The Accrual Anomaly and Operating Cash Flows: Evidence from Accrual Components

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Abstract

We argue and show that aggregation of accrual components (changes in inventories, changes in accounts payable, changes in accounts receivable and depreciation expense) into total accruals results in a loss of mispricing-related information in individual accrual components. This motivates us to examine whether the recent evidence that operating cash flows subsume the mispricing effect associated with total accruals holds when accruals are disaggregated into accrual components. We find that accrual components are associated with future abnormal returns even *after* controlling for operating cash flows and growth. The three-day earnings announcement period abnormal returns also support the finding. The evidence with respect to change in accounts payable is especially noteworthy because its inclusion in total accruals *reduces* the mispricing effects of other components considerably. Overall, the prior evidence that operating cash flows subsume the mispricing effects associated with total accruals is likely caused by the aggregation of accrual components into total accruals. Future research would benefit from focusing on accrual components rather than total accruals.

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I. INTRODUCTION

This paper examines the accrual anomaly at the level of accrual components after controlling for operating cash flows and growth. In an important contribution to the accounting literature, Sloan (1996) shows that total accruals are associated with future abnormal returns. However, Desai, Rajgopal and Venkatachalam (2004) find that when both total accruals and cash flows from operations scaled by price (*CFO/P*) are used jointly, *CFO/P* subsumes the mispricing effects associated with total accruals.

Fundamentally, accruals are generated at a more primitive level given by accrual components such as changes in inventories, changes in accounts receivables, changes in accounts payables, and depreciation expense. Individual accrual components may be viewed as the building blocks for total accruals. Hribar (2000) and Thomas and Zhang (2002) show that the accrual components are also associated with mispricing, i.e., the accrual anomaly exists at the level of accrual components. Thus, the evidence on the mispricing effect at the level of total accruals could be an aggregation of mispricing effects at the level of accrual components. If the accrual anomaly emanates at the level of accrual components, a better understanding of the anomaly is more likely to be accomplished through focusing our efforts on accrual components.

Desai et al. examine the role of *CFO/P* only at the level of total accruals. On the other hand, studies examining mispricing effects of accrual components (e.g., Hribar 2000, and Thomas and Zhang 2002) do not examine the role of *CFO/P*. We fulfill this gap in the literature by studying the mispricing effects associated with accrual components while controlling for the effect of *CFO/P*.[1] We argue that the aggregation of accrual components into total accruals would weaken and could even eliminate the mispricing effects observed with accrual components. The *CFO/P* related evidence at the level of total accruals may be driven by aggregation of the accrual components into total accruals. Whether the accrual anomaly at the level of accrual components can indeed be explained away by *CFO/P* is only to be determined through an empirical analysis.[2]

Our main argument is that aggregation or summing of accrual components into total accruals would result in a loss of mispricing-related information embedded in individual accrual components. Hence, at the aggregate (total accruals) level, the mispricing effect would be weaker than found by using the individual accrual components. We explain this argument below by using a simple model and later in the paper we also provide direct evidence in support of our argument. Assume that there are two accrual components which are represented by X and Y and they are related to future abnormal returns (ABRET) in a linear fashion given by the following two equations (with time subscripts on X, Y and ABRET):

$$\text{ABRET}_{t+1} = a_1+b_1X_t+\textit{error}, \qquad (1)$$

and

$$\text{ABRET}_{t+1}= a_2+b_2Y_t+\textit{error}. \qquad (2)$$

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[1] Desai et al. (2004) also use total assets (*TA*) as a denominator for *CFO* but their focus is on *CFO/P*. In our analysis, we use both the denominators but provide only one set of results based on price as the denominator for simplicity in exposition. Our conclusions are not affected whether we use *CFO/TA* or *CFO/P*. Results based on *TA* as the denominator and many other robustness results are available from the authors.

[2] In another line of research to further study the original results of Sloan (1996), Xie (2001) uses the Jones (1991) model to examine mispricing effects associated with normal and abnormal accruals. He finds that the accrual anomaly can be largely attributed to abnormal accruals. Cheng and Thomas (2006) show that *CFO/P* does not subsume the mispricing effects of abnormal accruals, but Desai et al. (2004) find the conflicting opposite result. Neither Xie (2001) nor Cheng and Thomas (2006) study the mispricing effects associated with changes in accounts receivable, changes in inventories, changes in accounts payable or depreciation expense.

This model captures the essence of the commonly used research design in accruals related studies that estimate the mispricing effects of accruals. The mispricing effects are given by b_1 and b_2. Total accruals are defined as X+Y and the mispricing effect of total accruals (X+Y) is estimated from running the regression given by

$$ABRET_{t+1} = a_3+b_3 (X_t+Y_t) +error. \tag{3}$$

In this setup, the coefficient b_3 would not necessarily be significant even if one or both of the coefficients b_1 and b_2 are individually significant. For example, consider a situation when b_1 is significant and b_2 is not. Then, by adding Y to X, we are essentially adding noise to the relevant independent variable. Such aggregation of X and Y would reduce the power of the test and the coefficient b_3 will move toward zero and statistical insignificance.[3]

The impact of aggregating the individual accrual components into total accruals is more dramatic when b_1 and b_2 are of different sign. In that case, even if both components are individually significant, the mispricing effect associated with one component will cancel part or the entire mispricing effect associated with the other component. We argue and show that changes in accounts payable (one of the accrual components) act in a manner that supports this point. In particular, an increase in accounts payable can be interpreted to reflect the possibility that the company is having difficultly in making its payments in a timely fashion. This is highly plausible because benefits from making timely payments or disadvantages from not making timely payments are potentially

[3]Econometrically, this translates into the well known errors-in-variable problem (Judge et al. 1988). As a realistic illustration of adding noise to the more relevant accrual component, consider Wal-Mart Inc. Wal-Mart has 45 days of inventories (based on 2005 financial data). However, it has only 3 days of accounts receivable as most of its sales are through credit cards or cash. Combining receivables with inventories may not be very meaningful in such cases.

large.[4] The implication from this interpretation of changes in accounts payable is opposite to the traditional view of the mispricing effects associated with accruals. The traditional view from accruals related studies is that an increase (decrease) in accounts payable is an income-decreasing (increasing) accrual and is likely to be associated with future positive (negative) abnormal returns. We argue that an increase (decrease) in accounts payable is a negative (positive) signal about the firm's fundamentals and is likely to be associated with future negative (positive) abnormal returns.[5]

The above discussion suggests that even if *CFO/P* (or any other variable) subsumes the mispricing effect at an aggregate level (total accruals), *CFO/P* may not be effective in explaining away the mispricing effects of individual accrual components. Hence, it is important to conduct the empirical analysis because only such an analysis can show the extent to which *CFO/P* captures the mispricing effects of accrual components. Desai et al. also control for growth but find that various growth proxies do not contribute in explaining away the accrual anomaly. We control for growth in addition to controlling

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[4] For example, the discussion of such terms as a 2% discount for a payment in 10 days (versus no discount beyond that and payment being due in 30 days) is almost universally discussed in accounting texts. In this case, not making a timely payment translates into a large opportunity cost of about 36% per year. On the other hand, accounting texts also view an increase of accounts payable as a positive practice as it preserves cash within the firm and reduces the cash conversion cycle (e.g., Revsine et al., 2008).

[5] Consistent with our view, there is some evidence in the literature that suggests that changes on the liabilities side of the balance sheet should be interpreted differently from the changes on the assets side (see Richardson, Sloan, Soliman and Tuna 2005; Bradshaw, Richardson and Sloan, 2006; and Dimitrov and Jain 2008). For changes in accounts payable itself, Thomas and Zhang (2002) find the sign of the mispricing effect to be consistent with our arguments but the results are statistically insignificant. We provide stronger results using a broader dataset. They also do not control for *CFO/P* which is the focus of our study.

for *CFO/P*. [6]

We also examine three-day abnormal returns around earnings announcements and their association with accrual components. This approach is important for our understanding of the accrual anomaly because it allows us to invalidate risk-based explanations.[7] If we observe that abnormal returns around earnings announcements are associated with accrual components, the results would be more consistent with the mispricing explanation at the level of accrual components.

The results in this paper can be summarized as follows. We find that accrual components exhibit significant association with future abnormal returns even *after* controlling for the effects of *CFO/P* and growth. Out of the four main components (ΔAR, ΔINV, $-\Delta AP$, $-DEP$) studied, three (ΔINV, $-\Delta AP$, $-DEP$) are significantly associated with future hedge returns after controlling for *CFO/P* and growth. The magnitudes of hedge returns are large. For example, for ΔINV, annual hedge returns are 9.5% without any controls (in a regression framework described later).[8] After controlling for the effects of *CFO/P* and growth, annual hedge returns are still 5.9%. The results for ΔAP are consistent with our arguments in contrast to the traditional view as discussed earlier.

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[6] Inclusion of growth variables does not affect our conclusions. Fairfield, Whisenant and Yohn (2003) find that the accrual anomaly documented by Sloan (1996) may be viewed as a more general growth anomaly. This is another motivation for controlling for growth.

