Does growth subsume the implications of accruals for future performance?

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Abstract

There is ample confusion in the literature on the role of accruals and growth in explaining earnings persistence and future returns. The problem stems from accrual and growth proxies being positively correlated, and neither convincingly subsuming the other in empirical tests. This study identifies a subset of firms for which accruals do not capture growth, thus providing a discriminating test. Specifically, I focus on firms with negative operating cycles and non-cash net working capital balances. These firms typically have declining net working capital as they grow because their business models result in current liabilities increasing at a faster rate than current assets. In this setting, high growth firms tend to have negative accruals. Contrary to the growth hypothesis, high growth firms with low accruals experience high future profitability and returns. These findings indicate that accounting distortions embedded in accruals have distinct implications for future performance.

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I. Introduction

This study investigates whether growth subsumes the implications of accruals for earnings persistence and future stock returns. Sloan (1996) argues that accounting distortions cause the accruals component of earnings to be less persistent than the cash flow portion of earnings. However, investors fail to fully anticipate this lower persistence and overprice the accruals portion of earnings. This in turn results in abnormally low (high) future stock returns for high (low) accruals firms. In contrast, studies following Fairfield et al. (2003) maintain that the implications of accruals for future performance are due to a more general growth anomaly, in which diminishing marginal returns to investment cause depressed future profitability and stock returns.

It is important to understand whether the poor future performance of high accruals firms is an accounting phenomenon or is due to fundamental economics. From a policy perspective, regulators and the Financial Accounting Standards Board (FASB) are concerned about the usefulness of financial reporting. Therefore, if the accruals effect stems from accounting distortions, then accounting rules and their implications for investors should be addressed. Alternatively, if accruals merely reflect fundamental growth, then the empirical phenomenon that high accruals firms experience low earnings persistence and future stock returns does not necessarily entail policy implications for financial regulators and standard setters.

However, it is difficult to disentangle and interpret the results from existing accruals and growth research. Since the majority of empirical studies in both accruals and growth research use accrual-based proxies, it is difficult to attribute the results to either anomaly. For example, change in net operating assets represents total accruals for

Richardson et al. (2006), but is deemed to be a growth proxy by Fairfield et al. (2003). Change in total assets used by Cooper et al. (2008) and Fama and French (2006) is practically equivalent to the "comprehensive definition of accruals" in Richardson et al. (2005). Investment growth proxies such as abnormal corporate investment (Titman et al., 2004) are based on or closely related to accrual adjustments in plant, property and equipment (PP&E). The problem with accrual-based growth proxies is that accounting distortions cause them to measure growth with error. For example, changes in PP&E may not measure real investment growth as managers can overcapitalize costs and delay write-offs. Sales growth has a credit sales component that is subject to interpretation of accounting rules. Therefore, the use of accrual-based growth proxies contributes to the difficulty of interpreting existing research.

Zhang (2007) identifies a non-accrual based proxy in employee growth, and finds that the accruals effect is subsumed by accruals' covariation with growth at the industry level. This paper will first reexamine this result by taking into consideration the Daniel et al. (2000) conclusion that even when covariance risk is priced, fundamental firm characteristics can be better forecasters of future returns than the covariance risk measures. When firm-level employee growth is directly tested alongside accruals in predicting earnings persistence and future returns, accruals remain economically and statistically significant.

Other attempts to horse race growth and accruals proxies also find that both are incremental to each other (e.g., Fama and French, 2006; Richardson et al., 2006). Therefore, these studies do not provide conclusive evidence whether accruals are subsumed by growth. Creating more confusion, real investment growth often necessitates

increased operating assets, and hence is positively associated with accruals (Jones, 1991; Richardson et al., 2006). The positive correlation between accruals and growth proxies makes it difficult to disentangle and interpret the results from existing research.

Additionally, a variety of factors contribute to the lack of consistency around the growth hypothesis. Several studies indicate that growth in Research and Development (R&D) expenses (Penman and Zhang, 2002; Eberhart et al., 2006) and purchase obligations (Lee, 2010) positively predict future performance. Moreover, the diminishing returns to investment hypothesis is motivated at the industry level, but it is an open question how it flows to the firm level. Given the inconsistencies within the growth literature, it is important to examine whether the implications of accruals for future performance are due to accounting distortions or economic growth.

