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ABSTRACT

An exclusive focus on bottom-line income misses important information about the quality of earnings. Accruals (the difference between accounting earnings and cash flow) are reliably, negatively associated with future stock returns. Earnings increases that are accompanied by high accruals, suggesting low-quality earnings, are associated with poor future returns. We explore various hypotheses -- earnings manipulation, extrapolative biases about future growth, and under-reaction to business conditions – to explain accruals' predictive power. Distinctions between the hypotheses are based on evidence from operating performance, the behavior of individual accrual items, and discretionary versus nondiscretionary components of accruals.

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Security analysts, firm managers, and investors all devote a great deal of attention to firms' reported earnings. Forecasts of earnings are widely disseminated in the financial press, and revisions in analysts' forecasts are closely followed. Managers are keenly interested in maintaining growth in earnings because their compensations are often tied to their firms' earnings. News that a firm has fallen short of earnings expectations can immediately send its stock price plummeting; firms that beat expectations, on the other hand, are handsomely rewarded by investors. With the advent of round-the-clock financial news reporting as well as expanded trading venues, the market's obsession with earnings performance is not likely to diminish.

The focus on earnings is so great that it has been suggested that the market fixates on firms' bottom line income, to the exclusion of other indicators of operating performance. Such single-minded attention fails to recognize that reported net income is the final result of an extended accounting process with considerable room for managerial discretion at every step. For example, accounting rules give some leeway with respect to the timing and measurement of revenues and expenses. Further, special items such as restructuring charges and write-offs can have large temporary effects on earnings. Given the heightened attention to accounting income, managers may have an incentive to be aggressive in applying accounting rules in order to maintain steady growth in earnings. Empirical evidence supporting the existence of managerial manipulation of earnings is provided in Degeorge, Patel and Zeckhauser (1999), and Teoh, Welch and Wong (1998a, 1998b).

More generally, there has been growing concern about firms' "quality of earnings," or the extent to which reported earnings reflect operating fundamentals. The financial press has noted managers' tendencies to put a good face on earnings, and the SEC has initiated a research program on earnings management. In the context of stock prices, to the extent that the market fixates on reported income and does not take into account the quality of firms' historical earnings, there may be temporary deviations of prices away from their correct values. Put another way, measures of earnings quality may have predictive power for future movements in stock prices.

If market participants can be accused of fixating on earnings, a similar charge might also apply to academic empirical research on stock returns. A large literature documents that firm characteristics based on accounting data help predict the cross-section of future stock returns. Few if any studies, however, venture beyond net income or cash flow (net income plus depreciation). In so doing, researchers may be making the

same mistake as investors in taking net income at face value and ignoring the underlying quality of earnings. As a result the existing literature may give an incomplete picture of the behavior of stock returns. To take an illustration, there is extensive evidence that an unexpected increase in earnings is associated with positive abnormal returns (Latane and Jones (1979), Foster, Olsen and Shevlin (1984), Bernard and Thomas (1989)). However, this association might be expected to vary, depending on whether the earnings surprise reflects a genuine improvement in profitability, or aggressive accounting by managers who are manipulating earnings. In this respect, adjusting net income to reflect the quality of earnings may be important.

One measure, accounting accruals, has recently gained attention as an important indicator of earnings quality that is useful for equity valuation. Accruals represent the difference between a firm's accounting earnings and its underlying cash flow. Large positive accruals indicate that earnings are much higher than the cash flows generated by the firm. The difference arises because of accounting conventions as to when, and how much, revenues and costs are recognized (the so-called "revenue recognition" and "matching" principles). Empirically, Sloan (1996), Houge and Loughran (2000) find that stocks with high accruals, signifying earnings are high relative to cash flows, subsequently have lower returns and under-perform stocks with low accruals.

One popular interpretation of this evidence equates accruals with managerial book-keeping mischief (see, for example, Abarbanell and Lehavy (2000)). Generally accepted accounting principles give firm managers some latitude in terms of the timing and magnitudes of revenues and expenses. As managers inflate earnings above cash flows, accruals rise. High accruals may reflect, for example, increases in accounts receivable as managers record sales prematurely, or decreases in current liabilities as managers understate liabilities such as warranty expenses. Since investors fixate on reported bottom-line income, they are temporarily fooled. This viewpoint has far-reaching consequences. It suggests, for instance, that it may be necessary to limit the amount of accounting discretion managers have, since investors apparently cannot unravel the valuation effect of reported earnings in a timely manner under current reporting standards.

Such an interpretation may be premature, however. There is some evidence in the literature that accounting accruals are above average for firms subject to enforcement actions by the SEC (see Dechow et al. (1996)). However, there is no documented evidence that managers deliberately manipulate earnings through

accruals for firms with high accruals in general. Rather, the predictive power of accruals may reflect other influences. Numerous variables influence the level of accruals. For example, accruals are driven by changes in working capital, which in turn tend to rise with sales. A high level of accruals, then, may be a reflection of strong past growth in sales. Some evidence from studies in psychology suggest that investors extrapolate past trends from short histories too far into the future (see, for example, the discussion in Shleifer (2000)). If this were the case, and investors overestimate future sales growth when pricing firms with high accruals, future returns are likely to turn out to be disappointing.

Another explanation is that the components that make up accruals contain information about operating performance but the market reacts to this information slowly. The components of accruals, such as changes in inventories, receivables, and payables are commonly used by security analysts as indicators of business conditions. A build-up of inventories, for instance, may suggest difficulties in generating sales or over-production. Similarly increases in payables may imply problems with paying suppliers, which may in turn be due to insufficient sales revenues or credit difficulties. There is evidence, moreover, that the market responds with a delay to the information in the overall earnings number (see, for example, Bernard and Thomas (1990), Chan, Jegadeesh and Lakonishok (1996)). Accordingly there may be a similarly slow response to the components contained in accruals. In this case the components of accruals may serve as early indicators of improvement or deterioration in operating performance.

It bears noting that the hypotheses are not mutually exclusive. When sales growth starts to slow, for example, managers may face mounting pressures to inflate earnings in order to meet analyst forecasts, thereby leading to an increase in accruals. These pressures may be all the stronger insofar as investors and analysts maintain exaggerated expectations about future profitability growth. At the same time, inventory may start to accumulate as sales flatten, and accounts receivable may rise as competitive pressures force firms to extend better credit terms, so accruals increase. In short, any stark distinctions between the hypotheses may be artificial, so an eclectic interpretation may be more appropriate.

This paper provides an in-depth examination of the predictive power of accruals for stock returns. We begin by checking whether future stock returns reflect information about the current quality of earnings (as proxied by accruals). Additionally, we examine various hypotheses — earnings manipulation, extrapolative

biases concerning future growth, or under-reaction to business conditions — to explain the predictive power of accruals. We sharpen the distinctions between these hypotheses by looking at the operating performance of firms with high and low accruals, and by examining the individual components of accruals (including accounts receivable, inventories and accounts payable). Some items give managers more discretion (for example, with regard to the timing of revenue recognition) so focusing on such items may highlight the effects of manipulation. Importantly, the predictions of the earnings management and under-reaction hypotheses differ for some components of accruals. Under the conventional interpretation that accruals solely reflect earnings manipulation, an increase in accounts payable is a favorable event because it reduces accruals. However increases in payables, to the extent that they signal difficulties in meeting payments, should be unfavorable from the standpoint of the underreaction hypothesis.

As another way to discriminate between the hypotheses, we decompose accruals into nondiscretionary and discretionary components based on sales growth. An increase in sales may, for instance, give rise to an increase in inventories and accounts receivable, thereby raising the nondiscretionary component of accruals. If extrapolative biases are boosting investor valuations of firms with high accruals, the nondiscretionary accrual component should do well in predicting future returns. On the other hand, the manipulation hypothesis and delayed reaction hypothesis suggest no role for nondiscretionary accruals; only the discretionary component of accruals should predict future returns.

These are our main findings. Accruals are reliably, negatively related to future stock returns. Firms with high current accruals experience a sudden, large increase in accruals over the prior year, accompanied by a substantial deterioration in cash flows. The high accrual years mark a turning point in the fortunes of these firms. The high accrual firms exhibit high levels of past earnings and sales growth. These companies continue to report growing earnings even as accruals are high and only in the subsequent year do earnings show signs of deterioration. Accordingly, the time series behavior of accruals and operating performance for firms with the largest accruals gives strong hints that managers are manipulating earnings, and the market is initially misled.

However, two pieces of evidence suggest that the manipulation hypothesis may not be the only explanation for the predictive power of accruals. First, the predictive power of one accrual item, changes in

accounts payable, does not fit the manipulation hypothesis. A decrease in accounts payable lowers accruals and hence, under the conventional interpretation, suggests future returns are low. In fact, however, a decrease in accounts payable is associated with relatively high future returns. This finding suggests that accounts payable, at least, serves as an early indicator of changes in firms' business conditions which seems to be partially ignored by investors. Second, the general perception is that accounts receivable are at least as easy to manipulate as inventories. However, changes in inventory are by far the most important component of accruals for predicting future returns, with changes in accounts receivable and accounts payable tied for second place.

We find that the non-discretionary component of accruals, which we construct by extrapolating past trends in sales growth and accruals, does not predict future returns. Only the discretionary components of accruals, and accounts receivable, inventory and accounts payable predict returns. Therefore, the extrapolation hypothesis is unlikely to explain the predictive power of accruals.

In a larger context beyond why accruals predict returns, our results suggest that the quality of earnings matters. When an increase in earnings is accompanied by high accruals, suggesting low-quality earnings, subsequent stock returns are sub-par. Notably, in a two-way classification, the marginal contribution of accruals in predicting returns exceeds the contribution of earnings surprises.

The rest of the paper is organized as follows. Section 1 describes the sample and helps to motivate the importance of earnings quality through a simple two-way classification. Section 2 documents the accrual effect. Various hypotheses as to why accruals predict returns are explored in section 3. The results from cross-sectional regressions are reported in section 4. Section 5 concludes.

