Earnings quality in U.K. private firms: Comparative loss recognition timeliness

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Abstract

UK private and public companies face substantially equivalent regulation on auditing, accounting standards and taxes. We hypothesize that private-company financial reporting nevertheless is lower quality due to different market demand, regulation notwithstanding. A large UK sample supports this hypothesis. Quality is operationalized using Basu’s (1997) time-series measure of timely loss recognition and a new accruals-based method. The result is not affected by controls for size, leverage, industry membership and auditor size, or by allowing endogenous listing choice. The result enhances understanding of private companies, which are predominant in the economy. It also provides insight into the economics of accounting standards.

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1. Introduction

We examine timely loss recognition – an important attribute of financial reporting quality – in a large sample of U.K. private and public firms. Private company reporting is interesting in its own right, due to the predominance of private companies in the economy.¹ The U.K. setting is particularly interesting, because U.K. private company reporting is subject to substantially equivalent regulatory provisions as public company reporting, whereas the markets for private and public financial reporting are substantially different. The U.K. therefore provides a rare opportunity to study the interaction between market and regulatory effects (Ball, Robin and Wu 2000, 2003; Ball 2001). We argue that the market demands lower quality financial reporting for private companies than for public companies, regulation notwithstanding, and report evidence consistent with that view. The result enhances our understanding of the economic role of accounting standards, an issue that is surprisingly neglected in the literature.

Three principal features of the U.K. financial reporting regulations are substantially equivalent for private and public companies. First, the U.K. Companies Act requires all private and public companies to file annual financial statements that comply with the same accounting standards. Second, financial statements filed by U.K. private companies must be audited (there is an exemption for very small companies, but no firms in our sample qualify). Third, private and public companies are subject to the same tax laws. These are the major regulatory institutions for U.K. financial reporting, and they are substantially equivalent for public and private companies.

Nevertheless, the market for financial reporting differs substantially between private and public companies. Private companies are more likely to resolve information asymmetry by an

¹ Over 90% of registered U.K. companies are private (Companies House, U.K.). They constitute 99.9% of all private non-agricultural entities in 1993 Europe (Mulhern 1995). The Forbes list of the top 500 U.S. private companies (http://www.forbes.com/private500/) includes 245 with revenues exceeding $1 billion in 2000. The U.S. Small Business Administration (http://www.sba.gov/advo/stats/facts99.pdf) reports that in 1998 businesses with fewer than 500 employees accounted for 51% of US GDP, 47% of sales, and 53% of private nonfarm employment. The role of small firms in job creation, growth and innovation is widely debated; see Schumpeter (1934) and Acs (1996).
“insider access” model. They are less likely to use public financial statements in contracting with lenders, managers and other parties, and in primary and secondary equity transactions. Their financial reporting is correspondingly more likely to be influenced by taxation, dividend and other policies. These differences imply a demand for lower quality financial reporting.

We interpret reporting quality in abstract terms as the usefulness of financial statements to investors, creditors, managers and all other parties contracting with the firm. Following Basu (1997), we measure a single but nevertheless important attribute of reporting quality: timeliness in financial-statement recognition of economic losses. Timely loss recognition increases financial statement usefulness generally, particularly in corporate governance and debt agreements. Governance is affected because timely loss recognition makes managers less likely to make investments they expect \textit{ex ante} to be negative-NPV, and less likely to continue operating investments with \textit{ex post} negative cash flows. Debt is affected because timely loss recognition provides more accurate \textit{ex ante} information for loan pricing and more quickly triggers debt agreement rights (such as repricing, and restrictions on leverage, investment and dividends) from violating covenants based on \textit{ex post} accounting ratios. We therefore argue that timely recognition of economic losses is an important attribute of financial reporting quality.\footnote{The literature on timely loss recognition, conservatism and value relevance are discussed further in Section 2.3.}

Our principal result is that timely loss recognition is substantially less prevalent in private companies than in public companies, despite the groups facing equivalent regulatory rules. The result is apparent in both a test for transitory time-series components in income and a new test based on the relation between accruals and cash flow from operations. It is robust with respect to controls for size, leverage, industry and fiscal year-end (which influence the likelihood of experiencing an economic loss) and for auditor firm size. It also is robust with respect to alternative definitions of both income (inclusion or exclusion of exceptional and/or extra-ordinary
items) and operating cash flow (estimated from successive balance sheets or directly from cash flow statements), alternative estimation methods (Fama-MacBeth t-statistics, extent of data Winsorizing) and alternative model specifications (a selection model addressing endogeneity of the public/private choice). This result cannot be attributed to risk or tax differences between private and listed firms. The lower timeliness of loss recognition observed in private companies relative to public companies, despite the substantive equivalence of their reporting rules, supports the view that market demand substantially determines important financial reporting properties.

As financial reporting criteria, quality and usefulness differ from economic efficiency because they do not address optimality. Lower quality does not imply sub-optimality because it can arise from either lower demand for or higher cost of supplying quality. Our findings thus should not be interpreted as supporting stricter regulation of financial reporting by private firms. Quite the contrary: our hypothesis is that lower earnings quality in private firms is an optimal outcome in the market for financial reporting, not a failure in supply.

The following section describes the economic role of timely loss recognition (the attribute of earnings quality we measure), and its relation to conservatism and “value relevance.” The section also outlines our two principal tests of loss recognition timeliness: Basu’s (1997) method of identifying transitory loss components in income; and a test we develop that is based on the relation between accruals and cash flow from operations. Section three describes the relevant UK institutional features and develops the hypothesis that loss recognition timeliness is substantially affected by the different economic roles of financial reporting in private and public companies. Section four describes the data, section five presents the principal results, and section six describes a variety of specification tests to ensure the robustness of the results. The final two sections consider alternative explanations and summarize our conclusions.

2. Timely loss recognition: hypotheses and tests
This section outlines the economic role of timely loss recognition in accounting, and its
relation to conservatism and to value relevance. It then describes the two measures of loss
recognition timeliness we utilize: Basu’s (1997) test for transitory time-series components in
income and a new test based on the relation between accruals and cash flow from operations.

2.1 Timeliness of accounting income

Accounting income is a barometer for evaluating financial reporting in general, because
changes in balance sheet quantities flow through the income statement (assuming “clean surplus”
accounting and ignoring offsetting changes such as reclassifications). Timely income-statement
recognition therefore implies timely revision of all financial statement variables and all financial
ratios based on them.

Economic income incorporates both current-period cash flow and any revision in the
present value of expected future cash flows. Accounting recognition of economic income can be
thought of as occurring under two broad models: deferred and timely recognition. Deferred
recognition largely ignores revisions in expectations and awaits the realization of the revised cash
flows themselves. For a multi-period investment, revisions in expected cash flow for any one
future period are likely to be correlated with revisions for other future periods, so deferred
recognition incorporates economic gains and losses in accounting income over its entire life.
Equivalently, deferred recognition generates persistent components of accounting income.
Timely recognition incorporates unrealized gains or losses in income (and hence the balance
sheet) on an accrued basis, for example as inventory write-downs or as restructuring or asset
impairment charges. Our tests seek to identify which recognition model is most prevalently used
for economic gains and losses, and how this choice differs between public and private companies.

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3 Economic income is change in market value of equity, adjusted for dividends and capital contributions. This
corresponds to the Hicks (1946) definition of income as the maximum amount that can be consumed consistent with
the maintenance of wealth. Hicks discusses alternative definitions.
The following subsections discuss the disproportionate emphasis that is placed on loss recognition in accounting, relative to gain recognition, and how this asymmetry is related to conservatism and value relevance.

2.2 Economic role of asymmetric timeliness in income-statement recognition of gains and losses

Accountants are reluctant to recognize (i.e., incorporate in audited financial statements) information managers possess about future cash flows when it is unobservable to external parties, and hence is unauditable (unverifiable). Thus, under the revenue recognition rules, reported income is based on actual cash flow realizations, adjusted for accruals that are derived from independently-verifiable predictors of future cash flows. One such predictor is the verified amount of accounts receivable, which is a predictor of future cash inflow, other things equal. Ignoring unverifiable information about future cash flows – such as that embodied in managers’ expectations, strategies and plans – reflects a trade-off between relevance and reliability (Financial Accounting Standards Board 1984, para. 77).

Financial reporting normally modifies the revenue recognition rules by adopting a lower verification standard for information about decreases in expected future cash flows (i.e., economic losses) than for increases (i.e., economic gains). A primary reason for asymmetric accounting recognition is that managers have an asymmetric incentive to reveal their private information. Timeliness of economic loss incorporation is an important attribute of earnings quality because it makes financial statements more useful in several contexts, for example in corporate governance and loan agreements.

The governance effect of timely loss incorporation is due to it mitigating agency problems associated with managers’ investments decisions. If managers know ex ante that losses will be

recognized during their tenure, then they are less likely to make negative-NPV investments, such as “pet” projects or “trophy” acquisitions. In contrast, if managers can defer loss recognition to periods when the reduced cash flows underlying negative NPVs are realized, then the earnings consequences of their investment decisions can be passed on to subsequent generations of managers. The ability to defer loss recognition also provides managers with an accounting-based incentive to continue operating investments with \textit{ex post} negative NPVs, to avoid reported losses on sale or abandonment. These agency problems are mitigated by timely loss recognition, which reports losses around the time expectations are revised downward, irrespective of managers’ decisions to continue or abandon. Timely loss recognition therefore increases managers’ incentives to act quickly to limit economic losses, and thereby increases the efficiency of contracting between firms and managers.\footnote{Recent awareness of the importance of losses is due to Hayn (1995), Elliott and Hanna (1996), Francis, Hanna and Vincent (1996) and Collins, Maydew and Weiss (1997). Basu (1997) studies \textit{timely} loss recognition, discussed below.}

The efficiency of debt agreements that utilize financial statement variables also is affected. Timely loss recognition can assist \textit{ex ante} loan pricing by providing new information to lenders. It also is quicker in triggering \textit{ex post} violations of covenants based on financial statement variables. This increases debt agreement efficiency by more quickly giving lenders the option to impose contractual restrictions (such as leverage, investment and dividend restrictions) on covenant violators. This applies to covenants triggered by income-statement variables such as minimum interest coverage and balance-sheet variables such as leverage ratios, because accounting losses flow from the income statement onto the balance sheet values of asset, liability and owners’ equity accounts. Consequently, timely income-statement incorporation of economic losses more quickly transfers decision rights from loss-making managers to lenders.\footnote{An example is reported in DaimlerBenz AG \textit{Annual Report 1996} (English language version, pages 44-45), reproduced in Ball (1998). Daimler implemented US GAAP standards for calculating earnings throughout the corporation, reducing the discretion that individual business-unit managers exercised in reporting their own performance (including their capacity to hide losses), and requiring them to focus more on shareholder value.}
We do not focus on timely gain recognition, for three overlapping reasons. First, we conjecture there is less demand for it. Managers have a greater incentive to disclose timely information about unrealized economic gains than unrealized losses (they can realize gains by selling), so external parties are likely to demand an offsetting asymmetry in the financial statements. For example, managers have incentives to disclose economic gains to potential lenders to obtain favorable _ex ante_ debt pricing, thereby skewing the demand from lenders toward loss recognition in the financial statements. Further, debt agreements do not generally transfer decision rights when covenants are exceeded, only when they are violated, so there is lower _ex post_ demand for timely gain recognition. In the context of corporate governance, potential agency issues arise from managers undertaking or continuing negative-NPV (not positive NPV) investments, so there is less demand from investors for timely gain recognition derived from contracting with managers. Overall, the economics of contracts involving financial reporting predicts asymmetry in the demand for gain and loss accounting.

Second, we note that accounting rules and practice are fundamentally asymmetric. Recall that economic gains and losses involve changes in expected _future_ cash flows, which by definition are “unrealized.” A long-standing example of asymmetric accruals is the lower of cost or market inventory rule, which recognizes unrealized economic losses arising from declines in fair values of inventory, but does not recognize unrealized gains. Accounting for gains and losses on long-term assets also is asymmetric, as formalized in the asset impairment standards issued by several countries, including FAS 121 and 144 in the U.S. and FRS11 in the U.K. In contrast, upward revaluation has not been practiced in the U.S. since the SEC was established in 1934. In the U.K., although upward revaluation can be recognized in the balance sheet, gains from

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8 Beatty and Weber (2002) report that performance-pricing, under which interest rates vary inversely with accounting performance measures, is a new feature of U.S. debt contracts. While this provides incentives for timely recognition
revaluation are not included in income like losses from asset impairment. In general, asymmetry is a fundamental property of accounting rules and practice.

Third, the evidence is consistent with timely gain recognition not being a high priority in accounting. Basu (1997) reports that loss recognition is the prime source of timeliness in U.S. earnings. The asymmetry is difficult to reconcile with a symmetric value relevance view of accounting (Holthausen and Watts 2001). It replicates for public companies in a wide range of countries, including the U.K. (Ball, Kothari and Robin, 2000).

The three reasons for not focusing on gain recognition are far from independent. To the extent that accounting standards are endogenous rather than imposed, asymmetry in demand will be reflected in standards (e.g., standards for asset impairment but not for upward revaluation), and the evidence will reveal an asymmetric response of earnings to economic gains and losses.

2.3 Timely loss recognition, value relevance and conservatism

Timely loss recognition is related to the concepts of value relevance and conservatism. This subsection attempts to clarify those concepts and how they relate to each other, with a view to understanding timely loss recognition, which is the attribute of reporting quality we measure.

In a Basu (1997) piecewise-linear regression with fiscal-year stock return as the independent variable and current-year accounting income as the dependent variable, timely loss recognition is equivalent to a partial stock price association criterion. In this context, stock returns proxy for economic gains and losses, assuming some degree of market efficiency. The association criterion is partial in that it focuses on losses, whereas a full association criterion also addresses gains. Further, the use of fiscal-year returns implies there is no gap in calendar time between successive return intervals, as is the case with short windows. Fiscal-year association tests therefore map directly into value relevance tests. In particular, timelier recognition of fiscal-year

of economic gains, we are not aware of this being practiced in the U.K. during our sample period. In any event, our
economic gains and losses (proxied by fiscal-year stock returns) implies a higher correlation between book and market values.

The relation between timely loss recognition and conservatism is clouded by the existence of two related but distinct definitions of conservatism. One definition of conservatism is an accounting bias toward reporting low book values of stockholders equity (and hence, if clean surplus accounting is being followed, low average net incomes). The second definition of conservatism is an equivalent bias conditional on firms experiencing contemporaneous economic losses. Confusion of the unconditional and conditional versions of conservatism is evident as early as Gilman (1939, page 130) and APB Statement No. 4.

In the more recent literature, Watts and Zimmerman define conservatism as:

Conservatism means that the accountant should report the lowest value among possible alternative values for assets and the highest alternative value for liabilities. Revenues should be recognized later rather than sooner and expenses sooner than later.

This is a variant of the first definition above, in that it does not specify conditionally low equity or income, and hence does not address loss-recognition timeliness. To illustrate, under this definition a firm’s accounting is conservative if it simply delays revenue recognition by one period, or subtracts a constant from earnings every period, independent of current economic gains and losses. This type of conservatism is an asymmetric response to uncertainty: from a range of possible values, select a low value, not the expected value. It frequently is associated with Germany, where under the vorsicht (prudence) principle there are unconditionally conservative practices such as charging future operating expenses against current-period income.

