The Market Pricing of Accruals Quality

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We investigate whether investors price accruals quality, our proxy for the information risk associated with earnings. Measuring accruals quality (AQ) as the standard deviation of residuals from regressions relating current accruals to cash flows, we find that poorer AQ is associated with larger costs of debt and equity. This result is consistent across several alternative specifications of the AQ metric. We also distinguish between accruals quality driven by economic fundamentals ('innate AQ') versus management choices ('discretionary AQ'). Both components have significant cost of capital effects, but innate AQ effects are significantly larger than discretionary AQ effects.

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1. Introduction

This study investigates the relation between accruals quality and the costs of debt and equity capital for a large sample of firms over the period 1970-2001. Our study is motivated by recent theoretical research that shows that information risk is a non-diversifiable risk factor (e.g., Easley and O'Hara [2003]; O'Hara [2003]; Leuz and Verrecchia [2004]). By information risk, we mean the likelihood that firm-specific information that is pertinent to investor pricing decisions is of poor quality. We assume that cash flow is the primitive element that investors price and identify accruals quality as the measure of information risk associated with a key accounting number – earnings. That is, accruals quality tells investors about the mapping of accounting earnings into cash flows. Relatively poor accruals quality weakens this mapping and, therefore, increases information risk.[1]

Our paper makes two contributions. First, consistent with theories that demonstrate a role for information risk in asset pricing, we show that firms with poor accruals quality have higher costs of capital than do firms with good accruals quality. This result is consistent with the view that information risk (as proxied by accruals quality) is a priced risk factor. Second, we attempt to disentangle whether the components of accruals quality – accruals that reflect economic fundamentals ('innate factors') and accruals that represent managerial choices ('discretionary factors') – have different cost of capital effects. While theory does not distinguish among the sources of information risk, prior research on discretionary accruals (e.g., Guay, Kothari and Watts [1996]; Subramanyam [1996]) provides a framework in which discretionary accruals quality and innate accruals quality will have distinct cost of capital effects. Briefly,

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[1] We focus on accruals quality because we believe it is a more primitive construct for information risk concerning cash flows than are other earnings attributes. Other studies that investigate alternative (to accruals quality) measures include: Francis, LaFond, Olsson and Schipper [2003], who calibrate the pricing effects of accruals quality, persistence, predictability, smoothness, value relevance, timeliness and conservatism; Barth and Landsman [2003], who examine the relation between the value relevance of earnings and the weighted average cost of capital; Barone [2003], who examines measures based on Lev and Thiagarajan's [1993] fundamental scores and a measure based on relations between financial statement line items; and Bhattacharya, Daouk and Welker [2003], who examine the association between country-level measures of the average cost of equity and earnings opacity (where opacity is a combination of earnings aggressiveness, loss avoidance, and earnings smoothing behavior, measured at the country level).

this body of work suggests that, in broad samples, discretionary accrual choices are likely to reflect both opportunism (which exacerbates information risk) and performance measurement (which mitigates information risk); these conflicting effects will yield average cost of capital effects for discretionary accruals quality that are likely lower than the cost of capital effects for innate accruals quality. Consistent with this view, we find that innate accruals quality has larger cost of capital effects than does discretionary accruals quality.

The accruals quality (*AQ*) metric we use is based on Dechow and Dichev's [2002] model which posits a relation between current period working capital accruals and operating cash flows in the prior, current and future periods. Following McNichols' [2002] discussion of this model, we also include the change in revenues and property, plant and equipment (PPE) as additional explanatory variables. In this framework, working capital accruals reflect managerial estimates of cash flows, and the extent to which those accruals do not map into cash flows, changes in revenues and PPE – due to intentional and unintentional estimation errors – is an inverse measure of accruals quality.

Our tests examine the relation between *AQ* and the costs of debt and equity capital. We find that firms with poorer *AQ* have higher ratios of interest expense to interest-bearing debt and lower debt ratings than firms with better *AQ* (all differences significant at the 0.001 level). Controlling for other variables known to affect debt costs (leverage, firm size, return on assets, interest coverage, and earnings volatility), the results suggest that firms with the best *AQ* enjoy a 126 basis point (bp) lower cost of debt relative to firms with the worst *AQ*. In terms of the cost of equity, tests focusing on earnings-price ratios show that firms with lower *AQ* have significantly (at the 0.001 level) larger earnings-price ratios relative to their industry peers; that is, a dollar of earnings commands a lower price multiple when the quality of the accruals component of those earnings is low. More direct tests show that CAPM betas increase monotonically across *AQ* quintiles, with a difference in betas between the lowest and highest quintiles of 0.35 (significantly different from zero at the 0.001 level). Assuming a 6% market risk premium, this difference implies a 210 bp higher cost of equity for firms with the worst *AQ* relative to firms with the best *AQ*. In asset pricing regressions which include market returns and an accruals quality factor

(*AQfactor*), we find that not only is there a significant (at the 0.001 level) positive loading on *AQfactor*, but the coefficient on the market risk premium (i.e., the estimated beta) decreases in magnitude by nearly 20%. Extending this analysis to the three-factor asset pricing regression, we find that *AQfactor* adds significantly to size and book to market (as well as the market risk premium) in explaining variation in expected returns. In these regressions, the largest change in coefficient estimates (relative to the model which excludes *AQfactor*) is noted for the size factor where the average loading declines by about 30% when *AQfactor* is included. We conclude that accruals quality not only influences the loadings on documented risk factors, but contributes significant incremental explanatory power over and above these factors.

We extend these analyses by investigating whether the pricing of accruals quality differs depending on whether the source of accruals quality is innate, that is, driven by the firm's business model and operating environment, or discretionary, that is, subject to management interventions. Following Dechow and Dichev, we identify several summary indicators of the firm's operating environment or business model: firm size, standard deviation of cash flows, standard deviation of revenues, length of operating cycle, and frequency of negative earnings realizations. Our first analysis uses the fitted values from annual regressions of *AQ* on these summary indicators as the measure of the innate portion of accrual quality; the residual is used as the measure of discretionary accruals quality. Our second analysis of innate versus discretionary components includes these summary indicators as additional control variables in the cost of capital tests. Controlling for these variables allows us to interpret the coefficient on (total) *AQ* as capturing the pricing effects associated with the discretionary piece of accruals quality – that is, the piece that is incremental to the innate factors. Regardless of the approach used to isolate the components of *AQ*, we find that the cost of capital effect of a unit of discretionary *AQ* is smaller both in magnitude and statistical significance than the cost of capital effect of a unit of innate *AQ*.

Overall, we interpret our results as documenting cost of capital effects that are consistent with a rational asset pricing framework in which accruals quality captures an information risk factor that cannot be diversified away. The findings concerning innate and discretionary accruals quality are consistent with

information risk having larger pricing effects when it is driven by firm-specific operating and environmental characteristics than when it is associated with discretionary decisions.

We believe these results have implications for assessments of reporting quality. First, we provide systematic evidence that reporting quality as captured by accruals quality is salient for investors; that is, we provide evidence that reporting quality matters. Second, our results contradict an implicit assumption in some policy-oriented discussions (e.g., Levitt [1998]) that reporting quality is largely determined by management's short-term reporting choices; our results suggest that in broad samples, over long periods, reporting quality is substantially more affected by management's long-term strategic decisions that affect intrinsic factors. For those who believe that financial reporting should reflect economic conditions more than management implementation decisions, this result suggests that accrual accounting is performing as intended. Third, research which has assessed the relative importance of reporting standards versus implementation decisions using a cross-jurisdictional design (e.g., Ball, Robin and Wu [2003]) has concluded that the reporting standards are less important than the incentives which drive implementation decisions in determining differences in earnings quality across jurisdictions. Our results suggest that this analysis should be further conditioned on innate factors that capture jurisdiction-specific features of business models and operating environments.

In addition to research pertaining to the pricing of information risk, our results relate to three other streams of research. The first stream investigates the capital market effects of financial reporting, as documented by adverse capital market consequences (in the form of shareholder losses) when earnings are of such low quality as to attract regulatory or legal attention. For example, previous research has documented severe economic consequences for earnings of sufficiently low quality as to attract SEC enforcement actions (Feroz, Park and Pastena [1991]; Dechow, Sloan and Sweeney [1996]; Beneish [1999]), shareholder lawsuits (Kellogg [1984]; Francis, Philbrick and Schipper [1994]), or restatements (Palmrose, Richardson and Scholz [2001]). The financial press also provides ample anecdotal evidence of catastrophic shareholder losses associated with the (arguably) lowest quality accruals, those resulting from financial fraud. However, research on severely low earnings quality firms does not establish a

general relation between reporting quality and capital market consequences. Our results show that the quality of one component of earnings – accruals – has economically meaningful consequences for broad samples of firms, unconditional on external indicators of extremely poor quality.

The second stream of related research explores a different, and explicitly anomalous, form of capital market effects of accruals. By anomalous effects we mean systematic patterns in average returns not explained by the CAPM (Fama and French [1996]). Specifically, this research shows that firms with relatively (high) low magnitudes of signed accruals, or signed abnormal accruals, earn (negative) positive risk-adjusted returns (e.g., Sloan [1996]; Xie [2001]; Chan, Chan, Jegadeesh and Lakonishok [2001]). While both anomaly research and our investigation are concerned with the relation between accruals-based measures and returns, the perspectives differ. Whereas anomaly research views the abnormal returns associated with observable firm attributes as arising from slow or biased investor responses to information, we view observable firm characteristics as proxies for underlying, priced risk factors. Consistent with this view, our tests are based on *unsigned* measures. That is, we predict that larger magnitudes of *AQ* are associated with larger required returns, regardless of the sign of accruals, because a larger magnitude of *AQ* indicates greater information risk, for which investors require compensation in the form of larger expected returns. In contrast, anomaly research rests on *signed* accruals measures; this research predicts positive returns to firms with the largest negative accruals and negative returns to firms with the largest positive accruals. While the anomaly research perspective and our perspective imply the same predictions about large negative accruals, the perspectives imply the opposite predictions for large positive accruals. Consistent with this argument, we find that while the profitability of the accruals trading strategy is marginally reduced by the inclusion of accruals quality as a control (risk) factor, the abnormal returns remain reliably positive. We conclude that the accruals quality pricing effects that we document are distinct from the accruals anomaly.

