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Cash Flows, Accruals, and Future Returns

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The study of the "accrual anomaly" reported here is unique because it analyzed originally reported—unrestated—quarterly data for 1991 through the first quarter of 2004 to calculate accruals and used U.S. SEC filing dates to identify the day on which investors first obtained information about accruals. The study found that the accrual anomaly exists for quarterly accruals as has been found for annual accruals. Future quarterly earnings were found to be more highly associated with current net operating cash flows than with accruals because accruals have less persistence. Companies with extremely high (low) current quarterly accruals have significant and negative (positive) abnormal returns through the subsequent four quarters.

In a rigorous study, Sloan (1996) documented that net operating cash flow is more closely associated with future income and stock returns than are accruals (which represent the difference between income and net operating cash flows). Sloan attributed this phenomenon to the fact that accruals reverse faster than earnings in subsequent periods and are less persistent than net operating cash flows. Investors who focus on total income rather than operating cash flows tend to overestimate the persistence of accruals and underestimate the persistence of net operating cash flows. In Sloan's study, a trading strategy that held long positions in companies with extremely low accruals and short positions in companies with high accruals obtained significant abnormal returns over the subsequent three years. Sloan also showed that a substantial portion of the abnormal return to the accrual strategy occurs around the dates of subsequent quarterly earnings announcements, which is consistent with an initial market mispricing of accruals that is corrected when future quarterly earnings become known. Sloan's findings have been confirmed by many ensuing studies.

An understanding of what accruals are and why they are likely to be less persistent than net operating cash flows is important for analysts and investors because of the implications for future earnings and returns. To explain what accruals are, we highlight two cases in which the accrual data can be misleading.[1] In one case, management is overly optimistic about future sales and thus builds up excessive inventories that are then reduced in future periods. Because the U.S. accounting system treats inventory increases as investments in assets that are not expensed on the income statement, earnings are initially higher in this case but fall in subsequent periods when the inventories are drawn down. This case does not assume any sinister managerial motives; it is based on the reasonable assumption that managers may at times be too optimistic about future demand.

The second case involves "channel stuffing," which is a company's deceptive business practice of inflating sales by deliberately sending to the retailers along its distribution channel more products than they are able to sell to in the normal course of business and allowing the retailers to pay later. In this case also, the accounting system records the increase in receivables as an investment. Because the income statement is based on all sales—whether collected during the period or not—channel stuffing leads to higher current income at the expense of lower future income.[2]

Whether accruals are misleading because they are actively managed to produce a desired level of current income or are the result of erroneous managerial expectations about the future, the current accounting system nevertheless includes accruals in current earnings, which may not fully translate into future earnings. Therefore, users of financial statements—such as financial analysts, investors, and creditors—should closely scrutinize a company's quarterly accruals for the possibility of future reversals. If sufficiently large numbers of investors are not careful but are fixated on earnings, however, and ignore information in net operating cash flows and accruals, prices may not accurately reflect the economic situation of the company. The result is potential mispricing and "the accrual anomaly."

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The purpose of this study was to investigate whether *quarterly* accruals exhibit the same pattern as that found in prior studies of annual accruals. As the literature review in the next section illustrates, most accrual studies to date have focused on annual accruals, which were shown to have less persistence than net operating cash flows. If extreme quarterly accruals contain valuable information about future earnings and stock return reversals, however, users of financial statements should focus on quarterly cash flows and accruals to obtain an early warning that future earnings may reverse. Financial analysts tend to revise earnings forecasts after quarterly earnings are released; therefore, their ability to improve forecasts after a careful consideration of quarterly accruals and cash flows is likely to be extremely important for them. Similarly, if investment and credit managers had such information on a quarterly basis, they would be unlikely to wait a whole year for the next annual earnings announcement to examine changes in accruals, rebalance their portfolios, or take actions about their outstanding credit positions.

Why then did most previous studies examine annual rather than quarterly accruals? There are two primary reasons. First, accruals typically become known to the market when companies file their 10-Q/10-K forms with the U.S. SEC, unless they disclose net operating cash flows in their preliminary earnings announcements, which only about 10 percent do. Unlike preliminary earnings release dates, which are available in the Compustat Quarterly database, SEC filing dates are not part of computerized databases used by academics. Therefore, quarterly accruals have not been studied by academics because of the massive hand collection of data that would be necessary. The second reason is that quarterly accruals and subsequent reversals are natural and probable in companies that are subject to seasonality in their operations. It is unclear whether quarterly accruals would exhibit the same pattern as annual accruals if most companies were affected by within-year seasonality.

Literature Survey

The accrual anomaly exists because accruals tend to be less persistent than net operating cash flows as a result of intentional or unintentional managerial errors in forecasting future demand, events, or cash flows that cause erroneous levels of current accruals. In particular, managers may use positive accruals to elevate earnings when operating cash flows are low and use negative accruals that reduce high levels of earnings when operating cash flows are high. Indeed, Sloan (1996) and others documented a negative association between net operating cash flows and accruals and found higher earnings for companies with higher levels of accruals than for those with lower levels. Xie (2001) and DeFond and Park (2001) provided evidence that the accrual anomaly is driven by the mispricing of abnormal accruals (i.e., accruals that are subject to managerial discretion). In contrast, Beneish and Vargus (2002) found that the accrual anomaly can be attributed mainly to mispricing of income-increasing accruals, regardless of whether total or discretionary accruals are used. Thomas and Zhang (2002) attributed the accrual anomaly to investors' failure to correctly understand the importance of inventory changes—one of the most significant components of total accruals. Richardson, Sloan, Soliman, and Tuna (2004) provided evidence that the accrual anomaly can be attributed to those accounts that have low earnings quality and potentially high managerial discretion.

Several studies have attempted to determine whether the accrual anomaly is unique or is supplemented or subsumed by other known anomalies. Collins and Hribar (2000) showed that the accrual anomaly is separate from the effect of post-earnings-announcement drift and that combining both anomalies yields greater abnormal returns than either of them alone provides. Barth and Hutton (2003) showed that the accrual anomaly can be combined with analysts' earnings revisions to increase abnormal returns. Desai, Rajgopal, and Venkatachalam (2004) provided evidence that the accrual anomaly is another manifestation of the value versus growth phenomenon. Finally, Fairfield, Whisenant, and Yohn (2003) suggested that the accrual anomaly is partially driven by mispricing of the implications of growth in net operating assets for future profits and returns.

As for most anomalies, an intriguing question remains: Why is the accrual anomaly not arbitraged away? Collins, Gong, and Hribar (2003) provided evidence that the accrual anomaly is weaker for those companies that have a greater proportion of institutional investors, who are supposed to be more sophisticated than retail investors. Mashruwala, Rajgopal, and Shevlin (2004) showed that an annual accrual strategy does not earn positive abnormal returns in all 12 months after portfolio formation and that it is, indeed, weaker for companies with lower arbitrage risk. Lev and Nissim (2004) showed that companies with extremely high or low accruals have attributes that institutional investors shun. Finally, Kraft, Leone, and Wasley (2004) argued that the accrual anomaly is probably driven by relatively few extreme observations and the failure to properly account for delisting returns.

