Accrual Reliability, Earnings Persistence and Stock Prices*

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Abstract

This paper extends the work of Sloan (1996) by linking accrual reliability to earnings persistence. We construct a model showing that less reliable accruals lead to lower earnings persistence. We then develop a comprehensive balance sheet categorization of accruals and rate each category according to the reliability of the underlying accruals. Empirical tests generally confirm that less reliable categories of accruals lead to lower earnings persistence and that investors do not fully anticipate the lower earnings persistence, leading to significant security mispricing. We conclude that there are significant costs associated with the recognition of unreliable information in financial statements.

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1. Introduction

This paper investigates the relation between accrual reliability and earnings persistence. The paper builds on the work of Sloan (1996), who shows that the accrual component of earnings is less persistent than the cash flow component of earnings and attributes this difference to the greater subjectivity of accruals. We draw a natural link between Sloan's notion of subjectivity and the well-known accounting concept of reliability. We formally model the implications of reliability for earnings persistence, with our model predicting that less reliable accruals result in lower earnings persistence. Our empirical tests employ a comprehensive categorization of accounting accruals in which each accrual category is rated according to its reliability. Consistent with the predictions of our model, the empirical tests generally confirm that less reliable accruals lead to lower earnings persistence.

Our paper makes three significant contributions to the existing literature. First, we directly link reliability to empirically observable properties of accounting numbers. Reliability, along with relevance, is considered to be one of the two primary qualities that make accounting information useful for decision-making.[1] While a large body of research examines the value relevance of accounting numbers, there is relatively little research on reliability. One consequence of the emphasis on relevance has been calls for the recognition of more relevant and less reliable information in accounting numbers (e.g., Lev and Sougiannis, 1996). However, as recently articulated by Watts (2003), allowing less verifiable and hence less reliable estimates into accounting numbers can

[1] For example, see Figure 1 in *Statement of Financial Accounting Concepts 2*, "Qualitative Characteristics of Accounting Information" (Financial Accounting Standards Board, 2002).

seriously compromise their usefulness. Our research highlights the crucial trade-off between relevance and reliability. The recognition of less reliable information in accounting numbers introduces measurement error that reduces earnings' persistence. Moreover, our stock price tests indicate that investors do not fully anticipate the lower persistence of less reliable earnings, leading to significant security mispricing.

A second major contribution of our work is to provide a comprehensive definition and categorization of accruals. Following Healy (1985), a large body of research has employed a narrow definition of accruals that focuses on current operating accruals. Long-term operating accruals, such as capitalized software development costs and capitalized expenditures on plant and equipment, are ignored under Healy's definition. Ignoring such accruals results in noisy measures of both accruals and cash flows (because cash flows are typically computed as the difference between earnings and accruals). Our evidence indicates that many of the accruals that are omitted from Healy's definition are of low reliability, suggesting that accruals-based research should incorporate these omitted accruals.

Along similar lines, our analysis also provides a reinterpretation of the results in Fairfield, Whisenant and Yohn (2003a). Fairfield et al. show that Sloan's (1996) accrual results extend to growth in long-term net operating assets. Based on this evidence, they conclude that Sloan's findings are not unique to accruals, but are a special case of a more general growth anomaly. In contrast, we point out that long-term operating assets and liabilities are also accounting accruals and we show that the effect of these accruals on earnings persistence is related to their reliability. As such, the results documented by

Fairfield et al. can be interpreted as a natural extension of Sloan's accrual anomaly rather than a more general growth anomaly.[2]

The third major contribution of our work is to corroborate and extend Sloan's findings regarding the mispricing of the accrual component of earnings. Sloan shows that investors act as if they do not anticipate the lower persistence of the accrual component of earnings, resulting in significant security mispricing. We corroborate and extend Sloan's results in two ways. First, we develop a more comprehensive definition of accruals than Sloan and show that it is associated with even greater mispricing. Second, we show that both the persistence of earnings and the extent of the associated mispricing are directly related to the reliability of the underlying accruals.

The remainder of the paper is organized as follows. The next section develops our research design. Section 3 describes our data, section 4 presents our results and section 5 concludes.

2. Research Design

Our research design builds on Sloan (1996), who argues that the key difference between the accrual and cash flow components of earnings is that the accrual component involves a greater degree of subjectivity. The accrual component of earnings typically incorporates estimates of future cash flows, deferrals of past cash flows, allocations and valuations, all of which involve higher subjectivity than simply measuring periodic cash

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[2] Fairfield et al. argue that their more general growth anomaly is likely attributable to conservative accounting or diminishing returns to scale rather than features of accruals, such as their susceptibility to manipulation. In related research (Richardson et al., 2004), we show that Fairfield et al.'s results cannot be explained by conservative accounting or diminishing returns to scale, but present evidence that they are consistent with accrual manipulation.

flows. This leads Sloan to reason that when the accrual component of earnings is unusually high or low, earnings will be less persistent.

We begin in section 2.1 by formalizing Sloan's intuition and linking it to the accounting construct of reliability. Section 2.2 reconsiders the standard definition of accruals and proposes a new and more comprehensive definition. Finally, section 2.3 provides our categorization of accruals and our assessment of the relative reliability of each accrual category.

2.1 A Model of Accrual Reliability and Earnings Persistence

Sloan argues that the key factor driving the different properties of the accrual and cash flow components of earnings is the greater subjectivity involved in the estimation of accruals. Accountants more typically refer to the degree of subjectivity involved in an accounting measurement in terms of the verifiability of that measurement. For example, the Financial Accounting Standard Board's (FASB) Statements of Financial Accounting Concepts (SFAC) defines verifiability as:

> "The ability through consensus among measurers to ensure that information represents what it purports to represent or that the chosen method of measurement has been used without error or bias." [SFAC 2, Glossary of Terms]

Verifiability, along with representational faithfulness, provides the basis for the key accounting quality of reliability, defined by the FASB as:

> "The quality of information that assures that information is reasonably free from error and bias and faithfully represents what it purports to represent." [SFAC 2, Glossary of Terms]

Accrual accounting can provide more relevant information to investors. However, it can also introduce error and bias, resulting in less reliable information. Maximizing the usefulness of accrual accounting information therefore involves a trade-off between relevance and reliability (see SFAC 2, paragraph 42). A large body of accounting literature has evaluated accounting information on the basis of the relevance criterion (see Holthausen and Watts, 2001). However, relatively little attention has been given to evaluating accounting information on the basis of the reliability criterion. Given the one-sided nature of research in this area, it is perhaps not surprising that some researchers and regulators have called for more value-relevant and less verifiable estimates to be incorporated into accounting numbers (see Watts, 2003 for examples). However, as articulated by Watts (2003), researchers and regulators who propose the recognition of unverifiable estimates in financial reports should consider the costs generated by their proposals. We examine one such cost. Following Sloan (1996), we examine the implications of accrual reliability for the persistence of earnings.

We model the impact of accrual reliability on the persistence of earnings using standard errors-in-variables analysis. The primary role of earnings is to measure the periodic financial performance of an enterprise (see SFAC 1, paragraph 43). We denote the underlying periodic performance of the enterprise as E^*. It is well established that competitive forces result in the dissipation of economic rents, and that this is expected to result in the mean reversion of financial performance (e.g., Palepu, Healy and Bernard, 2000). Thus, even in the absence of reliability issues, we expect financial performance (deflated by an appropriate measure of invested capital) to follow a mean reverting process:[3]

$$E^*_{t+1} = \gamma E^*_t + \varepsilon_{t+1} \quad (1)$$

where $0<\gamma<1$ and greater competition implies lower values of γ.

We can make the definition of underlying 'economic' earnings, E^*, more concrete by considering the special case in which the cash consequences of a business's transactions and events all occur during a single performance measurement interval. Such a situation would arise when the operating and investing cycles of the business are very short. In this case, the net cash receipts of the business provide a completely reliable representation of periodic performance. Denoting the net cash receipts as C, this special case therefore results in:

$$E^* = C \quad (2)$$

Next, we introduce the more realistic situation in which the actual cash receipts and disbursements occur in different periods from the underlying transactions and events that generate them. In this case E^* does not necessarily equal C and accounting accruals are introduced in order to provide a better measure of periodic performance than periodic net cash receipts. Accrual accounting involves the accrual and deferral of past, current and anticipated future cash receipts and disbursements. However, earnings measured using accrual accounting are not expected to perfectly coincide with E^* for two reasons. First, accruals and deferrals relating to future economic benefits that cannot be measured with sufficient reliability are disallowed under GAAP (e.g., immediate expensing of

[3] For expositional ease, our model reverts E^* toward a mean of zero. The analysis is easily adapted to non-zero mean by redefining E^* as the deviation from the long-run mean performance. Our empirical analysis allows for a non-zero mean through the inclusion of an intercept in the regression.

R&D costs). This results in an omitted variable problem that is not explored in this paper.[4] Second, many accruals required by GAAP measure the future economic benefits of current period events and transactions with error. It is the latter scenario that serves as the focus of this paper.

As an example of this second situation, consider the recognition of sales revenue. If cash sales are made for $100 (with no returns allowed and no after sales service), then it is straightforward to book $100 of revenue in current period earnings. But if the sales are credit sales for $110, of which $100 ultimately ends up being collected as cash in the next period, uncertainty exists about the amount to record in current period earnings. An aggressive manager could book sales of $110, representing an error of +10 in current period accruals and earnings. Conversely, a conservative manager could book sales of $90, representing an error of –10 in current period accruals and earnings. This results in an errors-in-variables problem in accruals, because observed accruals are noisy measures of the future benefits or obligations that they represent. Note that while we characterize the errors as resulting from aggressive and conservative accounting respectively, we do not mean to imply that all errors result from intentional earnings management. They could also result from the neutral application of GAAP (e.g., a one-off gain from a LIFO

[4] The omission of a relevant variable results in biased coefficient estimates on the included variables when the omitted variable is correlated with the included variables. However, we have no reason to believe that any omitted accruals would differentially bias the cash flow and included accrual components of earnings. Penman and Zhang (2002) provide evidence of predictable changes in earnings and stock returns associated with omitted accruals for research and development and advertising expenditures. In order to verify the robustness of our results with respect to these omitted accruals, we reconstructed the omitted accruals following Penman and Zhang's procedures (the 'C' score) and included them in our earnings and stock return regressions. Their inclusion had no significant impact on our results.

inventory liquidation) and unintentional errors (e.g., overestimating the creditworthiness of a new customer, or overestimating the value of work-in-process inventory).[5]

To develop the errors in variables representation of this problem, we first define A* as the unobservable 'perfect foresight' accrual that would result in an earnings performance measure equal to E^*.

$$A^* = E^* - C \tag{3}$$

Referring back to the example above, A* represents the $100 amount that is ultimately collected on the credit sales. We next define observed accruals as the sum of A* and an error term, e, that is assumed to be uncorrelated with C and A^*:[6]

$$A = A^* + e \tag{4}$$

In the example above, e would be +10 for the aggressive manager and –10 for the conservative manager. The 'true' earnings persistence relation can be written in terms of unobservable 'perfect foresight' earnings, observable cash flows and the unobservable 'perfect-foresight' accruals as:[7]

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[5] Following Watts (2003), the application of conservative accounting should lead to larger errors for accruals resulting in losses, because conservatism imposes a lower verifiability threshold for the recognition losses versus profits. On the other hand, opportunistic managers with limited tenures and limited liability have incentives to introduce errors that result in profits. We do not attempt to discriminate between the relative importances of these different sources of errors in this paper.

[6] The assumption that e is uncorrelated with C and A^* is required to make the analysis tractable. While this assumption represents a logical starting point, one can think of arguments as to why e may be correlated with C and A^*. For example, the argument that managers try to smooth earnings would suggest a negative correlation between e and both C and A^*. On the other hand, the argument that managers take big baths during periods of poor performance would suggest a positive correlation between e and both C and A^*. Given the ambiguity concerning the potential sign of the correlation and the intractability of trying to incorporate it into our analysis, we generate predictions under the simple assumption of no correlation and investigate how well the resulting predictions describe the data.

[7] Our model focuses exclusively on the impact of errors in accruals on the relative persistence of the cash flow and accrual components of earnings. We therefore assume that if accruals could be measured without error, the persistence coefficients on the cash flow and accrual components of earnings would be identical. However, it is likely that the persistence coefficients on the cash flow and accrual components of earnings will differ for other reasons. Indeed, in editorial correspondence Ross Watts indicates that both he and S.P. Kothari independently came to that conclusion by extending the algebraic model developed in Dechow, Kothari and Watts (1998). Thus, we caution that our research invokes the standard *ceteris paribus*

$$E^{*}_{t+1} = \gamma C_t + \gamma A^{*}_t + \varepsilon_{t+1} \quad (5)$$

If we replace E^* and A^* with their observable counterparts, E and A, we have the classic errors-in-variables model for two explanatory variables where one is measured with error:

$$E_{t+1} = \gamma C_t + \gamma A_t + \omega_{t+1} \quad (6)$$

where $\omega_{t+1} = \varepsilon_{t+1} + e_{t+1} - \gamma e_t$.

Because ω_{t+1} is correlated with A_t through the mutual inclusion of e_t, the estimated coefficients on C (γ_C) and A (γ_A) will provide biased estimates of γ.[8] Griliches and Ringstad (1971) show that the biases are given by:[9]

$$(\gamma_A - \gamma) = \frac{-\gamma \dfrac{\text{var}(e)}{\text{var}(A)}}{1 - \rho^2_{C,A}} \quad (7)$$

$$(\gamma_C - \gamma) = -\rho_{C,A}(\gamma_A - \gamma) \quad (8)$$

where var(e) and var(A) denote the variance of e and A respectively and $\rho_{C,A}$ denotes the correlation between C and A. Equation (7) indicates that γ_A is biased downward towards zero, with the bias increasing in var(e)/var(A), the proportion of the total variation in observed accruals (A) that is attributable to measurement error (e).

assumption and focuses only on developing and testing predictions relating to the impact of accrual reliability on earnings persistence.

[8] An additional source of bias is introduced if errors in accruals reverse in the next period. These reversals induce a negative correlation between e_t and e_{t+1}, which will exaggerate the biases described below, but do not affect their directions or relative magnitudes.