The third stream of related research assesses the relation between costs of capital and measures of either the quantity of information communicated to investors, or some mixture of quality/quantity attributes of that information. For example, Botosan [1997] finds evidence of higher costs of equity for

firms with low analyst following and relatively low disclosure scores, where the scores capture

information quantity. Research has also found a relation between both the cost of equity (Botosan and

Plumlee [2002]) and the cost of debt (Sengupta [1998]) and analyst-based (AIMR) evaluations of

aggregate disclosure efforts, where the evaluations take into account annual and quarterly reports, proxy

statements, other published information and direct communications to analysts. Our analysis adds to this

work by providing evidence on the link between the costs of debt and equity capital and measures of the

quality of accruals information.

In the next section we develop hypotheses and describe the proxy for accruals quality used to test

these hypotheses. Section 3 describes the sample and provides descriptive information on the test and

control variables. Section 4 reports tests of whether (total) accruals quality is related to the cost of capital

and section 5 extends these tests by examining whether the innate and discretionary components of

accruals quality are separately and differentially priced. Section 6 reports the results of robustness checks

and additional tests. Section 7 concludes.

2. Hypotheses and Accruals Quality Metrics

2.1. Theories of the pricing of information risk

Our paper builds on theoretical research investigating how the supply of information affects the

cost of capital. Easley and O'Hara [2003] develop a multi-asset rational expectations model in which the

private versus public composition of information affects required returns and thus the cost of capital. In

their model, relatively more private information increases uninformed investors' risk of holding the stock,

because the privately informed investors are better able to shift their portfolio weights to take advantage

of new information. Uninformed investors thus face a form of systematic (i.e., undiversifiable)

information risk, and will require higher returns (charge a higher cost of capital) as compensation.

Required returns are affected both by the amount of private information (with more private information

increasing required returns) and by the precision of public and private information (with greater precision

of either reducing required returns). Easley and O'Hara explicitly note an important role for precise

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accounting information in reducing the cost of capital by decreasing the (information-based) systematic risk of shares to uninformed investors.

Taking a different approach, Leuz and Verrecchia [2004] consider the role of performance reports (e.g., earnings) in aligning firms and investors with respect to capital investments. Poor quality reporting impairs the coordination between firms and their investors with respect to the firm's capital investment decisions, and thereby creates information risk. Anticipating this, investors demand a higher risk premium; that is, they charge a higher cost of capital. Leuz and Verrecchia show that even in an economy with many firms and a systematic component to the payoff, a portion of this information risk is non-diversifiable.

In short, both Easley and O'Hara and Leuz and Verrecchia predict that firms with more information risk will have higher costs of capital. In both models, information risk concerns the uncertainty or imprecision of information used or desired by investors to price securities. We assume that investors value securities based on their assessments of future cash flows; therefore, we seek a measure that captures the information uncertainty in cash flows. Information about cash flows is supplied by earnings; that is, cash flow equals earnings less accruals, and prior research (e.g., Dechow [1994]) shows that current earnings is, on average, a good indicator of future cash flow. We focus on the accrual component of earnings because this component is subject to greater uncertainty than is the cash flow component. Accruals are the product of judgments, estimates, and allocations (of cash flow events in other periods), while the cash flow component of income is realized. Using accruals quality as the proxy for information risk, we formalize the prediction that costs of capital are increasing in information risk; stated in null form, our first hypothesis is:

H1: There is no difference in the costs of capital of firms with poor accruals quality and firms with good accruals quality.

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We test this hypothesis against the alternative that firms with poor accruals quality have higher costs of capital than firms with good accruals quality.[2]

2.2. Measuring accruals quality

We believe that uncertainty in accruals is best captured by the measure of accruals quality developed by Dechow and Dichev [2002] (hereafter DD). In the DD model, accruals quality is measured by the extent to which working capital accruals map into operating cash flow realizations. This model is predicated on the idea that, regardless of management intent, accruals quality is affected by the measurement error in accruals. Intentional estimation error arises from incentives to manage earnings, and unintentional error arises from management lapses and environmental uncertainty; however, the source of the error is irrelevant in this approach. DD's approach regresses working capital accruals on cash from operations in the current period, prior period and future period. The unexplained portion of the variation in working capital accruals is an inverse measure of accruals quality (a greater unexplained portion implies poorer quality).

As a practical matter, the DD approach is limited to current accruals. While applying the DD model to total accruals would, in principle, produce an accruals quality metric that comprehensively measures accruals uncertainty, the long lags between non-current accruals and cash flow realizations effectively preclude this extension. To address this limitation, we also consider proxies for accruals quality that are based on the absolute value of abnormal accruals, where abnormal accruals are estimated using the Jones [1991] model, as modified by Dechow, Sloan and Sweeney [1995]. Applying the modified Jones approach to our setting, accruals quality is related to the extent to which accruals are well captured by fitted values obtained by regressing total accruals on changes in revenues and plant, plant and equipment. Because abnormal accruals consider both current and non-current accruals they do not suffer from the limitation of the DD model. However, the modified Jones' model's identification of 'abnormal'

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[2] Easley, Hvidkjær and O'Hara [2002] find results that are broadly consistent with the prediction that firms with more private information (as measured by PIN scores, a market microstructure measure of informed trading) and less public information have larger expected excess returns. Our analysis complements their research by considering a second implication of Easley and O'Hara's model, namely, that more precise (higher quality) accounting information reduces the cost of capital.

accruals has been subject to much criticism (see, for example, Guay, Kothari and Watts [1996]; Bernard and Skinner [1996]). Furthermore, the modified Jones model identifies accruals as abnormal if they are not explained by a limited set of fundamentals (PPE and changes in revenues), and while we believe that such abnormal accruals contain a substantial amount of uncertainty, the link to information risk is less direct than in the DD approach.

For these reasons, we use the DD approach to estimate a proxy for accruals quality. (As described in section 6.1, we also examine the sensitivity of our results to other *AQ* measures.) Specifically, our *AQ* metric is based on the cross-sectional DD model, augmented with the fundamental variables from the modified Jones model, namely, PPE and change in revenues (all variables are scaled by average assets):

$$TCA_{j,t} = \phi_{0,j} + \phi_{1,j}CFO_{j,t-1} + \phi_{2,j}CFO_{j,t} + \phi_{3,j}CFO_{j,t+1} + \phi_{4,j}\Delta Rev_{j,t} + \phi_{5,j}PPE_{j,t} + \upsilon_{j,t} \qquad (1)$$

where $TCA_{j,t} = \Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{j,t} + \Delta STDEBT_{j,t}$ = total current accruals in year t,

$CFO_{j,t} = NIBE_{j,t} - TA_{j,t}$ = firm j's cash flow from operations in year t,[3]

$NIBE_{j,t}$ = firm j's net income before extraordinary items (Compustat #18) in year t,

$TA_{j,t} = (\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{j,t} + \Delta STDEBT_{j,t} - DEPN_{j,t})$ = firm j's total accruals in year t

$\Delta CA_{j,t}$ = firm j's change in current assets (Compustat #4) between year t-1 and year t,

$\Delta CL_{j,t}$ = firm j's change in current liabilities (Compustat #5) between year t-1 and year t,

$\Delta Cash_{j,t}$ = firm j's change in cash (Compustat #1) between year t-1 and year t,

$\Delta STDEBT_{j,t}$ = firm j's change in debt in current liabilities (Compustat #34) between year t-1 and year t,

$DEPN_{j,t}$ = firm j's depreciation and amortization expense (Compustat #14) in year t,

$\Delta Rev_{j,t}$ = firm j's change in revenues (Compustat #12) between year t-1 and year t,

$PPE_{j,t}$ = firm j's gross value of property, plant and equipment (Compustat #7) in year t,

McNichols [2002] proposes this combined model, arguing that the change in sales revenue and PPE are important in forming expectations about current accruals, over and above the effects of operating

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[3] We calculate total accruals using information from the balance sheet and income statement (indirect approach). We use the indirect approach rather than the statement of cash flows (or direct method, advocated by Hribar and Collins [2002]) because statement of cash flow data are not available prior to 1988 (the effective year of SFAS No. 95) and our *AQ* metric requires five yearly observations. We draw similar inferences (not reported) if we restrict our sample to post-1987 and use data from the statement of cash flows.

cash flows. She shows that adding these variables to the cross-sectional DD regression significantly

increases its explanatory power, thus reducing measurement error. Our intent in using this modified DD

model is to obtain a better-specified expectations model which, in turn, should lead to a better-specified

stream of residuals. For our sample, the addition of change in revenues and PPE increases explanatory

power from a mean of 39% to a mean of 50%.

We estimate equation (1) for each of Fama and French's [1997] 48 industry groups with at least

20 firms in year t. Consistent with the prior literature, we winsorize the extreme values of the distribution

to the 1 and 99 percentiles. Annual cross-sectional estimations of (1) yield firm- and year-specific

residuals, which form the basis for our accruals quality metric: $AQ_{j,t} = \sigma(\upsilon_j)_t$ is the standard deviation of

firm j's residuals, $\upsilon_{j,t}$, calculated over years t-4 through t. Larger standard deviations of residuals

indicate poorer accruals quality. However, if a firm has *consistently* large residuals, so that the standard

deviation of those residuals is small, that firm has relatively good accruals quality because there is little

uncertainty about its accruals. For such a firm, the accruals map poorly into cash flows, but this is a

predictable phenomenon, and should not be a reason for priced uncertainty.

2.3. Distinguishing between the cost of capital effects of innate and discretionary accruals quality

2.3.1 *Hypothesis development.* The theoretical models summarized in section 2.1 establish a

pricing role for information risk, but do not distinguish among possible sources of this risk. That is, these

models do not predict differences between the pricing effects of poor accruals quality that is driven by

innate features of the firm's business model and operating environment, and poor accruals quality that is

discretionary, i.e., due to accounting choices, implementation decisions, and managerial error. However,

insights from research on earnings management suggest a potential distinction between the pricing effects

of the innate and discretionary components of accruals quality. Guay, Kothari and Watts' [1996]

discussion of the exercise of managerial discretion over accruals suggests that the discretionary

component of accruals quality contains up to three distinct subcomponents. The performance

subcomponent, which reflects management's attempts to enhance the ability of earnings to reflect

performance in a reliable and timely way, would be expected to reduce information risk. The second and third subcomponents, which reflect opportunism and pure noise, respectively, would be expected to increase information risk, although it is not clear that they would have the same magnitude of effect as would innate accruals quality.

While Guay et al.'s arguments suggest that the performance and opportunism subcomponents dominate the noise component (that is, the discretionary component of accruals is not mostly noise), their empirical results do not clearly point to either the performance effect or the opportunistic effect as being empirically stronger for the sample they consider. However, their discussion of results, combined with Healy's [1996] discussion of their paper, provides insights that are pertinent for our purposes. First, Guay et al., p.104, conclude that "[g]iven that managerial discretion over accruals has survived for centuries, our prior is that the net effect of discretionary accruals in the population is to enhance earnings as a performance indicator."[4] Under this view, the discretionary component of accruals quality *reduces* information risk, and thereby offsets the increased cost of capital associated with low innate accruals quality.

