The Accruals-Cash Flow Relation and the Evaluation of Accrual Accounting

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Abstract. Considerable research has evaluated the role of accruals in determining earnings, with an accrual-cash flow relation at the center of the investigation. However, much of the research is based on misconceptions. First, accruals are identified as the items that reconcile earnings to cash flows in the cash flow statement. But these are not the accruals applied in determining earnings; rather, they are changes in balance-sheet items, the relevant accruals reduced by the cash flow. Second, accruals are characterized as an adjustment to cash flows, to reduce volatility of cash flows. Consequently, a negative correlation between accruals and cash flow—the accruals-cash flow relation—has been taken as the criterion for quality accruals. However, the accruals that determine earnings are independent of those cash flows, not a reaction to them. The two misconceptions combine to introduce confusion. With the accruals measure employed in the existing research, the comparison to cash flows is spurious, for accruals (so-called) include cash flows. The paper presents a corrective analysis and conducts empirical tests that confirms that analysis and reexamines hypotheses tested in previous research.

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1. Introduction

Accruals define accounting, distinguishing it from a mere cash book. So, the study of accruals and their properties has been an important continuing endeavor of accounting research. The influential paper of Dechow (1994) introduced a characterization of accruals as a modification of cash flows, with a negative correlation between accruals and cash flow—the so-called accruals-cash flow relation—the discriminating feature of quality accruals and earnings. Others have built on this characterization, including Dechow, Kothari, and Watts (1998), Dechow and Dichev (2002), Jayaraman (2008), Dechow, Ge, and Schrand (2010), Bushman, Lerman, and Zhang (2016), and more recently Andrén and Jankensgård (2020), Dong, Teoh, and Zhang (2019) and Dutta, Patatoukas, and Wang (2019). This paper brings a critique to this characterization of accruals and provides a corrective view.

As investors are interested in future cash flows, not accruals, the ability of accruals to forecast future cash flows is a necessary focus of research. However, the focus of the aforementioned papers is on a correlation between accruals and contemporaneous cash flows. That seems to stem from an idea that the role of accruals is to smooth fluctuations in cash flows:

"If accruals are used to smooth temporary fluctuations in cash flows, then changes in cash flows and accruals will be negatively correlated" Dechow (1994), p. 19.

"A fundamental property of accruals is to smooth out fluctuations in operating cash flows." Bushman, Lerman, and Zhang (2016), lead sentence.

"…a negative relationship between accruals and cash flows is a necessary characteristic of high quality earnings (e.g., Dechow and Dichev, 2002)." Bushman, Lerman, and Zhang (2016), p.45.

"….accruals and deferrals (collectively called *accruals*) are usually recorded when a timing mismatch arises between the occurrence of an economic transaction and its associated cash transaction. A direct consequence of such a timing role for accruals, first recognized by Dechow (1994), is that contemporaneous accruals and cash flow from

operations (CFO) are negatively correlated. This insight has formed the conceptual basis for earnings and accrual quality models in the accounting literature (Dechow and Dichev 2002; Dechow, Ge, and Schrand 2010; Bushman, Lerman, and Zhang 2016)." Dong, Teoh, and Zhang (2019), lead paragraph (emphasis in the original).

With the presumption that the negative relationship between accruals and cash flows indicates accrual quality, researchers have been concerned about the documented decline in the negative correlation over time (e.g., Bushman et al. 2016; Dong et al. 2019; Dutta et al. 2019). They have thus set out on an endeavor to discover the reason for the decline, conjecturing economic factors, increase in intangible asset intensity, technological change, financial performance volatility, non-working capital accruals, a decrease in operating cycles, working capital management, impairments, and asymmetric timeliness in loss recognition.

This paper shows that this characterization of accruals is misguided, leading to a misrepresentation about the quality of accrual earnings. The claim rests on two points. The first follows from accounting principles underlying accrual accounting: Accruals are recorded independently of contemporaneous cash flows, not in reaction to them. Second, accruals in the previous research are defined as changes in balance-sheet items. However, those numbers are not the accruals that determine earnings. Rather, they are the relevant accruals reduced by cash flows, partly determined by cash flows. The so-called accruals-cash flow relation thus involves a mechanical negative correlation between "accruals" (so-called) and cash flows: The higher the cash flows for given accruals, the lower the change in balance sheet items.

The misconceptions apparently arise from viewing earnings measurement as a process of observing cash flows then adding accruals to adjust them. This is prompted by the reconciliation in the cash flow statement under the indirect method: Earnings equal cash flow plus "accruals" (though the cash flow statement does not label them as such). However, the cash flow statement presentation is a reverse engineering of what the accountant actually does: The accountant

recognizes accruals independently of cash flows and books them to both earnings and the balance sheet with double-entry. Cash flows then reduce the balance sheet accrual without any effect on earnings, and the cash flow statement reports the change in this balance-sheet number as the difference between the actual accrual and cash flow. Indeed, by simple arithmetic, a number that reconciles accrual earnings to cash flows must be the accruals in earnings minus cash flows. The so-called "accruals" in the research result from cash flows modifying accruals, not accruals modifying cash flows.

The next section lays out this critique. An empirical analysis follows that not only supports the critique but also investigates hypotheses in prior research about the determinants of informative accruals. Among these are the effect of the volatility of cash flows on accrual information, the effect of the operating cycle on the informativeness of accruals, the distinction of short-term and long-term accruals, and, of course, the relevance of the accruals-cash flow relation. Some of those hypotheses survive under the corrected identification of accruals, others do not.

2. The Critique and the Identification of Accruals Affecting Earnings

These points may come as a surprise to those conditioned to the definition of accruals in this research stream. They are demonstrated simply with the journal entries we all learn in Accounting 101. The example here is for revenue recognition but applies to accrual accounting for expenses also. If a sale on credit is deemed to satisfy revenue recognition criteria, the entry is:

Accounts Receivable	Dr.	A
Revenue	Cr	

This entry affects earnings, of course. When the customer pays,

Cash	Dr

Accounts Receivable Cr B

This entry reduces Accounts Receivable in the balance sheet, but has no effect on earnings. The so-called accrual in the literature is the change in Accounts Receivable, A – B, the change in the balance-sheet item from the receivable booked with recognized revenue less the cash on payment of the receivable. But, if the entry for B has no effect on earnings, then A – B cannot be the effect on earnings. It is A that is the earnings accrual, determined by accrual accounting principles for recognizing Revenue, and that is independent of whether it is a cash sale or a credit sale. For a cash sale,

Cash Dr
Revenue Cr. C

is determined by accrual accounting rules for recognizing Revenue—they must be satisfied for Revenue to be booked as the credit entry. Otherwise,

Cash Dr
Deferred Revenue Cr D

For the purpose of earnings measurement, A is the accrual and so is C, irrespective of whether the debit entry is to Accounts Receivable or Cash. D adds to the balance sheet but not to earnings—because of an accrual accounting principle for revenue recognition.

To be clear, we are referring to accruals that affect earnings and potentially the quality of earnings. Those accruals affect the balance sheet, as in A and D, but accrual accounting affects the balance sheet more broadly. So, for example, the entry,

Inventory Dr
Accounts Payable Cr.

is an accrual that creates a balance sheet, and the cash flow

Accounts Payable Dr.

Cash	Cr	

explains the change in the balance-sheet item, Accounts Payable. Neither of these two entries affect earnings. Rather, it is the following accrual entry that is the effect on earnings:

Cost of Goods Sold	Dr	
Inventory	Cr	E

An (accrual) matching principle determines this entry—the cost of inventory sold is netted against the revenue to yield (gross) earnings from the sale, irrespective of the changes in Inventory and Accounts Payable. A broader, comprehensive definition of accruals includes balance-sheet accruals, as in Richardson, Sloan, Soliman, and Tuna (2005) and Larson, Sloan, and Giedt (2018). However, for the determination of earnings, the relevant accruals are the subset that affect earnings.

The definition of accruals in the literature appears to be based on the following accounting relation:

$$Earnings_t = Cash\ Flow\ from\ Operations_t + Accruals_t. \quad (1)$$

This is the relation that governs the reconciliation of earnings to cash flows in the Cash Flow from Operations section of the cash flow statement under the indirect method of presentation, with *Accruals* being changes in balance sheet items. Earnings are viewed as being composed of two components, with accruals adjusting cash flows: The accountant observes cash flow, then adds accruals to modify them—to smooth them, to reduce their volatility. Accordingly, there is a negative accruals-cash flow relation: When cash flows are low (high), accruals are high (low).

