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THE NATURE AND AMOUNT OF INFORMATION REFLECTED IN CASH FLOWS AND ACCRUALS

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ABSTRACT

Based on stock price behavior around the release of annual reports, Wilson [1987] concludes that for a given amount of earnings, the market reacts more favorably the larger (smaller) are cash flows (current accruals). The goals of this paper are to assess the generality of Wilson's finding, and to understand what economic logic would manifest itself as a "preference" for cash flows over current accruals.

We first document that for the overall period, 1977-1984, there is no evidence of the simple relation observed by Wilson in his two-quarter test period. We then examine progressively more contextual models of the implications of cash flows and accruals. These models are also unsuccessful in explaining stock price behavior around the release of detailed financial statements. We conclude that either (1) the differential security price implications of cash flows and current accruals are too highly contextual to be modeled parsimoniously, or (2) important uncertainties about the contents of detailed financial statements are resolved prior to their public release.

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The Amount and Nature of Information
Reflected in Cash Flows and Accruals

Wilson [1987, table 1] finds evidence that for a given amount of earnings, the stock market reacts more favorably the larger (smaller) is the cash flow (accrual) component. Wilson's tests are based on stock price behavior during the nine days surrounding the release of the annual report, when detailed earnings information (including cash flows and accruals) is disclosed for the first time. Wilson's sample includes observations from the fourth quarters of fiscal years 1981 and 1982.

This paper extends the work of Wilson in two ways. The first step is to assess the generality and robustness of Wilson's result by conducting the same tests over a longer time period (32 quarters, as opposed to two quarters in Wilson), and using a largely independent sample of firms. Our results do not contradict those obtained by Wilson for the two quarters he examined, but we find no evidence of a similar result for the overall period, 1977-1984.

Given our failure to confirm the simple relation observed by Wilson, our second step is to examine progressively more contextual models of the implications of cash flows and accruals. We argue that it is not obvious that cash flows should be "preferred" to accruals on average. However, motivated by Wilson [1987, p. 320], we hypothesize that such a "preference" might arise only under certain macroeconomic conditions. We find no support for that hypothesis. We then offer an alternative hypothesis under which the nature of information conveyed by cash flow and accrual data varies according to which specific accrual accounts are unexpectedly high or low. We also fail to find support for this hypothesis.

In sum, we are unable to identify the economic logic underlying how the market assimilates information about cash flows and accruals. That is, we find no systematic difference between the implications of cash flows and accruals, as reflected in stock price behavior surrounding the release of detailed financial statements.

There are at least two possible interpretations of our evidence. One is that the differential price implications of the cash flow and accrual components of earnings are so highly contextual that they are not amenable to parsimonious modeling. An alternative interpretation is that it is inherently difficult to detect reactions to the release of detailed financial statements, in part because any important uncertainties about their contents may have been resolved prior to their publication. Note that although the latter explanation is inconsistent with the results of Wilson [1987], it may warrant attention, given how brief was the time period he examined, and how modest was the explanatory power of his model (R-squared less than 3 percent; see Wilson [1987, table 1]). Moreover, others have been unable to detect unusual variance in stock prices around the release of detailed financial statements.[1]

The rest of the paper is organized as follows. Section I discusses prior research, and outlines reasons why the valuation implications of cash flows and accruals might differ. Section II describes our data and section III applies the tests of Wilson [1987] to our data. In sections IV through VI, we test more contextual models of the security price implications of cash flows and accruals. Conclusions are offered in section VII.

I. THE POTENTIAL INFORMATION CONTENT OF CASH FLOWS AND ACCRUALS

Existing evidence on the information content of cash flows and accruals

Prior studies of the information content of cash flows and accruals have adopted approaches that appear quite different on the surface, but it is possible to interpret them within a common framework. We present that common framework here, to facilitate later discussions of possible economic logic underlying the existing statistical evidence.

Recent studies include Wilson [1986, 1987], Rayburn [1986], and Bowen, Burgstahler, and Daley [1987]. Each of these studies decomposed accounting earnings as follows:

Cash Flow from Operations
\+ Current Accruals
= Working Capital from Operations
\+ Noncurrent Accruals
= Accounting earnings

Here, current accruals include such items as increases in inventories and receivables and decreases in payables, while depreciation and deferred income taxes are (negative) noncurrent accruals.

Each of the studies involves regressions of stock return metrics against the unexpected portions of the above components of earnings (or combinations thereof). Below, we write the abnormal return on security j in period t (R_{jt}) as a function of unexpected operating cash flows (UCF_{jt}), unexpected current accruals (UCA_{jt}), unexpected noncurrent accruals ($UNCA_{jt}$), and a disturbance term, u_{jt}:

$$R_{jt} = b_0 + b_1(UCF_{jt}) + b_2(UCA_{jt}) + b_3(UNCA_{jt}) + u_{jt}. \tag{1}$$

We also write an alternative representation of the same equation.[2] We denote unexpected working capital from operations as $UWCO_{jt}$; thus $UWCO_{jt} = UCF_{jt} + UCA_{jt}$. We denote unexpected accounting earnings as UE_{jt}; thus $UE_{jt} = UWCO_{jt} + UNCA_{jt}$. When, in equation (1), we substitute ($UWCO_{jt}$-UCF_{jt}) for UCA_{jt} and (UE_{jt}-$UWCO_{jt}$) for $UNCA_{jt}$, we obtain (after rearranging terms):

$$R_{jt} = b_0 + (b_1-b_2)UCF_{jt} + (b_2-b_3)UWCO_{jt} + b_3UE_{jt} + u_{jt}. \tag{2}$$

In Wilson [1987], the event window is centered around the publication of the annual report, at which time earnings have already been announced. Therefore, in that design, unexpected earnings must be zero ($UE_{jt} = 0$). Wilson also obtains evidence (Wilson [1986, sections 5.2 and 5.4]) consistent with working capital from operations being known by that time ($UWCO_{jt} = 0$); this may simply indicate that noncurrent accruals are relatively predictable. Under these conditions, equation (2) can be rewritten as:

$$R_{jt} = b_0 + (b_1 - b_2)UCF_{jt} + u_{jt}. \tag{3}$$

The major results of recent research can be discussed within the framework of equations (1), (2), and (3). Wilson [1987, table 1] estimates the equivalent of equation (3), and obtains a significantly positive coefficient. In terms of our notation, Wilson's estimates imply that $(b_1 - b_2) > 0$.[3] Since b_1 and b_2 represent the "response coefficients" on unexpected cash flows and unexpected current accruals, respectively, in equation (1), this result can be interpreted to indicate that the market responds more favorably to one dollar of cash flow than to one dollar of current accruals.

Wilson [1986, sections 2 and 3] points out that the Wilson [1987] result is subject to two alternative interpretations. Given that total working capital from operations is already known, either (1) cash flows may be informative while current accruals are not ($b_1 > 0$; $b_2 = 0$), or (2) both cash flows and current accruals are informative, but differentially so ($b_1 > 0$; $b_2 > 0$; $(b_1 - b_2) > 0$). To distinguish between these two alternatives, Wilson [1986] re-estimates equation (3), with returns data from the period surrounding the financial statement release date, simultaneously with a constrained version of equation (1), with returns data for the period surrounding the earnings announcement date.[4] Wilson [1986, section 5.4] finds evidence consistent with the market responding favorably to both unexpected cash flows ($b_1 > 0$) and unexpected current accruals ($b_2 > 0$), but more favorably to the former ($(b_1 - b_2) > 0$).[5]

In summary, Wilson [1987], in combination with Wilson [1986], implies that the market responds favorably to both unexpected cash flows and unexpected current accruals, but more favorably to the former. However, there is mixed evidence on the extent to which this "preference" for cash flows over current accruals holds across other research designs. On the one hand, that same implication can be drawn from Bowen, Burgstahler, and Daley [1987], who estimate an equation that takes on the form of (2), using annual returns data for 1972-1981.[6] Their results indicate that $(b_1 - b_2) > 0$ and $(b_2 - b_3) > 0$, which implies that the market responds more favorably to cash flow than to current accruals, and more favorably to current accruals than to noncurrent accruals. On the other hand, different implications can be drawn from Rayburn [1986, tables 7 and 9], who estimates an equation with the form of equation (1), using annual returns data for 1962-1982.[7] Rayburn obtains positive but approximately equal estimates of b_1 and b_2, implying no difference in the market response to cash flows and current accruals. (Rayburn's results on noncurrent accruals are mixed.)

We find the evidence of a more favorable response to cash flows than to current accruals intriguing. We argue below that, although the result has some intuitive appeal, it is not obvious that it should necessarily hold. It is possible to construct logic where such a result would obtain only under certain conditions, and other logic where the opposite result would be obtained. Doubts about the generality of the result are also raised by its failure to hold in Rayburn [1986], and by Wilson's own speculation [1986, pp. 188-189; 1987, p. 320] that the result might be specific to his test period.

Below, we consider alternative explanations for possible differences in the security price implications of cash flows and accruals. Some of the explanations are unconditional, and predict that the reaction to unexpected cash flows would always be larger than the reaction to accruals, or vice versa. Other explanations are less parsimonious, and permit the sign of the difference to vary across time, or across firms.

Alternative explanations for differences in the security price implications of cash flows and current accruals

Reasons for expecting differential security price implications for cash flows and accruals vary across the prior studies (or, in some cases, are not explicitly stated). However, a common element in the motivations offered for expecting such a relation is what could be labeled a "quality of earnings" explanation.[8] After discussing this explanation, we offer a second, based on the speculation in Wilson [1986, 1987], in which the differential price impacts of cash flows and accruals vary according to macroeconomic conditions. Finally, we propose a third explanation, in which the price impacts vary according to the specific mix of components of unexpected current accruals.

a. <u>The "quality of earnings" explanation and others in which the sign of the difference is unconditional</u>. Under the "quality of earnings" explanation, accruals have a smaller impact on prices than cash flows (or no impact at all) since accruals are either subject to manipulation (e.g., inventories), or represent only very indirect links to future cash flows (e.g., depreciation).[9] Alternatively, O'glove [1987 p. 107] argues:

> Obviously, higher trending inventories in relation to sales can lead to inventory markdowns, write-offs, etc. In addition, it is important to note that an excess of inventories, time and time again, is a good indicator of future slowdown in production.