However, Guay et al. also note, as does Healy, that broad samples covering long time periods will contain both accruals that conform to the performance hypothesis and accruals that are driven by managerial opportunism. Specifically, Healy notes that in a cross-section of firms, management of one firm can report opportunistically and management of another can report unbiasedly (with both behaviors potentially shifting over time), with the result that the overall observed effect, for a given sample, will be a weighted average of the separate effects. That is, while performance effects might be expected to dominate when management does not face incentives to engage in opportunistic behaviors, previous research provides evidence that opportunistic effects dominate in carefully-selected, nonrandom samples

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[4] Empirical support for the view that, in large samples, discretionary accruals improve earnings as a signal of performance is provided by Subramanyam [1996], who finds that managerial discretion improves the contemporaneous returns-earnings relation. Note, however, that returns-earnings (or value-relevance) tests of the pricing of accruals are fundamentally different from our cost of capital tests. The latter focus on future expected returns and unsigned measures of accruals quality, while the former focus on contemporaneous realized returns and signed measures of accruals (total or discretionary).

where incentives for opportunistic behaviors are strong. Our sample, which is selected to enhance the generalizability of our results, likely contains observations that are associated with both effects. We do not attempt to separate these effects because testing for opportunistic behaviors affecting discretionary accruals quality would require the use of targeted, idiosyncratic samples chosen to enhance the effects of specific incentives to behave opportunistically.

Placing these results and discussion in the context of our research question, we draw the following inferences. First, while theories of information risk do not imply differences in the cost of capital effects of innate versus discretionary accruals quality, research on earnings management and discretionary accruals suggests the possibility of such differences. Second, managers' attempts to use discretion over accruals to improve earnings as a performance indicator will reduce the information asymmetry that gives rise to undiversifiable information risk, and therefore reduce the information risk premium demanded by investors. However, broad samples covering long time periods will also contain observations where managerial discretion is used to reap opportunistic gains; such behaviors are expected to increase information uncertainty and, therefore, increase the risk premium demanded by investors. This reasoning implies that discretionary accruals quality is expected to have cost of capital effects that reflect some mixture of performance improvement (which will offset the cost of capital increases associated with innate accruals quality factors) and opportunism plus noise (which will exacerbate these factors). To the extent that discretionary accruals quality reflects a mixture of information-risk-increasing and information-risk-decreasing effects, we expect the overall cost of capital effect to be smaller than the effect for innate accruals quality. Our second hypothesis formalizes the prediction of differential cost of capital effects between innate and discretionary components of accruals quality; we state H2 in its null form (which implies that investors are indifferent to the specific causes of information risk) and test it against the alternative form (which implies that investors value a unit of discretionary accruals quality less than they value a unit of innate accruals quality):

> H2: There is no difference in the cost of capital effects of the innate component of accruals quality versus the discretionary component of accruals quality.

2.3.2 *Empirical distinctions between innate and discretionary accruals quality.* We use two approaches to disentangle the costs of capital effects of the discretionary and innate components of accruals quality. Both methods use summary indicators to capture the influence of operating environment and business model on accruals quality. We refer to these effects as 'innate factors,' recognizing that this description is imprecise because management can change the business model (e.g., by increasing receivables turnover) or the operating environment (e.g., by exiting a line of business or a geographic region). We view innate factors as being slow to change, relative to factors (such as management's accounting implementation decisions) that affect discretionary accruals quality. We use the factors suggested by DD as affecting (innate) accruals quality: firm size, standard deviation of cash flow from operations, standard deviation of sales revenues, length of operating cycle and incidence of negative earnings realizations.

The first approach (Method 1) explicitly separates the innate and discretionary components of accruals quality using annual regressions of AQ on the innate factors. The predicted value from each regression yields an estimate of the innate portion of firm j's accrual quality in year t, $InnateAQ_{j,t}$. The prediction error is the estimate of the discretionary component of the firm's accruals quality in year t, $DiscAQ_{j,t}$. Method 1 replaces the (total) AQ variable in the original regressions with $InnateAQ$ and $DiscAQ$. The second approach (Method 2) controls for innate factors affecting accruals quality by including them as independent variables in the costs of capital tests. In these augmented regressions, the coefficient on AQ captures the cost of capital effect of the portion of accruals quality that is incremental to the effect captured by the innate factors. We interpret this coefficient as a measure of the cost of capital effect of discretionary accruals quality.

The two approaches to distinguishing between innate and discretionary accruals quality differ in several ways that have implications for drawing inferences about H2. One difference arises because Method 2 does not produce a separate measure of innate accruals quality. Therefore, under the Method 2 approach, inferences about H2, which (in its null form) predicts no differences in the costs of capital

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effects of innate versus discretionary accruals quality, must be based on comparisons between the total

accruals quality cost of capital effect and the discretionary component's effect. In contrast, Method 1

allows us to make direct comparisons of the effects of innate versus discretionary accruals quality. A

second difference stems from the relative sensitivity of the two methods to the effects of potentially

omitted innate variables, Z. Under Method 1, omitted innate factors lead to model misspecification,

which manifests itself as noise in the error term. All else equal, noisier values of the error terms increase

the measurement error in *DiscAQ*, leading to a downward bias (toward zero) on the estimates of the

pricing effects of discretionary accruals quality. Under Method 2, the exclusion of Z likely results in

larger coefficient estimates on *AQ* than would occur if Z is included as an independent variable

(assuming that Z is positively associated with the cost of capital). In short, to the extent our set of innate

factors is incomplete, the estimated pricing effects of discretionary accruals quality are likely biased

downward under Method 1 and upward under Method 2. Comparing results based on the two methods

bounds the cost of capital effects of the discretionary component of accruals quality, conditional on the

identification of the set of innate factors.

3. **Sample and Description of Accruals Quality Proxies**

We calculate values of $AQ_{j,t} = \sigma(\upsilon_j)_t$ for all firms with available data for the 32-year period

t=1970-2001. To be included in any of the market-based tests, we require that each firm-year observation

have data on *AQ* and the necessary market measures. Because $\sigma(\upsilon_j)_t$ is based on five annual residuals,

our sample is restricted to firms with at least five years of data. This restriction likely biases our sample

to surviving firms which tend to be larger and more successful than the population. We expect this

restriction will, if anything, reduce the variation in *AQ*, making it more difficult to detect effects. In total,

there are 91,280 firm-year observations with data on *AQ*. The number of firms each year ranges from

about 1,500 per year in the early 1970s to roughly 3,500 per year towards the end of the sample period.

Table 1 reports summary statistics on *AQ* for the pooled sample. Mean and median values of *AQ* are

0.0442 and 0.0313, respectively; 80% of the values are in the range from 0.0107 to 0.0943. In unreported tests, we also examine the over-time variation in *AQ*, as captured by the cross-sectional distribution of firm j's rolling five-year standard deviation of $\sigma(\upsilon_j)_t$. (We exclude firm-year observations with incomplete five-year data). These data indicate considerable over-time variability, as evidenced by an average standard deviation of 0.0119, or 27% of the mean value of $\sigma(\upsilon_j)_t = 0.0442$.

Table 1 also reports summary information on selected financial variables. The sample firms are large (median market value of equity is about $64 million and median assets are about $102 million); profitable (median return on assets is about 0.042); and growing (median sales growth is 0.126). In unreported tests, we compare these sample attributes to those of the Compustat population for the same time period. Consistent with the selection bias noted above, our sample firms are larger, more profitable and experience higher growth than the typical Compustat firm (the median Compustat firm over our sample period has a market value of equity of $59 million, *ROA* of 0.034, and sales growth of 0.100). We note that while the differences between our sample and the Compustat population are statistically significant (tests not reported), they are relatively small in economic terms.

4. Accruals Quality and the Costs of Debt and Equity Capital

Our first set of tests examines the association between accruals quality and proxies for costs of capital: cost of debt (section 4.1) and cost of equity, as captured by industry-adjusted earnings-price ratios (section 4.2) and factor loadings in conventional one-factor and three-factor asset pricing models (section 4.3). For each test, we merge the sample described in section 3 with all observations with the market and accounting data dictated by that test. Of the 91,280 firm-year observations with data on *AQ*, 76,195 have data on interest expense as a percent of interest bearing debt (our proxy for the cost of debt) and 55,092 have the necessary data to calculate earnings-price ratios. The samples used in the asset pricing tests include 8,881 firms with data on *AQ* and monthly returns data, and 20,878 firms with monthly returns data, respectively.

Our analyses are based on annual regressions estimated using the decile ranks of AQ, for the period t=1970-2001. The use of decile ranks controls for outliers and non-linearities, and facilitates interpretation of the economic magnitudes of the cost of capital effects. To control for cross-sectional correlations, we assess the significance of the 32 annual regression results using the time-series standard errors of the estimated coefficients (Fama-MacBeth [1973]).

4.1. Cost of debt

Our first test examines whether AQ explains variation in the realized cost of debt ($CostDebt$), calculated as the ratio of firm j's interest expense in year t +1 (Compustat #15) to average interest bearing debt outstanding during years t and t +1 (Compustat #9 and #34). Summary information reported in Table 1 shows a mean (median) cost of debt of 9.9% (9.2%), with 80% of the sample having a cost of debt between 5.9% and 14.4%.

Evidence on the relation between $CostDebt$ and accruals quality is detailed in Panel A of Table 2, where we report the mean cost of debt for each quintile of the ranked AQ distribution. These data show that the worst accruals quality firms (Q5) have mean cost of debt of 10.77% while the best accruals quality firms (Q1) have mean cost of debt of 8.98%. The increase in $CostDebt$ across the quintiles is monotonic, with a significant (at the 0.001 level) difference between the mean $CostDebt$ for the worst and best AQ quintile (Q5 versus Q1). These differences are economically meaningful: the differential cost of debt between Q5 and Q1 corresponds to 179 bp (t-statistic = 10.10).