[7] Bernard, Thomas and Wahlen (1997) and several other studies have examined the three-day abnormal returns around earnings announcements to test whether the phenomena under investigation is consistent with a risk-based explanation or consistent with mispricing. For a discussion of the importance of such an analysis in the finance literature, see LaPorta et al. (1997).

[8] The hedge returns are larger (13.6%) if they are computed as the difference between returns on the extreme decile portfolios formed using change in inventories. Hence, 9.5% is a conservative estimate.

Without any controls, changes in accounts payable are associated with annual hedge returns of 8.5% (in absolute value) which is only second to those associated with Δ*INV* (9.5%). With controls for CFO/P and growth, annual hedge returns are 5.4%. Thus, changes in accounts payable should be interpreted differently from its role as an income-increasing or income-decreasing accrual component.

The three-day hedge returns around earnings announcements are consistent with the annual hedge return results. On average, the three-day hedge returns are three times as large as they would have been had the annual hedge returns distributed evenly over time. Overall, the evidence from this analysis strengthens our conclusion that *CFO/P* does not explain away the accrual anomaly at the level of accrual components.

We also provide direct evidence that aggregation of two or more accrual components into one accrual measure (such as working capital accruals) reduces the power of the tests. We start with one accrual component (say, changes in inventories) and then aggregate two (and more) components into one and repeat the analysis. As we go from using one accrual component to two or more accrual components (say, changes in inventories plus changes in accounts receivable), we find that future abnormal returns become relatively smaller. When *CFO/P* is used in conjunction with accrual components, we note that *CFO/P* is increasingly effective in subsuming the mispricing effects as more accrual components are aggregated. The aggregation of the accrual components into one accrual measure appears to be a major reason underlying the Desai et al. findings.

We do not attempt to explain the accrual anomaly in this paper. We only show that the accrual anomaly is actually stronger than the prevalent results at the level of total accruals suggest. Many researchers have made efforts to fine-tune the understanding of the accrual anomaly or explain it using other variables (e.g., Mashruwala, et al. 2005; Kraft et al. 2006; Zach 2006; Pincus et al. 2007; Zhang 2007; Khan 2008; Jin et al. 2010). Even at the aggregate level, satisfactory reasons to completely explain away the accrual anomaly have eluded the researchers. As Fama and French (2008) recently conclude, the anomalous average returns associated with accruals are pervasive and strong in all size groups (tiny, small, and big). Even if some other variables appear to work to various degrees with respect to the mispricing effects of total accruals, our study indicates that such results do not necessarily carry over to the level of accrual components. Future researchers would be better off studying the accrual anomaly at this level.

The rest of the paper is organized as follows. In section II, we describe the sample. In section III, we explain our research methodology. The descriptive statistics and pairwise correlations are discussed in section IV. The main results of our analysis are presented in section V. In section VI, we show that the results are robust to a variety of examinations such as using the accrual components from the statements of cash flows. We also directly show that aggregation of accrual components into total accruals reduces the power of the tests to study the accrual anomaly. We present our conclusions and implications for future research in section VII.

II. SAMPLE

Sample Selection and Variable Measurement

To construct our sample, we start with all the firms listed on the NYSE/AMEX and NASDAQ markets and covered by Compustat annual industrial and research files and the CRSP monthly file over the period from 1970 to 2002. Similar to prior studies

(Desai et al., 2004; Richardson et al., 2005), we exclude financial institutions (SIC 6000-6999), closed-end funds, investment trusts, foreign companies, and firms with negative book value of equity. We follow the recommendations of Kraft et al. (2006) to avoid several potential sample selection biases. In particular, we do not require a firm-year to have accounting variables available in the following year and we do not eliminate firm-years with missing values of stock returns in a month during the return accumulation period.

Following Sloan (1996), we define total accruals (*TACC*) and CFO as follows:

$TACC = (\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - DEP$, and

$CFO = Earnings - TACC$,

where ΔCA is change in current assets (Compustat data item #4), $\Delta Cash$ is change in cash and cash equivalents (#1), ΔCL is change in current liabilities (#5), ΔSTD is change in current portion of debt (#34), ΔTP is change in tax payable (#71), *DEP* is depreciation and amortization expense (#14), and *Earnings* is operating income after depreciation (#178). Other items used later include sales growth (*SG*) measured as change in sales revenue (#12) deflated by previous year's sales revenue and averaged over the recent three years, *MB* measured as market capitalization at the end of the fourth month after year-end divided by the book-value of equity (#60), and $\Delta Sales$ measured as asset-deflated change in sales revenue (#12). *TACC* and *Earnings* are deflated by average total assets (#6) to make it comparable across firms. STD and TP are set to zero if their values are missing.

For analyzing the commonly used accrual components, we rewrite the above definition of *TACC* in the form of accrual components:

$TACC = \Delta AR + \Delta INV – \Delta AP – DEP + \Delta OTHER$,

where ΔAR: change in accounts receivable (Compustat #2),

ΔINV: change in inventory (Compustat #3),

$–\Delta AP$: minus change in accounts payable (Compustat #70),

$–DEP$: minus depreciation and amortization expense (Compustat #14), and

$\Delta OTHER$: the difference between *TACC* and the four accrual components (ΔAR, ΔINV, $-\Delta AP$ and $-DEP$) given above.

Effectively, we divide *TACC* into five components. For comparability across firms and time, all accrual measures are deflated by average total assets. The first four components are commonly used in financial statement analysis and do not need any explanation. The last component, $\Delta OTHER$ includes the net of other remaining assets and liabilities in working capital. Thus, $\Delta OTHER$ is a potpourri of several assets and liabilities and it is difficult to get a handle on this remaining component of *TACC*. From our reading of several company financial statements, we find that firms have widely differing items in this part of working capital. Practically, there is no uniformity in this category to consider $\Delta OTHER$ to be a variable of interest in this paper. Thus, we present results associated with $\Delta OTHER$ only for completeness and do not have any ex-ante prediction or ex-post analysis.

To facilitate discussion, we multiply depreciation and change in accounts payable by –1 to give them the same directional interpretation (income-increasing or income-decreasing) as accounts receivable and inventory related accrual components. To mitigate the effect of outliers, all variables other than stock returns are winsorized at the top and bottom 1% levels.

We calculate raw returns for a firm-year as the buy-and-hold stock returns cumulated over 12 months from the beginning of the fifth month after the fiscal year-end. If the return value is missing for any month during the 12-month period, we use a value of zero for the missing month rather than deleting the firm-year observation. This is because CRSP calculates the next nonmissing return using the last nonmissing price. Thus, any missing return in between is effectively assumed to be zero. If a firm is delisted during the return cumulation period, we use the delisting return, if available, or -35% (-55%) for NYSE/AMEX (NASDAQ) firms if the delisting return is missing with delisting codes 500 and 520-584 (Shumway, 1997). Any remaining proceeds are assumed to be reinvested in the value-weighted size-matched decile portfolio. Size-adjusted abnormal returns, *BHAR*, are calculated as raw returns minus the value-weighted buy-and-hold cumulative returns of all firms in the same size-matched decile, with the size decile cutoff points based on NYSE/AMEX firms only (Lakonishok et al., 1994).

III. RESEARCH METHODOLOGY

Our main objective is to examine mispricing effects of accrual components *after* controlling for operating cash flows and growth. To accomplish this, we regress one-year ahead buy-and-hold abnormal returns on each of the accrual components while using *CFO/P* along with others as control variables. This approach is the same as in Desai et al. (2004). While Desai et al. (2004) focus on *TACC*, we focus on accrual components. All the explanatory variables are measured in decile ranks and are transformed into a value between 0.0 and 1.0. For additional control for growth, we follow recommendations from Jones (1991) to incorporate change in sales (*ΔSales*) and property, plant and equipment (*PPE*) and recommendations from Desai et al. (2004) to also incorporate the sales growth rate (*SG*) and market-to-book ratio (*MB*). [9]

For three-day abnormal returns around earnings announcements, we use day -1, day 0 and day 1 relative to the announcement dates reported on Compustat. While short window abnormal returns are not sensitive to a specific form of model to compute abnormal returns (Brown and Warner 1985), we use size decile-adjusted returns to be consistent with the annual abnormal returns. Also, to be consistent with the use of annual returns data in our main tests, we report the sum of four quarterly 3-day abnormal returns (a total of 12-days).

In additional analyses, we use several accrual components at the same time (in the same regression) even though our primary interest is not in studying what happens if more than one accrual component is used simultaneously. Rather, we are interested in finding out whether any one of accrual components is still significantly associated with abnormal returns after controlling for the effects of *CFO/P* and growth. One issue related to using several accrual components in the same regression is that pairwise correlations across accrual components are not low. Nevertheless, for completeness and for providing benchmark for future research, the results are useful. We do want to emphasize, however, that the most important result for our purpose relates to the coefficients on the accrual components in which only one accrual component is used at a time while

[9] Following Desai et al. (2004), we require a minimum of $1 million in the denominator when calculating the sales growth rate. Both *ΔSales* and *SG* measures represent change in sales but there are two differences. Δ*Sales* is measured over one year while *SG* is an average over three years; and the denominator in SG is sales from year t-1 while the denominator in Δ*Sales* is average total assets. Neither Δ*Sales* nor *SG* plays an important role in explaining future abnormal returns. Our conclusions are also not affected by omitting either one or both of the variables.

controlling for *CFO/P* and growth.