Basu (1997) is an important contribution to our understanding of the conservatism concept. He defines conservatism as (page 4, emphasis added):

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I interpret conservatism as capturing accountants’ tendency to require a higher degree of verification for recognizing good news than bad news in financial statements. Under my interpretation of conservatism, earnings reflects bad news more quickly than good news.

Basu (pages 7-8) compares this definition – which stresses the timeliness of loss recognition – with variants of the first definition. The additional requirement of this conditional conservatism definition is that the reduction in accounting income reflects a contemporaneous economic loss. This requirement is not satisfied by expensing early, by deferring revenue, or by under-reporting income or book value on a regular basis (e.g., creating excessive provisions in all years), none of which is correlated with contemporaneous real income. The difference in definitions is most apparent in Basu’s primary research design, which studies the asymmetric incorporation of economic gains and losses (proxied by positive and negative stock returns over the fiscal year) in current-year accounting income.

The distinction between conditional and unconditional asymmetry is central to understanding the role of conservatism in efficient contracting with the firm. Watts (1993, abstract page) hypothesizes that accounting conservatism “evolved from accounting’s contracting role.” He singles out “avoidance of inappropriate distributions to claim holders” to protect more senior claims (notably, debt) as “an important contracting reason for conservatism.” Watts (1993, page 5) mentions the effect of conservatism “to offset the manager’s optimism (engendered by compensation based on income).”

Gilman (1939, page 232) explores similar effects of conservatism, and also suggests a political costs motive.

The “timely loss recognition” version of conservatism provides fresh insight into its contracting role. It is difficult to see how contracting is affected by conservatism in the form of an unconditional accounting bias of known magnitude. Rational agents would simply invert the

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10 See, for example, (Gray 1980). Delaying recognition or under-reporting income correspondingly reports lower book values of equity, hence lower asset values or higher liabilities.
bias. For example, if book values of assets were under-reported by a known proportion \(?,\) leverage covenants would increase the proportion of book value that firms could borrow by a factor of \((1-?)^{-1}\), without affecting the lending rate or the circumstances under which covenants were violated. In addition, unconditional biases reduce opportunities to account in a conditionally conservative fashion (for example, writing off assets at acquisition eliminates the opportunity to impair them at the time of economic losses). Contracting-based demand for a known unconditional bias thus seems unlikely. Further, an unconditional bias of unknown magnitude introduces randomness in decisions based on financial information and can only reduce contracting efficiency.\(^{12}\) In contrast, the conditional form of conservatism (timely loss recognition) can improve contracting efficiency. It more quickly triggers debt covenant violations that transfer decision rights to lenders, allowing lenders to restrict managers’ actions (such as distributions, borrowing, and new investment) sooner after economic losses become apparent, thereby increasing the efficiency of debt contracting. Similarly, timely loss recognition gives managers less incentive to undertake \textit{ex ante} negative-NPV projects and more incentive to abandon \textit{ex post} loss-making investments quickly, thereby increasing the efficiency of compensation contracting and corporate governance.\(^{13}\) While unconditional conservatism seems inefficient or at best neutral in contracting, conditional conservatism (timely loss recognition) can enhance contracting efficiency.

Confusion between the unconditional and conditional versions of conservatism helps explain why conservatism is a controversial property of accounting, despite its long–standing

\(^{11}\) Earlier, Watts and Zimmerman (1986, page 206) hypothesized a purpose of conservatism is to “offset managerial optimism (presumably encouraged by earnings-based compensation plans).”

\(^{12}\) These points are made in the context of German \textit{vorsicht} conservatism in Ball (1998).

\(^{13}\) The role of timeliness in debt and governance is discussed in Ball, Kothari and Robin (2000, page 52), Ball (2001, pages 138-140), and Ball, Robin and Wu (2003, pages 4-5).
Ambivalence is evident in APB Statement No. 4, which seemingly approves of conservatism in its unconditional version (AICPA 1970, ¶171):

Conservatism. Frequently, assets and liabilities are measured in a context of significant uncertainties. Historically, managers, investors, and accountants have generally preferred that possible errors in measurement be in the direction of understatement rather than overstatement of net income and net assets.

while combining the versions among accounting’s “characteristics and limitations” (¶35):

Conservatism. The uncertainties that surround the preparation of financial statements are reflected in a general tendency toward early recognition of unfavorable events and minimization of the amount of net assets and net income.

Later, FASB Statement of Financial Accounting Concepts No. 2 defines conservatism with seeming approval as “prudent reaction to uncertainty” (FASB 1980, Glossary), which it interprets by quoting the unconditional version of APB Statement No. 4 (¶171, cited above). It then appears to cite the unconditional version disapprovingly:

The convention of conservatism, which was once commonly expressed as “anticipate no profits but anticipate all losses,” developed during a time when balance sheets were considered the prime (and often only) financial statement, and details of profits or other operating results were rarely provided … .”

Ambivalence toward conservatism could reflect confusion between its unconditional and conditional forms. As argued above, in a contracting setting unconditional conservatism seems at best neutral (if the bias is known) and possibly inefficient (if the bias is unknown). In contrast, conditional conservatism involves timely loss recognition, and thereby increases the efficiency of debt and compensation/governance contracting. From a contracting perspective, conditional and unconditional conservatism are substantially different concepts.

2.4 Time-series test of timeliness in loss recognition

Our principal timeliness measure exploits the transitory nature of economic income [Samuelson (1965), Fama (1970)]. It measures timely gain and loss incorporation as the tendency

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14 Basu (1997, pages 8-9) cites evidence of conservatism in accounting as early as the fifteenth century. Gilman
for increases and decreases in accounting income to reverse (Basu 1997), an indicator of
transitory gain and loss components. Our hypothesis is that there is less reversal of income
decreases in private companies than in public companies, reflecting a lower frequency of timely
loss recognition due to lower demand for financial reporting quality.

To identify transitory gain and loss components in accounting income, we therefore
estimate various specifications of Basu’s (1997) piecewise-linear regression:

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\Delta NI_t = \alpha_0 + \alpha_1 D\Delta NI_{t-1} + \alpha_2 \Delta NI_{t-1} + \alpha_3 D\Delta NI_{t-1} * \Delta NI_{t-1} + \varepsilon_t
\] (1)

\(\Delta NI_t\) is change in income (alternatively defined as including and excluding extra-ordinary and
exceptional items) from fiscal year \(t-1\) to \(t\), scaled by beginning book value of total assets.
\(D\Delta NI_{t-1}\) is a dummy variable taking the value 1 if the prior-year change
\(\Delta NI_{t-1}\) is negative.

Untimely recognition of economic gains, by deferring incorporation in income until their
underlying increases in cash flows are realized, causes gains to be recognized as “persistent”
positive components of accounting income that tend not to reverse. The implication is \(\alpha_2 = 0\).
Alternatively, timely recognition of economic gains implies they are recognized as “transitory”
increases in income components that do tend to reverse, the implication being \(\alpha_2 < 0\). Similarly,
timely recognition of economic losses implies they are recognized as transitory income decreases,
and hence reverse, the implication being \(\alpha_2 + \alpha_3 < 0\). The hypothesis that economic losses are
recognized in a more timely fashion than gains implies \(\alpha_3 < 0\).

The independent variable in this specification is change in income, which has two primary
advantages. First, changes provide the correct specification for identifying transitory income
components.\(^{15}\) Second, the incremental coefficient \(\alpha_3\) is less likely to be affected by survival
biases in a changes specification, because survival frequencies are likely to be more similar in

\(^{(1939, especially pp. 201-204) describes the controversy, which persists to this day.\(^{15}\) Hayn’s (1995) bankruptcy model predicts a non-linearity, but it applies to income levels.\}
samples of negative and positive earnings changes than in samples of negative and positive earnings levels (i.e., loss-making firms are less likely to survive than profitable firms experiencing earnings decreases). The non-linearity is due to accounting income being a mixture of two processes: a type of moving average of current and past economic gains; and a substantially less smoothed, more transitory incorporation of economic losses.

2.5 Accruals-based test of loss recognition

Basu’s serial dependence model (1) has two potential limitations. First, it cannot distinguish transitory gain or loss components in earnings from random errors in accruals (such as miscounting inventory) and from some types of earnings management (such as excess provisions that revert over time). All are transitory and cause negative serial dependence in income changes. Second, the model can only identify the existence of transitory components, and not whether their recognition is timely or untimely. Basu’s association test mitigates both limitations by identifying whether transitory earnings components are contemporaneously correlated with stock returns, which proxy for economic gains and losses. Private companies do not have stock returns, so we develop an alternative model that exploits the likelihood that timely loss recognition occurs through accounting accruals. The model adapts the Dechow, Kothari and Watts (1998) model to incorporate the recognition of unrealized gains and losses via accruals.

The role of accruals in the Dechow, Kothari and Watts (1998) model is to mitigate noise in operating cash flow.\footnote{The model builds on Dechow (1994) and Guay, Kothari and Watts (1996).} For example, other things equal (specifically, accounts payable) the cash flow effects of a transitory fall in inventory reverse over time: an increase in the current year and a decrease in the following year. Accrual accounting attempts to eliminate these transitory effects by matching the cost of inventory sold, rather than the cost of inventory purchased, against sales revenue. A primary function of working-capital accruals thus is to construct an earnings variable
that is less noisy than cash flow from operations. One implication is that accruals and cash flow from operations are contemporaneously negatively correlated (Dechow 1994).

We envision a second role for accruals, timely recognition of economic gains and losses, and hypothesize it is a source of positive but asymmetric correlation between accruals and contemporaneous cash flows. The positive correlation between accruals and cash flows arises because cashflows from an individual durable asset (such as plant and equipment, or an ongoing production process) tend to be correlated over time, or “persistent.” This implies that revisions in current-period cash flow are positively correlated with current revisions in expected future cash flows. For example, an investment experiencing decreased current-period cash flow is likely also to be experiencing a downward revision in its future prospects: i.e., in its expected future cash flows. Timely gain and loss recognition is based on expected not realized cash flows, and therefore is accomplished through accruals. It follows that timely gain and loss recognition is a source of positive correlation between accruals and current-period cash flow, thereby attenuating the negative correlation predicted by the Dechow, Kothari and Watts (1998) model.

The above argument is assisted by the following illustration, adapted from Ball, Robin and Wu (2003). Consider an asset that at the beginning of period $t$ is an $L$-period annuity of expected future cash flows, $CF$. Assume new information arriving at the end of period $t$ causes a revision $\Delta CF_t$ in both its current-period cash flow and its expected cash flows for all remaining future periods. For example, the market for the products produced out of an economically specific plant might have shrunk in the current period, without prospects for recovery, thereby permanently impairing the cash flows associated with the plant. The current-period cash flow effect of the information is $\Delta CF_t$. To analyze the contemporaneous effect on accruals, assume without loss of generality a discount rate of zero. The new information then generates a reduced present value of future cash flows of $(L-1)\Delta CF_t$, which is correlated with the revision in current-
period cash flows $\Delta CF_t$ (perfectly correlated in this simple example) and also with the level of the current-period cash flow $CF_t$ (of which $\Delta CF_t$ is but a part). To the extent this reduction in present value is accrued as a component of current-period accounting income as an impairment charge, it is a source of positive correlation between accruals and both cash flows and cash flow revisions.

The asymmetry in this accruals model arises because economic losses are more likely to be recognized on a timely basis, as unrealized (i.e., non-cash) accrued charges against income. Economic gains are more likely to be recognized when realized, and hence accounted for on a cash basis.\(^{17}\) This asymmetry implies that the positive correlation between cash flows and accruals arising from the second role of accruals is greater in the case of losses. We therefore estimate a piecewise-linear relation between cash flows and accruals:

$$ACC_t = \beta_0 + \beta_1*DCFO_t + \beta_2*CFO_t + \beta_3*DCFO_t*CFO_t + \nu_t \quad (2)$$

Cash flow from operations ($CFO_t$) is measured as earnings before exceptional and extra-ordinary items less accruals.\(^{18}\) Accruals ($ACC_t$) initially are measured as:\(^{19}\)

$$ACC_t = \Delta\text{Inventory} + \Delta\text{Debtors} + \Delta\text{Other current assets} - \Delta\text{Creditors} - \Delta\text{Other current liabilities} - \text{Depreciation}$$

Both accruals and cash from operations are standardized by the beginning of period total assets. $DCFO_t$ is a dummy variable taking the value 1 if $CFO_t$ is negative, and 0 otherwise.

This model provides for both roles of accruals: mitigation of noise in cash flow and asymmetric recognition of unrealized gains and losses. We predict a negative coefficient for cash flows $\beta_2$, as in Dechow, Kothari and Watts (1998). Under our hypothesis that accrued losses are

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\(^{17}\) No such asymmetry would occur if accruals functioned only to reduce earnings variability. Accruals then would be negatively related to both negative and positive changes in cash flow from operations.

\(^{18}\) Exceptional and extra-ordinary items tend to be accrued liabilities or diminutions in value of fixed assets.

\(^{19}\) Section 6.3 also reports results for a smaller sample of firms that report cash flow statements. “Debtors” and “Creditors” in U.K. terminology are equivalent to Accounts Receivable and Payable in U.S. terminology.
more likely in periods of negative cash flows, we predict a positive incremental coefficient $\beta_3$ for negative cash flows. We offer no prediction for the intercept $\beta_0$ or the “dummy” intercept $\beta_1$.

**3. Hypothesis: Different demand for financial reporting in private and public companies**

Private companies have different ownership, governance, financing, management and compensation structures than public companies. They do not have access to public capital markets, and their financial statements are not widely distributed to the public. Consequently, their financial reporting is more likely to be influenced by dividend and retention policies, as well as income tax policies. These important differences between private and public companies can be exploited to further our understanding of the economics of financial reporting generally.

In this section, we outline the institutional framework for private and public company reporting in the U.K., and develop our hypothesis that their financial reporting fulfils different economic functions and hence differs in quality, even under identical accounting standards.

**3.1 Regulatory influences: U.K. company law for private and public companies**

In the United Kingdom, all limited liability companies are formed by incorporation with the Companies House, the government agency that administers them. They are registered as either public or private companies. Public companies must incorporate ‘public limited company’ or ‘plc’ in their name, whereas private limited liability companies need only include ‘limited.’

Public companies must have a minimum share capital of £50,000 before they can commence business, whereas there is no minimum share capital requirement for private companies.

The most important distinction between private and public companies relates to their ability to raise funds from the general public. A public company has an unrestricted right to offer shares or debentures to the public, whereas this is prohibited in the case of a private company.

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21 Section 117 of Companies Act, 1985.
22 Section 81 of Companies Act, 1985.
Since only public companies can issue shares to the general public, only they are eligible to be listed. In our empirical analysis, we define “public companies” as those listed on the London Stock Exchange.

Prior to 1967, only public companies were required to file their financial statements with the Registrar of Companies House. In the preceding years there was a substantial increase in the number of firms incorporated as private companies, and also in the percentage of private companies being liquidated or struck-off the Companies Register, which sparked political fears of abuse and creditor protection. This led to the Companies Act of 1967 requiring all companies, private and public, to file their financial statements annually with the Registrar.