O'glove [1987, p. 107] also argues that an excess of accounts receivable

> ... may provide a clue as to whether a company is merely shifting inventory from the corporate level to its customers because of a "hard sell" sales campaign or costly incentives. In such an instance, this type of sales may constitute "borrowing from the future."

The "quality of earnings" explanation leads to a simple, unambiguous prediction: that market prices will react more to a given amount of unexpected cash flows than the same amount of unexpected accruals. Despite its simplicity, the prediction has appeal, at least with respect to the difference between cash flows and <u>noncurrent</u> accruals. We would agree that the links between future cash flows and noncurrent accruals such as depreciation and deferred taxes are tenuous at best. Moreover, the evidence in Wilson [1986, section 5.2] is consistent with the possibility that noncurrent accruals have a small impact on price --or even no impact at all.

With respect to the difference between cash flows and current accruals, however, we find this logic much less compelling. First, the link to future cash flows is much more direct for current accruals than for noncurrent accruals. Second, although the incentives and ability of managers to manipulate accounting accruals is a debatable point (and the frequency of such manipulations is ultimately an empirical issue), we doubt whether systematic manipulations of current accruals are widespread.[10] Third, some competing explanations in the following sections predict that, under certain conditions, the sign of the difference between the coefficients of cash flows and current accruals would be the opposite of that predicted by the "quality of earnings" explanation.

Despite our concerns about the power of the "quality of earnings" explanation as it applies to cash flows and current accruals, it is important to determine whether the resulting prediction is borne out in our data, as it was in prior studies. Therefore, one hypothesis to be tested in this paper is:

$b_1 > b_2$ (coefficient on cash flows > coefficient on current accruals).

Before we turn to more contextual descriptions of the difference between the price impacts of unexpected cash flows and unexpected accruals, we must add that there are other explanations which could yield an unambiguous predictions about the sign of the difference. For example, Wilson [1987, p. 295] mentions a "liquidity" argument under which the market responds more favorably to cash flows than accruals because high liquidity is a signal of a smaller likelihood of financial distress. Our purpose here is not to provide an exhaustive list of these potential explanations; instead, we will test to see if any of the explanations with unambiguous directional predictions are consistent with the data.

b. <u>The Wilson [1986, 1987] conjecture: the sign of the difference varies across time according to macroeconomic conditions.</u> Because he observed that the impact on security prices was greater for unexpected cash flows than unexpected current accruals in 1981-1982 (a period of economic downturn), Wilson [1986, pp. 188-89; 1987, p. 320] speculated that perhaps these differential security price reactions are attributable to how well firms anticipate and adjust to changing economic conditions. As the economy contracts, the market would react favorably when management liquidates non-cash working capital, which would manifest itself as a "preference" for cash flow over current accruals. Thus, the prediction is:

$b_1 > b_2$ (coefficient on cash flow > coefficient on current accruals) in an economic contraction.

In contrast, during an expansion, the market would react favorably when management uses cash to increase non-cash working capital, and we have:

$b_1 < b_2$ (coefficient on cash flow < coefficient on current accruals) in an economic expansion.

In our empirical tests, we examine whether the sign of $(b_1 - b_2)$ depends on the unexpected component of GNP. Since economic expansion and contraction is also related to interest rates, we also examine the unexpected component of interest rates as a conditioning variable.

c. <u>Explanations where the sign of the difference varies across firms according to the specific mix of components of unexpected current accruals.</u> Under this explanation, the relative security price impact of cash flows versus accruals is generally indeterminate; that is:

$b_1 > b_2$ <u>or</u> $b_1 < b_2$ (coefficient on cash flow is greater <u>or</u> less than coefficient on current accruals) depending on the specific mix of current accruals.

We consider the following decomposition of current accruals:

current accruals =
increases in inventories
+ increases in receivables
- increases in payables.

Using this identity, we write an alternative to equation (1) that decomposes the term pertaining to unexpected current accruals, b_2(UCA), so as to explicitly identify unexpected changes in inventories, receivables, and payables (denoted UINV, UREC, and UPAY, respectively):

$$R_{jt} = b_0 + b_1(UCF_{jt}) + b_{2I}(UINV_{jt}) + b_{2R}(UREC_{jt}) + b_{2P}(UPAY_{jt}) + b_3(UNCA_{jt}) + w_{jt}. \quad (4)$$

Abstracting from the competing theories described above, our maintained hypothesis would be that all the coefficients in equation (4) are the same.[11] Below, we consider whether the coefficients on these components of unexpected current accruals should differ from one another, from the coefficient on unexpected current accruals, and from the coefficient on unexpected operating cash flows (i.e., whether $b_{2I} = b_{2R} = b_{2P} = b_2 = b_1$).

Just prior to the release of financial statements, net earnings are already known. Thus, the unexpected components of cash flows and accruals that become known at the financial statement release date must sum to zero. This implies that the earnings components identified in equation (4) must conform to the following equation:

$$UCF_{jt} + UINV_{jt} + UREC_{jt} + UPAY_{jt} + UNCA_{jt} = 0. \quad (5)$$

where expectations for each are based on information revealed through the earnings announcement date.

When we substitute equation (5) into equation (4), we obtain:

$$R_{jt} = b_0 + (b_{2I}-b_1)UINV_{jt} + (b_{2R}-b_1)UREC_{jt} + (b_{2P}-b_1)UPAY_{jt} + (b_{2R}-b_1)UNCA_{jt} + w_{jt}. \quad (6)$$

Since inventories, receivables, and payables support the ongoing operations of the firm, intuition suggests that there should be a relation between the balances in such current operating accounts and future sales levels. In section V, we consider how such a relation might arise from a simple model of the operating cycle, and describe the factors that would determine the signs of $(b_{2I}-b_1)$, $(b_{2R}-b_1)$, and $(b_{2P}-b_1)$. This model suggests that the differences in security price implications of cash flows and current accruals may be due to what they reveal about managers' beliefs concerning future sales levels (or the demand for a firm's products). Because the directional prediction for the stock price reaction to the inventory component of current accruals in equation (6) differs from that of explanations (a.) and (b.) above, it can be empirically distinguished from competing explanations. Stock price tests of equation (6) are described in section VI.

d. <u>Other more contextual explanations for differential valuation implications of operating cash flows and current accruals.</u> The above are not the only possible reasons why valuation implications could differ between cash flows and current accruals, or how they could vary across the components of current accruals. Other possible explanations could be based, for example, on more refined notions about "earnings quality" under alternative accrual accounting methods (e.g., LIFO versus FIFO). Also, the context within which management decides to alter the levels of receivables and inventories might be important; e.g., a decrease in inventories may have favorable security price implications if it results from managements' attempts to streamline the manufacturing process by installing a "just-in-time" inventory system.[12]

Our priors are that explanation (a) may be too simplistic. On the other hand, explanations (b) and (c) might have enough power to explain the data. However, if (d) is the case (i.e., everything is contextual), then perhaps we should dispense with attempts to develop parsimonious depictions of these relations, and admit that the situation is too complicated to model with the tools at our disposal. At the same time, we should be careful in interpreting the results of the prior studies--the world might not be so simple as one could infer from the apparent consistency of the data with a simple "earnings quality" explanation.

II. DATA AND EXPECTATIONS MODELS

Sample Selection

Our sample consists of all corporations which were required to file quarterly and annual reports with the SEC from 1976 through 1985 and for which the required data were available. The required data fell into three categories.

a) Quarterly earnings, sales, funds flow, and balance sheet data. Beginning in 1976, SEC companies were required to furnish quarterly balance sheet data in addition to quarterly income statement data. These data are now available on COMPUSTAT II, and can be used to construct funds flow data (as described later in this section). We required data for the 1976-1984 period; this provided a quarterly time series of 36 observations for each firm which, due to differencing, allowed estimation of expectations models for accounting variables over the test period 1977-1984.

b) Earnings announcement dates and information release dates for 10-Qs, 10-Ks, and annual reports. In addition to the Wall Street Journal earnings announcement dates, this study required knowledge of the date of release of 10-Q reports, 10-K reports, and annual reports to shareholders. Release dates for these reports were obtained from computer files maintained by the SEC.[13]

To maintain a clear separation between the effects of earnings announcements and the effects of financial statement releases, Wilson [1987, p. 299] used only observations with at least eight days separating these two events. Wilson reports that for over 90 percent of the observations in his study, at least eight days separated the earnings announcement date and the first date that either the annual report or the 10-K arrived at the SEC. For the fourth quarter releases in our sample, 89.7 percent of these dates were separated by at least eight trading days (90.3 percent in the 1981-1982 period studied by Wilson). Following Wilson, we excluded observations from our tests if there were fewer than eight days between the two dates. For the observations remaining, the mean and the median number of trading days between those dates in the fourth quarters of firms fiscal years were 25 and 24, respectively (both in the full 1977-1984 sample period and in the 1981-1982 subperiod). The mean and the median were 17 and 15 days respectively for all observations, including fiscal quarters 1 through 3, indicating that 10-Q reports follow earnings announcements more closely than is the case for year end reports.

c) Daily stock returns data. These data were obtained from the CRSP database.

Table 1 shows the effect of applying these criteria sequentially on the size of the available sample. There were 177 firms for which complete COMPUSTAT data for the period 1976-1984 were available, and which were also listed on CRSP for the period 1977-1984. Of these firms, 170 were located on the SEC computer file of financial statement release dates. For some of these firms, CRSP returns were missing for some days during 1977-1984. Also, financial statement release dates were not available for some quarters. Thus, while 170 firms potentially represent 5,440 quarterly observations over an 8-year period, the actual number of usable observations was fewer. Approximately 10 percent of our firms were also included in the Wilson [1986, 1987] sample, which included data for the fourth quarters of 1981 and 1982 only.