Most accrual studies have followed Sloan's (1996) use of annual cash flows and accruals, which are associated with annual buy-and-hold returns. Only a few studies have examined whether the accrual anomaly is present in quarterly data. Collins and Hribar (2000) provided such evidence, but they used accumulated returns from the *assumed* SEC filing date through the subsequent two quarters, not from the *actual* date available to investors from SEC filings. DeFond and Park (2001) examined abnormal working capital accruals for a sample of observations in the years 1992–1995 to explore whether investors seem to interpret quarterly earnings surprises correctly. In their study, the abnormal returns for companies that generated "good" earnings news and had income-decreasing accruals during the 80-day period after the preliminary earnings announcement exceeded the abnormal returns for companies with income-increasing accruals. Essentially, however, they assumed that the market has the accrual information at the time of the preliminary earnings announcement.[3]

In short, little research has been devoted to whether quarterly accruals follow the same patterns as those observed for annual accruals.

Data and Sample

Our data on accruals and net operating cash flows are Compustat data. Data entry into the Compustat databases has been performed in a fairly structured manner over the years. When a company releases its preliminary earnings announcement, Compustat takes as many line items as possible from the preliminary announcement and enters them into the quarterly database within two to three days. The preliminary data in the database are denoted by an update code of 2. When the company files its Form 10-Q/10-K with the SEC or releases it to the public, Compustat updates all available information and uses an update code of 3.

Obtaining Preliminary Quarterly Data. Unlike the Compustat Annual database, which is maintained as originally reported by the company (except for restated items), the Compustat Quarterly database is further updated when a company restates its previously reported quarterly results. For example, if a company engages in merger, acquisition, or divestiture in a particular quarter and restates previously reported quarterly data to reflect these events, Compustat inserts the restated data into the database instead of the previously reported numbers. Similarly, when the annual audit is performed and the company is required to restate its previously reported quarterly results by its auditor as part of the disclosure contained in Form 10-K, Compustat updates the quarterly database to reflect these restated data.

Charter Oak Investment Systems has collected the original weekly CD-ROM that Compustat sent to its clients, which always contained updated data as of that week. From these weekly updates, Charter Oak has constructed a database that contains three numbers for each company for each Compustat line item in each quarter. The first number is the preliminary earnings announcement that Compustat inserted into the database when it bore the update code of 2. The second number is the "As First Reported" figure when Compustat first changed the update code to 3 for that company-quarter. The third number is the number that exists in the current version of Compustat, which is what most investors use. The Charter Oak database allowed us to use the first-reported information in the SEC filing so that our quarterly earnings, cash flows, and accruals could correspond to those reported originally by the companies, which are also available to market participants at the time of the SEC filing.[4] Using the restated Compustat Quarterly database might have introduced a hindsight bias into our backtests because we might have used restated earnings, cash flows, or accruals that were not known to market participants on the SEC filing dates.

Sample Selection. The initial population for the study consisted of all company-quarters in the Compustat database between the first quarter of 1988 (the first quarter after the adoption of Statement of Financial Accounting Standards No. 95, *Statement of Cash Flows*, which mandated the disclosure of net operating cash flow) and the most recent quarter at the time of the study, the first quarter (Q1) of 2004. The only limitation on the initial selection of company-quarters was that market value at quarter-end had to be in excess of $50 million. The resulting initial population was 368,378 company-quarters.

From this initial population, we deleted an observation if the originally reported income before extraordinary items and discontinued operations (Compustat Quarterly Item 8) was missing; if the originally reported quarterly net operating cash flow (Item 108) was missing; if the company's market value at the end of the prior quarter was unavailable; or if total assets (Item 44) at the end of the prior quarter or the end of the "current" quarter were missing. This process yielded a population of 242,292 company-quarters.

For each company-quarter in this reduced population, we attempted to obtain the SEC filing date of the 10-Q/10-K form, which was supplied to us by Compustat for the calendar years 1991–2004. We found 176,864 observations with SEC filing dates.

We then used the GVKEY from Compustat to match the observation to the CRSP database. We computed buy-and-hold excess returns (BHRs) from two days after the SEC filing date through the next four preliminary earnings announcements. We assumed that investors get access to SEC filings on the day after the filing date and that, after estimating accruals, they take portfolio positions on the following day. We used holding periods through one day after subsequent earnings announcements because prior studies have indicated that a substantial portion of the returns to an accrual-based strategy are generated around the times of subsequent earnings announcements, presumably when investors understand any earlier mispricing.

To reduce survivor bias, if subsequent quarterly earnings announcements were missing, we used holding periods of 90, 180, 270, or 360 days after the SEC filing date. If a security was delisted from an exchange before the end of the holding period, we used the delisting return from CRSP (if available) and –100 percent if the stock was forced to delist by the exchange or if the delisting was the result of financial difficulties. After a company was delisted, we assumed the proceeds were invested in the benchmark portfolios based on size and on book value to market value of equity (B/M).[5]

We first calculated the buy-and-hold return on the security during the holding period; then, we subtracted the buy-and-hold return on a benchmark portfolio of similar size and B/M for the same holding period. The benchmark returns are from Kenneth French's data library and are based on classification of the population into six (two size and three B/M) portfolios.[6] To make sure that our results were not driven by observations with extreme returns, we deleted all observations with BHRs in any of the four return periods at the top or bottom 0.5 percent of the distribution. This step reduced the sample to 155,985 company-quarters.

Consistent with the accrual literature, we estimated accruals as earnings minus net operating cash flows and we scaled them by average assets in quarter t. We scaled all current and subsequent quarters' variables (i.e., earnings, net operating cash flows, and accruals in quarters $t, \ldots, t + 4$) by average total assets in quarter t to be consistent in our scaling.[7] To eliminate the undue influence of extreme observations, we winsorized earnings, net operating cash flows, and accruals to fall in the range (–1, +1). This procedure allowed us to keep all observations, even when some earnings, cash flows, or earnings surprises were extreme.