The 1981 Companies Act modified this provision, allowing “small” and “medium-sized” companies to protect their financial affairs from public scrutiny by reporting only abridged financial statements. Under the Act, “Small” companies have (i) annual revenue (“turnover”) not exceeding £2.8 million, (ii) book value of total assets not exceeding £1.4 million and (iii) average number of employees not exceeding 50 for the last two years. “Medium” companies have (i) revenue not exceeding £11.2 million, (ii) total assets not exceeding £5.6 million and (iii) average number of employees not exceeding 250 for the last two years. Small companies are required to submit only an abbreviated balance sheet, and medium companies are required to submit also an abbreviated profit and loss account (which need not disclose sales).23

The financial statements of private (public) companies must be filed within ten (seven) months of their fiscal year. Failure to file is a criminal offense. All financial statements must be prepared in accordance with U.K. accounting standards, whether the firm is public or private.24 They must be audited if annual sales exceed £350,000, a threshold exceeded by all firms in our

23 Sections 246 and 246A of the Companies Act, 1985
24 Sections 221-242 of Companies Act, 1985 lay down the rules for submission of accounts and audit reports.
sample. U.K. tax laws likewise do not discriminate between public and private firms. London Stock Exchange listing rules require additional disclosure for public companies, but do not mandate accounting standards for financial reporting and in particular do not address the calculation of earnings. In all important respects, the U.K. regulatory regimes governing financial reporting for public companies and all but the smallest private companies are equivalent.

3.2 Market influences: demand and supply of earnings quality in private and public companies

Differences between the actual financial reporting practices of private and public companies depend on the demand for and supply of financial reporting. We reason that, relative to public companies, the demand for financial reporting in private companies arises relatively less from reducing information asymmetry between managers and other parties (lenders, shareholders, suppliers and customers) and relatively more from other sources (tax, dividend and compensation payment policies). We also reason that there is sufficient flexibility in the application of accounting rules to allow financial reporting practice to respond to demand differences between public and private companies, even under uniform regulations. In other words, we hypothesize the supply of financial reporting quality is not inelastic, rules notwithstanding.

3.2.1 The demand for earnings quality

Our fundamental hypothesis is that private companies are more likely than public companies to communicate privately, on an “as needed” basis, with shareholders, creditors, employees, suppliers, customers and others, thereby reducing the demand for public financial reporting quality. Private communication would be comparatively inefficient for public companies, which contract in larger volume “at arm’s length.” For example, public companies face an almost unlimited number of actual and potential shareholders, whose identities change almost continually through stock market trading. For public firms in common-law countries like

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25 The threshold was increased to £1 million after June 2000 (Section 249A of Companies Act).
the U.K., information asymmetry therefore is ameliorated more through public dissemination of
information than is the case in private companies. Private companies typically are more closely
held, shareholder turnover is lower, and shareholders take a more active role in management,
which reduces their reliance on financial statements for monitoring managers. The implication
is that higher-quality financial statements are demanded from public companies on average than
from private companies.

Debt contracting differences between private and public companies constitute a
potentially important determinant of financial reporting quality. The median private company in
our sample has more total debt, though less long-term debt, than the median public company (see
Table 2). We surmise this reflects greater use of trade credit and bank debt by private firms,
though the data we use are not sufficiently fine to verify this. We have been unable to uncover
reliable information on systematic differences (if any) between U.K. private and public company
debt agreements. We suspect private companies communicate with lending banks on a more
private, “insider” basis than public companies, thereby reducing the demand for financial
reporting quality, but we cannot confirm this.

The demand for higher quality in public-company financial statements is reflected in the
greater legal obligations of issuers – managers and auditors – to recognize economic losses in a
more timely fashion, and in the litigation costs of failing to do so. Managers and auditors of
private firms implicitly or explicitly contract for a lower level of financial reporting quality, and
face lower litigation costs for supplying it.28

26 UK corporate tax in 1998 was a 31% flat rate for both public firms and private firms with sales over £300,000.
27 For example, see Nagar et al. (2002). Ke, Petroni and Safieddine (1999) and Beatty, Ke and Petroni (2002) show,
in a sample of U.S. insurers and banks, that publicly-held firms rely more on accounting information for performance
measurement and for monitoring managers than do privately-held firms.
28 Thompson and Thomas (2002) show that in Delaware Court of Chancery cases alleging breach of fiduciary duties
by corporate officers and directors, less than 10% related to private corporations. This contrasts with the
predominance and aggregate size of private companies in the economy (see n.1). St. Pierre and Anderson (1984) and
Palmrose (1997) show that U.S. auditor litigation involving privately held firms is comparatively infrequent.
We therefore expect less demand for financial reporting quality in private companies. If financial reporting in private companies is oriented less to reducing information asymmetry, then correspondingly it is determined more by other factors, such as tax, dividend or compensation policies. The influence of tax policy on private firms’ financial reporting would arise from the lower benefit, relative to cost, of keeping separate tax and financial reporting records. We discuss the effect of taxes on our results in Section 7 below.

3.2.2 The supply of earnings quality

We believe there is sufficient flexibility in the application of accounting standards to allow the supply of financial reporting quality to respond to demand. It is well known that accruals present flexibility in financial reporting (e.g., Dechow 1994, page 5), because accruals by definition are not observable cash outcomes at the time of reporting and require estimates of future cash outcomes. Thus, for any set of accounting, auditing and tax standards, we predict there is sufficient supply elasticity to respond to differences between public and private companies in the demand for financial reporting quality.

The fundamental reason for earnings quality to differ between private and public companies therefore is that their financial statements fulfill different economic roles: that is, the demand for quality varies. The lower demand for financial reporting in private firms has an international parallel in the financial reporting by public companies in countries that resolve information asymmetry via “insider access” rather than “arm’s length” public disclosure. Examples of insider access include the German “stakeholder” system, with both labor and capital (bank) represented in corporate governance, the Japanese keiretsu and South Korean chaebol systems of investing and trading largely within internally-informed corporate groups, and the Chinese system of family-controlled businesses and guanxi (connections) networks. The international evidence is consistent with insider access and high quality public financial reporting.
being substitutes for reducing information asymmetry, so we expect private and public companies follow a similar pattern.

4. Data

4.1 Sample selection

Data are obtained from the March 2000 and earlier versions of the “Financial Analysis Made Easy” (FAME) database supplied by Bureau Van Dijk. The database provides financial statement information on over 100,000 public and private British companies for fiscal years ending between January 1989 and December 1999. It is compiled from records filed at the Companies House in Cardiff, London and Edinburgh, and supplemented with information taken from the London and Edinburgh Gazettes. Its coverage is less detailed in the initial years.

The database is updated monthly. When a firm converts from one type to another (private to public, for example), all its past information is classified in subsequent versions of FAME under the latest type. We therefore checked the firm type in older versions of the database for each year over the sample period, 1990 to 2000. Changes in type were verified against the listing or delisting date from the London Share Price database and/or the date of last change of name in the FAME database (conversion from private to public requires a name change in the U.K.). The database does not include banks, insurance companies and other financial institutions. It includes only companies with either annual turnover greater than £750,000 or pre-tax profits greater than £45,000, or shareholders’ funds greater than £750,000. Further, since certain firms with sales of less than £350,000 are exempt from audit, we deleted firms with less than £350,000 in sales to ensure that our sample includes only firms that meet the audit requirement criteria. Thus, very small companies are not represented, and there is a small survivor bias. There is no other survivor bias because coverage starts when a firm first files accounts with the Companies House and stops only when it ceases functioning as a separate legal entity.
We exclude subsidiaries because the economic role of their financial reporting likely is different.\textsuperscript{29} For example, Ford Motor Company Limited (U.K.) is a private, wholly owned subsidiary of Ford Motor Company (USA). Its financial statements by definition are “internal” reports. We also exclude all firm-years in which the fiscal year was not exactly twelve months or a change in organizational type (such as public to private) took place.

Several forms of verification are used by the vendor to insure accuracy of the FAME data. In addition, we screen out observations judged likely to be erroneous, based on the following rules. First, we exclude firms for which book value of total assets changed by over 30\% from the prior year. These are likely to be firm-years in which a major acquisition, restructuring or divestment occurred.\textsuperscript{30} Second, we exclude firm-years in which accounting numbers were inconsistent (e.g., revenues, expenses and profits were inconsistent) or irreconcilable across the different monthly versions of FAME. After these exclusions and after requiring firms to have data for our analyses, the sample consists of 54,778 (1475) firms and 141,649 (6,208) firm-years for private (public) companies.

Due to data errors and scaling problems, we study a truncated sample that excludes 1\% of the accounting variables at each extreme. Data errors are a concern because companies do not file with the Companies House electronically. There undoubtedly are undetected data entry errors, especially in view of the large size and limited circulation of the database. Errors introduce noise in measuring income, leading us to over-estimate the extent of both positive and negative transitory components. Scaling problems arise from near-zero observations in the scaling variables.\textsuperscript{31} Kothari, Sabino and Zach (1999) demonstrate that truncating skewed distributions

\textsuperscript{29} The FAME database indicates whether a firm is a subsidiary.
\textsuperscript{30} This could exclude genuinely extreme gains or losses, so we re-ran the regressions in Tables 3 to 5 below with: (1) no exclusion based on change in total assets; and (2) excluding firms/years when total assets changed by less than -50\% or more than 100\%. Neither modification had a qualitative impact on the results.
\textsuperscript{31} For example, when scaled by total assets the extreme values for change in net income before exceptional and extraordinary items are -1305555\% and 30700\%.

23
such as earnings can bias test statistics, but we believe that there are sufficient errors (as distinct from genuinely extreme observations) in the data to warrant it. We repeat the analyses with 0.5% and 2% exclusion criteria, and our conclusions are unaltered.  

4.2 Descriptive statistics

Little is known about private companies generally and about the database used in this study, so we provide relatively detailed descriptive statistics. To maintain comparability with our results, we present descriptive statistics only for the data used in our tests. This restriction essentially excludes very small firms that are required by the Companies Act to report only the balance sheet and not the profit and loss account. For ease of presentation, we separately describe income statement (Table 1) and balance sheet (Table 2) variables. Panels A and B present statistics for public and private companies respectively, with t-statistics for a two tailed test of differences in means between private and public. The t-statistics must be interpreted with caution, since they control for neither cross-sectional nor serial correlation.

4.2.1 Income statement items

Table 1 presents descriptive statistics for the income statement variables. Size is the most obvious difference. Listed firms in the sample have mean annual sales of £432 million, compared to £6 million for private firms. Other measures of firm size (such as total assets and number of employees) exhibit typical right skewness for both private and public firms, indicating the presence of a few relatively large firms in both groups. The substantial size difference between private and public firms suggests the need to control for size in our earnings quality analyses.

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32 When extreme observations are not deleted, the coefficients representing differences between public and private firm reporting ($\alpha_7$ and $\beta_7$, defined below) are significant with the predicted signs, but the r-squares and t-statistics are substantially reduced. Due to the magnitude of the outliers and their influence on the regressions, we place little weight on these results.

33 Descriptive statistics are for all firm-years with data availability, which varies across firm-years and data items. Statistics for the full sample can be obtained from: www.london.edu/faculty/lshivakumar.
Table 1

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<th>Publicly Listed Firms</th>
<th>Private Firms</th>
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<tr>
<td>Mean net income after</td>
<td>4.8%</td>
<td>5.2%</td>
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<td>exceptional and extra-</td>
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<td>ordinary items, scaled by</td>
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<td>total assets, averages</td>
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<td>reporting quality differences</td>
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The mean net income after exceptional and extra-ordinary items, scaled by total assets, averages 4.8% for publicly listed firms and 5.2% for private firms. Other definitions of net incomes are also marginally higher for private firms compared to listed firm. This is consistent with private firms being more profitable, or more capital-constrained. However, it also is consistent with different loss and gain recognition practices between the samples. Thus, the ranking of the medians is reversed (5.6% for listed firms and only 4.1% for private firms), indicating that private-firm earnings are right-skewed but public-firm earnings are left-skewed. This is consistent with a greater one-time recognition of capitalized gains by private firms, and/or greater one-time recognition of capitalized losses by public firms and is our first evidence of reporting quality differences between the groups.

The next descriptive evidence of reporting quality differences between public and private companies comes from their different practices in reporting exceptional and extra-ordinary items. Under U.K. accounting standards, both items arise from material events or transactions that are unusual and non-recurring in nature. Exceptional items arise within the firm’s ordinary business activities, whereas extra-ordinary items arise outside its ordinary activities (FRS 3). Public firms report significantly negative average exceptional and extra-ordinary items combined (-0.5% of total assets, or approximately one-tenth of average net income before exceptional and extra-ordinary items), compared with an average of 0.0% for private firms. Public firms report either an exceptional or extra-ordinary item in 57% of all firm-years, with negative values in 35% of all firm-years. In contrast, private firms report exceptional or extra-ordinary items in only 13% of firm-years, with negative values in only 7% of firm-years. Exceptional and extra-ordinary

34 For variables that are scaled by beginning of year total assets, we repeated the analyses using either sales or end of year total assets. The results are qualitatively unchanged.
35 Exceptional items (and income before exceptional and extraordinary items) are on the FAME database after 1994.
items thus are frequent and asymmetric in public companies, but less frequent and symmetric in private companies. These data are consistent with listed companies recognizing economic losses in a more timely manner, as negative transitory ("one time") components of income.\textsuperscript{36} This is despite public companies on average being substantially larger and having less volatile earnings before exceptional and extra-ordinary items (standard deviation of 8.4\% versus 9.2\%).

The earnings skewness statistics show a similar picture. Income is positively skewed for private firms, but negatively skewed for public firms, consistent with them recording a greater frequency of large losses. The skewness statistics for income before both exceptional and extra-ordinary items are −1.2 and +0.5 for public and private firms, respectively. The equivalent skewness statistics for income after both exceptional and extra-ordinary items are −1.3 and +0.5. The substantial difference in skewness between the private and public firms occurs despite them exhibiting near-identical skewness for Sales (+4.0 and +3.9) and Cost of Sales/Sales (-1.0 for both), and despite private firms exhibiting substantially greater earnings volatility. The income skewness difference also occurs despite public and private firms exhibiting similar skewness in accruals (-0.3 and −0.2), suggesting the relation between cash flow and accruals differs between the two groups. We take up this suggestion in our accruals-based model (2), reported in table 5 below. Overall, the negative earnings skewness for public firms is consistent with income conservatism – that is, timelier recognition of economic losses than gains, as large transitory items. In contrast, private firms exhibit positive earnings skewness.

\subsection*{4.2.2 Balance sheet items}

Table 2 presents summary statistics for balance sheet items. Substantial size differences between private and public companies are apparent, as in the income-statement variables. The average public company has total assets of £419.9 million, while the average private firm has

\textsuperscript{36}We report below that most of the asymmetry is in earnings before exceptional and/or extra-ordinary items.
total assets of only £3.7 million. The first decile of total assets for public (private) firms is £10.5 million (£0.3) and the ninth decile is £1093.6 million (£9.1). This is further evidence of the need to control for size in our analysis of differential earnings quality.

Table 2

5. Results: Timely loss recognition in private and public companies

The descriptive statistics provide preliminary evidence that listed public companies recognize larger loss components in book income than private firms. This section investigates whether they are more likely to report loss components of income that are transitory in time, and whether their accrual behavior is consistent with transitory loss recognition.

5.1 Differential mean reversion in earnings changes

Table 3 presents the results from estimating the following version of the regression (1), modified to allow differences between private and public firms:

\[ \Delta NI_t = \alpha_0 + \alpha_1 \Delta NI_{t-1} + \alpha_2 \Delta NI_{t-1} + \alpha_3 \Delta NI_{t-1} \times \Delta NI_{t-1} + \alpha_4 DPR + \alpha_5 DPR \times \Delta NI_{t-1} + \alpha_6 DPR \times \Delta NI_{t-1} + \alpha_7 DPR \times \Delta NI_{t-1} \times \Delta NI_{t-1} + \epsilon_t \]  

(4)

where \( DPR \) is a dummy variable that takes the value 1 for private firms and 0 for publicly-listed firms, and other variables are as defined above.