I. Preliminaries

A. Sample and methodology

The sample comprises all firms listed on the New York (NYSE), American (AMEX) and Nasdaq markets which are covered on both the Center for Research in Security Prices (CRSP) file as well as the Compustat files (current and research). We consider only domestic, primary stocks so closed-end funds, investment

trusts, units and foreign companies are excluded. Following related accounting studies in this area, financial firms (with SIC codes 6000–6999) are dropped from the sample.[1]

We follow Sloan (1996) and measure accruals as:

$$\begin{aligned} Accruals &= \Delta CA - \Delta CL - DEP \\ &= (\Delta AR + \Delta INV + \Delta OCA) - (\Delta AP + \Delta OCL) - DEP. \end{aligned} \quad (1)$$

ΔCA is the change in non-cash current assets, given by the change in current assets (Compustat annual data item 4) less the change in cash (item 1). ΔCL is the change in current liabilities excluding short-term debt and taxes payable, given by the change in current liabilities (item 5) minus the change in debt included in current liabilities (item 34) and minus the change in income taxes payable (item 71). DEP is depreciation and amortization (data item 14). The components are further defined as ΔAR the change in accounts receivable (item 2); ΔINV the change in inventories (item 3); ΔOCA the change in other current assets (item 68); ΔAP the change in accounts payable (item 70); and ΔOCL the change in other current liabilities (item 72). As the magnitudes of all these items vary with the overall size of the firm's balance sheet, we follow the accounting literature and scale each item by average total assets (the average of total assets, Compustat data item 6, at the beginning and end of the fiscal year). Since we are interested in firms' operating performance we focus on profitability before financing costs and taxes. Our measure of earnings is thus operating income after depreciation (before interest expense, taxes and special items), corresponding to Compustat annual data item 178.

We measure all variables at the end of April each year from 1971 to 1995.[2] We assume that there is a four-month delay between the end of a firm's fiscal year and when the accounting information becomes publicly known. All firms with available data are included in the sample, regardless of their fiscal year-ends. Table 1 summarizes the accounting variables. Panel A provides descriptive statistics on the components of working capital; panel B presents statistics on earnings, cash flow, accruals and the individual accrual

[1]To mitigate return measurement problems with small, low-priced stocks we exclude any stock trading at a price below $5 that falls in the bottom three deciles of market capitalization, based on NYSE breakpoints.

[2]Our analysis begins in 1971 because prior to that year there are fewer than 400 firms with available data on the required accounting items.

items.[3]

Accruals comprise the changes in various working capital accounts, so to give some perspective we begin by examining the underlying working capital items in panel A. Current assets is the dominant item, representing 47.1 percent of total assets for the median firm. Accounts receivable and inventory make up the bulk of current assets, with each item accounting for more than 20 percent of total assets for a typical firm.

Panel B provides information on the individual accrual items. The largest accrual item is depreciation, but it displays little variability across firms, as evidenced by the low standard deviation. The items that contribute most to differentiating accruals across firms are changes in accounts receivable and changes in inventory. The standard deviation of each of these items exceeds 7 percent. Total accruals displays large cross-sectional variability, with a standard deviation of 10.2 percent. This variability is close in magnitude to the average level of earnings (as a percent of total assets). The implication, then, is that changes in accruals that may not appear unusual can lead to substantial changes in reported earnings.

B. The importance of earnings quality

To help motivate the remainder of the paper, we first examine the potential importance of looking beyond the bottom-line earnings number and considering accruals as well. The cross-sectional predictive power of earnings surprises for future returns is widely documented (see, for example, Bernard and Thomas (1989), Chan, Jegadeesh and Lakonishok (1996)). However, it may not be meaningful to compare firms with large and small earnings surprises without some adjustment to separate cases where firms are improving their underlying cash flow performance from cases where they may be "cooking the books". Table 2 checks whether we can refine the predictive power of earnings surprises for returns by taking into consideration accruals as a (crude) measure of the quality of earnings.

In Table 2 stocks are assigned to portfolios on the basis of a two-way classification. Stocks are grouped at the end of each April over the sample period into one of five categories based on earnings surprise. Our indicator of earnings surprise is the change in earnings from a year ago, relative to average total assets.[4] At

[3]Each year we calculate the percentiles of the distribution across all firms in the sample that year. The quartiles reported in Table 1 are the simple means of these statistics over all years in the sample period.

[4]At each portfolio formation date current earnings is the earnings number as of the most recently ended fiscal year, assuming a

the same time stocks are independently classified into quintile groups based on accruals relative to average total assets. The intersection of these two classifications gives twenty five categories; stocks are equally-weighted within each group.

We report annual buy-and-hold returns and abnormal returns for each portfolio in the first year after portfolio formation. Size and book-to-market adjusted abnormal returns are computed as follows. Each April we calculate quintile breakpoints for size (market value of equity) based on NYSE stocks. Since the bottom quintile of firms contains a disproportionately large number of firms (mostly Nasdaq stocks) we break this group out into two categories (the first and second decile of the distribution of firm size). Accordingly there are six categories by firm size. Independently we calculate quintile breakpoints for the ratio of book-to-market value of equity. The intersection of these two classifications gives thirty groups. We calculate buy-and-hold returns for equally-weighted portfolios of the stocks within each group. Based on where a stock falls given the size and book-to-market breakpoints, it is assigned one of these portfolios as a control. The abnormal return for a stock is the difference between its raw return and the return of the control portfolio.

In line with results from previous studies, a measure of earnings surprise predicts stock returns. To assess the marginal contribution of earnings surprise, we calculate the spread in returns between the top and bottom quintiles by earnings surprise for each of the five categories of accruals. The spreads are reported in the last row of each panel in Table 2. The average spread in abnormal returns is 4.2 percent per year. Importantly, the marginal contribution of accruals is larger. From the last column in panel B, the spread in abnormal returns between the top and bottom quintiles by accruals averages 6.2 percent. Even when the earnings surprise is most favorable and one expects positive abnormal returns on the basis of prior research, abnormal returns turn out to be negative if accruals are high. When accruals are high, abnormal returns are negative across all categories of earnings surprise. Holding fixed earnings surprise, returns become more disappointing as accruals rise. To summarize, the evidence in Table 2 suggests that the market may be temporarily misled by ignoring information about the quality of earnings, as proxied by accruals.

four-month publication delay.

II. The accrual effect

A. Accruals and stock returns

Table 3 examines the characteristics and returns of stocks classified by accruals. At the end of April each year, we rank stocks by accruals relative to average total assets and assign them to one of ten equal-sized portfolios. Annual buy-and-hold returns and abnormal returns for these equally-weighted decile portfolios are calculated for each of the three years following portfolio formation.[5]

Panel A of Table 3 describes the average levels of accruals, cash flows, earnings and accrual components for the decile portfolios (all measured as of the portfolio formation date). In the portfolio of the highest-ranked stocks, accruals average 18.9 percent of total assets while in the portfolio of lowest-ranked stocks accruals are -16.2 percent of total assets. Accruals are positively correlated with earnings, but negatively correlated with cash flow. Earnings relative to total assets are 17.6 percent for the top decile portfolio, but only 7.1 percent for the bottom decile portfolio. Despite their very high earnings, firms in the top decile portfolio generate negative cash flows because of high accruals. The firms in the bottom decile portfolio, on the other hand, produce substantial cash flows in spite of their low earnings due to their negative accruals.

Panel B shows that firms with high accruals tend to be growth stocks with low book-to-market ratios. Further, they have performed well in the past: growth in sales averages 22.8 percent per year in the three years leading up to portfolio formation. Panels C and D provide additional evidence on the superior past performance of the firms ranked highest by accruals. The average stock return on this group is 35.9 percent per year over the three prior years, and past abnormal returns are large.[6] However, the extraordinary past

[5] If a stock is delisted in a year subsequent to portfolio formation, we use the return on the CRSP value-weighted return from that point on until the end of the holding period. At the beginning of the next holding period we rebalance all remaining stocks in the portfolio to equal weights and compute returns for the following year.

[6] Recall that, in order to mitigate problems with extreme returns in the years following portfolio formation, we exclude from our sample any stock which in the portfolio formation year is priced below $5 and which falls in the bottom three deciles of market capitalization based on NYSE stocks. This exclusion rule tends to drop firms that have had poor past returns, so the overall average return across the ten portfolios in the pre-formation period tends to be higher than the overall mean return in the post-formation years. Nonetheless, when all stocks are included it is still the case that the high-accruals portfolio tends to have superior past performance.

stock price performance is mainly driven by the large returns three and two years before portfolio formation. One year prior to portfolio formation, their returns, while above average, are less stellar. The rise in accruals for this portfolio, at the same time that its performance undergoes a relative slowdown, is not inconsistent with the idea that managers manipulate earnings to maintain favorable investor sentiment. Further, the lofty valuations of the firms with large positive accruals probably provides managers with an added incentive to manipulate earnings in order to maintain earnings growth and avoid negative earnings surprises.

Past studies (see, for example, Jegadeesh and Titman (1993), Chan, Jegadeesh and Lakonishok (1996)) document continuations in price trends over intermediate horizons. On this basis the above-average past returns of the portfolio with high accruals suggests that returns should continue to be relatively high in the year following portfolio formation. To the contrary, in the first post-formation year the top decile portfolio has an average return of only 9 percent (the overall return in the first year averaged across all the decile portfolios is 15.6 percent). The lowest-ranked decile portfolio has an average return of 17.8 percent, so that the return differential between the low- and high-accruals portfolios is 8.8 percent (the 't'-statistic for the difference is 3.79). However much of the difference in returns stems from the relatively poor performance of the high-accruals portfolio. The spread in return between the second and ninth decile portfolios, for example, is only 3.8 percent. Average returns continue to be disappointing for the high-accruals portfolio in the second and third years after portfolio formation.