Table 1 provides summary statistics about this sample. As can be seen, mean quarterly earnings at quarter t were about –0.07 percent of average total assets but median earnings were 1.03 percent of average total assets, with more than 75 percent of the company-quarters having positive earnings. The mean and median quarterly net operating cash flow (in tables, "cash flow") figures are higher, but accruals at t had a negative mean percentage and median percentage of average assets. The major reason is that depreciation and amortization are included in income but excluded from net operating cash flow. Note that, in spite of the negative mean and median accrual percentages, because the accrual figure for 75 percent of company-quarters

Table 1. Summary Statistics for Company-Quarters in Preliminary Sample, Data for Q1 1991–Q1 2004

Variable	*N*	Mean	Standard Deviation	10%	25%	Median	75%	90%
Earnings at *t*/Average total assets	155,985	–0.0007	0.0668	–0.0460	0.0002	0.0103	0.0222	0.0369
Cash flow at *t*/Average total assets	155,985	0.0125	0.0645	–0.0478	–0.0048	0.0177	0.0395	0.0660
Accruals at *t*/Average total assets	155,985	–0.0133	0.0635	–0.0580	–0.0296	–0.0102	0.0069	0.0339
BHR for period *t* through *t* + 1	155,985	–0.0020	0.2105	–0.2414	–0.1124	–0.0076	0.0955	0.2289
BHR for period *t* through *t* + 2	150,067	–0.0066	0.3213	–0.3760	–0.1932	–0.0262	0.1424	0.3566
BHR for period *t* through *t* + 3	144,683	–0.0106	0.4147	–0.4757	–0.2601	–0.0473	0.1704	0.4558
BHR for period *t* through *t* + 4	141,803	–0.0085	0.5108	–0.5557	–0.3212	–0.0666	0.2004	0.5494

Notes: Sample consists of all sample observations (company-quarters) for which earnings (Item 8) and net operating cash flows (Item 108) were available for the current quarter, the market value of equity at quarter-end was at least $50 million, and total assets (Item 44) were available for the current and prior quarters. Extreme-BHR observations (top and bottom 0.5 percent) were deleted. Earnings (quarterly) were scaled by average total assets during quarter *t* and winsorized to fall in the range (–1, +1). Cash flows (quarterly) were scaled by average total assets during quarter *t* and winsorized to fall in the range (–1, +1). Accruals are quarterly earnings minus quarterly cash flows, scaled by average total assets over quarter *t* and winsorized to fall in the range (–1, +1). BHR is the abnormal return on a stock, cumulated from two days after the SEC filing date for quarter *t* through one day after the preliminary earnings announcement for quarter *t* + *i*. If the preliminary earnings announcement date was missing, it was replaced by 90, 180, 270, and 360 days after SEC filing. The abnormal return is the raw return over the period minus the return on a benchmark portfolio of the same size and B/M (six portfolios). The BHR includes delisting returns where applicable.

is a positive 0.0069, more than 25 percent of the observations had positive, income-increasing accruals. Finally, the mean (median) buy-and-hold abnormal returns from the SEC filing dates through the subsequent preliminary earnings announcements are all negative, indicating that the average company in our sample was likely to disclose unfavorable news from the SEC filing through the subsequent earnings announcement.

To focus on the companies that are more likely to have extremely high or low accruals, which will be less persistent, we further required that all observations in the bottom two deciles of accruals (i.e., the most negative accruals) have both positive incomes and positive net operating cash flows. Such companies have either decided to manage earnings downward to reduce already high positive earnings and operating cash flows or they have future expectations that are too pessimistic on average.[8] We further required that companies in the top two accrual deciles (i.e., those with the most positive accruals) also have positive current earnings, which would be consistent with, on average, either income-increasing earnings management or overly optimistic forecasts. These restrictions reduced the sample to 137,012 observations for the remaining analyses.

Results. **Table 2** shows the distribution of BHRs from t, which is two days after the SEC filing time, through one day after each subsequent earnings announcement for sample observations sorted according to the level of accruals each quarter. The accrual literature provides evidence that companies with income-decreasing, or low, accruals have larger subsequent abnormal returns than companies with income-increasing, high, accruals. The evidence in Table 2 is consistent with those findings. The bottom accrual decile (Decile 0) always has higher subsequent returns than the top accrual decile (Decile 9). Note that this difference in BHR is 3.4 percentage points for the first quarter and rises through each quarter to 9.9 percentage points for quarter $t + 4$. This result is comparable to Sloan's (1996) hedge portfolio return for the subsequent year. Table 2 also shows that the long portfolio of extremely negative accruals (Decile 0) produced buy-and-hold excess returns exceeding an expected transaction cost of 2 percent. Thus, the strategy would have yielded positive abnormal returns net of transaction costs, even if only the long position had been used.

The accrual literature attributes the negative association between accruals and returns to accruals being less persistent than net operating cash flows. **Table 3** examines the relationships between earnings in the subsequent four quarters and current earnings, net operating cash flows, and accruals. As can be seen, the association is positive and statistically significant between current earnings and earnings in the subsequent four quarters, where 78–83 cents of each dollar of the current quarter's earnings are carried over to earnings in

Table 2. Subsequent Returns to Accrual Deciles for Company-Quarters in Final Sample, Data for Q1 1991–Q1 2004

		Buy-and-Hold Return				
Accrual Decile	N for $t + 1$	Period t through $t + 1$	Period t through $t + 2$	Period t through $t + 3$	Period t through $t + 4$	N for $t + 4$
0	6,854	0.022	0.033	0.044	0.053	6,290
1	10,046	0.016	0.031	0.038	0.047	9,176
2	15,513	0.005	0.006	0.003	0.006	14,089
3	15,614	0.004	0.005	0.007	0.009	14,213
4	16,069	0.001	0.000	–0.004	0.002	14,612
5	16,095	0.000	0.000	–0.003	–0.001	14,663
6	15,950	–0.003	–0.008	–0.010	–0.008	14,527
7	15,841	–0.006	–0.015	–0.022	–0.020	14,428
8	12,776	–0.006	–0.014	–0.018	–0.020	11,711
9	12,254	–0.012	–0.028	–0.040	–0.046	11,200
All	137,012	0.001	–0.001	–0.004	–0.001	124,909
Low – High		0.034	0.061	0.084	0.099	

Notes: Sample consists of 137,012 observations. See the notes to Table 1. Company-quarter observations were sorted each quarter into deciles according to the scaled accruals. The row "Low – High" reports the returns obtained on a hedge portfolio that held long positions in companies falling into the lowest accrual decile and short positions in companies falling into the highest accrual decile.

Table 3. Regression of Future Earnings on Current Earnings, Cash Flows, and Accruals, Data for Q1 1991–Q1 2004
(*p*-values in parentheses)

	Dependent Variable							
	Earnings at $t+1$ (N = 136,014)		Earnings at $t+2$ (N = 133,428)		Earnings at $t+3$ (N = 128,962)		Earnings at $t+4$ (N = 124,456)	
Independent Variable	Earnings Only	Cash Flow and Accruals	Earnings Only	Cash Flow and Accruals	Earnings Only	Cash Flow and Accruals	Earnings Only	Cash Flow and Accruals
Intercept	–0.0017	–0.0025	–0.0022	–0.0032	–0.0026	–0.0039	–0.0030	–0.0044
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Earnings	0.7911		0.7786		0.7822		0.8324	
	(0.0001)		(0.0001)		(0.0001)		(0.0001)	
Accruals		0.7390		0.7000		0.6836		0.7328
		(0.0001)		(0.0001)		(0.0001)		(0.0001)
Cash flows		0.8143		0.8066		0.8126		0.8704
		(0.0001)		(0.0001)		(0.0001)		(0.0001)
R^2	0.3303	0.3382	0.2765	0.2861	0.2473	0.2584	0.2562	0.2961
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)

Notes: See notes to Tables 1 and 2. Untabulated tests that the slope coefficient on net operating cash flows is statistically equal to the coefficient on accruals rejected the equivalence at a *p*-value of 0.0001 for all four future quarterly earnings.

the subsequent four quarters.[9] Table 3 also shows that net operating cash flow is more persistent than accruals, with about 81 cents of every dollar of cash flow carried over to the subsequent four quarters versus 68–74 cents of a dollar of accruals carried over. Thus, we found that quarterly net operating cash flows and accruals exhibit the same pattern of more persistence of net operating cash flows as found in annual data.