Our predictions concerning public companies are based on the reasoning and evidence reported in Ball, Kothari and Robin (2000) and Ball and Robin (1999) for companies listed in the U.K. and other common law countries. We predict deferred recognition of economic gains, as “persistent” positive components of accounting income, the implication being \( \alpha_2 = 0 \). We also predict economic losses receive timelier recognition than gains, as transitory income decreases, the implications being \( \alpha_3 < 0 \) and \( \alpha_2 + \alpha_3 < 0 \).

We expect private company financial reporting to be substantially different. We have no hypotheses concerning differences between public and private companies in gain recognition, so
we offer no prediction on the incremental private-company coefficient on earnings increases, $\alpha_6$. Our primary hypothesis is that private firms are less likely to recognize economic losses in a timely fashion than public firms, the prediction being $\alpha_7 > 0$. We offer no prediction for the intercept and incremental intercept coefficients $\alpha_0, \alpha_1, \alpha_4$ and $\alpha_5$.

**Table 3**

Panel A of Table 3 reports results for three definitions of income: income before both exceptional and extra-ordinary items; income after exceptional items, but before extra-ordinary items; and income after both exceptional and extra-ordinary items. This allows us to examine the role of exceptional items and extra-ordinary items in timely loss recognition (Pope and Walker 1999). Prior to 1994, the FAME database has limited data on income before exceptional and extra-ordinary items and on exceptional items, so the regressions for those variables have considerably lower sample sizes.

For public companies, there is clear evidence of transitory loss but not gain components, under all income definitions. The coefficient $\alpha_2$ on lagged positive earnings changes is small and insignificant, ranging from -0.006 to 0.04 depending on the income definition. This indicates a near absence of either continuation or reversal of income increases. Conditional on an increase, the level of income thus is “persistent” because the increase has essentially no “momentum,” with at most 4% continuing on as an increase in the following year. The persistence of the level of income after experiencing an increase is consistent with the deferred recognition of economic gains as repeating elements over time in accounting income. In contrast, the sum of the coefficients $\alpha_2 + \alpha_3$ ranges from -0.59 to -0.67 across the three income definitions, indicating a substantial (on average, approximately sixty to seventy percent) reversal of income decreases (in all regressions, the p-value from an F-test for the sum of the coefficients is less than 0.0001). This is consistent with timely recognition of economic losses as non-repeating transitory components.
of income. The incremental coefficient $\alpha_3$ on lagged negative earnings changes is significantly negative, ranging from $-0.58$ to $-0.71$, consistent with loss recognition being substantially more timely (i.e., more transient) than gain recognition. The $\alpha_3$ coefficient estimates are only slightly larger in absolute value when earnings is defined after exceptional and/or extra-ordinary items, suggesting that most transitory loss components of earnings are not classified by U.K. public companies as either exceptional or extra-ordinary.

Because our hypothesis is that private company financial reporting is substantially different, we focus on the incremental coefficients $\alpha_6$ and $\alpha_7$, particularly the latter. Relative to public companies, private companies are more likely to incorporate transitory gains, since the incremental private-firm coefficient $\alpha_6$ on earnings increases is significantly negative for all income definitions (coefficients of $-0.15$, $-0.21$ and $-0.20$; t-values $-3.57$, $-7.48$ and $-7.56$). As hypothesized, private companies are less likely than public companies to incorporate transitory losses in income, since the incremental private-firm coefficient $\alpha_7$ on income-decreases varies from $0.35$ to $0.47$ and is statistically significant for all income definitions (t-values of $5.35$, $10.59$ and $10.81$). That is, decreases in private-company income are substantially less transitory, but increases are substantially more transitory. Overall, these results are consistent with our hypothesis that private companies report lower-quality earnings, with substantially less asymmetry in the timely recognition of gains and losses.\textsuperscript{37}

\begin{center}
Figures 1 and 2
\end{center}

\textsuperscript{37} The other significant coefficients are $\alpha_1$, $\alpha_4$ and $\alpha_5$, for which we offered no prediction. All are incremental “dummy” intercepts, identifying negative lagged changes in income, private firms and the interaction of those variables, respectively. $\alpha_1$ indicates that changes in net income for listed firms on average are 0.1\% of total assets lower following years of decreases in income than after increases, controlling for all other variables in the regression. $\alpha_4$ indicates that changes in net income average 0.4\% of total assets more for private than public firms, controlling for all other variables. $\alpha_5$ indicates that, for private firms relative to public firms, the average change in net income in the year after income decreases is smaller by 0.9\% of total assets, again controlling for all other variables.
Figure 1 graphs the serial dependence coefficients for income changes in private and public firms, with income defined before and after both exceptional and extra-ordinary items. It shows that negative earnings changes are substantially less transitory for private companies, and positive changes are more transitory. Figure 2 compares the U.K. public and private samples with the most comparable common law, code law and East Asia public-firm groups reported in prior research.\(^{38}\) U.K. private firms most closely approximate the code law group, which is not surprising in view of their similar “insider access” model of ameliorating information asymmetry.

The sample of firm-years underlying Panel A of Table 3 varies across alternative definitions of net income, primarily due to the absence of data on exceptional and/or extra-ordinary items in the earlier years of the FAME database. Panel B of Table 3 therefore reports results from a sample that is constant across all income definitions. No coefficient changes substantially in sign or magnitude, and our conclusions are qualitatively unchanged.

Pope and Walker (1999) claim that UK accounting standards cause income before exceptional and/or extra-ordinary items to incorporate substantially fewer negative transitory elements than income after these items. There is little evidence of this in our private company sample, which reports under UK standards. The three versions of income exhibit similar skewness statistics (0.5 in Table 1). In Panel B of Table 3, the slope of earnings changes on negative lagged earnings changes is the sum \(\alpha_2 + \alpha_3 + \alpha_6 + \alpha_7\), which is approximately \(-0.4\) for all income definitions.\(^{39}\)

5.2 Controls for size, industry and leverage

Table 4 reports results from versions of regression (4) with controls for size and industry composition, which proxy for exogenous volatility in economic income. Size also is correlated

\(^{38}\) For comparability, U.K. results are for income after exceptional and extra-ordinary items (Pope and Walker 1999).
with listing status, and larger firms – both public and private – could report losses in a more timely manner than small firms, due for example to greater litigation risk or different agency costs. We check this possibility by adding the rank of year-end total assets ($SIZE_t$) as an interactive variable. The results in Panel A of Table 4 show that size adds little or no explanatory power: adjusted $r$-squares increase by less than 0.5%. The coefficient on $SIZE_t \Delta NL_{t-1} * D \Delta NL_{t-1}$ varies between 0.01 and 0.10 and is significantly positive in two of the three regressions, consistent with larger firms being more likely to report transitory losses. Nevertheless, the coefficient in which we are primarily interested, the $\alpha_7$ slope on $DPR_t * D \Delta NL_{t-1} * \Delta NL_{t-1}$, continues to be statistically significant and varies from 0.38 to 0.53. Size differences thus do not explain differences between public and private companies in gain and loss recognition practices. In untabulated results, we included leverage (defined as the ratio of long-term debt to shareholder’s funds) as a further interactive variable, and the results were qualitatively unchanged. None of these proxies for exogenous volatility in economic income affects our results.

| Table 4 |

To test whether differences in industry composition between public and private firms can explain our results, we re-estimated equation (2) with 349 interactive dummy variables, one for each 3-digit SIC code. Results are reported in Panel B of Table 4. The interactive dummies reduce the degrees of freedom, but little other change is apparent. Further, the results remain qualitatively unaltered when size is included as an additional interactive variable.

5.3 Different public and private loss accruals behavior

Table 5 presents results from the following regression, which allows an asymmetric relation between accruals and cash flow levels that differs between private and public firms:

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39 The corresponding slope for public firms ($\alpha_2 + \alpha_3$) is –0.7 for income after exceptional and/or extra-ordinary items, but only –0.6 for income before these items. Private and public firms therefore differ slightly in reporting exceptional and extra-ordinary items, even though they report under the same UK standards.
\[ ACC_t = \beta_0 + \beta_2 \times DCFO_t + \beta_3 \times CFO_t + \beta_5 \times DCFO_t \times CFO_t + \beta_4 \times DPR_t + \beta_6 \times DPR_t \times DCFO_t + \beta_7 \times DPR_t \times CFO_t + \nu_t \]  

(5)

The variables are as defined earlier. The role of accruals in mitigating negative serial correlation in cash flows predicts $\beta_2$ is negative. Asymmetric loss recognition predicts $\beta_3$ is positive. Our central hypothesis, that private firms are less likely to recognize losses as transitory items, implies their asymmetry is lower. We test this by predicting $\beta_5$ is negative. We offer no prediction for the intercept coefficients $\beta_0$, $\beta_1$, $\beta_4$, and $\beta_6$, or for the coefficient $\beta_6$ reflecting the differential accruals behavior of private firms in years with positive cash flows.

### Table 5

The predictions are borne out in Table 5. For public firms, $\beta_2$ is $-0.61$ and statistically significant, implying that on average 61% of cash flow is offset by accruals in years it is positive. This is consistent with accruals purging noise in cash flows from earnings (Dechow, 1994; Dechow, Kothari and Watts, 1998). As predicted, $\beta_3$ is 0.34 and significant, implying that in years with negative cash flows only 27% (61% - 34%) on average of cash flow is offset by accruals. Thus, the negative relation between accruals and cash flow is less pronounced when cash flow is negative, consistent with asymmetrically more unrealized loss recognition via accruals than gain recognition. This asymmetric behavior supports our view that timely loss recognition is an important role of accounting accruals.

In years with positive cash flows, private and public firms exhibit very similar accruals behavior. $\beta_6$ is 0.00 and statistically insignificant, implying that accruals of private firms also

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40 The asymmetry in our accruals model (5), together with a similar asymmetry in the alternative specification based on cash flow changes reported in Section 6.5 below, helps explain the asymmetric shape of the earnings and earnings changes distributions reported in Hayn (1995, Fig. 1) and Burgstahler and Dichev (1977, Fig. 1). As cash flow falls, the frequency of accrued losses (e.g., provisions, inventory write-downs, asset impairments) rises, thereby moving mass to the left tail of the earnings distribution. The earnings distribution then is missing mass above and immediately below the mean, and has additional mass in the left tail. We conjecture that much of the shape of the
offset on average 61% of cash flows. This does not carry over into years with cash losses: the incremental coefficient for private firms in cash-loss years $\beta_7$ is negative (-0.41) and statistically significant ($t = -10.00$). The sum $\beta_2 + \beta_3 + \beta_6 + \beta_7$ is -0.68, indicating that in negative cash flow years private companies offset 68% of cash flows through accruals. Compared to public firms, they appear to accrue substantially less unrealized losses in cash-loss years.

When we control for size in this regression, the explanatory power marginally increases: adjusted r-squares increase by 1%. All the coefficients interacted with size are statistically significant. Because size is scaled to the interval (0,1), its coefficient of 0.009 ($t = 5.51$) implies that, in positive cash flow years, accruals increase by 0.9% of assets over the entire range of public and private firm sizes. The negative coefficient -0.04 for $\beta_6$ indicates that, in negative cash flow years, larger firms report more negative accruals. The coefficient on $SIZE*CFO_t$ is significantly negative (-0.36), indicating that the relation between accruals and positive cash flows is more negative for larger firms. This is consistent with accruals mitigating more cash flow noise in larger firms. The coefficient $\beta_{11}$, which is a measure of asymmetric income statement conservatism, is significantly positive, indicating that conservatism increases with firm size.

Relative to the regression that does not control for size, the coefficients $\beta_1$ to $\beta_7$, in general, are smaller in magnitude. The only exceptions to this are $\beta_1$ and $\beta_6$. The significantly positive coefficient for $\beta_1$ implies that accruals on average are positive in cash loss years. $\beta_6$ is significantly negative in these regressions, which implies that, after controlling for size, private firms use accruals to mitigate more of cash flow noise in positive cash flow years. Since listing status is correlated with size, it is possible that our earlier results on timely loss recognition are a size effect. However, the significantly negative coefficient on $\beta_7$ suggests otherwise. Even after

earnings distribution is due to the asymmetric loss-recognition role of accruals, combined with the positive correlation between current-period cash flows and accrued losses that we model.
controlling for firm size, private firms have a significantly greater negative relation between accruals and negative cash flows. This conclusion remains unchanged when we control for interactive dummy variables for industry membership. Overall, the results from the accruals-based test, like those based on earnings changes, show that private firms report fewer transitory losses than listed firms.

6. Specification and other estimation issues

6.1 Fama-Macbeth t-statistics

The estimated standard errors in the pooled regressions likely are affected by cross-sectional correlation, particularly since the data are concentrated in a small number of years. We therefore estimated Fama-Macbeth t-statistics derived from annual cross-sectional regressions, for all years that have non-trivial sample sizes. These t-statistics are not affected by cross-correlation or skew (or other departures from normality) in the residuals, since they are based on the sampling distribution of the mean of the annual regression slopes. Results are not tabulated.

The Fama-Macbeth t-statistic for the incremental private-firm coefficient on earnings decreases [\(\alpha_i\) in regression (4)] is significantly positive for all three income-definitions (t-values of 2.91, 7.74 and 6.77). In the accruals regression (5), the average annual incremental private-firm coefficient \(\beta_i\) on negative cash flows is \(-0.52\), with a Fama-Macbeth t-statistic of \(-3.72\). The significance is attributable to a surprising degree of consistency in the annual coefficient values. Thus, the hypothesis that private firms are less likely to report economic losses in a timely manner is robust with respect to this test of cross-sectional dependence.

6.2 Private and public firm samples matched on size, industry and fiscal year-end

Private firms are smaller on average than listed firms, and could have different investment and financing policies. While we report above that the results are qualitatively unaffected by including size and industry dummies as interactive control variables, the effects of size and
industry on the estimated coefficients need not be linear. Consequently, we also study a sub-sample of private and listed firms matched on the basis of size, industry and fiscal year-end. To conserve space, we discuss the results without tabulating them.

In each year and for each private firm, we choose, without replacement, a size-matched firm from all listed firms with the same 2-digit SIC code and fiscal year-end. The chosen firm is the closest in year-end total assets to the private firm, provided they differ by no more than 5%. This yields 5020 matched pairs, with the actual number for a particular analysis depending on data availability. The average total assets is £25mn for both groups. Size-matching selects largely from the largest decile of private firms and the smallest three deciles of listed firms.

For this matched sample, the coefficient $\alpha_7$ on $DPR \times \Delta NI_{t-1} \times D \Delta NI_{t-1}$ is significantly positive, ranging from 0.51 to 0.72 for different income definitions (t-statistics of 4.12 to 4.72), consistent with the full sample results in Table 3. The results from the regression of accruals on cash from operations are qualitatively similar to those in Table 5. The coefficient $\beta_7$ on $DPR \times DCFO \times CFO_t$ is significantly negative (-0.37, t-statistic of $-3.97$). Differences in asymmetric recognition of economic losses therefore exist between similar-sized public and private firms in the same industry.

6.3 Sample with directly-observed cash flows.

Operating cash flow in our accruals-based analysis is estimated from changes in balance sheet accounts. Hribar and Collins (2002) show this is noisy, so we reran the regression using data taken directly from the cash flow statements, with accruals estimated from operating profits and cash from operations. Cash flow statement data are available for most firms only for 1995-

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41 We match on 2-digit SIC codes because finer classifications yield insufficient observations for meaningful analysis. We also conducted the analyses with replacement, with no qualitative impact on the results.