The portfolio returns after adjusting for size and book-to-market effects (Panel D of Table 3) tell the same story as the raw returns. Mean abnormal returns differ by 7.4 percent between the low- and high-accruals portfolios in the first post-formation year. The bulk of the difference is due to the low abnormal return on the high-accruals portfolio (-4.7 percent). In comparison, the abnormal return for the low accrual portfolio is relatively small (2.6 percent). The differences in the abnormal returns across the extreme decile portfolios may stem from differences in the incentives to manipulate earnings upward or downward. In particular, if managers are manipulating earnings, they are more likely to inflate earnings than to decrease or smooth earnings through manipulation. As a result, the potential impact of manipulation on returns may be more apparent in the portfolio with high positive accruals. In summary, accruals predict future returns, although the effect is largely driven by the poor performance of the portfolio with the highest accruals, where the

incentive to manipulate earnings may be the strongest.

B. Operating Performance

To get some insight into the reasons behind the large divergence between earnings and cash flows, we examine the portfolios' operating performance before and after portfolio formation. Figure 1 plots selected balance sheet items and operating performance measures for the extreme deciles over the five years before and after portfolio formation. The underlying statistics are provided for all decile portfolios in Appendix Table A1.

At the portfolio formation year-end, average accruals for the highest-ranked portfolio are 18.9 percent of assets. In comparison, this portfolio's average accruals are less than 6 percent of assets in the other pre-formation years. Accruals in the case of the lowest-ranked decile portfolio behave similarly, only in the opposite direction. Two items are chiefly responsible for the sudden change in accruals: inventories and accounts receivable. By their nature, accruals should be mean-reverting. Inventories and accounts receivable may rise temporarily as business conditions deteriorate, for example. However, it is unlikely they will continue climbing for several successive years, once production and marketing decisions are adjusted. Similarly, if managers manipulate earnings by recognizing revenues prematurely, current accruals rise but there will be some accompanying decline in future accruals. Figure 1 confirms that the extreme accruals are quickly reversed in the year after portfolio formation, and the pattern in the post-formation period is similar to the pre-formation period.

There are several possible explanations for the changes in accruals. Accruals may grow if managers expect sales to grow in the near future. For instance, managers may build up inventory in anticipation of large increases in future sales. However, the performance of sales in the post-formation period for the top decile portfolio does not seem to warrant such expectations. In fact, sales relative to assets (sales turnover) drops in the first post-formation year, and continues to decline over the subsequent years. In short, it is unlikely that these firms were building up inventory to meet growing demand.

It is likely that changes in current business conditions, or managerial manipulation of earnings, account for the sudden jump in accruals for the top decile portfolio. A deterioration in business conditions, for

example, may initially result in an increase in inventory because sales increase by less than expected. In the same vein, competitive pressures may compel firms to offer more attractive credit terms to support sales, thereby raising accounts receivable. Figure 1 and Table A1 confirm that the business conditions facing firms with high accruals worsen in the years after portfolio formation. However, the timing of the slowdown in sales and earnings (relative to total assets) seems to occur one year after the jump in accruals, rather than contemporaneously. The delay raises the suspicion that managerial manipulation may be contributing to the jump in accruals during the portfolio formation year. Managers may have seen signs of weakness in sales over the year leading up to the portfolio formation date, and they attempt to delay its impact on the bottom line. In particular, managers have considerable latitude as to when expenses or revenues are recognized. To avoid a disappointing earnings report, for example, managers may delay writing off obsolete inventory or allocate more overhead to inventory. This results in an inflated valuation of inventory and at the same time a reduction of expenses, and hence higher reported earnings. Similarly, some of the growth in sales in the portfolio formation year may be due to managers' booking revenues before the sales are completed.

In any event, the upshot from Figure 1 is that an improvement in earnings when accompanied by an increase in accruals (and hence a reduction in cash flow) is an early warning sign of deterioration in future operating performance. The decline in operating performance is accompanied by sub-par stock returns (Table 3).

The operating performance of firms with low accruals also reveals an interesting pattern, although any evidence of manipulation here is somewhat less apparent. The popular belief is that firms store some earnings in the form of accruals in good years so that they can tap into such earnings in bad times. For example, firms may be more aggressive in writing off bad debt and obsolete inventory at times when the bottom line earnings number offers sufficient cushion to absorb such write-offs. However, the firms with the lowest accruals have declining sales and earnings over the period prior to portfolio formation. Earnings relative to assets and the gross margin hit their lowpoints in the portfolio formation year, so this is not a particularly opportune moment to store earnings through accruals. Rather, it may be the case that these firms reduce their earnings in the formation year when they see light at the end of the tunnel and signs that their fortunes will rebound in the near future. Cutting earnings even more enables them to show subsequent improvements

in the bottom line numbers that the market does not seem to anticipate fully at the portfolio formation year.

III. Understanding the predictive power of accruals

A. The components of accruals

Relating total accruals to future stock returns provides limited opportunities to distinguish between the competing explanations for accruals' predictive power. One way to focus our tests is to look at the components of accruals. For example, some items may be more susceptible to managerial manipulation than others, while other components may be better indicators of past or future business conditions. Importantly, in the case of an increase in accounts payable the manipulation hypothesis and the underreaction hypothesis yield very different predictions. On the one hand, an increase in accounts payable may be an early warning sign of deterioration in cash flow and hence signals poor stock price performance in the future. Under the conventional belief that changes in accruals connote manipulation, however, a rise in accounts payable lowers current accruals and is perceived as transferring current earnings to the future. Insofar as investors interpret this as a negative shock to current earnings and do not recognize the impact on future earnings, the future stock price performance should be favorable as future earnings recover.

Table 4 reports returns on portfolios sorted by each component of accruals. With the exception of changes in other current liabilities, each component reliably predicts raw and abnormal returns at least over the first year following portfolio formation. The accrual component that is associated with the largest spread in returns over the post-formation period is changes in inventory (panel B). The mean raw return over the first post-formation year for the portfolio ranked lowest by ΔINV is 19 percent, compared to 9.5 percent for the highest-ranked portfolio, for a spread of 9.53 percent. The spread in average abnormal returns is 7.2 percent. These are comparable to the spreads associated with total accruals. In Table 3, the corresponding spreads are 8.8 percent and 7.4 percent for raw and abnormal returns, respectively.

ΔINV may signal unanticipated changes in a firm's future prospects. For example, in many macroeconomic models, changes in aggregate inventory are a negative leading indicator of future economic conditions. On the other hand, it is possible to manipulate earnings through ΔINV. For example, managers

may not be fully writing off obsolete items in their inventories, or they may be allocating more overhead expenses to inventory than to cost of goods sold.

In the first year after portfolio formation, changes in accounts receivable (panel A) are associated with a mean spread in raw returns of 5.4 percent, or 3.1 percent for abnormal returns. Accountants and regulators suggest that overstating revenues, or recognizing revenues prematurely, are common ways to manipulate earnings. Accounts receivable may also be increasing because as sales flatten and business conditions worsen, firms are compelled to offer more generous credit terms to hold on to customers.

Changes in accounts payable (panel D) provide a sharp means to discriminate between two of our hypotheses. In panel D, the sort by ΔAP indicates that the extreme decile portfolios' future performance does not mesh with the conventional notion that identifies accruals with managerial manipulation. Specifically, over the post-formation period it is the highest ranked decile portfolio that has relatively poor returns while the lowest ranked portfolio does not underperform. The top decile portfolio's abnormal return is -3.1 percent in the first post-formation year while the bottom decile portfolio's abnormal return is 2.6 percent. Averaging over the three post-formation years, the average abnormal returns for the top and bottom decile portfolios are -2 percent and 0.7 percent per year, respectively. The positive spread in returns between the bottom and top decile portfolios ranked by changes in accounts payable is consistent with investors being slow to impound changing business conditions into stock prices. For instance, when a company's business prospects deteriorate, accounts payable may rise because the firm has difficulties in meeting payments.

In summary, inventory changes are the dominant component of accruals for predicting returns. Changes in accounts receivable and accounts payable also have some predictive power. However, the negative association between accounts payable changes and future returns is hard to square with the conventional presumption that accruals reflect managerial manipulation of earnings.

B. The role of nondiscretionary and discretionary accruals

As business conditions such as sales vary across firms, so do working capital requirements and thereby the level of accruals. Controlling for the effects of business conditions may help tease out more clearly the role of managerial discretion in using accruals to manipulate earnings. In this section we implement this

idea by decomposing the level of accruals into nondiscretionary and discretionary components. The nondiscretionary component captures the impact of business conditions while the discretionary portion reflects managerial choices. Our strategy parallels other approaches in the accounting literature for distinguishing between non-discretionary and discretionary accruals (see Jones (1991)).

Few firms have sufficiently long time series to permit reliable estimation of a regression model to extract the discretionary portion of accruals. Instead we rely on a parsimonious model. For each of the underlying working capital items except depreciation, we relate its level, Acc_{it}, for firm i in year t, to its current sales, $Sales_{it}$, as follows:

$$E_t(Acc_{it}) = \frac{\sum_{k=1}^{5} Acc_{it-k}}{\sum_{k=1}^{5} Sales_{it-k}} Sales_{it}. \tag{2}$$

The nondiscretionary part of the accrual component, NDA_{it} is then given by

$$NDA_{it} = E_t(Acc_{it}) - Acc_{it-1}, \tag{3}$$

while the discretionary part, DA_{it} is

$$DA_{it} = Acc_{it} - E_t(Acc_{it}). \tag{4}$$

Equation (2) models the level of each underlying working capital account as a relatively stable proportion of firm sales. The model reflects the idea that working capital requirements are closely related to sales. To smooth out transitory fluctuations in this relation we estimate the proportion as the ratio of a moving average of the past five years of the account to a moving average of the past five years of sales. The discretionary component of this account is then the difference between the actual level and its fitted level from equation (2).