These effects may be overstated because the tests do not control for the effects of other factors known to affect the cost of debt: financial leverage, firm size, return on assets, interest coverage, and earnings volatility (Kaplan and Urwitz [1979]; Palepu, Healy and Bernard [2000]). If accruals quality is not subsumed by one or more of these factors, and if creditors view firms with low quality accruals as riskier than firms with high quality accruals, we expect a positive relation between costs of debt and AQ, or $\theta_6 > 0$, in the following regression:

$$CostDebt_{j,t} = \theta_0 + \theta_1 Leverage_{j,t} + \theta_2 Size_{j,t} + \theta_3 ROA_{j,t} + \theta_4 IntCov_{j,t}$$
$$+ \theta_5 \sigma(NIBE)_{j,t} + \theta_6 AQ_{j,t} + \varsigma_{j,t} \tag{2}$$

where $Leverage_{j,t}$ = firm j's ratio of interest-bearing debt to total assets in year t,

$Size_{j,t}$ = log of firm j's total assets in year t,

$ROA_{j,t}$ = firm j's return on assets in year t,

$IntCov_{j,t}$ = firm j's ratio of operating income to interest expense in year t,

$\sigma(NIBE)_{j,t}$ = standard deviation of firm j's net income before extraordinary items (*NIBE*), scaled by average assets, over the rolling prior 10- year period; we require at least five observations of *NIBE* to calculate the standard deviation.

Panel B, Table 2 reports the results of estimating equation (2). The first five rows show the coefficient estimates and t-statistics for the control variables. As expected, earnings volatility is significantly (at the 0.01 level or better) positively correlated with *CostDebt*, and *ROA* and *IntCov* are significantly (at the 0.01 level) negatively related; for our sample, *CostDebt* is insignificantly related to *Size*, and negatively related to *Leverage*.[5] The results for *AQ* show that accruals quality is positively correlated with *CostDebt* (t-statistic = 13.36). The mean value of the yearly θ_6's from the decile rank regressions indicates the economic importance of these effects. The average coefficient estimate of 0.14, suggests a difference of 126 bp (0.14 multiplied by nine decile differences) in realized costs of debt between the worst and best *AQ* deciles.

In unreported tests, we also examine the association between accruals quality and ex-ante costs of debt, proxied by S&P Issuer Credit Ratings (Compustat #280).[6] The sample size for these tests is smaller (n=13,032 firm-year observations) both because these data are available beginning in 1985 and because they are not reported for many firms. Consistent with the results for the realized cost of debt, we find that *AQ* adds meaningfully to explaining debt ratings, incremental to control variables. Specifically, the mean

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[5] The negative coefficient on *Leverage* suggests the possibility that firms with little debt in their capital structures are minimally-levered because they face a high cost of debt. To explore this possibility, we re-estimate (2) after excluding firms with low debt financing (defined as firms with debt less than 20% of assets). Results (not reported) show that the coefficient on *Leverage* becomes significantly (at the 0.01 level) positive, and does not affect inferences about other variables.

[6] We recode the Compustat data to remove unassigned and similar codes. Our recoded variable, *DebtRating*, ranges from 1 (AAA) to 20 (Default).

decile rank coefficient estimate on *AQ* of 0.27 (t-statistic = 12.64) suggests a difference in debt ratings of

2.43 for firms in the best and worst AQ deciles. Given that the mean debt rating for firms in the best *AQ*

decile is roughly A, a 2.4 category difference corresponds to a BBB rating for the worst *AQ* firms.

In summary, the above findings indicate that accruals quality affects the cost of debt, incremental

to financial leverage, size, return on assets, interest coverage and earnings volatility. The results are

consistent across both ex post and ex ante measures of the cost of debt. The realized cost of debt

regressions suggest a 126 basis point differential between the best and worst accruals quality firms.

4.2 <u>Earnings-price ratios</u>

Following Liu, Nissim and Thomas [2002], we view the price multiple attached to earnings as a

short-hand valuation, which places a price on a dollar of earnings. A higher multiple implies a lower cost

of capital—investors are willing to pay more for a given dollar of earnings. Viewing the price-earnings

ratio as an inverse indicator of the cost of equity, we assess whether lower accruals quality results in

lower price-earnings ratios (Penman [2001]). Specifically, we investigate the relation between *AQ* and

industry-adjusted earnings-price ratios. We use earnings-price ratios to address concerns with the effects

of small values of earnings in the denominator, and we industry-adjust based on Alford's [1992] finding

that industry membership works well for selecting firms that are comparable in terms of risk and growth.

To calculate industry-adjusted *EP* ratios, we first calculate the median *EP* ratio for all firms with

positive earnings in year t in each of the 48 Fama-French industry groups; we require a minimum of five

positive earnings firms in the industry in year t (excluding firm j). We calculate firm j's industry-adjusted

EP ratio, *IndEP*, as the difference between its *EP* ratio and the median industry *EP* ratio in year t. (We

draw similar inferences using the ratio of firm j's *EP* to the median industry *EP*.) If investors apply lower

multiples to lower quality accruals, we expect the earnings associated with such accruals to have larger

IndEP values. Evidence on the relation between *IndEP* and *AQ* is provided in Panel A, Table 2, where

we report the mean value of *IndEP* for each quintile of the ranked *AQ* distribution. These data show that

the poorest accruals quality firms have the largest *IndEP*, that the increase in *IndEP* is near monotonic

across *AQ* quintiles, and that the mean *IndEP* for the worst accruals quality quintile (Q5) is significantly

larger than the mean for the best accruals quality quintile (Q1). The difference in mean values between Q5 and Q1 is 0.0093 and is reliably different from zero (t-statistic = 4.37). To provide a more intuitive sense of the economic magnitude of this effect, we also calculated the difference in unadjusted price-earnings earnings ratios between the worst and best *AQ* quintiles (tests not reported): the mean difference is about 12 (t-statistic = 7.96). Given that the average EPS of our sample is $1.67, this difference in price-earnings ratios corresponds to about $20 per share of market value.

More formal tests of whether accruals quality explains industry-adjusted *EP* ratios are shown in Panel C, Table 2, where we report the coefficient estimates and t-statistics from estimating equation (3), which includes controls for growth, leverage, beta and firm size:

$$IndEP_{j,t} = \vartheta_0 + \vartheta_1 Growth_{j,t} + \vartheta_2 Leverage_{j,t} + \vartheta_3 Beta_{j,t} + \vartheta_4 Size_{j,t} + \vartheta_5 AQ_{j,t} + \varsigma_{j,t} \qquad (3)$$

where   *Growth* = log of one plus the firm's growth in book value of equity over the past five years,

   Beta = 5-year rolling estimate of beta, obtained from firm-specific CAPM estimations; we require a firm to have at least 18 monthly returns for this estimation.

Results show that *IndEP* is negatively related to *Growth* (t-statistic = -2.00), consistent with higher growth firms having smaller earnings-price ratios. We also expect that riskier firms have larger earnings-price ratios; this positive association is observed for *Leverage* (t-statistic = 2.55) but not for *Beta* (where we find a reliably negative association). To the extent that smaller firms are more risky than larger firms, our finding of a negative association between *IndEP* and *Size* (t-statistic = -1.67) is also consistent with the risk explanation. The last row of Panel C shows that firms with larger *AQ* scores have larger earnings-price ratios, controlling for other factors affecting earnings-price ratios: the mean estimate of φ_5 is positive, with a t-statistic of 5.83. We interpret this result as indicating that as the quality of accruals decreases, so too does the amount investors are willing to pay for a dollar of earnings, implying a higher cost of equity capital for firms with lower quality accruals.

4.3 Factor loadings in one-factor and three-factor asset pricing models

Our next analysis investigates the effects of accruals quality on the equity cost of capital, as manifest in the factor loadings and explanatory power of one-factor and three-factor asset pricing models.

Whereas the *EP* ratio analysis in the prior section captures investors' ex-ante assessment of the cost of equity, the asset-pricing regressions in this section use average (ex-post) returns realizations to proxy for the cost of equity. We begin by examining whether poorer accruals quality is associated with a larger factor loading on systematic risk (beta) in a traditional one-factor model. If accruals quality is associated with this risk, we expect a positive association between *AQ* and beta.

To allow for differences in firms' fiscal year ends as well as over-time changes in accruals quality, we use a dynamic portfolio technique to assign firms to *AQ* quintiles. Specifically, beginning in April 1971, we form quintiles on the first day of each calendar month *m* based on the firm's most recent value of *AQ* known prior to month *m*; firms with the smallest (largest) *AQ* values are placed in the first (fifth) quintile.[7] We calculate the average monthly excess return for each quintile for the period April 1971 to March 2002, yielding a time series of 384 monthly excess returns for each of the quintiles (q=Q1,…,Q5). The portfolio beta is the coefficient obtained from regressing each quintile's monthly excess return on the monthly excess market return:

$$R_{q,m} - R_{F,m} = \alpha_q + \beta_q (R_{M,m} - R_{F,m}) + \varepsilon_{q,m} \tag{4}$$

Panel A, Table 2 reports the betas obtained from estimating equation (4) for each quintile. These data show that estimated betas increase monotonically across the quintiles, from 0.92 for Q1 to 1.27 for Q5. The differences in betas between the Q5 and Q1 portfolios is 0.35 (t-statistic = 6.75). Assuming a 6% market risk premium, the Q5-Q1 difference in betas of 0.35 implies that firms with the highest quality accruals enjoy a 210 basis point reduction in the cost of equity capital relative to firms with the worst quality accruals.

More explicit tests of the effects of accruals quality on the cost of equity capital are conducted using firm-specific asset-pricing regressions. We begin by estimating one-factor models for each of the J=8,881 firms with data on *AQ* and at least 18 monthly returns between April 1971 and March 2002. The

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[7] For example, for the month of April 1998 firms are ranked into quintiles based on the *AQ* signals calculated using annual data for fiscal year-ends between January 1997 and December 1997. This procedure means that firm j's *AQ* signals for year *t*, where fiscal year *t* ends in month *n*, will influence firm j's ranking for months *n*+4 through *n*+15.

mean (median) sample firm has 159 (130) monthly returns. Panel A, Table 3 reports the mean values of the coefficients and adjusted R^2's from these CAPM tests, and reports t-statistics of whether the mean coefficient estimate equals zero. The results show a mean beta of 1.04 (t-statistic of 174.57) and a mean adjusted R^2 of 13.5%. To the traditional CAPM, we add a variable capturing accruals quality. Specifically, we calculate an *AQ* factor-mimicking portfolio, *AQfactor*, equal to the difference between the monthly excess returns of the top two AQ quintiles (Q4 and Q5) and the bottom two AQ quintiles (Q1 and Q2). This procedure (similar to that used by Fama and French [1993] to construct size and book-to-market factor-mimicking portfolios) yields a series of 384 monthly *AQfactor* returns. Panel A shows the results of regressions which include *AQfactor* as an additional independent variable; these tests allow us to assess the degree to which accruals quality *overlaps with* and *adds to* the market risk premium in explaining returns. Specifically, we report the mean of the J=8,881 loadings, β_j and λ_j, from firm-specific estimations of equation (5):

$$R_{j,m} - R_{F,m} = \alpha_j + \beta_j (R_{M,m} - R_{F,m}) + \lambda_j AQfactor_m + \varepsilon_{j,m} \tag{5}$$

The mean loading on *AQfactor* is positive and highly statistically significant, with a t-statistic of 83.48. The mean estimated beta remains statistically positive ($\hat{\beta} = 0.83$, t-statistic = 146.19) in the presence of *AQfactor*, but its magnitude is reduced by 20% relative to the point estimate of 1.04 from the regression excluding *AQfactor*. While this result suggests that some of the information in *AQfactor* overlaps with the market risk premium, the statistical significance of both variables indicates that neither beta nor accruals quality subsumes the other. Evidence on the extent to which *AQfactor* adds to explaining returns is provided in the last row of Panel A, where we report the incremental explanatory power of the *AQfactor*, equal to the average difference in adjusted R^2s from estimations of equation (5) versus equation (4). These results show that *AQfactor* increases the average adjusted R^2 by 4.3% from a mean of 13.5% to a mean of 17.8%, or by about 32%.

