L., 1981. Auditor independence, ‘low balling’, and disclosure regulation. *Journal of Accounting and Economics* 3, 113–127.
- DeAngelo, L., 1986. Accounting numbers as market valuation substitutes: a study of management buyouts of public stockholders. *The Accounting Review* 61, 400–420.
- DeAngelo, L., 1988. Managerial competition, information costs, and corporate governance: the use of accounting performance measures in proxy contests. *Journal of Accounting and Economics* 10, 3–36.
- Dechow, P., 1994. Accounting earnings and cash flows as measures of firm performance: the role of accounting accruals. *Journal of Accounting and Economics* 18, 3–42.
- Dechow, P., Dichev, I., 2002. The quality of accruals and earnings: the role of accrual estimation errors. *The Accounting Review* 77, 35–59.
- Dechow, P., Ge, W., 2006. The persistence of earnings and cash flows and the role of special items: implications for the accrual anomaly. *Review of Accounting Studies* 11, 253–296.
- Dechow, P., Ge, W., Larson, C., Sloan, R. Predicting material accounting misstatements. *Contemporary Accounting Research*, forthcoming.
- Dechow, P., Huson, M., Sloan, R., 1994. The effect of restructuring charges on executives’ cash compensation. *The Accounting Review* 69, 138–156.

- Dechow, P., Kothari, S., Watts, R., 1998. The relation between earnings and cash flows. *Journal of Accounting and Economics* 25, 133–168.
- Dechow, P., Myers, L., Shakespeare, C., 2009. Fair value accounting and gains from asset securitizations: a convenient earnings management tool with compensation side-benefits. Working Paper, University of Michigan, University of California, Berkeley, and University of Arkansas.
- Dechow, P., Richardson, S., Sloan, R., 2008. The persistence and pricing of the cash component of earnings. *Journal of Accounting Research* 46, 537–566.
- Dechow, P., Richardson, S., Tuna, I., 2003. Why are earnings kinky? An examination of the earnings management explanation. *Review of Accounting Studies* 8, 355–384.
- Dechow, P., Schrand, C., 2004. Earnings Quality. The Research Foundation of CFA Institute.
- Dechow, P., Skinner, D., 2000. Earnings management: reconciling the views of accounting academics, practitioners, and regulators. *Accounting Horizons* 14, 232–250.
- Dechow, P., Sloan, R., 1991. Executive incentives and the horizon problem: an empirical investigation. *Journal of Accounting and Economics* 14, 51–89.
- Dechow, P., Sloan, R., Sweeney, A., 1995. Detecting earnings management. *The Accounting Review* 70, 193–225.
- Dechow, P., Sloan, R., Sweeney, A., 1996. Causes and consequences of earnings manipulation: an analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research* 13, 1–36.
- DeFond, M., 2010. Discussion of: "Understanding earnings quality: a review of the proxies, their determinants and their consequences". *Journal of Accounting and Economics*, forthcoming.
- DeFond, M., Hung, M., Trezevant, R., 2007. Investor protection and the information content of annual earnings announcements: international evidence. *Journal of Accounting and Economics* 43, 37–67.
- DeFond, M., Jiambalvo, J., 1994. Debt covenant violation and manipulation of accruals. *Journal of Accounting and Economics* 17, 145–176.
- DeFond, M., Park, C., 1997. Smoothing income in anticipation of future earnings. *Journal of Accounting and Economics* 23, 115–139.
- DeFond, M., Park, C., 2001. The reversal of abnormal accruals and the market valuation of earnings surprises. *The Accounting Review* 76, 375–404.
- DeFond, M., Subramanyam, K., 1998. Auditor changes and discretionary accruals. *Journal of Accounting and Economics* 25, 35–67.
- DeGeorge, F., Patel, J., Zeckhauser, R., 1999. Earnings management to exceed thresholds. *Journal of Business* 72, 1–33.
- Demski, J., 1973. Rational choice of accounting method for a class of partnership. *Journal of Accounting Research* 11, 176–190.
- Demski, J., 1998. Performance measure manipulation. *Contemporary Accounting Research* 15, 261–285.
- Desai, H., Hogan, C., Wilkins, M., 2006. The reputational penalty for aggressive accounting: earnings restatements and management turnover. *The Accounting Review* 81, 83–112.
- Desai, H., Krishnamurthy, S., Venkataraman, K., 2006. Do short sellers target firms with poor earnings quality? Evidence from earnings restatements. *Review of Accounting Studies* 11, 71–90.
- Desai, H., Rajgopal, S., Venkatchalam, M., 2004. Value-glamour and accrual mispricing: one anomaly or two? *The Accounting Review* 79, 355–385.
- Dhaliwal, D., Fargher, N., Lee, K., 1991. The association between unexpected earnings and abnormal security returns in the presence of financial leverage. *Contemporary Accounting Research* 8, 20–41.
- Dhaliwal, D., Gleason, C., Mills, L., 2004. Last-chance earnings management: using the tax expense to meet analysts' forecasts. *Contemporary Accounting Research* 21, 431–459.
- Dhaliwal, D., Salamon, G., Smith, E., 1982. The effect of owner versus management control on the choice of accounting methods. *Journal of Accounting and Economics* 4, 41–53.
- Dharan, B., 1987. The effect of sales and collection disclosures on cash flow forecasting and income smoothing. *Contemporary Accounting Research* 3, 445–459.
- Dharan, B., Lev, B., 1993. The valuation consequence of accounting changes: a multi-year examination. *Journal of Accounting, Auditing and Finance* 8, 475–494.
- Dichev, I., Skinner, D., 2002. Large-sample evidence on the debt covenant hypothesis. *Journal of Accounting Research* 40, 1091–1123.
- Dichev, I., Tang, V., 2008. Matching and the changing properties of accounting earnings over the last 40 years. *The Accounting Review* 83, 1425–1460.
- Dietrich, J., Harris, M., Muller, K., 2000. The reliability of investment property fair value estimates. *Journal of Accounting and Economics* 30, 125–158.
- Dietrich, J., Muller, K., Riedl, E., 2007. Asymmetric timeliness tests of accounting conservatism. *Review of Accounting Studies* 12, 95–125.
- Dontoh, A., Radhakrishnan, S., Ronen, J., 2004. The declining value-relevance of accounting information and non-information-based trading: an empirical analysis. *Contemporary Accounting Research* 21, 795–812.
- Dopuch, N., Pincus, M., 1988. Evidence on the choice of inventory accounting methods: LIFO versus FIFO. *Journal of Accounting Research* 26, 28–59.
- Doyle, J., Ge, W., McVay, S., 2007a. Accruals quality and internal control over financial reporting. *The Accounting Review* 82, 1141–1170.
- Doyle, J., Ge, W., McVay, S., 2007b. Determinants of weaknesses in internal control over financial reporting. *Journal of Accounting and Economics* 44, 193–223.
- Ducharme, L., Malatesta, P., Sefcik, S., 2004. Earnings management, stock issues, and shareholder lawsuits. *Journal of Financial Economics* 71, 27–49.