We follow as yet another approach (similar to that of Xie 2001 and Cheng and Thomas 2006) for the entire analysis in which we use a two-step process to control for the effects of *CFO/P* and growth. In the first step, we estimate regressions of accrual components (or total accruals) on *CFO/P* and growth. In the second step, we regress abnormal returns on residuals from the first step (abnormal accruals at the level of total as well as at the component levels).[10] The idea is that the first stage regression would remove the effects of *CFO/P* and growth from accrual components (or total accruals). The results from this supplemental analysis are generally stronger and support our arguments. However, we do not compare these results with those from Desai et al. as they did not use this alternative approach. We discuss this approach in Appendix I.

IV. DESCRIPTIVE STATISTICS

Table 1 provides the summary statistics for the variables used in the study. For cash flows from operations, we present descriptive statistics for both *CFO/P* and *CFO/TA*. The results are broadly consistent with those in prior studies. The mean (median) *Earnings* is 0.051 (0.087), mean (median) *CFO/TA* is 0.077 (0.112), and the mean (median) *TACC* is -0.025 (-0.031). The means (medians) for the four accrual components, namely, *ΔAR*, *ΔINV*, -ΔAP, and -*DEP* are 0.024 (0.013), 0.019 (0.004), -

[10] Econometrically, if one runs the regression $x = c_0 + c_1 z + \xi$ in the first step and then runs the regression $y = b_0 + b_1\xi + \varepsilon$ in the second step, the coefficient b_1 would be the same as the coefficient b_1 from the one-step full regression $y = b_0 + b_1 x + b_2 z + \mu$. The two-step procedure and one-step procedure may produce somewhat different coefficients in our case for two reasons: The one-step regression uses decile ranks of the independent variables and is run for pooled observations; the first step of the two-step procedure uses raw measures of all the variables and is run within industries (like the Jones model). Hence we also examine the alternative two-step procedure to see if our results are robust.

0.012 (-0.007), and -0.047 (-0.041), respectively. Over firm-years, there is a considerable variation in these accrual components, with standard deviations between 0.030 and 0.075. Consistent with growth in working capital accounts, mean sales growth (*ΔSales* and *SG*) are positive. As in other studies, both raw and abnormal returns are right skewed.

Table 2 presents pair-wise Pearson and Spearman correlation coefficients among accrual components, measures of growth and stock returns. Generally, the Pearson and the Spearman correlations are similar and in our discussion, we mostly refer to the Pearson correlations which are presented above the diagonal in the table. The correlations among the three working capital accrual components (Δ*INV*, Δ*AR*, and Δ*AP*) in absolute terms are between 0.345 and 0.479. They suggest that the working capital components, on average, move together. While these correlations are not small, they are not large enough to suggest that Δ*INV*, Δ*AR* and -Δ*AP* move together perfectly. Thus, these three accrual components exhibit potential to play differential roles in explaining future returns that are different from those related to *TACC*. The correlation between *TACC* and *CFO/P* is larger (0.408 in absolute value) than the correlations of individual accrual components with *CFO/P*. This suggests that while *CFO/P* may be able to subsume the mispricing effects associated with *TACC*, it may not be able to do the same for accrual components.

It is worth noting how individual accrual components are correlated with earnings and with *CFO/P*. Three of the four accrual components given by Δ*AR*, Δ*INV* and *–DEP* are positively (negatively) correlated with *Earnings* (*CFO/P*) and behave in a manner similar to that of *TACC*, consistent with the explanation that accruals are used to mitigate the timing and matching problems of cash flows (Dechow 1994). However, the exception is –*ΔAP*, which is *negatively* correlated with *Earnings* and positively correlated with *CFO/P*. The results are consistent with the alternative explanation discussed in the introduction. The fact that -*ΔAP* is differently correlated with earnings suggests that –*ΔAP* may have different pricing implications from *TACC* and other accrual components. The preliminary evidence in Table 2 confirms this view as the correlation between future abnormal returns and –*ΔAP* is positive whereas the correlations between future abnormal returns and other accrual components are negative.

We also note that Δ*AR*, Δ*INV* and -Δ*AP* are correlated with sales growth (*ΔSales* and *SG*) and market-to-book ratio (*MB*). The correlations with Δ*Sales* are the largest (0.558, 0.469 and -0.442). Thus, the effect of contemporaneous sales growth on accrual components appears to be large. On the other hand, the absolute values of correlations with *SG* and *MB* range only between 0.044 and 0.119.[11] Desai et al. (2004) conjecture that *CFO/P* may be a growth proxy, with lower *CFO/P* representing growth firms while higher *CFO/P* (or *CFO/TA*) representing value firms. However, the evidence on this conjecture is mixed.[12]

V. EMPIRICAL RESULTS ON FUTURE ABNORNMAL RETURNS

In this section, we first present hedge returns for accrual components and for total accruals in Table 3. Then, in Table 4, we present results after controlling for *CFO/P*

[11] Note that if one were to use only the income-increasing and income-decreasing interpretation of accruals and accrual components, the correlations between -Δ*AP* and Δ*Sales* would not be consistent with that interpretation.

[12] Consistent with their conjecture, *CFO/P* is negatively correlated with *MB*, *SG* and Δ*Sales*. However, contrary to their conjecture, *CFO/TA* is positively correlated with each of the three variables related to growth (Δ*Sales*, *MB*, *SG*) in at least one of the correlation measures (Pearson and Spearman).

(Panel A) and finally for *CFO/P* and for growth proxies given by Δ*Sales*, *SG*, and *MB* (Panel B). In Tables 5 and 6, we report corroborative evidence from a similar analysis of abnormal returns around earnings announcements.

Annual Hedge Return associated with Accrual Components

Table 3, Panel A reports hedge returns based on total accruals, accrual components and cash flows from operations. We compare the mean return from portfolio D1 to the mean return from portfolio D10 by using all the observations in these two extreme portfolios. We compute one hedge return per year and test whether the mean across the years (1970 to 2002) is different from zero. For brevity, throughout this paper, we report only one set of statistical test (Fama and MacBeth 1973) which is regarded to be more conservative and generally yield smaller *t*-statistics. [13] The hedge returns of 10.3% for total accruals (*TACC*) are similar to those reported in Sloan (1996).[14]

The new and most interesting result for accrual components is the one with respect to the *–ΔAP* strategy. We find that the *–ΔAP* based strategy yields large abnormal returns of 10.8% (in absolute terms). For the remaining three main accrual components, the results are similar to those reported in prior studies (Hribar 2000; Thomas and Zhang 2002). The *ΔINV* based hedge portfolio yields annual returns of 13.6%. For Δ*AR* and –*DEP*, the hedge returns are also large (6.8% and 4.4%, respectively). It is important to note that consistent with our earlier discussion, the hedge returns to the *–ΔAP* strategy are *negative*, in contrast to the positive returns to hedge portfolios based on other accrual

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[13] The mean hedge returns are similar whether we use the Fama-MacBeth approach (reported in Table 3) or the pooled approach (not reported).

[14] Also, consistent with Kraft et al. (2006), more of the abnormal returns comes from the short side (-6.9%) than from the long side (3.4%).

components.[15] These abnormal returns are clearly economically substantial and are highly statistically significant.

Table 3, Panel B presents results based on simple regressions in which *BHAR* is the dependent variable and one accrual component at a time is used as an explanatory variable. Since the values assigned to the independent variables are between 0.0 and 1.0, the slope coefficients can be interpreted as portfolio returns and compared across different regressions. The slope coefficients in panel B are similar to the hedge returns reported in panel A, i.e., the regression approach yields similar results to those based on portfolio formation. [16] In the next subsection, we examine whether *CFO/P* and growth subsume the mispricing effects associated with accrual components.

Hedge Returns for Accrual Components after Controlling for *CFO/P* and Growth

We start with our replication of Desai et al. (2004) results in Table 4, Panel A, Column 1. As expected, *CFO/P* subsumed the mispricing effects associated with *TACC*. New results are reported in columns 2 to 5. For three of the four accrual components (ΔINV, ΔAP and $-DEP$), *CFO/P* does not subsume the mispricing effects associated with these accrual components. Hedge returns for these three accrual components are 5.9%, 6.9% and 3.9%, respectively.[17] If we use *CFO/TA* instead of *CFO/P*, the untabulated

[15] Thomas and Zhang (2002) use only NYSE/AMEX firms and find weak results to the $-\Delta AP$ strategy (only -2.7%). In their paper, the focus was on change in inventories and not on accounts payable.

[16] Over the 33 years of our study, we find that $-\Delta AP$ and ΔINV yield more consistent results than *TACC*. The coefficients on *TACC* are negative in 27 years. However, the coefficients on $-\Delta AP$ and ΔINV are positive and negative, respectively, in 32 years.