We also investigate the ability of *AQfactor* to explain returns by examining its contribution to the three-factor asset pricing model. This analysis provides evidence on whether *AQfactor* proxies for either

or both the size factor (*SMB*) or the book-to-market factor (*HML*), both of which have been shown to be incrementally relevant for asset pricing (Fama and French [1993]). We begin by estimating the three-factor model for each of the J=8,881 firms:

$$R_{j,m} - R_{F,m} = a_j + b_j(R_{M,m} - R_{F,m}) + s_j SMB_m + h_j HML_m + \varepsilon_{j,m} \tag{6}$$

Panel A reports the mean coefficient estimates and t-statistics for the three-factor pricing regressions. These results show that each of the factor loadings is highly significant, with t-statistics of 164.71 (*b*), 106.35 (*s*) and 23.53 (*h*). Together, the three factors explain an average of 18.9% of the total variation in the sample firms' excess returns. The remaining columns of Panel A report the mean coefficient estimates and t-statistics for regressions which include *AQfactor*:

$$R_{j,m} - R_{F,m} = a_j + b_j(R_{M,m} - R_{F,m}) + s_j SMB_m + h_j HML_m + e_j AQfactor_m + \varepsilon_{j,m} \tag{7}$$

The results show a mean estimate of $e > 0$, with a t-statistic of 44.72. Inspection of the incremental R^2's and the changes in the estimates of *b*, *s* and *h*, indicates that the significance of *AQfactor* comes both from additional explanatory power (the average adjusted R^2 increases from a mean of 18.9% to a mean of 20.8%) and from overlap with the other three factors. By far, the most significant overlap of *AQfactor* is with *SMB*, where the inclusion of *AQfactor* causes the average factor loading on *SMB* (*s*) to decline by 29%, from 0.90 to 0.64. The significant impact of *AQfactor* on *s* is consistent with Berk's [1995] conclusion that size factor loadings reflect misspecification and estimation errors of the asset pricing model. In particular, if the three-factor model is misspecified due to the exclusion of *AQfactor*, we would expect its inclusion to reduce the magnitude of the loading on *SMB*.

The results in Table 3 suggest that accruals quality plays a statistically and economically meaningful role in determining the cost of equity capital. To mitigate concerns that these findings are specific to the sample of firms used to calculate *AQfactor*, we repeat the one-factor and three-factor tests using the 20,878 publicly traded firms with at least 18 monthly returns during the period April 1971

through March 2002.[8] If firms with poor accruals quality have higher costs of capital, their excess returns should exhibit positive loadings on *AQfactor*. The results of these tests, reported in Panel B, Table 3, are, if anything, stronger than those reported in Panel A of this table. In particular, the CAPM tests show significant positive loadings on *AQfactor* (t-statistic = 100.51), with *AQfactor* contributing a mean incremental explanatory power of 4.1%, an increase of about 34% from the regression excluding *AQfactor*. The three-factor results show that *AQfactor* retains statistical significance in the presence of the other three factors (t-statistic = 53.02), and provides average incremental explanatory power of 2.1%, an increase of about 12% over the model excluding *AQfactor*. In addition, the factor loading on *SMB* decreases by 31% (from 0.83 to an average of 0.58) when *AQfactor* is included.

We interpret the results in Tables 2 and 3 as showing that accruals quality affects market perceptions of equity risk. The result that firms with poor quality accruals have larger costs of equity capital than firms with high quality accruals is consistent both with intuition and with predictions from Easley and O'Hara [2003], O'Hara [2003] and Leuz and Verrecchia [2004]. Furthermore, the loadings on the other variables change, sometimes substantially, when the accruals quality factor is added to the asset pricing model. Such coefficient changes indicate that an asset pricing model without an information quality factor is not fully specified (inducing misspecification bias on the coefficients); in particular, mere correlation between *AQfactor* and the other factors would not substantially change coefficient estimates.

5. The Pricing of Innate versus Discretionary Accruals Quality

The results in Tables 2 and 3 demonstrate that *total* accruals quality is priced by the market. In this section we test Hypothesis 2, which considers differential pricing effects for the innate versus discretionary components of accruals quality. Our tests use the two approaches described in section 2.3.2 to distinguish the innate and discretionary components of accruals quality.

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[8] This analysis is facilitated by the factor mimicking portfolio design which maps firm- and year-specific accruals quality values into month-specific excess returns, *AQfactor*. Because *AQfactor* is not firm-specific, it can be correlated with the excess returns of *any* firm, irrespective of whether the firm has data to calculate *AQ*.

Our perspective on the relation between accruals quality and costs of capital is that both the innate component and the discretionary component of accruals quality have the potential to influence costs of capital. In related work, Cohen [2003] explores whether a set of nine exogenous variables explains both reporting quality and its economic consequences.[9] He uses a two-stage regression approach, in which he first estimates the probability that reporting quality for a given firm is above the industry median and then tests for an association between this instrument for reporting quality and proxies for economic consequences. He finds reporting quality is associated with bid-ask spreads and analyst forecast dispersion, but not with his implied estimates of the cost of equity capital. While our sample period, data, variable selection and measurement, and research design differ considerably from his, both studies identify firm-specific variables that are intended to capture intrinsic influences on reporting outcomes.

5.1. Separating accruals quality into innate and discretionary components (Method 1)

DD identify five innate factors as affecting accruals quality: firm size (*Size*, measured as the log of total assets; our results are not sensitive to other measures of size, such as revenues), standard deviation of cash flow from operations ($\sigma(CFO)$), standard deviation of sales revenues ($\sigma(Sales)$), length of operating cycle (*OperCycle*, measured as the sum of days accounts receivable and days inventory) and incidence of negative earnings realizations (*NegEarn*). Following DD, we expect smaller firms, and firms with greater cash flow volatility, longer operating cycles, and a greater incidence of losses, to have poorer accruals quality. We measure each of these summary indicators on a firm-specific basis, using rolling 10-year windows (we require at least five observations in each window); results are not sensitive to the length of the window used to measure the innate factors. Descriptive statistics about the innate factors are reported in Table 1. The values of the indicators for our sample (1970-2001) are similar to those reported by DD for their sample (1987-1999). For example, our sample mean values are 4.80 for

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[9] Of the nine exogenous variables, two (firm size and operating cycle) are also included in the DD set. The other seven variables are number of shareholders, growth in sales, capital intensity, market share, leverage, gross margin percentage, and number of business segments, all industry-adjusted.

Size, 0.094 for $\sigma(CFO)$, 0.257 for $\sigma(Sales)$, 182 days for *OperCycle* , and 19.3% for *NegEarn* ; in

comparison, Dechow and Dichev report mean values of 5.50 for *Size*, 0.060 for $\sigma(CFO)$, 0.215 for

$\sigma(Sales)$, 141 days for *OperCycle* , and 10% for *NegEarn.*

Our first approach to identifying the components of accruals quality (Method 1) relies on annual

estimations of equation (8):

$$AQ_{j,t} = \lambda_0 + \lambda_1 Size_{j,t} + \lambda_2 \sigma(CFO)_{j,t} + \lambda_3 \sigma(Sales)_{j,t} + \lambda_4 OperCycle_{j,t} + \lambda_5 NegEarn_{j,t} + \mu_{j,t} \qquad (8)$$

where $\sigma(CFO_{j,t})$ = the standard deviation of firm j's CFO, calculated over the past 10 years,
$\quad \sigma(Sales)_{j,t}$ = the standard deviation of firm j's sales, calculated over the past 10 years,
$\quad OperCycle_{j,t}$ = the log of firm j's operating cycle,
$\quad NegEarn_{j,t}$ = the number of years, out of the past 10, where firm j reported *NIBE*<0.

The predicted values from (8) yield an estimate of the innate portion of firm j's accrual quality in year t,

$$InnateAQ_{j,t} = \hat{\lambda}_0 + \hat{\lambda}_1 Size_{j,t} + \hat{\lambda}_2 \sigma(CFO)_{j,t} + \hat{\lambda}_3 \sigma(Sales)_{j,t} + \hat{\lambda}_4 OperCycle_{j,t} + \hat{\lambda}_5 NegEarn_{j,t}.$$ The residual

from (8) is the estimate of the discretionary component of firm j's accrual quality, $DiscAQ_{j,t} = \hat{\mu}_{j,t}$.

Table 4, panel A reports the mean coefficient estimates from the annual regressions of equation

(8). The reported t-statistics are based on the time-series standard errors of the 32 coefficient estimates.

In all cases, we find the expected signs on the summary indicators of innate factors (i.e., all indicators but

Size are positively related to accruals quality, *Size* is negatively related), and all indicators are individually

significant in explaining accruals quality (with t-statistics, in absolute value, ranging from 12.38 to

24.38). The explanatory power of the summary indicators of innate factors averages 45% across the

yearly estimations.

Using the parameter estimates obtained from the annual regressions of (8), we calculate

InnateAQ and *DiscAQ* derived using Method 1. Unreported results show that the mean (median) value

of the innate component is 0.044 (0.037), compared to a zero mean (-0.003 median) value for the

discretionary component. The zero mean value of *DiscAQ* is expected, given that the discretionary

component is defined as the prediction error from (8). Because *AQ* is linear in accrual quality (with larger

values of *AQ* indicating poorer quality accruals), *DiscAQ* and *InnateAQ* are also linear in accruals quality. Hence, the negative median value of *DiscAQ* indicates that for the median firm, the discretionary component of accruals quality *increases* accruals quality. In unreported tests, we find that *DiscAQ* is negative for 58% of the observations; this percentage is reliably different from chance (50%) at the 0.001 level. On the whole, we believe these data are consistent both with Guay, Kothari and Watts' [1996] view and Subramanyam's [1996] evidence – that the expected net effect of discretion over accruals quality in broad samples that approximate the population will be to improve earnings as a performance measure – and with Healy's [1996] comment that panel data are likely to be heterogeneous with respect to how managers exercise their discretion over accruals.