[9] This derivation is based on the assumption that the cash flow component of earnings is measured without error. If both cash flows and accruals are measured with error, the biases in the coefficients will depend on the variance-covariance matrix of the errors (see Klepper and Leamer, 1984). We conducted simulations confirming that if one variable is measured with significantly greater error than the other, the downward bias continues to be much greater in the estimated coefficient on the variable with the greater error (our main simulations use an error variance ratio of 5 to 1). Thus, as a practical matter, the predictions of our model simply require that accruals are measured with significantly greater error than cash flows.

In terms of our earlier example, var(e)/var(A) is increasing in the range of plausible values that the error can take. More unreliable accruals lead to greater potential errors, resulting in an increase in var(e). We can modify our original example to make the accruals more unreliable by assuming that we make credit sales of \$110 of which \$90 ultimately ends up being collected as cash in the next period. Further assume that an aggressive manager could book sales of \$110, representing an error of +20 in current period accruals and earnings, while a conservative manager could book sales of \$70, representing an error of –20 in current period accruals and earnings. As the range of possible errors increases, var(e)/var(A) will increase. The point is that the more uncertainty there is about the amount of cash that will ultimately be collected, the greater the range of possible accruals that can be plausibly booked. Var(e)/Var(A) therefore provides a natural measure of the reliability of accruals, with a higher value representing lower reliability.

Equation (7) indicates that the bias in γ_A is also increasing in the strength of the correlation between cash flows and accruals. We know from previous research (see Dechow, 1994) that this correlation is around –0.6 for annual data, exaggerating the downward bias by over 50%. The bias in γ_C is a function of the correlation between observed accruals and cash flows and the bias in γ_A. Using the historical average annual correlation between accruals and cash flows of around –0.6, γ_C will also have a downward bias, but it will only be 60% as large as the downward bias in γ_A.

The above analysis generates two testable predictions for our empirical research:

1. *Ceteris paribus*, the magnitude of the downward bias in the persistence coefficients will always be greater for the accrual component of earnings than for the cash flow component of earnings (i.e., $\gamma_A - \gamma_C < 0$).
2. *Ceteris paribus*, the downward bias in the persistence coefficients on the accrual components of earnings relative to the cash flow component of earnings, $(\gamma_A - \gamma_C)$, is increasing in the proportion of the variation in accruals that is attributable to measurement error. This leads to the prediction that $(\gamma_A - \gamma_C)$ will be more negative for less reliable accruals.

2.2 Definition of Accruals

Sloan (1996) follows the convention in academic research of defining accruals as the change in non-cash working capital less depreciation expense. This convention can be traced back at least as far as Healy (1985) and corresponds closely with the definition of operating accruals used in the FASB's Statement of Financial Accounting Standard Number 95 "Statement of Cash Flows". However, this definition of accruals omits many accruals and deferrals relating to non-current operating assets, non-current operating liabilities, non-cash financial assets and financial liabilities.

To formally derive a comprehensive measure of accruals, we begin by noting that in the absence of accrual accounting, the only asset or liability account appearing on the balance sheet would be the cash asset account. All other asset and liability accounts are products of the accrual accounting process. Net assets would therefore equal cash, and through the balance sheet identity, owners' equity would also equal cash:

Cash Basis Net Assets = Cash = Cash Basis Owners Equity

Earnings under the cash basis of accounting, 'cash earnings', can then be derived through the clean surplus relation as:

Cash Earnings$_t$ = Change in Cash Basis Owners' Equity$_t$ + Net Cash Distributions to Equity$_t$

= Change in Cash$_t$ + Net Cash Distributions to Equity$_t$

Net cash distributions to equity holders represents all cash payments from the firm to equity holders (i.e., cash dividends plus stock repurchases less equity issuances). This expression tells us that cash earnings represent the net cash receipts of the firm, exclusive of the effect of any cash distributions (receipts) to (from) equity holders.

Conventional accrual-based earnings can be defined through the usual definition of net assets:

Accrual Earnings$_t$ = Change in Owners' Equity$_t$ + Net Cash Distributions to Equity$_t$

= Change in Net Assets$_t$ + Net Cash Distributions to Equity$_t$

= Change in Assets$_t$ – Change in Liabilities$_t$ + Net Cash Distributions to Equity$_t$

Accruals represent the difference between accrual earnings and cash earnings:

Accruals$_t$ = Accrual Earnings$_t$ – Cash Earnings$_t$

= Change in Non-Cash Assets$_t$ – Change in Liabilities$_t$

Without accrual accounting, the only asset or liability is cash, and so accruals represent the change in all non-cash assets less the change in all liabilities.

This comprehensive definition of accruals differs from the definition of accruals used by Healy (1985), Sloan (1996) and others in several key respects. First, this definition incorporates accruals relating to non-current operating assets, such as capital expenditures. Healy's definition ignores the origination of non-current operating asset accruals and only incorporates the reversal of a subset of non-current operating asset accruals through subtraction of depreciation expense. Second, our definition of accruals incorporates accruals relating to non-current operating liabilities, such as post-retirement benefit obligations. Third, our definition of accruals incorporates accruals relating to financial assets, such as long-term receivables. Finally, our definition of accruals incorporates financing accruals related to financial liabilities, such as long-term debt. While the nature and potential reliability of these accruals are all quite different, they are nevertheless all manifestations of the accrual accounting process. By starting with a comprehensive definition of accruals and then evaluating the reliability of different categories of accruals, we seek to provide a comprehensive analysis of the information content of accruals.

2.3 Categorization of Accruals

The balance sheet provides a systematic classification of accounting accruals based on the nature of the underlying benefits or obligations that they represent. Some balance sheet categories, such as marketable securities and short-term debt, can generally be measured with high reliability. Other balance sheet classifications, such as accounts receivable and intangible assets, are generally measured with lower reliability. In this section, we decompose accruals along broad balance sheet categories and use our knowledge of the measurement issues underlying each accrual category to make qualitative assessments concerning the relative reliability of each category. These assessments provide the basis for predictions concerning the relative magnitudes of the persistence coefficients on each of the accrual categories.

Our complete balance sheet decomposition is illustrated in table 1 and a summary of our reliability assessments is provided in table 2. Our initial balance sheet decomposition is based on the nature of the underlying business activity that is represented. We use three broad categories of business activities - current operating activities, non-current operating activities and financing activities. We refer to the resulting accrual categories as the change in non-cash working capital (ΔWC), the change in net non-current operating assets (ΔNCO) and the change in net financial assets (ΔFIN):

$$Accruals = \Delta WC + \Delta NCO + \Delta FIN \quad (9)$$

ΔWC represents the change in current operating assets, net of cash and short-term investments, less the change in current operating liabilities, net of short-term debt. These accruals form the core of the traditional measure of accruals used by Sloan (1996). We generally agree with Sloan's original assessment that considerable subjectivity is involved in the measurement of this accrual category. There are, however, significant differences between the underlying asset and liability components, so we conduct an extended accrual decomposition that further decomposes ΔWC into its underlying asset (ΔCOA) and liability (ΔCOL) components:

$$\Delta WC = \Delta COA - \Delta COL \quad (10)$$

The major underlying assets driving ΔCOA are trade accounts receivable and inventory (see Thomas and Zhang, 2002). Both of these categories are measured with relatively low reliability. Accounts receivable involves the subjective estimation of uncollectible accounts. Moreover, accounts receivable is the most common accrual category that is used to manipulate earnings, primarily through techniques such as trade-loading and premature revenue recognition (see Dechow, Sloan and Sweeney, 1996).

The measurement of inventory allows for a number of different cost flow assumptions and involves subjective cost allocations. For example, LIFO liquidations can artificially distort reported income, and the allocation of fixed costs to inventory can lead to distortions when production levels are unusually high or low. Inventory accounting also calls for subjective write-down decisions based on the estimated market value of inventory.

The major liability driving ΔCOL is accounts payable. In contrast to receivables and inventory, payables can generally be measured with a high degree of reliability. Accounts payable are financial obligations to suppliers that are recorded at their face value. If a firm is to continue as a going concern, then it will typically have to pay its suppliers in full. The only common source of subjectivity that arises for payables is in estimating discounts for prompt payment that may be offered by suppliers. But since the amount of any discounts can typically be verified with the suppliers, there is relatively little room for error.

Our second major category of accruals is non-current operating accruals, ΔNCO. This category is measured as the change in non-current assets, net of long-term non-equity investments and advances, less the change in non-current liabilities, net of long-term debt. It contains accruals that have generally been ignored in previous research. Nevertheless, as we will argue below, this category contains subjective and unreliable accruals. As with the working capital accruals, we further decompose ΔNCO into its underlying asset (ΔNCOA) and liability (ΔNCOL) components:

$$\Delta NCO = \Delta NCOA - \Delta NCOL \qquad (11)$$

The major underlying components of ΔNCOA are property, plant and equipment (PP&E) and intangibles. Considerable uncertainty is involved in the estimation of these accruals. First, there is considerable subjectivity involved in the initial decision of which costs to capitalize for both PP&E and recognizable internally generated intangibles (such as capitalized software development costs). For example, the well-publicized accounting scandal at WorldCom involved billions of dollars of operating costs that were aggressively capitalized as PP&E. Second, there is considerable subjectivity involved in selecting an amortization schedule for both PP&E and intangibles. The depreciation/amortization method, the useful life and the salvage value are all subjective decisions that impact this accrual category. Third, both PP&E and intangibles are subject to periodic write-downs when they are determined to have been impaired. The estimation of the amount of these impairments involves great subjectivity. For example, AOL Time Warner wrote off over $50 billion in a single quarter in relation to goodwill acquired in the merger of AOL and Time Warner. Because such write-downs are typically made in large discrete amounts, they inevitably introduce periodic distortions into earnings.

ΔNCOL, the liability component of ΔNCO, is driven by a wide variety of different liabilities. Examples include long-term payables, deferred taxes and postretirement benefits. Some of these liabilities, such as long-term payables, can be measured with a high degree of reliability. Others, such as postretirement benefits, involve many subjective estimates and so are measured with a low degree of reliability. The mix of different liabilities in this category makes it difficult to assign an unambiguous reliability ranking. We rate the reliability of this category as medium, reflecting the range of different liabilities with varying degrees of reliability.

Our third and final major category of accruals is the change in net financial assets, ΔFIN. ΔFIN is measured as the change in short-term investments and long-term investments less the change in short-term debt, long-term debt and preferred stock. Financial accruals have also been ignored in past accruals research. However, as we will argue below, these accruals can generally be measured with a high degree of reliability, and in this respect are similar to cash. In fact, some of these accruals are actually referred to as 'cash equivalents' to reflect their close correspondence with cash. There are some subtle differences between the various financial assets and liabilities, and to highlight these differences, we further decompose ΔFIN into its underlying short-term investment (ΔSTI), long-term investment (ΔLTI) and financial liability (ΔFINL) components:

$$\Delta FIN = \Delta STI + \Delta LTI - \Delta FINL \qquad (12)$$

Short-term investments and financial liabilities can both be measured with a high degree of reliability. Short-term investments are comprised of securities with readily observable market values that are expected to be converted into cash within a year. Financial liabilities include debt, capitalized lease obligations and preferred stock, most of which are financial obligations that are valued at the present value of the future cash obligations owed by the firm, with the discount rate fixed at the issue date. Firms are not permitted to book an allowance for the anticipated non-payment of their own financial obligations, so there is relatively little subjectivity involved in the measurement of these liabilities. We therefore expect the reliability of accruals related to short-term investments and financial liabilities to be relatively high. Reliability is, however, more of an issue for long-term investments. The long-term investments category incorporates a variety of financial assets including long-term receivables and long-term investments in marketable securities. Long-term receivables have at least as much potential for measurement error as short-term receivables and have been at the heart of some of the most celebrated cases of earnings manipulation.[10] On the other hand, most long-term investments in liquid marketable securities can be measured with a high degree of reliability. To reflect the mix of low and high reliability accruals included in ΔLTI, we assign it an overall reliability rating of medium.[11]

Table 2 lists reliability assessments for both the initial and the extended balance sheet decompositions. The reliability assessments for the initial decomposition represent a synthesis of the reliability assessments for the accrual categories from the extended decomposition. ΔWC is assigned a reliability rating of medium, because it combines the low reliability accruals in ΔCOA with the high reliability accruals in ΔCOL. ΔNCO receives a low/medium reliability rating, as it combines the low reliability accruals in ΔNCOA with the medium reliability accruals in ΔCOL. Finally, ΔFIN receives a high reliability rating, because it represents the combination of two high reliability categories with a medium reliability category. Our assessment of the relative reliabilities of the accrual categories is crude and subjective. Nevertheless, we have identified some clear differences in the relative reliabilities of the measurements in the different accrual categories that generate testable empirical predictions. We predict that accruals in the high reliability categories will have persistence coefficients similar to cash flows, while

[10] In a well-publicized accounting scandal, Boston Chicken reported steadily growing earnings by overstating its long-term notes receivable in the years from 1994 to 1996.

[11] Ideally, we would like to decompose long-term investments further to distinguish between items such as long-term receivables and investments in marketable securities. Unfortunately, Compustat groups these items together in annual data item #32 and does not provide a finer decomposition.

accruals in the medium and low reliability categories will have progressively lower persistence coefficients.

3. Data

Our empirical tests employ data from two sources. Financial statement data are obtained from the *Compustat* annual database and stock return data are obtained from the *CRSP* daily stock returns files. Our sample period covers all firm-years with available data on *Compustat* and *CRSP* for the period 1962-2001. We exclude all firm-year observations with SIC codes in the range 6000-6999 (financial companies) because the demarcation between operating and financing activities is not clear in these firms. We eliminate firm-year observations with insufficient data on *Compustat* to compute the primary financial statement variables used in our tests.[12] These criteria yield a final sample size with non-missing financial statement and returns data of 108,617 firm-year observations.

As discussed in section 2.3, our measure of total accruals, TACC, is defined as follows: TACC = ΔWC+ ΔNCO + ΔFIN where:

(i) ΔWC, the change in net working capital is defined as WC_t - WC_{t-1}. WC is calculated as Current Operating Assets (COA) - Current Operating Liabilities (COL), and COA = Current Assets (Compustat Item #4) - Cash and Short Term Investments (STI) (Compustat Item #1), and COL=Current Liabilities (Compustat Item #5) - Debt in Current Liabilities (Compustat Item #34).