Stocks are sorted into decile portfolios by discretionary accruals in panel A, and nondiscretionary accruals in panel B of Table 5. In terms of the return spreads between the lowest- and highest-ranked decile portfolios, the sort by discretionary accruals comes close to matching the performance of the sort by total accruals. In panel A, the return spread between the extreme deciles is 7.8 percent in raw returns (7.4 percent in abnormal returns) over the first post-formation year. The spreads corresponding to the classification by total accruals are 8.8 and 7.4 percent for raw and abnormal returns, respectively. Very large changes in

working capital in any year are likely to reflect instances of managerial discretion, so the extreme portfolios in the sort by accruals should also do well in detecting the impact of manipulation. What is more telling is how well discretionary accruals spread out the returns for the other, intermediate, portfolios. For example, the second and ninth decile portfolios have a spread in abnormal returns over the first subsequent year of 5.6 percent based on discretionary accruals, compared to 2.5 percent based on total accruals.[7]

One explanation for the returns on firms with high accruals is that investors regard such firms as enjoying superior sales growth in the past and form exaggerated expectations about future growth. Panel B indicates that there is essentially no association between nondiscretionary accruals and future returns. This evidence is not consistent with the hypothesis that firms with large accruals represent instances of overvaluation because of biases in investors' expectations about future growth.

Table 6 examines the predictive power of individual components of accruals, in terms of their discretionary and nondiscretionary values. For the sake of brevity we report differences in the returns (raw and abnormal) between the extreme decile portfolios. Since Table 4 indicates that changes in three accounts — inventory, accounts receivable and accounts payable — account for the bulk of the predictive power of accruals, we limit attention to these items.

The results from Table 6 echo those in the earlier tables. For instance, the discretionary component of inventory changes is associated with the largest spreads in future abnormal returns. The difference in the first post-formation year between the extreme decile portfolios is 9.1 percent in terms of abnormal returns. Discretionary increases in accounts payable are associated with lower future returns, counter to the managerial manipulation hypothesis, but in line with the market underreaction hypothesis. For both inventory and accounts payable, the nondiscretionary portion induces almost no difference in returns.

Information on that part of accruals which is predictable from past sales, or discretionary accruals, would appear to be easily available to sophisticated investors and analysts. Accordingly it would stretch credulity if returns are systematically related to discretionary accruals. In this respect our finding that future returns

[7] Many related studies in the accounting literature use the Jones (1991) model to decompose accruals into discretionary and nondiscretionary components. In additional, unreported, work we replicate our results with the Jones (1991) model. Compared to the Jones decomposition, our approach based on past sales generally yields larger spreads in future returns and a more monotonic pattern across the decile portfolios' returns.

are related only to discretionary accruals provides some reassurance that the accrual effect is not entirely spurious.

IV. Cross-sectional regressions

A. Accrual regressions

As another way to determine the impact of the individual accrual items we carry out monthly cross-sectional regressions. Table 7 reports the time-series averages of the regression slopes together with their 't'-statistics. The dependent variable in each regression is the annual abnormal return for individual stocks. Panel A presents results based on raw accruals, and panel B gives results for discretionary accruals.

Regression (1) in panel A confirms a negative and significant relation between raw accruals and future abnormal returns. The slope coefficient for accruals averages -0.2627 (with a 't'-statistic of -4.14). In the univariate regressions for the individual accrual items the slope coefficients are also negative and significant. When all three accrual components — changes in accounts receivable, inventories and accounts payable — are included (regression (5)) the item with the largest predictive power is inventory changes. The average slope for ΔINV is -0.2661, and it is almost as large as the slope for accruals by itself in the first regression. Notably, the average slope for changes in accounts payable is always negative in panel A, although it is not statistically significant in regression (5).

The results for discretionary accruals in panel B generally tell a similar story. For example the average slope for discretionary accruals is -0.2419 (with a 't'-statistic of -5.20) in regression (6), and the average slope for discretionary changes in inventory is -0.3259 (with a 't'-statistic of -4.55) in regression (10).

B. Portfolio results based on return prediction models

Regardless of why items like changes in inventory or accounts payable predict returns, there is no reason to think that a catchall measure like total accruals best summarizes the information in these predictors. Parsimony compels us to look at a short list of variables, but the specific linear combination of these variables defined as accruals may not necessarily be the most informative indicator of manipulation or future business

conditions. Indeed, the negative association between accounts payable and future returns strengthens the suspicion that it may be possible to improve on the accrual measure. In particular slopes from regression models such as those in Table 7 can be interpreted as weights for constructing alternative indicators. In this section we see if measures constructed in this fashion turn out to be more informative than considering accruals only. We do this by implementing a trading strategy based on predicted returns from the models, and examining whether the predictions from the models spread out returns more than do accruals.

We consider four return prediction models. In model 1, the predictor is accruals, so all the individual accrual components (depreciation and changes in: inventories, accounts receivable, accounts payable, other current assets, and other current liabilities) enter the regression. Model 2 uses the discretionary components of these same items, as given by equations (2) and (4). Model 3 uses as predictors changes in: inventories, accounts receivable and accounts payable. The discretionary components of these three variables serve as the predictors in model 4. At each year-end we take a rolling average of the estimated coefficients from all the prior years' cross-sectional regressions and use these as the parameters in the prediction model. Based on the predicted return from the model, stocks are ranked and grouped into one of ten portfolios. Buy-and-hold raw returns and abnormal returns for the ten equally-weighted portfolios are then calculated over the subsequent year.[8]

Table 8 reports the mean returns for the portfolios. Recall that the sort by accruals generates a return differential of 8.8 percent in raw returns and 7.4 percent in abnormal returns between the extreme deciles over the first subsequent year. This performance is roughly matched by all the models in Table 8. For example, the predictive model (1), which is based on all the individual accrual items, yields a spread of 8.3 percent for raw returns, and 7 percent for abnormal returns between the extreme deciles. Economic intuition suggests that the nondiscretionary portion of accruals should not help to predict returns, so a strategy that excludes this component should do better. Model (2), which is based on the discretionary portion of the individual accrual items, confirms this logic. The spread in raw returns (abnormal returns) is 8.9 percent

[8]To start the trading rule at the beginning of the sample period, we use the average coefficients from the first five years' cross-sectional regressions to generate predicted returns. Returns earned from the trading strategies are calculated from the sixth year onward. This ensures that there is no look-ahead bias.

(8.8 percent).

Compared to a trading rule based on total accruals, rules based on models (3) and (4), which use only three accrual items — changes in inventory, accounts receivable and accounts payable — compare favorably. The difference, however, is that models (3) and (4) allow for a negative predictive relation between accounts payable changes and returns. In particular, the investment strategy based on model 4 yields the largest return spread (9.7 percent in raw and abnormal returns). This model predicts returns based on discretionary values of ΔINV, ΔAR, and ΔAP.

V. Summary and conclusions

A firm's "bottom-line" earnings number has traditionally been the focus of analysts, investors and researchers, while other financial statement items have generally been overlooked. This paper provides evidence suggesting that a broader set of information from financial statements may have rich predictive power for stock returns. In particular, there is a reliable, negative association between accruals (the difference between accounting earnings and cash flows) and future stock returns. Importantly, the behavior of accruals throws a different light on the well-documented relation between earnings surprises and stock returns. Increases in earnings, when accompanied by high accruals, are associated with sub-par returns. In this regard, accruals may provide information about the quality of earnings.

The bulk of the predictive power of accruals stems from changes in inventory. Changes in accounts receivable and accounts payable also have strong predictive power. Notably, following an increase in accounts payable, which would tend to lower accruals and predict higher returns on this basis, future returns are disappointing.

There are at least three possible explanations for why accruals predict stock returns. Under the conventional interpretation, high accruals smell of earnings manipulation by managers. On the other hand accruals may serve as leading indicators of changes in a firm's prospects, without any manipulation by managers. Accruals may also predict returns if the market views accruals as reflecting past growth, and extrapolates such growth to form expectations about future performance.

The time series behavior of accruals and the performance characteristics of firms with high accruals suggest that managers are manipulating earnings. In particular, we find that a large increase in accruals marks a sharp turning point in the fortunes of a company. A firm that looked dazzling (with high stock returns and high earnings growth) in the years preceding the rise in accruals suddenly appears to lose steam. Earnings in subsequent years, along with stock prices, tumble. Intriguingly, in the year when accruals are high and possibly signal that the company is falling on harder times, earnings show no weakness but continue to grow rapidly. These patterns suggest that firms with high accruals already face symptoms of adverse changes in their fortunes, but they use creative accounting to delay reporting the bad news.

Not surprisingly, the firms with the highest accruals also tend to display increases in accounts receivable, accounts payable, and inventories. We find that changes in accounts receivable and inventory are negatively related to future returns. These results are consistent with both the earnings manipulation hypothesis and the delayed reaction hypothesis. We find that changes in accounts payable are also negatively related to future returns, which runs counter to the conventional notion that the predictive power of accruals is mainly due to managerial manipulation. Rather, it suggests that at least this accrual item helps signal future business prospects. For example, an increase in accounts payable can signify a weakening financial situation that induces firms to delay payments to suppliers.

In summary the underreaction hypothesis can account for the differences in returns across portfolios sorted by each of the various accrual items. The manipulation hypothesis can also account for the spreads associated with all the individual accrual items except changes in accounts payable. As far as the amount of managers' accounting discretion is concerned, the general perception is that it is relatively easy to manipulate earnings by booking revenues prematurely. On this basis, accounts receivable should be a stronger indicator of manipulation than inventory. However, changes in accounts receivable do not predict returns as well as inventory changes, which are associated with the largest return spreads. Our results thus suggest that the two hypotheses are not mutually exclusive.

We also sharpen our tests by decomposing accruals into discretionary and nondiscretionary components. The discretionary component, which may be a better reflection of managerial discretion in determining accruals, is the main contributor to the predictability in returns. The accounting literature generally tends to

regard discretionary accruals as being an indicator of managers' attempts to manipulate earnings. Nondiscretionary accruals, on the other hand, do not help to predict returns, contrary to the hypothesis that high-accrual firms tend to be overvalued because of exaggerated expectations about future growth.