As a validity test of Method 1's decomposition of total accruals quality into *InnateAQ* and *DiscAQ*, we investigate over time changes in each of these components. We expect that firms with poor quality that is driven by innate features of the business environment would find it more difficult to improve their situation than would firms where poor quality is driven by discretionary sources. We test this conjecture by examining the percentage year-to-year absolute change in *InnateAQ* and *DiscAQ*, holding the firm constant. Using a paired-sample test of these changes, we find that the average change in *DiscAQ* is significantly (at the 0.001 level) larger than the average change in *InnateAQ*. Specifically, the average change is 160 percentage points larger for discretionary than for innate (t-statistic = 105). These results are insensitive to whether we use raw rather than percentage change values (t-statistic is 151 for raw values). Overall, we view these results as supportive of Method 1's identification of the innate-discretionary partition.

5.2. Cost of capital effects of innate and discretionary accruals quality

Our first approach to distinguishing between the cost of capital effects of innate and discretionary accruals quality substitutes *InnateAQ* and *DiscAQ* for *AQ* in the original cost of capital regressions. Our second approach adds the summary indicators of innate factors as right hand side variables to the original cost of capital regressions. In both approaches, and for each cost of capital test, we continue to control for variables found by prior research to be associated with the cost of capital. Table 4 reports the results of

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estimating the main regression tests for the cost of debt (Panel B), industry-adjusted earnings-price ratios (Panel C), and firm-specific, three-factor, asset pricing regressions for all listed firms (Panel D). For brevity, we do not table the coefficient estimates on the summary indicators of innate factors under the second approach.

Turning first to the cost of debt tests, Panel B shows that under Method 2, the discretionary component of accruals quality has a significant pricing effect. Specifically, the decile rank regressions show a mean coefficient estimate on *AQ* of 0.08 (t-statistic = 9.93). This result suggests that firms with the best discretionary accruals quality enjoy 72 bp lower costs of debt than firms with the worst discretionary accruals quality.[10] Comparing these results with those for the total accruals quality metrics (reported in the columns labeled "Total"; these are identical to the results in Panel B, Table 2) shows that the cost of debt effects of discretionary accruals quality are about one-half of the total effects documented previously (0.08 versus 0.14). Since total *AQ* reflects both innate and discretionary effects, we interpret these results as not consistent with the null hypothesis of no difference in the pricing effects of innate versus discretionary accruals quality; rather, the results indicate that discretionary accruals quality has a weaker pricing effect than innate accruals quality.

The cost of debt effects of discretionary accruals quality are both smaller in magnitude and weaker in statistical significance under Method 1, which explicitly separates the innate component of accruals quality and therefore allows for direct comparisons. The mean coefficient estimate on *InnateAQ* is over six times as large as the mean coefficient on *DiscAQ* (i.e., 0.26 versus 0.04). Both are reliably different from zero (the t-statistic of *InnateAQ* is 13.11 and the t-statistic for *DiscAQ* is 6.92). Economically, the effect of innate accruals quality is to increase the cost of debt by about 234 bp between the highest and lowest innate accruals quality firms, while the effect of discretionary accruals quality is about 36 bp. The difference in innate versus discretionary pricing effects is significant at the 0.001 level

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[10] To maintain notational consistency with how we describe *AQ* in the rest of the paper, we continue to use the naming convention "best" ("worst") to describe the lowest (highest) values of *AQ* when discussing *discretionary AQ*. This does not indicate any priors on our part. As discussed previously, to the extent the performance subcomponent of discretionary accruals dominates, higher values of discretionary accruals can be associated with *lower* information asymmetry.

(tests not reported). These results indicate that investors attach a higher cost of debt to firms with poor accruals quality that is attributable to innate factors, relative to the cost of debt effects of discretionary accruals quality.

Tests based on industry-adjusted earnings-price ratios as the measure of cost of equity capital (Panel C) lead to similar inferences. Under Method 2, discretionary accruals quality has a positive coefficient that is smaller and less significant (estimate is 0.0008, with a t-statistic = 4.77) than is the coefficient on total accruals quality (estimate is 0.0013, t-statistic = 5.83). When both innate and discretionary components are included (Method 1), the coefficient on the innate component exceeds the coefficient on the discretionary component by a factor of four (0.0021 versus 0.0005, difference (not reported) significant at the 0.001 level). The t-statistic for the mean coefficient on the innate component equals 6.97, while the mean coefficient on the discretionary component exhibits weaker statistical significance (t-statistic = 3.00). Similar to the results in Panel B, the Panel C results reject the null hypothesis of no difference between the costs of capital effects of innate versus discretionary accruals quality, in favor of the view that the innate component of accruals quality is accorded a higher risk premium than is the discretionary component.

Results of firm-specific asset pricing regressions are reported in Panel D. For Method 2, we construct factor-mimicking portfolios for each innate factor, which we add to equation (7) as additional independent variables. For Method 1, we construct factor-mimicking portfolios for *InnateAQ* and *DiscAQ*, which we substitute for *AQfactor* in equation (7). We estimate these augmented equations for the 20,878 firms with at least 18 monthly returns. We obtain similar results (not reported) if we restrict the analysis to 8,881 firms with data on the *AQ* variables, or if we use the CAPM as the base model. Both methods of distinguishing *DiscAQ* produce reliably (at the 0.001 level) positive loadings on the accrual quality factors: under Method 1, the coefficient estimate on innate *AQfactor* is 0.23 (t-statistic = 52.20) and the coefficient estimate on discretionary *AQfactor* is 0.10 (t-statistic = 8.94); under Method 2, the discretionary component has a mean factor loading of 0.09 (t-statistic = 3.98). For both methods, the coefficient on discretionary *AQfactor* is reliably smaller (at the 0.001 level, not reported) than the

respective coefficient estimate on total *AQfactor* or on innate *AQfactor*. Although it is not straightforward to interpret differences in factor loadings on the innate and discretionary components under Method 1 (because the factor itself changes), we observe that the loading on discretionary *AQ* is about one-half the loading on innate AQ; this difference is significant at the 0.001 level (not reported).

5.3. Summary

We draw the following inferences from the results in Table 4. Summary indicators (size, standard deviation of cash flows, standard deviation of sales revenues, operating cycle, and frequency of negative earnings) of innate operating and environmental factors explain a significant portion of accruals quality. We interpret this result as indicating that a substantial portion of total accruals quality is innate, in the sense that it is attributable to business models and operating environments, as opposed to discretionary (attributable to accounting policy choice, implementation decisions, and estimation errors). We also find that a larger-than-chance fraction of firms have negative values of our discretionary accruals measures; this pattern is consistent with Guay, Kothari and Watts' view that, in broad samples over long time periods, managers will tend to use accruals to improve earnings as a performance signal. Finally, we find that innate accruals quality is reliably priced (over and above cost of capital determinants identified by prior research) and that the discretionary component of accruals quality has significantly smaller pricing effects. This result is inconsistent with the view that the source of information risk is a matter of indifference to investors; rather, our results suggest that the information uncertainty measured by innate accruals quality has stronger cost of capital consequences than does the discretionary component. We speculate that this result is at least partly due to the commingling of discretionary accruals quality effects that are opportunistic (hence, information-risk-increasing) and discretionary accruals effects that reflect management's attempts to make earnings more informative (hence, information-risk-decreasing); disentangling these effects would require a different sample and different research design than the one we use.

6. Additional Tests

In this section, we summarize the results of several sensitivity tests (section 6.1), and we describe two supplemental tests. The first supplemental test investigates whether changes in accruals quality are predictably associated with changes in the proxies for costs of capital (section 6.2); the second examines the relation between our findings and the accruals anomaly (section 6.3).

6.1. Sensitivity tests

We examine the sensitivity of our results to several methodological choices or concerns: estimation procedures, variable specification, skewness, and alternative proxies for accruals quality. With respect to estimation procedure, we repeat our tests using pooled time-series, cross-sectional regressions. For these tests, we control for heteroscedasticity and autocorrelation by assessing statistical inference using Newey-West [1987] standard errors. The pooled results (not reported) are similar in all respects to the annual results. With respect to variable specification, we repeat our tests replacing the decile rank values of *AQ* with the raw values of this variable. Results for the raw regressions (not reported) are similar in all respects to those reported. With respect to skewness, we investigate whether the results are robust to the exclusion of firms in the worst accruals quality quintile. Although the magnitude of the cost of capital effects are smaller when we exclude observations in Q5 (not reported), all results and differences remain statistically significant. Finally, with respect to alternative proxies, we repeat our tests using four other proxies for accruals quality (the calculations of these proxies are detailed in the Appendix). While the results for proxies based on the absolute value of abnormal accruals generally show smaller cost of capital effects than do proxies based on the standard deviation of residuals (not reported), all results and differences are statistically significant.

6.2. Changes in accruals quality and changes in costs of capital

To augment the cross-sectional tests of total accruals quality detailed in section 4, we investigate whether the *change* in a firm's accruals quality is positively correlated with the *change* in its costs of capital. While this test controls for firm-specific factors that are constant over time, it has lower power (relative to the cross-sectional levels tests) because of the over-time variation in *AQ*. We first divide the

sample period into six intervals, T=1,2,…6, corresponding to the following sub-periods: 1970-75, 1976-80, 1981-85, 1986-90, 1991-95, and 1996-2001. For each sub-period, we calculate firm j's mean value of *AQ* (we require at least three observations to calculate the mean; results are not sensitive to this choice). We then take the difference in firm j's mean value of *AQ* between T and T-2; we exclude T-1 from the comparison to avoid overlap with the interval used to calculate *AQ*. We also calculate the mean change in each of firm j's cost of capital proxies between T and T-2: $\Delta CostDebt_j$, $\Delta IndEP_j$ and $\Delta Beta_j$. Because these tests require data for both period T and period T-2, the number of observations is smaller than in the previous tests: $\Delta CostDebt_j$ (n=3,193), $\Delta IndEP_j$ (n=2,920) and $\Delta Beta_j$ (n=3,698).

Our tests regress the change in each cost of capital measure on the change in *AQ*. The results show significant positive correlations for all cost of capital measures: t-statistics are 2.33 for $\Delta Beta_j$, 4.35 for $\Delta IndEP_j$, and 5.65 for $\Delta CostDebt_j$. We conclude from these results that the cross-sectional finding – that accruals quality is priced by the market – is robust to an alternative research design which holds the firm constant and correlates over-time changes in accruals quality with contemporaneous changes in costs of capital.