[17] With the control for *CFO/P*, the coefficients on *TACC* are negative in only 14 out of 33 years. However, the coefficients on $-\Delta AP$ are positive in 28 years and the coefficients on

hedge returns are similar (7.3%, 6.7% and 3.9%); only for ΔAR and only when *CFO/P* is used as the control variable, the coefficient is not significant. Note that even if there were only one accrual component reliably associated with future abnormal returns, we would still conclude that *CFO/P* did not subsume the mispricing effects associated with accrual components.

In Table 4, Panel B, we control for growth in addition to controlling for *CFO/P*. We add four additional explanatory variables (*ΔSales*, *PPE*, *SG* and *MB*) as discussed earlier. Overall, the mispricing results for accrual components are not affected. Three of the four accrual components are still significantly associated with future abnormal returns and the absolute values of hedge returns are similar.

The above results underscore our main finding. We conclude that operating cash flows do not explain away the mispricing effects associated with accrual components. In the next subsection, we present corroborative evidence using the three-day earnings announcement period returns.

Three-Day Abnormal Returns Around Earnings Announcements

To distinguish between risk-based explanations and the mispricing effect explanation, we examine the 3-day abnormal returns for the four quarterly earnings announcements following the formation of the portfolios (a total of 12 days). Hribar (2000) and Thomas and Zhang (2002) did not examine abnormal returns associated with accrual components around earnings announcements. These are important new results. If the accrual components are associated with mispricing, we expect to see significant abnormal returns around earnings announcements.

ΔINV are negative in 24 years. In the meantime, the coefficients on *CFO/P* are positive in 25 or 26 years.

In Table 5, Panel A, we find that for portfolios based on accrual components (Δ*AR*, Δ*INV*, -Δ*AP* and –*DEP*), hedge returns around the earnings announcement periods in absolute value terms are 2.3%, 3.4%, 1.1% and 0.2%, respectively. Three of the four accrual components are associated with significant announcement period hedge returns. On average, the three-day hedge returns are three times as large as they should have been had the annual abnormal returns were distributed evenly over the year. These results more clearly indicate that accrual components are associated with mispricing. In Table 5, Panel B, the regression based results are similar and, if at all, stronger as all the four accrual components yield statistically significant abnormal returns.

In Table 6, Panel A, we present results by including *CFO/P* to the above analysis and in Panel B, we add four additional growth variables. Overall the hedge return results are not affected by including *CFO/P*. In Panel A, three of the four accrual components are statistically significant. Consistent with Cheng and Thomas (2006), an interesting finding from this analysis is that even for total accruals, *CFO/P* does not subsume the mispricing effect. In particular, note that in Panel A, hedge returns associated with *TACC* are 2.8% (statistically significant). Thus, Desai et al. (2004) results are not applicable even to total accruals so far as the three-day earnings announcement period is concerned. This result is an important one because it suggests that while *TACC* and *CFO/P* are correlated, the cash flow variable should not be thought to be the dominating variable.[18] In Panel B, the results are similar for *TACC* and two of the four accrual components are still statistically significant. The signs of the coefficients are always consistent with the

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[18] The coefficients on *TACC* and Δ*INV* are each negative in 32 out of 33 years when *CFO/P* is not controlled (Table 5 Panel B). They remain negative in 31 and 30 years when *CFO/P* is included (Table 6 Panel A). The coefficients on *CFO/P* are positive in only 19 and 24 years when considered with these two variables.

evidence presented above. Taken together, the evidence from the three-day returns analysis strongly supports the above mentioned results for annual abnormal returns.

Summary of Our Evidence

There are three new results. First, we show that for one-year ahead abnormal returns, *CFO/P* does not subsume the mispricing effects associated with accrual components. This is our main finding that sheds important light on the accrual anomaly. Second, for the three-day windows around earnings announcements, the results support our main finding. Third, we present interesting evidence with respect to the accrual component given by *–ΔAP*. The third result is important by itself because it highlights the pitfall when accrual components are aggregated in accordance with their income-increasing and income-decreasing effects. In addition, Cheng and Thomas (2006) have already shown that for three-day windows, *CFO/P* does not even subsume the mispricing effects associated with total accruals. Our results, especially in combination with Cheng and Thomas (2006), strongly suggest that we should interpret the results in Desai et al. with caution. The *CFO/P* variable does not appear to be the main driver to capture the accrual anomaly.

VI. ADDITIONAL RESULTS

Multivariate Regression Analysis for Accrual Components

In this subsection, we examine the effects of accrual components by estimating a multiple regression with all accrual components and control variables as explanatory variables. This allows us to examine the joint effect of all the accrual components as explained below. In a multivariate regression, individual accrual components could become statistically insignificant due to correlations among themselves. So long as at least one of the components remains significant, the results reported above are robust.

Table 7 presents the regression results. As mentioned above, the coefficients of decile-rank based regressions can be interpreted as hedge returns and hence, they are more easily comparable across different specifications. In Column 1, we present the results when all the four accrual components are used on the right hand side and there are no control variables. We find that in this multivariate framework, three of the four components are associated with large and statistically significant future abnormal returns. Thus, even though correlations among the components are relatively large (Table 2), they are not large enough for one component to proxy for other components. The four coefficients on the four accrual components are -1.4%, -7.4%, 5.6%, and -4.9%.

For the purpose of various comparisons presented below, we use the following theoretical procedure. Assuming that we are able to construct a portfolio based on stocks from extreme deciles of all four accrual components, the average hedge return for that portfolio would be the sum of the absolute values of the four coefficients mentioned above (see Abarbenell and Bushee (1998) for more detailed discussion and similar use of total coefficients). The sum of the absolute values of the four coefficients is 19.3%. The sum represents the average return so long as it is possible to take long positions in stocks in the lowest deciles of *ΔAR*, *ΔINV*, *-DEP*, and *ΔAP* and short positions in the stocks from highest deciles of *ΔAR*, *ΔINV*, *-DEP*, and *ΔAP*. We recognize that this is only a theoretical possibility as sufficient number of stocks may not be available in extreme decile categories for each of the four accrual components. Hence, to the extent possible, we calibrate these theoretical percentages with additional empirical analysis.[19] Results

[19] For calibration, we form portfolios to examine the mispricing effects associated with

from such an empirical analysis are very similar to those given by summing of the coefficients from the multivariate regressions. Hence, summing the coefficients provides a relevant benchmark to compare results across regressions that are discussed below.[20]

The results in Column 2, Table 7 show that the *CFO/P* variable is not effective in subsuming the effects reported in Column 1. The same three coefficients are statistically significant and sum of the coefficient (after accounting for the signs appropriately) is 12.5% instead of 19.3% as reported above.[21] Thus, the introduction of *CFO/P* reduces the magnitude of hedge returns from 19.3% to 12.5%. Nearly two-thirds of the abnormal returns remain unexplained. In Column 3, we present the result when all the control variables are included in the regression. The sum of the four coefficients is now 15.9%.[22]

Computing Accrual Components from the Statement of Cash Flows

Hribar and Collins (2002) argue that deriving accruals from changes in balance sheet accounts may introduce measurement error. They recommend using the statement of cash flows and hence we replicate our analysis using the statement of cash flows. However, statements of cash flows (under SFAS No. 95) are widely available only from

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two variables at the same time by using a 5x5 design instead of deciles to ensure a reasonable number of observations in each cell. For three variables, we similarly use a 3x3x3 design.

[20] Note that we are not summing the coefficients from simple regressions (regressions with only one accrual component at a time). By using all the four accrual components as explanatory variables in one multiple regression, we have implicitly (econometrically) taken the correlations among explanatory variables into account.

[21] Note that the coefficient on ΔAR changed from negative in column 1 to positive in column 2. To be consistent with the implied trading strategy of longing (shorting) in firms in the lowest (highest) decile of ΔAR, we subtract, rather than add, the 2.1% from the sum of returns based on the other three components.

[22] For annual and announcement period abnormal returns, the sum of the coefficients are negative in at least 28 out of 33 years in the 6 cases of Table 7.

1988 and hence accrual components can be computed only from 1988. Other than limited data, one additional difficulty arises because changes in accounts payable are not reported on statement of cash flows but are combined with other accrued liabilities. For the remaining three accrual components, there is no problem in using the statement of cash flows. To overcome the problem associated with changes in accounts payable, we use two approaches and report our results in Table 8, Panels A and B. In the first case (Panel A), we use the statement of cash flows for three of the four accrual components but use the balance sheets for $-\Delta AP$. We present results for three regression specifications similar to those reported in the previous table. Overall, the results are similar to those from using the balance sheet data. In Panels A, the sums of the four coefficients suggest hedge returns of 21.0%, 16.6% and 18.7% respectively. In each or the three regressions, at least two of the four coefficients are statistically significant at the 1% level (and at least one more is statistically significant at the 5% level). In the second case (Panel B), we do not include the $-\Delta AP$ variable but keep the remaining variables. The results in Panel B are comparable to those in Panel A as the coefficients on the three accrual components are similar across the two panels. Further, while we cannot show -ΔAP related mispricing effect using the statement of cash flows data, it is highly likely that the results would be similar because the results are similar for the other three accrual components.[23]

Overall, whether the accrual components are taken from the statements of cash flows or from the balance sheets, the accrual components are similarly associated with

[23] If we use item "change in accounts payable and accrued liabilities" (Compustat data item #304), its coefficient is insignificant. This is consistent with our argument that combining different components results in a loss of information.

future abnormal returns without any controls and also after controlling for *CFO/P* and growth.