Table 4 provides direct evidence about the persistence of accruals. It shows the associations between accruals in the current quarter, t, and those in the subsequent four quarters. The association between current accruals and accruals at quarter $t+1$ is negative and statistically significant (–0.025, $p < 0.0001$) but has completely reversed by quarter $t+2$; no association appears with accruals in quarter $t+3$, but a very high and significantly positive association with accruals shows up with quarter $t+4$. Thus, Table 4 shows that quarterly accruals tend to reverse in the immediately subsequent quarter, reverse again (becoming a positive association) in quarter $t+2$, and exhibit a high level of seasonality at quarter $t+4$. This evidence may explain why accruals are less persistent than net operating cash flows in predicting future quarterly earnings. The relative lack of persistence in quarterly accruals explains why a strategy of long positions in companies with low accruals and short positions in companies with high accruals can yield significant positive returns. Earnings of companies with extremely low or extremely high

Table 4. Regression of Future Accruals on Current Accruals, Data for Q1 1991–Q1 2004
(*p*-values in parentheses)

	Dependent Variable			
Independent Variable	Accruals at $t+1$ (N = 135,499)	Accruals at $t+2$ (N = 131,947)	Accruals at $t+3$ (N = 127,451)	Accruals at $t+4$ (N = 122,908)
Intercept	–0.0116	–0.0121	–0.0127	–0.0116
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Accruals at Q_t	–0.0254	0.0247	0.0009	0.4193
	(0.0001)	(0.0001)	(0.8312)	(0.0001)
R^2	0.0004	0.0003	0.0000	0.0744
	(0.0001)	(0.0001)	(0.0001)	(0.0001)

Note: See notes to Tables 1 and 2.

quarterly accruals will tend to be less persistent than earnings of companies with accruals close to zero. When investors learn the surprising actual quarterly earnings in the future, stock prices decline for high-accrual companies with lower future earnings and rise for low-accrual companies that experience higher earnings in future quarters.

Table 5 provides regression results that reveal the association between future returns and current earnings, net operating cash flows, and accruals. It shows future buy-and-hold excess returns that are positively and significantly associated with current earnings for every holding period through the subsequent four quarters. An even stronger association can be seen between future excess returns and current net operating cash flows. In contrast, the incremental association between accruals in quarter *t* and future excess returns is significantly lower after the levels of net operating cash flows are controlled for, probably because of the greater persistence of cash flows. These results indicate that future returns are more strongly related to net operating cash flows than to accruals.

Table 6 examines the differential future returns to the extreme-decile portfolios in a methodology that is used extensively in studies of post-earnings-announcement drift. We sorted companies into accrual deciles every quarter, with the lowest accrual decile ranked 0 and the highest, ranked 9. We then divided each decile rank by 9 and from it, subtracted 0.5. So, the decile ranks were now scaled and ranged between –0.5 and +0.5. In regressions of future BHRs on the scaled decile ranks, the intercept measures the average excess return across all deciles and the slope coefficient measures the differential return between the highest accrual decile and the lowest accrual decile.

As Table 6 shows, the intercept is almost never significant, whereas the slope coefficient is always negative and statistically different from zero. This result was expected because the highest accrual decile was expected to yield future returns that were lower than the lowest accrual decile. Table 6 also shows (in the "Accrual decile rank" row) that a hedge portfolio consisting of the lowest accrual decile minus the highest accrual decile would have yielded an excess return of 2.71 percent for the first subsequent quarter up to 7.82 percent through the fourth subsequent quarter. These are economically and statistically significant excess returns, even after transaction costs.

Table 7 examines the average returns to extremely high accrual, extremely low accrual, and hedge portfolios across the 53 quarters of the sample period—1991 through the first quarter of 2004. The methodology we used for this test is similar to the methodology Fama and MacBeth (1973) used. As Table 7 reports, the long portfolio (lowest accrual decile) had a mean return from two days after the SEC filing through one day after the next earnings announcement of 2.62 percent (statistically significant at a *p*-value of 0.0001). In 41 of 53 quarters, the portfolio yielded positive returns. In 32 of the 53 quarters, it yielded positive returns above the

Table 5. Regression of Future Returns on Earnings, Cash Flows, and Accruals, Data for Q1 1991–Q1 2004
(*p*-values in parentheses)

	Buy-and-Hold Return							
	Period *t* through *t* + 1 (*N* = 137,012)		Period *t* through *t* + 2 (*N* = 131,976)		Period *t* through *t* + 3 (*N* = 127,365)		Period *t* through *t* + 4 (*N* = 124,909)	
Independent Variable	Earnings Only	Cash Flow and Accruals	Earnings Only	Cash Flow and Accruals	Earnings Only	Cash Flow and Accruals	Earnings Only	Cash Flow and Accruals
Intercept	–0.0016	–0.0035	–0.0068	–0.0105	–0.0114	–0.0161	–0.0091	–0.0144
	(0.0046)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Earnings	0.2068		0.4528		0.6349		0.6466	
	(0.0001)		(0.0001)		(0.0001)		(0.0001)	
Cash flows		0.2522		0.5379		0.7363		0.7659
		(0.0001)		(0.0001)		(0.0001)		(0.0001)
Accruals		0.0445		0.1433		0.2333		0.1823
		(0.0098)		(0.0001)		(0.0001)		(0.0001)
R^2	0.0016	0.0034	0.0032	0.0064	0.0036	0.0068	0.0025	0.0052
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)

Notes: See notes to Tables 1 and 2. Untabulated tests that the slope coefficient on net operating cash flows is statistically equal to the coefficient on accruals rejected the equivalence at a *p*-value of 0.0001 for all four BHR holding periods.

Table 6. Regression of Future Returns on Scaled Accrual Ranks, Data for Q1 1991–Q1 2004
(*p*-values in parentheses)

	Buy-and-Hold Return			
Independent Variable	Period *t* through *t* + 1 (*N* = 137,012)	Period *t* through *t* + 2 (*N* = 131,976)	Period *t* through *t* + 3 (*N* = 127,366)	Period *t* through *t* + 4 (*N* = 124,909)
Intercept	0.0017	0.0002	–0.0018	0.0011
	(0.0022)	(0.8217)	(0.1100)	(0.4536)
Accrual decile rank	–0.0271	–0.0519	–0.0672	–0.0782
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
R^2	0.0015	0.0024	0.0024	0.0021
	(0.0001)	(0.0001)	(0.0001)	(0.0001)

Notes: See notes to Tables 1 and 2. For this regression, companies were sorted into accrual deciles each quarter and assigned the decile rank divided by 9 minus 0.5. Thus, accrual decile rank ranges between –0.5 and +0.5. The intercept measures the average BHR in the sample, and the slope coefficient is the difference in BHR between the highest and lowest accrual deciles.