Measures of funds from operations.

Our tests required measures of cash flow from operations and working capital from operations, but these data were not available on COMPUSTAT for years before 1984. Thus, we constructed these amounts using income statement and balance sheet data as follows.

Working capital from operations =
Operating income before depreciation
- Interest expense
- Current portion of income tax expense.

Cash flow from operations =
Working capital from operations
- Increase in net working capital other than cash and securities, net of short-term debt.

The correlations between our measures of working capital from operations (scaled by total assets), and those actually reported by the firms for the four quarters of fiscal 1984 are .80, .75, .81, and .75. (We considered four other measures, all of which yielded similar results.[14]) Except for our inability to segregate current income tax expense into operating and non-operating segments, our measure is one that could have been reported by firms as working capital from operations, in accordance with GAAP. The benefit of our measure is that it is calculated consistently across firms, while the measures actually reported by firms are not (see Ketz and Largay [1987]). In fact, inconsistency in reporting practices across firms is a likely explanation for our inability to approximate the reported numbers with greater precision.

Information about firms' information release policies.

Our tests require knowledge of the first date on which cash flow and accrual data are publicly available. Although that date typically coincides with the financial statement release date, some firms reveal these data in news releases at some time before the financial statements are published. These firms should be excluded from tests which focus on the period surrounding the financial statement release date.

To ascertain when firms in our sample first released financial statement information to the public, we conducted a news release survey similar to that described in Wilson [1987]. Because it would be difficult to obtain copies of firms news releases for the entire 1977-1984 period covered by our database, we requested only news releases announcing earnings for firms' most recent fiscal years: one announcing fourth quarter earnings and one pertaining to a quarter other than the final quarter of the fiscal year. Of the firms in our final sample, 137 out of 170 (81%) responded to our survey and a follow-up. We identified the firms that, in 1986, furnished data sufficient to calculate funds flow measures prior to the release of financial statements, and excluded those firms from tests which focus on the period surrounding the financial statement release date, on the assumption that the same disclosure policy had been in effect since 1977.[15,16]

Identification of the date at which interim financial statement data first became available presented a special problem for us, since the firms in our sample issued both 10-Qs and quarterly reports to shareholders (QR/Ss), but we have release dates only for the former. We asked firms to indicate whether they released the QR/S prior to the week during which the 10-Q was released. The 38 firms that answered in the affirmative (27.7% of our sample) were eliminated from tests which focus on the period surrounding the release of interim financial statements.

Expectations models

For purposes of replicating the work of Wilson [1987], we estimate expectations models for cash flow and working capital from operations (after the earnings announcement date) using the method adopted by Wilson. Wilson's applied ordinary least squares (OLS) estimation to a pooled cross-section of firms, which means the model parameters are assumed to be the same for all firms. The independent variables used in these expectations models are listed in table 2. Since we have more data than Wilson, we modified his approach by estimating the same models not only in pooled cross-section but also in time-series, while permitting the parameters to vary industry-by-industry. For purposes of estimating expectations models on an industry-by-industry basis, the sample was grouped into 33 industries, primarily on the basis of 2-digit Compustat industry codes.

Table 2 also contains summary statistics on the goodness of fit for the expectations models and compares their performance here to that in Wilson's [1987] sample. Where the expectations models are estimated in pooled cross-section (the approach used by Wilson), the R^2s of these models in our sample during the time periods studied by Wilson [1987] are higher than those reported by Wilson. The explanatory power of these pooled cross-sectional models falls off somewhat when estimated over the entire 1977-1984 time period; however, the expectations models estimated in time-series, industry-by-industry, exhibit a greater degree of explanatory power, on average, than those estimated in pooled cross-section. Table 2 also shows that there is very little residual autocorrelation under either approach, indicating that these expectations models are efficient forecasters of funds from operations. Finally, note that since the functional form of expectations models used here is precisely the same as that used in Wilson [1986, 1987], that feature of our design should not create any differences between our results and Wilson's.

III. REPLICATION AND EXTENSION OF WILSON [1987]

We begin our empirical tests by attempting to replicate and extend the work of Wilson [1987]. Those tests assume that any difference between the stock price implications of cash flows and current accruals is the same for all firm-periods. Thus, they can be viewed as tests of hypotheses emanating from the "quality of earnings" explanation and others in which the sign of the difference is unconditional.

Following Wilson, our event period is the nine-day interval surrounding the release date of the annual report to shareholders (AR/S).[17] As indicated in section II, the procedures used to identify event dates and estimate key variables mimic those used by Wilson as closely as possible. The primary differences were as follows. First, while Wilson's tests were based only on fourth quarter data taken from annual reports, our tests were based on data from all fiscal quarters, taken from both interim and annual reports. Certain of our results are partitioned into interim and fourth quarters, in order to check sensitivity to this difference. Second, while Wilson's sample was restricted to firms with SIC codes 1000-4800, ours was not; 20 percent of our sample includes firms from wholesaling, retailing, and services (SIC 5000-8900). However, we conducted supplemental analyses to ascertain whether our results are sensitive to this choice. Third, our measures of funds from operations were constructed from income statement and balance sheet data, whereas Wilson's were taken directly from the statement of changes in financial position.

Our primary interest is in estimates of the following equation, which corresponds to equation (3) of section I:

$$R_{jt} = c_0 + c_1 UCF_{jt} + z_{jt}, \qquad (7)$$

where: R_{jt} = market model prediction error[18] for firm j during a nine-day window surrounding the release of financial statements for quarter t and

UCF_{jt} = unexpected cash flow from operations for firm j, quarter t, scaled by total assets at the end of quarter t-1, where expectations are conditional on information released through the earnings announcement date (see table 2 for the expectations model used).

Except for differences in the notation, equation (7) above is the identical to equation (2) of Wilson [1987] when he uses unexpected cash from operations as the independent variable in his equation. If we assume, based on Wilson's evidence [1986, section 5.2]) that working capital from operations is essentially known by the market as soon as earnings are announced, c_1 is equal to (b_1-b_2) in equation (3).

On the other hand, if we allow for the possibility that there is some uncertainty about working capital from operations after earnings have been announced, there is motivation for using unexpected working capital from operations in an equation like Wilson's. In our notation, this equation would be:

$$R_{jt} = d_0 + d_1 UWCO_{jt} + z_{jt}, \tag{8}$$

where: R_{jt} is as defined above and

$UWCO_{jt}$ = unexpected working capital from operations for firm j, quarter t, scaled by total assets at the end of quarter t-1, where expectations are conditional on information released through the earnings announcement date (see table 2 for the expectations model used).

Although Wilson finds no evidence of uncertainty about working capital from operations once earnings have been announced, we present estimates of equation (8) for the sake of completeness. The coefficient d_1 in equation (8) should be interpreted as the difference between the price response coefficients on working capital from operations and its complement, non-current accruals. However, if the value of $UWCO_{jt}$ (excluding measurement error) is close to zero for all firms, we will be unable to estimate this difference with any precision.

Table 3, panel A presents the results of Wilson's estimation of equations (7) and (8). Wilson obtained a significantly positive regression coefficient on unexpected cash flow from operations, suggesting that the market reacts favorably upon learning that the amount of earnings that arrived in the form of cash flow (rather than accruals) is higher than expected. Wilson obtained an even larger positive coefficient on unexpected working capital from operations but, given that it was estimated so imprecisely, he was unable to reject the hypothesis that the underlying parameter equals zero at conventional levels.

Panels B and C of table 3 summarize the portion of our replication that includes only data from the fourth quarters of 1981 and 1982, the same two quarters used in Wilson [1987]. Panel B contains the results based on the statistical method used by Wilson. Under that approach, the expectations models for cash flows and working capital from operations are estimated in pooled cross-section. The approach in panel C differs, in that expectations models are estimated in time-series, industry-by-industry.

In general, although the results reported in panel B are not as strong as Wilson's, they do not contradict his results. In the regression of market model prediction errors against unexpected cash flow from operations, our coefficient is about three-fourths as large as Wilson's; however, we were unable to replicate his significance level. The difference in significance levels reflects, in part, less precision in our estimate, which in turn is partially due to our smaller sample size. If all else remained constant while our sample size was expanded to the size of Wilson's, our t-statistic would be 1.68; if our coefficient remained constant while attaining Wilson's degree of precision in estimation, our t-statistic would be 2.43.

In the regression of market model prediction errors against unexpected working capital from operations, our coefficient estimate is nearly identical to Wilson's, although, like Wilson's coefficient, it is not statistically significant at conventional levels. Finally, in panel C, our results based on industry-specific expectations models indicate an even weaker relation between unexpected funds flow and stock returns than those based on expectations models estimated in pooled cross-section.

It is possible that our use of income statement and balance sheet data (rather than data from the statement of changes in financial position) to calculate cash flow from operations could potentially explain why our estimated coefficient is smaller than Wilson's. However, it is not clear that our measure contains more error than Wilson's (in sense of deviating from some underlying valuation-relevant cash flow measure). As discussed in section II, our approach is one that conforms closely to that which firms could follow under GAAP and our measure (unlike Wilson's) has the virtue of not being influenced by the frequent inconsistencies in how firms measure cash flows from operations. Note also that, although Wilson's coefficient is significant while ours is not, the difference between Wilson's coefficient and ours is statistically insignificant at any standard level.

It is also possible that the reason we were unable to replicate Wilson's result more closely is that we have included non-industrial firms in our tests, while Wilson did not. To ascertain whether restricting the sample to industrial firms would alter these comparisons, we conducted supplemental analyses analogous to those in panel B on only those firms in our sample from industries with SIC codes 1000-4800, resulting in 29 fewer observations. The coefficients and degree of explanatory power in these regressions were similar to those in Panel B and the t-values declined in accordance with the reduction in sample size.