42 The results are qualitatively insensitive to changing the maximum difference in total assets to either 10% or 20%.

43 Since FRS 1 (revised 1996), UK firms are required to reconcile operating profits to cash from operations before interest and taxes in their cash flow statement. US cash flow statements reconcile to income after interest and taxes.
1999. Despite the short sample period, \( \beta_7 \) is consistently negative in both the pooled regressions and in annual regressions. In the pooled regressions, the coefficient \( \beta_7 \) is \(-0.43\) with a t-statistic of \(-5.66\), while in the Fama-Macbeth regressions the average coefficient \( \beta_7 \) is \(-0.62\) with a t-statistic of \(-3.58\). Hence, our results are robust to alternative measures of cash flow.

6.4 Endogeneity of private-firm dummy.

If firms select listing status based on either expected changes in net income or expected accruals, the dummy variable DPR is endogenous. Choice of listing status then should be estimated simultaneously with the regressions of changes in net income (4) and accruals (5). We believe this is highly unlikely in the income changes regression (4), because any relation between choice of listing status and income is likely to involve the average level of income in the years following the listing decision, not the change in a single future year. In contrast, regression (5) of accruals on cash flows is specified in the levels, so endogeneity is a greater threat.

The standard 2SLS simultaneous equations model is inappropriate here, because the dummy variable for listing status (the dependent variable in the choice regression) is interactive in the regressions. Hence, we use the switching simultaneous equations model of Lee (1979), which controls for any bias resulting from self-selection of listing status (Maddala 1983, Chapter 9). The model is estimated using the Heckman (1979) two-stage approach. In the first stage, the listing choice equation is estimated as a probit model and, using the parameters estimated from this model, the inverse Mills ratios are computed for all firms in the sample. In the second stage, regression equations (4) and (5) are estimated, including the inverse Mills ratio as a control variable and allowing its coefficient to vary between private and listed firms.

To implement the first-stage probit model, we include size, long-term leverage (a measure of financial constraints and equity risk), the quick ratio (a measure of liquidity needs and financial risk), the ratio of exports to total sales (a measure of risk), and sales growth (a measure
of growth options) as explanatory variables. The sample size is reduced by nearly two-thirds. Little else changes qualitatively. In untabulated results, all the variables in the first-stage regressions except sales growth are significant at less than the 1% level.

In the second stage income changes regression, the coefficients on the inverse Mills ratios are insignificant, indicating a lack of endogeneity bias in this regression. Our primary coefficient of interest ($\alpha_7$) continues to be significantly positive. For example, in regressions based on net income after exceptional and extra-ordinary items, $\alpha_7$ is 0.28 with a t-statistic of 3.47. This compares with 0.45 in Table 3 (for a substantially larger sample).

In the second stage accruals regression, the coefficients on the inverse Mills ratios are significant, justifying the endogeneity concerns. However, controlling for endogeneity has little effect on the estimated coefficients. The coefficient of primary interest ($\beta_7$) is $-0.42$ ($t = -6.82$) when endogeneity is controlled for, but for the same sample it is $-0.45$ ($t = -7.33$) under standard OLS. Further, the adjusted r-square is identical in the standard OLS and the two stage approaches. We find little benefit from using the two-stage approach, and focus on the results from standard OLS regressions, which permits a larger sample.

6.5 Alternative specifications of accruals-based model.

Our accruals based regression adapts the Dechow, Kothari and Watts (1998) working capital model to incorporate asymmetric gain and loss recognition. Several studies control for cash flow levels when disaggregating accruals into discretionary and non-discretionary components (e.g., Rees, Gill and Gore (1996), Jeter and Shivakumar (1999), Denis and Sarin (2000)). However, Dechow (1994) argues that accruals are negatively related to changes in cash flow, not its level. In addition, the discussion of our accruals model in section 2.5 predicts a

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44 We also considered profitability, measured either as return on equity or as ratio of cash flows to shareholders’ funds. Inclusion or exclusion of this variable has no qualitative effect on our results.
positive correlation between accruals and both the level and change in current-period cash flows. We therefore estimate an alternative specification of (5) using cash flow changes.

We replace $CFO_t$ and $DCFO_t$ in equation (5) with $\Delta CFO_t$ (change in cash from operations between period t-1 and t, standardized by total assets at end of period t-1) and $D \Delta CFO_t$ (a dummy variable that takes the value 1 if change in cash flow is negative, and 0 otherwise). Consistent with Dechow (1994), untabulated results from this specification show that accruals and changes in cash from operations are negatively related: the coefficient on $\Delta CFO_t$ is $-0.412$ (t-stat=-11.92). Further, the coefficient on the interactive dummy $D \Delta CFO_t \ast DCFO_t$ is significantly positive with a coefficient of 0.22 (t-stat=4.31). This is consistent with listed firms being more likely to use accruals to recognize losses than gains. When the variables in the accruals model are interacted with the private dummy, $DPR$, only the coefficient on the $DPR \ast D \Delta CFO_t \ast DCFO_t$ is statistically significant. This coefficient estimate is $-0.12$ (t $= -3.21$), which supports the arguments that private firms report less conservatively than public listed firms. These results are robust to controls for size, leverage, and industry as well as to using the Fama-Macbeth t-statistics.

As a further robustness check, we included both cash flow levels ($CFO_t$) and changes ($\Delta CFO_t$) in the accrual regressions, with the coefficients on both varying with their signs. The primary coefficients of interest, on $DPR \ast DCF0_t \ast CFO_t$ and $DPR \ast D \Delta CFO_t \ast DCFO_t$, are both significantly negative in this combined regression. Overall, our inferences from accruals-based analyses remain unchanged irrespective of whether the independent variables in the regressions are expressed in levels, changes or both levels and changes.

7. Alternative Explanations

7.1 Are public firms more risky?

Watts and Zimmerman (1983) argue that because firms can self-select their organizational type for efficient risk sharing, listed firms might be higher risk. They thus could experience a
higher frequency and magnitude of economic losses. Even under the alternative hypothesis of equal accounting behavior, they thus could report more and larger transitory losses. An alternative interpretation of our results thus is that listed firms simply face greater economic risk. We believe there are several reasons to reject this interpretation, as explained below.

First, in our tests of different loss recognition between public and private firms, we focus on regression slope coefficients. In contrast to the covariances of the dependent and independent variables, regression slopes are \textit{standardized by the variance} of the independent variable. The dummy slope \textit{DPR} therefore controls for any difference in the variance of income changes between public and private firms.

Second, the descriptive data in Table 1 imply that the listed-firm sample is not more risky, in that operating cash flow (standardized by total assets) is \textit{less} variable than for private firms. The standard deviations are 10.3\% and 11.8\% respectively. The lowest decile of cash flow for public firms is +0.9\% of total assets, but for private firms it is –2.8\%, implying a lower frequency of cash losses. These data are more consistent with selection of firm type occurring in the opposite direction (e.g., with high-risk firms not meeting the LSE’s listing requirements).

Third, the cash flow distributions for public and private firms exhibit similar skewness (skew statistics of -0.1 and 0.3 respectively). Due to different financial reporting behaviors there is a substantial difference in the skew of their earnings distributions (skew statistics of -1.3 and +0.5 respectively, for earnings after exceptional and extraordinary items).

Fourth, risk cannot explain \textit{asymmetry} in the recognition of losses and gains. Our principal results are the significant incremental slopes $\alpha_7$ and $\beta_7$ on $DPR*\Delta NI_{t-1} *\Delta NI_{t-1}$ and $DPR*DCFO_t*CFO_t$ in the income-change and accruals-based regressions, respectively. Even if there was more volatility in the cash flows of public firms than private firms and it somehow influenced regression slopes (it should be clear from the above that neither of these premises is
correct), the effect on income and accruals would not be asymmetric: it would be reflected in the slopes $\alpha_6$ and $\beta_6$ on $DPR^*\Delta NI_t$ and $DPR^*CFO_t$, but not in either $\alpha_7$ or $\beta_7$.

Fifth, the risk interpretation is inconsistent with the results from our accruals-based test. If the results were due to risk differences between private and public firms, but they actually reported losses in the same manner, then the relation between accruals and cash flows would not differ between firm types. Accruals reflect reporting choices and cash flows reflect more fundamental economic gains and losses; in absence of reporting differences, the relationship between them would not differ between the samples. The regressions of accruals on changes in cash flows show that they differ substantially.

Sixth, the evidence suggests that any risk differences between private and public companies do not influence our results. Data limitations do not allow us to estimate individual-company standard deviations, but we do have several valid proxies for individual-company risk. In tables 4-6 we show that all of our results are robust with respect to controls for size, leverage and industry membership, all of which are likely to influence the standard deviation of equity cash flows. In our untabulated results from allowing listing choice to be endogenous, listing is specified in the probit model as a function of size, leverage, the quick ratio (a measure of financial risk), the ratio of exports to total sales (a measure of risk), and sales growth (a measure of growth options). In the second-stage regression for changes in net income, the coefficients on the inverse Mills ratio are insignificant, indicating that these proxies for risk do not have a significant influence on the income-changes regression (4).

7.2 Does audit firm size affect earnings quality?

DeAngelo (1981) proposes that audit firm size is a determinant of audit quality. Basu, Hwang and Jan (2001) show that earnings reported by U.S. clients of larger audit firms incorporate economic losses in a more timely fashion. Chaney, Jeter and Shivakumar (2001)
report that approximately three-quarters of U.K. public firms employ “Big-five” auditors, compared with only one-quarter of private firms. These studies suggest that the differences in earnings quality could be due to public firms being more likely to employ large auditors. This would not necessarily be a threat to our hypothesis, because the selection of audit firm size is endogenous and could be a means of bonding to or signaling high quality. Nevertheless, we investigate the relation between audit firm size and timely loss recognition.

Table 6

Panel A of Table 6 confirms that the Big-five audit 76% of our public firms, but only 19% of private firms. Panels B and C repeat the whole-sample analyses in Tables 3, 4 and 5, for firms with Big-five auditors. The results are similar. For the Big-five sample, $\alpha_7$ varies between 0.38 and 0.46 for the three definitions of income, compared with 0.35 to 0.47 for the full sample in Table 3. Controlling for size, the coefficients are similar to the full sample in Table 4. The $\alpha_7$ coefficient when income is defined after exceptional and extra-ordinary items is 0.43 in Table 6, which is lower than the 0.51 reported for this coefficient in Table 4. The $\beta_7$ coefficients from the accruals regressions in Panel C are qualitatively similar to those reported for the full sample in Table 5. Thus, even if auditor size is viewed as an exogenous determinant of financial reporting quality, it does not explain the difference in loss recognition between private and public firms.

7.3 Are managers of public firms more opportunistic?

Public firms could incorporate more negative transitory components in earnings than private firms because their managers take more frequent “big baths,” allowing them to report higher earnings in future years. This would reflect managerial opportunism, not timely loss recognition. If negative transitory earnings components arise from earnings management, then they are purely cosmetic and will not predict future cash flows. However, if transitory earnings
components reflect revised estimates of future cash flows, then both positive and negative earnings changes will be positively correlated with realized future cash flows.

We test these differential predictions, by estimating the following regression:

\[
CFO_{t+1} = \alpha_0 + \alpha_1 NI_{t-1} + \alpha_2 I_{\Delta NI < 0} + \alpha_3 I_{\Delta NI = 0} \times \Delta NI_{t} + \alpha_4 I_{\Delta NI < 0} \times \Delta NI_{t} + \alpha_5 DPR + \alpha_6 DPR \times NI_{t-1} \\
+ \alpha_7 DPR \times I_{\Delta NI < 0} + \alpha_8 DPR \times I_{\Delta NI > 0} \times \Delta NI_{t} + \alpha_9 DPR \times I_{\Delta NI < 0} \times \Delta NI_{t} + \epsilon_{t+1}
\]

(6)

where: \(CFO_{t+1}\) is cash flow from operations in year \(t+1\) as reported in the cash flow statement, standardized by total assets at end of year \(t\); \(NI_{t-1}\) is income (before or after) exceptional and extra-ordinary items, standardized by total assets at the end of year \(t-2\); \(\Delta NI_{t}\) is the change in income from year \(t-1\) to \(t\), standardized by total assets at end of year \(t-1\); and \(I_{\Delta NI < 0}\) \((I_{\Delta NI > 0})\) is an indicator variable for negative (non-negative) earnings changes in year \(t\). The model includes the interactive dummy variable for private firms, DPR.

We include \(NI_{t-1}\) in the above model to control for expected \(CFO_{t+1}\) conditional on information at the beginning of year \(t\), and predict its coefficient \(\alpha_0\) is positive. Our basic hypothesis that private firms’ earnings are of lower quality implies they are less informative about future cash flows, so we predict \(\alpha_6\) is negative. This specification allows us to examine the news about future cash flows contained in the current period's unexpected earnings, measured as earnings change \((\Delta NI_{t})\). Since asymmetric recognition of economic losses and gains could cause positive and negative earnings changes to have different information about future cash flows, we interact earnings change with the indicator variables for non-negative \((I_{\Delta NI > 0})\) and negative earnings changes \((I_{\Delta NI < 0})\). The coefficients on earnings change \(\alpha_3\) and \(\alpha_4\) are predicted to be positive if both positive and negative earnings changes contain economic information.

Alternatively, if negative earnings changes are due to earnings management (we earlier used them to indicate transitory loss components of earnings), \(\alpha_4\) is predicted to be insignificant. Moreover, if earnings changes contain less economic information relating to one-year-ahead cash flows for
private firms than for public firms, the incremental coefficients $\alpha_8$ and $\alpha_9$ are predicted to be negative. We offer no predictions for the intercept and dummy intercepts $\alpha_0, \alpha_2, \alpha_5$ and $\alpha_7$.

<table>
<thead>
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<th>Table 7</th>
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Results from regression (6) are reported in Table 7. Consistent with past earnings containing information about future cash flows (Dechow 1994, Dechow, Kothari and Watts 1998), the coefficient $\alpha_1$ on for net income in year t-1 is 0.9 and statistically significant. $\alpha_3$ and $\alpha_4$ are significantly positive, ranging from 0.65 to 0.82 for $\alpha_3$ and from 0.28 to 0.41 for $\alpha_4$. Both negative and positive earnings changes in year t therefore contain information about future cash flow. The coefficient on negative earnings changes ($\alpha_4$) is significantly lower than that on positive earnings changes ($\alpha_3$) in year t, consistent with losses being incorporated in income as larger, more transitory components relative to gains. The incremental coefficients for private firms tend to be significant for positive earnings changes and vary from −0.17 to −0.24. For negative earnings changes, the incremental coefficients are insignificant and close to zero. These results hold irrespective of whether income is before or after exceptional and extra-ordinary items. There is no evidence in these regressions to suggest that transitory negative earnings changes in public firms are due to greater earnings management.

We repeated the above analysis with separate regressions for each year. The untabulated average coefficients from these annual regressions, and their Fama-Macbeth t-statistics, confirm the evidence. We also repeated the analyses using cash flows calculated from changes in balance sheet accounts, and the results were qualitatively unchanged.