[12] Specifically, we require availability of Compustat data items 1, 4, 5, 6, 12 and 181 in both the current and previous year and data item 178 in the current year in order to keep a firm-year in the sample. If data items 9, 32, 34, 130 or 193 are missing, we set them equal to zero rather than eliminating the observation. Each of the latter data items represent a balance sheet item that may not be relevant for many companies (e.g., preferred stock), so we set them to zero rather than needlessly discarding observations. All results are qualitatively similar if we instead estimate each regression using only observations with all data available for that particular regression.

(ii) ΔNCO, the change in net non-current operating assets is defined as NCO_t - NCO_{t-1}. NCO is calculated as Non-Current Operating Assets (NCOA) - Non-Current Operating Liabilities (NCOL), and NCOA = Total Assets (Compustat item #6) - Current Assets (Compustat Item #4) - Investments and Advances (Compustat Item #32), and NCOL = Total Liabilities (Compustat Item #181) - Current Liabilities (Compustat Item #5) – Long-Term Debt (Compustat Item #9).

(iii) ΔFIN, the change in net financial assets is defined as FIN_t - FIN_{t-1} and FIN = Financial Assets (FINA) - Financial Liabilities (FINL). FINA = Short Term Investments (STI) (Compustat Item #193) + Long Term Investments (LTI) (Compustat Item #32), and FINL= Long Term Debt (Compustat Item #9) + Debt in Current Liabilities (Compustat Item #34) + Preferred Stock (Compustat Item #130).

As in previous research, we deflate each of these components of earnings by average total assets.[13] For our analysis of the persistence of the various components of earnings, we use return on assets (ROA). ROA is calculated as operating income after depreciation (Compustat Item #178) deflated by average total assets.[14] In our regression analyses, each component of earnings is winsorized at +1 and –1 in order to eliminate the influence of extreme outliers.[15]

Our extended balance sheet decomposition further decomposes each of the three accrual components defined above into their respective asset and liability components. ΔWC is decomposed into its current operating asset (ΔCOA) and current operating liability (ΔCOL) components, as defined above. ΔNCO is decomposed into its noncurrent operating asset (ΔNCOA) and noncurrent operating liability (ΔNCOL)

[13] Barth and Kallapur (1996) show that deflation can introduce biases into regression coefficients when the deflator measures the true underlying scale variable with error. Such biases may be present in our analysis. However, we have no reason to believe that any such biases would differentially affect the cash flow and accrual components of earnings.

[14] Following Sloan (1996), we use a measure of income from continuing operations in our analysis of earnings persistence as it is unaffected by explicitly identified non-recurring components of net income. This increases the overall power of our persistence regressions. However, inferences regarding the relative persistence of the different components of earnings are qualitatively similar if we instead use bottom line net income.

components, as defined above. Finally, ΔFIN is decomposed into its respective short-term investment (ΔSTI), long-term investment (ΔLTI) and liability (ΔFINL) components, as defined above. The balance sheet items and their associated accrual categorizations are summarized in table 1.

Our stock return tests use data from the *CRSP* daily files. Stock returns are measured using compounded buy-hold size-adjusted returns, inclusive of dividends and other distributions. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same size-matched decile, where size is measured as the market capitalization at the beginning of the return cumulation period. Returns are calculated for a twelve-month period beginning four months after the end of the fiscal year.[16] For firms that are delisted during our future return window, we calculate the remaining return by first applying CRSP's delisting return and then reinvesting any remaining proceeds in the CRSP value-weighted market index.[17] This mitigates concerns with potential survivorship biases.

A potential shortcoming of our accrual measurement procedures is that they use balance sheet data. Hribar and Collins (2002) point out that the use of balance sheet data can introduce errors into the measurement of accruals, particularly in the presence of mergers and acquisitions. Indeed, the empirical distributions of our accrual variables contained a small number of extreme outliers, and inspection of some these outliers

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[15] Inferences regarding the relative persistence and pricing of the different components of earnings are qualitatively similar without winsorization. The winsorized results, however, have lower standard errors.

[16] This is standard in the literature, as firms generally file Form 10-K's within four months after the end of the fiscal year (see Alford et al. 1994).

[17] Firms that are delisted for poor performance (delisting codes 500 and 520-584) frequently have missing delisting returns (see Shumway 1997). We control for this potential bias by applying delisting returns of –100% in such cases. Our results are qualitatively similar if we make no such adjustment.

indicates that they are attributable to measurement issues associated with the use of the balance sheet approach.

We conduct three procedures to confirm the robustness of our results with respect to potential measurement issues introduced by the balance sheet approach. First, we delete (as opposed to winsorize) firm-year observations from our regression analysis when any one of the regression variables exceeds one in absolute value. We do this in an effort to remove outliers that may be attributable to measurement issues. Our results are similar for this reduced sample. Second, we confirm the robustness of our total accrual results using a measure of total accruals derived from data in the statement of cash flows rather than data from the balance sheet. Note in this respect that cash flow data is only available from 1988, and while we can compute total accruals using statement of cash flow data, we cannot compute many of our underlying accrual components without using balance sheet data. This alternative measure of accruals is computed as the difference between income before extraordinary items (*Compustat* item 123) less total operating, investing and financing cash flows (items 308, 311 and 313) plus sales of common stock (item 108) less stock repurchases and dividends (items 115 and 127). Results using this cash flow-based measure of total accruals are qualitatively similar to the results obtained using our balance sheet measure of total accruals. Third, we also conducted our analyses after removing firms experiencing an increase in reported goodwill. This procedure is expected to eliminate some observations involving significant mergers and acquisitions.[18] Our results are again qualitatively similar for this sample.

[18] Not all observations with mergers and acquisitions will be eliminated. Mergers and acquisitions accounted for using the pooling of interest method or involving the creation of new goodwill that is less than or equal to the amortization of goodwill for the period will not be eliminated.

4. *Results*

We present our results in four sections. Section 4.1 begins with descriptive statistics for our accrual decompositions. Section 4.2 presents tests of our predictions concerning the relative magnitudes of the persistence coefficients on the accrual components of earnings. Section 4.3 provides additional analysis of certain issues uncovered in section 4.2. Finally, section 4.4 presents our stock return tests, providing evidence on the extent to which investors appear to understand the relative magnitudes of the persistence coefficients.

4.1 *Descriptive Statistics*

We begin by presenting univariate statistics and pair-wise correlations for our key variables. We organize these descriptive statistics around the accrual decompositions that we use to motivate our empirical analysis. Panel A of table 3 contains univariate statistics for the initial accrual decomposition. The mean value of TACC is 0.052, indicating the average firm's accruals are just over 5% of total assets. Note that the positive mean value for accruals documented here differs from the negative mean value for accruals documented by Sloan (1996). The key reason for this difference is that Sloan's definition of accruals includes the reversal of certain non-current operating asset accruals (through the subtraction of depreciation and amortization expense), but does not include the origination of these accruals. Inspection of the working capital (ΔWC), net non-current operating asset (ΔNCO) and financing (ΔFIN) accruals indicates that ΔWC and ΔNCO both have positive means, while ΔFIN has a negative mean. These means indicate that the average firm is growing its net operating assets and reducing its net financial assets (e.g., increasing debt) to finance this growth. Focusing on the standard deviations of the accrual components, we see that ΔWC has the lowest standard deviation (0.108), followed by ΔNCO (0.151) and ΔFIN (0.181). These standard deviations suggest that ΔNCO and ΔFIN, the new accrual components examined in this paper, account for a relatively large proportion of the variation in total accruals.

Panel B of table 3 reports the pair-wise correlations for the initial accrual decomposition. The correlations between the accrual components reveal important regularities. ΔWC and ΔNCO are positively correlated, indicating that firms tend to grow their current and non-current operating activities in tandem. In contrast, both ΔWC and ΔNCO are very strongly negatively correlated with ΔFIN. The negative correlations indicate that firms tend to finance growth in their net operating assets by using up financial assets and/or generating financial liabilities. What is clear from these descriptive statistics is that the financing accruals (ΔFIN) behave very differently from the operating accruals (ΔWC and ΔNCO).

Table 4 provides descriptive statistics for the extended accrual decomposition. Recall that the major extension in this decomposition involves separating the accrual components into their asset and liability subcomponents. The standard deviations in panel A indicate that most of the variation in ΔWC is attributable to ΔCOA, most of the variation in ΔNCO is attributable to ΔNCOA and most of the variation in ΔFIN is attributable to ΔFINL. Thus, variation in operating accruals tends to be dominated by the assets, while variation in financing accruals tends to be dominated by the liabilities.

The correlations in panel B of table 4 shed more light on the relation between operating assets and financing liabilities. In interpreting these accruals, it is important to remember that the liability component of accruals is subtracted from the asset component of accruals to arrive at net accruals. Thus, a positive correlation between an asset and a liability category indicates that they tend to have offsetting effects on total accruals. Both ΔCOA and ΔNCOA are strongly positively correlated with ΔFINL, indicating that financing liabilities provide an important source of funding for growth in operating assets. ΔCOA and ΔNCOA are also strongly positively correlated with ΔCOL and ΔNCOL, indicating that operating liabilities provide an additional source of funding for growth in operating assets. Another noteworthy set of correlations is that both ΔCOL and ΔNCOL are positively correlated with TACC. The direct effect of increases in ΔCOL and ΔNCOL is to reduce TACC, so one might have expected a negative correlation between these two liability components and TACC. There is, however, a straightforward explanation for the observed positive correlations. As mentioned above, the asset and liability components of operating accruals are strongly positively correlated. For example, the Pearson (Spearman) correlation between ΔCOA and ΔCOL is 0.583 (0.560). Firms that are growing their operations tend to increase both their operating assets and their operating liabilities. However, firms typically require positive working capital, so the increase in operating assets tends to be larger than the increase in operating liabilities. Firm growth therefore results in an indirect positive relation between ΔCOL and TACC. We will see in the next section that the strong correlations between the operating asset and operating liability components of accruals complicate the interpretation of our multivariate regression results.

4.2 Earnings Persistence Results

Table 5 presents our analysis of the persistence of the cash flow and accrual components of earnings. Section 2.1 generates two key predictions concerning these persistence coefficients. First, the accrual component of earnings is expected to be less persistent than the cash flow component of earnings. The cash component of earnings performance is simply the difference between earnings performance itself and the accrual component of earnings performance. Accordingly, our first prediction can be tested through the following regression:

$$ROA_{t+1} = \gamma_0 + \gamma_1(ROA_t - TACC_t) + \gamma_2 TACC_t + \upsilon_{t+1} \quad (13)$$

where γ_1 measures the persistence of cash flows and γ_2 measures the persistence of accruals, and our first prediction is $(\gamma_2-\gamma_1)<0$. In order to focus on the relative persistence of accruals, we estimate a slightly modified version of (13) in which the cash flow component of earnings performance is replaced by earnings performance itself:

$$ROA_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2 TACC_t + \upsilon_{t+1} \quad (14)$$

Note that this regression equation can be rewritten in terms of the persistence parameters in equation (13) as:

$$ROA_{t+1} = \gamma_0 + \gamma_1(ROA_t) + (\gamma_2 - \gamma_1)TACC_t + \upsilon_{t+1} \quad (15)$$

So $\rho_1=\gamma_1$ and $\rho_2=(\gamma_2-\gamma_1)$. The advantage of estimating this modified version is that ρ_2 provides a direct estimate of $(\gamma_2-\gamma_1)$, so our first prediction is simply that $\rho_2<0$.

Our second prediction is that $(\gamma_2-\gamma_1)$ will be more negative for less reliable accruals. Recall that table 2 summarizes our assessments of the reliability of the various accrual categories. In order to test our second prediction, we must examine each of the accrual categories individually. We do this through a combination of univariate and multivariate regression analyses. Our univariate regression analysis follows from equation (14). For example, to examine the persistence of the working capital component of accruals, we estimate the following regression:

$$ROA_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2 \Delta WC_t + \upsilon_{t+1} \quad (16)$$

The analog to equations (13) and (15) are now:

$$ROA_{t+1} = \gamma_0 + \gamma_1(ROA_t - \Delta WC_t) + \gamma_2 \Delta WC_t + \upsilon_{t+1} \quad (17)$$

$$ROA_{t+1} = \gamma_0 + \gamma_1(ROA_t) + (\gamma_2 - \gamma_1)\, \Delta WC_t + \upsilon_{t+1} \quad (18)$$

So ρ_1 measures the persistence of earnings exclusive of the working capital component of accruals, and ρ_2 measures the difference between the persistence of the working capital component of accruals and the persistence of earnings exclusive of the working capital component of accruals. Note that the interpretation of the coefficients is subtly different than in equation (13), because ρ_1 no longer represents the persistence of cash flows, but instead represents the persistence of earnings exclusive of the particular accrual component that is included in the regression (ΔWC in this case). Since this accrual component is a subset of total accruals, ρ_1 now represents the combined persistence of cash flows and all of the other accrual components. Our second prediction is that ρ_2 is predicted to be more negative for less reliable accruals. It is also possible that ρ_2 may be positive for more reliable accruals, the reason being that ρ_1 represents the combined persistence of cash flows and the other (potentially less reliable) accruals.[19] The presence of the less reliable accruals may drive $\gamma_1<\gamma_2$, in which case $\rho_2>0$. Nevertheless, ρ_2 is always predicted to be lower for less reliable accruals.

[19] Recall from footnote 9 that when both components of earnings are measured with error, the downward bias in the estimated coefficients tends to be greatest for the variable that is measured with the most error.

The univariate regressions have some shortcomings. First, they do not allow for formal statistical tests of differences in the ρ_2 estimates across accrual components. Second, as described above, they do not allow us to directly benchmark the persistence of the accrual components relative to cash flows. To address these shortcomings, we also estimate a multivariate version of equation (16) that simultaneously includes all components of accruals:

$$ROA_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2 \Delta WC_t + \rho_3 \Delta NCO_t + \rho_4 \Delta FIN_t + \upsilon_{t+1} \quad (19)$$

The analog to equations (17) and (18) are now:

$$ROA_{t+1} = \gamma_0+\gamma_1(ROA_t-\Delta WC_t-\Delta NCO_t-\Delta FIN_t)+\gamma_2\Delta WC_t+\gamma_3\Delta NCO_t+\gamma_4\Delta FIN_t+\upsilon_{t+1} \quad (20)$$

$$ROA_{t+1} = \gamma_0 + \gamma_1(ROA_t) + (\gamma_2-\gamma_1)\Delta WC_t + (\gamma_3-\gamma_1)\Delta NCO_t + (\gamma_4-\gamma_1)\Delta FIN_t + \upsilon_{t+1} \quad (21)$$

So ρ_1 now measures the persistence of the cash flow component of earnings, while ρ_2, ρ_3 and ρ_4 each measure the persistence of their respective accrual component relative to the cash flow component. F-tests allow for formal statistical tests of the equality of the coefficients across the accrual components. The key shortcoming of this multivariate regression is that the errors-in-variables model developed in section 2.1 only applies to the case of two variables. We have now decomposed accruals into multiple variables, all of which are potentially measured with error. In the case of multiple variables measured with error, the magnitude of the resulting biases will also depend on the correlations between these variables (see Klepper and Leamer, 1984). Recall from panel B of table 4 that several of the accrual components are highly correlated. Thus, care must be taken in interpreting the coefficients of these variables in the multivariate specification.