Although our tests for the fourth quarters of 1981 and 1982 may be less powerful than those in Wilson [1987] (because we have fewer firms in our sample), our database permits us to examine whether Wilson's results are pervasive, or specific to the time period he examined. A set of results for the entire time period 1977 through 1984 is presented in table 4. Wilson's method (expectations models estimated in pooled cross-section) is applied in panel A, while expectations models estimated in time-series, industry-by-industry, are used in panel B. Results are presented for all firm-quarters combined, separately for the fourth quarters of firms' fiscal years,[19] and for the 1981-82 fourth quarters studied by Wilson. In table 4, even in regressions with over 2400 firm-quarters of observations, none of the coefficients on unexpected funds flow in the 1977-1984 period is significantly different from zero. Note also that, if the market responds more favorably to unexpected funds flow than to the complementary unexpected accruals, we would expect the coefficients reported in table 4 to be positive but, in fact, most of the coefficients for periods other than the 1981-1982 fourth quarters are negative.

We also extended the tests by considering firm size. Freeman [1987] and Atiase [1985] indicate that, for large firms, there exist private information sources more timely than accounting reports; thus, we would not expect the published financial statements of large firms to convey as much new information to the market as those of smaller firms. The t-values for results stratified by firm size are also presented in table 4. There is no obvious pattern in the results across the different size classes.[20] In particular, we find no evidence that information about unexpected cash flows/accruals was more likely to be impounded in market prices for small and medium-sized firms than for large firms during the period surrounding the release of the annual report.

Finally, we also modified these tests in several other ways (e.g., deletion of outliers,[21] use of market-adjusted returns instead of market model prediction errors, and centering the event window around the earlier of the 10-K or the AR/S release dates, instead of around AR/S release dates), but none of these modifications altered our conclusions. Thus, in general, we found no systematic evidence that unexpected funds flows or accruals would explain stock price behavior in short windows surrounding the release of financial statements outside of the fourth quarters of 1981 and 1982.

Summarizing to this point, we were unable to document a consistent difference between the valuation implications of cash flows and accruals via short-run association tests for the period surrounding the release of financial statements. This suggests that the simple "quality of earnings" explanation discussed in section I is either not operative (as it applies to these earnings components), or is overwhelmed by other, more complex considerations. However, it is still possible that differential valuation implications of cash flows and accruals exist, but that they are "averaged out" in a pooled estimation like that above. Sections IV and VI include tests of explanations in which the difference between the price impact of cash flows and accruals is conditioned on factors that vary across time or across firms.

IV. TESTS OF THE WILSON CONJECTURE: VALUATION IMPLICATIONS VARY ACCORDING TO MACROECONOMIC CONDITIONS

We now describe tests of Wilson's conjecture that his result might extend only to periods of economic downturn, and that the opposite result would be obtained in periods of economic improvement. We partitioned the 1977-1982 period into three regimes, using each of two proxies for unexpected changes in the state of the economy. The proxies used are the unexpected components of real GNP and of short-term interest rates (on 90-day

Treasury bills). Our prediction is that when GNP growth is unexpectedly low, or interest rates are unexpectedly high for the quarter just ended, the market would respond more favorably to those firms that contemporaneously liquidated current working capital accounts, thus generating more cash from operations. This "preference" for cash flow over accruals would manifest itself as a positive stock price reaction when financial statements are released, for firms with higher-than-expected cash flow from operations. Thus, during such a regime, we would expect a positive coefficient in equation (7). In contrast, when GNP is unexpectedly high, or interest rates are unexpectedly low, we would expect that same coefficient to take on a negative sign.

The unexpected components of real GNP and interest rates were identified by fitting time-series models to the data. [22] The 11 quarters with the most negative unexpected components were placed in one regime; the 11 with the most positive make up another and the remaining 10 quarters constitute a third regime. We then followed the same estimation approach used in table 4, except that both the expectations models for cash from operations and the final regressions were estimated within regimes.[23] (When we used industry-specific expectations models, there were insufficient data for within-regime estimation for four industries with a single representative and thus these industries were excluded.)

Because Wilson's [1987, p. 320] conjecture arose from observing that the fourth quarters of 1981 and 1982 he studied were part of a period "when the economy was in a severe downturn (1981-1982)," it is of interest to know how these two quarters would be classified on the basis of our proxies for the state of the economy. For the partition based on unexpected interest rates, both these quarters fall in the regime where we would expect a positive coefficient in equation (7), meaning that interest rates were unexpectedly high in both of these quarters. In contrast, for the partition based on real GNP, only the fourth quarter of 1981 falls in the regime where we would expect a positive coefficient (meaning that real GNP growth was unexpectedly low in this quarter); in the fourth quarter of 1982, unexpected real GNP growth was near zero, where we make no prediction as to the sign of the coefficient.

Table 5 summarizes the results based on partitioned data. There is clearly no support for our predictions. The coefficients take on the "wrong" signs as frequently as the "right" ones; they are never statistically significant and the R^2s are all less than one percent. Similar conclusions are reached when we use an event window centered around the earlier of the 10-K or annual report date for fourth quarter reports (as opposed to using annual report dates only), or when we substitute market-adjusted returns for market model prediction errors.[24]

In table 5, contemporaneous values of unexpected GNP growth were used to partition time periods according to the present state of the economy. However, Fama [1981] observes that common stock returns tend to lead measures of real output such as GNP. To the extent that stock prices react to the future course of the economy, partitions based on realized future GNP growth rates may provide better tests of the Wilson conjecture. We also conducted such tests where the partitions were based on the unexpected component of real GNP for quarter t+1, but our conclusions did not change. Neither did they change when we partitioned the data on the basis of realized annual growth rates in real GNP for the year ended in quarter t+4.

Despite our failure to find support for the Wilson conjecture, it is possible that the coefficients of equation (7) do vary according to the state of the economy but that we have improperly partitioned the time periods into economic regimes. To assess the likelihood of that possibility, we conducted one final test. Here, the null hypothesis is that the coefficients for each quarter are the same. The approach used is a standard test of linear restrictions on a coefficient vector (see Theil [1971, equation 7.23]. The resulting test statistic should be distributed as an F(62, 2337) under the null hypothesis. The observed value of the test statistic is .99; a value at least this large would be observed by chance approximately 50 percent of the time. This failure to find any significant differences in the coefficients of equation (7) across time suggests that further attempts to document time-varying coefficients are not likely to be fruitful.

V. POTENTIAL LINKS THROUGH FUTURE SALES: A SIMPLE MODEL OF THE INFORMATION REVEALED BY THE COMPONENTS OF CURRENT ACCRUALS

The third explanation to be considered is that the stock price implications of cash flows and current accruals vary across firms according to their specific mix of components of current accruals. We consider a simple model of the operating cycle that permits us to predict the signs of the coefficients in equation (6) from section I. Because current period sales are always disclosed prior to or at the time information on current accruals is released, we consider whether (and how) current accruals could provide information about future period sales incremental to that contained in current period sales. A formal description of our model is provided in the appendix. The remainder of this section describes the essential features of our model and its empirical implications, then presents some evidence on the predictive links in this model.

Changes in inventory balances

The model in the appendix segregates inventory into two components: (1) the optimal inventory balance, given management's expectation of future sales, and (2) the deviation from this balance. The second component includes inventory "buildups" and "liquidations" that arise as a function of deviations of prior sales from expectations. Now consider the viewpoint of investors who have already received announcements of earnings and sales for the period, and who are awaiting disclosure of the inventory balance in the published financial statements. Since sales for the period are known, the market is already aware of the magnitude of the second component of inventory: the deviation from the optimum due to imperfectly anticipated sales volume. The market also has some (imperfect) estimate of management's expectation of period t+1 sales, and uses that to form its own (imperfect) estimate of the remaining component of inventory: the optimum, given management expectations. Upon publication of the actual inventory balance, the market can determine this remaining component with certainty, and can infer management's beliefs about future sales. Higher than expected inventory signals higher future sales, which should typically have favorable implications for firm value. In other words, given that sales and earnings are already known, the market would react favorably upon learning that the portion of earnings coming in the form of inventory (rather than cash) is higher than expected. This implies that in equation (6):

$b_1 < b_{2I}$ (coefficient on cash flow < coefficient on inventories).

It is important to note that the expected inventory balance is conditioned on knowledge of current period sales. If it were not, higher than expected inventory could simply reflect an inventory buildup resulting from an unanticipated decline in customer demand, which would presumably be a negative signal. That would stand in direct contrast to the prediction made here, and would be consistent with predictions based on the "quality of earnings" explanation.

Changes in receivables balances

Upon receipt of sales and earnings information, the market forms expectations for the receivables balance. The subsequent announcement of end-of-period receivables reveals unexpected receivables (UREC). If UREC is negative (because collections were unexpectedly low, and/or receivables unexpectedly high), it could imply either of the following. First, it may reveal that management was able to generate the previously announced sales volume only by relaxing credit policy and/or 'borrowing sales from the future' (as argued by O'glove [1987, p. 107]. Second, it may reveal that customers have become less willing or able to pay quickly. We would view both of these as negative signals about the value of the firm; however, these implications for firm value may or may not operate in terms of changes in expected future sales. Nevertheless, contrary to the case of unexpected inventories, this leads to the prediction that, in equation (6):

$b_1 > b_{2R}$ (coefficient on cash flow > coefficient on receivables).

In this case, the directional prediction of our model is the same as that under the "quality of earnings" explanation.

Changes in payables balances

The third major remaining component of current accruals consists of changes in accounts payable. The payables balance could reveal information about two things. First, since payables are a function of inventory purchases, changes in payables balances provide a signal about management's expectations of future sales. Second, payables balances provide a signal about unexpected changes in the pace of retiring this form of debt. The first signal is redundant, given the signal available from the inventory balance; the implications of the second signal for share values are unclear (to us). Thus, we conduct tests on the full model, (6), and a version of the model including only changes in inventory and receivables balances, excluding payables.