NYSE/AMEX Firms versus NASDAQ Firms

We examine all our results separately for NYSE/AMEX and NASDAQ firms based on exchange codes from CRSP (Kraft et al. 2006). Most findings in the literature are stronger for smaller firms and firms listed on NASDAQ. In Table 9, we present results for NYSE firms (Panel A) and for NASDAQ firms (Panel B). While the results are stronger for the NASDAQ firms, the hedge returns for the NYSE/AMEX firms are also large. In particular, in comparison to 19.3% for the entire sample (Table 7, Panel A, Column 1), the returns for NYSE/AMEX and for the NASDAQ firms are 14.3% and 22.2%, respectively. With controls for *CFO/P* and growth, the corresponding abnormal returns associated with the NYSE firms are 8.8% and 11.3% and the corresponding numbers for the NASDAQ firms are 14.4% and 18.0%. Clearly, NASDAQ firms exhibit stronger mispricing but the results for the NYSE firms are not insignificant by any means. In particular, even after controlling for *CFO/P* and growth, three of the four accrual components are associated with significant mispricing. We conclude that the results are not driven by NASDAQ firms alone.

Firm Size

To understand the importance of firm size on future abnormal returns, we divide firms into two equal-sized subgroups based on the median market capitalization each year. While smaller firms exhibit stronger mispricing, the accrual components based strategies are significantly profitable for both large and small firms. For example, untabulated results show that the sum of the coefficients on the four accrual components is reduced at most to 12.3% for large and 16.9% for small firms, respectively, with controls for *CFO/P* and growth. Overall, the effect of *CFO/P* and growth is not related strongly to size or exchange characteristics.

Aggregation of Two or Three Accrual Components to Form One Accrual Measure

In this subsection, we directly show that when two or more accrual components are aggregated (summed into one accrual measure), there is a considerable reduction in the power of the statistical tests. In Table 10, we present results for all possible aggregation of two accrual components into one. We also report results when the three main working capital accrual components (ΔINV, ΔAR and $-\Delta AP$) are aggregated into one accrual measure.

In Table 10, Panel A, we report results without any controls. Each cell has two sets of results. The first number represents the hedge returns when two accrual components (shown in the corresponding row and column titles) are aggregated. For example, the first number of -0.093 implies that when ΔINV and ΔAR are aggregated into one measure ($\Delta INV + \Delta AR$), the hedge returns are 9.3%. However, were these two accrual components treated as individual variables, the corresponding hedge returns would be 11.1% as shown in square parenthesis in the same cell. More dramatic results are obtained when one of the accrual components is $-\Delta AP$. For example, consider the case of combining ΔAR and $-\Delta AP$.[24] As previously seen, both accrual components yield significant hedge returns. Furthermore, even when considered jointly (without aggregating them), the hedge returns are 9.5%. However, when the two are aggregated

[24] Note that the accrual components ΔAR and ΔINV are defined with a positive sign (from the assets side of the balance sheet) and ΔAP (from the liabilities side of the balance sheet) is defined with a negative sign. Also, *-DEP* is defined with a negative sign.

into one measure (Δ*AR*-Δ*AP*), the hedge returns are only 0.01%. All other results reported in the table also support our argument. In all the cells, the number in the square parenthesis is smaller (in absolute terms) than the number above that. Note that when the three main accrual components (Δ*AR*, Δ*INV*, Δ*AP*) are put together, the hedge returns are only 6.6% (versus 13.3% if they are considered separately). This accrual measure (Δ*AR*+Δ*INV*-Δ*AP*) is essentially the same as the working capital accruals except that Δ*OTHER* is not included. For the exact working capital measure (sum of four accrual components), the corresponding abnormal returns are 7.8% (versus 20.1% if all four components are considered separately).

In Table 10, Panel B, we report results after controlling for *CFO/P*. The results are consistent with our arguments. For example, for the case of (Δ*AR*+Δ*INV*-ΔAP), *CFO/P* is able to completely subsume the mispricing effect of this aggregated accrual measure. The hedge returns for this case are insignificant -0.011 (or 1.1% in absolute value terms) versus 6.6% in Panel A. For the working capital accrual measure (i.e., including Δ*OTHER*), the corresponding hedge return is similarly insignificant -0.022. Thus, *CFO/P* is able to subsume the effect of accruals only when aggregated measures (sum of three accrual components, working capital accruals or total accruals) are used. Furthermore, throughout this table, more dramatic results are obtained when we aggregate *ΔINV* and -*ΔAP* by their impact on earnings (income increasing and income decreasing). In general, Δ*INV* is an important accrual component as its mispricing effect is evident in all circumstances examined in this paper. However, we find that when Δ*INV* is summed with -Δ*AP*, the strategy yields hedge returns of only 3.5% without any controls and 1.1% with all the controls. These results show that summing -Δ*AP* with

Δ*INV* can reduce even the large effects associated with Δ*INV*. Conclusions are also similar when we add growth variables (not reported for brevity). Overall, this evidence directly supports our arguments that aggregating individual accrual components into working capital accruals or total accruals results in a loss of information. Hence, the resultant hedge returns are less significant or even non-existent.

VII. CONCLUSIONS

In an important contribution to the accounting literature, Sloan (1996) shows that total accruals are associated with future abnormal returns. This result is popularly known as the accrual anomaly. Desai et al. (2004) find that the mispricing effects associated with total accruals are subsumed by a single variable given by cash flows from operations, scaled by price or total assets (*CFO/P* or *CFO/TA*). We argue that summing of accrual components into total accruals results in a loss of information embedded in individual accrual components. Hence, the Desai et al. evidence may be driven by aggregation of the accrual components into total accruals and may have less to do with the accrual anomaly at the level of accrual components. An empirical study at the level of accrual components is necessary to help us determine whether a cash flow variable can explain away the accrual anomaly in more general settings. Prior studies (Hribar 2000; Thomas and Zhang 2002) examining the mispricing effects associated with accrual components do not consider *CFO/P* (or *CFO/TA*). Our main contribution in this paper is to show that *CFO/P* (or *CFO/TA*) is not effective in subsuming the mispricing effects associated with accrual components.

In addition to examining annual abnormal returns, we also examine three-day abnormal returns around earnings announcements. Prior studies do not examine three-day announcement period abnormal returns for accrual components with or without cash flow controls. The results are consistent with the mispricing effects associated with the accrual components. Hence, our results are robust and allow us to conclude that the accrual anomaly is embedded at a deeper level in the accounting process and reporting.

We also extend prior research with respect to changes in accounts payable in a significant way. Although a change in accounts payable is an accrual component, it is fundamentally different from other accrual components. While accounts receivable and inventories are on the asset side of the balance sheet, accounts payable are on the liabilities side of the balance sheet. We argue that an increase in accounts payable may reflect the fact that the company is having difficulty in making timely payments. A decrease in accounts payable can be interpreted similarly to suggest that the company is healthier and makes timely payments to benefit from potential early payment discounts. The traditional view, however, would regard an increase (decrease) in accounts payable as an income-increasing accrual that should be associated with positive (negative) future abnormal returns. On the other hand, our results show that increases (decreases) in accounts payable are associated with negative (positive) future returns.

We also provide direct evidence that aggregation of two or more accrual component into one accrual measure reduces the power of the tests. As we go from using one accrual component to combination of multiple accrual components (say, change in inventories plus change in accounts receivable), we find that future hedge returns become relatively smaller. These results directly support our argument that aggregating individual accrual components into total accruals reduces the power of the tests that evaluate mispricing.

Many researchers have made efforts to better understand the accrual anomaly or explain it using other variables (e.g., Mashruwala, et al. 2005; Kraft et al. 2006; Zach 2006; Pincus et al., 2007; Zhang 2007; Khan 2008; Jin et al., 2010) and many of the issues related to the accrual anomaly are now better understood. However, Fama and French (2008) recently conclude that the anomalous average returns associated with accruals are pervasive. Hence, additional research is necessary to understand this anomaly. Given our results, it is clear that if we were to get a better handle on the accrual anomaly, studying the accrual anomaly in the future at the level of accrual components may bear fruit. Our focus in this paper is not to explain the accrual anomaly *per se* but to point out that a finer partitioning of total accruals is critical for future research. At the very least, the cash flow variable is not a parsimonious variable to explain away the accrual anomaly. Further investigation of the accrual anomaly is left for future research.

APPENDIX I

In this appendix we explain an alternate two-step method to control for growth and cash flows from operations. Our conclusions are similar whether we use *CFO/P* or *CFO/TA* for the cash flow proxy. Our approach is in the spirit of Xie (2001) and Cheng and Thomas (2006). We start with the Jones model and then expand that basic model to incorporate *CFO/P* and other measures to compute abnormal (or growth removed) accruals. As explained below, we use four different models: (a) Jones model, (b) *CFO* model, (c) Augmented Jones model and (d) Augmented Jones and *CFO* model. These models are estimated for each combination of 2-digit SIC and year. We require a minimum of 10 observations to estimate a model.