6.3. Comparison with Sloan [1996]

Our final analysis of the pricing of total accruals quality explores the relation between our findings and those documented in Sloan [1996] concerning the accruals anomaly. Our beta regressions (Table 2, panel A) are similar in appearance to some of the accruals anomaly tests in Sloan [1996, Table 6]. Specifically, we sort firms into quintiles based on accruals quality and regress quintile returns on excess market returns; Sloan sorts firms into deciles based on signed total accruals and regresses signed-accrual decile returns on excess market returns. However, we believe that Sloan's tests and ours are substantively unrelated. First, Sloan's interest is in the regression intercept ("Jensen's alpha"), a measure of the unexpected return. In contrast, our interest is in the slope coefficient ("beta"), a measure of the expected return, i.e., the cost of capital. Second, the accrual quality effects we document are predicated on over-time variability of accrual mappings into cash flows, or, in the sensitivity checks reported in

section 6.1, on absolute abnormal accruals. Neither of these constructs maps directly into the signed accruals or signed abnormal accruals which are the basis for accruals anomaly. Further, even if such a mapping existed, our asset pricing results are robust to controls for size and book-to-market factors, which Fama and French [1996] show capture value-glamour strategies, such as cash flow-to-price, which in turn has been shown by Desai, Rajgopal and Venkatachalam [2003] to capture most or all of the accruals anomaly.

To test whether our results are empirically related to Sloan's results, we perform portfolio tests similar to his. Specifically, we go long in the top decile of total accruals and short in the bottom total accruals decile. We then test to see whether the intercept (the measure of the accruals anomaly) of this total accruals 'hedge' portfolio is eliminated when we add *AQfactor* to the model of expected return (similar to equation (7), except the dependent variable is the return to the accruals hedge portfolio). The results (not reported) show that the intercept is only marginally affected. We conclude that our results are largely unrelated to the accruals anomaly.

7. Conclusions

We find that investors price securities in a manner that reflects their awareness of accruals quality: lower quality accruals are associated with higher costs of debt, smaller price multiples on earnings, and larger equity betas. Moreover, accruals quality loads as a separate factor in explaining variation in excess returns in both one-factor and three-factor asset pricing regressions. Our results are consistent across securities (debt and common equity), estimation procedures (pooled regressions and annual regressions), variable specification (raw and decile), research design (cross-sectional levels versus over-time changes), and proxies for accruals quality (standard deviation of residuals from Dechow-Dichev type models and absolute values of abnormal accruals), and are robust to the inclusion of control variables known to affect costs of capital.

We also assess the separate costs of capital effects of the innate and discretionary components of accruals quality. Using two distinct approaches to isolate the discretionary portion of accruals quality, we

reject the hypothesis that discretionary accruals quality and innate accruals quality have indistinguishable costs of capital effects, in favor of the view that the discretionary component of accruals quality, on average, has a significantly smaller pricing effect than the innate component of accruals quality. The latter result, when interpreted in the context of our broad samples, is consistent with heterogeneity among firms with respect to discretionary accruals (Guay, Kothari and Watts [1996], Subramanyam [1996]). While many managers use discretionary accruals to improve the reporting of the underlying economics (decreasing information uncertainty), previous research on earnings management has also documented how managers, in some time periods, make accounting choices and implementation decisions that reduce accruals quality (increasing information uncertainty). We do not attempt to segment our sample along lines that would allow us to explore the firm- and time-specific operation of specific incentives to engage in accruals-quality-decreasing behaviors. For example, managers compensated with stock options have incentives to increase volatility during the expected lives of their options, so as to increase the options' value. Since the firm's cost of capital can be viewed as a proxy for the volatility of returns, the existence of stock options provides an incentive for managers to take actions which increase the cost of capital, even though such increases impose costs on the firm.

Finally, our broad-sample evidence supports the view that the capital market consequences of differences in accruals quality arise because accruals quality proxies for information risk, a risk factor that cannot be diversified away in equilibrium (Easley and O'Hara [2003]; O'Hara [2003]; Leuz and Verrecchia [2004]). In contrast to other firm characteristics that have been shown by prior research to empirically predict cross-sectional differences in costs of capital, notably size and the book-to-market ratio, accruals quality maps into a theoretically grounded cost of capital determinant: information risk.

Appendix: Alternative Proxies for Accruals Quality

In addition to $AQ_{j,t} = \sigma(\upsilon_j)_t$, we considered four other proxies for accruals quality, two based on the standard deviation of residuals from Dechow-Dichev regressions, and two based on measures of absolute abnormal accruals. In this Appendix, we detail our calculations of these four proxies.

The first additional proxy is the standard deviation of residuals from an (unmodified) Dechow-Dichev model estimated annually for each of Fama and French's [1997] 48 industry groups with at least 20 firms in year t. The model regresses total current accruals in year t on lagged, current, and future cash flows from operations (this unmodified regression excludes the change in revenues and PPE as independent variables). Accruals quality is captured by the standard deviation of firm j's annual residuals from these regressions, $\upsilon_{j,t}$, calculated over years t-4 through t, $AQ_{j,t} = \sigma(\upsilon_j)_t^{Unmodified}$.

Our second additional accruals quality metric is based on firm-specific time-series estimations of the (unmodified) Dechow-Dichev model. For each firm j and year t, we estimate the relation between current accruals and past, current and future cash flows using the most recent 12 years of data; this estimation yields 10 values of the residual for each firm. $AQ_{j,t} = \sigma(\upsilon_j)_t^{Firm-Specific}$ is the standard deviation of the resulting 10 firm-specific residuals.

Our third additional metric is the absolute value of abnormal accruals generated by the modified Jones (1991) approach. We estimate the following cross-sectional regression for each of the Fama-French 48 industry groups with at least 20 firms in year t.

$$\frac{TA_{j,t}}{Asset_{j,t-1}} = \kappa_1 \frac{1}{Asset_{j,t-1}} + \kappa_2 \frac{\Delta Rev_{j,t}}{Asset_{j,t-1}} + \kappa_3 \frac{PPE_{j,t}}{Asset_{j,t-1}} + \varepsilon_{j,t} \qquad (A1)$$

The industry- and year-specific parameter estimates obtained from equation (A1) are used to estimate firm-specific normal accruals (*NA*) as a percent of lagged total assets:

$NA_{j,t} = \hat{\kappa}_1 \frac{1}{Asset_{j,t-1}} + \hat{\kappa}_2 \frac{(\Delta Rev_{j,t} - \Delta AR_{j,t})}{Asset_{j,t-1}} + \hat{\kappa}_3 \frac{PPE_{j,t}}{Asset_{j,t-1}}$, where $\Delta AR_{j,t}$ = firm j's change in accounts

receivable (Compustat #2) between year t-1 and year t, and to calculate abnormal accruals (*AA*) in year t,

$AA_{j,t} = \dfrac{TA_{j,t}}{Asset_{j,t-1}} - NA_{j,t}$. The absolute value of the resulting measure of abnormal accruals is our third

additional proxy for accruals quality, $AQ_{j,t} = \left| AA_{j,t} \right|$, with larger values of $\left| AA_{j,t} \right|$ indicating poorer

accruals quality.

      To obtain our fourth additional accruals quality metric, we extend the modified Jones abnormal

accruals measure in two ways. First, we include the change in accounts receivable in the estimation of

normal accruals:

$$\frac{TA_{j,t}}{Asset_{j,t-1}} = \kappa_1^{Adj} \frac{1}{Asset_{j,t-1}} + \kappa_2^{Adj} \frac{(\Delta Rev_{j,t} - \Delta AR_{j,t})}{Asset_{j,t-1}} + \kappa_3^{Adj} \frac{PPE_{j,t}}{Asset_{j,t-1}} + \varepsilon_{j,t}^{Adj} \tag{A2}$$

We include the change in accounts receivable in the estimation of normal accruals because not doing so

produces abnormal accruals values which are not centered on zero when the mean ΔAR is not zero. In

particular, the mean ΔAR will be positive for firms that are growing; a positive ΔAR implies that normal

accruals will be under-stated by the modified Jones approach, leading to positive mean AA's. The

resulting measures of adjusted normal accruals and adjusted abnormal accruals are:

$$NA_{j,t}^{Adj} = \hat{\kappa}_1^{Adj} \frac{1}{Asset_{j,t-1}} + \hat{\kappa}_2^{Adj} \frac{(\Delta Rev_{j,t} - \Delta AR_{j,t})}{Asset_{j,t-1}} + \hat{\kappa}_3^{Adj} \frac{PPE_{j,t}}{Asset_{j,t-1}} \text{ and}$$

$AA_{j,t}^{Adj} = \dfrac{TA_{j,t}}{Asset_{j,t-1}} - NA_{j,t}^{Adj}$. The second extension adjusts the resulting abnormal accruals by

performance-matching (Kothari, Leone and Wasley [2004]; McNichols [2000]). Specifically, we

partition the sample firms in each industry into deciles based on the firm's prior year return on assets

(*ROA*) defined as net income before extraordinary items divided by beginning of year total assets.

Performance-adjusted accruals are calculated as the difference between firm j's metric and the median

metric for its industry *ROA* decile, where the median calculation excludes firm j. Our fourth additional

measure of accruals quality is the absolute value of the resulting adjusted, performance-matched abnormal

accrual, $\left| AA_{j,t}^{Adj\&PM} \right|$.