- Durtschi, C., Easton, P., 2005. Earnings management? The shapes of the frequency distributions of earnings metrics are not evidence ipso facto. *Journal of Accounting Research* 43, 557–592.
- Durtschi, C., Easton, P., 2009. Earnings management? Erroneous inference based on earnings frequency distributions. *Journal of Accounting Research* 47 (2009), 1249–1282.
- Dutta, S., Reichelstein, S., 2005. Accrual accounting for performance evaluation. *Review of Accounting Studies* 10, 527–552.
- Dye, R., 1988. Earnings management in an overlapping generations model. *Journal of Accounting Research* 26, 195–235.
- Dye, R., Verrecchia, R., 1995. Discretion vs. uniformity: choices among GAAP. *The Accounting Review* 70, 389–415.
- Easley, D., O'Hara, M., 2004. Information and the cost of capital. *Journal of Finance* 59, 1553–1583.
- Easton, P., Monahan, S., 2005. An evaluation of accounting-based measures of expected returns. *The Accounting Review* 80, 501–538.
- Easton, P., Zmijewski, M., 1989. Cross-sectional variation in the stock market response to the announcement of accounting earnings. *Journal of Accounting and Economics* 9, 117–141.
- Ecker, F., Francis, J., Kim, I., Olsson, P., Schipper, K., 2006. A returns-based representation of earnings quality. *The Accounting Review* 81, 749–780.
- Efendi, J., Srivastava, A., Swanson, E., 2007. Why do corporate managers misstate financial statements? The role of option compensation and other factors. *Journal of Financial Economics* 85, 667–708.
- Elgers, P., Pfeiffer, R., Porter, S., 2003. Anticipatory income smoothing: a re-examination. *Journal of Accounting and Economics* 35, 405–422.
- Elliott, J., Philbrick, D., 1990. Accounting changes and earnings predictability. *The Accounting Review* 65, 157–174.
- Engel, E., Hayes, R., Wang, X., 2003. CEO turnover and properties of accounting information. *Journal of Accounting and Economics* 36, 197–226.
- Erickson, M., Hanlon, M., Maydew, E., 2006. Is there a link between executive equity incentives and accounting fraud? *Journal of Accounting Research* 44, 113–143.
- Erickson, M., Wang, S., 1999. Earnings management by acquiring firms in stock for stock mergers. *Journal of Accounting and Economics* 27, 149–176.
- Evans, J., Sridhar, S., 1996. Multiple control systems, accrual accounting, and earnings management. *Journal of Accounting Research* 34, 45–65.
- Ewert, R., Wagenhofer, A., 2010. Earnings quality metrics and what they measure. Working Paper, University of Graz.
- Fairfield, P., Yohn, T., 2001. Using asset turnover and profit margin to forecast changes in profitability. *Review of Accounting Studies* 6, 371–385.
- Fairfield, P., Whisenant, S., Yohn, T., 2003a. Accrued earnings and growth: implications for future profitability and market mispricing. *The Accounting Review* 78, 353–371.
- Fairfield, P., Sweeney, R., Yohn, T., 1996. Accounting classification and the predictive content of earnings. *Accounting Review* 71, 337–355.
- Fan, J., Wong, T., 2002. Corporate ownership structure and the informativeness of accounting earnings in East Asia. *Journal of Accounting and Economics* 33, 401–425.

- Farber, D., 2005. Restoring trust after fraud: does corporate governance matter? *The Accounting Review* 80, 539–561.
- Feng, M., Ge, W., Luo, S., Shevlin, T. Why do CFOs become involved in material accounting manipulations? *Journal of Accounting and Economics*, in press, doi:10.1016/j.jacc.2010.09.005.
- Ferguson, M., Seow, G., Young, D., 2004. Nonaudit services and earnings management: UK evidence. *Contemporary Accounting Research* 21, 813–841.
- Feroz, E., Park, K., Pastena, V., 1991. The financial and market effects of the SEC's accounting and auditing enforcement releases. *Journal of Accounting Research* 29, 107–142.
- Fields, T., Lys, T., Vincent, L., 2001. Empirical research on accounting choice. *Journal of Accounting and Economics* 31, 255–307.
- Finger, C., 1994. The ability of earnings to predict future earnings and cash flows. *Journal of Accounting Research* 32, 210–223.
- Fischer, P., Verrecchia, R., 2000. Reporting bias. *The Accounting Review* 75, 229–245.
- Fisher, I., 1907. In: *The Rate of Interest*. The Macmillan Co., New York.
- Fisher, I., 1930. In: *The Theory of Interest*. The Macmillan Co., New York.
- Foster, G., 1977. Quarterly accounting data: time-series properties and predictive ability results. *The Accounting Review* 52, 1–21.
- Francis, J., Hanna, J., Vincent, L., 1996. Causes and effects of discretionary asset write-offs. *Journal of Accounting Research* 34, 117–134.
- Francis, J., Ke, B., 2006. Disclosure of fees paid to auditors and the market valuation of earnings surprises. *Review of Accounting Studies* 11, 495–523.
- Francis, J., Krishnan, J., 1999. Accounting accruals and auditor reporting conservatism. *Contemporary Accounting Research* 16, 135–165.
- Francis, J., LaFond, R., Olsson, P., Schipper, K., 2004. Costs of equity and earnings attributes. *The Accounting Review* 79, 967–1010.
- Francis, J., LaFond, R., Olsson, P., Schipper, K., 2005a. The market pricing of accruals quality. *Journal of Accounting and Economics* 39, 295–327.
- Francis, J., Maydew, E., Sparks, H., 1999. The role of Big 6 auditors in the credible reporting of accruals. *Auditing* 18, 17–34.
- Francis, J., Nanda, D., Olsson, P., 2008. Voluntary disclosure, earnings quality, and cost of capital. *Journal of Accounting Research* 46, 53–99.
- Francis, J., Olsson, P., Schipper, K., 2006. Earnings quality. *Foundation and Trends in Accounting* 1, 259–340.
- Francis, J., Schipper, K., 1999. Have financial statements lost their relevance? *Journal of Accounting Research* 37, 319–352.
- Francis, J., Schipper, K., Vincent, L., 2002a. Earnings announcements and competing information. *Journal of Accounting and Economics* 33, 313–342.
- Francis, J., Schipper, K., Vincent, L., 2002b. Expanded disclosures and the increased usefulness of earnings announcements. *The Accounting Review* 77, 515–546.
- Francis, J., Schipper, K., Vincent, L., 2005b. Earnings and dividend informativeness when cash flow rights are separated from voting rights. *Journal of Accounting and Economics* 39, 329–360.
- Francis, J., Wang, D., 2008. The joint effect of investor protection and Big 4 audits on earnings quality around the world. *Contemporary Accounting Research* 25, 157–191.
- Frankel, R., Johnson, M., Nelson, K., 2002. The relation between auditors' fees for nonaudit services and earnings management. *The Accounting Review* 77, 71–105.