The importance of segregating the components of current accruals

Prior studies may have lost much of the information available in current accruals by treating them collectively. Our analysis suggests that changes of the same sign in receivables and inventory may have opposite impacts on share values. Also, unexpected changes in inventory and unexpected changes in payables may both provide information about future sales, but that information may be lost when the two accounts are offset against each other, as is done when current accruals are grouped. Thus, if the components of current accruals convey information about future sales, then holding working capital from operations constant, aggregate current accruals may have ambiguous implications for valuation.

Evidence on the links in the model

Before describing the results of direct, stock-price tests of our model, we offer some evidence on the links between inventory, receivables, and future sales that were described above. Tests of our model require expectations models for sales, inventories, receivables, and payables. These expectations models, described in table 6, were estimated from data pooled within industries and include some firm-specific parameters to take care of within industry variation. The unexpected components of the inventory and receivables balances as of the end of quarter t are defined as those not predictable on the basis of inventory and receivables balances through quarter t-1 and sales though quarter t; the models allow for seasonality in sales and in the relation of inventory and receivables to sales.[25]

In table 7, we examine the relation between the unexpected components of inventory and receivables at the end of quarter t, and unexpected sales for quarter t+1, where expectations are conditional on sales for quarter t. We adopt the perspective of an investor who has received a sales announcement (along with an earnings announcement) for quarter t, but does not yet know the inventory and receivables balances for the end of quarter t. The investor has predicted sales for period t+1 using information about sales through quarter t with the time-series forecasting model developed by Foster [1977]. [26] We then ask how much of the investor's sales forecast error could be explained by the unexpected changes in inventory and receivables balances reported for the end of quarter t.

Table 7 presents the regression equation used to assess whether inventory and receivables balances are incrementally useful in predicting sales. The results in panel A suggest that positive sales forecast errors are associated with unexpectedly high prior-quarter inventory levels (t = 6.55) and unexpectedly low prior-quarter receivables levels (t = -11.04). [27] Thus, revelation of the inventory and receivables balances could have served to improve the prediction of sales, even after prior sales had already been taken into account. However, in panel B, when "outliers" are excluded from the sample, the significance of receivables is lost.[28] Furthermore, the R^2s for the regressions in both panel A and panel B are extremely low (2.8% and 0.4%), indicating that improvements in sales forecasting ability are modest, even though statistically significant. In panel C, following an approach like that used in Beaver, Clarke, and Wright [1979], we group the firms into 25 portfolios based on rankings of their independent variables,[29] to determine how much stronger the predictive relation is at a portfolio level. (A higher R^2 is expected, as the result of diversifying some of the firm-specific "noise" in the data.) After grouping, the R^2 rises to 60.1% and unexpected inventory balances remain good predictors of future sales[30] ($t = 5.51$); however, the coefficient on unexpected receivables switches sign.

On the basis of the evidence in table 7, we conclude that there is modest support for the logic underlying our model. Specifically, inventory balances do appear to be incrementally useful in predicting future sales, after controlling for information about current and prior sales. Moreover, this supports the link in our model which differentiates its predictions from a simple "quality of earnings" story. But, receivables balances do not generally have similar predictive ability; so if unexpectedly high receivables balances are "bad news," the data do not support the existence of a link through future sales, as argued by O'glove [1987].

VI. TESTS OF THE INFORMATION CONTENT OF EARNINGS COMPONENTS BASED ON THE LINKS BETWEEN INVENTORY, RECEIVABLES, AND FUTURE SALES

Since the model predicts that the security price implications of cash flows and accruals vary across firms, in addition to over time, it is possible that tests based on the components of current accruals could explain stock price behavior even when the tests previously discussed could not. Having established at least some support for the economic links between inventory, receivables and future sales, we now proceed to determine whether the components of current accruals can explain stock price behavior around the release of quarterly and annual reports.

Our tests are based on a modified version of equation (6), which was introduced in section I. Since Wilson [1986, section 5.2] presents evidence to show that noncurrent accruals are either uninformative, or already known prior to the financial statement release date, we drop $UNCA_{jt}$ as a regressor to obtain the equation below:

$$R_{jt} = b_0 + (b_{2I}-b_1)UINV_{jt} + (b_{2R}-b_1)UREC_{jt} + (b_{2P}-b_1)UPAY_{jt} + w_{jt}. \qquad (9)$$

The model discussed in section V predicts that $(b_{2I}-b_1)$ is positive, and that $(b_{2R}-b_1)$ is negative. Our model suggests that unexpected payables convey (in a noisier fashion) the same information conveyed by unexpected inventory. Thus, given that $UINV_{jt}$ is already included in the regression, our model provides no motivation for including $UPAY_{jt}$. However, since the portion of unexpected payables that is not redundant with unexpected inventory could conceivably have security price implications, we present estimates of equation (9) both with and without $UPAY_{jt}$. (The expectations for payables are conditioned, in part, on the contemporaneous values of inventory and receivables, so that any information reflected in $UPAY_{jt}$ is intended to be incremental to that in $UINV_{jt}$ and $UREC_{jt}$; see table 6 for details.)

There are two procedural differences between the tests summarized here and those used in the replication and extension of Wilson [1987]. First, for the vast majority of fourth quarter observations where both the 10-K and annual report date are available, we use the <u>earlier</u> of the two, rather than just the annual report date.[31] Second, whereas our earlier tests used market model prediction errors to maintain comparability with Wilson [1987], here we report results based on market-adjusted returns.[32] It turns out, however, that our results are qualitatively insensitive to both of these procedural differences, with one exception, which we will discuss.

Estimates of equation (9) appear in table 8. Panel A presents results of estimating equation (9) while using only the two regressors (UINV and UREC) for which our model offers predictions. Panel B presents estimates of the full equation, including UINV, UREC, and UPAY. The estimates in panel A provide little support for the predictions of our model. Although the coefficients on unexpected inventories all take on the predicted positive sign, none is significant. The coefficients on unexpected receivables are generally of the wrong sign and insignificant. Overall, the explanatory power of these regressions is quite low; the R^2 is never higher than two percent.

In panel B, we again find no support for our predictions concerning UINV and UREC.[33] In contrast, UPAY does take on significant coefficients when we use only data from fourth quarters. We do not want to place undue emphasis on this result, however. First, it is not clear why unexpectedly high payables balances should reveal favorable information about the value of the firm, after controlling for the level of inventory.[34] Second, although the result (and all others in table 8) is insensitive to the treatment of outliers,[35] the t-values always fall below 1.7 when we substitute market model prediction errors for market-adjusted returns, or when we adopt Wilson's approach and use only annual report dates, rather than the earlier of the 10-K or the annual report. Finally, the result is insignificant at the .10 level in the full sample.

Our final attempt to find support for the model involved focusing on a subset of the industries in our sample. We identified 10 of our 33 industries where unexpected inventory balances provided statistically significant incremental explanatory power (at the .01 level, using a one-tailed test) in the sales prediction equation of table 7. We then re-estimated regressions like those summarized in table 8. Again the estimated coefficients were not reliably different from zero.

We conclude that there is little support for the stock price predictions derived from consideration of the separate effects of the components of unexpected current accruals. As in previous sections, we are unable to explain stock price behavior around the release of financial statements by using detailed information about cash flows and accruals.

VII. CONCLUDING REMARKS

This paper has re-examined recent research concerning the valuation implications of detailed components of earnings (in particular, cash flows and current accruals) and has attempted to develop some economic logic for why those valuation implications should differ across these components.

Our approach was to attempt to confirm one simple relation observed in prior research, and then to examine progressively more contextual models of the valuation implications of cash flows and accruals. We were unable to confirm that the relation observed by Wilson [1986, 1987]--a larger price reaction to cash flows than to accruals--extends beyond his test period. When we allowed the relative impacts of cash flows and accruals to vary according to the state of the economy, we were again unable to explain a significant fraction of stock price behavior. Moreover, our failure to find evidence of any significant variation over time in the relative impacts of cash flows and accruals suggests that other partitions of the data according to time periods are not likely to overturn this conclusion. Finally, we introduced a model in which the relative price impacts of cash flows and accruals depend on what the accruals reveal about management expectations of future sales. Although we found modest support for the economic logic underlying our model, we were unable to detect any empirical support for its stock price predictions.

Whenever one fails to reject the null hypothesis in research of this nature, there are several potential explanations. We have conducted a number of supplemental analyses in an effort to eliminate some of these explanations. We believe the remaining explanations fall into two categories. One maintains that financial statement release dates may not represent important events for pricing, because the essential information included therein has already been made available through alternative channels. A second maintains that differences in the valuation implications of cash flows and the various accrual accounts are more contextual than any of the models examined here. If so, then future research might benefit by adopting a less ambitious, more incremental approach. For example, one could strive for a thorough understanding of the economics of a single industry, and develop hypotheses regarding the kind of information that is revealed by the various accrual accounts of firms in that industry.

Our conclusion is that further progress in this line of research will require a better understanding of (a) the process by which information is transmitted from firms to the public, and (b) the economic context in which the implications of detailed earnings components are interpreted. Until such an understanding is developed, we suggest that readers may want to temper conclusions reached in prior related research. In particular, simple descriptions of the differential valuation implications of cash flows and accruals appear to have little or no explanatory power. In fact, on the basis of our evidence, it is possible that the links between detailed earnings components and valuation are so highly contextual that no parsimonious model could ever capture more than a small portion of the story.

FOOTNOTES TO TEXT

[1]Foster, Jenkins, and Vickrey [1986] find no unusual price volatility in the week of annual report releases (the annual report may or may not have been preceded by a 10-K release, as in Wilson [1987]). Foster, Jenkins, and Vickrey [1983] find no evidence of higher-than-average price volatility in the week of a 10-K release, given that the annual report has already been released. (This represents a reversal of the conclusion in Foster and Vickrey [1978].) To our knowledge, there is currently no evidence on the price volatility surrounding the release of the earlier of the 10-K or the annual report, although Professors Peter Easton and Mark Zmijewski of the University of Chicago are currently investigating this topic.