However, that is not how accrual accounting works under accounting principles, nor in practice. Under double entry, accruals that determine earnings are added to the balance sheet,

then cash flows modify the balance sheet accrual but with no effect on the income statement. The accruals that determine earnings are independent of cash flows. Rather than cash flows determining earnings with an adjustment by accruals, accruals solely determine earnings with cash flows being irrelevant.[1]

The accounting is applied for both revenue and expense recognition. Revenue is recorded in answer to the question: Have specified recognition criteria been satisfied—irrespective of whether it is a cash or credit sale?[2] The journal entries above so demonstrate. But this is also the case with recognized expenses and corresponding payables and accrued expense liabilities; income statement expenses are determined solely by expense recognition criteria without any reference to the cash flow that reduces the payable or accrued expense liability. Recognition of cost of goods sold makes no reference to cash paid for inventory in the period, as in journal entry E above. Rent expense is the rent obligation incurred without regard to the cash paid, whether contemporaneous, prepaid, or delayed. And so for all other expenses—wages, insurance, warranties, pension expense, to name a few. Some accruals (for estimated bad debts, depreciation and amortization, and impairments, for example) are adjustments to recorded balance sheet numbers, but these adjust accrual numbers (accounts receivable, plant, recorded intangible assets), and to not involve cash flow.

The accounting for debt is illustrative of the point: Under the effective interest method, accrued interest has nothing to do with the cash coupon on the debt; it is the same for a zero-coupon

[1] Bushman, Lerman, and Zhang (2016) recognize the point in their first paragraph, but then proceed with a definition of accruals that confounds.

[2] ASC 606 and IFRS 15, *Revenue from Contracts with Customers*, make no reference to contemporaneous cash flow in their revenue recognition criteria, nor did the predecessor documents which they replace. They only refer to future cash flows which must be "highly probable" for revenue recognition.

(deep discount) bond as for one issued at par (where the coupon rate equals the effective borrowing rate). The correlation between the cash coupon and the accrued interest is of no relevance. And the difference between the cash coupon and accrued interest has no effect on earnings; it just reduces the net debt in the balance sheet to which the accrued interest is added.

Of course, equation (1), being an accounting equation, always holds. But *Accruals* is just a reconciliation number reconciling earnings to cash flows in the cash flow statement, not the accruals that determine earnings in the income statement.[3] Rather, it is those accruals reduced by cash flow, the appropriate number required for the reconciliation.[4]

Define *ACCRUALS* as the non-cash accounting that affects earnings. That is, *ACCRUALS* refers to all non-cash debits and credits to the income statement that have a corresponding credit and debit effect on the balance sheet, whether to cash or other balance sheet accounts. Journal entries A, C, and E are examples. Indeed, *ACCRUALS* determine every income statement item; we know of no item that is not determined by an accrual accounting rule. Indeed that is evident from the cash flow statement reconciliation: The number that reconciles earnings to cash flow from operations is those accruals less cash flows. Thus, with the *Accruals* in equation (1) being the actual accruals minus the cash flow, the equation can be restated as

$$Earnings_t = Cash\ Flow_t + (ACCRUALS_t - Cash\ Flow_t). \quad (1a)$$

[3] The cash flow statement does not apply the label "accruals" to the numbers that reconcile earnings to cash flow. That term seems to have been introduced by researchers.

[4] The misconception is perpetuated in Nezlobin, Sloan, and Zha Giedt (2019) defining accrual quality. Dechow (1994) appropriately stresses the matching function of accrual accounting for earnings measurement, but this is then muddied with language about the negative correlation between accruals and cash flows being a determining feature of accrual accounting. It is the latter property that subsequent papers have taken up as the subject of investigation. Nikolaev (2018) characterizes accruals appropriately, for example recognizing the revenue accrual in footnote 2 as the accrual. However, in modeling the empirical analysis, accruals become the specified number adjusted for cash flows, and accruals in the empirical analysis are those in the cash flow statement, as in equation (1).

which, of course, is equal to $ACCRUALS_t$. Cash flow drops out and earnings is determined solely by the revenue and expense *ACCRUALS.*

This emphasizes that the negative correlation between *Accruals* and cash flow is purely mechanical: For given *ACCRUALS,* the correlation of *Accruals* and cash flow is necessarily negative, depending on the amount of the cash flow. But that is just a mechanical feature inducing a correlation that is irrelevant to the determination of accrual earnings. One cannot identify a journal entry, nor conceive of one, where earnings are credited with *Accruals*.

While *ACCRUALS* defines the accruals under accrual accounting, the quality of the measured accruals actually applied in practice remains an open question. So the amount of cash flow relative to *ACCRUALS* might provide commentary on that. That implies that high (low) cash flow relative to low (high) accruals in a particular period might be an earnings quality diagnostic. If so, the negative correlation would indicate less informative earnings. Our empirical tests so indicate. That contrasts with the claim that a negative correlation indicates more informative accrual earnings.

Appendix A shows how the accounting equations that govern the accrual accounting system imbed the property that accrual earnings that are independent of cash flows. Further, is shows how that property captures the economics of investment activities, operating activities, and distributions to claimants.

3. Empirical Analysis

The literature has tested a number hypotheses about the information conveyed by accruals using *Accruals* as the accrual component of earnings. Our empirical analysis involves tests of the same hypotheses but with the alternative definition of *ACCRUALS*.

As standard in the literature, we evaluate the information in accruals and its quality via regressions with stock returns. Dechow (1994) makes the comparison via regressions involving accruals and cash flows one at a time. More typically, accruals and cash flows have been considered jointly, allowing an assessment of incremental explanatory power. With the earnings components in equation (1), the decomposed returns-earnings regression,

$$Return_{it} = a_t + b_1 Accruals_{it} + b_2 CFO_{it} + e_{it} \quad (2)$$

is estimated in the cross-section, where CFO_{it} is cash flow from operations as in the cash flow statement and $Accruals_{it}$ is changes in balance-sheet items, as in equation (1). Both $Accruals_{it}$ and CFO_{it} are denominated in beginning of period stock price, as is $Return_{it}$. Typically both b_1 and b_2 are typically reported as positive. As $Earnings_{it} = C_{it} + Accruals_{it}$ by equation (1), the regression is equivalent to

$$Return_{it} = a_t + b_1 Earnings_{it} + (b_2 - b_1) CFO_{it} + e_{it}$$

with cash flow adding information to accruals if $b_2 \neq b_1$.

Equation (1a) that recognizes *ACCRUALS* as determining earnings, implies an alternative specification[2]:

$$Return_{it} = \alpha_t + \beta_1 Earnings_{it} + \beta_2 CFO_{it} + \varepsilon_{it} \quad (3)$$

with $Earnings_{it} = ACCRUALS_{it}$ and $\beta_2 = 0$: *ACCRUALS* are priced but, given *ACCRUALS*, cash flow from operations is irrelevant to pricing.

Our regression specification is in a form implied by the accounting structure in Appendix A (firm subscripts suppressed):

$$\frac{P_t^{NOA}-P_{t-1}^{NOA}}{P_{t-1}^{NOA}} = \alpha + \beta_1 \frac{OI_t}{P_{t-1}^{NOA}} + \beta_2^C \frac{C_t}{P_{t-1}^{NOA}} + \beta_2^I \frac{I_t}{P_{t-1}^{NOA}} + \beta_3 \frac{NOA_{t-1}}{P_{t-1}^{NOA}} + \varepsilon_{it} \qquad (4)$$

With the price of operations, $P_t^{NOA} = P_t + Net\ Debt_t$ (with P_t the equity price), the pricing variable is the price change for period t, OI_t is contemporaneous operating income (earnings from operations), C_t is cash flow from operations, I_t is cash investment, and $\frac{NOA_{t-1}}{P_{t-1}^{NOA}}$ is the book-to-price ratio at the beginning of the period.