We conduct all of our regression analyses following the Fama and MacBeth (1973) procedure of estimating annual cross-sectional regressions and reporting the time-series averages of the resulting regression coefficients. Panel A of table 5 reports regression results for TACC, the total accrual component of earnings. The first regression model is a simple earnings autoregression and provides a benchmark for the subsequent regressions. Consistent with Sloan (1996), earnings is slowly mean reverting with a persistence coefficient of about 0.77. The second regression estimates the model in equation (14). Consistent with our first prediction, ρ_2 is negative (-0.082) and statistically significant (t=-16.13), indicating that the accrual component of earnings is less persistent than the cash flow component of earnings. This result corroborates Sloan's original result using our comprehensive definition of accruals.[20]

Panel B of table 5 reports results of estimating equation (16) for each of the components of our initial accrual decomposition. Recall from table 2 that ΔWC and ΔNCO are assessed to have medium or low reliability and so are predicted to have relatively low persistence coefficients, while ΔFIN is assessed to have high reliability and hence a relatively high persistence coefficient. The coefficients in each of the univariate regressions are consistent with these predictions. The coefficient on ΔWC is negative and highly statistically significant (-0.116 with a t-statistic of –15.05), the coefficient on ΔNCO is also negative and statistically significant (-0.047 with a t-statistic of –12.39) and the coefficient on ΔFIN is close to zero (0.015 with a t-statistic of 2.86).

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[20] Fairfield Whisenant and Yohn (2003b) show that the lower persistence of accruals relative to cash flows is primarily attributable to growth in the investment base that is not matched by growth in income. In other words, firms with high operating accruals are firms that are growing their operating investments, but earn a lower average return on their increased operating investments, leading to lower persistence in earnings performance. To investigate the importance of this issue for our results, we replicated all of the results in table 5 using the Fairfield, Whisenant and Yohn approach of measuring our dependent variable as next year's income deflated by last year's average total assets. Our results are surprisingly robust with respect to this procedure. For example, our total accruals variable continues to have a significantly negative coefficient and the operating asset accruals variables continue to have the most negative coefficients.

The final row of panel B of table 5 reports results for the multivariate specification in equation (19). Consistent with our predictions, the multivariate regression analysis basically maintains the same relative ranking of accrual persistence coefficients as the univariate regressions. Untabulated F-tests confirm that the coefficients on ΔWC and ΔNCO are significantly different from the coefficient on ΔFIN. The multivariate regressions, however, differ from the univariate regressions in a couple of significant respects. First, the coefficients on all of the accrual components are somewhat lower than in the univariate specifications. Second, the coefficient on ΔFIN is negative and statistically significant. As described earlier, there is a natural explanation for these differences. In the univariate regressions, the omitted accrual components are implicitly grouped with cash flows and the lower persistence of these accrual components causes ρ_1 to be lower. The multivariate specification allows ρ_1 to represent the coefficient on the pure cash flow component of earnings, causing ρ_1 to increase and the coefficients on each of the less reliable accrual components to correspondingly decrease.

Panel C of table 5 presents results for the extended accrual decomposition. Recall from table 2 that the asset components of the operating accruals are assessed to be the least reliable, so we predict that the coefficients on the operating asset components of accruals will be the most negative. The results from the univariate regressions confirm these predictions. The persistence coefficients on ΔCOA and ΔNCOA are the two most negative and the most statistically significant coefficients. However, inconsistent with our assessment that ΔCOL is more reliable than ΔNCOL, we find that ΔCOL has the more negative coefficient. One possible explanation for this result is that the accruals in ΔNCOL consist of accruals relating to deferred taxes and retirement obligations that can take many periods to reverse. This possibility is examined in more detail in the next subsection.

Our extended decomposition of financing accruals is a three-way decomposition into short-term investing accruals (ΔSTI), long-term investing accruals (ΔLTI) and financial liability accruals (ΔFINL). Recall from table 2 that we assess both ΔSTI and ΔFINL to be of high reliability and hence have similar persistence to cash flows. In contrast, we assess ΔLTI to have only medium reliability and hence have a significantly lower coefficient than cash flows. The results are generally consistent with these predictions. The coefficient on ΔLTI is significantly negative (-0.045, t=-4.11) and the lowest of the coefficients on the three financing components. In contrast, the coefficient on ΔSTI is much closer to zero (0.036, t=1.05), while the coefficient on ΔFINL is significantly positive (0.023, t=3.83). The significantly positive coefficient on ΔFINL may seem somewhat surprising, but remember that in the univariate specification, ρ_1 represents the combined persistence of all components of earnings other than the included accrual component. These components include the relatively unreliable operating asset accruals, which will cause ρ_1 to be lower and the coefficient on ΔFINL to be higher.

The final regression in panel C of table 5 is the multivariate regression for the extended accrual decomposition. Since this regression includes all accrual components, ρ_1 represents the persistence of the pure cash flow component of earnings. Consequently, the coefficient of 0.801 is higher than in any of the preceding univariate regressions. The coefficients in the multivariate regression confirm several of our key predictions. The coefficients on ΔCOA, ΔNCOA and ΔLTI continue to be significantly negative, consistent with their low to medium reliability assessments. Also, the highest coefficient is reported on ΔSTI, an accrual component we assess to have high reliability. However, both ΔCOL, ΔNCOL have relatively high persistence coefficients in the univariate regressions, but have much lower persistence coefficients in the multivariate regression. We provide an explanation for the discrepancy in these persistence coefficients between the univariate and multivariate regressions in the next subsection.

4.3 Additional Tests on Earnings Persistence

The earnings persistence results in subsection 4.2 raise two issues that are worthy of additional examination. First, it is possible that the persistence coefficients on non-current operating accruals are sensitive to the horizon over which earnings persistence is measured. Second, it appears that there are important interactions between operating asset and operating liability accruals that cause dramatic shifts in the persistence coefficients on the operating liability accruals between the univariate and multivariate regression specifications. This subsection addresses each of these issues in turn.

The regressions in table 5 examine earnings persistence over consecutive annual intervals. It is possible that some accrual errors take several years to reverse, particularly in the case of accruals relating to non-current assets and liabilities. To investigate the sensitivity of the results with respect to longer-term persistence, table 6 replicates the regression analysis in table 5 measuring the dependent variable as earnings performance averaged from 2 through 5 years ahead (denoted FROA). As expected, the use of long-term earnings leads to a reduction in the persistence coefficients on ROA. There is modest evidence that the persistence coefficients on the long-term accruals fall relative to the current accruals. For example, in the univariate regressions in panel C, the coefficient on ΔNCOL switches from being larger than the coefficient on ΔCOL in table 5 to being smaller than the coefficient on ΔCOL in table 6. This is consistent with lower reliability of ΔNCOL manifesting itself over longer horizons due to the long-term nature of the underlying accruals.

The results in tables 5 and 6 provide consistent evidence concerning the lower earnings persistence associated with operating asset accruals. The results for operating liability accruals, however, are mixed. In particular, recall from panel C of table 5 that both ΔCOL and ΔNCOL have relatively high persistence coefficients in the univariate regressions, but relatively low persistence coefficients in the multivariate regressions. From a statistical perspective, these results arise because of the strong correlations between the operating liability accruals and the other accrual components. In particular, panel B of table 4 indicates that both ΔCOL and ΔNCOL are highly positively correlated with both ΔCOA and ΔNCOA. Table 7 conducts additional tests that provide insights into the economic rationale behind these statistics.

The reason that operating liability accruals tend to be positively correlated with operating assets accruals is straightforward. As a business grows, its operating asset and liability accounts tend to grow in tandem. For example, a business that adds new productive capacity will typically have increases in both inventories and accounts payable, as it is buys more inputs and produces more outputs. For this reason, operating liability accruals will tend to proxy for operating asset accruals (and vice versa) in the univariate regressions. In contrast, the multivariate regressions control for variation in operating asset accruals. This means that the persistence coefficients on operating liability accruals represent the marginal effect of financing operating assets using operating liabilities as opposed to other sources of financing. In particular, the significantly negative coefficients on the operating liability accruals tell us that growth in operating assets that is financed using operating liabilities is associated with relatively higher earnings persistence.[21] The results in panel A of table 7 provide direct evidence in support of this explanation.

Panel A of table 7 examines the persistence of operating asset accruals according to the manner in which the accruals are financed. Using the balance sheet identity and our earlier terminology, we can decompose operating asset accruals (ΔOA) into its financing sources as follows:

$$\Delta OA = \Delta OL + \Delta FINL + \Delta EQUITY - \Delta FA \tag{22}$$

where ΔOA is the change in operating assets ($\Delta COA+\Delta NCOA$), ΔOL is the change in operating liabilities ($\Delta COL+\Delta NCOL$), $\Delta FINL$ is the change in debt (including preferred stock), $\Delta EQUITY$ is the change in common equity and ΔFA is the change in financial assets (including cash). The first regression in table 7 confirms our earlier results that operating asset accruals are associated with lower earnings persistence. The next regression indicates that the lower earnings persistence is entirely attributable to operating asset accruals that are financed by debt, financial assets or equity. When operating liabilities are used to finance increases in operating assets, earnings persistence is actually higher, as indicated by the significantly positive coefficient on ΔOL. In contrast, when debt, equity or financial assets are used to finance increases in operating assets, persistence is lower, as indicated by the significantly negative coefficients on these sources of financing. Nissim and Penman (2003) provide related evidence. They

[21] Note that changes in operating liabilities enter the regressions with a negative sign (because increases in operating liabilities represent decreases in accruals). The significantly negative coefficients on changes in operating liabilities in the multivariate regressions therefore indicate that larger increases in operating liabilities lead to higher earnings persistence.

find that leverage arising from operating liabilities is associated with higher future profitability than leverage arising from debt.

The economic intuition behind these results can be illustrated via example. Consider two companies, each reporting high operating asset accruals in the form of large increases in inventory. In one company, the inventory increase results from slowing sales, and the company is forced to issue new debt in order to finance the inventory glut (because inventory trade payables become due before the inventory is sold). In the other company, the increase represents new inventory that is being acquired in response to a surge in demand, and the company is able to finance the increase using trade credit (because the inventory is being sold before the associated trade payable becomes due). The former company is experiencing problems that are likely to result in reductions in future profitability, while the latter company is experiencing healthy growth that is likely to lead to increases in future profitability. A second and complementary economic force that is also likely to be at work is that trade creditors are in a unique position to continuously verify the quality of the operating assets that are available to satisfy their claims. Unlike other sources of financing, trade credit tends to be short term in nature and granted by suppliers who have unique insights into the financial health of the business operations. As a result, operating asset accruals that are financed by operating liabilities are expected to be more persistent than operating asset accruals that are financed by debt or equity.

Panel B of table 7 provides additional evidence supporting the above interpretation of the interaction between operating assets and operating liabilities. To construct this table, we conduct independent quintile sorts of our sample on ΔOA (the sum of ΔCOA and ΔNCOA) and ΔOL (the sum of ΔCOL and ΔNCOL). The numbers in parentheses represent the number of observations in each cell. The positive correlation between ΔOA and ΔOL leads the observations to be concentrated down the main diagonal. There are, however, many observations in the other cells, providing us with the opportunity to examine how ΔOA and ΔOL interact to inform about earnings persistence.

The statistic reported in each cell of panel B of table 7 is the mean change in next period's earnings performance (ΔROA_{t+1}) for observations in that cell. Scanning down each column reveals a negative association between future earnings changes and ΔOA, consistent with the lower persistence and reliability of operating asset accruals. But we also see that the maximum spread in future profitability is observed between the 'low ΔOA, high ΔOL' cell and the 'high ΔOA, low ΔOL' cell. The 'low ΔOA, high ΔOL' cell has a mean future earnings change of 0.065, compared to an average change of 0.018 for all low ΔOA cells. Similarly, the 'high ΔOA, low ΔOL' cell has a future earnings change of -0.040 compared to an average change of -0.029 for all high ΔOA cells. Focusing on cells where ΔOA and ΔOL move in opposite directions maximizes the spread in future earnings changes.[22] Firms where ΔOA is rising and ΔOL is falling subsequently do most poorly, while firms where ΔOA is falling and ΔOL is rising subsequently do the best. To summarize, ΔOL provides important information about the persistence of ΔOA, because higher operating liability accruals signal more reliable operating asset accruals.

[22] We conducted t-tests of differences in means between each possible combination of the 4 corner cells in the 5x5 ΔOA/ΔOL matrix, confirming that they are all significantly different from each other at conventional levels. For example, in the high ΔOA row the difference between low ΔOL (-0.040) and high ΔOL (-0.026) is statistically significant at the 5% level (two-tailed test).

4.4 Stock Return Results

In this section, we investigate whether stock prices act as if investors anticipate the implications of accrual reliability for earnings persistence. If investors understand the implications of accrual reliability for earnings persistence, then there should be no relation between accruals and future abnormal stock returns. However, if investors naïvely fail to anticipate the lower persistence of the less reliable accrual components of earnings, there will be a negative relation between these accrual components and future abnormal stock returns. For example, a firm with relatively high accruals this period is expected to have relatively low earnings performance next period, but if investors naïvely ignore the high accruals, they will be surprised by next period's low earnings performance, resulting in negative abnormal returns in the next period. Thus, the naïve investor hypothesis predicts a negative relation between accruals and future stock returns, with the relation being stronger for less reliable accruals that result in lower earnings persistence.

Our stock return tests are presented in table 8. This table replicates the analysis in table 5 after replacing the dependent variable with the next year's annual size-adjusted buy-hold stock return (measured starting four months after the fiscal year end). Panel A of table 8 reports the results of the basic regression of stock returns on earnings and the accrual component of earnings. As in previous research, we obtain a negative and significant coefficient on accruals, which is consistent with the naïve investor hypothesis.