Table 7. Long, Short, and Hedge Returns by Quarter, Data for Q1 1991–Q1 2004

Portfolio	Average No. Securities per Quarter	Mean Return	*t*-Statistic	*p*-Value	No. Quarters with Positive Returns	No. Quarters with Returns > 2%
BHR for t through t + 1						
Long	124	0.0262	7.02	0.0001	41	32
Short	222	0.0098	2.89	0.0056	36	19
Hedge	346	0.0359	7.78	0.0001	48	37
BHR for t through t + 2						
Long	122	0.0375	6.39	0.0001	46	33
Short	218	0.0249	4.34	0.0001	38	28
Hedge	340	0.0623	9.33	0.0001	46	43
BHR for t through t + 3						
Long	120	0.0500	5.98	0.0001	44	37
Short	214	0.0339	4.08	0.0002	42	31
Hedge	334	0.0839	9.00	0.0001	44	41
BHR for t through t + 4						
Long	118	0.0616	5.52	0.0001	40	39
Short	211	0.0382	3.77	0.0004	37	31
Hedge	329	0.0998	9.36	0.0001	47	42

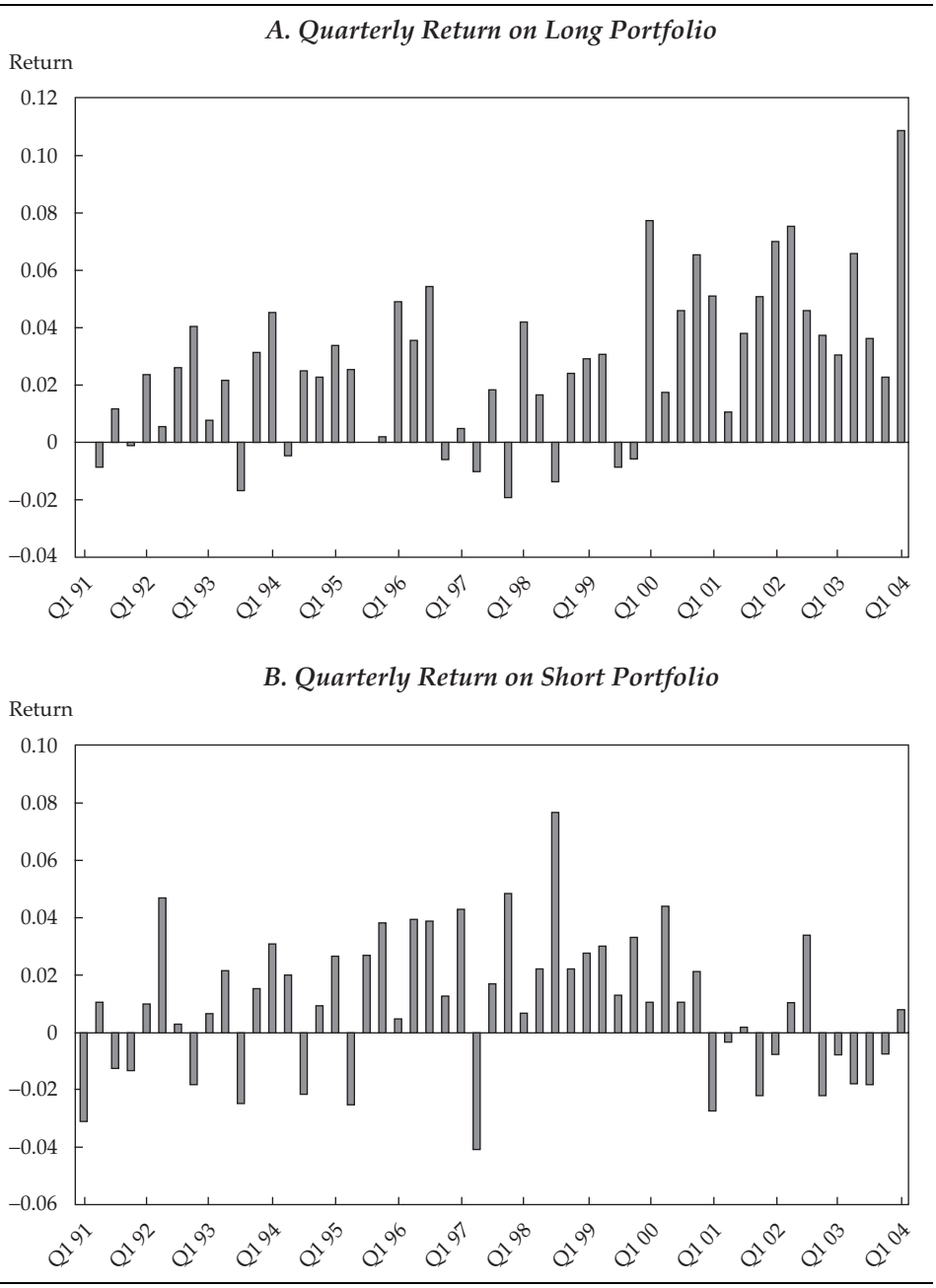
Note: The *t*-statistics and *p*-values are for a test that the time-series mean return over all 53 quarters is statistically different from zero.

assumed transaction costs of 2 percent. For the equivalent short portfolio (the highest accrual decile), the mean return is much lower, although it is statistically significant at a *p*-value of 0.0056, with 36 quarters of returns above zero and 19 quarters of returns above 2 percent. Table 7 shows that the hedge portfolio, a combination of the long and short positions, had a mean return of 3.59 percent, was positive in 48 of the 53 quarters, and had returns above 2 percent in 37 of the 53 quarters.

Table 7 also reports the results for longer holding horizons (two to four quarters after the SEC filings). The benefits of the accrual strategy are shown to increase with longer holding periods for the short positions, which provided larger and more significant returns over a period that spanned at least two quarters after the SEC filings. Thus, the accrual strategy seems to yield abnormal returns that are both statistically and economically significant.

Figure 1 shows the quarter-by-quarter BHRs from two days after the SEC filing through a day after the subsequent earnings announcement by quarter for the portfolio that went long the lowest accrual decile (the long portfolio, Panel A), the portfolio that went short the highest accrual decile (the short portfolio, Panel B), and the hedge portfolio that combined those positions (Panel C). As Figure 1 shows, most long-portfolio returns were positive (41 out of 53 quarters) and shorting the highest accrual decile produced positive returns in 36 of 53 quarters. The hedge portfolio yielded positive BHRs in 48 of the 53 quarters, and the magnitude of the most negative BHR for the hedge fund is only about 5 percent. Thus, sorting companies by accruals is successful in predicting the returns through the next quarterly announcements.