This regression equation modifies that in equation (3) to fully capture the features of the accounting system relevant to pricing. First, "cash flow from operations" in the cash flow statement, is somewhat misnamed because it includes cash flows in financing activities. In our tests, we deal with the pricing of operations, P_t^{NOA}. Thus CFO_t is replaced with C_t, the actual cash from operating activities. That yields additional insights, as will be seen. Second, as the return for the operations is $\frac{P_t^{NOA}+FCF_t-P_{t-1}^{NOA}}{P_{t-1}^{NOA}}$ where FCF_t is free cash flow for the period, free cash flow has been moved to the right-hand side of the equation, enabling an assessment of its information for price changes.[5] Further, as $FCF_t = C_t - I_t$, the free cash flow has been decomposed into its constituents to isolate cash flow from operations, C_t (not CFO_t). Third, as $\Delta NOA_t = OI_t - FCF_t$ (the clean surplus equation for operating activities), the specification with OI_t, C_t, I_t, and $\frac{NOA_{t-1}}{P_{t-1}^{NOA}}$ satisfies clean surplus, the articulation of the income statement and balance sheet, and this incorporates all accounting features that determine that balance sheet as well the income statement: ΔNOA_t added to NOA_{t-1} is the updating of NOA_t that is

[5] The price for operations is reduced by net payout to equity and net debt (just as equity price is reduced by net payout to equity), and that is given by FCF_t = *Net payout to equity + Net payout to net debt*. The inclusion of FCF_t on the right-hand side of the regression controls for this effect on prices that is not due to operations, but also allows for free cash flow to inform about prices.

contemporaneous with the updating of prices for t. All accounting variables are denominated in the same price, P_{t-1}^{NOA}, as the contemporaneous price change, so additions to price are explained by additions in the accounting system.

This is the specification in Penman and Yehuda (2009), derived directly from the set of accounting equations in Appendix A that distinguish accruals and cash flow in the accounting system. The reader is referred to that paper for the full development and its properties.

3.1 The Data

The data covers fiscal years 1988 to 2016, the period after the cash-basis cash flow statement became available in 1987. The analysis covers all NYSE, AMEX, and NASDAQ firms listed during that period, with the exception of financial firms with SIC codes between 6000 and 6999. We require the following items to be available for a firm-year to be included: net income (#NI), income before extraordinary items (#IB), book value of equity (#CEQ), long-term debt (#DLTT), price (#PRCC), and shares outstanding (#CSHO). Firms with price per share less than 20 cents are excluded. Appendix B lays out how the test sample was determined. Most of our tests exclude firms with acquisitions for reasons to be stated, others include them, so two numbers are given. Appendix B also details the calculation of accounting variables.

For the regression results reported, annual changes in share prices were calculated over the fiscal year to align operating income and cash flow flows with the contemporaneous prices and book value changes. As the annual report is published with some delay, this does not precisely align the pricing period with the reporting period, though much of the accounting information is available through quarterly reports and analysts' forecasts prior to the end of the fiscal year. The

analysis was repeated with price changes calculated over a year beginning three months after fiscal-year end by which time annual reports must be filed, by law. Results were similar.

Panel A of Table 1 summarizes the distribution of variables in the empirical analysis. The mean and medians of (price denominated) $Accruals_t$ are well below those for $OI_t = ACCRUALS_t$ and so at all percentiles, indicating the effect of cash flows on the accrual number. Panel B presents a correlation matrix of the variables. Operating income is positively correlated with price changes for operations and with both free cash flow, FCF_t, and cash flow from operations, C_t. Both free cash flow and cash from operations have negative correlation with price changes for operations. $Accruals_t = OI_t - C_t$ is negatively correlated with C_t, confirming the (mechanical) accruals-cash flow relation. But the negative correlation with C_t is considerably higher than the positive correlation with OI_t, indicating the extent of the effect of cash flow on this supposedly accruals measure. The positive correlation of investment with price changes indicates investment is valued. $\frac{NOA_{t-1}}{P_{t-1}^{NOA}}$ is positively correlated with $\frac{OI_t}{P_{t-1}^{NOA}}$, indicating beginning-of period book value projects income, and that is controlled for in the regressions. Of course, these are unconditional correlations, not those with the numbers jointly reported in the accrual accounting system. It is these correlations that are reported in our empirical tests.

3.2 The Pricing of Accruals and Cash Flows

Table 2 reports the results from estimating regression (4) each year in the cross section, for the full sample period and five-year subperiods. Reported coefficients are the means from annual cross-sectional regressions, with the associated t-statistics calculated as those mean coefficients

relative to their standard errors estimated from the time series of coefficients. For the full period, the table also reports the percentage of positive coefficients observed (out of 29).

The mean coefficient on (accrual) operating income is positive and significantly different from zero, and consistently so over subperiods. That, of course, is consistent with positive correlation between earnings and returns typically observed, but now with the other conditioning variables included in the regression. The mean coefficient on Investment, I_t, is positive and greater than 1.0 in all except the last period. The t-statistic on the mean coefficient of 1.33 for the full period, relative to 1.0, is 3.04: Investment is added to *NOA* at cost under GAAP, but the market adds 33 cents of value to each dollar cost of investment; investment is priced as positive net-present-value on average.[6]

The coefficient on cash flow from operations, C_t, is of primary interest. The mean is -0.99 for the full period, not significantly different from -1.0, and negative in every year. Given accrual operating income, cash flow does not add to price; rather cash flow reduces the price of operations approximately dollar for dollar. By the clean-surplus accounting equation for operations, $\Delta NOA = OI - FCF = OI - C + I$, cash flow from operations reduces net operating assets (NOA) one-for-one. The regression results report that it also reduces price one-for-one. The journal entries A and B at the beginning of Section 2 are illustrative. Entry A recognizes revenue and at the same time books *NOA* with Accounts Receivable. But, on payment of the receivable, entry B reduces the *NOA* and increases cash that is not part of operating activities but

[6] Investment here is that reported in the investment section of the cash flow statement, less net investment in debt assets (which is a financing activity incorrectly classified under GAAP). This, of course, is investment added to *NOA* on the balance sheet. The sample here excludes firms with acquisitions because the acquisitions number is not a clean number for investment in operations. It includes net debt acquired, changes from equity method to consolidation, and excludes stock acquisitions. When cash acquisitions are added to the regression, it returns a mean coefficient of 1.33 with a t-statistic of 17.75 with little change to the other mean coefficients. More generally, results changed little with acquisitions included in the tests.

rather net debt (a financial asset). The pricing result says that cash also reduces the price of operations. This corresponds to the economics: Cash from payment of a receivable is invested in a cash account, and cash is a zero-NPV asset; in contrast to investment in operations that add to *NOA* and price, it decreases *NOA* and the price of operations. It follows that, given A, the change in the balance sheet account, journal entries A – B, reduces pricing of *NOA* rather than adding to price.

The price reduced by cash flow here is the price of operations, not equity price. As the price of equity, $P_t = P_t^{NOA} - Net\ Debt_t$ and interest-bearing cash is a (negative) part of net debt, a reduction of P_t^{NOA} by a dollar of cash flow and an decrease of net debt by a corresponding dollar leaves P_t unchanged. To confirm, when the regression is run with the price change for equity as the dependent variable, the mean coefficient on C_t is 0.02 with a t-statistic of 0.36: Cash flow from operations reduces the price of operations dollar for dollar but is irrelevant to the pricing of equity. Only added income determined by *ACCRUALS* is relevant and that is not affected by cash flow.

The findings in Table 2 are on average. We now proceed to investigate hypotheses in prior research that postulate conditions under which *Accruals* (balance-sheet changes) are said to be relevant to the information in earnings and to earnings quality. Each of the following subsections partitions firms in the cross-section on those conditions with the question: Do the conditions change the coefficients observed on average over these conditions?

3.3 Pricing of Accruals and Cash Flows with the Accruals-Cash Flow Relation

With accruals said to be an adjustment to cash flows, a negative correlation between accruals and cash flows—the accruals-cash flow relation—is said to be a property of accrual accounting, with

a more negative correlation being an indicator of quality accruals. Bushman, Lerman, and Zhang (2016) report that the correlation between accruals and cash flows has become less negative over time and have attributed a perceived decline in the informativeness of earnings over time to this change. Subsequent papers have pursued the reasons for the change in the correlation. The accruals in this endeavor are *Accruals*, that is, balance sheet changes net of cash flows so correlation of cash flows with a measure that includes cash flow is a curious construction.

Table 3 repeats the regression in Table 2 for 10 portfolios formed from a ranking on firms' correlation between Cash Flow from Operations and *Accruals*, the two components in equation (1) whose negative correlation is such a focus in the literature.[7] The correlations are estimated over the 10 years prior to portfolio formation but results are similar with calculations over the prior 5 years. The tests run from 1988-2016 but the correlations for 1988-1997 are estimated with *Accruals* calculated as balance sheet changes rather than from the cash flow statement (then unavailable for the prior 10 years). The requirement of 10 years of prior years' data to estimate the ranking correlation resulted in a small number of firms in each portfolio per year, 34 on average but less than 20 in 11 of the 29 years. So the estimates here are from pooled data over the 29 years. While pooled regressions may have some effect on t-statistics (but not on coefficients) because of some contemporaneous observations, the small number of firms per year mitigates the concern.