7.4 What is the role of taxes?

If informing users is a lower priority in private company reporting, then other factors presumably exert relatively higher influence. A prime candidate is taxes, because private firms are likely to see a lower benefit (relative to cost) of keeping separate tax and financial reporting
records. While tax is likely to affect private company financial reporting, financial reporting is unlikely to affect tax. U.K. financial reporting choices are not binding for tax purposes.\textsuperscript{45} Expenses do not have to be reported in financial accounting to be deductible for tax purposes, and different depreciation methods and estimates can be used in tax and financial records. The definition of taxable profits is based primarily on tax case law and to a lesser extent on codified tax laws; in particular, it is not based on the company law governing financial reporting.

In one sense, tax-motivated reporting creates a possible bias \textit{against} our hypotheses in our income-changes test (4), in that taxes might induce firms to take large write-offs against income. This would introduce transitory negative elements in private company reporting, due to tax incentives rather than timely loss recognition, making it more closely resemble public company reporting in the Basu (1997) income-changes test. However, for several reasons we do not believe any such bias against our hypothesis is large. First, we observe evidence of substantially less loss recognition in private companies, despite any tax-induced bias to the contrary. Second, our accruals-based test (5) confirms the difference between private and public companies, and tax rules generally do not allow the same degree of discretion in making income-decreasing accruals as does financial reporting. Third, our test (6) of managerial opportunism in the form of “big baths” should detect transitory negative elements due to tax incentives rather than timely loss recognition. The test indicates that the earnings of public firms are more positively correlated with (contain more information about) one-year-ahead cash flows than the earnings of private firms, whereas if anything tax motivated earnings management would imply the opposite. Fourth, all our results are substantially unchanged when we control for size, which is a control among other things for the benefit relative to cost of keeping separate tax and financial reporting records.

\textsuperscript{45} U.K. tax information in this paragraph is from Eberhartinger (1999).
In another sense, private companies giving higher priority to taxes in their financial reporting essentially is our hypothesis. That is, we hypothesize that objectives other than reducing information asymmetry between managers and other parties have greater priority in private companies. It is not a problem for the hypothesis that taxes could be one of those other objectives.

8. Conclusions

In spite of their economic importance and likely differences from public companies, little is known about financial reporting by private firms, including their reporting quality. We attribute this to the difficulty of obtaining financial data, and to the absence of market-based measures of quality such as association with stock prices or returns. We address these limitations with a large sample of U.K. private-firm data and by using two time-series measures of timely loss recognition that do not require share market data. Loss recognition timeliness is a summary indicator of the speed with which adverse economic events are reflected in the both income statements and balance sheets, and thus is an important attribute of earnings quality.

A feature of the UK institutional setting makes private companies especially interesting: under U.K. law, their financial statements must be audited and must comply with the same accounting standards and tax laws as public companies. We hypothesize that private-company financial reporting nevertheless is lower in quality because that is what the market demands. That is, private companies are likely to substitute private communication for financial reporting to reduce information asymmetry between managers and other parties.

The evidence consistently shows that private-company earnings indeed are lower quality on average, despite being prepared under the same regulations. We interpret “quality” as the usefulness of financial statements to investors, creditors, managers and all parties contracting with the firm. We observe a single but important attribute of quality: timely recognition of economic losses (Basu 1997). The difference between public and private company timeliness occurs consistently in both earnings-changes-based and accruals-based tests of quality. It is
reflected in different earnings skewness between public and private companies, despite similar skewness in revenues. It holds under alternative measures of both income (with and without extraordinary and/or exceptional items) and cash flow (estimated from balance sheets or taken directly from cash flow statements). It is not affected by controls for size, leverage, fiscal year-end and industry differences between public and private companies, and does not appear to be due to risk differences or tax effects. It holds in a sub-sample of private companies with Big-5 auditors. It is robust with respect to Fama-MacBeth tests of significance, to different levels of Winsorizing to eliminate data errors, and to allowing listing status to be endogenous using the switching simultaneous equations model of Lee (1979).

Our results support the hypothesis that financial statements are economic goods and their properties – including earnings quality – are determined primarily by the economic uses to which they are put. Lower earnings quality on average in private firms does not imply the failure of accounting or auditing standards, or the need for stricter regulation of financial reporting by private firms, or that their financial reporting practices are sub-optimal. Our interpretation is that the difference in average earnings quality between public and private firms is an equilibrium outcome in the market for corporate financial reporting, reflecting differences in demand for financial reporting between private and public firms, and is that it is not a failure in supply.

The results also assist in understanding the economic role of accounting standards, an issue that is surprisingly neglected in the literature. Average earnings quality is measurably lower in U.K. private companies than in public companies, even though their financial statements are audited and certified as complying with the same accounting standards. Accounting standards are not absolute givens, and their effect on actual financial reporting is subject to market demand. Although the focus of this paper has been on private and listed companies in general, future studies could extend this line of research by examining firms that switch organizational type.
References


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Table 1
Summary statistics for income statement items

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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>118818</td>
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<td>134650</td>
<td>115415</td>
<td>116562</td>
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<td>124159</td>
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<tr>
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<td>6.1</td>
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<td>31.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
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<td>5.3</td>
<td>5.2</td>
<td>0.0</td>
<td>10.5</td>
</tr>
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<td>% &gt; 0</td>
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<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>78.9</td>
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<td>0.8</td>
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<td>79.3</td>
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<tr>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>3.8</td>
<td>2.8</td>
<td>6.7</td>
<td>18.9</td>
<td>19.6</td>
<td>19.9</td>
<td>63.3</td>
<td>15.0</td>
</tr>
<tr>
<td>Skewness</td>
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<td>1.6</td>
<td>-1.0</td>
<td>1.8</td>
<td>3.6</td>
<td>1.9</td>
<td>-10.4</td>
<td>-0.3</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>-0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Std dev</td>
<td>10.1</td>
<td>161.9</td>
<td>17.8</td>
<td>16.8</td>
<td>48.2</td>
<td>0.6</td>
<td>0.1</td>
<td>0.8</td>
<td>9.4</td>
<td>9.2</td>
<td>9.2</td>
<td>0.1</td>
<td>11.8</td>
</tr>
<tr>
<td>1st decile</td>
<td>0.8</td>
<td>72.3</td>
<td>45.8</td>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-3.5</td>
<td>-3.7</td>
<td>-3.8</td>
<td>-0.2</td>
<td>-2.8</td>
</tr>
<tr>
<td>Median</td>
<td>2.5</td>
<td>205.1</td>
<td>73.6</td>
<td>15.2</td>
<td>14.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>4.3</td>
<td>4.1</td>
<td>4.1</td>
<td>0.0</td>
<td>10.1</td>
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<td>90.4</td>
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<td>79.2</td>
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<td>0.0</td>
<td>0.0</td>
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<td>16.4</td>
<td>16.3</td>
<td>0.1</td>
<td>25.9</td>
</tr>
<tr>
<td>t-stat*</td>
<td>10.1</td>
<td>544.8</td>
<td>1103.1</td>
<td>423.5</td>
<td>223.7</td>
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<td>-31.1</td>
<td>-4.6</td>
<td>200.7</td>
<td>210.7</td>
<td>208.3</td>
<td>-91.6</td>
<td>156.6</td>
</tr>
</tbody>
</table>

* t-stat for two tailed test of differences between private and public firms
Table 1 (contd.)

Variable definitions:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>Total annual sales revenue in £ millions</td>
</tr>
<tr>
<td>Sales/Assets</td>
<td>Sales divided by total assets at beginning of year</td>
</tr>
<tr>
<td>CoS/sales</td>
<td>Cost of sales divided by total sales.</td>
</tr>
<tr>
<td>Depn/LTAssets</td>
<td>Depreciation and amortization expense divided by long-term assets (fixed assets + intangible assets) at end of year</td>
</tr>
<tr>
<td>Interest/EBIT</td>
<td>Interest expense, net of interest income, divided by earnings before interest and taxes</td>
</tr>
<tr>
<td>X-cep/Assets</td>
<td>Exceptional items divided by total assets at beginning of year</td>
</tr>
<tr>
<td>X-ord/Assets</td>
<td>Extra-ordinary items divided by total assets at beginning of year</td>
</tr>
<tr>
<td>(X-cep + X-ord)/Assets</td>
<td>Exceptional items plus extra-ordinary items divided by total assets at beginning of year</td>
</tr>
<tr>
<td>NI_1/Assets</td>
<td>Net income before exceptional and extra-ordinary items divided by total assets at beginning of year</td>
</tr>
<tr>
<td>NI_2/Assets</td>
<td>Net income after exceptional but before extra-ordinary items divided by total assets at beginning of year</td>
</tr>
<tr>
<td>NI_3/Assets</td>
<td>Net income after exceptional and extra-ordinary items divided by total assets at beginning of year</td>
</tr>
<tr>
<td>Acc/Assets</td>
<td>Accruals scaled by beginning total assets, where accruals are change in inventory + change in debtors + change in other current assets – change in creditors – change in other current liabilities – depreciation</td>
</tr>
<tr>
<td>CFO/Assets</td>
<td>Cash flow from operations (as per cash flow statement), scaled by beginning total assets</td>
</tr>
</tbody>
</table>

The table reports the summary statistics on income statement and cash flow variables for firm-years with data available to estimate regressions reported in either Tables 3 or 5. The statistics are reported separately for public listed firms and private firms. For each variable, the extreme 1% of the observations on each side is excluded.
Table 2
Summary statistics for balance sheet items

<table>
<thead>
<tr>
<th></th>
<th>Total Assets (£ mn)</th>
<th>Lev_1 (%)</th>
<th>Lev_2 (%)</th>
<th>Intang/Assets (%)</th>
<th>Tang/Assets (%)</th>
<th>Reval/LTAssets (%)</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A: Public listed firms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of obs</td>
<td>6080</td>
<td>5972</td>
<td>6024</td>
<td>6012</td>
<td>5955</td>
<td>4939</td>
<td>6066</td>
</tr>
<tr>
<td>Mean</td>
<td>419.9</td>
<td>49.1</td>
<td>10.2</td>
<td>0.8</td>
<td>39.3</td>
<td>5.4</td>
<td>4697.7</td>
</tr>
<tr>
<td>% &gt; 0</td>
<td>100.0</td>
<td>100.0</td>
<td>81.2</td>
<td>17.6</td>
<td>100.0</td>
<td>38.8</td>
<td>100.0</td>
</tr>
<tr>
<td>% &lt; 0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Skewness</td>
<td>4.2</td>
<td>0.5</td>
<td>1.5</td>
<td>6.1</td>
<td>0.6</td>
<td>2.7</td>
<td>4.0</td>
</tr>
<tr>
<td>Std dev</td>
<td>1041.3</td>
<td>17.6</td>
<td>11.5</td>
<td>3.5</td>
<td>22.8</td>
<td>10.9</td>
<td>10809.6</td>
</tr>
<tr>
<td>1st decile</td>
<td>10.5</td>
<td>27.4</td>
<td>0.0</td>
<td>0.0</td>
<td>12.6</td>
<td>0.0</td>
<td>112.0</td>
</tr>
<tr>
<td>Median</td>
<td>63.2</td>
<td>48.6</td>
<td>6.8</td>
<td>0.0</td>
<td>35.3</td>
<td>0.0</td>
<td>912.0</td>
</tr>
<tr>
<td>9th decile</td>
<td>1093.6</td>
<td>70.9</td>
<td>25.7</td>
<td>1.0</td>
<td>76.3</td>
<td>19.9</td>
<td>12152.0</td>
</tr>
<tr>
<td><strong>B: Private firms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>No. of obs</td>
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<td>135438</td>
<td>136759</td>
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<td>135082</td>
<td>120245</td>
<td>99211</td>
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<tr>
<td>Mean</td>
<td>3.7</td>
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<td>8.8</td>
<td>0.6</td>
<td>32.1</td>
<td>2.9</td>
<td>89.7</td>
</tr>
<tr>
<td>% &gt; 0</td>
<td>100.0</td>
<td>100.0</td>
<td>62.5</td>
<td>10.9</td>
<td>100.0</td>
<td>12.3</td>
<td>100.0</td>
</tr>
<tr>
<td>% &lt; 0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Skewness</td>
<td>4.5</td>
<td>0.4</td>
<td>2.3</td>
<td>6.5</td>
<td>0.7</td>
<td>3.9</td>
<td>3.7</td>
</tr>
<tr>
<td>Std dev</td>
<td>6.7</td>
<td>26.5</td>
<td>13.9</td>
<td>2.7</td>
<td>24.5</td>
<td>9.8</td>
<td>139.6</td>
</tr>
<tr>
<td>1st decile</td>
<td>0.3</td>
<td>27.1</td>
<td>0.0</td>
<td>0.0</td>
<td>4.4</td>
<td>0.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Median</td>
<td>1.5</td>
<td>63.5</td>
<td>1.9</td>
<td>0.0</td>
<td>26.7</td>
<td>0.0</td>
<td>43.0</td>
</tr>
<tr>
<td>9th decile</td>
<td>9.1</td>
<td>93.9</td>
<td>27.0</td>
<td>0.1</td>
<td>69.0</td>
<td>6.6</td>
<td>214.0</td>
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<tr>
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<td>6.0</td>
<td>823.6</td>
<td>232.8</td>
<td>75.4</td>
<td>458.0</td>
<td>101.3</td>
<td>10.0</td>
</tr>
</tbody>
</table>

* t-stat for two tailed test of differences between private and public firms
Table 2 (contd).