In light of the confounding issues discussed above, this study's contribution to literature is to identify a subset of firms for which accruals *do not* capture growth. This approach provides a discriminating test of whether accounting distortions embedded in accruals have distinct implications for earnings persistence and stock returns. Specifically, I focus on firms with negative operating cycles and non-cash net working (NWC) capital balances. These firms typically have declining net working capital as they grow because their business models result in current liabilities increasing at a faster rate than current assets. For example, software companies such as Microsoft incur large deferred revenue liabilities and cash balances as they grow sales. Retailers such as Dell and Amazon.com have business models that enable them to make cash sales while carrying low inventory and borrowing from suppliers. Thus as these firms grow, they tend to have negative accruals. Contrary to the growth hypothesis, empirical results

indicate that high growth firms with low accruals experience high future profitability and returns. These results suggest that the lower persistence of accruals due to accounting distortions have negative implications for future profitability and stock returns, and this effect is distinct from the diminishing returns to investment hypothesis.

In addition, investors appear to value accruals no differently in negative versus positive non-cash NWC samples. Therefore, the negative non-cash NWC sample is not cherry-picked to favor accruals, and the finding that the implications of accruals are independent of growth can be generalized in the full sample. Therefore the result provides direct evidence that the accruals effect is distinct from the growth hypothesis.

The remainder of this paper is organized as follows. Section II reviews related research on the accruals anomaly and the growth anomaly, and motivates the research questions in this study. Section III details data sources and sample descriptive statistics. Section IV presents research questions and empirical results. Section V offers concluding remarks.

II. Related Literature

2.1. Earnings Persistence

Sloan (1996) began documenting the accruals anomaly, and his first main finding was that the accruals portion of earnings was less persistent than the cash flow component of earnings. Follow-up studies explored the reason behind the lower persistence of accruals. Xie (2001) estimates abnormal accruals using the Jones (1991) model, and finds that cash flows are more persistent than normal accruals, while abnormal/discretionary accruals have the lowest persistence. Dechow and Dichev (2002) regress accruals on past, current, and future cash flows. They conclude that firms with

extreme accruals estimation errors tend to have extreme accruals and low earnings persistence. Richardson et al. (2005) broaden the definition of accruals into working capital, non-current operating, and financial accruals, and find that less reliable accruals are less persistent. Dechow and Ge (2006) document that the special item component of accruals is less persistent than other accruals components. Chan et al. (2006) attribute the income-decreasing special items following high accruals year to the reversal of effects from previous managerial manipulation. Thomas and Zhang (2002) report that the accounting rates of return increase following extreme low changes in inventory, and vice versa. They conclude that inventory changes are related to profitability reversals. Allen et al. (2010) study inventory and other accruals reversals, and find that accruals reversals are responsible for the negative relationship between accruals and future changes in net income. Hirshleifer et al. (2004) find that net operating assets predict earnings persistence incremental to accruals, while Collins and Hribar (2000) document that accruals are less persistent than cash flows after controlling for the post-earnings announcement drift. In addition to the studies on accruals persistence, the cash flow component of earnings was further decomposed by Dechow et al. (2008). They report that cash flows are only more persistent than accruals when they are distributed to equity holders.

Not all studies discussing the growth anomaly report whether the accruals' predictive ability for future profitability is subsumed by growth. Of growth studies that do investigate earnings persistence, Fairfield et al. (2003) find that accruals and growth in long-term net operating assets have equivalent incremental negative relations with future profitability. Fama and French (2006) report that accruals negatively predict one-year-ahead profitability, while accruals are positively related to future total asset growth.

Zhang (2007) replicated the Sloan (1996) result that, on average, accruals are less persistent than cash flows. In contrast, Zach (2007) report that around 25% of firms in extreme accruals portfolios have been in the same portfolios the previous year. However, this "stickiness" of extreme accruals does not invalidate the finding that accruals are, on average, less persistent than cash flows. Change in NOA is defined as total accruals by Richardson et al. (2006), and is found to be less persistent than cash flows. The authors further decompose total accruals into sales growth and asset efficiency components, and find that the effect of sales growth is no different than the effect of asset efficiency on future earnings. They interpret this as evidence for the accruals effect being incremental to growth.

The majority of studies in the existing literature agree that accruals are less persistent than cash flows. Conclusively linking the causation of the lower persistence of accruals to growth has not been sufficiently established in the growth literature. Given the wealth of empirical results, the only viable way to attribute the lower persistence to growth is to simply define accruals as merely another measure of growth.