For each portfolio, the correlation is increasing over portfolios, by construction. However, the coefficient on Operating Income, determined by the actual accounting *ACCRUALS*, exhibits no

[7] To be comparable with the previous literature, *Accruals* for this test are calculated as Earnings minus cash flow from operations in the cash flow statement. The correlation of this measure with *Accruals* = *OI* – *C* (in Table 1) is 0.98.

systematic pattern over portfolios: The postulated quality metric has no bearing on the pricing of income. The coefficient for portfolio 1 with the most negative correlation between accruals and cash flows is similar to that in portfolio 10 with positive correlation. Similarly, there is no systematic pattern in the coefficients on cash flow over portfolios, all negative. Nor is there any evidence of higher R^2 for the higher negative correlation portfolios. We conclude that the correlation between *Accruals* and cash flow is not relevant for the pricing of accounting accruals.

3.4 Pricing with the Volatility of Cash Flows

The proposition underlying the negative correlation idea is that accruals smooth out volatility in cash flows, the so-called "noise reduction role of accruals." Bushman et al. (2016, p. 59): "Good accruals absorb the noise."[8]

Table 4 is in the same form as Table 3, but now the ranking variable is the standard deviation of cash flow from operations estimated over the 10 years prior to portfolio formation. There is no systematic variation in mean coefficients on operating income over portfolios, nor in the coefficients on cash flow, all negative. Even though the volatility of cash flows is considerably higher in portfolio 10, the pricing of accrual income and cash flows is similar to that in portfolio 1 and to that on average over all conditions in Table 2.

3.5 Pricing of Accruals and Cash Flows with the Length of the Operating Cycle

The operating cycle refers to the length of time to the receipt of cash from the sale of products, with the feature that balance-sheet accounts build up until cash is ultimately received—inventory net of payables, accounts receivable net of deferred revenues, and prepaid expenses relative to

[8] Leuz, Nanda, and Wysocki (2003) critique the smoothing function of accruals but from a different perspective than here.

accrued expenses, for example. Dechow (1994) hypothesizes that the relative importance of accruals increases with the operating cycle, for cash flows are less informative the longer they take to be realized. Dong et al. (2019) investigate whether changes in the operating cycles explain changes in the correlation between *Accruals* and cash flows over time, but Table 3 indicates that is a doubtful target to pursue. The question is open as to whether *ACCRUALS* that are independent of cash flows are priced differently under differing operating cycles.

Two measures of the operating cycle have been used in the papers. The first, is called the Operating Cycle:

Operating Cycle = (Average Accounts Receivable/(Sales/360))

+ (Average Inventory/(COGS/360))

The second, called the Trade Cycle, adjusts with accounts payable:

Trade Cycle = (Average Accounts Receivable/(Sales/360))

+ (Average Inventory/(COGS/360))

- (Average Accounts Payable/(Purchases/360))

Table 5 forms portfolios each year on these two measures, with reported coefficients the means from annual cross-sectional regressions. For brevity, only the coefficients on accrual Operating Income and Cash Flow from Operations are reported, along with the mean R^2. For both measures, the mean coefficients on Operating Income are increasing in the measured operating cycle (though lower for portfolio 10) and decreasing in cash flow. So, the pricing weights shift from cash flows to accrual Operating Income as the operating cycle increases, and with little variation in R^2: When cash is realized relatively quickly (slowly), accrual income is relatively

less (more) informative and cash flow is relatively more (less) informative. There is some attenuation in portfolio 10, suggesting there is an issue with the quality of extreme accruals, an issue we return to in the last table in the paper. Nevertheless, the t-statistic on the difference between the mean of the coefficients on Operating Income for portfolios 9 and 10 and that for portfolios 1 and 2 is 2.01 for the Operating Cycle measure and 2.34 for the Trade Cycle measure. The t-statistic for that difference in mean coefficients on cash flow for the Operating Cycle measure is -7.19 and -2.70 for the Trade Cycle measure.[9]

The operating cycle measures are for the levels of the relevant balance-sheet accounts, and higher balance sheet assets beget higher earnings. The coefficients in the regression are pricing multipliers that project future earnings. So the higher operating cycle measures in the longer operating cycle portfolios project higher future earnings (growth), and that is reflected in the higher multipliers on operating income. Indeed, the operating cycle measures compare balance-sheet numbers to their corresponding income statement numbers—Accounts Receivable-to-Sales, Inventory-to-COGS, and so on—so explicitly calculate the investment in these accounts to gain future earnings relative what is currently being realized.

These results substantiate the hypotheses in previous research that the importance of accruals increases with the length of the operating cycle.

3.6 Pricing Short-term Accruals and Long-term Accruals

The analysis so far presumes accrual accounting conveys information for pricing in an unbiased manner. As the accruals-cash flow relation has been postulated as a measure of earnings quality,

[9] Bloomfield, Gerakos, and Kovrijnykh (2017) find that the relation between accruals and returns increases with the rate at which accruals convert to cash flows, albeit with accruals calculated as *Accruals* rather than *ACCRUALS.* In contrast, Table 5 reports a lower multiplier in these cases, but with added pricing of cash flow generated.

the quality issue requires investigation. That can be done with the regression specification: If accruals are of doubtful quality, they should be discounted, with the market giving more weight to cash flows as the relatively credible information. This is evaluated in this section and the next.

The measurement issue in this section concerns the amount of short-term accruals relative to long-term accruals. It bears on the correlation issue: In trying to explain the decrease in the negative correlation between accruals and cash flow over time. Dong et al. (2019) distinguish "cash from operating accruals" (short-term) from "non-CFO investment accruals" (long-term). Dechow (1994) recognizes the measurement issues: Long-term accruals such as annual depreciation and amortization are hard to measure relative to their economic values. As a result, short-term accruals like cost of goods sold result is better matching to revenues than depreciation and amortization.

Panel A of Table 6 tests whether the *Accruals* measure discriminates on the pricing of accruals that vary on their long-term versus short-term components. To do so, it estimates the pricing equation with firms partitioned each year on $\frac{(Accruals+\ Depreciation+Amortization)_t}{(Depreciation+Amortization)_t}$. The denominator is depreciation and amortization (D&A) that are long-term accruals and also non-cash accruals. The numerator adds these back to all *Accruals* for an estimate of short-term accruals that generate cash in the near term. Again, *Accruals* are those in the cash flow statement, as in equation (1), the measure typically used in previous research.

Low D&A generates high values of the partitioning measure through the denominator. The higher values for the measure in the extreme portfolios in Panel A reflect this, though with a net effect in a different direction. The mean β_1 coefficients on operating income are low in portfolios 1 - 7, even negative, while those for portfolios 8 - 10 are considerably higher. Correspondingly,

the mean coefficients on cash from operations for portfolios 1 – 7 are relatively higher, greater than the benchmark -1.0, while those for portfolios 8 - 10 are less than -1.0: The weight in the pricing shifts from income to cash flow over portfolios indicating that the cash flow component in *Accruals* measure is determining the results.

However, accruals affecting operating (and its pricing conditional on D&A component) are not affected by cash flows. As $\frac{(Accruals+ D\&A)_t}{D\&A_t} = \frac{Accruals_t}{D\&A\ _t} - 1 = \frac{ACCRUALS_t - C_t}{D\&A_t} - 1$, the partitioning measure in Panel A subtracts cash flow from operations, C_t, from the *ACCRUALS* in the income statement, confusing accruals and cash flows. Thus, Panel B of Table 6 partitions on $\frac{(ACCRUALS+D\&A)_t}{D\&A_t} = \frac{(OI+D\&A)_t}{D\&A_t}$. The (negative) coefficients on cash flow are now similar over all portfolios. Those on operating income are increasing over portfolios, though little different over portfolios 5 - 10. They are negative for portfolios 1 and 2 with high D&A. These are firms with losses, even after adding back D&A. In portfolio 3 with high D&A—operating income before D&A is only 23 % of D&A—the mean coefficient is only 0.736. Overall, the results indicate the amount of depreciation and amortization affects the pricing of operating income, but particularly so for firms with low operating income with a high D&A component.