- Frankel, R., Lee, C., 1998. Accounting valuation, market expectation, and cross-sectional stock returns. *Journal of Accounting and Economics* 25, 283–319.
- Friedlan, J., 1994. Accounting choices of issuers of initial public offerings. *Contemporary Accounting Research* 11, 1–31.
- Frost, C., Gordon, E., Hayes, A., 2006. Stock exchange disclosure and market development: an analysis of 50 international exchanges. *Journal of Accounting Research* 44, 437–483.
- García Lara, J., García Osma, B., Penalva, F., 2009. Accounting conservatism and corporate governance. *Review of Accounting Studies* 14, 161–201.
- Gaver, J., Gaver, K., 1998. The relation between nonrecurring accounting transactions and CEO cash compensation. *The Accounting Review* 73, 235–253.
- Gaver, J., Gaver, K., Austin, J., 1995. Additional evidence on bonus plans and income management. *Journal of Accounting and Economics* 19, 3–28.
- Gaver, J., Paterson, J., 1999. Managing insurance company financial statements to meet regulatory and tax reporting goals. *Contemporary Accounting Research* 16, 207–241.
- Gaver, J., Paterson, J., 2001. The association between external monitoring and earnings management in the property-casualty insurance industry. *Journal of Accounting Research* 39, 269–282.
- Ge, W., 2007. Off-balance-sheet activities, earnings persistence and stock prices: evidence from operating leases. Working Paper, University of Washington.
- Ge, W., McVay, S., 2005. The disclosure of material weaknesses in internal control after the Sarbanes-Oxley Act. *Accounting Horizons* 19, 137–158.
- Geiger, M., Lennox, C., North, D., 2008. The hiring of accounting and finance officers from audit firms: how did the market react? *Review of Accounting Studies* 13, 55–86.
- Geiger, M., North, D., 2006. Does hiring a new CFO change things? An investigation of changes in discretionary accruals. *The Accounting Review* 81, 781–809.
- Gigler, F., Hemmer, T., 2001. Conservatism, optimal disclosure policy, and the timeliness of financial reports. *The Accounting Review* 76, 471–493.
- Givoly, D., Hayn, C., 2000. The changing time-series properties of earnings, cash flows and accruals: has financial reporting become more conservative? *Journal of Accounting and Economics* 29, 287–320.
- Givoly, D., Hayn, C., Katz, S., 2010. Does public ownership of equity improve earnings quality? *The Accounting Review* 85, 195–225.
- Givoly, D., Hayn, C., Natarajan, A., 2007. Measuring reporting conservatism. *The Accounting Review* 82, 65–106.
- Gleason, C., Jenkins, N., Johnson, W., 2008. The contagion effects of accounting restatements. *The Accounting Review* 83, 83–110.
- Gleason, C., Mills, L., 2008. Evidence of differing market responses to beating analysts' targets through tax expense decreases. *Review of Accounting Studies* 13, 295–318.
- Gonedes, N., 1969. The significance of selected accounting procedures: a statistical test. *Journal of Accounting Research* 7, 90–113.
- Gong, G., Louis, H., Sun, A., 2008. Earnings management, lawsuits, and stock-for-stock acquirers' market performance. *Journal of Accounting and Economics* 46, 62–77.
- Graham, B., Dodd, D., 1934. In: *Security Analysis*. The McGraw-Hill Book Company, Inc.
- Graham, J., Li, S., Qiu, J., 2008. Corporate misreporting and bank loan contracting. *Journal of Financial Economics* 88, 44–61.
- Green, J., Hand, J., Soliman, M., 2010. Going, going, gone? The death of the US accruals anomaly. Working Paper, UNC and University of Washington.
- Greenberg, R., Johnson, G., Ramesh, K., 1986. Earnings versus cash flow as a predictor of future cash flow measures. *Journal of Accounting, Auditing, and Finance* 1, 266–277.
- Griffin, P., 1977. The time-series behavior of quarterly earnings: preliminary evidence. *Journal of Accounting Research* 15, 71–83.
- Guay, W., Kothari, S., Watts, R., 1996. A market-based evaluation of discretionary accrual models. *Journal of Accounting Research* 34, 83–105.
- Guenther, D., 1994. Earnings management in response to corporate tax rate changes: evidence from the 1986 Tax Reform Act. *The Accounting Review* 69, 230–243.
- Guenther, D., Maydew, E., Nutter, S., 1997. Financial reporting, tax costs, and book-tax conformity. *Journal of Accounting and Economics* 23, 225–248.
- Guenther, D., Young, D., 2000. The association between financial accounting measures and real economic activity: a multinational study. *Journal of Accounting and Economics* 29, 53–72.
- Guidry, F., Leone, A., Rock, S., 1999. Earnings-based bonus plans and earnings management by business-unit managers. *Journal of Accounting and Economics* 26, 113–142.
- Guiso, L., Sapienza, P., Zingales, L., 2009. Cultural biases in economic exchange? *Quarterly Journal of Economics* 124, 1095–1131.
- Gul, F., Srinidhi, B., 2007. The differential effects of auditors' nonaudit and audit fees on accrual quality. *Contemporary Accounting Research* 24, 595–629.
- Gul, F., Chen, C., Tsui, J., 2003. Discretionary accounting accruals, managers' incentives, and audit fees. *Contemporary Accounting Research* 20, 441–464.

- Hackenbrack, K., Hogan, C., 2002. Market response to earnings surprises conditional on reasons for an auditor change. *Contemporary Accounting Research* 19, 195–223.
- Hagerman, R., Zmijewski, M., 1979. Some economic determinants of accounting policy choice. *Journal of Accounting and Economics* 1, 141–161.
- Hall, S., Stammerjohan, W., 1997. Damage awards and earnings management in the oil industry. *The Accounting Review* 72, 47–65.
- Hammersley, J., Myers, L., Shakespeare, C., 2008. Market reactions to the disclosure of internal control weaknesses and to the characteristics of those weaknesses under Section 302 of the Sarbanes Oxley Act of 2002. *Review of Accounting Studies* 13, 141–165.
- Han, J., Wang, S., 1998. Political costs and earnings management of oil companies during the 1990 Persian Gulf crisis. *The Accounting Review* 73, 103–117.
- Hand, J., 1989. Did firms undertake debt-equity swaps for an accounting paper profit or true financial gain? *The Accounting Review* 64, 587–623.
- Hanlon, M., Heitzman, S., 2010. A review of tax research. Working Paper, MIT, University of Oregon.
- Hanlon, M., Laplante, S., Shevlin, T., 2005. Evidence for the possible information loss of conforming book income and taxable income. *Journal of Law and Economics* 48, 407–442.
- Hanlon, M., Maydew, E., Shevlin, T., 2008. An unintended consequence of book-tax conformity: a loss of earnings informativeness. *Journal of Accounting and Economics* 46, 294–311.
- Haw, I., Hu, B., Hwang, L., Wu, W., 2004. Ultimate ownership, income management, and legal and extra-legal institutions. *Journal of Accounting Research* 42, 423–462.