Regardless of the sources of accruals' predictive power, a simple catchall measure such as accruals may not be the most informative indicator of earnings manipulation or changes in business conditions. Accordingly we develop a model based on the components of accruals to predict future returns. This model does better in spreading out returns than the simple accrual measure. A small number of discretionary accrual items, which seem to represent a combination of influences, including managerial manipulation of earnings and early signs of changes in business conditions (through accounts payable changes), contain information about the cross-section of future returns.

References

Abarbanell, Jeffrey, and Reuven Lehavy, 2000, Biased forecasts or biased earnings: The role of earnings management in explaining apparent optimism and inefficiency in analysts' earnings forecasts, working paper, University of North Carolina.

Bernard, Victor L., and Jacob K. Thomas, 1989, Post-earnings-announcement drift: Delayed price response or risk premium?, *Journal of Accounting Research (Supplement)* 27, 1–36.

Chan, Louis K. C., Narasimhan Jegadeesh, and Josef Lakonishok, 1996, Momentum strategies, *Journal of Finance* 51, 1681–1713.

Dechow, Patricia, Richard Sloan, and Amy Sweeney, 1996, Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC, it Contemporary Accounting Research 13, 1–36.

Degeorge, François, Jayendu Patel, and Richard Zeckhauser, Earnings management to exceed thresholds, *Journal of Business* 72, 1–33.

Foster, George, Chris Olsen, and Terry Shevlin, 1984, Earnings releases, anomalies, and the behavior of security returns, *The Accounting Review* 59, 574–603.

Houge, Todd, and Tim Loughran, 2000, Cash flow is king: Cognitive errors by investors, *Journal of Psychology and Financial Markets*, forthcoming.

Jegadeesh, Narasimhan, and Sheridan Titman, 1993, Returns to buying winners and seling losers: Implications for stock market efficiency, *Journal of Finance* 48, 65–91.

Jones, Jennifer J., 1991, Earnings management during import relief investigations, *Journal of Accounting Research* 29, 193–228.

Latane, Henry A., and Charles P. Jones, 1979, Standardized unexpected earnings 1971–1977, *Journal of Finance* 34, 717–724.

Shleifer, Andrei, 2000, Inefficient markets: An introduction to behavioral finance, Oxford University Press.

Sloan, Richard G., 1996, Do stock prices fully reflect information in accruals and cash flows about future earnings?, *Accountng Review* 71, 289–315.

Teoh, Siew Hong, Ivo Welch, and T. J. Wong, 1998a, Earnings management and the long-run performance of initial public offerings, *Journal of Finance* 53, 1935–1974.

Teoh, Siew Hong, Ivo Welch, and T. J. Wong, 1998b, Earnings management and the underperformance of seasoned equity offerings, *Journal of Financial Economics* 50, 63–99.

Table I
Summary statistics

The sample comprises all domestic common stocks (except financial firms) on NYSE, Amex and Nasdaq with coverage on CRSP and Compustat, and with available data. Variables for each firm are measured as of the end of April each year from 1971 to 1995, assuming a reporting delay of four months from the end of the fiscal year. Panel A provides summary statistics for the components of working capital (each item is divided by average total firm assets). Panel B provides statistics for: ΔCA the change in non-cash current assets; ΔCL the change in current liabilities excluding short-term debt and taxes payable; DEP depreciation and amortization; ΔAR, change in accounts receivable; ΔINV, change in inventories; ΔOCA, change in other current assets; ΔAP, change in accounts payable; ΔOCL, change in other current liabilities. Accruals is defined as ($\Delta CA - \Delta CL - DEP$); earnings is measured as operating income after depreciation; cash flow is earnings minus accruals. All items are divided by average total firm assets.

Panel A: Components of working capital (relative to average total assets)

Variable	Mean	Standard deviation	25-th percentile	Median	75-th percentile
Current assets	0.459	0.238	0.269	0.471	0.631
Current liabilities	0.191	0.110	0.117	0.171	0.240
Accounts receivable	0.217	0.140	0.115	0.204	0.290
Inventory	0.218	0.170	0.064	0.203	0.331
Other current assets	0.024	0.028	0.008	0.016	0.030
Accounts payable	0.103	0.082	0.050	0.081	0.128
Other current liabilities	0.089	0.069	0.044	0.073	0.112

Panel B: Earnings, cash flow and accruals (relative to average total assets)

Variable	Mean	Standard deviation	25-th percentile	Median	75-th percentile
ΔCA	0.060	0.121	0.001	0.038	0.100
ΔCL	0.027	0.064	-0.001	0.018	0.047
DEP	0.045	0.028	0.027	0.039	0.055
ΔAR	0.030	0.073	-0.001	0.017	0.050
ΔINV	0.026	0.071	-0.002	0.010	0.046
ΔOCA	0.004	0.023	-0.001	0.002	0.007
ΔAP	0.014	0.045	-0.004	0.008	0.026
ΔOCL	0.013	0.038	-0.001	0.008	0.022
Accruals	-0.012	0.102	-0.064	-0.024	0.028
Earnings	0.121	0.126	0.070	0.117	0.176
Cash flow	0.133	0.141	0.075	0.137	0.202

Table 2
Returns for portfolios sorted by earnings change and accruals

The sample comprises all domestic common stocks (except financial firms) on NYSE, Amex and Nasdaq with coverage on CRSP and Compustat, and with available data. Stocks are ranked at the end of April each year into one of five groups by accruals (relative to average total assets) and independently by earnings change relative to average total assets. Earnings change is the difference between earnings for the most recently ended fiscal year (assuming a four-month reporting delay) and the prior year's earnings. The intersection of the two sorts gives twenty five portfolios. Equally-weighted buy-and-hold raw and abnormal returns on each portfolio in the first year following portfolio formation are reported in panels A and B respectively. A stock's abnormal return is its return in excess of a control portfolio matched by size and book-to-market.

Panel A: Raw returns

		Accruals relative to average total assets					
		1(Low)	2	3	4	5(High)	(1)-(5)
Earnings change relative to average total assets	1(Low)	0.158	0.152	0.138	0.101	0.096	0.062
	2	0.193	0.184	0.150	0.142	0.116	0.078
	3	0.213	0.184	0.166	0.174	0.117	0.096
	4	0.215	0.185	0.162	0.171	0.139	0.076
	5 (High)	0.170	0.170	0.164	0.153	0.120	0.050
	(5)-(1)	0.012	0.019	0.027	0.052	0.024	

Panel B: Abnormal returns

		Accruals relative to average total assets					
		1(Low)	2	3	4	5(High)	(1)-(5)
Earnings change relative to average total assets	1(Low)	-0.004	-0.009	-0.018	-0.054	-0.051	0.047
	2	0.034	0.026	-0.010	-0.015	-0.037	0.071
	3	0.056	0.028	0.011	0.018	-0.027	0.083
	4	0.066	0.032	0.010	0.020	-0.008	0.073
	5 (High)	0.026	0.035	0.021	0.005	-0.012	0.038
	(5)-(1)	0.030	0.045	0.038	0.059	0.039	

Accruals are defined as $\Delta CA - \Delta CL - DEP$ where ΔCA is the change in non-cash current assets; ΔCL the change in current liabilities excluding short-term debt and taxes payable; DEP is depreciation and amortization. Earnings is operating income after depreciation.

Table 3
Characteristics and returns for portfolios sorted by accruals

The sample comprises all domestic common stocks (except financial firms) on NYSE, Amex and Nasdaq with coverage on CRSP and Compustat, and with available data. At the end of April each year from 1971 to 1995, all stocks are ranked by accruals relative to average total assets and assigned to one of ten equally-weighted portfolios (assuming a reporting delay of four months from the end of the fiscal year). Average values of accruals, earnings and characteristics for each portfolio are presented in panels A and B. Average annual buy-and-hold returns are presented in panel C for each year from three years prior to portfolio formation to three years after formation, along with the difference between the bottom and top deciles and the 't'-statistic for the mean difference. Panel D reports average annual returns in excess of the return on control portfolios matched by size and book-to-market.

	1 (Low)	2	3	4	5	6	7	8	9	10 (high)
Panel A: Accruals and earnings										
Accruals	-0.162	-0.088	-0.063	-0.046	-0.030	-0.015	0.003	0.027	0.067	0.189
Cash flow	0.233	0.187	0.172	0.155	0.144	0.132	0.125	0.111	0.084	-0.013
Earnings	0.071	0.100	0.109	0.110	0.114	0.117	0.128	0.138	0.151	0.176
ΔCA	-0.056	-0.004	0.010	0.018	0.029	0.043	0.060	0.087	0.134	0.277
ΔCL	0.037	0.024	0.020	0.017	0.018	0.019	0.020	0.025	0.033	0.058
DEP	0.070	0.060	0.052	0.047	0.042	0.039	0.037	0.035	0.034	0.030
ΔAR	-0.024	0.001	0.007	0.011	0.015	0.021	0.029	0.041	0.063	0.130
ΔINV	-0.029	-0.006	0.000	0.005	0.011	0.018	0.027	0.041	0.063	0.134
ΔOCA	-0.003	0.001	0.002	0.002	0.003	0.003	0.005	0.006	0.008	0.013
ΔAP	0.012	0.010	0.009	0.008	0.009	0.010	0.011	0.014	0.019	0.039
ΔOCL	0.025	0.014	0.011	0.009	0.009	0.009	0.009	0.011	0.014	0.019
Panel B: Firm characteristics										
Log Size	4.12	4.63	4.86	4.88	4.95	4.83	4.64	4.43	4.19	3.88
Book-to-market	0.79	0.83	0.85	0.85	0.86	0.84	0.80	0.76	0.69	0.58
Average annual growth in sales over prior 3 years	0.072	0.076	0.088	0.093	0.099	0.104	0.108	0.126	0.157	0.228

Table 3 contd.