3.7 Pricing Accrual Quality

Our final test focuses directly on whether the amount of negative correlation between cash flow and accruals indicates high quality accruals. This implies that accruals are more important when higher in absolute value relative to cash flows. That is Hypothesis 3 in the Dechow (1994) paper. However, there is a competing hypothesis: Higher accruals relative to cash flow indicate low quality accruals. That is the presumption when the accruals-to-cash flow diagnostic is calculated in financial statement analysis to assess the quality of accruals: The greater the distance between

cash flows and accruals, the more suspect the accruals and the earnings that result. Thus there are three alternative hypotheses to be resolved:

(i) The negative correlation quality hypothesis: The coefficient on Operating Income increases as the difference between Cash Flow from Operations and *Accruals* increases.

(ii) Unbiased accruals hypothesis: The coefficient on Operating Income is invariant to the difference between Cash Flow from Operations and *Accruals*.

(iii) Biased accruals hypothesis: The coefficient on Operating Income decreases as the difference between Cash Flow from Operations and *Accruals* increases.

Table 7 partitions on the difference between Cash Flow from Operations and *Accruals*. Variance inflation factors indicate cash flow from operations and accruals are highly correlated for some of these partitions, so the regressions here drop the cash flow variable, C_t. Operating Income aside, there is little effect on the coefficients on the other included variables relative to regressions including C_t, nor much effect on the mean R^2. So the effect of cash flow is largely absorbed into the coefficient on Operating Income.

The mean coefficients on Operating Income do not vary systematically over central portfolios, 3 - 8 but are lower in both extremes where the difference between cash flows and accruals is the highest. There is no indication of Operating Income being weighted higher when the absolute difference between cash flows and accruals is high—that would predict higher coefficients in the extremes. To the contrary, with lower coefficients in the both extreme portfolios, the biased accruals hypothesis (iii) is supported.

The low coefficients in portfolios 1 and 2 are notable, for this is the case where low cash flows relative to accruals are observed to detect excessive accruals in standard quality diagnostic analysis. When cash flows are included in regressions for portfolios 1 and 10, variance inflation factors indicate little multicollinearity and the mean coefficient on cash flows for portfolio 1 is -

1.172 while that for portfolio 10 is -0.451 (with a t-statistic on the mean difference of -2.09): When cash flows are (extremely) lower than accruals, cash flow implies lower prices given the measured operating income, while they imply a relatively higher price when cash flows are high relative to accruals. This, of course, modifies the on-average finding of cash-flow irrelevance: Just as (irrelevant) cash dividends can function as "signals" in dividend-signaling theory because they are correlated with fundamentals that matter, so can operating cash flows, in this case as an indication of the quality of accruals.

4. Conclusion

Considerable research has investigated accrual accounting and its role in determining earnings. However, much of the research is based on misconceptions. First, accruals are identified as the items that reconcile earnings to cash flow in the cash flow statement, that is, changes in balance sheet items. However, these are not the accruals that determine earnings. Rather, they are those accruals reduced by cash flows. Second, to evaluate accrual accounting, accruals (so-called) are viewed as an adjustment to cash flows, to reduce the volatility of cash flows, to smooth them. Rather, the accruals that determine earnings are independent of cash flows. Third, a negative correlation between accruals (so-called) and cash flow—the accrual-cash flow relation—is taken in evidence of quality accruals. Rather, a negative relationship is evidence of lower quality accruals.

The correction to these misconceptions is by reference to properties of the accrual accounting system—how a cruel accounting system actually works. That differentiates accruals affecting the earnings from changes in balance-sheet items. As changes in balance-sheet items are the earnings accruals less cash flow, the paper shows that the negative correlation in the so-called accruals-

cash flow relation is spurious: It is a correlation of cash flows with a measure partially determined by cash flows.

The paper also presents confirming results with an empirical analysis. It first shows that the market prices cash flows from operations as a reduction in the price of operations and irrelevant for equity prices. The empirical analysis then examines hypotheses that have been offered and tested under the standard definition of accruals to see if they require revision. It finds that the accruals-cash flow relation has no bearing on the pricing of accruals and cash flows—the negative correlation is of no relevance. Nor is the volatility of cash flows relevant. The operating cycle affects the informativeness of accruals, as hypothesized, but it is the accruals affecting earnings, not balance-sheet changes, that are relevant. Short-term and long-term accruals have different implications for pricing but, again, it is accruals determining earnings that discriminate. Finally, the relation between accruals and cash flows does convey accrual quality, but a negative correlation indicates poor quality, not higher quality.

The existing research has attributed a decline in the negative correlation between so-called accruals and cash flow as the reason for decline in the informativeness of accrual accounting over time. Though challenging this attribution, this paper also reports, in Table 2, a decline in the R^2 in regressions of stock returns on accounting variables. An alternative explanation is required.

Appendix A. Accruals and Cash Flows in the Accounting System

The accrual accounting system prescribes that accruals are independent of cash flows. Here we summarize the accounting equations that govern the accounting system to draw relevant conclusions. It is adapted from Penman and Yehuda (2009). Variables are defined in Appendix B.

Separating operating activities from financing activities, the book value of shareholders' equity, *B*, is given by the balance sheet equation,

$$B = NOA - ND, \tag{A1}$$

and the periodic updating of the equity is given by

$$\Delta B = \Delta NOA - \Delta ND. \tag{A2}$$

NOA is Net Operating Assets (Operating Assets minus Operating Liabilities) and *ND* is Net (financing) Debt. All numbers are for a given firm at the same point in time so firm and time subscripts are omitted. By the clean surplus equation for operating activities,

$$\Delta NOA = OI - FCF, \tag{A3}$$

where *OI* is Operating Income calculated under accrual accounting principles and *FCF* is free cash flow. Free cash flow is the net cash flow from the business, equal to *CFO – I* where *I* is Cash Investment. This equation says that *ΔNOA* is determined by the recognition of *OI*, then *FCF* reduces *ΔNOA* (with no effect on *OI*). Similarly, by the clean surplus equation for financing activities,

$$\Delta ND = NFE - FCF + d, \tag{A4}$$

where *NFE* is the (accrued) net financing expense on the net debt. This says that *NFE* adds to indebtedness, but free cash flow after paying net dividends, *d*, is applied to reducing that indebtedness. By substituting equations (A3) and (A4) into equation (A2), the change in shareholders' equity is accounted for as follows:

$$\Delta B = OI - FCF - NFE + FCF - d$$

$$= OI - NFE - d$$

$$= Earnings - d, \qquad \text{(A5)}$$

Equation (A5) is, of course, the clean-surplus equation for updating shareholders' equity. Significantly, $FCF = CFO - I$ drops out in the updating of shareholders equity with (accrual) earnings. It is not the case that accruals add to cash flows in earnings as in equation (1) in the main text: The accrual accounting system deems cash flows as being irrelevant, they have no effect on updating equity. In equation (A3), free cash flow is a payout from the operating activities—a dividend—that is then applied to paying shareholder dividends and reducing net indebtedness in equation (A4). That satisfies the cash conservation equation,

$$FCF = d + (NFE - \Delta ND). \qquad \text{(A6)}$$

That is, free cash flow equals payments to claimants.

This system is not arbitrary. Rather it conforms to the economics. Under Miller and Modigliani (1961) assumptions, dividends are irrelevant to shareholder (cum-dividend) value: Dividends are the distribution of value, not the generation of value. Correspondingly, dividends do not affect earnings in equation (A5), the accounting measure that adds to shareholder book value. Rather, they are paid out of book value as a distribution. Similarly, free cash flow—the dividend from

the operating activities that is distributed to the shareholders and net debt holders—is irrelevant to the value of the operating activities (enterprise value). And, just as dividends do not affect earnings—the generation of shareholder book value—in the accounting for equity in equation (A5), so free cash flow does not affect operating income, *OI*, in the accounting for operating activities in equation (A3). Nor does it affect accounting for *NFE* in the accounting for net debt in equation (A4).

It is the accounting system summarized in equations (A3), (A4), and (A5) that we adopt in designing the empirical tests that challenge the prevailing perspective on the accrual-cash flow relation. Of course, these are just equations and the question of measurement—the quality of the accruals—that goes into the system remains. The negative correlation between "accruals" and cash flows has been nominated as indicating accrual quality, the claim that is the subject of our empirical analysis.