The basic Jones model (for total accruals and accrual components) is given as follows:

$TACC$, ΔAR, ΔINV, $-\Delta AP$, and $\Delta OTHER = b_0 + b_1 \Delta Sales + \varepsilon$, and

$-DEP = b_0 + b_1\, PPE + \varepsilon$,

For brevity, we have written the first equation with several variables on the left-hand side because the right-hand variable is the same. Each one of the left-hand side variable is separately regressed on ΔSales.

The Jones model may not fully capture the growth effect in accruals because one-year's growth in sales (Δ*Sales*) may not capture a trend in growth. Desai et al. (2004) also consider market-to-book ratio, *MB,* and sales growth relative to prior year's sales *(SG)*. The variable *MB* captures anticipated growth and *SG* captures trend in growth. Zhang (2006) similarly finds that these two variables are correlated with accruals. We refer to this revised version (with *MB* and *SG*) as the Augmented Jones Model which is represented as follows:

$TACC$, ΔAR, ΔINV, $-\Delta AP$, and $\Delta OTHER = b_0 + b_1 \Delta Sales + b_2\, MB + b_3\, SG + \varepsilon$, and

$-DEP = b_0 + b_1\, PPE + b_2\, SG + b_3\, MB + \varepsilon$.

To control for the potential effects of *CFO/P*, we estimate the following *CFO* Model for the accrual components:

$TACC$, ΔAR, ΔINV, $-\Delta AP$, $-DEP$, and $\Delta OTHER = b_0 + b_1 CFO/P + \varepsilon$,

where *CFO/P* is operating cash flows measured as earnings minus total accruals.

Finally, we consider all-inclusive model with all growth variables and *CFO/P* considered jointly, given below. We refer to the all-inclusive model as Augmented Jones and *CFO* Model:

$TACC$, ΔAR, ΔINV, $-\Delta AP$, and $\Delta OTHER =$
$b_0 + b_1 \Delta Sales + b_2\, MB + b_3\, SG + b_4 CFO/P + \varepsilon$, and

$-DEP = b_0 + b_1\, PPE + b_2\, SG + b_3\, MB + b_4\, CFO/P + \varepsilon$.

We take the residuals from these models and use them in the second step. Note that by construction, the residuals from the above models are orthogonal to growth and *CFO/P*. In the second step, we sort residuals into deciles and compute mean abnormal returns for portfolios corresponding to each decile. The hedge returns are the difference between the highest and the lowest decile portfolio abnormal returns.

Results

For brevity, we do not present the results in a tabular format and only discuss the main results here. Additional details are available from the authors. We find that hedge return based on the residuals of total accruals from the Jones model is 9.1%. Thus, consistent with the results in Xie (2001), the Jones model does not appreciably attenuate the hedge returns based on total accrual. We find that for accrual components as well, hedge returns do not go down substantially. For ΔAR, ΔINV, -ΔAP and –DEP based strategies, the hedge returns are 3.8%, 11.7%, -7.4% and 5.0% (all statistically significant at the 1% level), respectively. Results are similar when we use the Augmented Jones mode. For example, the strategy based on ΔINV earns hedge returns of 10.6% (in comparison to 11.7% when the Jones model is used) and the strategy based on -ΔAP yields -5.6% (in comparison to -7.4% for the Jones model).

When we examine hedge returns based on residuals from The CFO model and The Augmented Jones and CFO model, the overall tenor of the results is not changed. Most importantly, out of the eight possible strategies (four accrual components, each with the last two most elaborate models), seven yield statistically significant results and the overall average of hedge returns across all strategies is 5.8%. In other words, if one were to pick a component-based strategy randomly and control for the effects of all the control variables mentioned above, the expected hedge return is 5.8% which is highly significant.

Table 1
Descriptive Statistics

	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
Earnings	0.051	0.191	-0.833	0.016	0.087	0.146	0.403
CFO/P	0.272	0.881	-1.007	0.022	0.130	0.289	7.378
CFO/TA	0.077	0.197	-0.812	0.025	0.112	0.182	0.457
TACC	-0.025	0.110	-0.367	-0.078	-0.031	0.022	0.356
ΔAR	0.024	0.075	-0.202	-0.007	0.013	0.049	0.325
ΔINV	0.019	0.066	-0.177	-0.003	0.004	0.037	0.289
–ΔAP	-0.012	0.047	-0.205	-0.027	-0.007	0.007	0.129
–DEP	-0.047	0.030	-0.176	-0.059	-0.041	-0.027	-0.004
ΔOTHER	-0.008	0.045	-0.191	-0.021	-0.005	0.008	0.153
ΔSALES	0.155	0.332	-0.836	0.000	0.109	0.278	1.453
PPE	0.582	0.372	0.033	0.288	0.508	0.823	1.685
SG	0.237	0.425	-0.353	0.044	0.131	0.272	2.784
MB	2.816	4.209	0.029	0.879	1.546	2.901	29.868
Raw Returns	0.164	0.786	-1.000	-0.235	0.053	0.380	43.000
BHAR	0.010	0.741	-2.282	-0.346	-0.075	0.211	42.234
ANN_AR	0.007	0.186	-1.319	-0.080	0.000	0.086	5.000

The sample consists of all firm years from 1970 to 2002 with available accounting data from the Compustat annual industrial and research files and stock returns data from the CRSP monthly file. All accounting variables are deflated by average total assets (TA) (Compustat #6) unless indicated otherwise. Earnings is operating income after depreciation (#178). CFO is Earnings minus total accruals TACC. P is the total market capitalization at the end of the fourth month after year-end. TACC is measured as (ΔCA –ΔCash) – (ΔCL –ΔSTD – ΔTP) – DEP, where ΔCA is change in current assets (#4), ΔCash is change in cash and cash equivalents (#1), ΔCL is change in current liabilities (#5), ΔSTD is change in current portion of debt (#34), ΔTP is change in tax payable (#71), and DEP is depreciation and amortization expense (#14). ΔAR is change in accounts receivable (#2); ΔINV is change in inventory (#3); ΔAP is change in accounts payable (#70); PPE is gross property, plant and equipment (#7); ΔOTHER is the difference between TACC and (ΔAR + ΔINV – ΔAP – DEP). ΔSales is asset-deflated change in sales revenue (#12); PPE is gross property, plant and equipment (#7); SG is change in sales revenue deflated by previous year's sales revenue (a minimum of $1 million required in the deflator), averaged over the recent three years. MB is market capitalization at the end of the fourth month after year-end divided by book value of equity (#60). Raw Returns are the buy-and-hold raw stock returns cumulated over 12 months from the beginning of the fifth month after the fiscal year-end. BHAR is annual abnormal returns measured as Raw Returns minus the value-weighted buy-and-hold cumulative returns of all firms in the same size-matched decile over the same period, where the size decile cutoff points are based on NYSE/AMEX firms. ANN_AR is the sum of the four 3-day size-decile adjusted abnormal returns around the quarterly earnings announcements in the subsequent year. All variables other than stock returns are winsorized for the top and bottom 1% of the observations. The primary sample for annual abnormal returns contains 123,286 observations. The sample requiring ΔSales, PPE, SG, MB has 111,012 observations. The corresponding samples for announcement-period abnormal returns have 79,909 and 74,319 observations.

Table 2
Correlation Coefficients

	BHAR	ANN_AR	Earnings	CFO/P	CFO/TA	TACC	ΔAR	ΔINV	–ΔAP	–DEP	ΔOTHER	ΔSALES	PPE	SG	MB
BHAR		0.297	0.038	0.012	0.056	-0.036	-0.029	-0.046	0.043	-0.013	-0.008	-0.021	0.006	-0.018	-0.049
ANN_AR	0.260		0.006	0.021	0.041	-0.057	-0.035	-0.045	0.016	-0.002	-0.021	-0.030	-0.001	-0.032	-0.021
Earnings	0.124	0.001		0.143	0.821	0.247	0.168	0.160	-0.029	0.135	-0.002	0.274	0.126	-0.086	-0.238
CFO/P	0.153	0.043	0.303		0.255	-0.408	-0.283	-0.242	0.100	-0.129	-0.034	-0.113	0.371	-0.128	-0.460
CFO/TA	0.158	0.045	0.681	0.655		-0.389	-0.154	-0.165	0.021	-0.204	-0.137	0.094	0.292	0.021	0.053
TACC	-0.040	-0.046	0.280	-0.196	-0.329		0.598	0.623	-0.138	0.382	0.215	0.396	-0.251	0.044	-0.003
ΔAR	-0.036	-0.017	0.263	-0.139	-0.184	0.545		0.345	-0.479	0.057	-0.268	0.558	-0.118	0.101	0.119
ΔINV	-0.046	-0.039	0.272	-0.147	-0.205	0.570	0.339		-0.451	0.105	-0.137	0.469	-0.110	0.067	0.044
–ΔAP	0.052	0.008	-0.120	0.061	0.061	-0.126	-0.448	-0.398		-0.035	0.115	-0.442	0.045	-0.055	-0.113
–DEP	-0.023	-0.013	0.045	-0.038	-0.083	0.398	0.055	0.101	-0.030		0.008	0.028	-0.510	-0.054	-0.063
ΔOTHER	-0.010	-0.026	-0.087	-0.027	-0.119	0.141	-0.258	-0.150	0.133	0.011		-0.228	0.046	-0.058	-0.100
ΔSALES	-0.024	-0.016	0.429	-0.085	0.032	0.375	0.550	0.454	-0.406	0.011	-0.259		-0.103	0.138	0.122
PPE	0.075	0.012	0.095	0.131	0.262	-0.278	-0.115	-0.074	0.031	-0.568	0.043	-0.099		-0.184	-0.120
SG	-0.048	-0.023	0.127	-0.070	-0.110	0.092	0.136	0.108	-0.068	-0.009	-0.067	0.206	-0.194		0.120
MB	-0.078	-0.016	0.152	-0.149	-0.227	0.071	0.187	0.089	-0.127	-0.064	-0.105	0.217	-0.142	0.187	

For sample selection and variable definitions, see Table 1. Pearson correlation coefficients are above the diagonal and Spearman rank correlation coefficients are below the diagonal. For variable definitions, see Table 1.