2.2. Stock Market Mispricing

Sloan (1996) theorizes that naïve investors fixate on bottom line earnings. The study's second main finding is that investors appear to not understand that innovations in accruals are subject to distortions and tend to reverse in the future. Therefore, investors fail to take this time-series property into account when forecasting future earnings and cash flows. There is a large body of follow-up work that attempts to understand the negative relationship between accruals and future stock returns. Disputing the naïve investor fixation hypothesis, Ali et al. (2000) find that abnormal returns are not lower for

firms that are followed by “sophisticated investors”, who might better understand the properties of accruals. Moreover, Penman and Zhang (2002) and Hirshleifer et al. (2004) document that, consistent with the investor fixation hypothesis, limited attention of investors who focus on accounting profitability without taking into consideration other factors in forecasting future cash profitability, could explain the mispricing. A number of studies, including Xie (2001) and Chan et al. (2006), find that the mispricing is consistent with earnings management, and attribute it to the overestimation of the persistence of discretionary accruals. Richardson et al. (2006) and Allen et al. (2010) find that accounting distortions also play an important role in explaining the lower persistence of accruals, and are incremental to growth-based explanations.

The growth/investment anomaly is not a new area in Finance and Accounting literature. There is a vast body of work documenting a negative relationship between various forms of corporate investment and cross-sectional stock returns. An increase in sales and asset growth rates, capital investment, and external financing tends to be negatively correlated with subsequent stock returns (e.g., Agrawal et al., 1992; Ibbotson, 1975; Loughran and Ritter, 1995), while asset divestment may lead to positive future returns (e.g. Cusatis and Wooldridge, 1993). Fairfield et al. (2003) find that both the operating accruals as defined in Sloan (1996) and the growth in long-term NOA have similar negative associations with future ROA, and that the market similarly seems to overvalue them. Desai et al (2004) propose that the accruals anomaly is a manifestation of mispricing related to the cash flow-to-price proxy of the value-glamour phenomenon. The Fairfield et al. (2003) and Desai et al. (2004) studies inspired considerable debate about whether the accruals anomaly is a special case of the more general growth

anomaly. Cheng and Thomas (2006) argue that the accruals anomaly is distinct from the value-glamour anomaly. Collins and Hribar (2000) and Zach (2006) debate whether the accruals anomaly is incremental to the post-earnings announcement drift. Both accruals and total asset growth are found to be incremental to each other in predicting future stock returns by Fama and French (2006). Cooper et al. (2008) document a negative correlation between firm total asset growth and subsequent firm abnormal returns, and that the results hold after including size, value, lagged returns, and various growth measures as control variables. However, Richardson et al. (2006) point out that the total asset growth measure is simply an algebraic transformation of the change in NOA documented in Richardson et al. (2005).

Titman et al. (2004) and Anderson and Garcia-Feijoo (2006) find that companies that accelerate their investments the most have significantly lower future returns. Titman et al. (2004) find that the abnormal returns are concentrated around earnings announcements, and conclude that the mispricing is consistent with investors' under-reaction to increased investments for empire building purposes. However, Dechow et al. (2008) document that it is the use of the external financing proceeds that predicts future returns, rather than the act of raising financing alone as suggested by earlier studies. Moreover, Dechow et al. (2008) find that, even if internally generated funds are used instead of external financing, firms with high accruals experience lower future earnings persistence and stock returns. In a related stream of research, Li and Zhang (2010) use a two-period q-theory model to show theoretically that the expected return–investment relation should be steeper in firms with high investment frictions than in firms with low

investment frictions. Their empirical results from using financial constraints as proxy for investment frictions do not support this prediction.

There are inconsistencies within the growth hypothesis and its predictions. One of the inconsistencies is that "growth" seems to have different implications for earnings persistence and stock returns under different accounting regimes. Even as a number of growth proxies mentioned above negatively predict future firm valuation, there are also clear exceptions. For example, the Penman and Zhang (2002) study treats research and development (R&D) expense as a "hidden reserve", which leads to positive future stock returns. Eberhart et al. (2006) expands on this result to show that R&D growth manifested in significantly positive long-term stock returns. Similarly, Lee (2010) documents that growth in purchase obligations, which are off balance-sheet, is positively associated with higher future sales, earnings and stock returns.

Fairfield et al. (2003) references Stigler (1963, 54) to support the diminishing returns to investment hypothesis. Closer inspection of Stigler (1963) reveals that the author argues that with competition, new production comes online in profitable industries, and the resulting supply shocks reduce prices. Figure 1 illustrates the familiar supply shock idea in economics behind the Stigler (1963) argument. However, Stigler (1963) discusses this at the industry level, and it is an open question how the idea flows to the firm level. For example, niche/specialty players or firms in the early stages of industry growth may actually enjoy increasing returns to scale. In addition, firms in general do not report number of units sold in financial statements. The reported sales figures not only suffer from the confounding price effect illustrated in Figure 1, but more importantly are measured using accounting rules, and are subject to distortion. Dechow et

al. (2010) report that in a sample of firms subject to Accounting and Auditing Enforcement Releases (AAERs) by the SEC, misstating revenues represents the largest percentage of fraud (54%) committed. Therefore, the link between the diminishing returns to investment hypothesis and implications of firm-level growth should be carefully reconsidered.