Panel B reports regression results for the initial balance sheet decomposition. Consistent with the naïve investor hypothesis, the relative rankings of the coefficients on the accrual components of earnings line up closely with their counterparts in table 5. The coefficients on ΔWC and ΔNCO are consistently the most negative and are highly statistically significant.

Panel C of table 8 reports regression results for the extended accrual decomposition. We again see a close correspondence between the relative rankings on the accrual coefficients with those reported in panel C of table 5. Most importantly, the coefficients on ΔCOA, ΔNCOA and ΔLTI are consistently the most negative and significant. These are the accruals that we judge to be the least reliable and which also have the lowest persistence coefficients in table 5. Overall, the results are consistent with the naïve investor hypothesis. Future stock returns are negatively related to accruals, and the negative relation is stronger for less reliable accruals.

The results for operating liability accruals in panel C of table 8 display similar properties to those from panel C of table 5. In particular, the persistence coefficients on ΔCOL and ΔNCOL fall sharply from the univariate regressions to the multivariate regression. Table 9 replicates the additional analysis of operating asset and liability accruals in table 7, but focuses on next year's stock returns instead of next year's earnings changes. The stock return results in table 9 mirror the earnings results from table 7. Panel A shows that the negative relation between operating asset accruals and future stock returns is not significant when these accruals are financed by operating liabilities. The negative relation is driven by the other sources of financing. Panel B shows that the predictable future stock returns are greatest when operating asset accruals and operating liability accruals move in opposite directions. Firms in the 'low ΔOA, high ΔOL' cell have mean size adjusted returns of 10.2%. Conversely, firms in the 'high

ΔOA, low ΔOL' cell have mean size adjusted returns of –9.4%.[23] These results indicate that investors do not use information in operating liability accruals about the persistence operating asset accruals.

Table 10 provides evidence on the economic significance of our results, using the common convention of reporting abnormal returns for ranked portfolios. We rank observations annually on each accrual component and use the ranks to group observations into ten equal-sized portfolios (deciles). We calculate size-adjusted annual returns for each decile, with the return cumulation period starting 4 months after fiscal year-end. We also compute returns on a hedge portfolio consisting of a long position in the lowest accrual decile and an equal-sized short position in the highest accrual decile, to provide a summary measure of the economic magnitude of the mispricing for each accrual component.

Panel A of table 10 reports the results for the initial accrual decomposition. The hedge portfolio return for total accruals is 13.3%. The initial accrual decomposition provides evidence on the source of these returns. The ΔWC component has a hedge portfolio return of 12.8%. This component of accruals differs slightly from the accrual definition used by Sloan (1996) in that it excludes depreciation. The ΔNCO component of accruals has a hedge portfolio return of 16.5%. This component of accruals is largely unexplored by previous research. ΔNOA (the sum of ΔWC and ΔNCO) has the largest hedge portfolio return of 18.0%. By combining current and non-current operating accruals, we obtain hedge portfolio returns that are larger than those obtained using each

[23] We also conducted t-tests of differences in means for the 4 cells at the corners of this 5x5 ΔOA/ΔOL matrix. All differences are significant at conventional levels, with the exception of the difference between the 'high ΔOA, low ΔOL' cell (-0.094) and the 'high ΔOA, high ΔOL' cell (-0.075).

component independently. Finally, the hedge portfolio return for the ΔFIN component of accruals is -8.2%. While operating accruals are negatively associated with future stock returns, financing accruals are positively associated with future stock returns. This result is explained by the negative correlation between ΔFIN and the operating accruals, as reported in table 3 and discussed in section 4.1. A sort on ΔFIN is essentially a noisy reverse sort on ΔNOA, because ΔFIN is a primary source of financing for ΔNOA.

Panel B of table 10 reports the hedge portfolio returns for the extended decomposition of accruals. The strongest mispricing is in the operating asset components of accruals, ΔCOA and ΔNCOA, with hedge portfolio returns of 14.5% and 16.1% respectively. Decomposition of ΔFIN into ΔSTI, ΔLTI and ΔFINL shows that the source of negative hedge portfolio returns is ΔFINL, which is the financing component having the strongest correlation with operating accruals. ΔLTI is associated with a positive hedge portfolio return of 5.2%, consistent with its lower persistence and reliability.

Overall, the results in table 10 confirm that our more comprehensive measure of accruals is associated with even greater mispricing than has been documented in previous accrual research such as Sloan (1996). Moreover, the mispricing is driven by the accrual components with the lowest reliability.

5. Conclusion and Implications

Our comprehensive examination of accrual reliability, earnings persistence and future stock returns generates several new insights. First, we document important costs of recognizing less verifiable and hence less reliable information in the accounting system. Less reliable accruals lead to lower earnings persistence and investors do not appear to fully anticipate this lower persistence, leading to significant security mispricing. Second, we provide a comprehensive definition and categorization of accruals that incorporates many accruals that have been ignored by previous research. Our results indicate that some of the accrual categories that have been ignored by previous research have particularly low reliability. Third, we show that the magnitude of the security mispricing related to accruals is significantly greater than originally documented by Sloan (1996). For example, a simple decile sort on a combination of the least reliable accrual categories produces annual hedge portfolio returns of 18%.

Our analysis has several implications for existing research. First, it highlights the crucial trade-off between relevance and reliability in accrual accounting. We show that less reliable accruals introduce costs in the form of lower earnings persistence and the associated mispricing. Our findings provide a natural counterpoint to research calling for new categories of relevant but relatively unreliable information to be allowed under GAAP (e.g., Lev and Sougiannis, 1996). In particular, our results support Watts (2003) argument that recent moves by the FASB to introduce even less verifiable information into GAAP may prove extremely costly.[24] We reiterate Watts' conclusion that the case for allowing less verifiable and hence less reliable categories of accruals must recognize the problems that verifiability and reliability evolved to address.

The second key implication of our analysis is that accruals-based research should consider broader definitions of accruals than the definition originally proposed by Healy (1985). Healy's definition has become synonymous with accruals in the accounting literature. Yet we show that his definition excludes several economically significant categories of accruals with low reliability. Non-current operating asset accruals (e.g., capitalization of operating costs as long-term) are a good example. Such accruals were at the heart of the well-known accounting debacle at WorldCom. We recommend that researchers using accruals to measure earnings management consider broader measures of accruals in order to maximize the power of their tests. Our analysis also highlights the differing degrees of reliability associated with different categories of accruals. In this respect our analysis is still quite crude, and further refinements should lead to additional insights into accrual reliability and earnings persistence.

Finally, our findings corroborate claims concerning the importance of distinguishing between earnings and 'free cash flow' in evaluating firm performance.[25] The standard textbook definition of free cash flow adjusts earnings by adding back depreciation and amortization and subtracting changes in working capital and capital expenditures. As such, these adjustments are substantially similar to the operating accrual components that we develop in this paper. Financing accruals are not typically backed out in arriving at free cash flow. Thus, the accruals that we find to be the least reliable correspond closely to the adjustments that are made to earnings in arriving at free cash flow. Free cash flow represents a combination of actual cash flows plus the relatively reliable financing accruals.

[24] The specific examples used by Watts are the FASB's recent standards SFAS No. 141 and SFAS No. 142. These standards require managers to estimate the future cash flows associated with the firm's operating assets and (under certain circumstances) recognize these estimates in the financial statements.

[25] For an example, see 'Cash is King', Chapter 5 of Copeland et al. (2000).

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Table 1
Illustration of Balance Sheet Categorization of Accruals.

Non-Cash Assets				Liabilities			
	Data Item	***Initial***	***Extended***		***Data Item***	***Initial***	***Extended***
Short Term Investments	#193	ΔFIN	ΔSTI	Debt in Current Liabilities	#34	ΔFIN	ΔFINL
Receivables	#2	ΔWC	ΔCOA	Accounts Payable	#70	ΔWC	ΔCOL
Inventory	#3	ΔWC	ΔCOA	Income Taxes Payable	#71	ΔWC	ΔCOL
Other Current Assets	#68	ΔWC	ΔCOA	Other Current Liabilities	#72	ΔWC	ΔCOL
Property, Plant and Equipment, Net	#8	ΔNCO	ΔNCOA	Long Term Debt	#9	ΔFIN	ΔFINL
Investments – Equity Method	#31	ΔNCO	ΔNCOA	Other Liabilities	#75	ΔNCO	ΔNCOL
Investments-Other	#32	ΔFIN	ΔLTI	Deferred Taxes	#35	ΔNCO	ΔNCOL
Intangibles	#33	ΔNCO	ΔNCOA	Minority Interest	#38	ΔNCO	ΔNCOL
Other Assets	#69	ΔNCO	ΔNCOA	Preferred Stock	#130	ΔFIN	ΔFINL

Data Item denotes the Compustat annual data item number. *Initial* denotes the accrual component in which the item is classified for our initial accrual decomposition. *Extended* denotes the accrual component in which the item is classified for our extended accrual decomposition.

ΔWC is the change in working capital accruals, defined as WC_t - WC_{t-1}. Where WC = Current Operating Assets (COA) - Current Operating Liabilities (COL) where COA=Current Assets (Compustat Item #4) - Cash and Short Term Investments (STI) (Compustat Item #1). COL=Current Liabilities (Compustat Item #5) - Debt in Current Liabilities (Compustat Item #34).

ΔNCO is defined as NCO_t - NCO_{t-1}. Where NCO = Non-Current Operating Assets (NCOA) - Non-Current Operating Liabilities (NCOL) where NCOA = Total Assets (Compustat item #6) - Current Assets (Compustat Item #4) - Investments and Advances (Compustat Item #32). NCOL = Total Liabilities (Compustat Item #181) - Current Liabilities (Compustat Item #5) – Long-term debt (Compustat Item #9).

ΔFIN is defined as FIN_t - FIN_{t-1}. Where FIN = Financial Assets (FINA) - Financial Liabilities (FINL). FINA = Short Term Investments (STI) (Compustat Item #193) + Long Term Investments (LTI) (Compustat Item #32). FINL= Long term debt (Compustat Item #9) + Debt in Current Liabilities (Compustat Item #34) + Preferred Stock (Compustat Item #130).

Table 2
Summary of Reliability Assessments by Accrual Category.

Accrual Category	*Decomposition Level*	*Reliability Assessment*	*Summary of Reasoning Behind Reliability Assessment*
ΔCOA	Extended	Low	Category is dominated by receivables and inventory. Receivables require the estimation of uncollectibles and are a common earnings management tool (e.g., channel stuffing). Inventory accruals entail various cost flow assumptions/allocations and subjective write-downs.
ΔCOL	Extended	High	Category is dominated by payables, which represent financial obligations of the firm that can be measured with a high degree of reliability.
ΔWC	Initial	Medium	Combination of ΔCOA (low reliability) and ΔCOL (high reliability) suggests medium reliability.
ΔNCOA	Extended	Low	Category is dominated by PP&E and intangibles. Both PP&E and internally generated intangibles (e.g., capitalized software development costs) involve subjective capitalization decisions. Moreover, PP&E and intangibles involve subjective amortization and write-down decisions.
ΔNCOL	Extended	Medium	Category includes long-term payables, deferred taxes and postretirement benefit obligations. Best characterized as a mixture of accruals with varying degrees of reliability, so classify as medium reliability.
ΔNCO	Initial	Low/ Medium	Combination of ΔNCOA (low reliability) and ΔNCOL (medium reliability) suggests low/medium reliability.
ΔSTI	Extended	High	Represents marketable financial securities that are expected to be sold within 12 months. Market values of marketable financial securities can be measured with a high degree of reliability.
ΔLTI	Extended	Medium	Category includes long-term receivables and investments in marketable securities that are expected be held for more than a year. Best characterized as a mixture of accruals with varying degrees of reliability, so classify as medium reliability.
ΔFINL	Extended	High	Category contains interest-bearing financial obligations. Typically measured with a high degree of reliability using effective interest rate at origination.
ΔFIN	Initial	High	Combination of ΔSTI (high reliability), ΔLTI (medium reliability) and ΔFINL (high reliability) suggests high reliability.

ΔWC is the change in working capital accruals, defined as WC_t - WC_{t-1}. Where WC = Current Operating Assets (COA) - Current Operating Liabilities (COL) where COA=Current Assets (Compustat Item #4) - Cash and Short Term Investments (STI) (Compustat Item #1). COL=Current Liabilities (Compustat Item #5) - Debt in Current Liabilities (Compustat Item #34).

ΔNCO is defined as NCO_t - NCO_{t-1}. Where NCO = Non-Current Operating Assets (NCOA) - Non-Current Operating Liabilities (NCOL) where NCOA = Total Assets (Compustat item #6) - Current Assets (Compustat Item #4) - Investments and Advances (Compustat Item #32). NCOL = Total Liabilities (Compustat Item #181) - Current Liabilities (Compustat Item #5) – Long-term debt (Compustat Item #9).

ΔFIN is defined as FIN_t - FIN_{t-1}. Where FIN = Financial Assets (FINA) - Financial Liabilities (FINL). FINA = Short Term Investments (STI) (Compustat Item #193) + Long Term Investments (LTI) (Compustat Item #32). FINL= Long term debt (Compustat Item #9) + Debt in Current Liabilities (Compustat Item #34) + Preferred Stock (Compustat Item #130).

TABLE 3

Descriptive Statistics and Correlations for the Initial Accrual Decomposition.

Panel A: Descriptive Statistics

	Mean	**Std. Dev.**	**25%**	**Median**	**75%**
$TACC_t$	0.052	0.181	-0.007	0.039	0.098
ΔWC_t	0.022	0.108	-0.020	0.015	0.063
ΔNCO_t	0.051	0.151	-0.009	0.025	0.082
ΔFIN_t	-0.021	0.181	-0.080	-0.006	0.041
ROA_t	0.070	0.175	0.032	0.093	0.151
ROA_{t+1}	0.063	0.177	0.025	0.089	0.146
$FROA_{t+2}$	0.078	0.130	0.040	0.091	0.140
RET_{t+1}	0.010	0.715	-0.330	-0.078	0.199

The sample consists of 108,617 firm years from 1962 to 2001.

TACC is total accruals from the balance sheet approach. It is calculated as ΔWorking Capital (ΔWC) + ΔNon-Current Operating (ΔNCO) + ΔFinancial (ΔFIN). Total accruals and all of its components (described below) are deflated by average total assets.