Table 3
Annual Abnormal Returns (BHAR) based on Total Accruals, Accrual Components and CFO/P

Panel A. Portfolio results

	Basis for portfolio formation						
Portfolios	TACC	ΔAR	ΔINV	–ΔAP	–DEP	ΔOTHER	CFO/P
D1	0.034	0.023	0.061	-0.077	0.019	0.015	-0.036
D10	-0.069	-0.045	-0.075	0.031	-0.026	-0.018	0.057
Hedge portfolio: D1-D10	0.103**	0.068**	0.136**	-0.108**	0.044*	0.033*	-0.093*

Panel B. Regression results: BHAR = $b_0 + b_1$ X + ε

	Independent variable X						
	TACC	ΔAR	ΔINV	–ΔAP	–DEP	ΔOTHER	CFO/P
Intercept	0.052**	0.037**	0.059**	-0.031**	0.041**	0.026*	-0.051*
X	-0.082**	-0.050**	-0.095**	0.085**	-0.058**	-0.029	0.125**
R^2	0.004	0.002	0.004	0.002	0.003	0.001	0.015

For sample selection and variable definitions, see Table 1. For each year, firms are assigned to ten equal-sized portfolios (D1 to D10) based on each designated variable. In Panel A, the hedge portfolio is formed by taking a long position in firms in the lowest decile and a short position in firms in the highest decile. Mean annual abnormal returns (BHAR) are calculated for portfolios D1, D10 and the hedge portfolio. The time-series averages of the 33 annual mean portfolio returns for the sample period 1970-2002 are reported. In Panel B, the decile ranks of the explanatory variable are transformed into a value between 0.0 and 1.0. Regressions are run for each year of 1970-2002 and the time-series mean coefficients are reported. * and ** indicate statistical significance at the 5% and 1% levels based on the t-statistics for the time-series means.

Table 4
Regressions of Annual Abnormal Returns (BHAR) on Total Accruals and Accrual Components with Control for CFO/P and Growth

Panel A. Controlling for CFO/P only: $BHAR = b_0 + b_1 X + b_2 CFO/P + \varepsilon$

	Independent variable X					
	TACC	ΔAR	ΔINV	–ΔAP	–DEP	ΔOTHER
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.032	-0.048	-0.014	-0.082**	-0.028	-0.036
X	-0.027	-0.007	-0.059**	0.069**	-0.039*	-0.029
CFO/P	0.114*	0.125**	0.111**	0.118**	0.118**	0.124**
R^2	0.018	0.016	0.017	0.016	0.017	0.016

Panel B. Controlling for both CFO/P and growth: $BHAR = b_0 + b_1 X + b_2 CFO/P + b_3 \Delta SALES + b_4 PPE + b_5 SG + b_6 MB + \varepsilon$

	Independent variable X					
	TACC	ΔAR	ΔINV	–ΔAP	–DEP	ΔOTHER
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.042	0.002	0.033	-0.030	0.094*	0.030
X	-0.049	0.007	-0.059**	0.054**	-0.093**	-0.033*
CFO/P	0.087*	0.113**	0.093**	0.107**	0.108**	0.105**
ΔSALES	0.011	-0.007	0.019	0.015	-0.008	-0.013
PPE	-0.033	-0.026	-0.024	-0.025	-0.086*	-0.024
SG	-0.021	-0.019	-0.018	-0.019	-0.028	-0.018
MB	-0.040	-0.030	-0.037	-0.030	-0.038	-0.035
R^2	0.029	0.028	0.029	0.028	0.030	0.028

For sample selection and variable definitions, see Table 1. Explanatory variables are decile ranked and transformed into a value between 0.0 and 1.0. Regressions are run for each year of 1970-2002 and the time-series mean coefficients are reported. * and ** indicate statistical significance at the 5% and 1% levels based on the t-statistics for the time-series means.

Tables 5
Announcement-period Abnormal Returns (ANN_AR) based on Total Accruals, Accrual Components and CFO/P

Panel A. Portfolio results

Portfolios	Basis for portfolio formation						
	TACC	ΔAR	ΔINV	–ΔAP	–DEP	ΔOTHER	CFO/P
D1	0.026	0.020	0.027	0.004	0.004	0.016	-0.001
D10	-0.012	-0.003	-0.008	0.014	0.002	0.001	0.024
Hedge portfolio: D1-D10	0.038**	0.023**	0.034**	-0.011**	0.002	0.015**	-0.024**

Panel B. Regression results: ANN_AR = $b_0 + b_1$ X + ε

	Independent variable X						
	TACC	ΔAR	ΔINV	–ΔAP	–DEP	ΔOTHER	CFO/P
Intercept	0.022**	0.015**	0.021**	0.003	0.011**	0.013**	-0.005
X	-0.031**	-0.015**	-0.027**	0.009**	-0.007**	-0.011**	0.024**
R^2	0.004	0.001	0.004	0.000	0.000	0.001	0.003

For sample selection and variable definitions, see Table 1. For each year, firms are assigned to ten equal-sized portfolios (D1 to D10) based on each designated variable. In Panel A, the hedge portfolio is formed by taking a long position in firms in the lowest decile and a short position in firms in the highest decile. Mean announcement-period abnormal returns (ANN_AR) are calculated for portfolios D1, D10 and the hedge portfolio. The time-series averages of the 33 annual mean portfolio returns for the sample period 1970-2002 are reported. In Panel B, the decile ranks of the explanatory variable are transformed into a value between 0.0 and 1.0. Regressions are run for each year of 1970-2002 and the time-series mean coefficients are reported. * and ** indicate statistical significance at the 5% and 1% levels based on the t-statistics for the time-series means.

Table 6
Regressions of Announcement-period Abnormal Returns (ANN_AR) on Total Accruals and Accrual Components with Control for CFO/P and Growth

Panel A. Controlling for CFO/P only: ANN_AR = $b_0 + b_1$ X + b_2 CFO/P + ε

	Independent variable X					
	TACC	ΔAR	ΔINV	–ΔAP	–DEP	ΔOTHER
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.017**	0.001	0.011**	-0.007**	-0.003	0.001
X	-0.028**	-0.008**	-0.023**	0.006*	-0.003	-0.011**
CFO/P	0.009	0.021**	0.015**	0.023**	0.023**	0.023**
R^2	0.005	0.003	0.005	0.003	0.003	0.003

Panel B. Controlling for both CFO/P and growth: ANN_AR = $b_0 + b_1$ X + b_2 CFO/P + b_3 ΔSALES + b_4 PPE + b_5 SG + b_6 MB + ε

	Independent variable X					
	TACC	ΔAR	ΔINV	–ΔAP	–DEP	ΔOTHER
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.041**	0.017**	0.027**	0.016**	0.030**	0.026**
X	-0.031**	-0.002	-0.022**	0.000	-0.015**	-0.015**
CFO/P	0.004	0.020**	0.013**	0.021**	0.020**	0.019**
ΔSALES	-0.001	-0.009**	-0.002	-0.010**	-0.011**	-0.014**
PPE	-0.013**	-0.009**	-0.008**	-0.009**	-0.018**	-0.008**
SG	-0.015**	-0.015**	-0.014**	-0.015**	-0.016**	-0.015**
MB	-0.009*	-0.002	-0.005	-0.002	-0.002	-0.004
R^2	0.010	0.007	0.009	0.007	0.007	0.008

For sample selection and variable definitions, see Table 1. Explanatory variables are decile ranked and transformed into a value between 0.0 and 1.0. Regressions are run for each year of 1970-2002 and the time-series mean coefficients are reported. * and ** indicate statistical significance at the 5% and 1% levels based on the t-statistics for the time-series means.