	1 (Low)	2	3	4	5	6	7	8	9	10 (high)	1-10	't'-stat
Panel C: Raw returns												
Three years before	0.113	0.140	0.151	0.159	0.169	0.185	0.191	0.224	0.281	0.376	-0.263	-8.34
Two years before	0.130	0.141	0.151	0.147	0.163	0.164	0.199	0.232	0.273	0.419	-0.289	-6.59
One year before	0.304	0.251	0.229	0.210	0.201	0.198	0.199	0.207	0.220	0.281	0.024	0.97
One year after	0.178	0.178	0.174	0.170	0.163	0.157	0.157	0.150	0.140	0.090	0.088	3.79
Two years after	0.157	0.165	0.177	0.179	0.170	0.155	0.156	0.157	0.137	0.097	0.060	3.76
Three years after	0.189	0.184	0.178	0.184	0.174	0.182	0.183	0.168	0.175	0.132	0.057	3.08
Panel D: Abnormal returns												
Three years before	-0.028	-0.004	0.010	0.014	0.024	0.041	0.049	0.084	0.142	0.243	-0.271	-9.20
Two years before	-0.002	0.003	0.013	0.008	0.024	0.026	0.057	0.093	0.139	0.294	-0.296	-7.21
One year before	0.150	0.094	0.072	0.055	0.042	0.044	0.048	0.057	0.072	0.143	0.007	0.35
One year after	0.026	0.024	0.023	0.017	0.009	0.007	0.003	-0.001	-0.001	-0.047	0.074	3.83
Two years after	0.004	0.009	0.018	0.019	0.010	0.001	0.006	0.006	-0.009	-0.041	0.044	2.97
Three years after	0.018	0.012	0.005	0.010	0.002	0.009	0.015	0.000	0.012	-0.025	0.043	2.48

Accruals are defined as $\Delta CA - \Delta CL - DEP$ where ΔCA is the change in non-cash current assets; ΔCL the change in current liabilities excluding short-term debt and taxes payable; DEP is depreciation and amortization. Individual components of accruals are also reported: ΔAR, ΔINV, ΔOCA, ΔAP, ΔOCL are the changes in accounts receivable, inventories, other current assets, accounts payable and other current liabilities, respectively. Earnings is operating income after depreciation, and cash flow is the difference between earnings and accruals. All the above items are divided by average total firm assets. Log size is the natural logarithm of market value of equity (im millions of dollars); book-to-market is the ratio of book to market value of equity; average annual growth in sales over the prior 3 years is the average of the value-weighted annual growth rate in sales of each portfolio over the three years prior to portfolio formation.

Table 4
Returns for portfolios sorted by accrual components

The sample comprises all domestic common stocks (except financial firms) on NYSE, Amex and Nasdaq with coverage on CRSP and Compustat, and with available data. At the end of April each year from 1971 to 1995, all stocks are ranked by a component of accruals relative to average total assets and assigned to one of ten portfolios (assuming a reporting delay of four months from the end of the fiscal year). Annual buy-and-hold returns are calculated over the subsequent year, as well as returns in excess of the return on a control portfolio matched by size and book-to-market. Average returns in each of the first to third years following portfolio formation ($R1$, $R2$, $R3$ respectively) and excess returns in each of the first to third post-formation years ($AR1$, $AR2$, $AR3$) on the equally-weighted decile portfolios are reported. Also reported is the difference between the bottom and top decile portfolios and the 't'-statistic for the mean difference.

	1 (Low)	2	3	4	5	6	7	8	9	10 (high)	1-10	't'-stat
Panel A: Ranked by change in accounts receivable												
R1	0.165	0.161	0.161	0.165	0.170	0.175	0.156	0.151	0.142	0.112	0.054	2.66
R2	0.168	0.164	0.172	0.157	0.153	0.172	0.160	0.151	0.144	0.112	0.056	2.94
R3	0.183	0.186	0.192	0.177	0.173	0.175	0.181	0.177	0.165	0.140	0.043	2.78
AR1	0.006	0.005	0.007	0.012	0.021	0.023	0.007	0.005	-0.001	-0.025	0.031	2.23
AR2	0.004	0.001	0.009	0.003	0.000	0.018	0.010	0.002	0.001	-0.024	0.028	2.10
AR3	0.003	0.007	0.019	0.007	0.004	0.007	0.012	0.010	0.002	-0.015	0.018	1.17
Panel B: Ranked by change in inventory												
R1	0.190	0.174	0.176	0.163	0.158	0.154	0.161	0.155	0.133	0.095	0.095	4.63
R2	0.165	0.172	0.168	0.158	0.160	0.167	0.163	0.150	0.139	0.110	0.055	3.45
R3	0.182	0.185	0.177	0.189	0.164	0.178	0.181	0.180	0.167	0.144	0.038	2.06
AR1	0.029	0.014	0.023	0.014	0.012	0.005	0.011	0.006	-0.011	-0.043	0.072	4.34
AR2	0.001	0.012	0.013	0.009	0.006	0.012	0.011	-0.002	-0.008	-0.032	0.033	2.34
AR3	-0.001	0.007	0.010	0.021	-0.001	0.010	0.013	0.012	0.001	-0.017	0.016	0.84

Table 4 continued

	1 (Low)	2	3	4	5	6	7	8	9	10 (high)	1-10	'*t*'-stat
Panel C: Ranked by change in other current assets												
R1	0.187	0.172	0.155	0.149	0.158	0.154	0.154	0.151	0.145	0.133	0.054	4.61
R2	0.161	0.163	0.175	0.151	0.160	0.153	0.140	0.158	0.142	0.148	0.014	1.29
R3	0.184	0.174	0.182	0.163	0.178	0.165	0.185	0.170	0.172	0.174	0.011	0.75
AR1	0.033	0.018	0.004	-0.001	0.006	0.004	0.002	0.006	0.000	-0.012	0.045	4.29
AR2	0.004	0.005	0.019	-0.004	0.005	0.000	-0.013	0.010	-0.005	0.002	0.002	0.14
AR3	0.009	-0.002	0.012	-0.007	0.009	-0.005	0.019	0.003	0.009	0.008	0.000	0.01
Panel D: Ranked by change in accounts payable												
R1	0.184	0.167	0.162	0.166	0.160	0.156	0.160	0.149	0.145	0.109	0.074	5.86
R2	0.153	0.168	0.166	0.164	0.164	0.171	0.154	0.156	0.135	0.120	0.033	2.55
R3	0.179	0.184	0.176	0.173	0.187	0.176	0.167	0.175	0.175	0.154	0.024	1.60
AR1	0.026	0.011	0.009	0.016	0.009	0.007	0.010	0.003	-0.001	-0.031	0.057	5.79
AR2	-0.006	0.008	0.008	0.009	0.010	0.019	0.002	0.006	-0.014	-0.021	0.015	1.21
AR3	0.002	0.010	0.006	0.003	0.020	0.007	-0.001	0.006	0.009	-0.007	0.009	0.49
Panel E: Ranked by change in other current liabilities												
R1	0.147	0.158	0.141	0.158	0.161	0.167	0.162	0.151	0.164	0.148	-0.001	-0.07
R2	0.142	0.156	0.160	0.154	0.166	0.155	0.160	0.163	0.155	0.138	0.004	0.27
R3	0.177	0.179	0.164	0.167	0.183	0.179	0.183	0.184	0.165	0.167	0.010	0.75
AR1	-0.006	0.002	-0.012	0.005	0.008	0.016	0.013	0.003	0.021	0.011	-0.017	-1.28
AR2	-0.014	-0.001	0.001	-0.003	0.009	0.000	0.007	0.013	0.010	0.000	-0.013	-1.01
AR3	0.003	0.006	-0.008	-0.005	0.007	0.006	0.015	0.018	0.004	0.009	-0.006	-0.46

Table 5
Returns for portfolios sorted by discretionary
and non-discretionary accruals

The sample comprises all domestic common stocks (except financial firms) on NYSE, Amex and Nasdaq with coverage on CRSP and Compustat, and with available data. At the end of April each year from 1971 to 1995, all stocks are ranked by accruals (discretionary or non-discretionary) relative to average total assets. Based on the ranking stocks are assigned to one of ten portfolios (assuming a reporting delay of four months from the end of the fiscal year). Annual buy-and-hold returns are calculated over the subsequent year, as well as returns in excess of the return on a control portfolio matched by size and book-to-market. Raw returns and excess returns in each of the three years following portfolio formation($R1$ through $R3$ and $AR1$ through $AR3$, respectively) on the equally-weighted decile portfolios are reported. The return spread between the bottom and top deciles, $(1)-(10)$ and its 't'-statistic, as well as the spread between the second and ninth deciles $(2)-(9)$ and its 't'-statistic, are also reported.

	1 (Low)	2	3	4	5	6	7	8	9	10 (high)	(1)-(10)	't'-stat	(2)-(9)	't'-stat
Discretionary accruals														
R1	0.178	0.190	0.178	0.171	0.163	0.150	0.149	0.152	0.128	0.100	0.078	5.50	0.062	6.01
R2	0.159	0.175	0.171	0.159	0.165	0.159	0.154	0.154	0.144	0.110	0.049	4.13	0.032	2.33
R3	0.186	0.188	0.182	0.188	0.187	0.174	0.167	0.171	0.160	0.145	0.041	3.10	0.028	2.07
AR1	0.032	0.036	0.023	0.017	0.010	0.000	-0.000	0.004	-0.019	-0.043	0.074	5.51	0.056	5.79
AR2	0.008	0.018	0.013	0.001	0.010	0.006	0.001	0.003	-0.004	-0.033	0.041	3.74	0.022	1.66
AR3	0.016	0.015	0.010	0.014	0.017	0.004	-0.002	0.004	-0.007	-0.015	0.031	2.71	0.021	1.87
Non-discretionary accruals														
R1	0.139	0.166	0.157	0.163	0.165	0.161	0.158	0.153	0.159	0.135	0.004	0.17	0.007	0.46
R2	0.138	0.156	0.169	0.159	0.166	0.155	0.174	0.149	0.158	0.126	0.012	0.67	-0.002	-0.10
R3	0.161	0.168	0.184	0.179	0.178	0.174	0.192	0.179	0.175	0.156	0.006	0.31	-0.007	-0.36
AR1	-0.011	0.011	0.008	0.014	0.012	0.008	0.007	0.003	0.013	-0.005	-0.006	-0.26	-0.001	-0.10
AR2	-0.013	0.000	0.013	0.004	0.011	0.001	0.019	-0.004	0.006	-0.016	0.003	0.19	-0.006	-0.38
AR3	-0.007	-0.002	0.013	0.009	0.006	0.003	0.023	0.010	0.006	-0.006	-0.001	-0.05	-0.008	-0.49

Accruals are defined as the change in non-cash current assets less the change in current liabilities excluding short-term debt and taxes payable and minus depreciation. Each working capital account except depreciation for firm i in year t, Acc_{it}, is related to the firm's current-year sales, $Sales_{it}$, as follows:

$$E_t(Acc_{it}) = \frac{\sum_{k=1}^{5} Acc_{it-k}}{\sum_{k=1}^{5} Sales_{it-k}} Sales_{it}.$$

The nondiscretionary component of accruals for this account is given by $E_t(Acc_{it}) - Acc_{it-1}$ while the discretionary component is $Acc_{it} - E_t(Acc_{it})$.