ΔWC is defined as WC_t - WC_{t-1}. Where WC = Current Operating Assets (COA) - Current Operating Liabilities (COL) where COA=Current Assets (Compustat Item #4) - Cash and Short Term Investments (STI) (Compustat Item #1). COL=Current Liabilities (Compustat Item #5) - Debt in Current Liabilities (Compustat Item #34).

ΔNCO is defined as NCO_t - NCO_{t-1}. Where NCO = Non-Current Operating Assets (NCOA) - Non-Current Operating Liabilities (NCOL) where NCOA = Total Assets (Compustat item #6) - Current Assets (Compustat Item #4) - Investments and Advances (Compustat Item #32). NCOL = Total Liabilities (Compustat Item #181) - Current Liabilities (Compustat Item #5) – Long-term debt (Compustat Item #9).

ΔFIN is defined as FIN_t - FIN_{t-1}. Where FIN = Financial Assets (FINA) - Financial Liabilities (FINL). FINA = Short Term Investments (STI) (Compustat Item #193) + Long Term Investments (LTI) (Compustat Item #32). FINL= Long term debt (Compustat Item #9) + Debt in Current Liabilities (Compustat Item #34) + Preferred Stock (Compustat Item #130).

ROA is operating income after depreciation (Compustat Item #178) deflated by average total assets.

FROA is the average ROA over the next four years. For example, $FROA_{t+2}$ is the average ROA for years t+2 through t+5. There are 72,475 observations for FROA.

RET is the annual buy-hold size-adjusted return. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same size-matched decile, where size is measured as market capitalization at the beginning of the return cumulation period. The return cumulation period begins four months after the end of the fiscal year.

Panel B: Correlation Matrix - Pearson (above diagonal) and Spearman (below diagonal) (p-values shown in italics below correlations)

	$TACC_t$	ΔWC_t	ΔNCO_t	ΔFIN_t	ROA_t	ROA_{t+1}	$FROA_{t+2}$	RET_{t+1}
$TACC_t$	--	0.392 *(0.0001)*	0.423 *(0.0001)*	0.418 *(0.0001)*	0.250 *(0.0001)*	0.125 *(0.0001)*	0.072 *(0.0001)*	-0.058 *(0.0001)*
ΔWC_t	0.419 *(0.0001)*	--	0.108 *(0.0001)*	-0.288 *(0.0001)*	0.224 *(0.0001)*	0.105 *(0.0001)*	0.059 *(0.0001)*	-0.046 *(0.0001)*
ΔNCO_t	0.416 *(0.0001)*	0.180 *(0.0001)*	--	-0.475 *(0.0001)*	0.085 *(0.0001)*	0.024 *(0.0001)*	0.020 *(0.0001)*	-0.062 *(0.0001)*
ΔFIN_t	0.226 *(0.0001)*	-0.354 *(0.0001)*	-0.470 *(0.0001)*	--	0.043 *(0.0001)*	0.038 *(0.0001)*	0.014 *(0.0003)*	0.021 *(0.0001)*
ROA_t	0.437 *(0.0001)*	0.261 *(0.0001)*	0.215 *(0.0001)*	0.061 *(0.0001)*	--	0.792 *(0.0001)*	0.613 *(0.0001)*	-0.003 *(0.3098)*
ROA_{t+1}	0.274 *(0.0001)*	0.140 *(0.0001)*	0.106 *(0.0001)*	0.081 *(0.0001)*	0.776 *(0.0001)*	--	0.696 *(0.0001)*	0.138 *(0.0001)*
$FROA_{t+2}$	0.164 *(0.0001)*	0.072 *(0.0001)*	0.071 *(0.0001)*	0.046 *(0.0001)*	0.566 *(0.0001)*	0.668 *(0.0001)*	--	0.126 *(0.0001)*
RET_{t+1}	-0.049 *(0.0001)*	-0.060 *(0.0001)*	-0.066 *(0.0001)*	0.052 *(0.0001)*	0.087 *(0.0001)*	0.301 *(0.0001)*	0.272 *(0.0001)*	--

All variables are as defined in panel A.

TABLE 4
Descriptive Statistics and Correlations for Extended Accrual Decomposition.

Panel A: Descriptive Statistics

	Mean	Std. Dev.	25%	Median	75%
$TACC_t$	0.052	0.181	-0.007	0.039	0.098
ΔCOA_t	0.047	0.133	-0.006	0.031	0.094
ΔCOL_t	0.025	0.084	-0.008	0.017	0.052
$\Delta NCOA_t$	0.057	0.153	-0.006	0.029	0.089
$\Delta NCOL_t$	0.006	0.047	0.000	0.002	0.011
$\Delta FINA_t$	0.009	0.107	-0.003	0	0.007
$\Delta FINL_t$	0.030	0.151	-0.021	0.001	0.066
ΔSTI_t	0.006	0.096	0	0	0
ΔLTI_t	0.003	0.046	0	0	0
ROA_t	0.070	0.175	0.032	0.093	0.151
ROA_{t+1}	0.063	0.177	0.025	0.089	0.146
$FROA_{t+2}$	0.078	0.130	0.040	0.091	0.140
RET_{t+1}	0.010	0.715	-0.330	-0.078	0.199

The sample consists of 108,617 firm years from 1962 to 2001.

TACC is total accruals from the balance sheet approach. It is calculated as ΔWorking Capital (ΔWC) + ΔNon-Current Operating (ΔNCO) + ΔFinancial (ΔFIN). This can be equivalently written as (ΔCOA - ΔCOL) + (ΔNCOA - ΔNCOL) + (ΔFINA - ΔFINL). Total accruals and all of its components (described below) are deflated by average total assets.

ΔCOA is change in current operating assets defined as COA_t - COA_{t-1}. Where COA = Current Assets (Compustat Item #4) - Cash and Short Term Investments (STI) (Compustat Item #1).

ΔCOL is change in current operating liabilities defined as COL_t - COL_{t-1}. Where COL=Current Liabilities (Compustat Item #5) - Debt in Current Liabilities (Compustat Item #34).

ΔNCOA is change in non-current operating assets defined as $NCOA_t$ - $NCOA_{t-1}$. Where NCOA = Total Assets (Compustat item #6) - Current Assets (Compustat Item #4) –Investments and Advances (Compustat Item #32).

ΔNCOL is change in non-current operating liabilities defined as $NCOL_t$ - $NCOL_{t-1}$. Where NCOL = Total Liabilities (Compustat Item #181) - Current Liabilities (Compustat Item #5) - Long-term debt (Compustat Item #9).

ΔFINA is change in financial assets defined as $FINA_t$ - $FINA_{t-1}$. Where $FINA_t$ = Short Term Investments (STI) (Compustat Item #193) + Long Term Investments (LTI) (Compustat Item #32).

ΔFINL is change in financial liabilities defined as $FINL_t$ - $FINL_{t-1}$. Where FINL= Long term debt (Compustat Item #9) + Debt in Current Liabilities (Compustat Item #34) + Preferred Stock (Compustat Item #130).

ΔSTI is change in short term investments.

ΔLTI is change in long-term investments.

ROA is operating income after depreciation (Compustat Item #178) deflated by average total assets.

FROA is the average ROA over the next four years. For example, $FROA_{t+2}$ is the average ROA for years t+2 through t+5. There are 72,475 observations for FROA.

RET is the annual buy-hold size-adjusted return. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same size-matched decile, where size is measured as market capitalization at the beginning of the return cumulation period. The return cumulation period begins four months after the end of the fiscal year.

Panel B: Correlation Matrix - Pearson (above diagonal) and Spearman (below diagonal) (p-values shown in italics below correlations)

	$TACC_t$	ΔCOA_t	ΔCOL_t	$\Delta NCOA_t$	$\Delta NCOL_t$	$\Delta FINA_t$	$\Delta FINL_t$	ROA_t	ROA_{t+1}	$FROA_{t+2}$	RET_{t+1}
$TACC_t$	--	0.376 *(0.0001)*	0.090 *(0.0001)*	0.401 *(0.0001)*	-0.045 *(0.0001)*	0.481 *(0.0001)*	-0.175 *(0.0001)*	0.250 *(0.0001)*	0.125 *(0.0001)*	0.072 *(0.0001)*	-0.058 *(0.0001)*
ΔCOA_t	0.441 *(0.0001)*	--	0.583 *(0.0001)*	0.295 *(0.0001)*	0.084 *(0.0001)*	-0.009 *(0.0001)*	0.368 *(0.0001)*	0.222 *(0.0001)*	0.127 *(0.0001)*	0.068 *(0.0001)*	-0.055 *(0.0001)*
ΔCOL_t	0.173 *(0.0001)*	0.560 *(0.0001)*	--	0.304 *(0.0001)*	0.058 *(0.0001)*	0.082 *(0.0001)*	0.207 *(0.0001)*	0.061 *(0.0001)*	0.065 *(0.0001)*	0.033 *(0.0001)*	-0.028 *(0.0001)*
$\Delta NCOA_t$	0.409 *(0.0001)*	0.362 *(0.0001)*	0.319 *(0.0001)*	--	0.212 *(0.0001)*	-0.020 *(0.0001)*	0.545 *(0.0001)*	0.090 *(0.0001)*	0.029 *(0.0001)*	0.024 *(0.0001)*	-0.063 *(0.0001)*
$\Delta NCOL_t$	0.102 *(0.0001)*	0.128 *(0.0001)*	0.094 *(0.0001)*	0.296 *(0.0001)*	--	0.045 *(0.0001)*	0.029 *(0.0001)*	0.020 *(0.0001)*	0.017 *(0.0001)*	0.012 *(0.0016)*	-0.006 *(0.0544)*
$\Delta FINA_t$	0.261 *(0.0001)*	-0.033 *(0.0001)*	0.068 *(0.0001)*	-0.039 *(0.0001)*	0.054 *(0.0001)*	--	0.009 *(0.0032)*	0.050 *(0.0001)*	0.031 *(0.0001)*	0.003 *(0.3752)*	-0.022 *(0.0001)*
$\Delta FINL_t$	-0.056 *(0.0001)*	0.372 *(0.0001)*	0.174 *(0.0001)*	0.504 *(0.0001)*	0.104 *(0.0001)*	-0.001 *(0.8206)*	--	-0.008 *(0.0069)*	-0.018 *(0.0001)*	-0.012 *(0.0010)*	-0.040 *(0.0001)*
ROA_t	0.437 *(0.0001)*	0.325 *(0.0001)*	0.183 *(0.0336)*	0.239 *(0.0001)*	0.186 *(0.0001)*	0.100 *(0.0001)*	0.004 *(0.1891)*	--	0.792 *(0.0001)*	0.613 *(0.0000)*	-0.003 *(0.3098)*
ROA_{t+1}	0.274 *(0.0001)*	0.205 *(0.0001)*	0.149 *(0.0001)*	0.123 *(0.0001)*	0.137 *(0.0001)*	0.070 *(0.0001)*	-0.038 *(0.0001)*	0.776 *(0.0001)*	--	0.696 *(0.0001)*	0.138 *(0.0001)*
$FROA_{t+2}$	0.164 *(0.0001)*	0.112 *(0.0001)*	0.082 *(0.0001)*	0.082 *(0.0001)*	0.090 *(0.0001)*	0.044 *(0.0001)*	-0.015 *(0.0001)*	0.566 *(0.0001)*	0.668 *(0.0001)*	--	0.126 *(0.0001)*
RET_{t+1}	-0.049 *(0.0001)*	-0.070 *(0.0001)*	-0.034 *(0.0001)*	-0.059 *(0.0001)*	0.032 *(0.0001)*	0.001 *(0.7008)*	-0.057 *(0.0001)*	0.087 *(0.0001)*	0.301 *(0.0001)*	0.272 *(0.0001)*	--

All variables are as defined in panel A.

TABLE 5

Time-Series Means and t-Statistics for Coefficients from Annual Cross-Sectional Regressions of Next Year's Accounting Rate of Return on This Year's Accounting Rate of Return and This Year's Accruals. The Sample Consists of 108,617 Firm-Year Observations from 1962-2001.

Panel A: OLS regressions for Total Accruals

$$ROA_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2 TACC_t + \upsilon_{t+1}$$

	Intercept	ROA	TACC	Adj. R^2
Mean Coefficient	0.012	0.766		0.582
t-statistic				
Mean Coefficient	0.014	0.796	-0.082	0.588
t-statistic			(-16.13)	

Panel B: OLS regressions for the Initial Accrual Decomposition

$$ROA_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2 \Delta WC_t + \rho_3 \Delta NCO_t + \rho_4 \Delta FIN_t + \upsilon_{t+1}$$

	Intercept	ROA	ΔWC	ΔNCO	ΔFIN	Adj. R^2
Predicted Reliability			**Medium**	**Low/ Medium**	**High**	
Mean Coef.	0.013	0.784	-0.116			0.589
t-statistic			(-15.05)			
Mean Coef.	0.014	0.772		-0.047		0.584
t-statistic				(-12.39)		
Mean Coef.	0.013	0.764			0.015	0.583
t-statistic					(2.86)	
Mean Coef.	0.015	0.802	-0.138	-0.074	-0.052	0.593
t-statistic			(-19.05)	(-11.18)	(-8.71)	

Panel C: OLS regressions for the Extended Accrual Decomposition

$$ROA_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2\ \Delta COA_t - \rho_3\ \Delta COL_t + \rho_4\ \Delta NCOA_t - \rho_5\ \Delta NCOL_t + \rho_6\ \Delta STI_t + \rho_7\ \Delta LTI_t - \rho_8\ \Delta\ FINL_t + \upsilon_{t+1}$$

	Intercept	ROA	ΔCOA	-ΔCOL	ΔNCOA	-ΔNCOL	ΔSTI	ΔLTI	-ΔFINL	Adj. R^2
Predicted Reliability			**Low**	**High**	**Low**	**Medium**	**High**	**Medium**	**High**	
Mean Coef.	0.014	0.780	-0.064							0.586
t-statistic			(-12.08)							
Mean Coef.	0.012	0.764		-0.035						0.583
t-statistic				(-4.74)						
Mean Coef.	0.014	0.772			-0.047					0.584
t-statistic					(-12.63)					
Mean Coef.	0.012	0.766				0.012				0.582
t-statistic						(0.96)				
Mean Coef.	0.012	0.765					0.036			0.582
t-statistic							(1.05)			
Mean Coef.	0.013	0.766						-0.045		0.583
t-statistic								(-4.11)		
Mean Coef.	0.013	0.765							0.023	0.584
t-statistic									(3.83)	
Mean Coef.	0.014	0.801	-0.137	-0.178	-0.084	-0.075	0.004	-0.084	-0.056	0.595
t-statistic			(-18.81)	(-18.13)	(-13.03)	(-6.48)	(0.10)	(-6.33)	(-8.17)	

The sample consists of 108,617 firm years from 1962 to 2001. Regression results are based on 40 annual regression using the Fama and MacBeth (1973) approach.