- Haw, I., Qi, D., Wu, D., Wu, W., 2005. Market consequences of earnings management in response to security regulations in China. *Contemporary Accounting Research* 22, 95–140.
- Hayn, C., 1995. The information content of losses. *Journal of Accounting and Economics* 20, 125–153.
- Healy, P., 1985. The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics* 7, 85–107.
- Healy, P., Howe, C., Myers, S., 2002. R&D accounting and the tradeoff between relevance and objectivity. *Journal of Accounting Research* 40, 677–710.
- Healy, P., Wahlen, J., 1999. A review of the earnings management literature and its implications for standard setting. *Accounting Horizons* 13, 365–383.
- Hennes, K., Leone, A., Miller, B., 2008. The importance of distinguishing errors from irregularities in restatement research: the case of restatements and CEO/CFO turnover. *The Accounting Review* 83, 1487–1519.
- Heron, R., Lie, E., 2006. What fraction of stock option grants to top executives have been manipulated or backdated? Working Paper, Indiana University and University of Iowa.
- Herrmann, D., Inoue, T., Thomas, W., 2003. The sale of assets to manage earnings in Japan. *Journal of Accounting Research* 41, 89–108.
- Hirshleifer, D., Teoh, S., 2003. Limited attention, information disclosure, and financial reporting. *Journal of Accounting and Economics* 36, 337–386.
- Hirst, D., 1994. Auditor sensitivity to earnings management. *Contemporary Accounting Research* 11, 405–422.
- Hirst, D., Hopkins, P., 1998. Comprehensive income reporting and analysts' valuation judgments. *Journal of Accounting Research* 36, 47–75.
- Hogan, C., Wilkins, M., 2008. Evidence on the audit risk model: do auditors increase audit fees in the presence of internal control deficiencies? *Contemporary Accounting Research* 25, 219–242.
- Hoitash, R., Krishnan, M., Sankaraguruswamy, S., 2002. Earnings quality and price quality. Working Paper, Bentley University, National University of Singapore, and Yeshiva University.
- Holthausen, R., Larcker, D., Sloan, R., 1995. Annual bonus schemes and the manipulation of earnings. *Journal of Accounting and Economics* 19, 29–74.
- Holthausen, R., Verrecchia, R., 1988. The effect of sequential information releases on the variance of price changes in an intertemporal multi-asset market. *Journal of Accounting Research* 26, 82–106.
- Hribar, P., Collins, D., 2002. Errors in estimating accruals: implications for empirical research. *Journal of Accounting Research* 40, 105–134.
- Hribar, P., Jenkins, N., 2004. The effect of accounting restatements on earnings revisions and the estimated cost of capital. *Review of Accounting Studies* 9, 337–356.
- Hribar, P., Jenkins, N., Johnson, W., 2006. Stock repurchases as an earnings management device. *Journal of Accounting and Economics* 41, 3–27.
- Hughes, J., Liu, J., Liu, J., 2005. Information, diversification, and cost of capital. Working Paper, UCLA.
- Hung, M., 2000. Accounting standards and value relevance of financial statements: an international analysis. *Journal of Accounting and Economics* 30, 401–420.
- Hunt, H., 1985. Potential determinants of corporate inventory accounting decisions. *Journal of Accounting Research* 23, 448–467.
- Hunt, A., Moyer, S., Shevlin, T., 1996. Managing interacting accounting measures to meet multiple objectives: a study of LIFO firms. *Journal of Accounting and Economics* 21, 339–374.
- Imhoff, E., 2003. Accounting quality, auditing, and corporate governance. *Accounting Horizons* 17, 117–128.
- Imhoff, E., Lobo, G., 1992. The effect of ex ante earnings uncertainty on earnings response coefficients. *The Accounting Review* 67, 427–439.
- Jacob, J., Jorgensen, B., 2007. Earnings management and accounting income aggregation. *Journal of Accounting and Economics* 43, 369–390.
- Jackson, S., Liu, X., Cecchini, M., 2009. Economic consequences of firms' depreciation method choice: evidence from capital investments. *Journal of Accounting and Economics* 48, 54–68.
- Jayaraman, S., 2008. Earnings volatility, cash flow volatility, and informed trading. *Journal of Accounting Research* 46, 809–851.
- Jensen, M., Meckling, W., 1976. Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3, 305–360.
- Jo, H., Kim, Y., Park, M., 2007. Underwriter choice and earnings management: evidence from seasoned equity offerings. *Review of Accounting Studies* 12, 23–59.
- Joe, J., Vandervelde, S., 2007. Do auditor-provided nonaudit services improve audit effectiveness? *Contemporary Accounting Research* 24, 467–487.
- Johnson, M., 1999. Business cycles and the relation between security returns and earnings. *Review of Accounting Studies* 4, 93–117.
- Johnson, S., Ryan, H., Tian, Y., 2009. Managerial incentives and corporate fraud: the sources of incentives matter. *Review of Finance* 13, 115–145.
- Johnson, V., Khurana, I., Reynolds, J., 2002. Audit-firm tenure and the quality of financial reports. *Contemporary Accounting Research* 19, 637–660.
- Johnson, W., Ramanan, R., 1988. Discretionary accounting changes from “successful efforts” to “full cost” methods: 1970–76. *The Accounting Review* 63, 96–110.
- Johnston, D., Rock, S., 2005. Earnings management to minimize Superfund clean-up and transaction costs. *Contemporary Accounting Research* 22, 617–642.
- Jones, J., 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29, 193–228.
- Jones, K., Krishnan, G., Melendrez, K., 2008. Do models of discretionary accruals detect actual cases of fraudulent and restated earnings? An empirical analysis. *Contemporary Accounting Research* 25, 499–531.
- Jorion, P., Shi, C., Zhang, S., 2007. Tightening credit standards: the role of accounting quality. *Review of Accounting Studies* 14, 1–38.
- Jung, W., 1989. Strategic choice of inventory accounting methods. *Contemporary Accounting Research* 6, 1–25.
- Kanagaretnam, K., Lobo, G., Yang, D., 2004. Joint tests of signaling and income smoothing through bank loan loss provisions. *Contemporary Accounting Research* 21, 843–884.
- Karpoff, J., Lee, D., Martin, G., 2008a. The consequences to managers for financial misrepresentation. *Journal of Financial Economics* 88, 193–215.
- Karpoff, J., Lee, D., Martin, G., 2008b. The cost to firms of cooking the books. *Journal of Financial and Quantitative Analysis* 43, 581–611.
- Kasznik, R., 1999. On the association between voluntary disclosure and earnings management. *Journal of Accounting Research* 37, 57–81.
- Kasznik, R., 2004. Discussion of “The effect of accounting restatements on earnings revisions and the estimated cost of capital”. *Review of Accounting Studies* 9, 357–367.
- Kasznik, R., McNichols, M., 2002. Does meeting earnings expectations matter? Evidence from analyst forecast revisions and share prices. *Journal of Accounting Research* 40, 727–759.