Appendix B. Sample Selection and Calculation of Variables

Sample Selection: NYSE, AMEX, and NASDAQ Firms, 1988-2016

	Number of Observations
NYSE, AMEX, and NASDAQ firms from *COMPUSTAT* annual excluding financial firms (SIC 6000 and 6999) and firms with a price-per share less than 20 cents.	102,833
Less: Observations with missing net income (#NI), income before extraordinary items (#IB), book value of equity (#CEQ), long-term debt (#DLTT), price (#PRCC), or shares outstanding (#CSHO).	(17,680)
	85,153
Less: Observations without lagged variables required for the calculation of dependent variables and some explanatory variables.	(18,152)
Firms-years in Test Sample	**67,001**
Less: Observations with acquisitions (#ACQ > 0)	(23,361)
Final-years in Test Sample without Acquisitions	**43,640**

Calculation of Variables

The calculation of variables follows that in Nissim and Penman (2001). Income is on a comprehensive income basis to honor the clean surplus relations in equations (A3) and (A5). However, there is one approximation: Unrealized gains and losses on securities in Other Comprehensive Income could not be divided between those in financing activities (on net debt) and those in operating activities (equities) without a detailed reading of footnotes.

Accounting variables	
Variable	**Definition**
FA	Financial Assets (FA) = Cash and short-term investments (#CHE) + Investments and advances-other (#IVAO).
FO	Financial Obligations (FO) = Debt in current liabilities (#DLC) + Long-term debt (#DLTT) + Preferred stock (#PSTK) – Preferred treasury stock (#TSTKP) + Preferred dividends in arrears (#DVPA).
ND	Net Debt (ND) = Financial Assets (FO) – Financial Assets (FA).
B	Book Value Common Equity (B) = Common equity (#CEQ) + Preferred treasury stock (#TSTKP) - Preferred dividends in arrears (#DVPA).
NOA	Net Operating Assets (NOA) = Net Debt (ND) + Common Equity (B) + Minority interest (#MIB).
NFE	Net Financial Expense (NFE) = After tax interest expense (#XINT x (1 - marginal tax rate)) + Preferred dividends (#DVP) – After tax interest income (#IDIT x (1 - marginal tax rate)). Marginal tax rate is the top statutory federal tax rate plus 2% average state tax rate. The top statutory federal tax rate was 50% in 1964, 48% in 1965 – 1967, 52.8% in 1968 – 1969, 49.2% in 1970, 48% in 1971 – 1978, 46% in 1979 – 1986, 40% in 1987, 34% in 1988 – 1992, and 35% in 1993 – 2016.
CSA	Clean Surplus Adjustments to Net Income (CSA) = Marketable securities adjustment (#MSA) - Lag marketable securities adjustment (lag #MSA) + Cumulative translation adjustment (#RECTA) - lag cumulative translation adjustment (lag #RECTA).
Earnings	Comprehensive Net Income (CNI) = Net income (#NI) – Preferred dividends (#DVP) + Clean surplus adjustments to net income (CSA).
OI	Comprehensive Operating Income (OI) = Earnings + Net Financial Expense + Minority interest income (#MII).
FCF	Free Cash Flow (FCF) = Comprehensive Operating Income (OI) - Change in Net Operating Assets (NOA), from appendix equation (A3).

I	Cash Investment in operations (I) = Capital expenditures (#CAPX) – Sale of Property (#SPPE) + Other investing activities (#IVACO). It excludes net investment in interest-bearing cash and investments that are included in the investment section of the cash flow statement but pertain to financing activities.
C	Cash Flow from Operations (C) = Free cash flow (FCF) + Cash Investment (I).

Pricing Variables	
Variable	**Definition**
$\frac{P_t^{NOA} - P_{t-1}^{NOA}}{P_{t-1}^{NOA}}$	Change in the price of operations for period *t* divided by lag price of operations, where P^{NOA} is the market price of equity (#PRCC × #CSHO) plus Net Debt (ND).
$\frac{OI_t}{P_{t-1}^{NOA}}$	Operating income for period *t*, calculated as above, divided by lag price of operations.
$\frac{NOA_{t-1}}{P_{t-1}^{NOA}}$	Book-to-price ratio for operations at *t* – 1 = Lag Net Operating Assets divided by lag price of operations.
$\frac{FCF_t}{P_{t-1}^{NOA}}$	Free cash flow for period *t* divided by lag price of operations.
$\frac{I_t}{P_{t-1}^{NOA}}$	Cash investment for period *t* divided by lag price of operations.
$\frac{C_t}{P_{t-1}^{NOA}}$	Cash flow from operations for period *t* divided by lag price of operations.

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Table 1
Summary Distributions of Selected Variables

Panel A reports the distribution of variables in the tests, for the period, 1988 to 2016, from data pooled over years, Panel B reports the mean of estimates of cross-sectional correlations for each year of the sample period. Pearson correlations are in upper diagonal and Spearman correlations are in the lower diagonal. For the means and standard deviations in Panel A and Pearson correlations in Panel B, firms in the top or bottom one percent of the variable each year are rejected. $Accruals_t = OI_t - C_t$. Other variables are defined in Appendix B.

Panel A: Distribution of Variables

Variable	N	Mean	Std Dev	25th Pctl	Median	75th Pctl
$\frac{P_t^{NOA} - P_{t-1}^{NOA}}{P_{t-1}^{NOA}}$	43,640	0.199	0.939	-0.207	0.041	0.351
$\frac{OI_t}{P_{t-1}^{NOA}}$	43,640	0.006	0.206	-0.024	0.046	0.081
$\frac{FCF_t}{P_{t-1}^{NOA}}$	43,640	-0.008	0.233	-0.067	0.017	0.078
$\frac{NOA_{t-1}}{P_{t-1}^{NOA}}$	43,640	0.567	0.486	0.208	0.520	0.844
$\frac{C_t}{P_{t-1}^{NOA}}$	43,640	0.060	0.251	-0.013	0.073	0.147
$\frac{I_t}{P_{t-1}^{NOA}}$	43,640	0.067	0.098	0.011	0.040	0.094
$\frac{Accruals_t}{P_{t-1}^{NOA}}$	43,640	-0.055	0.209	-0.106	-0.033	0.013

Panel B: Correlations Between Variables

	$\frac{P_t^{NOA} - P_{t-1}^{NOA}}{P_{t-1}^{NOA}}$	$\frac{OI_t}{P_{t-1}^{NOA}}$	$\frac{FCF_t}{P_{t-1}^{NOA}}$	$\frac{NOA_{t-1}}{P_{t-1}^{NOA}}$	$\frac{C_t}{P_{t-1}^{NOA}}$	$\frac{I_t}{P_{t-1}^{NOA}}$	$\frac{Accruals_t}{P_{t-1}^{NOA}}$
$\frac{P_t^{NOA} - P_{t-1}^{NOA}}{P_{t-1}^{NOA}}$		0.064	-0.184	0.024	-0.109	0.092	0.148
$\frac{OI_t}{P_{t-1}^{NOA}}$	0.242		0.498	0.051	0.496	0.078	0.235
$\frac{FCF_t}{P_{t-1}^{NOA}}$	-0.108	0.466		0.161	0.844	-0.060	-0.410
$\frac{NOA_{t-1}}{P_{t-1}^{NOA}}$	0.054	0.155	0.245		0.286	0.295	-0.312
$\frac{C_t}{P_{t-1}^{NOA}}$	-0.022	0.503	0.802	0.406		0.355	-0.578
$\frac{I_t}{P_{t-1}^{NOA}}$	0.135	0.190	0.010	0.410	0.467		-0.355
$\frac{Accruals_t}{P_{t-1}^{NOA}}$	0.170	0.158	-0.446	-0.394	-0.632	-0.411	

Table 2

The Pricing of Accruals, Cash Flow from Operations, and Cash Investment

This table reports the results of annual cross-sectional regressions, 1988-2016, of price changes for operations on contemporaneous accounting numbers. Reported coefficients are the means from annual cross-sectional regressions, with the associated t-statistics calculated as those mean coefficients relative to their standard errors estimated from the time series of coefficients with a Newey-West correction. Firms in the top and bottom one percent of each variable in the regression each year are rejected. Variables are defined in Appendix B.

$$\frac{P_t^{NOA} - P_{t-1}^{NOA}}{P_{t-1}^{NOA}} = \alpha + \beta_1 \frac{OI_t}{P_{t-1}^{NOA}} + \beta_2^C \frac{C_t}{P_{t-1}^{NOA}} + \beta_2^I \frac{I_t}{P_{t-1}^{NOA}} + \beta_3 \frac{NOA_{t-1}}{P_{t-1}^{NOA}} + \varepsilon_{it}$$