**Variable definitions:**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Assets</td>
<td>Total assets at end of year in £ millions</td>
</tr>
<tr>
<td>Lev_1</td>
<td>Leverage defined as total liabilities divided by total assets at end of year</td>
</tr>
<tr>
<td>Lev_2</td>
<td>Leverage defined as long-term liabilities divided by total assets at end of year</td>
</tr>
<tr>
<td>Intang/Assets</td>
<td>Intangible assets divided by total assets at end of year</td>
</tr>
<tr>
<td>Tang/Assets</td>
<td>Tangible fixed assets (property, plant and equipment) divided by total assets at end of year</td>
</tr>
<tr>
<td>Reval/LTAssets</td>
<td>Revaluation reserve divided by long term assets (= tangible fixed assets + intangible fixed assets at end of year)</td>
</tr>
<tr>
<td>Employees</td>
<td>Number of employees</td>
</tr>
</tbody>
</table>

The table reports the summary statistics on balance sheet variables for firm-years with data available to estimate regressions reported in either Tables 3 or 5. The statistics are reported separately for public listed firms and private firms. For each variable, the extreme 1% of the observations on each side is excluded.
### Table 3
Regression of change in earnings on lagged change in earnings for all firm-years

$$\Delta NI_t = \alpha_0 + \alpha_1 \Delta NI_{t-1} + \alpha_2 \Delta NI_{t-1} + \alpha_3 \Delta NI_{t-1} + \alpha_4 \Delta NI_{t-1} + \alpha_5 \Delta NI_{t-1} + \alpha_6 \Delta NI_{t-1} + \alpha_7 \Delta NI_{t-1} + \epsilon_t$$

Panel A: Full sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predict</th>
<th>Coeff before excep. items and x-ord items</th>
<th>t-stat</th>
<th>Coeff after excep. items, before x-ord items</th>
<th>t-stat</th>
<th>Coeff after excep. items and x-ord items</th>
<th>t-stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERCEPT ($\alpha_0$)</td>
<td>?</td>
<td>-0.002</td>
<td>-0.84</td>
<td>-0.003</td>
<td>-1.68</td>
<td>-0.004</td>
<td>-2.23</td>
</tr>
<tr>
<td>$\Delta NI_{t-1}$ ($\alpha_1$)</td>
<td>?</td>
<td>-0.012</td>
<td>-3.06</td>
<td>-0.017</td>
<td>-6.51</td>
<td>-0.014</td>
<td>-5.38</td>
</tr>
<tr>
<td>$\Delta NI_{t-1}$ ($\alpha_2$)</td>
<td>0</td>
<td>-0.006</td>
<td>-0.14</td>
<td>0.041</td>
<td>1.52</td>
<td>0.025</td>
<td>0.96</td>
</tr>
<tr>
<td>$\Delta NI_{t-1} * \Delta NI_{t-1}$ ($\alpha_3$)</td>
<td>-</td>
<td>-0.581</td>
<td>-8.95</td>
<td>-0.706</td>
<td>-16.36</td>
<td>-0.681</td>
<td>-16.57</td>
</tr>
<tr>
<td>DPR ($\alpha_4$)</td>
<td>?</td>
<td>0.004</td>
<td>1.71</td>
<td>0.005</td>
<td>3.28</td>
<td>0.006</td>
<td>3.74</td>
</tr>
<tr>
<td>DPR*$\Delta NI_{t-1}$ ($\alpha_5$)</td>
<td>?</td>
<td>0.009</td>
<td>2.39</td>
<td>0.013</td>
<td>4.93</td>
<td>0.011</td>
<td>3.90</td>
</tr>
<tr>
<td>DPR*$\Delta NI_{t-1}$ ($\alpha_6$)</td>
<td>?</td>
<td>-0.146</td>
<td>-3.57</td>
<td>-0.204</td>
<td>-7.48</td>
<td>-0.199</td>
<td>-7.56</td>
</tr>
<tr>
<td>DPR*$\Delta NI_{t-1} * \Delta NI_{t-1}$ ($\alpha_7$)</td>
<td>+</td>
<td>0.353</td>
<td>5.35</td>
<td>0.466</td>
<td>10.59</td>
<td>0.454</td>
<td>10.81</td>
</tr>
</tbody>
</table>

| Adj-R-square (%) | 6.52 | 7.29 | 7.73 |
| No. of obs | 50873 | 95872 | 95812 |

Panel B: Constant sample across all definitions of net income

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predict</th>
<th>Coeff</th>
<th>t-stat</th>
<th>Coeff</th>
<th>t-stat</th>
<th>Coeff</th>
<th>t-stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERCEPT ($\alpha_0$)</td>
<td>?</td>
<td>-0.002</td>
<td>-0.84</td>
<td>-0.004</td>
<td>-1.89</td>
<td>-0.005</td>
<td>-2.37</td>
</tr>
<tr>
<td>$\Delta NI_{t-1}$ ($\alpha_1$)</td>
<td>?</td>
<td>-0.012</td>
<td>-3.06</td>
<td>-0.018</td>
<td>-4.48</td>
<td>-0.015</td>
<td>-3.76</td>
</tr>
<tr>
<td>$\Delta NI_{t-1}$ ($\alpha_2$)</td>
<td>0</td>
<td>-0.006</td>
<td>-0.14</td>
<td>0.004</td>
<td>0.10</td>
<td>0.011</td>
<td>0.30</td>
</tr>
<tr>
<td>$\Delta NI_{t-1} * \Delta NI_{t-1}$ ($\alpha_3$)</td>
<td>-</td>
<td>-0.581</td>
<td>-8.95</td>
<td>-0.755</td>
<td>-12.67</td>
<td>-0.750</td>
<td>-12.65</td>
</tr>
<tr>
<td>DPR ($\alpha_4$)</td>
<td>?</td>
<td>0.004</td>
<td>1.71</td>
<td>0.008</td>
<td>3.32</td>
<td>0.009</td>
<td>3.64</td>
</tr>
<tr>
<td>DPR*$\Delta NI_{t-1}$ ($\alpha_5$)</td>
<td>?</td>
<td>0.009</td>
<td>2.39</td>
<td>0.015</td>
<td>3.55</td>
<td>0.012</td>
<td>2.81</td>
</tr>
<tr>
<td>DPR*$\Delta NI_{t-1}$ ($\alpha_6$)</td>
<td>?</td>
<td>-0.146</td>
<td>-3.57</td>
<td>-0.185</td>
<td>-4.77</td>
<td>-0.193</td>
<td>-5.02</td>
</tr>
<tr>
<td>DPR*$\Delta NI_{t-1} * \Delta NI_{t-1}$ ($\alpha_7$)</td>
<td>+</td>
<td>0.353</td>
<td>5.35</td>
<td>0.538</td>
<td>8.85</td>
<td>0.518</td>
<td>8.57</td>
</tr>
</tbody>
</table>

| Adj-R-square (%) | 6.52 | 7.40 | 7.88 |
| No. of obs | 50871 | 50871 | 50871 |

Variables:
Dependent variable:
$\Delta NI_t$: Change in earnings from year $t-1$ to year $t$, standardized by total assets at end of year $t-1$. Earnings are measured before (after) exceptional items and extra-ordinary items.

Independent variables:
$\Delta NI_{t-1}$ = 1 if $\Delta NI_{t-1} < 0$; = 0 otherwise
DPR Dummy for private companies, =1 if private firm; else 0.

The regressions exclude extreme 1% on each side for $\Delta NI_t$ and $\Delta NI_{t-1}$. 

55
Table 4
Regression of change in earnings on lagged change in earnings for all firm-years after controlling for size and industry effects

$$\Delta \text{NI}_t = \alpha_0 + \alpha_1 \Delta \text{NI}_{t-1} + \alpha_2 \Delta \text{NI}_{t-1} \times \Delta \text{NI}_{t-1} + \alpha_3 \text{DPR} + \alpha_4 \text{DPR} \times \Delta \text{NI}_{t-1} + \alpha_5 \text{CON}_t + \alpha_6 \text{CON}_t \times \Delta \text{NI}_{t-1} + \alpha_7 \text{CON}_t \times \Delta \text{NI}_{t-1} \times \Delta \text{NI}_{t-1} + \varepsilon_t$$

<table>
<thead>
<tr>
<th>Panel A: SIZE as control variable</th>
<th>Dependent variable: $\Delta \text{NI}_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predict</td>
<td>before excep. items and x-ord items</td>
</tr>
<tr>
<td>INTERCEPT ($\alpha_0$)</td>
<td>?</td>
</tr>
<tr>
<td>$\Delta \text{NI}_{t-1}$ ($\alpha_1$)</td>
<td>?</td>
</tr>
<tr>
<td>$\Delta \text{NI}_{t-1}$ ($\alpha_2$)</td>
<td>0</td>
</tr>
<tr>
<td>$\Delta \text{NI}<em>{t-1} \times \Delta \text{NI}</em>{t-1}$ ($\alpha_3$)</td>
<td>-</td>
</tr>
<tr>
<td>DPR ($\alpha_4$)</td>
<td>?</td>
</tr>
<tr>
<td>DPR $\times \Delta \text{NI}_{t-1}$ ($\alpha_5$)</td>
<td>?</td>
</tr>
<tr>
<td>DPR $\times \Delta \text{NI}_{t-1}$ ($\alpha_6$)</td>
<td>?</td>
</tr>
<tr>
<td>DPR $\times \Delta \text{NI}<em>{t-1} \times \Delta \text{NI}</em>{t-1}$ ($\alpha_7$)</td>
<td>+</td>
</tr>
<tr>
<td>SIZE ($\alpha_8$)</td>
<td>?</td>
</tr>
<tr>
<td>SIZE $\times \Delta \text{NI}_{t-1}$ ($\alpha_9$)</td>
<td>?</td>
</tr>
<tr>
<td>SIZE $\times \Delta \text{NI}<em>{t-1}$ ($\alpha</em>{10}$)</td>
<td>?</td>
</tr>
<tr>
<td>SIZE $\times \Delta \text{NI}<em>{t-1} \times \Delta \text{NI}</em>{t-1}$ ($\alpha_{11}$)</td>
<td>?</td>
</tr>
</tbody>
</table>

Adj-R-square (%): 6.61  7.36  7.82
No. of obs: 50705  95563  95501

Panel B: 3-digit SIC industry dummies as control variables

| INTERCEPT ($\alpha_0$)         | ?                                      | 0.003 | 0.29 | -0.012 | -1.80 | -0.010 | -1.45 |
| DNI_{t-1} ($\alpha_1$)        | ?                                      | -0.021 | -1.50 | -0.007 | -0.69 | -0.009 | -0.84 |
| $\Delta \text{NI}_{t-1}$ ($\alpha_2$) | 0                                      | -0.181 | -1.69 | 0.125 | 1.54 | 0.113 | 1.41 |
| $\Delta \text{NI}_{t-1} \times \Delta \text{NI}_{t-1}$ ($\alpha_3$) | -                                      | -0.436 | -2.25 | -0.716 | -5.09 | -0.657 | -4.81 |
| DPR ($\alpha_4$)              | ?                                      | 0.003 | 1.15 | 0.006 | 3.65 | 0.007 | 3.94 |
| DPR $\times \Delta \text{NI}_{t-1}$ ($\alpha_5$) | ?                                      | 0.011 | 2.76 | 0.013 | 4.52 | 0.011 | 3.68 |
| DPR $\times \Delta \text{NI}_{t-1}$ ($\alpha_6$) | ?                                      | -0.097 | -2.26 | -0.192 | -6.68 | -0.184 | -6.67 |
| DPR $\times \Delta \text{NI}_{t-1} \times \Delta \text{NI}_{t-1}$ ($\alpha_7$) | +                                      | 0.336 | 4.74 | 0.459 | 9.94 | 0.437 | 9.97 |

Adj-R-square (%): 7.62  8.23  8.74
No. of obs: 50873  95872  95812
Table 4 (contd)

In Panel A, the interactive control variable (CON\textsubscript{t}) is SIZE\textsubscript{t}. In Panel B, the interactive control variables are 349 industry dummies, one for each 3-digit SIC classification (the interactive coefficients on the 349 industry dummies are not reported). The regressions exclude the extreme 1% of observations on each side for \(\Delta NI_t\) and \(\Delta NI_{t-1}\).

**Variables:**

**Dependent variable:**
\(\Delta NI_t\) Change in earnings from year \(t-1\) to year \(t\), standardized by total assets at end of year \(t-1\). Earnings are measured before (after) exceptional items and extra-ordinary items.

**Independent variables:**
- \(D_{\Delta NI_{t-1}}\) = 1 if \(\Delta NI_{t-1} < 0\); = 0 otherwise.
- DPR Dummy for private companies. = 1 if private firm; else 0.
- SIZE\textsubscript{t} Rank of total assets at end of year \(t\), standardized to the interval (0,1).
- CON\textsubscript{t} An interactive dummy variable to control for size and industry differences between public and private firms, interacting with the intercepts, \(\Delta NI_{t-1}\) and \(\Delta NI_{t-1}\).
### Table 5
Regression of accruals on cash from operations for all firm-years

\[
\text{ACC}_t = \beta_0 + \beta_1 \cdot \text{DCFO}_t + \beta_2 \cdot \text{CFO}_t + \beta_3 \cdot \text{DCFO}_t \cdot \text{CFO}_t + \beta_4 \cdot \text{DPR} \\
+ \beta_5 \cdot \text{DPR} \cdot \text{DCFO}_t + \beta_6 \cdot \text{DPR} \cdot \text{CFO}_t + \beta_7 \cdot \text{DCFO}_t \cdot \text{CFO}_t + \beta_8 \cdot \text{SIZE}_t \\
+ \beta_9 \cdot \text{SIZE}_t \cdot \text{DCFO}_t + \beta_{10} \cdot \text{SIZE}_t \cdot \text{CFO}_t + \beta_{11} \cdot \text{SIZE}_t \cdot \text{DCFO}_t \cdot \text{CFO}_t + \nu_t
\]

<table>
<thead>
<tr>
<th>Predictor</th>
<th>REGN I</th>
<th>REGN II</th>
<th>REGN III</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff</td>
<td>t-stat</td>
<td>Coeff</td>
</tr>
<tr>
<td>INTERCEPT</td>
<td>0.024</td>
<td>9.70</td>
<td>0.015</td>
</tr>
<tr>
<td>DCFO&lt;sub&gt;t&lt;/sub&gt; ((\beta_1))</td>
<td>?</td>
<td>0.003</td>
<td>0.036</td>
</tr>
<tr>
<td>CFO&lt;sub&gt;t&lt;/sub&gt; ((\beta_2))</td>
<td>-0.613</td>
<td>-39.90</td>
<td>-0.277</td>
</tr>
<tr>
<td>DCFO&lt;sub&gt;t&lt;/sub&gt;*CFO&lt;sub&gt;t&lt;/sub&gt; ((\beta_3))</td>
<td>+0.344</td>
<td>8.45</td>
<td>0.184</td>
</tr>
<tr>
<td>DPR ((\beta_4))</td>
<td>?-0.009</td>
<td>-3.64</td>
<td>0.000</td>
</tr>
<tr>
<td>DPR*DCFO&lt;sub&gt;t&lt;/sub&gt; ((\beta_5))</td>
<td>?0.011</td>
<td>2.06</td>
<td>-0.010</td>
</tr>
<tr>
<td>DPR*CFO&lt;sub&gt;t&lt;/sub&gt; ((\beta_6))</td>
<td>?0.000</td>
<td>-0.02</td>
<td>-0.217</td>
</tr>
<tr>
<td>DPR*DCFO&lt;sub&gt;t&lt;/sub&gt;*CFO&lt;sub&gt;t&lt;/sub&gt; ((\beta_7))</td>
<td>-0.412</td>
<td>-10.00</td>
<td>-0.279</td>
</tr>
<tr>
<td>SIZE&lt;sub&gt;t&lt;/sub&gt; ((\beta_8))</td>
<td>?0.009</td>
<td>5.51</td>
<td></td>
</tr>
<tr>
<td>SIZE&lt;sub&gt;t&lt;/sub&gt;*DCFO&lt;sub&gt;t&lt;/sub&gt; ((\beta_9))</td>
<td>?-0.036</td>
<td>-10.88</td>
<td></td>
</tr>
<tr>
<td>SIZE&lt;sub&gt;t&lt;/sub&gt;*CFO&lt;sub&gt;t&lt;/sub&gt; ((\beta_{10}))</td>
<td>?-0.358</td>
<td>-42.72</td>
<td></td>
</tr>
<tr>
<td>SIZE&lt;sub&gt;t&lt;/sub&gt;*DCFO&lt;sub&gt;t&lt;/sub&gt;*CFO&lt;sub&gt;t&lt;/sub&gt; ((\beta_{11}))</td>
<td>?0.157</td>
<td>6.94</td>
<td></td>
</tr>
<tr>
<td>Interactive 3-digit SIC industry dummies</td>
<td>?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj-R-square (%)</td>
<td>58.39</td>
<td>59.71</td>
<td>60.08</td>
</tr>
<tr>
<td>No. of obs</td>
<td>115263</td>
<td>114890</td>
<td>115263</td>
</tr>
</tbody>
</table>

**Variables:**

Dependent variable:

\(\text{ACC}_t\): Accruals in year \(t\), standardized by beginning total assets. Accruals are defined as earnings before exceptional items and extra-ordinary items minus cash from operations.

Independent variables:

\(\text{CFO}_t\): Cash from operations in year \(t\), defined as earnings before exceptional items and extra-ordinary items in period \(t\) + Depreciation - Δ(Working capital), standardized by total assets at end of \(t-1\).