At the firm level, it is difficult to distinguish the decreasing returns to new investment hypothesis from the accruals effect, because if new assets truly suffer from lower returns, then managers should be depreciating them at a faster rate. However, if managers simply apply a standard depreciation rule (e.g., straight-line), then higher future expenses are created mechanically from either impairments or inflated allocation of fixed costs. Dutta and Reichelstein (2002) provide an analysis of aligning depreciation rules to management incentives.

Given the inconsistencies within the growth literature, it is important to investigate whether the implications of accruals for future performance are due to accounting distortions or economic growth.

2.3. The Incremental Effects of Accruals and Growth

There is ample confusion in the literature because accruals and growth proxies are positively correlated, and neither anomaly completely subsumes the other. Table 1 illustrates that operating accruals as defined in Sloan (1996) are positively related to sales growth (Richardson et al., 2006), employee growth (Zhang, 2007), abnormal corporate investment (Titman et al., 2004), and total asset growth (Fama and French, 2006; Cooper

et al., 2008). In addition, all accruals and growth proxies are negatively correlated with future profitability change and stock returns.

Zhang (2007) provides an intriguing setting for investigating the incremental effects of accruals and growth because the employee growth measure is not based on accruals. The measure of covariation used in the study is the sum of regression coefficients of accruals on lead, current, and lag growth at the industry level for year *t-2* and *t-1*. Therefore, this measure is a noisy representation of the level of covariance between growth and accruals available at time *t* to forecast returns at *t+1*. In terms of model specification, Daniel et al. (2000) point out fundamentals-scaled measures can be better forecasters of future returns than covariance risk measures even after the latter are priced. In terms of economic motivation, the industry-level measures do not fully represent the accruals effect, which is best motivated at the firm-level. Finally, the industry-level measures are used in the study's main pooled panel data tests without controlling for industry effects. Taken together, these concerns suggest that the debate on whether growth subsumes accruals is still an open one.

A potentially superior approach to investigate whether the implications of accruals for future performance is subsumed by employee growth is to directly use the firm-year employee growth data in the pooled regressions while controlling for industry effects. This specification has been widely used in the literature to test the incremental predictive power of a variety of price factors (e.g., Fama and French, 2006), and takes into account the Daniel et al. (2000) argument about covariance versus firm characteristics in predicting market mispricing. Moreover, the statistical significance of

the regression coefficients controls for average covariance amongst independent variables. The regression of future profitability is specified as follows:

$$ROA_{t+1} = \alpha_0 + \beta_1 ROA_t + \beta_2 Accruals_t + \beta_3 EmployeeGrowth_t + \beta_4 SalesGrowth_t + \beta_5 Industry\_FE + \beta_6 Year\_FE + \varepsilon_{t+1} \quad (1)$$

To be consistent with prior literature, this study adds the accruals and growth proxies to the Fama and French three-factor model with momentum. The OLS regression is specified as:

$$\text{Stock Returns}_{t+1} = \alpha_0 + \beta_1 Accruals_t + \beta_2 EmployeeGrowth_t + \beta_3 SalesGrowth_t + \beta_4 Market\text{-}Rf + \beta_5 SMB + \beta_6 HML + \beta_7 Momentum + \beta_8 Industry\_FE + \beta_9 Year\_FE + \varepsilon_{t+1} \quad (2)$$

In addition to the market beta, the Fama and French model above controls for the well-documented phenomena that, on average, 1) small stocks tend to earn excess return relative to large stocks; 2) value stocks tend to outperform growth stocks; and 3) high prior returns tend to persist for a certain time. The regression also controls for both industry and year fixed effects, and calculates standard errors clustered on firms.

Results from pooled regressions of future profitability and stock returns are reported in Table 2. Following Petersen (2008), standard errors are clustered by firm (Compustat gvkey) to correct for time series dependence in standard errors. Fixed year and industry effects are included to control for cross-sectional dependence. Two growth proxies are chosen to be tested alongside operating accruals. Employee growth is selected because it is a non-accruals measure, and is used directly instead of via its covariation with accruals as in Zhang (2007). Sales growth is chosen because, as discussed in Section II, it is an important driver of the diminishing marginal returns hypothesis in Fairfield et al. (2003). The diminishing marginal returns hypothesis is based on the idea that

increasing sales and production drives down prices and profits (Stigler 1963, 54 provides an industry-level argument). Therefore, while accruals-based, sales growth is an important proxy that drives other growth measures.