- Keating, A., Zimmerman, J., 1999. Depreciation-policy changes: tax, earnings management, and investment opportunity incentives. *Journal of Accounting and Economics* 28, 359–389.
- Kerstein, J., Rai, A., 2007. Intra-year shifts in the earnings distribution and their implications for earnings management. *Journal of Accounting and Economics* 44, 399–419.
- Key, K., 1997. Political cost incentives for earnings management in the cable television industry. *Journal of Accounting and Economics* 23, 309–337.
- Khan, M., 2008. Are accruals mispriced? Evidence from tests of an intertemporal capital asset pricing model. *Journal of Accounting and Economics* 45, 55–77.
- Khurana, I., Raman, K., 2006. Do investors care about the auditor's economic dependence on the client? *Contemporary Accounting Research* 23, 977–1016.
- Kim, J., Yi, C., 2006. Ownership structure, business group affiliation, listing status, and earnings management: evidence from Korea. *Contemporary Accounting Research* 23, 427–464.
- Kim, K., Schroeder, D., 1990. Analysts' use of managerial bonus incentives in forecasting earnings. *Journal of Accounting and Economics* 13, 3–23.
- Kim, M., Kross, W., 1998. The impact of the 1989 change in bank capital standards on loan loss provisions and loan write-offs. *Journal of Accounting and Economics* 25, 69–99.
- Kim, M., Kross, W., 2005. The ability of earnings to predict future operating cash flows has been increasing—not decreasing. *Journal of Accounting Research* 43, 753–780.
- Kim, J., Chung, R., Firth, M., 2003. Auditor conservatism, asymmetric monitoring, and earnings management. *Contemporary Accounting Research* 20, 323–359.
- Kinney, W., 1975. A decision-theory approach to the sampling problem in auditing. *Journal of Accounting Research* 13, 117–132.
- Kinney, W., 2000. Research opportunities in internal control quality and quality assurance. *Auditing* 19, 83–90.
- Kinney, W., McDaniel, L., 1989. Characteristics of firms correcting previously reported quarterly earnings. *Journal of Accounting and Economics* 11, 71–93.
- Kinney, W., Palmrose, Z., Scholz, S., 2004. Auditor independence, non-audit services, and restatements: was the U.S. government right? *Journal of Accounting Research* 42, 561–588.
- Kirschenheiter, M., Melumad, N., 2002. Can “big bath” and earnings smoothing co-exist as equilibrium financial reporting strategies? *Journal of Accounting Research* 40, 761–796.
- Klassen, K., Lang, M., Wolfson, M., 1993. Geographic income shifting by multinational corporations in response to tax rate changes. *Journal of Accounting Research* 31, 141–173.
- Klein, A., 2002. Audit committee, board of director characteristics, and earnings management. *Journal of Accounting and Economics* 33, 375–400.
- Koh, K., Matsumoto, D., Rajgopal, S., 2008. Meeting or beating analyst expectations in the post-scandals world: changes in stock market rewards and managerial actions. *Contemporary Accounting Research* 25, 1067–1098.
- Kormendi, R., Lipe, R., 1987. Earnings innovations, earnings persistence, and stock returns. *Journal of Business* 60, 323–345.
- Kose, J., Kedia, S., 2006. Design of corporate governance: role of ownership structure, takeovers, and bank debt. Working Paper, New York University.
- Kothari, S., Leone, A., Wasley, C., 2005. Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39, 163–197.
- Kothari, S., Ramanna, K., Skinner, D., 2010. Implications for GAAP from an analysis of positive research in accounting. Working Paper, Harvard Business School, MIT, University of Chicago.
- Kraft, A., Leone, A., Wasley, C., 2006. An analysis of the theories and explanations offered for the mispricing of accruals and accrual components. *Journal of Accounting Research* 44, 297–339.
- Kravet, T., Shevlin, T., 2010. Accounting restatements and information risk. *Review of Accounting Studies* 15, 264–294.
- Krishnan, G., 2003. Does Big 6 auditor industry expertise constrain earnings management? *Accounting Horizons* 17, 1–16.
- Krishnan, J., 2005. Audit committee quality and internal control: an empirical analysis. *The Accounting Review* 80, 649–675.
- LaBelle, R., 1990. Bond covenants and changes in accounting policy: Canadian evidence. *Contemporary Accounting Research* 6, 677–698.
- LaFond, R., 2005. Is the accrual anomaly a global anomaly?. Working Paper, Massachusetts Institute of Technology.
- LaFond, R., Roychowdhury, S., 2008. Managerial ownership and accounting conservatism. *Journal of Accounting Research* 46, 101–135.
- Lambert, R., 1984. Income smoothing as rational equilibrium behavior. *The Accounting Review* 59, 604–618.
- Lambert, R., Leuz, C., Verrecchia, R., 2007. Accounting information, disclosure, and the cost of capital. *Journal of Accounting Research* 45, 385–420.
- Landsman, W., Maydew, E., 2002. Has the information content of quarterly earnings announcements declined in the past three decades? *Journal of Accounting Research* 40, 797–808.
- Landsman, W., Peasnell, K., Shakespeare, C., 2008. Are securitization transactions really off balance sheet? *The Accounting Review* 83, 1251–1272.
- Lang, M., Raedy, J., Wilson, W., 2006. Earnings management and cross listing: are reconciled earnings comparable to US earnings? *Journal of Accounting and Economics* 42, 255–283.
- Lang, M., Raedy, J., Yetman, M., 2003. How representative are firms that are cross-listed in the United States? An analysis of accounting quality. *Journal of Accounting Research* 41, 363–386.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2006. What works in securities laws. *Journal of Finance* 61, 1–33.
- Larcker, D., Richardson, S., 2004. Fees paid to audit firms, accrual choices, and corporate governance. *Journal of Accounting Research* 42, 625–658.
- Larcker, D., Richardson, S., Tuna, I., 2007. Corporate governance, accounting outcomes, and organizational performance. *The Accounting Review* 82, 963–1008.
- Lee, C., Hsieh, D., 1985. Choice of inventory accounting methods: comparative analyses of alternative hypotheses. *Journal of Accounting Research* 23, 468–485.
- Lee, C., Li, L., Yue, H., 2006. Performance, growth and earnings management. *Review of Accounting Studies* 11, 305–334.
- Lee, K., 2010. Purchase obligations, earnings persistence and stock returns. Working Paper, The University of California, Berkeley.
- Lennox, C., Park, C., 2006. The informativeness of earnings and management's issuance of earnings forecasts. *Journal of Accounting and Economics* 42, 439–458.
- Leuz, C., Nanda, D., Wysocki, P., 2003. Earnings management and investor protection: an international comparison. *Journal of Financial Economics* 69, 505–527.
- Lev, B., 1983. Some economic determinants of time-series properties of earnings. *Journal of Accounting and Economics* 5, 31–48.
- Lev, B., 1989. On the usefulness of earnings and earnings research: lessons and directions from two decades of empirical research. *Journal of Accounting Research* 27, 153–192.