Table 1
Summary Financial Information About the Sample Firms, 1970-2001

Variable	mean	10%	25%	median	75%	90%
AQ	0.0442	0.0107	0.0179	0.0313	0.0558	0.0943
Financial variables:						
Market value of equity ($mils)	1206.6	4.7	14.3	64.2	374.8	1702.1
Assets ($mils)	1283.5	8.5	25.6	102.0	511.3	2333.6
Sales ($mils)	1240.1	8.9	30.7	127.6	575.2	2297.8
ROA	0.003	-0.101	0.005	0.042	0.076	0.114
Market to book ratio	2.02	0.44	0.77	1.32	2.29	4.07
CostDebt	0.099	0.059	0.074	0.092	0.114	0.144
Leverage	0.276	0.010	0.109	0.248	0.381	0.520
$\sigma(NIBE)$	0.065	0.011	0.020	0.038	0.077	0.151
Earnings-price ratio	0.089	0.026	0.047	0.073	0.114	0.166
IndEP	0.008	-0.045	-0.022	0.001	0.027	0.062
Sales growth	0.193	0.018	0.067	0.126	0.220	0.403
Growth (in book value of equity)	1.056	0.657	0.805	0.961	1.198	1.586
Innate factors explaining accruals quality:						
Size (log of total assets)	4.805	2.138	3.241	4.625	6.237	7.755
$\sigma(CFO)$	0.094	0.029	0.045	0.073	0.118	0.181
$\sigma(Sales)$	0.257	0.068	0.118	0.199	0.326	0.507
OperCycle	182	48	78	123	180	251
log(OperCycle)	4.707	3.866	4.362	4.810	5.191	5.527
NegEarn	0.193	0.000	0.000	0.100	0.300	0.600

Sample description and variable definitions: The sample contains 91,280 firm-year observations over t=1970-2001 with Compustat data to calculate *AQ* in any year. *AQ* = standard deviation of firm j's residuals, from years t-4 to t from annual cross-sectional estimations of the modified Dechow-Dichev (2002) model. *ROA* = return on assets; *CostDebt* = interest expense in year t+1 divided by average interest bearing debt in years t and t+1; *Leverage* = total interest bearing debt to total assets; $\sigma(NIBE)$ = standard deviation of firm j's net income before extraordinary items; *IndEP* = industry-adjusted EP ratio, equal to firm j's earnings-price ratio less the median earnings-price ratio of its industry; sales growth = year-to-year percentage change in sales; *Growth* = log of 1 plus the percentage change in the book value of equity; $\sigma(CFO)$ = standard deviation of cash flow from operations; $\sigma(Sales)$ = standard deviation of sales; *OperCycle* = firm j's operating cycle; *NegEarn* = incidence of negative earnings over the past 10 years.

Table 2
Tests of the Association Between Accruals Quality and
Proxies for the Costs of Debt and Equity Capital, 1970-2001

Panel A: Mean values of cost of debt, industry-adjusted EP ratios, and beta by AQ quintiles[a]

| Variable | AQ Quintile (1=High AQ score; 5 Low AQ score) | | | | | Q5-Q1 | |
	Q1	Q2	Q3	Q4	Q5	Diff.	t-stat.
CostDebt	8.98	9.49	9.71	10.08	10.77	1.79	10.10
IndEP	0.0048	0.0032	0.0076	0.0091	0.0140	0.0093	4.37
Beta	0.92	1.02	1.08	1.14	1.27	0.35	6.75

Panel B: Means of annual regressions of cost of debt on accruals quality, with controls[b]

Indep. var.	coef.est.	t-stat
Leverage	-2.50	-9.76
Size	-0.01	-0.55
ROA	-1.65	-5.02
IntCov	-0.02	-5.24
σ(NIBE)	5.44	12.35
AQ	0.14	13.36

Panel C: Means of annual regressions of industry-adjusted EP ratio on accruals quality, with controls[c]

Indep. var.	coef.est.	t-stat
Growth	-0.0027	-2.00
Beta	-0.0043	-2.74
Leverage	0.0097	2.55
Size	-0.0009	-1.67
AQ	0.0013	5.83

Sample description and variable definitions: See Table 1 for variable definitions. The sample used in the cost of debt tests (Panels A and B) contains 76,195 observations over 1970-2001. The sample used in the earnings-price ratio tests (Panels A and C) contains 55,092 firm-year observations over t=1970-2001. The sample used to calculate betas consists of 8,881 firms with at least 18 monthly returns and data on *AQ*.

[a] The first two rows of Panel A show the mean cost of debt and mean industry-adjusted earnings-price ratio for each AQ quintile. The third row shows the portfolio beta for each AQ quintile, where *Beta* is calculated by regressing each quintile's monthly excess return on the monthly excess market return, for the period April 1971 to March 2002. The columns labeled "Q5-Q1" show the difference in the mean values between the worst (Q5) and best (Q1) accruals quality quintiles, along with t-statistics of whether the difference is zero.

[b] Panel B (Panel C) reports the mean results of estimating annual relations between firm j's cost of debt (industry-adjusted earnings-price ratio) and the decile rank value of *AQ*, controlling for other factors known to affect the cost of debt (industry-adjusted earnings-price ratio). T-statistics are based on the time-series standard errors of the 32 coefficient estimates.

Table 3
Asset Pricing Tests of the Association Between
Future Stock Returns and Accruals Quality, 1971-2002

Panel A: Firm-specific cost-of-capital regressions (n=8,881 firms with AQ values and returns data)[a]

	Base model: CAPM				Base model: 3-factor			
	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat
$R_M\text{-}R_F$	1.04	174.57	0.83	146.19	0.95	164.71	0.90	154.48
SMB	-	-	-	-	0.90	106.35	0.64	69.59
HML	-	-	-	-	0.21	23.53	0.30	34.42
AQfactor	-	-	0.47	83.48	-	-	0.28	44.72
Adj. R^2	0.135		0.178		0.189		0.208	
Inc R^2			0.043				0.019	

Panel B: Firm-specific cost-of-capital regressions (n=20,878 firms with returns data)[b]

	Base model: CAPM				Base model: 3-factor			
	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat
$R_M\text{-}R_F$	0.99	178.24	0.77	147.33	0.91	162.08	0.86	150.77
SMB	-	-	-	-	0.83	108.00	0.58	63.40
HML	-	-	-	-	0.21	24.22	0.32	36.24
AQfactor	-	-	0.46	100.51	-	-	0.29	53.02
Adj. R^2	0.120		0.161		0.173		0.195	
Inc R^2			0.041				0.021	

Sample description and variable definitions: The sample used in Panel A consists of 8,881 firms with data on AQ and with at least 18 monthly stock returns between April 1971 and March 2002. The sample used in Panel B consists of 20,878 firms with at least 18 monthly stock returns between April 1971 and March 2002. Variable definitions: $R_M - R_F$ = excess return on the market portfolio; SMB = return to size factor-mimicking portfolio; HML = return to book-to-market factor-mimicking portfolio; AQfactor = the return to the accruals quality factor-mimicking portfolio for AQ.

[a] Panel A reports the average coefficient estimates across the J=8,881 firm-specific estimations of the one-factor and 3-factor asset pricing models. For each of these base models, we also report coefficient estimates for regressions which include AQfactor .

[b] Panel B reports similar information as Panel A, except these results are based on the J=20,878 firms with at least 18 monthly returns

Table 4
Tests of the Cost of Capital Effects of the Innate and Discretionary
Components of Accruals Quality, 1970-2001

Panel A: Mean results of annual regressions of AQ on innate factors[a]

	coef.est.	t-stat
Size	-0.0022	-14.18
$\sigma(CFO)$	0.1888	24.38
$\sigma(Sales)$	0.0250	12.38
log(OperCycle)	0.0035	12.47
NegEarn	0.0335	17.96
Adj. R^2	0.450	

Panel B: Mean results of annual regressions of cost of debt on accruals quality, with controls[b]

		Total		Method 1		Method 2	
Indep. var.		coef.est.	t-stat	coef.est.	t-stat	coef.est.	t-stat
Leverage		-2.50	-9.76	-2.64	-9.83	-2.87	-11.67
Size		-0.01	-0.55	0.11	4.15	0.04	1.73
ROA		-1.65	-5.02	-1.73	-5.34	-1.52	-4.89
IntCov		-0.02	-5.24	-0.02	-5.06	-0.01	-4.54
$\sigma(NIBE)$		5.44	12.35	1.10	1.62	-1.68	-2.87
AQ	Total	0.14	13.36	--	--	--	--
Method 1:	Innate	--	--	0.26	13.11	--	--
	Disc	--	--	0.04	6.92	--	--
Method 2:	Disc	--	--	--	--	0.08	9.93

Panel C: Mean results of annual regressions of industry-adjusted EP ratios on accruals quality, with controls[c]

		Total		Method 1		Method 2	
Indep. var.		coef.est.	t-stat	coef.est.	t-stat	coef.est.	t-stat
Growth		-0.0027	-2.00	-0.0032	-2.26	-0.0046	-3.53
Beta		-0.0043	-2.74	-0.0056	-3.85	-0.0047	-3.25
Leverage		0.0097	2.55	0.0077	2.06	0.0088	2.23
Size		-0.0009	-1.67	0.0005	0.86	-0.0004	-0.75
AQ	Total	0.0013	5.83	--	--	--	--
Method 1:	Innate	--	--	0.0021	6.97	--	--
	Disc	--	--	0.0005	3.00	--	--
Method 2:	Disc	--	--	--	--	0.0008	4.77

Panel D: Mean results of firm-specific cost-of-capital regressions, 3-factor model (n=20,878 firms)[d]

		Total		Method 1		Method 2	
		coef.est.	t-stat	coef.est.	t-stat	coef.est.	t-stat
R_M-R_F		0.86	150.77	0.88	148.84	0.89	107.18
SMB		0.58	63.40	0.59	63.62	0.58	53.24
HML		0.32	36.24	0.32	34.65	0.27	24.15
AQfactor	Total	0.29	53.02	--	--	--	--
Method 1:	Innate	--	--	0.23	52.20	--	--
	Disc	--	--	0.10	8.94	--	--
Method 2:	Disc	--	--	--	--	0.09	3.98

Sample definition and variable definitions: Under Method 1, *InnateAQ* is the predicted values obtained from the annual parameter estimates and firm j's reported values of the innate factors; *DiscAQ* is the residual. Under Method 2, *DiscAQ* is the coefficient on (total) *AQ*, including the innate factors as control variables. See Table 1 for other definitions.

[a] Panel A reports the mean values of the 32 annual coefficient estimates obtained from regressions of *AQ* on the innate factors. T-statistics are based on the standard errors of the 32 coefficient estimates.

[b] Panel B reports the mean results of estimating annual relations between firm j's cost of debt and the decile rank value of *AQ*, controlling for other factors known to affect the cost of debt. The columns labeled "Total" show the results including (total) *AQ* in the regressions; these results are identical to those shown in Tables 2 and 3. The columns labeled "Method 1" show results where we substitute the estimates of the innate and discretionary components of accruals quality (*InnateAQ* and *DiscAQ*) for *AQ* in the cost of debt regression. The columns labeled "Method 2" shows results where we include the innate factors in the cost of debt regression.

[c] Panel C reports similar information as Panel B, except that the focus is on the cost of equity, as proxied by industry-adjusted earnings-price ratios.

[d] Panel D reports similar information as Panel B, except that the focus is on the cost of equity, as captured by factor loadings on *AQfactor* in regressions of realized returns on the market risk premium, *SMB*, *HML* and *AQfactor*. The sample used in Panel D consists of 20,878 firms with at least 18 monthly stock returns between April 1971 and March 2002.

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