\(Δ(\text{Working capital}) = Δ\text{Inventory} + Δ\text{Debtors} + Δ\text{Other current assets} – Δ\text{Creditors} – Δ\text{Other current liabilities}\)

\(\text{DCFO}_t\): \(= 1\) if \(\text{CFO}_t < 0\); \(= 0\) otherwise.

\(\text{DPR}\): Dummy for private companies, \(= 1\) if private firm; else \(0\).

\(\text{SIZE}_t\): Rank of total assets at end of year \(t\), standardized to the interval \((0,1)\).

The regressions exclude extreme 1% on each side for \(\text{ACC}_t\) and \(\text{CFO}_t\).
Table 6
Analysis for sample of firm-years with Big-5 auditors

Panel A: Distribution of observations classified by Big-5 versus non-Big-5 auditors

<table>
<thead>
<tr>
<th></th>
<th>Public firm-years</th>
<th>Private firm-years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Big-5 auditors (%)</td>
<td>1491 (24.0)</td>
<td>115289 (81.4)</td>
</tr>
<tr>
<td>Big-5 auditors (%)</td>
<td>4717 (76.0)</td>
<td>26360 (18.6)</td>
</tr>
</tbody>
</table>

Panel B: Regression of change in earnings on lagged change in earnings for firm-years, Big 5 firm-years only

\[
\Delta NI_t = \alpha_0 + \alpha_1 \Delta NI_{t-1} + \alpha_2 \Delta NI_{t-1} + \alpha_3 \Delta NI_{t-1} \Delta NI_{t-1} + \alpha_4 \Delta NI_{t-1} + \alpha_5 \Delta NI_{t-1} \Delta NI_{t-1} + \alpha_6 \Delta NI_{t-1} \Delta NI_{t-1} + \alpha_7 \Delta NI_{t-1} \Delta NI_{t-1} + \alpha_8 \Delta NI_{t-1} \Delta NI_{t-1} + \alpha_9 \Delta NI_{t-1} \Delta NI_{t-1} + \alpha_{10} \Delta NI_{t-1} \Delta NI_{t-1} + \alpha_{11} \Delta NI_{t-1} \Delta NI_{t-1} + \varepsilon_t
\]

<table>
<thead>
<tr>
<th></th>
<th>Predict before excep. and x-ord items</th>
<th>Coeff</th>
<th>t-stat</th>
<th>Coeff</th>
<th>t-stat</th>
<th>Coeff</th>
<th>t-stat</th>
<th>Coeff</th>
<th>t-stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERCEPT ((\alpha_0))</td>
<td>?</td>
<td>-0.003</td>
<td>-1.31</td>
<td>-0.008</td>
<td>-1.60</td>
<td>-0.003</td>
<td>-1.75</td>
<td>-0.011</td>
<td>-2.99</td>
</tr>
<tr>
<td>(\Delta NI_{t-1}) ((\alpha_1))</td>
<td>?</td>
<td>-0.012</td>
<td>-2.71</td>
<td>-0.015</td>
<td>-1.82</td>
<td>-0.018</td>
<td>-5.87</td>
<td>-0.015</td>
<td>-2.60</td>
</tr>
<tr>
<td>(\Delta NI_{t-1} \Delta NI_{t-1}) ((\alpha_2))</td>
<td>0</td>
<td>0.029</td>
<td>0.70</td>
<td>0.014</td>
<td>0.21</td>
<td>0.025</td>
<td>0.87</td>
<td>0.129</td>
<td>2.92</td>
</tr>
<tr>
<td>(\Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1}) ((\alpha_3))</td>
<td>-</td>
<td>-0.656</td>
<td>-9.52</td>
<td>-0.687</td>
<td>-6.20</td>
<td>-0.749</td>
<td>-15.92</td>
<td>-0.819</td>
<td>-10.82</td>
</tr>
<tr>
<td>(\Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1}) ((\alpha_4))</td>
<td>?</td>
<td>0.002</td>
<td>0.86</td>
<td>0.005</td>
<td>1.33</td>
<td>0.004</td>
<td>1.90</td>
<td>0.008</td>
<td>2.97</td>
</tr>
<tr>
<td>(\Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1}) ((\alpha_5))</td>
<td>?</td>
<td>0.007</td>
<td>1.43</td>
<td>0.008</td>
<td>1.44</td>
<td>0.012</td>
<td>3.54</td>
<td>0.011</td>
<td>2.55</td>
</tr>
<tr>
<td>(\Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1}) ((\alpha_6))</td>
<td>?</td>
<td>-0.116</td>
<td>-2.54</td>
<td>-0.105</td>
<td>-1.99</td>
<td>-0.126</td>
<td>-4.03</td>
<td>-0.179</td>
<td>-4.97</td>
</tr>
<tr>
<td>(\Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1}) ((\alpha_7))</td>
<td>+</td>
<td>0.375</td>
<td>5.04</td>
<td>0.382</td>
<td>4.30</td>
<td>0.434</td>
<td>8.54</td>
<td>0.463</td>
<td>7.63</td>
</tr>
<tr>
<td>(\Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1}) ((\alpha_8))</td>
<td>?</td>
<td>0.005</td>
<td>1.04</td>
<td></td>
<td></td>
<td>0.009</td>
<td>2.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1}) ((\alpha_9))</td>
<td>?</td>
<td>0.004</td>
<td>0.48</td>
<td></td>
<td></td>
<td>-0.004</td>
<td>0.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1}) ((\alpha_{10}))</td>
<td>?</td>
<td>0.029</td>
<td>0.42</td>
<td></td>
<td></td>
<td>-0.134</td>
<td>3.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1} \Delta NI_{t-1}) ((\alpha_{11}))</td>
<td>?</td>
<td>0.024</td>
<td>0.22</td>
<td></td>
<td></td>
<td>0.092</td>
<td>1.24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Adj-R-square (%) | 5.52 | 5.63 | 7.12 | 7.16 | 7.60 | 7.63 |
| No. of obs        | 9636 | 9620 | 20210 | 20173 | 20195 | 20159 |
Table 6 (contd.)
Panel C: Regression of accruals on change in cash from operations, Big 5 firm-years only

\[ \text{ACC}_t = \beta_0 + \beta_1 \times \text{DCFO}_t + \beta_2 \times \text{CFO}_t + \beta_3 \times \text{DCFO}_t \times \text{CFO}_t + \beta_4 \times \text{DPR} + \beta_5 \times \text{DPR} \times \text{DCFO}_t + \beta_6 \times \text{DPR} \times \text{CFO}_t + \beta_7 \times \text{DPR} \times \text{DCFO}_t \times \text{CFO}_t + \beta_8 \times \text{SIZE}_t \]

<table>
<thead>
<tr>
<th>Variables</th>
<th>REGN I</th>
<th>REGN II</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERCEPT ( (\beta_0) )</td>
<td>?</td>
<td>0.020</td>
</tr>
<tr>
<td>DCFO ( (\beta_1) )</td>
<td>?</td>
<td>0.013</td>
</tr>
<tr>
<td>CFO ( (\beta_2) )</td>
<td>?</td>
<td>-0.586</td>
</tr>
<tr>
<td>DCFO ( \times ) CFO ( (\beta_3) )</td>
<td>+</td>
<td>0.394</td>
</tr>
<tr>
<td>DPR ( (\beta_4) )</td>
<td>?</td>
<td>-0.008</td>
</tr>
<tr>
<td>DPR ( \times ) DCFO ( (\beta_5) )</td>
<td>?</td>
<td>0.002</td>
</tr>
<tr>
<td>DPR ( \times ) CFO ( (\beta_6) )</td>
<td>?</td>
<td>-0.079</td>
</tr>
<tr>
<td>DPR ( \times ) DCFO ( \times ) CFO ( (\beta_7) )</td>
<td>-</td>
<td>-0.167</td>
</tr>
<tr>
<td>SIZE ( (\beta_8) )</td>
<td>?</td>
<td>0.027</td>
</tr>
<tr>
<td>SIZE ( \times ) DCFO ( (\beta_9) )</td>
<td>?</td>
<td>-0.047</td>
</tr>
<tr>
<td>SIZE ( \times ) CFO ( (\beta_{10}) )</td>
<td>?</td>
<td>-0.211</td>
</tr>
<tr>
<td>SIZE ( \times ) DCFO ( \times ) CFO ( (\beta_{11}) )</td>
<td>?</td>
<td>-0.189</td>
</tr>
</tbody>
</table>

Variables:
Dependent variables:
\( \Delta NI_t \)  Change in earnings from year t-1 to year t, standardized by total assets at end of year t-1.
Earnings are measured before (after) exceptional items and extra-ordinary items.

\( \text{ACC}_t \) Accruals in year t, standardized by beginning total assets. Accruals are defined as earnings before exceptional items and extra-ordinary items minus cash from operations.

Independent variables:
\( D\Delta NI_{t-1} \) = 1 if \( \Delta NI_{t-1} < 0; = 0 \) otherwise
DPR Dummy for private companies. = 1 if private firm; else 0.
CFO \( t \) Cash from operations (CFO \( t \)) in year t, standardized by total assets at end of t-1.
CFO \( t \) is defined as earnings before exceptional items and extra-ordinary items in period t + Depreciation - \( \Delta \) (Working capital)
\( \Delta \) (Working capital) = \( \Delta \) (Inventory) + \( \Delta \) (Debtors) + \( \Delta \) (Other current assets) - \( \Delta \) (Creditors) - \( \Delta \) (Other current liabilities)
DCFO \( = 1 \) if CFO \( t \) < 0; = 0 otherwise.
SIZE \( t \) Rank of total assets at end of year t, standardized to the interval \( (0,1) \).

The sample for this table includes only firm-years with Big-5 auditors. Panel A of this table presents the distribution of firm-years classified by whether the firm used a Big-5 auditor or a non-Big-5 auditor in that year. Panels B reports results from regression of change in net income on lagged change in net income, while Panel C presents the results from regression of accruals on change in cash from operations. In each analysis, we exclude the extreme 1% of the continuous variables on each side.
Table 7
Regression of cash flow from operations on lagged net income and lagged change in net income for all firm-years

\[
\begin{align*}
\text{CFO}_{t+1} = & \alpha_0 + \alpha_1 \text{NI}_{t-1} + \alpha_2 \text{I}_{\Delta\text{NI} < 0} + \alpha_3 \text{I}_{\Delta\text{NI} > 0} \times \Delta\text{NI}_t + \alpha_4 \text{I}_{\Delta\text{NI} > 0} \times \Delta\text{NI}_t + \alpha_5 \text{DPR} \\
& + \alpha_6 \text{DPR} \times \text{NI}_{t-1} + \alpha_7 \text{DPR} \times \text{I}_{\Delta\text{NI} < 0} + \alpha_8 \text{DPR} \times \text{I}_{\Delta\text{NI} > 0} \times \Delta\text{NI}_t + \alpha_9 \text{DPR} \times \text{I}_{\Delta\text{NI} < 0} \times \Delta\text{NI}_t + \epsilon_{t+1}
\end{align*}
\]

<table>
<thead>
<tr>
<th>Variables</th>
<th>Predict</th>
<th>Net income before excep. and x-ord items</th>
<th>Net income after excep., but before x-ord items</th>
<th>Net income after excep. and x-ord items</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERCEPT (α₀)</td>
<td>?</td>
<td>0.06 10.99</td>
<td>0.06 12.24</td>
<td>0.07 13.01</td>
</tr>
<tr>
<td>NI&lt;_{t-1} (α₁)</td>
<td>+</td>
<td>0.91 19.06</td>
<td>0.88 20.15</td>
<td>0.87 19.84</td>
</tr>
<tr>
<td>I_{ΔNI&lt;0} (α₂)</td>
<td>?</td>
<td>0.00 -0.26</td>
<td>0.00 -0.09</td>
<td>0.00 -0.04</td>
</tr>
<tr>
<td>I_{ΔNI&gt;0} * ΔNI&lt;₀ (α₃)</td>
<td>+</td>
<td>0.82 7.44</td>
<td>0.68 7.62</td>
<td>0.65 7.58</td>
</tr>
<tr>
<td>I_{ΔNI&lt;0} * ΔNI&lt;₀ (α₄)</td>
<td>+</td>
<td>0.41 3.35</td>
<td>0.29 3.19</td>
<td>0.28 3.14</td>
</tr>
<tr>
<td>DPR (α₅)</td>
<td>?</td>
<td>0.01 2.26</td>
<td>0.01 2.44</td>
<td>0.01 2.10</td>
</tr>
<tr>
<td>DPR*NI&lt;_{t-1} (α₆)</td>
<td>-</td>
<td>-0.30 -5.86</td>
<td>-0.29 -6.36</td>
<td>-0.28 -6.17</td>
</tr>
<tr>
<td>DPR* I_{ΔNI&lt;0} (α₇)</td>
<td>?</td>
<td>0.00 -0.12</td>
<td>0.00 -0.58</td>
<td>0.00 -0.64</td>
</tr>
<tr>
<td>DPR* I_{ΔNI&gt;0} * ΔNI&lt;₀ (α₈)</td>
<td>-</td>
<td>-0.24 -2.06</td>
<td>-0.19 -2.05</td>
<td>-0.17 -1.85</td>
</tr>
<tr>
<td>DPR* I_{ΔNI&lt;0} * ΔNI&lt;₀ (α₉)</td>
<td>-</td>
<td>-0.09 -0.70</td>
<td>0.00 0.03</td>
<td>0.00 0.03</td>
</tr>
<tr>
<td>Adj-R-square (%)</td>
<td></td>
<td>12.26</td>
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**Variables:**

**Dependent variable**

CFO_{t+1} Cash from operations in year t+1 as reported in the cash flow statement, standardized by total assets at end of year t.

**Independent variables:**

NI<_{t-1} Net income in period t-1, standardized by total assets at end of year t-2

ΔNI<₀ Change in earnings from year t-1 to year t, standardized by total assets at end of year t-1. Earnings are measured before (after) exceptional items and extra-ordinary items.

I_{ΔNI<0} Indicator variable for negative earnings changes, = 1 if ΔNI<₀ < 0; = 0 otherwise

I_{ΔNI>0} Indicator variable for non-negative earnings changes, = 1 if ΔNI>₀ ≥ 0; = 0 otherwise

DPR Dummy for private companies. = 1 if private firm; else 0.

The regressions exclude the extreme 1% on each side for the continuous variables.
Serial dependence in income, indicated by slope coefficients in a pooled piecewise-linear regression of change in accounting income on prior change in income, conditional on sign of prior change. Negative dependence (i.e., reversals of changes) indicates transitory gains and losses (proxies for economic gains and losses) incorporated in income as timely, non-persistent components.

Source: Summing the marginal regression coefficients in Table 3, Panel A as follows:

- Public firm gains: $\alpha_2$
- Public firm losses: $\alpha_2 + \alpha_3$
- Private firm gains: $\alpha_2 + \alpha_6$
- Private firm losses: $\alpha_2 + \alpha_3 + \alpha_6 + \alpha_7$
Serial dependence in income, indicated by slope coefficients in a pooled piecewise-linear regression of change in accounting income on prior change in income, conditional on sign of prior change. Negative dependence (i.e., reversals of changes) indicates transitory gains and losses (proxies for economic gains and losses) incorporated in income as timely, non-persistent components.

Sources: U.K. Public and U.K. Private from Table 3, Panel A; Common and Code from Ball and Robin (1999, Table 3); East Asia from Ball, Robin and Wu (2003, Table 4). U.K. results are for income after exceptional and extra-ordinary items, for comparability with the other categories (Pope and Walker, 1999).