Note that even if price variance in the week of financial statement release were no higher than average, that would not preclude the possibility of information content. It would, however, suggest that the financial statement release is not a major news event.

[2]Jennings [1987] considers such alternative representations of equations used to assess information content of earnings components.

[3]The Wilson [1987] paper moves immediately to a simple regression like (3), and so it never becomes necessary to express the coefficient in terms of differences between coefficients on earnings components, as is done here. However, the coefficient in (3) does have this interpretation, as shown above and in Wilson [1986; see equation (8)]. Therefore, the Wilson [1987, table 1] t-test on the coefficient (b_1-b_2) in equation (3) corresponds to the Wilson [1986, section 5.4] Chi-square test of differences between coefficients (b_1 versus b_2).

[4]Equation (7) in Wilson [1986] corresponds to our equation (1); however, Wilson groups all accruals into a single category, or (alternatively) excludes noncurrent accruals from the analysis. Equation (8) in Wilson [1986] corresponds to our equation (3).

[5]In reconciling the Wilson [1986] results with our interpretation, note that unexpected current accruals in the Wilson paper have the opposite sign as that of our UCA_{jt} variable. Thus, our b_2 corresponds to Wilson's $-\delta_{CA}$; our b_1 corresponds to Wilson's δ_{CO}.

[6]Bowen, Burgstahler, and Daley [1987] estimate an equation that includes the three measures of performance listed in equation (2), plus a fourth measure, unexpected cash flow after investment. In most specifications, this latter variable fails to take on significance (for example, see table 7 of that paper). We ignore it in our discussion, for the sake of preserving a correspondence with the related research.

[7]Rayburn's [1986] approach differs in that non-current accruals are segregated into two components, deferred taxes and depreciation.

[8]References in the previous research on this point include: Brealey and Myers [1981] and Healy [1985] (in Rayburn's [1986] paper); Brealey and Myers [1981], Treynor [1972], and a Chase Financial Brochure (in the Wilson [1986, 1987] papers).

[9]The term "quality of earnings" is often used in the financial press, but is difficult to define. One detailed discussion of the term is presented in Harvard Business School note 9-178-126, by David Hawkins and Leslie Pearlman (revised April, 1985). Other sources of discussion are O'glove [1987, especially Chapter 8], and Bernstein [1978, pp. 617-629].

To the extent that the "quality of earnings" depends on the proportion of earnings derived from recurring sources, the quality of earnings argument is related to Lipe's [1986] demonstration that the reaction to earnings components depends on their "persistence." Persistence in this context pertains to the strength of the relation between a shock in a given earnings component and future values of the same and other earnings components. Although Lipe did not segregate earnings into cash flow and accrual components, his ideas should apply here as well.

[10]DeAngelo [1988], Healy [1985] and Jones [1988] provide evidence consistent with management manipulation of current accruals. However, a question in these and similar studies is whether the research design properly controls for the non-discretionary portion of accruals. McNichols and Wilson [1988] attempt to do this with one current accrual--the provision for bad debts--and conclude that only a small portion of the variation in this account is discretionary.

[11]Our maintained hypothesis also abstracts from other reasons why stock price response coefficients might vary across earnings components, such as Lipe's [1986] notion of persistence.

[12]Another example is provided by Stober [1986], who describes how information from financial statement notes about LIFO inventory liquidations might be used to assess the "quality of earnings" previously reported. Consistent with the above predictions, this explanation leads to the view that unexpectedly low inventory balances for LIFO firms are "bad news."

[13]We appreciate the efforts of Peter Easton and Mark Zmijewski, who obtained this data from the SEC and made a portion of it available to us. We conducted a series of reasonableness checks on the financial statement release dates, but excluded only 0.5 percent of the data from consideration on that basis.

[14]The other alternatives were: (1) income before special items, nonoperating items, and extraordinary items, plus depreciation and deferred taxes; (2) income before nonoperating items and extraordinary items, plus depreciation and deferred taxes; (3) income before special items and extraordinary items, plus depreciation and deferred taxes; and (4) operating income before depreciation. Measure (1) is equivalent to that used in the tests; however, when all data necessary to compute that measure are not available, the calculation used here is more readily computed. We were prevented from knowing our chosen measure of working capital from operations in about 5 percent of the firm-quarters only because interest expense was not disclosed on a quarterly basis. In those cases, we allocated annual interest expense to quarters in proportion to the average debt balance (short-term and long-term) for the quarter.

[15]Since our understanding is that early disclosure of these data was less common in prior years, we view this assumption as conservative. However, following the approach of Wilson [1986, 1987], we assumed that any firm not responding to our request for information did not reveal detailed financial statement data prior to the release of the financial statements.

[16]For the release of annual financial statements, the date at which financial statement information is first available to the market would ordinarily be the earlier of the release date of the annual report to shareholders (AR/S) or the date at which the 10-K report is received at the SEC. We were able to identify dates that the SEC received 10-K reports and annual reports (as well as the dates it received definitive proxy statements, which must be accompanied by an annual reports). However, of the firms responding to our

news release survey, 37 (27.0% of our sample) stated that they typically mail a separate fourth-quarter report to shareholders prior to mailing the annual report; we excluded these firms from tests which focus on the period surrounding the release of annual financial statements.

[17]Following Wilson, we use the release date of the AR/S as the financial statement release date in our replication of his tests. We also conducted tests using the earlier of the release date of the AR/S and the date the 10-K report is received at the SEC as the financial statement release date. Where appropriate, we will report the effects of using these alternative event windows on our tests.

[18]To maintain comparability with Wilson [1987], market model parameters were estimated during a 120-day estimation period, from trading day t-210 to t-91, where t denotes the last trading day in the quarter for which earnings and funds flow information is reported. Thus, the market model estimation period does not overlap with any of the period to which the accounting data used to compute unexpected funds flow pertains.

[19]Our motivation for reporting separate results for the fourth quarters of firms fiscal years is twofold. First, whereas fourth-quarter accruals are audited, interim accruals are not. Second, we have more confidence in our financial statement release dates for the fourth quarter. For the vast majority of observations, we have both annual report and

10-K release dates, but for interim quarters, we have only 10-Q dates. We rely on questionnaires to exclude firms that tend to issue quarterly reports before 10-Qs are released (see section II).

[20]Significant t-values for the largest firms would be contrary to our expectations about the effects of firm size on the amount of new information conveyed by financial statements. Although there are some significant negative t-values for the smallest sized firms, a negative relation between unexpected funds flow and abnormal stock returns would be inconsistent with the results reported in Wilson [1987, p. 308, note 32].

[21]For these tests, we deleted observations where the absolute value of UCF was greater than 8 percent of total assets (representing approximately 3 percent of the sample) and observations where the absolute value of UWCO was greater than 4 percent of total assets (representing approximately 1 percent of the sample). These cutoffs were determined after visual inspection of distributions of these variables; the lower value of the cutoff for UWCO reflects the relatively greater predictability of working capital from operations.

[22]The time-series models were estimated with quarterly data. For the short-term interest rate series, a simple random walk model fit well. For real GNP, the raw series used was already seasonally adjusted and a Box-Jenkins IMA(1,2) model eliminated most of the remaining serial dependence. For GNP, observations are available only for quarters ended in March, June, September, and December. Firms with fiscal quarters ended in January, April, July, and October were matched with the calendar quarter ended one month earlier; firms with fiscal quarters ended February, May, August, and November were matched with fiscal quarters ended one month later. Since an interest rate for a 90-day T-bill is available at the end of any month, it was always possible to match an observation to any given fiscal quarter.

[23]The improvement in fit obtained from permitting the coefficients of the expectations models for cash flow from operations to vary by regime is small; the overall R-squared for

expectations models estimated in pooled cross-section rises from .40 to .42 when we partition on either unexpected GNP, or unexpected interest rates.

[24]We also attempted another partition, based on levels of interest rates. Motivation for this approach is provided by Collins and Kothari [1988], who show that earnings response coefficients vary inversely with the level of interest rates. If the coefficient c_1 in our model depends on the level of interest rates, then (7) and (8) are random coefficients models and pooling observations across different interest rate regimes would reduce the efficiency of our estimators. However, the results of using this partition did not alter our conclusions.

[25]Due to concerns about efficiency of the parameter estimates, we also reestimated our expectations models for inventories and receivables assuming the seasonal adjustment parameters k_{1q} and p_{3q} (see Appendix) were the same for all four quarters with no change in the results.

[26]This model assumes that quarterly sales follow a first-order autoregressive process in seasonal differences. See table 6 for details.

[27]There are more observations available in table 7 than in tables 2 and 3 because we need not restrict attention to firm-quarters for which detailed earnings component data are available for the first time upon release of the financial statements, and because missing CRSP data is not an issue here.

[28]Observations where the absolute value of UINV and UREC exceeded 30 percent of sales were classified as outliers. A casual examination of the data indicates that some of these outliers are caused by events such as acquisitions and the initial offering of credit cards to customers. Since such events are not what was intended to be captured by our measures of unexpected balances, a good case can be made for excluding outliers.

[29]First, we rank all observations (firm-quarters) on unexpected inventory, and form five groups. Then, within each of those groups, we rank firm-quarters on unexpected receivables, and again form five groups.

[30]This result is qualitatively insensitive to the exclusion of outliers.

[31]Because we also use 10-K dates in cases where no annual report date is available, there is a slight increase in sample size.

[32]That is, we simply subtract the market index return from raw returns. The reason for the change is that we were concerned that "noise" in the market model "alphas" from short (90-day) estimation periods used in our replication of Wilson [1987] would offset any advantages of using the market model. The results of Brown and Warner [1985] indicate there is no clear gain in power from using market model prediction errors instead of market adjusted returns even though their market model is estimated with 250 observations. Others share this concern; see Penman [1988, especially note 3].