	α	β_1	β_2^C	β_2^I	β_3	$Adj\ R^2$
1988-2016	0.11	0.85	-0.99	1.33	0.04	0.10
t-Statistics	(3.29)	(5.40)	(-11.29)	(12.15)	(1.02)	
Percent +		90%	0%	100%	59%	
2011-2016	0.07	0.31	-0.58	0.78	0.04	0.04
2006-2010	0.01	0.69	-0.89	1.44	0.16	0.10
2001-2005	0.09	0.67	-1.05	1.66	0.17	0.12
1996-2000	0.21	1.10	-1.24	1.57	-0.09	0.09
1991-1995	0.25	1.24	-1.22	1.40	-0.08	0.12
1988-1990	-0.01	1.45	-1.02	1.24	0.02	0.18

Table 3

The Pricing of Accruals and Cash Flow Based on the Correlation Between Cash Flow and Accruals

This table reports the results of regressions for ten portfolios formed from ranking firms on the correlation between Cash Flow from Operations and *Accruals* estimated over the prior 10 years. For 1998-2016, the ranking variable is calculated with *Accruals* reported in the cash flow statement. For 1988-1997, *Accruals* are estimated from balance-sheet changes. Reported coefficients are from data pooled over years, 1988-2016, with the associated t-statistics in parentheses. Firms in the top and bottom one percent of each variable in the regression (in pooled data over years) are rejected. Variables are defined in Appendix B.

$$\frac{P_t^{NOA} - P_{t-1}^{NOA}}{P_{t-1}^{NOA}} = \alpha + \beta_1 \frac{OI_t}{P_{t-1}^{NOA}} + \beta_2^C \frac{C_t}{P_{t-1}^{NOA}} + \beta_2^I \frac{I_t}{P_{t-1}^{NOA}} + \beta_3 \frac{NOA_{t-1}}{P_{t-1}^{NOA}} + \varepsilon_{it}$$

Partitioning Variable: Corr$\left(\frac{C_t}{P_{t-1}^{NOA}}, \frac{Accruals_t}{P_{t-1}^{NOA}}\right)$ over prior 10 years

Portfolio	Corr	α	β_1	β_2^C	β_2^I	β_3	$Adj\ R^2$
1	-0.990	-0.061	1.804	-0.965	0.798	0.117	0.22
		(-1.90)	(8.09)	(-9.34)	(4.93)	(2.78)	
2	-0.973	0.115	0.460	-0.931	1.376	-0.084	0.09
		(3.00)	(1.58)	(-5.80)	(5.83)	(-1.65)	
3	-0.955	-0.002	1.640	-1.238	1.268	0.090	0.15
		(-0.04)	(6.73)	(-7.39)	(5.12)	(1.83)	
4	-0.929	0.009	1.640	-0.830	0.360	0.088	0.10
		(0.25)	(6.77)	(-5.15)	(1.50)	(2.08)	
5	-0.895	-0.018	2.020	-0.279	0.533	0.035	0.15
		(-0.42)	(9.05)	(-1.65)	(2.20)	(0.73)	
6	-0.845	-0.025	1.306	-0.595	1.109	0.063	0.13
		(-0.73)	(7.20)	(-4.34)	(5.17)	(1.47)	
7	-0.773	-0.006	1.320	-0.775	0.995	0.069	0.08
		(-0.16)	(5.79)	(-3.86)	(3.35)	(1.31)	
8	-0.647	-0.033	0.402	-0.791	1.354	0.158	0.07
		(-0.73)	(1.94)	(-4.36)	(5.00)	(2.68)	
9	-0.414	0.161	0.784	-0.969	0.813	-0.023	0.05
		(3.79)	(3.18)	(-4.48)	(2.61)	(-0.36)	
10	0.117	0.053	1.797	-1.312	1.923	0.096	0.11
		(1.18)	(6.00)	(-5.26)	(4.62)	(1.35)	

Table 4

The Pricing of Accruals and Cash Flow Based on Volatility of Cash Flow

This table reports the results of regressions for ten portfolios formed from ranking firms on the standard deviation of Cash Flow from Operations estimated over the prior 10 years. Reported coefficients are from data pooled over years, 1988-2016, with the associated t-statistics in parentheses. Firms in the top and bottom one percent of each variable in the regression (in pooled data over years) are rejected. Variables are defined in Appendix B.

$$\frac{P_t^{NOA} - P_{t-1}^{NOA}}{P_{t-1}^{NOA}} = \alpha + \beta_1 \frac{OI_t}{P_{t-1}^{NOA}} + \beta_2^C \frac{C_t}{P_{t-1}^{NOA}} + \beta_2^I \frac{I_t}{P_{t-1}^{NOA}} + \beta_3 \frac{NOA_{t-1}}{P_{t-1}^{NOA}} + \varepsilon_{it}$$

Partitioning Variable: Standard Deviation of $\frac{C_t}{P_{t-1}^{NOA}}$ over prior 10 years

Portfolio	Std Dev	α	β_1	β_2^C	β_2^I	β_3	$Adj\ R^2$
1	0.021	0.060	1.198	-0.705	0.710	-0.066	0.04
		(1.92)	(3.14)	(-2.56)	(2.21)	(-1.51)	
2	0.033	-0.036	1.812	-1.299	0.959	0.094	0.19
		(-1.37)	(8.65)	(-8.83)	(4.32)	(2.60)	
3	0.044	0.077	0.514	-0.904	0.718	0.045	0.04
		(2.16)	(2.04)	(-4.64)	(2.28)	(0.92)	
4	0.055	-0.006	1.412	-0.808	1.019	0.043	0.12
		(-0.20)	(6.67)	(-4.64)	(4.78)	(1.00)	
5	0.069	0.050	1.568	-0.546	0.550	-0.012	0.09
		(1.34)	(6.76)	(-2.92)	(2.07)	(-0.23)	
6	0.087	0.091	1.639	-0.819	1.358	-0.032	0.09
		(1.99)	(5.70)	(-3.50)	(4.60)	(-0.49)	
7	0.110	0.072	1.170	-0.494	0.442	0.037	0.06
		(1.70)	(5.45)	(-2.54)	(1.52)	(0.64)	
8	0.147	-0.035	1.001	-0.846	1.563	0.097	0.12
		(-0.85)	(4.89)	(-5.36)	(6.94)	(1.89)	
9	0.223	0.091	0.919	-1.012	0.985	0.083	0.07
		(1.84)	(3.72)	(-5.53)	(3.35)	(1.44)	
10	1.450	0.080	1.195	-1.003	1.059	0.057	0.10
		(1.57)	(5.25)	(-6.18)	(3.61)	(0.90)	

Table 5

The Pricing of Accruals and Cash Flow with Variation in the Operating Cycle

This table reports the results of annual the cross-sectional regressions for ten portfolios formed from a ranking each year, 1988-2016, on two measures of the operating cycle. The Operating Cycle and Trade Cycle measures are defined in section 3.5 of the text. Reported coefficients are the means from annual cross-sectional regressions, with the associated t-statistics calculated as those mean coefficients relative to their standard errors estimated from the time series of coefficients with a Newey-West correction. Firms in the top and bottom one percent of each variable in the regression each year are rejected. Variables are defined in Appendix B.

$$\frac{P_t^{NOA} - P_{t-1}^{NOA}}{P_{t-1}^{NOA}} = \alpha + \beta_1 \frac{OI_t}{P_{t-1}^{NOA}} + \beta_2^C \frac{C_t}{P_{t-1}^{NOA}} + \beta_2^I \frac{I_t}{P_{t-1}^{NOA}} + \beta_3 \frac{NOA_{t-1}}{P_{t-1}^{NOA}} + \varepsilon_{it}$$