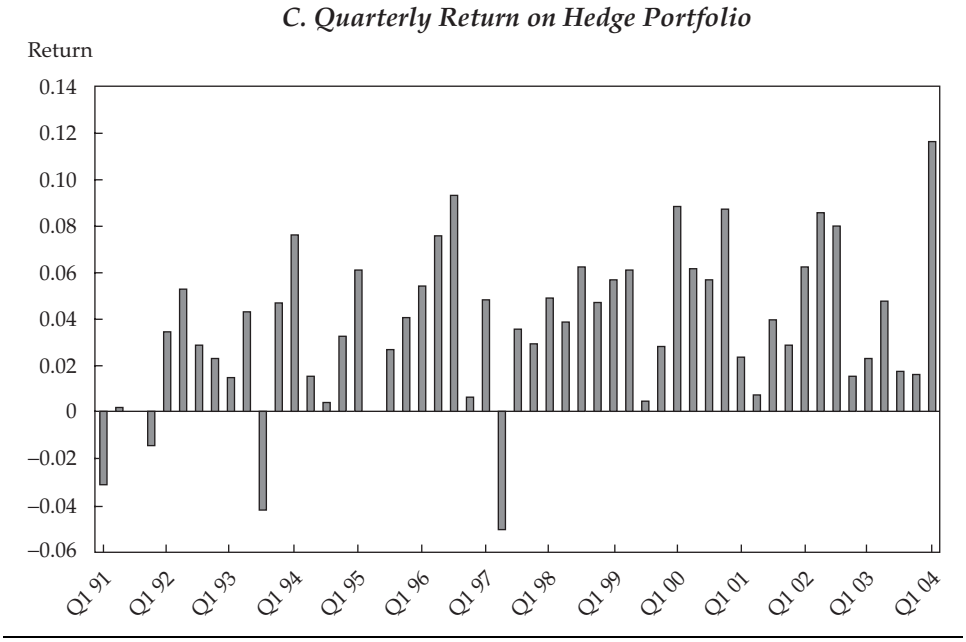
Figure 1. Mean Abnormal Returns to Extremely Low Accruals (Long Portfolio), Extremely High Accruals (Short Portfolio), and Hedge Portfolio, Data for Q1 1991–Q1 2004



Note: Q4 1990 = 100.

(continued)

Figure 1. Mean Abnormal Returns to Extremely Low Accruals (Long Portfolio), Extremely High Accruals (Short Portfolio), and Hedge Portfolio, Data for Q1 1991–Q1 2004 (continued)



Note: Q4 1990 = 100.

Figure 2 shows cumulative abnormal returns to the long, short, and hedge portfolios over the 53 quarters of the study. As can be seen, the cumulative returns to the long low-accrual portfolio are greater than those to the short high-accrual portfolio but both are clearly dominated by the hedge portfolio.

This analysis shows that using the information in accruals can help investors obtain consistent abnormal returns over a long period of time.

Robustness Checks

We carried out tests of the robustness of our findings by focusing on large-capitalization companies, by using only data after 1996 and then only data after 1999, by applying our method to companies that did not report information in their preliminary earnings announcements on the primary current accruals, and by separating the fourth quarter from the other three.

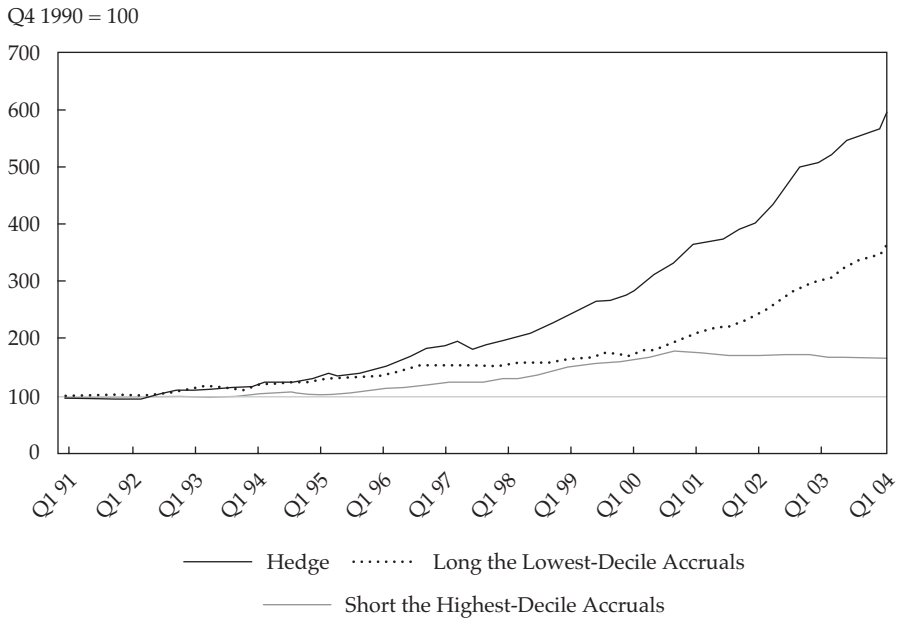
Large Companies. We repeated the analysis in Table 7 for companies with a market value of equity in excess of $1 billion. For these companies, the long portfolio generally yielded returns that were not significantly different from zero but the short portfolio yielded returns that were statistically and economically significant. The hedge portfolio yielded returns that were larger than those reported in Table 7 for all companies.

Recent Data and Post-EDGAR Data. We repeated the analysis in Table 7 with data from quarters after 1999. The hedge portfolio returns were better than those provided in Table 7 but mostly because of the long positions. The short portfolio yielded returns that were insignificantly different from zero.

We also examined the results of Table 7 for the post–May 1996 period—the period since all companies (foreign and domestic) have been required to file registration statements, periodic reports, and other forms electronically through the SEC's EDGAR (Electronic Data Gathering Analysis and Retrieval) system. The results were similar to those shown in Table 7 for the short, long, and hedge portfolios.

Balance Sheet or Cash Flow Information Not in Preliminary Earnings Announcement. We repeated the analysis for companies that did not report information in their preliminary earnings announcements on the main current accruals (inventories, accounts receivable, and accounts payable) or net operating cash flows. The results were similar to those reported in Table 7.

Figure 2. Cumulative Abnormal BHR to Extremely Low Accruals (Long Portfolio), Extremely High Accruals (Short Portfolio), and Hedge Portfolio, Data for Q1 1991–Q1 2004



Fourth Fiscal Quarter vs. Other Quarters. We found that the main results of Table 7 were similar for the first three fiscal quarters and the fourth quarter, except returns in the fourth quarter were slightly lower than those in Table 7 and statistically significant and those for the first three quarters were slightly higher.

Conclusion

We found that observing quarterly accruals after the SEC filings were available and sorting companies into deciles to obtain companies with extreme quarterly accruals can produce significant future abnormal returns. Companies with extremely low accruals in the current quarter had positive abnormal returns over the period from two days after the SEC filing through the day after the subsequent quarterly earnings announcement. Conversely, over the same period, companies with extremely high accruals in the current quarter had negative future abnormal returns. We also observed abnormal returns to these groups for holding periods from two days after the SEC filing through the subsequent four quarterly preliminary earnings announcements.