[33]Careful readers may wonder why inclusion of UPAY affects the estimates of coefficients on the other regressors, given that UPAY is designed to capture only information incremental to inventory and receivables. One reason is that since expectations for the three regressors are created in time-series, industry-by-industry, they would not necessarily be orthogonal in the final, pooled cross-sectional regression. The second reason is that the expectations for payables are conditioned on contemporaneous levels of inventory and receivables, not on UNIV and UREC per se.

[34] One possibility is that unexpectedly high payables arise when the firm builds raw materials inventory near the end of the quarter. If that action is taken in anticipation of higher demand, it could be viewed as a good signal by the market.

[35] As in table 8, outliers are defined as observations where at least one of the regressors (prior to scaling) has an absolute value greater than 30 percent of sales.

APPENDIX:

A SIMPLE MODEL OF THE LINKS BETWEEN CURRENT ACCRUALS AND FUTURE SALES

We consider a model of the operating cycle of the firm, in order to identify what valuation-relevant signals might be conveyed by information about current accruals. Two of the three major components of current accruals are considered: changes in inventory and changes in receivables.

Changes in inventory balances

Assume that inventory at the end of period t, denoted by I_t, consists of two components. The first is I_t^*, representing the optimal balance of inventory, given management's expectation of future sales $E_t(S_{t+1})$. The second component is D_t, representing the deviation from the optimal balance. This component depends on not only the deviation of period t sales (S_t) from management's expectations at the end of period t-1 ($E_{t-1}(S_t)$), but also on the previously-existing deviation from the optimal balance (D_{t-1}). Thus:

$$I_t = I_t^* + D_t, \qquad \text{(A-1)}$$

where (by assumption):

$$I_t^* = k_{1q}E_t(S_{t+1}), \qquad \text{(A-2)}$$

and:

$$D_t = k_2 D_{t-1} + k_3[E_{t-1}(S_t) - S_t]. \qquad \text{(A-3)}$$

The behavioral assumption underlying (A-2) is that the optimal inventory balance is a constant fraction of management's expectation of next quarters' sales, where this fraction may vary only with the quarter (q) of the firm's fiscal year.[1] (A-3) assumes that, if actual sales levels differ from expectations, then an unplanned inventory buildup or liquidation, in the amount $k_3[E_{t-1}(S_t) - S_t]$, would occur by the end of period t. In addition, (A-3) posits that if a deviation from the optimum (D_{t-1}) already existed at the beginning of the period, a fraction k_2 of that deviation would still remain at the end of the period.

Now, noting that $D_{t-1} = I_{t-1} - I_{t-1}^* = I_{t-1} - k_{1q}E_{t-1}(S_t)$, we can combine (A-1), (A-2), and (A-3) to obtain:

$$I_t = k_{1q}E_t(S_{t+1}) + k_2I_{t-1} - k_2k_{1q}E_{t-1}(S_t) + k_3[E_{t-1}(S_t) - S_t]. \quad \text{(A-4)}$$

After earnings and sales have been announced, but before the inventory balance is revealed in the published financial statements, the market is already aware of how large an "inventory buildup" or "inventory decline" should have occurred as a result of sales deviating from expectations. Those effects are captured in the last three terms in expression (A-4). What the market does not know (with certainty) is the first term, which depends on management's expectation of future sales, $E_t(S_{t+1})$. Publication of the inventory balance in the complete financial statements permits the market to infer what management expectations must be.

The empirical tests require an estimate of expected inventory from the point of view of the market, after the announcement of sales but before the release of financial statements. For that purpose, we use the sales forecast model in Foster [1977] to proxy for the market's expectation of future sales, and estimate the following analog of (A-4):[2]

$$I_t = m_1k_{1q}E_t(S_{t+1}) + m_2I_{t-1} - m_3k_{1q}E_{t-1}(S_t) + m_4[E_{t-1}(S_t) - S_t] + e_t. \quad \text{(A-5)}$$

where k_{1q} = seasonal adjustment factor, equal to the mean inventory-to-expected-sales ratio for each firm and each of the four quarters of the fiscal year;

m_1, m_2, m_3, m_4 = coefficients to be estimated, assumed identical within industries, but permitted to vary across industries.

In estimation, all left-hand and right-hand side variables are scaled by sales, to permit pooling across firms within the same industry.

Changes in receivables balances.

Letting R_t, S_t, and C_t denote receivables at the end of period t (net of allowances for bad debts), sales for period t, and collections for period t, respectively, we have the accounting identity for receivables:

$$R_t = R_{t-1} + S_t - C_t. \tag{A-6}$$

We model collections as a function of the beginning balance of receivables, the current period's sales, and a disturbance term, u_t:

$$C_t = p_1 R_{t-1} + p_2 p_{3q} S_t + u_t. \tag{A-7}$$

The term $p_2 p_{3q} S_t$ captures the portion of current sales that are expected to be collected within the same period, in accordance with management's long-run credit policy. (The term p_{3q} is permitted to be seasonal, as in the inventory model.) The term u_t captures transitory deviations from expected collections, due to changes in credit policy, or customers' willingness or ability to pay. Combining (A-6) and (A-7), we obtain:

$$R_t = (1-p_1)R_{t-1} + (1-p_2 p_{3q})S_t - u_t. \tag{A-8}$$

After sales (S_t) are announced, but before the end-of-period receivables balance (R_t) is revealed, the market already knows the first two terms on the right-hand side of (A-8). Revelation of R_t permits the market to infer u_t, the deviation from the expected collection experience.

In the empirical tests, we require an expectation of R_t from the market's perspective. Our expectation model is based on an estimate of (A-8). In estimation, we assume that p_{3q} is equal to the mean collections-to-sales ratio for each firm and each of the four quarters of the fiscal year. We also assume that p_1 and p_2 are identical within industries, but permit them to vary across industries. To permit pooling within industries, we scale all variables by sales.

FOOTNOTES TO APPENDIX

[1]We recognize that more sophisticated models of optimal inventory balances exist. Our simple specification (A-2) is motivated primarily by a desire for parsimony and to specify the model in terms of observable variables.

[2]While k_2 appears twice in equation (A-4), we do not impose this restriction in estimation. The reason for this is to let the parameters on I_{t-1} and $k_{1q}E_t(S_{t-1})$ remain free to help eliminate sources of nonstationarity not identified in the derivation of the model. (This is equivalent to permitting the error term to be a function of those terms.) Also note that permitting the coefficients in (A-5) to vary across industries can mitigate potential problems arising from the use of different inventory costing methods, such as LIFO and FIFO.

TABLE 1

SAMPLE SELECTION CRITERIA

Firms listed on CRSP daily stock returns file for the period 1977-1984, and for which following COMPUSTAT data were available.

Quarterly, 1976 through 1984:	
1. Net Income	
2. Income before Extraordinary Items	
3. Operating Income before Depreciation	
4. Sales	
5. Depreciation Expense	
6. Tax Expense	
7. Interest Expense on Long-Term Debt	
8. Total Assets	
Quarterly, fourth quarter 1975 through 1984:	
1. Deferred Taxes (balance sheet)	
2. Cash	
3. Accounts Receivable	
4. Inventory	
5. Short-term Debt	
6. Current Assets	
7. Current Liabilities	
Annual, 1976 through 1984:	
1. Capital Expenditures	
2. Interest Expense	177 firms
Firms not located on SEC file of financial statement release dates:	(7)
Total number of firms available for analysis:	170 firms

TABLE 2

SUMMARY OF EXPECTATIONS MODELS USED IN REPLICATION OF WILSON [1987]

Independent variables used in prediction for quarter t values of cash from operations, or working capital from operations (all variables scaled by total assets).

Values already announced for quarter t:	Sales Net Earnings
Values reported previous quarters: (values for quarter t-1; sum of values for quarters t-2 and t-3; values for quarter t-4)	Sales Cash from operations Current accruals Noncurrent accruals
Value for annual period including quarter t:	Capital expenditures

Summary statistics for estimation of expectations models.

Dependent variable:	Cash from operations			Working Capital from Operations		
	Wilson[a]	This study		Wilson[a]		This study
	1981-82 4th Qtr.	1981-82 4th Qtr.	1977-84 All Qtrs.	1981-82 4th Qtr.	1981-82 4th Qtr.	1977-84 All Qtrs.
Expectations models estimated in pooled cross-section:						
Number of observations	463	209	2594	463	209	2594
R-squared	.47	.52	.40	.66	.74	.65
Residual autocorrelations:						
lag 1	--	--	.04	--	--	-.00
lag 2	--	--	.02	--	--	.00
lag 3	--	--	-.00	--	--	-.05
lag 4	--	--	-.15	--	--	-.03
Expectations models estimated in time series, industry-by-industry:						
Number of observations						
Minimum:	N/A	N/A	32	N/A	N/A	32
Maximum:	N/A	N/A	480	N/A	N/A	480
R-squared (median across industries):	N/A	N/A	.48	N/A	N/A	.83
Residual autocorrelations (estimated in pooled data set):						
lag 1	--	--	.05	--	--	-.03
lag 2	--	--	.01	--	--	.01
lag 3	--	--	-.03	--	--	-.03
lag 4	--	--	-.05	--	--	-.02

[a]Results reported in Wilson [1987, p. 307].

TABLE 3

REGRESSIONS OF ABNORMAL STOCK RETURNS DURING THE FINANCIAL STATEMENT RELEASE PERIOD AGAINST UNEXPECTED FUNDS FLOW

Test period: Fourth Quarters of 1981 and 1982

Panel A: Results as reported in Wilson [1987].[a]

	Funds flow variable: Cash Flow from Operations	Funds flow variable: Working Capital from Operations
Coefficient	.23	.26
t-value	3.26	1.10
R-squared	2.9%	0.1%
Observations	325	325

Panel B: Results of Wilson's method applied to new sample (Expectations models estimated in pooled cross-section).

	Funds flow variable: Cash Flow from Operations	Funds flow variable: Working Capital from Operations
Coefficient	.17	.25
t-value	1.17	.62
R-squared	0.9%	0.2%
Observations	158	158

Panel C: Results based on new sample; industry-specific expectations models.