Table 6
Return spreads for portfolios sorted by discretionary
and non-discretionary values of accrual components

The sample comprises all domestic common stocks (except financial firms) on NYSE, Amex and Nasdaq with coverage on CRSP and Compustat, and with available data. At the end of April each year from 1971 to 1995, all stocks are ranked by the discretionary or nondiscretionary values of each component of accruals (relative to average total assets). Based on the ranking stocks are assigned to one of ten portfolios (assuming a reporting delay of four months from the end of the fiscal year). All stocks are equally-weighted in each portfolio. Annual buy-and-hold returns are calculated over each of the three years following portfolio formation (denoted $R1$ to $R3$), as well as $AR1$ to $AR3$, returns in excess of the return on a control portfolio matched by size and book-to-market in the first to third post-formation years. The table reports the difference in the raw returns and excess returns between the bottom-ranked and top-ranked decile portfolios (denoted (1)-(10)) and the associated 't'-statistic.

Accruals are defined as the change in non-cash current assets less the change in current liabilities excluding short-term debt and taxes payable and minus depreciation. Each working capital account except depreciation for firm i in year t, Acc_{it}, is related to the firm's current-year sales, $Sales_{it}$, as follows:

$$E_t(Acc_{it}) = \frac{\sum_{k=1}^{5} Acc_{it-k}}{\sum_{k=1}^{5} Sales_{it-k}} Sales_{it}.$$

The nondiscretionary component of accruals for this account is given by $E_t(Acc_{it}) - Acc_{it-1}$ while the discretionary component is $Acc_{it} - E_t(Acc_{it})$.

	Discretionary		Nondiscretionary	
	(1)-(10)	't'	(1)-(10)	't'
Panel A: Ranked by change in accounts receivable				
R1	0.034	2.89	0.033	1.84
R2	0.027	2.41	0.027	1.53
R3	0.020	1.40	0.033	2.13
AR1	0.035	2.99	0.007	0.51
AR2	0.022	2.08	-0.001	-0.04
AR3	0.017	1.29	0.008	0.43
Panel B: Ranked by change in inventory				
R1	0.093	7.17	0.008	0.33
R2	0.045	4.03	0.011	0.73
R3	0.035	3.05	0.007	0.34
AR1	0.091	7.02	-0.015	-0.71
AR2	0.039	3.45	-0.008	-0.53
AR3	0.028	2.47	-0.009	-0.36
Panel C: Ranked by change in accounts payable				
R1	0.038	4.24	0.040	2.93
R2	0.000	0.03	0.038	2.72
R3	0.005	0.34	0.036	1.98
AR1	0.041	4.95	0.015	1.40
AR2	0.002	0.21	0.010	1.02
AR3	0.011	0.87	0.010	0.48

Table 7
Fama-MacBeth cross-sectional regressions of abnormal returns on accruals and accrual components

The sample comprises all domestic common stocks (except financial firms) on NYSE, Amex and Nasdaq with coverage on CRSP and Compustat, and with available data. At the end of April each year from 1971 to 1995, cross-sectional regressions are estimated of individual stocks' abnormal returns on the following variables from the prior year (assuming a reporting delay of four months from the end of the fiscal year): accruals (the change in non-cash current assets less the change in non-cash current liabilities excluding short-term debt and taxes payable and minus depreciation); change in accounts receivable (ΔAR); change in inventory (ΔINV); and change in accounts payable (ΔAP). A stock's abnormal return is its return in excess of the return on a control portfolio matched by size and book-to-market. In panel A the explanatory variables are raw levels of accruals or individual accrual items. In panel B the explanatory variables are discretionary accruals or individual discretionary accrual items. Accruals for firm i in year t, Acc_{it}, are related to the firm's current-year sales, $Sales_{it}$, as follows:

$$E_t(Acc_{it}) = \frac{\sum_{k=1}^{5} Acc_{it-k}}{\sum_{k=1}^{5} Sales_{it-k}} Sales_{it}.$$

Discretionary accruals are given by $Acc_{it} - E_t(Acc_{it})$. The discretionary component of each individual accrual account is defined correspondingly. The reported statistics are the time series average of monthly regression coefficients together with their 't'-statistics (in parentheses).

Panel A: Raw accruals as explanatory variables

	Constant	Accruals	ΔAR	ΔINV	ΔAP
(1)	-0.0032	-0.2627			
	(-0.80)	(-4.14)			
(2)	0.0080		-0.2622		
	(1.69)		(-3.36)		
(3)	0.0091			-0.3197	
	(1.75)			(-3.50)	
(4)	0.0063				-0.3550
	(1.89)				(-3.29)
(5)	0.0119		-0.1490	-0.2661	-0.0120
	(2.20)		(-1.69)	(-2.83)	(-0.08)

Panel B: Discretionary accruals as explanatory variables

	Constant	Accruals	ΔAR	ΔINV	ΔAP
(6)	-0.0014	-0.2419			
	(-0.39)	(-5.20)			
(7)	0.0009		-0.2396		
	(0.26)		(-4.34)		
(8)	-0.0011			-0.3468	
	(-0.31)			(-5.11)	
(9)	0.0012				-0.2125
	(0.34)				(-1.95)
(10)	-0.0007		-0.1784	-0.3259	0.0229
	(-0.19)		(-2.60)	(-4.55)	(0.18)

Table 8
Portfolio returns based on return
prediction regressions

The sample comprises all domestic common stocks (except financial firms) on NYSE, Amex and Nasdaq with coverage on CRSP and Compustat, and with available data. At the end of April each year from 1971 to 1995, four models are used to predict each stock's future return, based on values of components of accruals from the most recently ended fiscal year (assuming a reporting delay of four months from the fiscal year-end). Based on the predicted return from each model, stocks are ranked and assigned to one of ten portfolios. Over the subsequent year each portfolio's equally weighted buy-and-hold raw return ($R1$) and abnormal return ($AR1$) are calculated. A stock's abnormal return is its return in excess of a control portfolio matched by size and book-to-market. The reported numbers are the mean return on each portfolio over all years, and the average spread in returns between the top and bottom deciles.

Model	Return	1 (Low)	2	3	4	5	6	7	8	9	10 (high)	(10)-(1)
(1)	R1	0.122	0.180	0.189	0.192	0.184	0.192	0.194	0.206	0.207	0.205	0.083
	AR1	-0.053	0.006	0.008	0.010	0.001	0.011	0.011	0.020	0.020	0.017	0.070
(2)	R1	0.127	0.160	0.178	0.188	0.195	0.198	0.196	0.198	0.213	0.216	0.089
	AR1	-0.052	-0.019	-0.003	0.006	0.011	0.013	0.012	0.016	0.030	0.036	0.088
(3)	R1	0.123	0.175	0.192	0.186	0.195	0.202	0.191	0.196	0.198	0.212	0.089
	AR1	-0.049	0.001	0.013	0.007	0.013	0.019	0.011	0.013	0.004	0.017	0.066
(4)	R1	0.123	0.167	0.173	0.190	0.184	0.197	0.201	0.207	0.209	0.220	0.097
	AR1	-0.059	-0.016	-0.006	0.009	0.001	0.015	0.019	0.024	0.025	0.038	0.097

Four return prediction models are used. In model (1), the predictors are depreciation nd changes in: accounts receivable, inventory, other current assets, accounts payable and other current liabilities. Model (2) uses the same variables, but is based on the discretionary components of these items. Model (3) uses as predictors the change in: inventory, accounts receivable, and accounts payable. Model (4) uses the discretionary values of these three variables. At each year-end the parameters of each model are the rolling averages of the estimates from all previous years' cross-sectional regressions. For each accounting variable Acc_{it} for firm i in year t the discretionary component is given by

$$Acc_{it} - \frac{\sum_{k=1}^{5} Acc_{it-k}}{\sum_{k=1}^{5} Sales_{it-k}} Sales_{it}$$

where $Sales_{it}$ is sales for firm i in year$t$.

Appendix

Table A1

Operating performance of decile portfolios sorted by accruals

The sample comprises all domestic common stocks (except financial firms) on NYSE, Amex and Nasdaq with coverage on CRSP and Compustat, and with available data. At the end of April each year from 1971 to 1995, all stocks are ranked by accruals relative to average total assets and assigned to one of ten equally-weighted portfolios (assuming a reporting delay of four months from the end of the fiscal year). This table reports average values of accruals relative to average total assets, cash flow relative to average total assets, earnings relative to average total assets, three components of accruals (ΔAR, change in accounts receivable, ΔINV, change in inventories, ΔAP, change in accounts payable) relative to average total assets, sales turnover (sales relative to average total assets) and earnings to sales for each portfolio.