Table 7
Regressions of Abnormal Returns on Joint Accrual Components with Control for CFO/P and Growth

Panel A. Annual abnormal returns

Independent Variables	Dependent variable: BHAR		
	(1)	(2)	(3)
Intercept	0.077**	-0.026	0.092
ΔAR	-0.014	0.021	0.019
ΔINV	-0.074**	-0.044*	-0.044**
–ΔAP	0.056**	0.065**	0.046**
–DEP	-0.049**	-0.036*	-0.088**
ΔOTHER	-0.050**	-0.037*	-0.033*
CFO/P		0.107*	0.095**
ΔSALES			0.009
PPE			-0.077*
SG			-0.027
MB			-0.044
R^2	0.009	0.022	0.033

Panel B. Announcement-period abnormal returns

Independent variables	Dependent variable: ANN_AR		
	(1)	(2)	(3)
Intercept	0.042**	0.033**	0.064**
ΔAR	-0.013**	-0.010**	-0.009**
ΔINV	-0.028**	-0.026*	-0.026**
–ΔAP	-0.006	-0.005	-0.008**
–DEP	-0.004	-0.002	-0.013**
ΔOTHER	-0.019**	-0.018**	-0.018**
CFO/P		0.010*	0.007
ΔSALES			-0.005
PPE			-0.017**
SG			-0.015**
MB			-0.009*
R^2	0.006	0.007	0.011

For sample selection and variable definitions, see Table 1. Explanatory variables are decile ranked and transformed into a value between 0.0 and 1.0. Regressions are run for each year of 1970-2002 and the time-series mean coefficients are reported. * and ** indicate statistical significance at the 5% and 1% levels based on the t-statistics for the time-series means.

Table 8
Regressions of Abnormal Returns on Joint Accrual Components with Control for CFO/P and Growth: Using the Cash Flow Statement Data

Panel A. Accrual components (except –ΔAP) and CFO from the cash flow statement and –ΔAP from the balance sheets

Independent Variables	Dependent Variable: BHAR		
	(1)	(2)	(3)
Intercept	0.069	0.009	0.097
ΔAR	-0.009	0.008	-0.002
ΔINV	-0.069**	-0.053*	-0.043*
–ΔAP	0.067**	0.066**	0.050**
–DEP	-0.065**	-0.054**	-0.095
ΔOTHER	-0.050	-0.060	-0.057
CFO/P		0.088	0.084
ΔSALES			-0.004
PPE			-0.079
SG			0.018
MB			-0.037
R^2	0.008	0.019	0.023

Panel B. Accrual components and CFO from the cash flow statement without considering –ΔAP

Independent Variables	Dependent Variable: BHAR		
	(1)	(2)	(3)
Intercept	0.108*	0.051	0.138
ΔAR	-0.031	-0.016	-0.007
ΔINV	-0.086**	-0.072*	-0.054*
–DEP	-0.064**	-0.054**	-0.097**
ΔOTHER	-0.022	-0.031	-0.030
CFO/P		0.083	0.081
ΔSALES			-0.028
PPE			-0.085*
SG			0.018
MB			-0.040
R^2	0.007	0.018	0.023

CFO is Compustate #308 net of #124; ΔAR is the negative of #302; ΔINV is the negative of #303; –DEP is the negative of #125. ΔOTHER is (Earnings – CFO – other accrual components). See Table 1 for other variable definitions. Explanatory variables are decile ranked and transformed into a value between 0.0 and 1.0. Regressions are run for each year of 1988-2002 and the time-series mean coefficients are reported. * and ** indicate statistical significance at the 5% and 1% levels based on the t-statistics for the time-series means.

Table 9
Regressions of Abnormal Returns on Joint Accrual Components with Control for CFO/P and Growth: NYSE/AMEX vs. NASDAQ firms

Panel A. NYSE/AMEX firms

Independent Variables	Dependent Variable: BHAR		
	(1)	(2)	(3)
Intercept	0.081**	-0.005	0.027
ΔAR	-0.021	0.008	0.006
ΔINV	-0.070**	-0.043**	-0.044**
–ΔAP	0.016	0.028*	0.028*
–DEP	-0.036**	-0.025	-0.047*
ΔOTHER	-0.035**	-0.021*	-0.014
CFO/P		0.082**	0.094**
ΔSALES			0.018
PPE			-0.045
SG			-0.037**
MB			0.010
R^2	0.010	0.019	0.033

Panel B. NASDAQ firms

Independent Variables	Dependent Variable: BHAR		
	(1)	(2)	(3)
Intercept	0.072*	-0.049	0.133
ΔAR	-0.013	0.025	0.026
ΔINV	-0.068**	-0.035	-0.033*
–ΔAP	0.088**	0.098**	0.065**
–DEP	-0.054**	-0.036	-0.109**
ΔOTHER	-0.067**	-0.053*	-0.055**
CFO/P		0.130*	0.104**
ΔSALES			0.006
PPE			-0.092**
SG			-0.022
MB			-0.093*
R^2	0.008	0.022	0.032

For sample selection and variable definitions, see Table 1. The sample is divided into NYSE/AMEX and NASDAQ firms by the exchange codes from CRSP. Explanatory variables are decile ranked and transformed into a value between 0.0 and 1.0. Regressions are run for each year of 1970-2002 (1972-2002) for the NYSE/AMEX (NASDAQ) sample and the time-series mean coefficients are reported. * and ** indicate statistical significance at the 5% and 1% levels based on the t-statistics for the time-series means.

Table 10
Regressions of Abnormal Returns on Combined Accrual Components with and without Control for CFO/P and Growth

Panel A. Estimates of b_1 in regressions of $BHAR = b_0 + b_1 (x_1 + x_2) + \varepsilon$ versus estimates of $b_1 + b_2$ (in square brackets) in regressions of $BHAR = b_0 + b_1 x_1 + b_2 x_2 + \varepsilon$ (except that the coefficient of -ΔAP is multiplied by -1)

X_2 \ X_1	ΔINV	-ΔAP	-DEP	ΔOTHER
ΔAR	-0.093** [-0.111**]	0.001 [-0.095**]	-0.064** [-0.103**]	-0.067** [-0.107**]
ΔINV		-0.035* [-0.132**]	-0.099** [-0.141**]	-0.092** [-0.147**]
-ΔAP			0.042** [-0.140**]	0.039** [-0.141]
-DEP				-0.052** [-0.087**]

Estimate of coefficient b_1 in regression of $BHAR = b_0 + b_1 (\Delta AR+\Delta INV- \Delta AP) + \varepsilon$:	-0.066**
Estimate of coefficient $b_1 + b_2 – b_3$ in regression of $BHAR = b_0 + b_1 \Delta AR + b_2\Delta INV +b_3(-\Delta AP) + \varepsilon$:	[-0.133**]
Estimate of coefficient b_1 in regression of $BHAR = b_0 + b_1 (\Delta AR+\Delta INV- \Delta AP+\Delta Other) + \varepsilon$:	-0.078**
Estimate of coefficient $b_1 + b_2 – b_3 + b_4$ in regression of $BHAR = b_0 + b_1 \Delta AR + b_2\Delta INV +b_3(-\Delta AP) + b_4\Delta Other + \varepsilon$:	[-0.201**]

Panel B. Estimates of b_1 in regressions of $BHAR = b_0 + b_1 (x_1 + x_2) + c\times CFO/P + \varepsilon$ versus estimates of $b_1 + b_2$ (in square brackets) in regressions of $BHAR = b_0 + b_1 x_1 + b_2 x_2 + c\times CFO/P + \varepsilon$ (except that the coefficient of -ΔAP is multiplied by -1)

X_2 \ X_1	ΔINV	-ΔAP	-DEP	ΔOTHER
ΔAR	-0.045 [-0.052]	0.041** [-0.052*]	-0.019 [-0.045]	-0.025 [-0.050]
ΔINV		-0.003 [-0.094**]	-0.061** [-0.094**]	-0.058** [-0.104**]
-ΔAP			0.039** [-0.107**]	0.028* [-0.113**]
-DEP				-0.040* [-0.069**]

Estimate of coefficient b_1 in regression of $BHAR = b_0 + b_1 (\Delta AR+\Delta INV- \Delta AP) + c\times CFO/P + \varepsilon$:	-0.011
Estimate of coefficient $b_1 + b_2 – b_3$ in regression of $BHAR = b_0 + b_1 \Delta AR + b_2\Delta INV +b_3(-\Delta AP) + c\times CFO/P + \varepsilon$:	[-0.075**]
Estimate of coefficient b_1 in regression of $BHAR = b_0 + b_1 (\Delta AR+\Delta INV- \Delta AP+\Delta Other) + c\times CFO/P + \varepsilon$:	-0.022
Estimate of coefficient $b_1 + b_2 – b_3 + b_4$ in regression of $BHAR = b_0 + b_1 \Delta AR + b_2\Delta INV +b_3(-\Delta AP) + b_4\Delta Other + c\times CFO/P + \varepsilon$:	[-0.128**]

For sample selection and variable definitions, see Table 1. All explanatory variables are decile ranked and transformed into a value between 0.0 and 1.0. Regressions are run for each year of 1970-2002 and the time-series mean coefficients are reported. * and ** indicate statistical significance at the 5% and 1% levels based on the t-statistics for the time-series means.

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