- Lev, B., Ryan, S., Wu, M., 2008. Rewriting earnings history. *Review of Accounting Studies* 13, 1–33.
- Lev, B., Sougiannis, T., 1996. The capitalization, amortization, and value-relevance of R&D. *Journal of Accounting and Economics* 21, 107–138.
- Lev, B., Thiagarajan, S., 1993. Fundamental information analysis. *Journal of Accounting Research* 31, 190–215.
- Lev, B., Zarowin, P., 1999. The boundaries of financial reporting and how to extend them. *Journal of Accounting Research* 37, 353–385.
- Levi, S., 2008. Voluntary disclosure of accruals in earnings press releases and the pricing of accruals. *Review of Accounting Studies* 13, 1–21.
- Li, F., 2008. Annual report readability, current earnings, and earnings persistence. *Journal of Accounting and Economics* 45, 221–247.
- Li, K., 2010. How well do investors understand loss persistence? Working paper, University of Toronto.
- Liang, P., 2004. Equilibrium earnings management, incentive contracts, and accounting standards. *Contemporary Accounting Research* 21, 685–717.
- Libby, R., Hunton, J., Tan, H., Seybert, N., 2008. Relationship incentives and the optimistic/pessimistic pattern in analysts' forecasts. *Journal of Accounting Research* 46, 173–198.
- Lindahl, F., 1989. Dynamic analysis of inventory accounting choice. *Journal of Accounting Research* 27, 201–226.
- Littleton, A., 1956. Choice among alternatives. *The Accounting Review* 31, 363–370.

- Liu, C., Ryan, S., 2006. Income smoothing over the business cycle: changes in banks' coordinated management of provisions for loan losses and loan charge-offs from the pre-1990 bust to the 1990s boom. *The Accounting Review* 81, 421–441.
- Liu, J., Thomas, J., 2000. Stock returns and accounting earnings. *Journal of Accounting Research* 38, 71–101.
- Liu, M., Wysocki, P., 2006. Operating risk, information risk, and cost of capital. Working Paper, Pennsylvania State University and Massachusetts Institute of Technology.
- Lo, K., 2008. Earnings management and earnings quality. *Journal of Accounting and Economics* 45, 350–357.
- Louder, M., Behn, B., 1995. Alternative income determination rules and earnings usefulness: the case of R&D costs. *Contemporary Accounting Research* 12, 185–205.
- Lougee, B., Marquardt, C., 2004. Earnings informativeness and strategic disclosure: an empirical examination of "pro forma" earnings. *The Accounting Review* 79, 769–795.
- Louis, H., Robinson, D., 2005. Do managers credibly use accruals to signal private information? Evidence from the pricing of discretionary accruals around stock splits. *Journal of Accounting and Economics* 39, 361–380.
- Lundholm, R., O'Keefe, T., 2001. Reconciling value estimates from the discounted cash flow model and the residual income model. *Contemporary Accounting Research* 18, 311–335.
- Malmquist, D., 1990. Efficient contracting and the choice of accounting method in the oil and gas industry. *Journal of Accounting and Economics* 12, 173–205.
- Manry, D., Tiras, S., Wheatley, C., 2003. The influence of interim auditor: reviews on the association of returns with earnings. *The Accounting Review* 78, 251–274.
- Matsumoto, D., 2002. Management's incentives to avoid negative earnings surprises. *The Accounting Review* 77, 483–514.
- Maydew, E., 1997. Tax-induced earnings management by firms with net operating losses. *Journal of Accounting Research* 35, 83–96.
- McAnally, M., Srivastava, A., Weaver, C., 2008. Executive stock options, missed earnings targets, and earnings management. *The Accounting Review* 83, 185–216.
- McDaniel, L., Martin, R., Maines, L., 2002. Evaluating financial reporting quality: the effects of financial expertise vs. financial literacy. *The Accounting Review* 77 (Suppl.), 139–167.
- McInnis, J., 2010. Earnings smoothness, average returns, and implied cost of equity capital. *The Accounting Review* 85, 315–341.
- McNichols, M., 2002. Discussion of "The quality of accruals and earnings: The role of accrual estimation errors". *The Accounting Review* 77, 61–69.
- McNichols, M., 2000. Research design issues in earnings management studies. *Journal of Accounting and Public Policy* 19, 313–345.
- McNichols, M., Stubben, S., 2008. Does earnings management affect firms' investment decisions. *The Accounting Review* 83, 1571–1603.
- McNichols, M., Wilson, G., 1988. Evidence of earnings management from the provision for bad debts. *Journal of Accounting Research* 26, 1–31.
- McVay, S., 2006. Earnings management using classification shifting: An examination of core earnings and special items. *The Accounting Review* 81, 501–531.
- McVay, S., Nagar, V., Tang, V., 2006. Trading incentives to meet the analyst forecast. *Review of Accounting Studies* 11, 575–598.
- Melumad, N., Nissim, D., 2008. Line-item analysis of earnings quality. *Foundation and Trends in Accounting* 3, 87–221.
- Menon, K., Williams, D., 2004. Former audit partners and abnormal accruals. *The Accounting Review* 79, 1095–1118.
- Menon, K., Williams, D., 2008. Management turnover following auditor resignations. *Contemporary Accounting Research* 25, 567–604.
- Mensah, Y., Considine, J., Oakes, L., 1994. Statutory insolvency regulations and earnings management in the prepaid health-care industry. *The Accounting Review* 69, 70–95.
- Mergenthaler, R., Jr., 2009. Principles-based versus rules-based standards and earnings management. Working Paper, University of Iowa.
- Miller, G., 2006. The press as a watchdog for accounting fraud. *Journal of Accounting Research* 44, 1001–1033.
- Miller, G., Skinner, D., 1998. Determinants of the valuation allowance for deferred tax assets under SFAS No. 109. *The Accounting Review* 73, 213–233.
- Mlynarczyk, F., 1969. An empirical study of accounting methods and stock prices. *Journal of Accounting Research* 7, 63–81.
- Moehrl, S., 2002. Do firms use restructuring charge reversals to meet earnings targets? *The Accounting Review* 77, 397–413.
- Mohanram, P., Rajgopal, S., 2009. Is PIN priced risk? *Journal of Accounting and Economics* 47, 226–243.
- Monem, R., 2003. Earnings management in response to the introduction of the Australian gold tax. *Contemporary Accounting Research* 20, 747–774.
- Moore, M., 1973. Management changes and discretionary accounting decisions. *Journal of Accounting Research* 11, 100–107.
- Morsfield, S., Tan, C., 2006. Do venture capitalists influence the decision to manage earnings in initial public offerings? *The Accounting Review* 81, 1119–1150.
- Moses, O., 1987. Income smoothing and incentives: empirical tests using accounting changes. *The Accounting Review* 62, 358–377.
- Moyer, S., 1990. Capital adequacy ratio regulations and accounting choices in commercial banks. *Journal of Accounting and Economics* 13, 123–154.