Panel A of Table 2 documents that operating accruals and growth proxies are individually negative in predicting future profitability. The coefficients are statistically significant. However, while sales growth remains statistically significant, employee growth is no longer statistically significant in predicting future profitability in the full regression that includes all three variables. Operating accruals continue to be significantly negative in predicting future profitability in the full regression. Panel B of Table 2 reports that operating accruals and growth proxies are individually negative in predicting future stock returns. The coefficients are statistically significant. However, while employee growth remains statistically significant, sales growth is no longer statistically significant in predicting future stock returns in the full regression that includes all three variables. In contrast, operating accruals continue to be significantly negative in predicting future stock returns in the full regression.

Operating accruals appear to be incremental to both employee and sales growth in predicting both future profitability and stock returns. Untabulated analyses reveal that adding abnormal corporate investment and total asset growth does not change the incremental effect of operating accruals and growth proxies on future profitability and returns. However, the results taken as a whole suggest that neither accruals nor growth completely subsumes the other. Moreover, since accruals are positively correlated to growth proxies, some may argue that accruals are simply a better growth proxy.

In light of the confusion in the literature, this paper is conditioned on an economic situation in which accruals do not capture growth, and provides a discriminating test to see whether 1) the lower persistence of accruals is distinct from diminishing returns to investment; and 2) the market mispricing of accruals persistence is distinct from the mispricing of growth. If accruals fail to negatively predict future profitability and stock returns when they are no longer positively related to growth proxies, then the results would suggest that growth subsumes accruals. On the other hand, if accruals continue to negatively predict future profitability and stock returns when they do not capture growth, then the results would be consistent with accruals being distinct from growth.

III. Definitions and Sample Selection

1) The Definition of Accruals and Return on Assets

The definition of accruals in this study follows the conventional definition used in academic research, and is used in studies such as Healy (1985), Sloan (1996), Fairfield et al. (2003) and Zhang (2007). Operating accruals are accordingly defined as the change in non-cash net working capital less depreciation expense. Return on assets is operating income after depreciation deflated by average total assets. This ROA definition is similarly used in previous literature. These definitions ensure that the empirical results from this study will be comparable to prior literature in accruals and growth anomalies.

2) Data

There are two main data sources for the empirical tests in this paper. Financial statement information is obtained from the Compustat annual database and stock returns data are obtained from the CRSP monthly stock returns files. To compute industry-based

fixed effects, the classification of Fama and French 49 Industries is gathered from Professor Kenneth R. French's website. A 30-year sample is obtained to illustrate the incremental effect of accruals and growth in pooled panel data tests. The sample period includes all firm-years with available data on Compustat and CRSP for the period 1978 – 2007. Observations with insufficient data to compute stock returns, operating accruals, current and future ROA, as well as employee and sales growth, are eliminated. The above criteria yield a final sample size of 95,137 firm-year observations. All variables except stock returns are winsorized at 1st and 99th percentiles to mitigate outliers.

The full sample is then divided into positive and negative non-cash net working capital firms-year observations. Non-cash net working capital is calculated as the difference between non-cash current assets (Current assets – Cash and Equivalents) and non-cash current liabilities (Current Liabilities – Short Term Debt). Short term debt includes both debt in current liabilities and the current portion of long term debt. This yields a sample of 76,649 firm-year observations with positive non-cash net working capital. The negative non-cash net working capital sample contains 18,488 observations.

3) Descriptive Statistics

Table 3 provides univariate statistics for key variables. Panel A contains statistics for the sample with positive beginning non-cash net working capital. There are 76,649 firm-year observations. Mean non-cash NWC is $101.78 million. Panel B reports statistics for the sample with negative beginning non-cash net working capital. There are 18,488 firm-year observations. Mean non-cash NWC is -$42.74 million. Negative non-cash NWC firms on average have significantly lower operating cycles than positive non-cash NWC firms. These firms also tend to have higher sales growth and employee growth

than positive non-cash NWC firms. The differences are economically and statistically significant. However, negative non-cash NWC firms do not have statistically significant higher abnormal corporate investment growth, or economically significant higher total asset growth than positive non-cash NWC firms. Negative non-cash NWC firms do on average have lower accruals and current ROA than positive non-cash NWC firms. In addition, negative non-cash NWC firms on average experience lower profitability reversals but show similar raw next-year stock returns as positive non-cash NWC firms.

IV. Research Questions and Empirical Results

A large part of the confusion in the literature is due to the fact that in the full sample, accruals and growth proxies are positively correlated, and neither anomaly subsumes the other. Even as results in Table 2 suggest that accruals appear to be incremental to growth proxies in predicting earnings persistence and returns, one may interpret the results as supporting the argument that accruals simply represent a superior growth proxy. Therefore, this study makes a significant contribution to the literature by identifying a subset of firms for which accruals and growth proxies are divergent. This provides a discriminating test to see whether accounting distortions embedded in accruals have distinct implications that are different from economic growth.