	Funds flow variable: Cash Flow from Operations	Funds flow variable: Working Capital from Operations
Coefficient	.13	.10
t-value	0.89	.22
R-squared	0.5%	0.0%
Observations	158	158

[a]As originally reported, Wilson's coefficients were based on a regression where the dependent variable is the average daily abnormal return. To make the coefficient comparable with our results, where the dependent variable is a 9-day cumulative abnormal return, we have multiplied Wilson's coefficients by nine.

TABLE 4

REGRESSIONS OF ABNORMAL STOCK RETURNS DURING THE FINANCIAL STATEMENT RELEASE PERIOD AGAINST UNEXPECTED FUNDS FLOW

Test period: 1977-1984

Panel A: Results of Wilson's method applied to new sample (Expectations models estimated in pooled cross-sections).

	Funds flow variable: Cash Flow from Operations			Funds flow variable: Working Capital from Operations		
	All Quarters	Fourth Quarters Only	Fourth Quarters 1981-82	All Quarters	Fourth Quarters Only	Fourth Quarters 1981-82
Coefficient	-.05	-.02	.17	-.02	.11	.25
t-value	-1.42	-.31	1.17	-.19	.69	.62
R-squared	0.1%	0.0%	0.9%	0.0%	0.1%	0.2%
Observations	2401	662	158	2401	662	158
t-values by firm size quintile:						
1 (smallest)	-1.59	-1.18	.65	-.11	1.28	1.62
2	-.84	1.46	1.87	.27	.29	-.10
3	1.30	-.03	-.33	.57	-.02	-1.40
4	-1.64	-.35	-.21	-.15	-.40	-2.30
5 (largest)	0.44	-.18	.27	-.72	.26	2.28

Panel B: Results based on new sample; industry-specific expectations models.

	Funds flow variable: Cash Flow from Operations			Funds flow variable: Working Capital from Operations		
	All Quarters	Fourth Quarters Only	Fourth Quarters 1981-82	All Quarters	Fourth Quarters Only	Fourth Quarters 1981-82
Coefficient	-.06	-.03	.13	-.08	.02	.10
t-value	-1.63	-.39	.89	-.62	.10	.22
R-squared	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%
Observations	2399	662	158	2400	662	158
t-values by firm size quintile:						
1 (smallest)	-2.24	-1.99	-1.17	.06	.84	1.05
2	-.96	1.26	2.05	-1.20	-.96	-.87
3	1.22	.61	.08	.62	.23	-.30
4	-.96	.07	.38	-.14	.13	-.64
5 (largest)	0.12	-.15	1.25	-.63	.18	1.95

TABLE 5

REGRESSIONS OF ABNORMAL STOCK RETURNS DURING THE FINANCIAL STATEMENT RELEASE PERIOD AGAINST UNEXPECTED FUNDS FLOW: EFFECTS OF PARTITIONING ON MACROECONOMIC CONDITIONS

Test period: 1977-1984

Panel A: Expectations models estimated in pooled cross-sections, within economic regimes.

Predicted sign of coefficient:	Positive		No prediction		Negative	
State of economy:	Unexpected GNP growth low	Unexpected interest rates high	Unexpected GNP growth near zero	Unexpected interest rates near zero	Unexpected GNP growth high	Unexpected interest rates low
Coefficient	-.06	-.07	.00	-.01	-.10	-.01
t-value	-.94	-1.26	.06	-.13	-.49	-.23
R-squared	0.1%	0.2%	0.0%	0.0%	0.3%	0.0%
Observations	846	883	748	666	807	852

Panel B: Industry-specific expectations models, estimated within economic regimes.

Predicted sign of coefficient:	Positive		No prediction		Negative	
State of economy:	Unexpected GNP growth low	Unexpected interest rates high	Unexpected GNP growth near zero	Unexpected interest rates near zero	Unexpected GNP growth high	Unexpected interest rates low
Coefficient	-.10	-.06	-.12	-.00	-.13	-.06
t-value	-1.38	-.86	-1.47	-.00	-1.70	-.79
R-squared	0.2%	0.1%	0.3%	0.0%	0.4%	0.1%
Observations	817	848	719	645	775	819

TABLE 6

SUMMARY OF EXPECTATIONS MODELS USED IN SECTIONS V and VI

Dependent variable:	Sales (S_t)	Inventory (I_t)	Receivables (R_t)	Payables (P_t)
Model estimated in:	Seasonal differences (S_t-S_{t-4})	Levels	Levels	Levels
Independent variables:	(S_{t-1}-S_{t-5})	I_{t-1}	R_{t-1}	P_{t-1}
		$E_t(S_{t+1})$	S_t	P_{t-4}
		$E_{t-1}(S_t)$		I_t
		S_t-$E_{t-1}(S_t)$		R_t
		(See Appendix)	(See Appendix)	
Approach to pooling:	Data pooled within industries[a]	Data pooled within industries[b]	Data pooled within industries[c]	Data pooled within industries
Approach to scale specific firms' data to mitigate heteroscedasticity	Two-stage Weighted Least Squares	Scale all data by sales	Scale all data by sales	Scale all data by sales
R-squared (for median industry):	.58	.92	.77	.71
Residual autocorrelations (estimated in pooled data set):				
lag 1	.06	.10	-.06	-.05
lag 2	.10	-.00	-.02	.11
lag 3	.07	-.00	.06	.03
lag 4	-.32	.13	-.06	.28

[a] Intercept (drift term) is permitted to vary by firm; slope coefficient is assumed constant across firms within industry.

[b] Coefficient on $E_t(S_{t+1})$ reflects firm-specific and seasonal variation (see Appendix). Otherwise, all coefficients are assumed constant across firms within an industry.

[c] Coefficient on R_{t-1} reflects firm-specific and seasonal variation (see Appendix). Otherwise, all coefficients are assumed constant across firms within an industry.

TABLE 7

INCREMENTAL USEFULNESS OF INVENTORY AND RECEIVABLE BALANCES AS PREDICTORS OF FUTURE SALES, GIVEN THAT PRIOR SALES ARE ALREADY KNOWN

Explanation: Unexpected sales of quarter t+1 (where the expectation includes information about quarter t sales) are regressed against unexpected inventory and receivables balances of quarter t. The latter are intended to represent those portions of inventory and receivables that are not predictable, given that sales for quarter t are already known.

Pooled time-series, cross-sectional regression estimates for:

$$\frac{S_{t+1} - E(S_{t+1}|S_t)}{E(S_{t+1}|S_t)} = a_0 + a_1 \frac{I_t - E(I_t|S_t, I_{t-1})}{E(S_{t+1}|S_t)} + a_2 \frac{R_t - E(R_t|S_t, R_{t-1})}{E(S_{t+1}|S_t)} + e_{jt-1},$$

where: S_t = Sales for quarter t;
I_t = Inventory, end of quarter t;
R_t = Receivables, end of quarter t;
and expectations models are as described in table 6.

Panel A: Full sample of individual securities.

Independent variable:	Unexpected Inventory	Unexpected Receivables
Coefficient	.24	-.19
t-value	6.55	-11.04

R-squared=2.8%   Number of observations=5585

Panel B: Sample of individual securities, excluding "outliers."
(Observations excluded where absolute value of regressor exceeds 30%.)

Independent variable:	Unexpected Inventory	Unexpected Receivables
Coefficient	.18	-.01
t-value	4.70	-.23

R-squared=0.4%   Number of observations=5431

Panel C: Full sample, grouped into 25 portfolios based on quintiles of UINV, then on quintiles of UNREC within each of the original quintiles.[a]

Independent variable:	Unexpected Inventory	Unexpected Receivables
Coefficient	.38	.08
t-value	5.51	1.50

R-squared=60.1%   Number of observations=25

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[a]No exclusion of outliers; when outliers excluded, results are similar.

TABLE 8

REGRESSIONS OF MARKET-ADJUSTED STOCK RETURNS DURING THE FINANCIAL STATEMENT RELEASE PERIOD AGAINST UNEXPECTED INVENTORY, RECEIVABLES, AND PAYABLES, CONTROLLING FOR CONTEMPORANEOUS SALES AND EARNINGS

Test period: 1977-1984

Pooled time-series cross-sectional regression estimates for equation (9):

$$R_{jt} = b_0 + (b_{2I}-b_1)UINV_{jt} + (b_{2R}-b_1)UREC_{jt} + (b_{2P}-b_1)UPAY_{jt} + e_{jt},$$

where: R_{jt} = Market-adjusted return for firm j, during nine days surrounding release of financial statements for quarter t;
$UINV_{jt}$ = unexpected inventory at end of same quarter;
$UREC_{jt}$ = unexpected receivables at end of same quarter;
$UPAY_{jt}$ = unexpected payables at end of same quarter;

expectations for all variables are conditioned on quarter t sales and earnings and all regressors are scaled by market value of equity prior to the event window.

Panel A: Estimation excluding UPAY as regressor.

Sample:	Coefficients (t-values) $b_{2I}-b_1$	$b_{2R}-b_1$	$b_{2P}-b_1$	R^2	N
All firm quarters	.01 (.38)	-.01 (-.43)	--	0.0%	2589
Fourth quarters only	.03 (1.25)	.01 (.37)	--	0.2%	858
Fourth quarters, 1981-82	.06 (1.34)	.09 (1.64)	--	2.0%	206

Panel B: Estimation of full model.

Sample:	Coefficients (t-values) $b_{2I}-b_1$	$b_{2R}-b_1$	$b_{2P}-b_1$	R^2	N
All firm quarters	-.00 (-.13)	-.01 (-.64)	.02 (1.52)	0.1%	2589
Fourth quarters only	.01 (.41)	-.00 (-.15)	.06 (2.58)	1.0%	858
Fourth quarters, 1981-82	.03 (.62)	.05 (.94)	.10 (2.53)	5.1%	206

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