- Muller, K., 1999. An examination of the voluntary recognition of acquired brand names in the United Kingdom. *Journal of Accounting and Economics* 26, 179–191.
- Myers, J., Myers, L., Skinner, D., 2007. Earnings momentum and earnings management. *Journal of Accounting, Auditing, and Finance* 22, 249–284.
- Narayanan, M., Schipani, C., Seyhun, H., 2006. Economic impact of backdating of executive stock options. *Michigan Law Review* 105, 1597–1641.
- Navissi, F., 1999. Earnings management under price regulation. *Contemporary Accounting Research* 16, 281–304.
- Ndubizu, G., 2007. Do cross-border listing firms manage earnings or seize a window of opportunity? *The Accounting Review* 82, 1009–1030.
- Nelson, M., Elliott, J., Tarpley, R., 2003. How are earnings managed? Examples from auditors. *Accounting Horizons* 17, 17–35.
- Nelson, M., Elliott, J., Tarpley, R., 2002. Evidence from auditors about managers' and auditors' earnings-management decisions. *The Accounting Review* 77, 175–202.
- Ng, D., Stoeckenius, J., 1979. Auditing: Incentives and truthful reporting. *Journal of Accounting Research* 17, 1–24.
- Nissim, D., Penman, S., 2001. Ratio analysis and equity valuation: from research to practice. *Review of Accounting Studies* 6, 109–154.
- Njoroge, K., 2009. Accrual noise ratio as a measure of accrual reliability. Working Paper, University of Oregon.
- Nwaeze, E., Yang, S., Yin, J., 2006. Accounting information and CEO compensation: the role of cash flow from operations in the presence of earnings. *Contemporary Accounting Research* 23, 227–265.
- O'Glove, T., 1987. *Quality of Earnings*. The Free Press, New York.
- Ogneva, M., Raghunandan, K., Subramanyam, K., 2007. Internal control weakness and cost of equity: evidence from SOX Section 404 disclosures. *The Accounting Review* 82, 1255–1297.
- Ohlson, J., 2000. Residual income valuation: the problems. Working Paper, New York University.
- Ohlson, J., 2010. Accruals: an overview. Working Paper, New York University.
- Pae, J., Thornton, D., Welker, M., 2005. The link between earnings conservatism and the price-to-book ratio. *Contemporary Accounting Research* 22, 693–717.
- Palmrose, Z., Richardson, V., Scholz, S., 2004. Determinants of market reactions to restatement announcements. *Journal of Accounting and Economics* 37, 59–89.
- Palmrose, Z., Scholz, S., 2004. The circumstances and legal consequences of non-GAAP reporting: evidence from restatements. *Contemporary Accounting Research* 21, 139–180.
- Patoukas, P., Thomas, J., 2010. Evidence of conditional conservatism: fact or artifact? Working Paper, Yale University.
- Paton, W., Littleton, A., 1940. *An Introduction to Corporate Accounting Standards*. American Accounting Association, Chicago.
- Penman, S., 1998. A synthesis of equity valuation techniques and the terminal value calculation for the dividend discount model. *Review of Accounting Studies* 2, 303–323.
- Penman, S., 2003. The quality of financial statements: perspectives from the recent stock market bubble. *Accounting Horizons* 17, 77–96.

- Penman, S., Sougiannis, T., 1998. A comparison of dividend, cash flow, and earnings approaches to equity valuation. *Contemporary Accounting Research* 15, 343–383.
- Penman, S., Zhang, X., 2002. Accounting conservatism, the quality of earnings, and stock returns. *The Accounting Review* 77, 237–264.
- Perry, S., Williams, T., 1994. Earnings management preceding management buyout offers. *Journal of Accounting and Economics* 18, 157–179.
- Petroni, K., 1992. Optimistic reporting in the property-casualty insurance industry. *Journal of Accounting and Economics* 15, 485–508.
- Petroni, K., Ryan, S., Wahlen, J., 2000. Discretionary and non-discretionary revisions of loss reserves by property-casualty insurers: differential implications for future profitability, risk and market value. *Review of Accounting Studies* 5, 95–125.
- Phillips, F., 1999. Auditor attention to and judgments of aggressive financial reporting. *Journal of Accounting Research* 37, 167–189.
- Phillips, J., Pincus, M., Rego, S., 2003. Earnings management: new evidence based on deferred tax expense. *The Accounting Review* 78, 491–521.
- Pincus, M., 1993. Accounting methods and differential stock market response to the announcement of earnings. *Journal of Accounting, Auditing and Finance* 8, 221–248.
- Pincus, M., Rajgopal, S., Venkatachalam, M., 2007. The accrual anomaly: international evidence. *The Accounting Review* 82, 169–203.
- Plumlee, M., Yohn, T., 2010. An analysis of the underlying causes attributed to restatements. *The Accounting Review* 24, 41–64.
- Plummer, C., Tse, S., 1999. The effect of limited liability on the informativeness of earnings: evidence from the stock and bond markets. *Contemporary Accounting Research* 16, 541–574.
- Pope, P., Walker, M., 1999. International differences in the timeliness, conservatism, and classification of earnings. *Journal of Accounting Research* 37, 53–87.
- Pourciau, S., 1993. Earnings management and nonroutine executive changes. *Journal of Accounting and Economics* 16, 317–336.
- Rajgopal, S., Shevlin, T., 2002. Empirical evidence on the relation between stock option compensation and risk taking. *Journal of Accounting and Economics* 33, 145–171.
- Rangan, S., 1998. Earnings management and the performance of seasoned equity offerings. *Journal of Financial Economics* 50, 101–122.
- Richardson, S., 2003. Earnings quality and short sellers. *Accounting Horizons* 17, 49–61.
- Richardson, S., Sloan, R., Soliman, M., Tuna, I., 2005. Accrual reliability, earnings persistence and stock prices. *Journal of Accounting and Economics* 39, 437–485.
- Richardson, S., Sloan, R., Soliman, M., Tuna, I., 2006. The implications of accounting distortions and growth for accruals and profitability. *The Accounting Review* 81, 713–743.
- Richardson, S., Tuna, I., Wysocki, P., 2010. Accounting anomalies, fundamental analysis, and returns to investment strategies. Working paper. *Journal of Accounting and Economics Conference*.
- Ronen, J., Sadan, S., 1975. Classificatory smoothing: alternative income models. *Journal of Accounting Research* 13, 133–149.
- Rosner, R., 2003. Earnings manipulation in failing firms. *Contemporary Accounting Research* 20, 361–408.
- Roychowdhury, S., 2006. Earnings management through real activities manipulation. *Journal of Accounting and Economic* 42, 335–370.
- Ruddock, C., Taylor, S., Taylor, S., 2006. Nonaudit services and earnings conservatism: is auditor independence impaired? *Contemporary Accounting Research* 23, 701–746.
- Ryan, S., Zarowin, P., 2003. Why has the contemporaneous linear returns–earnings relation declined? *The Accounting Review* 78, 523–553.
- Ryan, S., 2006. Identifying conditional conservatism. *European Accounting Review* 15, 511–525.