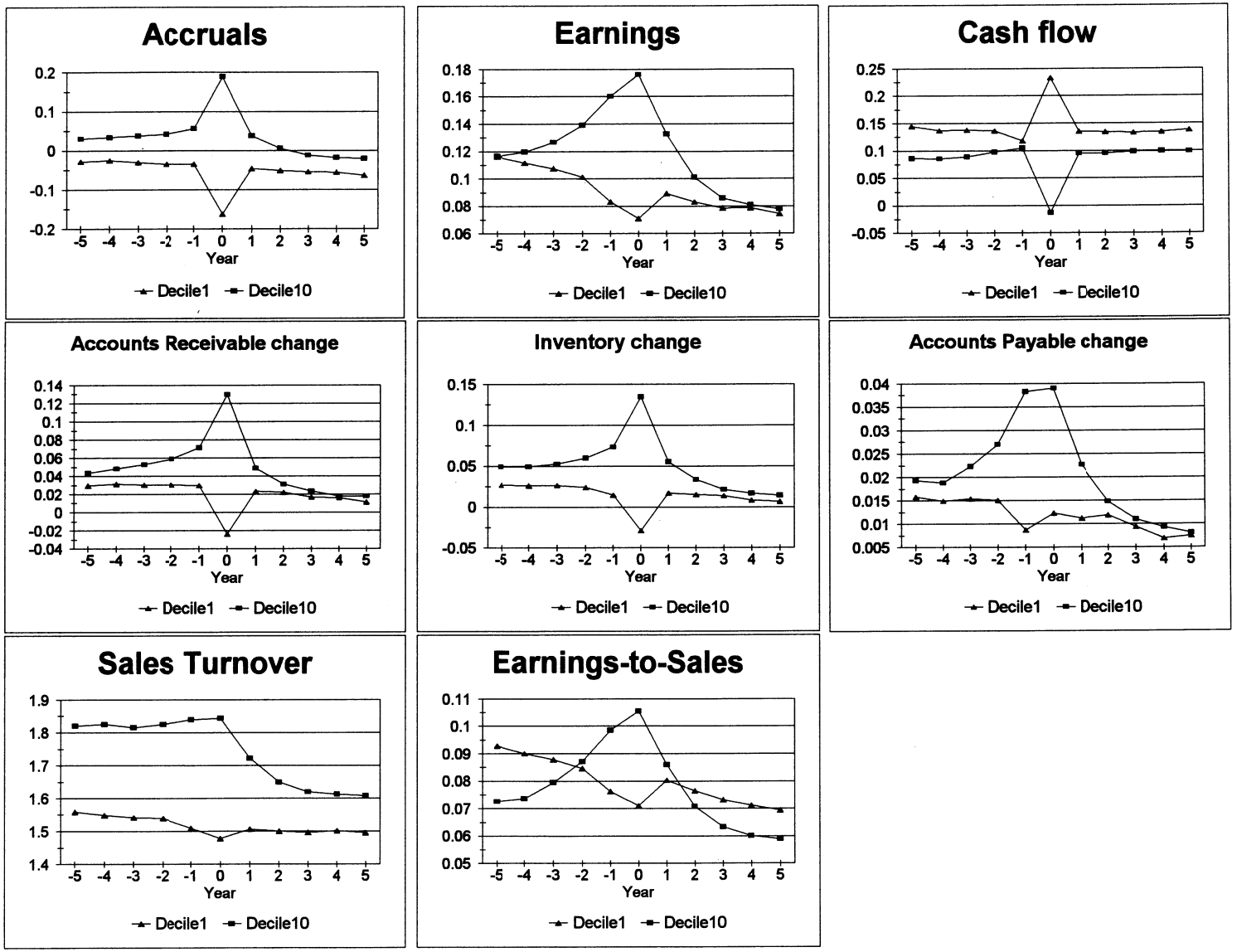
	1 (Low)	2	3	4	5	6	7	8	9	10 (high)
Panel A: Two years before portfolio formation										
Accruals	-0.035	-0.038	-0.031	-0.026	-0.022	-0.015	-0.006	0.004	0.016	0.042
Cash flow	0.136	0.151	0.149	0.147	0.142	0.138	0.138	0.135	0.130	0.097
Earnings	0.101	0.113	0.118	0.121	0.120	0.123	0.132	0.138	0.147	0.139
ΔAR	0.030	0.021	0.021	0.021	0.021	0.025	0.028	0.034	0.043	0.059
ΔINV	0.024	0.018	0.018	0.018	0.018	0.022	0.027	0.032	0.041	0.060
ΔAP	0.015	0.012	0.012	0.011	0.012	0.015	0.014	0.016	0.019	0.027
Sales turnover	1.540	1.517	1.462	1.457	1.411	1.474	1.556	1.684	1.729	1.825
Earnings to sales	0.085	0.095	0.102	0.107	0.116	0.111	0.104	0.097	0.096	0.087
Panel B: One year before portfolio formation										
Accruals	-0.035	-0.042	-0.036	-0.031	-0.026	-0.019	-0.012	-0.002	0.015	0.056
Cash flow	0.118	0.148	0.149	0.145	0.143	0.139	0.142	0.140	0.136	0.105
Earnings	0.083	0.106	0.113	0.115	0.117	0.119	0.130	0.138	0.151	0.160
ΔAR	0.030	0.019	0.020	0.019	0.019	0.022	0.027	0.032	0.045	0.071
ΔINV	0.015	0.014	0.014	0.017	0.017	0.020	0.025	0.033	0.043	0.073
ΔAP	0.009	0.009	0.011	0.012	0.012	0.014	0.016	0.020	0.024	0.038
Sales turnover	1.510	1.510	1.455	1.433	1.402	1.445	1.527	1.669	1.714	1.839
Earnings to sales	0.076	0.089	0.100	0.104	0.114	0.111	0.105	0.098	0.100	0.098
Panel C: Portfolio formation year										
Accruals	-0.162	-0.087	-0.063	-0.046	-0.030	-0.015	0.003	0.027	0.067	0.189
Cash flow	0.233	0.187	0.172	0.155	0.144	0.132	0.125	0.110	0.084	-0.013
Earnings	0.071	0.100	0.109	0.109	0.114	0.117	0.128	0.138	0.151	0.176
ΔAR	-0.024	0.001	0.007	0.011	0.015	0.021	0.029	0.041	0.063	0.130
ΔINV	-0.029	-0.006	0.000	0.005	0.011	0.018	0.027	0.041	0.063	0.134
ΔAP	0.012	0.010	0.009	0.008	0.009	0.010	0.011	0.014	0.019	0.039
Sales turnover	1.478	1.487	1.433	1.412	1.389	1.432	1.515	1.656	1.709	1.844
Earnings to sales	0.071	0.087	0.100	0.102	0.111	0.108	0.104	0.098	0.100	0.105

Appendix Table A1 continued

	1 (Low)	2	3	4	5	6	7	8	9	10 (high)
Panel D: One year after portfolio formation										
Accruals	-0.046	-0.045	-0.038	-0.031	-0.023	-0.017	-0.012	-0.003	0.010	0.038
Cash flow	0.135	0.148	0.147	0.140	0.133	0.127	0.132	0.131	0.122	0.095
Earnings	0.089	0.103	0.109	0.109	0.110	0.110	0.120	0.128	0.132	0.132
ΔAR	0.023	0.021	0.020	0.018	0.019	0.022	0.024	0.028	0.036	0.049
ΔINV	0.017	0.014	0.013	0.015	0.017	0.019	0.023	0.029	0.036	0.055
ΔAP	0.011	0.011	0.011	0.010	0.010	0.011	0.012	0.014	0.016	0.023
Sales turnover	1.506	1.492	1.430	1.412	1.379	1.417	1.500	1.631	1.662	1.722
Earnings to sales	0.080	0.089	0.099	0.102	0.109	0.104	0.100	0.093	0.090	0.086
Panel E: Two years after portfolio formation										
Accruals	-0.051	-0.046	-0.040	-0.033	-0.029	-0.023	-0.019	-0.009	-0.005	0.006
Cash flow	0.134	0.146	0.147	0.140	0.136	0.129	0.130	0.126	0.122	0.095
Earnings	0.083	0.101	0.107	0.106	0.107	0.106	0.110	0.118	0.117	0.101
ΔAR	0.022	0.018	0.017	0.017	0.017	0.018	0.020	0.025	0.028	0.031
ΔINV	0.015	0.014	0.013	0.013	0.014	0.015	0.018	0.024	0.024	0.034
ΔAP	0.012	0.010	0.009	0.009	0.010	0.009	0.010	0.011	0.012	0.015
Sales turnover	1.500	1.491	1.420	1.402	1.367	1.408	1.479	1.603	1.623	1.649
Earnings to sales	0.076	0.088	0.097	0.101	0.108	0.103	0.095	0.088	0.083	0.071
Panel F: Three years after portfolio formation										
Accruals	-0.054	-0.050	-0.043	-0.037	-0.030	-0.028	-0.022	-0.018	-0.014	-0.012
Cash flow	0.133	0.146	0.147	0.142	0.133	0.130	0.129	0.131	0.122	0.098
Earnings	0.079	0.097	0.103	0.105	0.103	0.102	0.107	0.112	0.108	0.086
ΔAR	0.017	0.016	0.015	0.016	0.015	0.015	0.017	0.018	0.022	0.023
ΔINV	0.014	0.012	0.011	0.011	0.012	0.013	0.016	0.018	0.021	0.021
ΔAP	0.009	0.009	0.009	0.008	0.008	0.008	0.009	0.009	0.010	0.011
Sales turnover	1.496	1.480	1.403	1.397	1.355	1.393	1.472	1.592	1.599	1.619
Earnings to sales	0.073	0.086	0.096	0.100	0.107	0.102	0.093	0.085	0.078	0.063

Accruals are defined as $\Delta CA - \Delta CL - DEP$ where ΔCA is the change in non-cash current assets; ΔCL the change in current liabilities excluding short-term debt and taxes payable; DEP is depreciation and amortization. Earnings is operating income after depreciation, and cash flow is the difference between earnings and accruals.

Figure 1: Operating performance of portfolios sorted by accruals



Note: All items except sales turnover and earnings-to-sales are divided by average total assets