Negative non-cash NWC firms typically have declining net working capital as they grow sales and total assets. These firms have business models that result in current liabilities increasing at a faster rate than current assets. Thus high growth firms tend to have negative accruals. At the same time, cash and cash equivalents and long-term assets often grow in the same direction as sales, thereby raising total assets. These firms on average have negative operating cycles, which suggests that they typically engage in

inventory, receivables and payables management. Figure 2, Panel A shows that negative non-cash NWC firms have steadily become a more important part of the U.S. economy over the 1978-2007 period.

Appendix 1 provides an example of the growth and NWC patterns of Apple, Inc. (Apple). Apple markets personal computers, mobile communication devices, and portable digital music and video players, and sells various related software, services, peripherals, and networking solutions. According to its SEC filings, “the Company may provide future unspecified features and additional software products free of charge to customers. Therefore, sales… are recognized under subscription accounting in accordance with Statement of Position ("SOP") No. 97-2. The Company recognizes the associated revenue and cost of goods sold on a straight-line basis over the currently-estimated 24-month economic lives of these products. Costs incurred by the Company for engineering, sales, and marketing are expensed as incurred.” In other words, while Apple is paid in full for an item sold, it has to create a deferred revenue liability instead of recognizing the sale in full. Appendix 1 reports that Apple’s deferred revenue liability is indeed increasing with sales growth. In addition, accrued expenses, which include income taxes payable, accrued marketing and distribution, accrued compensation and employee benefits, deferred margin on component sales, accrued warranty and related costs, and other current liabilities, have increased as well. The increase in accounts payable is likely to be due to payment cycle management with suppliers.

The growth in deferred revenue, accrued expenses and accounts payable cause Apple’s non-cash current liabilities to outstrip non-cash current assets as its sales grow. As a result, the firm’s operating accruals decline and its non-cash NWC is negative. At

the same time, increases in cash and equivalents, as well as non-current assets, ensure that total asset growth is still positive. The Apple Inc. example illustrates how growth and operating accruals are divergent in negative non-cash NWC firms.

Table 4 provides an industry comparison of the positive and negative non-cash NWC samples. The 18,488 firm-year observations described in Section III translate into 4,438 unique firms with negative non-cash NWC balances. This represents approximately 31% of the full sample of unique firms. Not surprisingly, software firms subject to the same revenue recognition rule as Apple Inc. represent the largest industry group at approximately 14% of all firms. Furthermore, software has become an integral part of the economy, as it also represents the largest industry group in the positive non-cash NWC sample. The second largest industry group is drugs/pharmaceuticals. Since R&D is expensed as incurred while raw materials and manufacturing represent relatively low costs, pharmaceuticals such as Amgen (gvkey 001602) typically have disproportionately low inventory increases as they grow sales. The third industry most frequently represented is oil. Specifically, oil refineries such as ConocoPhillips (gvkey 008549) have heavy PP&E investment but little inventory and other current assets. As they grow sales, current liabilities often outstrip current assets. Some specialty retail firms such as Abercrombie & Fitch (gvkey 063643) are present due to efficient receivables and payables management during growth periods. Other retailers such as Amazon.com (gvkey 064768) and Dell (gvkey 014489) manage their suppliers such that they incur low inventory increases even as sales grow. Insurance firms are present as most property-casualty insurance firms defer recognizing premiums as revenue, and instead recognize them over time as the risk covered by the policies runs off. In summary, no industry

represents an overwhelming majority, and the industry breakdown suggests that the negative non-cash NWC sample represents a variety of industries.

Research Question 1: Are operating accruals and growth proxies still positively correlated in negative non-cash NWC firms?

Table 5 presents the correlation matrices of growth proxies and accruals for both positive and negative non-cash NWC firms. Panel A shows that operating accruals and growth proxies are positively correlated for positive non-cash NWC firms. These are the firms for which real investment growth necessitates increase in operating assets (Jones, 1991; Richardson et al., 2006). Panel B demonstrates that Spearman correlations for operating accruals and growth proxies are no longer positively correlated. In fact, the Spearman correlation between sales growth and accruals is negative and statistically significant. In addition, the Spearman correlation between total asset growth and operating accruals is negative and statistically significant as well. These results are consistent with the intuition established by the Apple Inc. example, which is that negative non-cash NWC firms incur lower accruals as they grow. In addition, correlations between accruals, employee growth, and abnormal corporate investment are not statistically significant. As a robustness check, I also examine the relationship between lead and lag year accruals and growth proxies. The correlations in Panel B suggest that the negative relationship is quite stable through time. Note that the Spearman coefficients should be considered here because they are less sensitive to bias due to outliers, and do not require normality and linearity assumptions.