- Schelling, T., 1978. In: *Micromotives and Macrobehavior*. W.W. Norton & Co., Inc., New York.
- Schipper, K., Vincent, L., 2003. Earnings quality. *Accounting Horizons* 17, 235–250.
- Schneider, A., Wilner, N., 1990. A test of audit deterrent to financial reporting irregularities using the randomized response technique. *The Accounting Review* 65, 668–681.
- Scholes, M., Williams, J., 1977. Estimating betas from nonsynchronous data. *Journal of Financial Economics* 5, 309–327.
- Scholes, M., Wilson, G., Wolfson, M., 1992. Firms' responses to anticipated reductions in tax rates: the Tax Reform Act of 1986. *Journal of Accounting Research* 30, 161–185.
- Schrand, C., Wong, M., 2003. Earnings management using the valuation allowance for deferred tax assets under SFAS No. 109. *Contemporary Accounting Research* 20, 579–611.
- Shackelford, D., Shevlin, T., 2001. Empirical tax research in accounting. *Journal of Accounting and Economics* 31, 321–387.
- Shivakumar, L., 2000. Do firms mislead investors by overstating earnings before seasoned equity offerings? *Journal of Accounting and Economics* 29, 339–371.
- Sivakumar, K., Waymire, G., 2003. Enforceable accounting rules and income measurement by early 20th century railroads. *Journal of Accounting Research* 41, 397–432.
- Skinner, D., 1993. The investment opportunity set and accounting procedure choice: preliminary evidence. *Journal of Accounting and Economics* 16, 407–445.
- Skinner, D., Sloan, R., 2002. Earnings surprises, growth expectations, and stock returns or don't let an earnings torpedo sink your portfolio. *Review of Accounting Studies* 7, 289–312.
- Sloan, R., 1996. Do stock prices fully reflect information in accruals and cash flows about future earnings? *The Accounting Review* 71, 289–315.
- Smith, E., 1976. The effect of the separation of ownership from control on accounting policy decisions. *The Accounting Review* 51, 707–723.
- Soliman, M., 2008. The use of DuPont analysis by market participants. *The Accounting Review* 83, 823–853.
- Sridhar, S., Magee, R., 1996. Financial contracts, opportunism, and disclosure management. *Review of Accounting Studies* 1, 225–258.
- Srinivasan, S., 2005. Consequences of financial reporting failure for outside directors: evidence from accounting restatements and audit committee members. *Journal of Accounting Research* 43, 291–334.
- Sterling, R., 1970. *The Theory of the Measurement of Enterprise Income*. The University Press of Kansas, Lawrence.
- Stigler, G.J., 1963. *Capital and Rates of Return in Manufacturing Industries*. Princeton University Press, Princeton.
- Stocken, P., Verrecchia, R., 2004. Financial reporting system choice and disclosure management. *The Accounting Review* 79, 1181–1203.
- Subramanyam, K., 1996. The pricing of discretionary accruals. *Journal of Accounting and Economics* 22, 249–281.
- Summers, S., Sweeney, J., 1998. Fraudulently misstated financial statements and insider trading: An empirical analysis. *The Accounting Review* 73, 131–146.
- Sweeney, A., 1994. Debt-covenant violations and managers' accounting responses. *Journal of Accounting and Economics* 17, 281–308.
- Teoh, S., Rao, G., Wong, T., 1998a. Are accruals during initial public offerings opportunistic? *Review of Accounting Studies* 3, 175–208.
- Teoh, S., Welch, I., Wong, T., 1998b. Earnings management and the underperformance of seasoned equity offerings. *Journal of Financial Economics* 50, 63–99.
- Teoh, S., Wong, T., 1993. Perceived auditor quality and the earnings response coefficient. *The Accounting Review* 68, 346–366.
- Thomas, J., Zhang, H., 2002. Inventory changes and future returns. *Review of Accounting Studies* 7, 163–187.
- Tucker, J., Zarowin, P., 2006. Does income smoothing improve earnings informativeness? *The Accounting Review* 81, 251–270.
- Uecker, W., Brief, A., Kinney Jr., W., 1981. Perception of the internal and external auditor as a deterrent to corporate irregularities. *The Accounting Review* 61, 465–478.
- Vafeas, N., 2005. Audit committees, boards, and the quality of reported earnings. *Contemporary Accounting Research* 22, 1093–1122.
- Verrecchia, R., 1986. Managerial discretion in the choice among financial reporting alternatives. *Journal of Accounting and Economics* 8, 175–195.
- Verrecchia, R., 1990. Information quality and discretionary disclosure. *Journal of Accounting and Economics* 12, 365–380.
- Wang, D., 2006. Founding family ownership and earnings quality. *Journal of Accounting Research* 44, 619–656.
- Warfield, T., Wild, J., Wild, K., 1995. Managerial ownership, accounting choices, and informativeness of earnings. *Journal of Accounting and Economics* 20, 61–91.
- Watts, R., 2003a. Conservatism in accounting, Part I: Explanations and implications. *Accounting Horizons* 17, 207–221.
- Watts, R., 2003b. Conservatism in accounting, Part II: Evidence and research opportunities. *Accounting Horizons* 17, 287–301.

- Watts, R., Zimmerman, J., 1986. In: *Positive Accounting Theory*. Prentice-Hall Inc.
- Watts, R., Leftwich, R., 1977. The time series of annual accounting earnings. *Journal of Accounting Research* 15, 253–271.
- Waymire, G., 1985. Earnings volatility and voluntary management forecast disclosure. *Journal of Accounting Research* 23, 268–295.
- White, G., 1970. Discretionary accounting decisions and income normalization. *Journal of Accounting Research* 8, 260–273.
- Whittred, G., 1980. Audit qualification and the timeliness of corporate annual reports. *The Accounting Review* 55, 563–577.
- Willingham, J., Wright, W., 1985. Financial statement errors and internal controls judgments. *Auditing: A Journal of Practice and Theory* 1, 57–70.
- Wilson, G., 1987. The incremental information content of the accrual and funds components of earnings after controlling for earnings. *The Accounting Review* 62, 293–322.
- Wysocki, P., 2008. Assessing earnings and accruals quality: U.S. and international evidence. Working paper, MIT.
- Xie, H., 2001. The mispricing of abnormal accruals. *The Accounting Review* 76, 357–373.
- Yermack, D., 1997. CEO stock option awards and company news announcements. *The Journal of Finance* 52, 449–476.
- Zechman, S., 2010. The relation between voluntary disclosure and financial reporting: evidence from synthetic leases. *Journal of Accounting Research* 48, 725–765.
- Zhang, X., 2007. Accruals, investment, and the accrual anomaly. *The Accounting Review* 82, 1333–1363.
- Zimmer, I., 1986. Accounting for interest by real estate developers. *Journal of Accounting and Economics* 8, 37–51.
- Zmijewski, M., Hagerman, R., 1981. An income strategy approach to the positive theory of accounting standard setting/choice. *Journal of Accounting and Economics* 3, 129–149.