TACC is total accruals from the balance sheet approach. It is calculated as ΔWorking Capital (ΔWC) + ΔNon-Current Operating (ΔNCO) + ΔFinancial (ΔFIN). This can be equivalently written as (ΔCOA - ΔCOL) + (ΔNCOA - ΔNCOL) + (ΔFINA - ΔFINL). Total accruals and all of its components (described below) are deflated by average total assets.

ΔWC is defined as WC_t - WC_{t-1}. Where WC = Current Operating Assets (COA) - Current Operating Liabilities (COL) where COA=Current Assets (Compustat Item #4) - Cash and Short Term Investments (STI) (Compustat Item #1). COL=Current Liabilities (Compustat Item #5) - Debt in Current Liabilities (Compustat Item #34).
ΔCOA is change in current operating assets defined as COA_t - COA_{t-1}.
ΔCOL is change in current operating liabilities defined as COL_t - COL_{t-1}.

ΔNCO is defined as NCO_t - NCO_{t-1}. Where NCO = Non-Current Operating Assets (NCOA) - Non-Current Operating Liabilities (NCOL) where NCOA = Total Assets (Compustat item #6) - Current Assets (Compustat Item #4) - Investments and Advances (Compustat Item #32). NCOL = Total Liabilities (Compustat Item #181) - Current Liabilities (Compustat Item #5) – Long-term debt (Compustat Item #9).
ΔNCOA is change in non-current operating assets defined as $NCOA_t$ - $NCOA_{t-1}$.
ΔNCOL is change in non-current operating liabilities defined as $NCOL_t$ - $NCOL_{t-1}$.

ΔFIN is defined as FIN_t - FIN_{t-1}. Where FIN = Financial Assets (FINA) - Financial Liabilities (FINL). FINA = Short Term Investments (STI) (Compustat Item #193) + Long Term Investments (LTI) (Compustat Item #32). FINL= Long term debt (Compustat Item #9) + Debt in Current Liabilities (Compustat Item #34) + Preferred Stock (Compustat Item #130).
ΔFINA is change in financial assets defined as $FINA_t$ - $FINA_{t-1}$.
ΔFINL is change in financial liabilities defined as $FINL_t$ - $FINL_{t-1}$.
ΔSTI is change in short term investments.
ΔLTI is change in long-term investments.

ROA is operating income after depreciation (Compustat Item #178) deflated by average total assets.

TABLE 6

Time-Series Means and t-Statistics for Coefficients from Annual Cross-Sectional Regressions of the Average Future Accounting Rate of Return (FROA) on This Year's Accounting Rate of Return and This Year's Accruals. The Sample Consists of 72,475 Firm-Year Observations from 1962-2001.

Panel A: OLS Regressions for Total Accruals

$FROA_{t+2} = \rho_0 + \rho_1 ROA_t + \rho_2 TACC_{,t} + \upsilon_{t+2}$

	Intercept	ROA	TACC	Adj. R^2
Mean Coefficient t-statistic	0.038	0.494		0.342
Mean Coefficient t-statistic	0.039	0.539	-0.113 (-14.63)	0.358

Panel B: OLS regressions for the Initial Accrual Decomposition

$FROA_{t+2} = \rho_0 + \rho_1 ROA_t + \rho_2 \Delta WC_t + \rho_3 \Delta NCO_t + \rho_4 \Delta FIN_t + \upsilon_{t+2}$

	Intercept	ROA	ΔWC	ΔNCO	ΔFIN	Adj. R^2
Predicted Reliability			**Medium**	**Low/ Medium**	**High**	
Mean Coef. t-statistic	0.039	0.510	-0.093 (-11.02)			0.350
Mean Coef. t-statistic	0.040	0.500		-0.050 (-7.83)		0.346
Mean Coef. t-statistic	0.038	0.494			-0.006 (-1.07)	0.343
Mean Coef. t-statistic	0.040	0.541	-0.139 (-15.17)	-0.106 (-11.55)	-0.093 (-12.98)	0.361

Panel C: OLS regressions for the Extended Accrual Decomposition

$FROA_{t+2} = \rho_0 + \rho_1 ROA_t + \rho_2 \Delta COA_t - \rho_3 \Delta COL_t + \rho_4 \Delta NCOA_t - \rho_5 \Delta NCOL_t + \rho_6 \Delta STI_t + \rho_7 \Delta LTI_t - \rho_8 \Delta FINL_t + \upsilon_{t+2}$

	Intercept	ROA	ΔCOA	-ΔCOL	ΔNCOA	-ΔNCOL	ΔSTI	ΔLTI	-ΔFINL	Adj. R^2
Predicted Reliability			**Low**	**High**	**Low**	**Medium**	**High**	**Medium**	**High**	
Mean Coef. t-statistic	0.040	0.516	-0.085 (-13.48)							0.352
Mean Coef. t-statistic	0.039	0.501		0.057 (5.22)						0.345
Mean Coef. t-statistic	0.040	0.501			-0.049 (-7.72)					0.346
Mean Coef. t-statistic	0.038	0.500				0.029 (1.65)				0.343
Mean Coef. t-statistic	0.038	0.495					0.015 (0.26)			0.344
Mean Coef. t-statistic	0.038	0.494						-0.070 (-4.48)		0.343
Mean Coef. t-statistic	0.039	0.494							0.013 (2.43)	0.343
Mean Coef. t-statistic	0.040	0.547	-0.146 (-16.44)	-0.093 (-7.00)	-0.103 (-11.78)	-0.088 (-5.11)	-0.018 (-0.28)	-0.131 (-8.31)	-0.098 (-13.89)	0.366

The sample consists of 72,475 firm years from 1962 to 2001. Regression results are based on 40 annual regression using the Fama and MacBeth (1973) approach.

TACC is total accruals from the balance sheet approach. It is calculated as ΔWorking Capital (ΔWC) + ΔNon-Current Operating (ΔNCO) + ΔFinancial (ΔFIN). This can be equivalently written as (ΔCOA - ΔCOL) + (ΔNCOA - ΔNCOL) + (ΔFINA - ΔFINL). Total accruals and all of its components (described below) are deflated by average total assets.

ΔWC is defined as WC_t - WC_{t-1}. Where WC = Current Operating Assets (COA) - Current Operating Liabilities (COL) where COA=Current Assets (Compustat Item #4) - Cash and Short Term Investments (STI) (Compustat Item #1). COL=Current Liabilities (Compustat Item #5) - Debt in Current Liabilities (Compustat Item #34).
ΔCOA is change in current operating assets defined as COA_t - COA_{t-1}.
ΔCOL is change in current operating liabilities defined as COL_t - COL_{t-1}.

ΔNCO is defined as NCO_t - NCO_{t-1}. Where NCO = Non-Current Operating Assets (NCOA) - Non-Current Operating Liabilities (NCOL) where NCOA = Total Assets (Compustat item #6) - Current Assets (Compustat Item #4) - Investments and Advances (Compustat Item #32). NCOL = Total Liabilities (Compustat Item #181) - Current Liabilities (Compustat Item #5) – Long-term debt (Compustat Item #9).
ΔNCOA is change in non-current operating assets defined as $NCOA_t$ - $NCOA_{t-1}$.
ΔNCOL is change in non-current operating liabilities defined as $NCOL_t$ - $NCOL_{t-1}$.

ΔFIN is defined as FIN_t - FIN_{t-1}. Where FIN = Financial Assets (FINA) - Financial Liabilities (FINL). FINA = Short Term Investments (STI) (Compustat Item #193) + Long Term Investments (LTI) (Compustat Item #32). FINL= Long term debt (Compustat Item #9) + Debt in Current Liabilities (Compustat Item #34) + Preferred Stock (Compustat Item #130).
ΔFINA is change in financial assets defined as $FINA_t$ - $FINA_{t-1}$.
ΔFINL is change in financial liabilities defined as $FINL_t$ - $FINL_{t-1}$.
ΔSTI is change in short term investments.
ΔLTI is change in long-term investments.

ROA is operating income after depreciation (Compustat Item #178) deflated by average total assets.

FROA is the average ROA over the next four years. For example, $FROA_{t+2}$ is the average ROA for years t+2 through t+5.

TABLE 7

Additional Tests Investigating How the Change in Operating Assets (ΔOA) and the Change in Operating Liabilities (ΔOL) Relate to Next Year's Accounting Rate of Return. The Sample Consists of 108,617 Firm-Year Observations from 1962-2001.

Panel A: Mean Coefficients and t-statistics from Annual Cross-Sectional Regressions Analyzing a Financing Decomposition of ΔOA.

$$ROA_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2\, \Delta OA_t + \upsilon_{t+1}$$

$$ROA_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2\, \Delta OL_t + \rho_3 \Delta FINL_t - \rho_4 \Delta FA_t + \rho_5\, \Delta Equity_t + \upsilon_{t+1}$$

	Intercept	*ROA*	*ΔOA*	*ΔOL*	*ΔFINL*	*-ΔFA*	*ΔEquity*	*Adj. R^2*
Mean Coef. t-statistic	0.015	0.782	-0.044 (-14.93)					0.586
Mean Coef. t-statistic	0.013	0.817		0.047 (6.61)	-0.039 (-7.84)	-0.049 (-8.73)	-0.106 (-12.22)	0.595

Panel B: Mean Future Change in the Accounting Rate of Return (ΔROA_{t+1}) Partitioned by Independent Quintile Sorts on ΔOA and ΔOL (Number of Observations in Parentheses).

	ΔOL					
ΔOA	Low	2	3	4	High	Total Avg.
Low	0.010 (10,991)	0.015 (4,809)	0.023 (2,709)	0.032 (1,837)	0.065 (1,364)	0.018 (21,710)
2	-0.011 (4,763)	-0.005 (6,997)	0.000 (5,326)	0.005 (3,179)	0.027 (1,465)	-0.001 (21,730)
3	-0.019 (2,807)	-0.011 (5,132)	-0.007 (6,337)	-0.003 (5,142)	0.008 (2,313)	-0.007 (21,731)
4	-0.037 (2,009)	-0.024 (3,282)	-0.017 (4,927)	-0.015 (6,580)	-0.006 (4,931)	-0.017 (21,729)
High	-0.040 (1,140)	-0.035 (1,510)	-0.030 (2,431)	-0.031 (4,992)	-0.026 (11,644)	-0.029 (21,717)
Total Average	-0.006 (21,710)	-0.007 (21,730)	-0.006 (21,730)	-0.009 (21,730)	-0.009 (21,717)	

ΔOA is the change in operating assets, defined as ΔCOA + ΔNCOA.

ΔCOA is change in current operating assets defined as COA_t - COA_{t-1}. COA=Current Assets (Compustat Item #4) - Cash and Short Term Investments (STI) (Compustat Item #1). COA is deflated by average total assets.

ΔNCOA is change in non-current operating assets defined as $NCOA_t$ - $NCOA_{t-1}$. NCOA = Total Assets (Compustat Item #6) - Current Assets (Compustat Item #4) - Investments and Advances (Compustat Item #32). NCOA is deflated by average total assets.

ΔOL is the change in operating liabilities, defined as ΔCOL + ΔNCOL.

ΔCOL is change in current operating liabilities defined as COL_t - COL_{t-1}. COL=Current Liabilities (Compustat Item #5) - Debt in Current Liabilities (Compustat Item #34). COL is deflated by average total assets.

ΔNCOL is change in non-current operating liabilities defined as $NCOL_t$ - $NCOL_{t-1}$. NCOL = Total Liabilities (Compustat Item #181) - Current Liabilities (Compustat Item #5) – Long-term debt (Compustat Item #9). NCOL is deflated by average total assets.

ΔFINL is the change in financial liabilities (inclusive of preferred stock) defined as $FINL_t$ - $FINL_{t-1}$. FINL = Long-term debt (Compustat Item #9) + Debt in Current Liabilities (Compustat Item #34) + Preferred Stock (Compustat Item #130). FINL is deflated by average total assets.

ΔFA is the change in financial assets defined as FA_t - FA_{t-1}. FA = Cash and cash equivalents (Compustat Item #1) + Investments and Advances (Compustat Item #32). FA is deflated by average total assets.

ΔEquity is the change in external equity financing defined as EQ_t - EQ_{t-1}. EQ = Book value of common equity (Compustat Item #60). EQ is deflated by average total assets.

ΔROA_{t+1} is the change in the accounting rate of return defined as ROA_{t+1} – ROA_t, where ROA is operating income after depreciation (Compustat Item #178) deflated by average total assets in year t+1.

TABLE 8

Time-Series Means and t-Statistics for Coefficients from Annual Cross-Sectional Regressions of Next Year's Size Adjusted Stock Return on This Year's Accruals. The Sample Consists of 108,617 Firm-Year Observations for the Period 1962-2001.