To explain these results, we showed that, consistent with previous findings about annual accruals, quarterly accruals tend to have less persistence than net operating cash flows with respect to future quarterly earnings, which gives rise to the phenomenon known as the "accrual anomaly." Specifically, companies with extremely high accruals in quarter t tend to have lower future quarterly earnings than companies with the same levels of current earnings but higher current net operating cash flows.

The results of this study have implications for analysts and investors. Analysts should carefully examine the quarterly accruals of companies in the extreme-accrual cases to determine whether the accruals are likely to indicate less persistence of future quarterly earnings. This analysis will help financial analysts determine cases where a forecast revision may be warranted. Investors can use the results of such analysis to identify companies that are likely to have future changes in stock returns because of expected earnings changes.

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This article qualifies for 1 PD credit.

Appendix A. Reversing Accruals

The purpose of this appendix is to explain intuitively why net operating cash flows are more persistent than accruals, which tend to reverse more often because of the nature of accounting systems. Consider two identical companies that are subject to the same exogenous economic forces but for which accounting outcomes differ. In the first company, managerial decisions affect inventory levels, and in the second case, managerial decisions affect both inventory and accounts receivable.

The two companies begin operations in the first quarter (Q1) with $2,000 in cash and with the same cost structure of $1,000 fixed production costs a quarter and $2 per unit of variable costs. Each unit is sold for $5, and expected sales in the first quarter are 1,000 units. The companies maintain ending inventory (in units) that is 25 percent of the subsequent quarter's unit sales. The companies also incur other expenses, which are assumed to be 20 percent of sales. All expenses are paid immediately.

In the first case, the two companies differ in their expectations. Company A assumes sales growth of 10 percent a quarter, and Company B assumes (wrongly) that sales will grow at 50 percent a quarter. After the first quarter, Company B revises its estimates also to have growth of 10 percent a quarter. The nature of the cost system (first in, first out) is such that the costs of beginning inventory plus current production costs are used to determine the cost per unit during the quarter and that cost per unit is used to calculate the cost of ending inventory. **Table A1** shows earnings, cash flows, and balance sheet data for the two companies in this situation.

As Table A1 shows, required ending inventory in the first quarter is larger for Company B than for Company A, simply because forecasted sales in Q2 are higher for Company B than for Company A. Because there are more units produced in Q1 by Company A than Company B, the cost per unit for Company A is higher than that for Company B ($2.78 compared to $2.73), which means that Company A will have higher costs of sales than Company B. Also, Company B has higher inventory

Table A1. Company B's Excessive Inventories in Q1

	Q1		Q2		Q3	
Item	A	B	A	B	A	B
Forecasted sales (units)	1,000	1,000	1,100	1,500	1,210	1,210
Actual sales	1,000	1,000	1,100	1,100	1,210	1,210
Income statement						
Sales	$5,000.00	$5,000.00	$5,500.00	$5,500.00	$6,050.00	$6,050.00
Cost of sales	(2,784.31)	(2,727.27)	(3,147.39)	(3,178.32)	(3,420.00)	(3,446.11)
Other expenses	(1,000.00)	(1,000.00)	(1,100.00)	(1,100.00)	(1,210.00)	(1,210.00)
Earnings	$1,215.69	$1,272.73	$1,252.61	$1,221.68	$1,420.00	$1,393.89
Cash flows						
Collections	$5,000.00	$5,000.00	$5,500.00	$5,500.00	$6,050.00	$6,050.00
Production costs	(3,550.00)	(3,750.00)	(3,255.00)	(3,055.00)	(3,480.50)	(3,480.50)
Other expenses	(1,000.00)	(1,000.00)	(1,100.00)	(1,100.00)	(1,210.00)	(1,210.00)
Net operating cash flow	$ 450.00	$ 250.00	$1,145.00	$1,345.00	$1,359.50	$1,359.50
Balances						
Ending inventory	$ 765.69	$1,022.73	$ 873.29	$ 899.40	$ 933.79	$ 933.79
Cash	$2,450.00	$2,250.00	$3,595.00	$3,595.00	$4,954.50	$4,954.50
Production data						
Inventory (ending, units)	275.00	375.00	302.50	302.50	332.75	332.75
Actual sales (units)	1,000.00	1,000.00	1,100.00	1,100.00	1,210.00	1,210.00
Total needed	1,275.00	1,375.00	1,402.50	1,402.50	1,542.75	1,542.75
Subtract beginning inventory	0.00	0.00	–275.00	–375.00	–302.50	–302.50
Production (units)	1,275.00	1,375.00	1,127.50	1,027.50	1,240.25	1,240.25
Cost of production	$3,550.00	$3,750.00	$3,255.00	$3,055.00	$3,480.50	$3,480.50
Cost of production per unit	2.78	2.73	2.89	2.97	2.81	2.81
Cost of ending inventory	765.69	1,022.73	873.29	899.40	933.79	933.79
Cost of sales	$2,784.31	$2,727.27	$3,147.39	$3,178.32	$3,420.00	$3,446.11

levels (in units and total cost) at the end of the first quarter than Company A. The situation is reversed in Q2, when Company B works down its excess inventory, resulting in higher unit costs for Company B ($2.97 compared with $2.89 for Company A), higher costs of sales, and lower profits. Earnings in Q3 are also affected, simply because of the lingering effects of ending inventory costs from Q2.

Company B has higher earnings in Q1 than Company A because of Company B's decision to hold excess inventories at the end of Q1. Company B's earnings in Q2 and Q3 are lower than Company A's because Company B has higher accruals (inventories on the balance sheet) than Company A in the first two quarters.

The income statement does not penalize Company B in Q1 for building excess inventories but treats them as an asset. The net operating cash flow of Company B, however, fully reflects the inventory buildup in Q1 and liquidation in Q2; Company B has lower net operating cash flow in Q1 than Company A has, and a complete reversal occurs in Q2. Thus, if inventory shocks (excess inventories) occur, the accounting system is likely to cause accrual reversals whereas the net operating cash flows will portray a more accurate picture of the company's probable future earnings.

Assume now that the manager of Company B realizes the excessive inventory buildup and decides to manage earnings through channel stuffing (i.e., promising customers that they can take delivery in Q2 but need not pay until Q3). Company B will now have not only higher inventory accruals but also higher accounts receivable accruals in Q2. For simplicity, assume that customers who take delivery in Q2 reduce their Q3 orders by exactly the same amount. **Table A2** shows the effects on Company B's financial statements in comparison with Company A's.