Research Question 2: Since accruals do not capture growth, what are the implications of accruals for the negative non-cash NWC sample?

A central premise to the Fairfield et al. (2003) and Zhang (2007) hypothesis is that diminishing returns to size cause positively growing companies to have lower future profitability and stock returns. Therefore, since accruals are positively correlated with growth proxies, it must be that growth is driving the accruals anomaly. However, accruals and growth are no longer positively correlated in the negative non-cash NWC sample. This sample therefore provides an arena where the effect of accruals persistence on future profitability and returns can be observed independently of growth.

Hedge Portfolio Analysis

Table 6 illustrates the economic significance of the accruals anomaly in both positive and negative non-cash NWC samples. Accruals portfolios are formed by assigning equal numbers of firm-year observations into nine portfolios in each sample. Nine portfolios are formed instead of ten to yield an equal sized middle portfolio for later analysis. The choice of the number of portfolios does not influence results and interpretations. Means of operating accruals, sales growth, employee growth, change in future ROA, and size-adjusted stock returns are reported for each portfolio. Not surprisingly, Panel A reports that operating accruals, sales growth, and employee growth are monotonically increasing in the positive non-cash NWC sample. Panel B of Figure 1 plots mean sales growth, employee growth, and accruals, across accrual deciles for positive non-cash NWC firms. Consistent with prior research, mean accruals and growth move upwards together across portfolios formed on accruals. In addition, taking a long position in the “Low” portfolio and an equal sized short position in the “High” portfolio

yields a statistically significant net annual hedge return of 14.8%. The “Low” portfolio also experiences a 7.1% higher mean next-year ROA change than the “High” portfolio. These results are consistent with prior research, and further illustrate the difficulty in disentangling the accrual and growth effects in a sample where growth and accruals are positively correlated.

Panel B presents the mean statistics of operating accruals, growth proxies, future profitability and stock returns across accrual deciles for negative non-cash NWC firms. First, while mean accruals are monotonically increasing across accruals deciles, sales and employee growth means decrease until the middle accruals portfolios, and then increase thereafter. Panel C of Figure 1 shows that while mean operating accruals move upwards, mean sales and employee growth present U-shaped patterns across portfolios formed on accruals. Accruals and growth proxies are clearly not moving in the same direction in this sample. Taking a long position in the “Low” portfolio and an equal sized short position in the “High” portfolio yields a statistically significant net annual hedge return of 10.8%. The T-statistic in panel A is larger than that in panel B because panel A represents a much larger sample size. Another interesting result comes from inspecting the “Low” and “Middle” portfolios. Panel C replicates the well-known result that firms with lower accruals and lower growth enjoy higher future profitability and returns than firms with higher accruals and higher growth. In addition, panel D illustrates that taking a long position in the “Low” portfolio and an equal sized short position in the “Middle” portfolio yields a statistically significant net annual hedge return of 7.8%. Furthermore, the “Low” portfolio experiences a 4.7% higher mean next-year ROA change than the “High” portfolio. The statistically and economically significant hedge return and ROA

change difference are important as, while the "Low" portfolio has lower accruals, it experiences statistically significant higher sales and employee growth than the "Middle" portfolio. These results are contrary to the diminishing returns to investment hypothesis, which predicts that the portfolio that has higher sales and employee growth would underperform the portfolio with lower growth.

In addition, Figure 3 suggests that the hedge returns are primarily positive for both positive and negative non-cash NWC firms across the sample period. The negative non-cash NWC sample has positive hedge returns since 2000.

The Mishkin Test

The hedge portfolio analysis above provides intuition for the accruals effect in a sample where accruals are not positively correlated with growth. In this section, I investigate whether stock prices act as if investors anticipate the implications of accrual reliability for earnings persistence in the negative non-cash NWC sample. Before investigating the persistence of the accrual and cash flow portions of earnings, the following regression is specified to establish whether there is a difference in earnings persistence between the positive and negative non-cash NWC samples:

$$ROA_{t+1} = \alpha_0 + \beta_1 ROA_t + \beta_2 I[\text{Pos NWC}] + \beta_3 I[\text{Pos NWC}]*ROA_t + \beta_4 EmployeeGrowth_t + \beta_5 SalesGrowth_t + \beta_6 Ind\_FE + \beta_7 Year\_FE + \varepsilon_{t+1} \quad (3)$$

Regression (3) controls for growth proxies, as well as industry and year effects. The results are presented in Table 7. The indicator variable I[Pos NWC] equals 1 if the firm-year observation has a positive beginning non-cash NWC balance. The sign of β_2 is positive and significant, which confirms the Table 3 result that the average ROA is higher for positive non-cash NWC firms. Since β_3 is negative and significant, positive non-cash

NWC firms on average have lower earnings persistence than negative non-cash NWC firms. This means that further decomposition of earnings needs to take into account the differential earnings persistence between the two groups.