Panel A: OLS regressions for Total Accruals

$RET_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2 TACC_t + \upsilon_{t+1}$

	Intercept	ROA	TACC	Adj. R^2
Mean Coefficient	0.007	0.020		0.006
t-statistic	(0.86)	(0.36)		
Mean Coefficient	0.013	0.083	-0.197	0.011
t-statistic	(1.52)	(1.47)	(-6.38)	

Panel B: OLS regressions for the Initial Accrual Decomposition

$RET_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2 \Delta WC_t + \rho_3 \Delta NCO_t + \rho_4 \Delta FIN_t + \upsilon_{t+1}$

	Intercept	ROA	ΔWC	ΔNCO	ΔFIN	Adj. R^2
Predicted Reliability			**Medium**	**Low/ Medium**	**High**	
Mean Coef.	0.010	0.069	-0.309			0.011
t-statistic	(1.19)	(1.23)	(-8.72)			
Mean Coef.	0.019	0.048		-0.268		0.012
t-statistic	(2.14)	(0.86)		(-8.76)		
Mean Coef.	0.012	0.007			0.123	0.010
t-statistic	(1.40)	(0.12)			(5.85)	
Mean Coef.	0.022	0.094	-0.300	-0.271	-0.054	0.016
t-statistic	(2.45)	(1.69)	(-7.54)	(-6.77)	(-1.94)	

Panel C: OLS regressions for the Extended Accrual Decomposition

$RET_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2 \Delta COA_t - \rho_3 \Delta COL_t + \rho_4 \Delta NCOA_t - \rho_5 \Delta NCOL_t + \rho_6 \Delta STI_t + \rho_7 \Delta LTI_t - \rho_8 \Delta FINL_t + \upsilon_{t+1}$

	Intercept	ROA	ΔCOA	-ΔCOL	ΔNCOA	-ΔNCOL	ΔSTI	ΔLTI	-ΔFINL	Adj. R^2
Predicted Reliability			**Low**	**High**	**Low**	**Medium**	**High**	**Medium**	**High**	
Mean Coef.	0.016	0.085	-0.300							0.012
t-statistic	(1.74)	(1.55)	(-8.71)							
Mean Coef.	0.012	0.031		0.213						0.008
t-statistic	(1.29)	(0.57)		(4.49)						
Mean Coef.	0.021	0.049			-0.263					0.012
t-statistic	(2.30)	(0.88)			(-8.44)					
Mean Coef.	0.008	0.021				0.053				0.007
t-statistic	(0.88)	(0.37)				(0.65)				
Mean Coef.	0.008	0.016					0.054			0.007
t-statistic	(0.94)	(0.29)					(0.43)			
Mean Coef.	0.008	0.021						-0.204		0.007
t-statistic	(0.92)	(0.38)						(-3.38)		
Mean Coef.	0.014	0.015							0.206	0.010
t-statistic	(1.64)	(0.26)							(8.01)	
Mean Coef.	0.024	0.106	-0.309	-0.200	-0.250	-0.233	0.026	-0.253	-0.027	0.018
t-statistic	(2.51)	(1.93)	(-7.70)	(-4.10)	(-6.42)	(-2.98)	(0.17)	(-4.18)	(-0.90)	

The sample consists of 108,617 firm years from 1962 to 2001. Regression results are based on 40 annual regression using the Fama and MacBeth (1973) approach.

TACC is total accruals from the balance sheet approach. It is calculated as ΔWorking Capital (ΔWC) + ΔNon-Current Operating (ΔNCO) + ΔFinancial (ΔFIN). This can be equivalently written as (ΔCOA - ΔCOL) + (ΔNCOA - ΔNCOL) + (ΔFINA - ΔFINL). Total accruals and all of its components (described below) are deflated by average total assets.

ΔWC is defined as WC_t - WC_{t-1}. Where WC = Current Operating Assets (COA) - Current Operating Liabilities (COL) where COA=Current Assets (Compustat Item #4) - Cash and Short Term Investments (STI) (Compustat Item #1). COL=Current Liabilities (Compustat Item #5) - Debt in Current Liabilities (Compustat Item #34).
ΔCOA is change in current operating assets defined as COA_t - COA_{t-1}.
ΔCOL is change in current operating liabilities defined as COL_t - COL_{t-1}.

ΔNCO is defined as NCO_t - NCO_{t-1}. Where NCO = Non-Current Operating Assets (NCOA) - Non-Current Operating Liabilities (NCOL) where NCOA = Total Assets (Compustat item #6) - Current Assets (Compustat Item #4) - Investments and Advances (Compustat Item #32). NCOL = Total Liabilities (Compustat Item #181) - Current Liabilities (Compustat Item #5) – Long-term debt (Compustat Item #9).
ΔNCOA is change in non-current operating assets defined as $NCOA_t$ - $NCOA_{t-1}$.
ΔNCOL is change in non-current operating liabilities defined as $NCOL_t$ - $NCOL_{t-1}$.

ΔFIN is defined as FIN_t - FIN_{t-1}. Where FIN = Financial Assets (FINA) - Financial Liabilities (FINL). FINA = Short Term Investments (STI) (Compustat Item #193) + Long Term Investments (LTI) (Compustat Item #32). FINL= Long term debt (Compustat Item #9) + Debt in Current Liabilities (Compustat Item #34) + Preferred Stock (Compustat Item #130).
ΔFINA is change in financial assets defined as $FINA_t$ - $FINA_{t-1}$.
ΔFINL is change in financial liabilities defined as $FINL_t$ - $FINL_{t-1}$.
ΔSTI is change in short term investments.
ΔLTI is change in long-term investments.

ROA is operating income after depreciation (Compustat Item #178) deflated by average total assets.

RET is the annual buy-hold size-adjusted return. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same size-matched decile, where size is measured as market capitalization at the beginning of the return cumulation period. The return cumulation period begins four months after the end of the fiscal year.

TABLE 9
Additional Tests Investigating How the Change in Operating Assets (ΔOA) and the Change in Operating Liabilities (ΔOL) Relate to Next Year's Size Adjusted Annual Stock Returns (RET_{t+1}). The Sample Consists of 108,617 Firm-Year Observations for the Period 1962-2001.

Panel A: Mean Coefficients and t-statistics from Annual Cross-Sectional Regressions Analyzing a Financing Decomposition of ΔOA.

$$RET_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2\, \Delta OA_t + \upsilon_{t+1}$$

$$RET_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2\, \Delta OL_t + \rho_3 \Delta FINL_t - \rho_4 \Delta FA_t + \rho_5\, \Delta Equity_t + \upsilon_{t+1}$$

	Intercept	*ROA*	*ΔOA*	*ΔOL*	*ΔFINL*	*-ΔFA*	*ΔEquity*	*Adj. R^2*
Mean Coef.	0.024	0.096	-0.228					0.014
t-statistic			(-11.12)					
Mean Coef.	0.024	0.105		-0.034	-0.255	-0.179	-0.269	0.017
t-statistic				(-1.04)	(-9.76)	(-7.29)	(-6.25)	

Panel B: Next Year's Mean Size-Adjusted Annual Stock Return (RET_{t+1}) Partitioned by Independent Quintile Sorts on ΔOA and ΔOL (Number of Observations in Parentheses).

	ΔOL					
ΔOA	Low	2	3	4	High	Total Avg.
Low	0.062 (10,991)	0.066 (4,809)	0.099 (2,709)	0.060 (1,837)	0.102 (1,364)	0.069 (21,710)
2	0.026 (4,763)	0.022 (6,997)	0.041 (5,326)	0.081 (3,179)	0.092 (1,465)	0.041 (21,730)
3	-0.022 (2,807)	0.012 (5,132)	0.023 (6,337)	0.042 (5,142)	0.032 (2,313)	0.020 (21,731)
4	-0.062 (2,009)	-0.021 (3,282)	-0.016 (4,927)	-0.016 (6,580)	0.045 (4,931)	-0.008 (21,729)
High	-0.094 (1,140)	-0.093 (1,510)	-0.057 (2,431)	-0.066 (4,992)	-0.075 (11,644)	-0.073 (21,717)
Total Average	0.023 (21,710)	0.015 (21,730)	0.019 (21,730)	0.007 (21,730)	-0.014 (21,717)	

ΔOA is the change in operating assets, defined as ΔCOA + ΔNCOA.

ΔCOA is change in current operating assets defined as $COA_t - COA_{t-1}$. COA=Current Assets (Compustat Item #4) - Cash and Short Term Investments (STI) (Compustat Item #1). COA is deflated by average total assets.

ΔNCOA is change in non-current operating assets defined as $NCOA_t - NCOA_{t-1}$. NCOA = Total Assets (Compustat Item #6) - Current Assets (Compustat Item #4) - Investments and Advances (Compustat Item #32). NCOA is deflated by average total assets.

ΔOL is the change in operating liabilities, defined as ΔCOL + ΔNCOL.

ΔCOL is change in current operating liabilities defined as COL_t - COL_{t-1}. COL=Current Liabilities (Compustat Item #5) - Debt in Current Liabilities (Compustat Item #34). COL is deflated by average total assets.

ΔNCOL is change in non-current operating liabilities defined as $NCOL_t$ - $NCOL_{t-1}$. NCOL = Total Liabilities (Compustat Item #181) - Current Liabilities (Compustat Item #5) – Long-term debt (Compustat Item #9). NCOL is deflated by average total assets.

ΔFINL is the change in financial liabilities (inclusive of preferred stock) defined as $FINL_t$ - $FINL_{t-1}$. FINL = Long-term debt (Compustat Item #9) + Debt in Current Liabilities (Compustat Item #34) + Preferred Stock (Compustat Item #130). FINL is deflated by average total assets.

ΔFA is the change in financial assets defined as FA_t - FA_{t-1}. FA = Cash and cash equivalents (Compustat Item #1) + Investments and Advances (Compustat Item #32). FA is deflated by average total assets.

ΔEquity is the change in external equity financing defined as EQ_t - EQ_{t-1}. EQ = Book value of common equity (Compustat Item #60). EQ is deflated by average total assets.

RET is the annual buy-hold size-adjusted return. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same size-matched decile, where size is measured as market capitalization at the beginning of the return cumulation period. The return cumulation period begins four months after the end of the fiscal year.

TABLE 10
Next Year's Annual Mean Size-Adjusted Returns for Decile Portfolios Formed on Total Accruals and its Components. The Sample Covers 108,617 Firm-Year Observations for the Period 1962-2001.

Panel A: Portfolios constructed on Components of Initial Accrual Decomposition

Portfolio Rank	**TACC**	**ΔWC**	**ΔNCO**	**ΔNOA**	**ΔFIN**
Low	0.066	0.060	0.073	0.080	-0.061
2	0.038	0.056	0.053	0.081	-0.013
3	0.029	0.033	0.043	0.044	0.003
4	0.028	0.020	0.042	0.030	0.016
5	0.016	0.014	0.017	0.030	0.014
6	0.015	0.024	0.009	0.019	0.025
7	0.012	0.004	-0.003	-0.008	0.022
8	-0.011	-0.010	-0.013	-0.032	0.034
9	-0.026	-0.032	-0.029	-0.045	0.038
High	-0.067	-0.068	-0.092	-0.100	0.021
Hedge	0.133	0.128	0.165	0.180	-0.082
t-statistic	**10.25**	**10.56**	**14.26**	**14.91**	**-7.49**

Panel B: Portfolios constructed on Components of Extended Accrual Decomposition

Portfolio Rank	**ΔCOA**	**-ΔCOL**	**ΔNCOA**	**-ΔNCOL**	**Δ STI**	**Δ LTI**	**-Δ FINL**
Low	0.069	-0.027	0.070	-0.008	0.022	0.026	-0.076
2	0.061	0.001	0.054	-0.003	0.013	0.008	-0.024
3	0.029	0.001	0.049	0.019	0.005	0.015	-0.010
4	0.017	0.016	0.033	0.007	0.005	0.015	0.007
5	0.026	0.016	0.022	0.007	0.005	0.015	0.028
6	0.007	0.018	0.004	0.016	0.005	0.015	0.035
7	0.010	0.010	-0.001	0.033	0.005	0.015	0.032
8	-0.017	0.017	-0.009	0.007	0.005	0.015	0.038
9	-0.025	0.020	-0.029	0.019	0.016	0.002	0.044
High	-0.076	0.028	-0.091	0.003	0.015	-0.026	0.029
Hedge	0.145	-0.055	0.161	-0.011	0.007	0.052	-0.105
t-statistic	**11.79**	**-4.64**	**14.02**	**-1.08**	**0.71**	**5.40**	**-10.09**

Portfolios are formed based on total accruals and its components. Firm-year observations are ranked annually and assigned in equal numbers to decile portfolios based on the respective accrual component.

Hedge represents the net return generated by taking a long position in the 'Low' portfolio and an equal sized short position in the 'High' portfolio. T-statistic tests whether the hedge return is statistically different from zero.

TACC is total accruals from the balance sheet approach. It is calculated as ΔWorking Capital (ΔWC) + ΔNon-Current Operating (ΔNCO) + ΔFinancial (ΔFIN). This can be equivalently written as (ΔCOA - ΔCOL) + (ΔNCOA - ΔNCOL) + (ΔFINA - ΔFINL). Total accruals and all of its components (described below) are deflated by average total assets.

ΔWC is defined as WC_t - WC_{t-1}. Where WC = Current Operating Assets (COA) - Current Operating Liabilities (COL) where COA=Current Assets (Compustat Item #4) - Cash and Short Term Investments (STI) (Compustat Item #1). COL=Current Liabilities (Compustat Item #5) - Debt in Current Liabilities (Compustat Item #34).
ΔCOA is change in current operating assets defined as COA_t - COA_{t-1}.
ΔCOL is change in current operating liabilities defined as COL_t - COL_{t-1}.

ΔNCO is defined as NCO_t - NCO_{t-1}. Where NCO = Non-Current Operating Assets (NCOA) - Non-Current Operating Liabilities (NCOL) where NCOA = Total Assets (Compustat item #6) - Current Assets (Compustat Item #4) - Investments and Advances (Compustat Item #32). NCOL = Total Liabilities (Compustat Item #181) - Current Liabilities (Compustat Item #5) – Long-term debt (Compustat Item #9).
ΔNCOA is change in non-current operating assets defined as $NCOA_t$ - $NCOA_{t-1}$.
ΔNCOL is change in non-current operating liabilities defined as $NCOL_t$ - $NCOL_{t-1}$.

ΔNOA is defined as the sum of ΔWC and ΔNCO.

ΔFIN is defined as FIN_t - FIN_{t-1}. Where FIN = Financial Assets (FINA) - Financial Liabilities (FINL). FINA = Short Term Investments (STI) (Compustat Item #193) + Long Term Investments (LTI) (Compustat Item #32). FINL= Long term debt (Compustat Item #9) + Debt in Current Liabilities (Compustat Item #34) + Preferred Stock (Compustat Item #130).
ΔFINA is change in financial assets defined as $FINA_t$ - $FINA_{t-1}$.
ΔFINL is change in financial liabilities defined as $FINL_t$ - $FINL_{t-1}$.
ΔSTI is change in short term investments.
ΔLTI is change in long-term investments.

The portfolio returns are equal-weighted mean annual buy-hold size-adjusted return. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same size-matched decile, where size is measured as market capitalization at the beginning of the return cumulation period. The return cumulation period begins four months after the end of the fiscal year.