Table A2. Company B's Channel Stuffing in Q2

	Q1		Q2		Q3	
Item	A	B	A	B	A	B
Forecasted sales (units)	1,000	1,000	1,100	1,500	1,210	1,210
Actual sales	1,000	1,000	1,100	1,500	1,210	810
Income statement						
Sales	$5,000.00	$5,000.00	$5,500.00	$7,500.00	$6,050.00	$4,050.00
Cost of sales	(2,784.31)	(2,727.27)	(3,147.39)	(4,060.82)	(3,420.00)	(2,435.90)
Other expenses	(1,000.00)	(1,000.00)	(1,000.00)	(1,500.00)	(1,210.00)	(810.00)
Earnings	$1,215.69	$1,272.73	$1,252.61	$1,939.18	$1,420.00	$ 804.10
Cash flows						
Collections	$5,000.00	$5,000.00	$5,500.00	$5,500.00	$6,050.00	$6,050.00
Production costs	(3,550.00)	(3750.00)	(3,255.00)	(3,855.00)	(3,480.50)	(2,680.50)
Other expenses	(1,000.00)	(1000.00)	(1,100.00)	(1,500.00)	(1,210.00)	(810.00)
Net operating cash flow	$ 450.00	$ 250.00	$1,145.00	$ 145.00	$1,359.50	$2,559.50
Balances						
Ending inventory	$ 765.69	$1022.73	$ 873.29	$ 816.91	$ 933.79	$1,061.51
Cash	$2,450.00	$2250.00	$3,595.00	2,395.00	$4,954.50	$4,954.50
Accounts receivable				$2,000.00		
Production data						
Inventory (ending, units)	275.00	375.00	302.50	302.50	332.75	332.75
Actual sales (units)	1,000.00	1,000.00	1,100.00	1,500.00	1,210.00	810.00
Total needed	1,275.00	1,375.00	1,402.50	1,802.50	1,542.75	1,142.75
Subtract beginning inventory	0.00	0.00	–275.00	–375.00	–302.50	–302.50
Production (units)	1,275.00	1,375.00	1,127.50	1,427.50	1,240.25	840.25
Cost of production	$3,550.00	$3,750.00	$3,255.00	$3,855.00	$3,480.50	$2,680.50
Cost of production per unit	2.78	2.73	2.89	2.70	2.81	3.19
Cost of ending inventory	765.69	1,022.73	873.29	816.91	933.79	1,061.51
Cost of sales	$2,784.31	$2,727.27	$3,147.39	$4,060.82	$3,420.00	$2,435.90

In this case, earnings in Q2 are substantially higher for Company B than for Company A because Company B has booked higher sales; its cash flows, however, are actually lower because it has incurred additional expenses (the assumed 20 percent of sales). When the reversal occurs in Q3 (i.e., when Company B's clients, to work down their own inventories, order fewer goods), Company B's earnings fall significantly as compared with Company A's.

These examples show how the accounting system is likely to "cover" managerial buildup of inventories or receivables, which raises earnings during the period of accrual buildup that are subsequently reversed when the excess inventories or receivables are liquidated. The accounting system can also be used by managers to manage earnings through more favorable accounting methods and estimates (e.g., booking current bad-debt expenses that are too low), but the favorable effects of these selections are also likely to reverse in the future when new information surfaces.

For these reasons, net operating cash flow is likely to provide a more believable signal of future earnings than do accruals. Whether accruals will reverse in the future depends on the extent of managerial buildup of excessive accounting assets and on the extent of managerial actions (economic and accounting) to manage current earnings.

Notes

1. Appendix A provides detailed examples of these two cases.
2. Of course, managers can also affect current income through simple accounting choices that do not involve real economic transactions, such as the selection of aggressive accounting methods and estimates. For example, if bad-debt expense in the current period is too low, it will probably lead to higher bad-debt expense in the future and lower future income.
3. They mentioned that their results from robustness checks were weaker for a subsample of companies that included balance sheet information in the preliminary earnings announcement. They also reported that their results did not change when they used abnormal returns cumulated from the preliminary earnings announcement through the next 20 trading days, which presumably would include the SEC filing date. They reported that their results held for the first three fiscal quarters but not for the fourth.
4. SEC filing dates are available from 1991 on.
5. This procedure was used by Kraft et al. (2004).
6. Available at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.
7. Scaling by net operating assets in subsequent quarters can introduce a bias because of growth in total assets, as shown in Fairfield et al. (2003).
8. The assignment to accrual deciles was based on all available observations, even if they did not have SEC filing dates or abnormal returns. As Sloan (1996) and others documented, companies in the extreme-accrual deciles tend to be smaller than other companies.
9. The higher persistence of earnings at quarter t into quarter $t + 4$ is evidence of seasonality, which is expected in quarterly data.

References

Barth, Mary, and Amy Hutton. 2003. "Analyst Earnings Forecast Revisions and the Pricing of Accruals." Working paper, Dartmouth College and Stanford University.

Beneish, M.D., and M.E. Vargus. 2002. "Insider Trading, Earnings Quality and Accrual Mispricing." *Accounting Review*, vol. 77, no. 4 (October):755–791.

Collins, D.W., and P. Hribar. 2000. "Earnings-Based and Accrual-Based Market Anomalies: One Effect or Two?" *Journal of Accounting and Economics*, vol. 29, no. 1 (February):101–123.

Collins, D.W., G. Gong, and P. Hribar. 2003. "Investor Sophistication and the Mispricing of Accruals." *Review of Accounting Studies*, vol. 8, nos. 2–3 (June–September):251–276.

DeFond, M.L., and C.W. Park. 2001. "The Reversal of Abnormal Accruals and the Market Valuation of Earnings Surprises." *Accounting Review*, vol. 76, no. 3 (July):375–404.

Desai, H., S. Rajgopal, and M. Venkatachalam. 2004. "Value–Glamour and Accruals Mispricing: One Anomaly or Two?" *Accounting Review*, vol. 79, no. 2 (April):355–385.

Fairfield, P., J.S. Whisenant, and T.L. Yohn. 2003. "Accrued Earnings and Growth: Implications for Future Profitability and Market Mispricing." *Accounting Review*, vol. 78, no. 1 (January):353–371.

Fama, E.F., and J. MacBeth. 1973. "Risk, Return, and Equilibrium: Empirical Tests." *Journal of Political Economy*, vol. 81, no. 3 (May–June):607–636.

Kraft, A., A. Leone, and C. Wasley. 2004. "Research Design Issues and Related Inference Problems Underlying Tests of the Market Pricing of Accounting Information." Working paper, University of Rochester.

Lev, Baruch, and Doron Nissim. 2004. "The Persistence of the Accruals Anomaly." Working paper, New York University and Columbia University.

Mashruwala, C., S. Rajgopal, and T. Shevlin. 2004. "Why Is the Accrual Anomaly Not Arbitraged Away?" Working paper, University of Washington.

Richardson, S., R. Sloan, M. Soliman, and I. Tuna. 2004. "Accrual Reliability, Earnings Persistence and Stock Prices." Working paper, University of Michigan.

Sloan, R. 1996. "Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings?" *Accounting Review*, vol. 71, no. 3 (July):289–315.

Thomas, J., and H. Zhang. 2002. "Inventory Changes and Future Returns." *Review of Accounting Studies*, vol. 7, nos. 2–3 (June–September):163–187.

Xie, Hong. 2001. "The Mispricing of Abnormal Accruals." *Accounting Review*, vol. 76, no. 3 (July):357–373.