Partitioning Variables: Operating Cycle and Trade Cycle

	Operating Cycle Measure				Trade Cycle Measure			
Portfolio	Op. Cycle	β_1	β_2^C	$Adj\ R^2$	Trade Cycle	β_1	β_2^C	$Adj\ R^2$
1	19.121	0.367	-0.619	0.11	-375.745	0.433	-0.903	0.14
		(2.05)	(-3.38)			(2.40)	(-8.41)	
2	48.590	0.878	-0.868	0.14	1.446	0.688	-0.821	0.13
		(5.65)	(-6.96)			(5.65)	(-7.58)	
3	66.158	1.104	-0.846	0.15	21.179	1.071	-0.971	0.18
		(4.37)	(-5.78)			(3.22)	(-5.23)	
4	81.783	0.810	-0.965	0.15	37.766	1.072	-0.682	0.11
		(5.70)	(-7.28)			(3.72)	(-4.95)	
5	98.183	1.018	-0.937	0.13	53.824	0.856	-0.698	0.13
		(4.60)	(-6.09)			(3.45)	(-4.96)	
6	117.279	1.292	-0.918	0.12	71.480	1.315	-1.208	0.14
		(5.61)	(-6.19)			(6.63)	(-10.56)	
7	139.527	1.429	-1.137	0.13	92.440	1.116	-0.843	0.12
		(5.12)	(-10.13)			(4.12)	(-6.49)	
8	167.919	1.339	-1.078	0.15	117.705	1.457	-1.143	0.14
		(8.21)	(-12.87)			(6.97)	(-10.48)	
9	213.806	1.162	-1.115	0.14	157.966	1.223	-1.103	0.14
		(5.72)	(-6.66)			(7.56)	(-8.11)	
10	693.747	0.560	-1.131	0.14	786.845	0.755	-1.210	0.13
		(3.86)	(-7.83)			(3.48)	(-7.00)	

Table 6

The Pricing of Accruals and Cash Flow Based on Short-term Accruals Relative to Long-term Accruals

Panel A reports the results of annual the cross-sectional regressions for ten portfolios formed from a ranking each year, 1988-2016, on amount of Depreciation and Amortization relative to *Accruals.* Panel B reports the same regressions but with portfolios formed on Depreciation and Amortization relative to *ACCRUALS.* Reported coefficients are the means from annual cross-sectional regressions, with the associated t-statistics (in parentheses) calculated as those mean coefficients relative to their standard errors estimated from the time series of coefficients with a Newey-West correction. Firms in the top and bottom one percent of each variable in the regression each year are rejected. Variables are defined in Appendix B.

$$\frac{P_t^{NOA} - P_{t-1}^{NOA}}{P_{t-1}^{NOA}} = \alpha + \beta_1 \frac{OI_t}{P_{t-1}^{NOA}} + \beta_2^C \frac{C_t}{P_{t-1}^{NOA}} + \beta_2^I \frac{I_t}{P_{t-1}^{NOA}} + \beta_3 \frac{NOA_{t-1}}{P_{t-1}^{NOA}} + \varepsilon_{it}$$

Panel A: Partitioning Variable: $\frac{(Accruals + Depreciation + Amortization)_t}{(Depreciation + Amortization)_t}$

Portfolio	Partition Variable	α	β_1	β_2^C	β_2^I	β_3	$Adj\ R^2$
1	-32.236	0.124	0.113	-0.352	0.637	-0.175	0.07
		(2.87)	(0.77)	(-3.54)	(4.77)	(-2.87)	
2	-2.664	0.052	-0.238	0.274	0.530	-0.114	0.07
		(1.44)	(-1.10)	(1.46)	(4.58)	(-1.76)	
3	-1.340	0.047	-0.119	0.284	0.699	-0.116	0.13
		(1.27)	(-0.39)	(1.25)	(3.68)	(-2.70)	
4	-0.719	0.021	-0.093	0.421	0.726	-0.092	0.15
		(0.64)	(-0.34)	(2.84)	(4.90)	(-3.20)	
5	-0.293	0.006	-0.161	0.320	0.969	-0.009	0.12
		(0.28)	(-0.56)	(1.66)	(4.67)	(-0.25)	
6	0.095	0.007	-0.335	0.618	0.906	0.023	0.11
		(0.28)	(-0.82)	(2.24)	(4.01)	(0.48)	
7	0.578	0.043	-0.912	1.217	1.277	0.016	0.12
		(1.38)	(-1.70)	(2.37)	(6.43)	(0.54)	
8	1.334	0.086	1.350	-1.212	1.847	0.001	0.10
		(2.00)	(2.87)	(-2.92)	(12.43)	(0.02)	
9	2.869	0.106	2.657	-2.210	1.264	-0.044	0.11
		(2.04)	(11.16)	(-7.11)	(6.10)	(-0.83)	
10	27.099	0.185	1.484	-1.371	1.558	-0.066	0.17
		(3.45)	(4.21)	(-10.30)	(5.81)	(-0.58)	

Panel B: Partitioning Variable: $\frac{(OI+\ Depreciation+Amortization)_t}{(Depreciation+Amortization)_t}$

Portfolio	Partition Variable	α	β_1	β_2^C	β_2^I	β_3	$Adj\ R^2$
1	-74.267	-0.027	-0.520	-0.986	1.485	-0.276	0.13
		(-0.82)	(-4.75)	(-4.29)	(6.48)	(-4.13)	
2	-3.354	-0.089	-0.015	-0.958	1.386	0.106	0.12
		(-2.60)	(-0.10)	(-14.93)	(7.02)	(2.59)	
3	0.231	-0.101	0.736	-0.949	1.215	0.118	0.16
		(-3.67)	(1.43)	(-9.25)	(9.58)	(3.98)	
4	1.245	-0.129	2.772	-0.858	0.994	0.081	0.19
		(-4.57)	(3.64)	(-7.90)	(10.53)	(3.15)	
5	1.771	-0.157	4.164	-0.975	1.037	0.069	0.20
		(-5.45)	(10.40)	(-8.11)	(6.18)	(1.70)	
6	2.190	-0.161	5.738	-0.974	0.795	-0.074	0.24
		(-4.06)	(12.84)	(-9.43)	(6.56)	(-1.40)	
7	2.643	-0.118	4.625	-0.935	0.713	-0.048	0.23
		(-5.10)	(13.42)	(-9.51)	(4.30)	(-1.34)	
8	3.277	-0.069	5.067	-1.042	0.957	-0.197	0.21
		(-1.92)	(8.54)	(-6.96)	(4.03)	(-2.93)	
9	4.468	0.012	4.865	-1.016	0.747	-0.302	0.19
		(0.42)	(8.89)	(-7.76)	(3.74)	(-3.52)	
10	15.917	0.088	3.622	-1.007	0.643	-0.190	0.16
		(2.20)	(5.74)	(-4.93)	(1.63)	(-1.52)	

Table 7

The Pricing of Accruals and Cash Flow Based on Accruals Relative to Cash Flows

The table reports the results of annual the cross-sectional regressions for ten portfolios formed from a ranking each year, 1988-2016, on *Accruals* relative to Cash Flow from Operations. Reported coefficients are the means from annual cross-sectional regressions, with the associated t-statistics (in parentheses) calculated as those mean coefficients relative to their standard errors estimated from the time series of coefficients with a Newey-West correction. Firms in the top and bottom one percent of each variable in the regression each year are rejected. Variables are defined in Appendix B.

$$\frac{P_t^{NOA} - P_{t-1}^{NOA}}{P_{t-1}^{NOA}} = \alpha + \beta_1 \frac{OI_t}{P_{t-1}^{NOA}} + \beta_2^I \frac{I_t}{P_{t-1}^{NOA}} + \beta_3 \frac{NOA_{t-1}}{P_{t-1}^{NOA}} + \varepsilon_{it}$$

Partitioning Variable: $\frac{(Cash\ Flow\ from\ Operations - Accruals)_t}{P_{t-1}^{NOA}}$

Portfolio	Partition Variable	α	β_1	β_2^I	β_3	$Adj\ R^2$
1	-0.487	0.473	-0.051	1.689	0.053	0.09
		(6.21)	(-0.37)	(10.91)	(0.59)	
2	-0.106	0.164	0.585	1.954	0.015	0.08
		(3.99)	(2.42)	(11.02)	(0.27)	
3	-0.013	0.043	0.898	2.104	0.017	0.09
		(1.09)	(2.92)	(5.27)	(0.21)	
4	0.045	-0.002	1.762	1.301	0.043	0.09
		(-0.11)	(6.32)	(6.28)	(1.36)	
5	0.093	0.040	1.256	0.747	-0.050	0.10
		(1.30)	(6.12)	(4.69)	(-1.55)	
6	0.141	0.013	1.307	1.116	-0.064	0.11
		(0.28)	(5.83)	(4.89)	(-1.17)	
7	0.192	-0.008	1.140	0.853	-0.011	0.11
		(-0.25)	(5.39)	(7.21)	(-0.28)	
8	0.259	0.000	1.218	0.827	-0.012	0.13
		(-0.01)	(8.81)	(6.19)	(-0.25)	
9	0.368	-0.036	0.890	1.034	0.004	0.15
		(-0.81)	(5.93)	(5.89)	(0.10)	
10	0.784	-0.026	0.426	0.624	0.034	0.07
		(-0.44)	(3.68)	(4.43)	(0.78)	