Following Sloan (1996), the Mishkin's (1983) econometric framework is used to simultaneously estimate the actual persistence of the various components of earnings and growth, along with the corresponding persistence parameters that are reflected in stock prices. See Mishkin (1983) and Sloan (1996) for a complete explanation of this procedure. The following forecasting and valuation equations are jointly estimated:

Forecasting Equation: $\text{Earnings}_{t+1} = \gamma_0 + \gamma_1\text{Accruals}_t + \gamma_2\text{Cash Flows}_t + \gamma_3\text{I[Pos NWC]}_t + \gamma_4\text{I[Pos NWC]*Accruals}_t + \gamma_5\text{I[Pos NWC]*Cash Flows}_t + \gamma_6\text{EmployeeGrowth}_t + \gamma_7\text{SalesGrowth}_t + \upsilon_{t+1}$ (4)

Valuation Equation: $\text{Abnormal Return}_{t+1} = \beta(\text{Earnings}_{t+1} - \gamma_0 - \gamma^*_1\text{Accruals}_t - \gamma^*_2\text{Cash Flows}_t - \gamma^*_3\text{I[Pos NWC]}_t - \gamma^*_4\text{I[Pos NWC]*Accruals}_t - \gamma^*_5\text{I[Pos NWC]*Cash Flows}_t - \gamma^*_6\text{EmployeeGrowth}_t - \gamma^*_7\text{SalesGrowth}_t) + \varepsilon_{t+1}$ (5)

In the specifications above, γ_1 and γ_2 capture the persistence of accruals and cash flows for negative non-cash NWC firms, while γ_4 and γ_5 capture the incremental persistence of positive non-cash NWC firms. The indicator variable is interacted with both accruals and cash flows because positive non-cash NWC firms have lower earnings persistence. Table 8 summarizes the empirical results. Accruals have lower persistence than cash flows for negative non-cash NWC firms, as $\gamma_1 < \gamma_2$. Investors appear to overestimate the persistence of accruals, as $\gamma_1 < \gamma^*_1$. In addition, they appear to fixate on earnings as γ^*_1 is not different from γ^*_2 at the 10% significance level. While the positive and significant γ_4 indicate that accruals appear to be more persistent in the positive non-cash NWC sample, the insignificant γ^*_4 suggests that investors do not price the persistence of accruals differently across the two samples.

The results from the negative non-cash NWC sample condition on an economic situation where accruals do not capture growth, and provide direct evidence that the accruals' effect on earnings persistence and stock returns is distinct from growth. Moreover, since investors do not price the persistence of accruals differently across the two samples, the implications of accounting distortions embedded in accruals shown in the negative non-cash NWC sample can be generalized in the full sample.

V. Conclusion

There is ample confusion in the literature on accruals and growth because accruals and growth proxies are positively correlated, and neither anomaly convincingly subsumes the other. This study identifies a subset of firms for which accruals and growth are divergent. The negative non-cash NWC sample is conditioned on an economic situation where accruals do not capture growth. These firms typically have declining net working capital as they grow because their business models result in current liabilities increasing at a faster rate than current assets. Thus as these firms grow, they tend to have negative accruals. Contrary to the growth hypothesis, high growth firms with low accruals experience high future profitability and returns. In addition, investors do not value accruals persistence differently in negative versus positive non-cash NWC samples. Therefore, the finding that the accounting distortions embedded in accruals have distinct implications for future performance can be generalized in the full sample.

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Appendix 1. Apple Inc. (gvkey 001690) selected financial information. Balance sheet information is in $ millions.

	Fiscal Year	2003	2004	2005	2006
	Cash and Equivalents	4,566	5,464	8,261	10,110
(a)	**Non-Cash Current Assets**	**1,321**	**1,591**	**2,039**	**4,399**
	Total Current Assets	5,887	7,055	10,300	14,509
	Non-Current Assets	928	995	1,251	2,696
	Total Assets	6,815	8,050	11,551	17,205
	Debt in Current Liabilities	304	0	0	0
	Deferred Revenues - Current	368	544	501	746
	Accounts Payable	1,154	1,451	1,779	3,390
	Accrued Expenses	227	685	1,204	2,335
(b)	**Non-Cash Current Liabilities**	**2,053**	**2,680**	**3,484**	**6,471**
	Total Current Liabilities	2,357	2,680	3,484	6,471
	Non-Current Liabilities	235	294	601	750
	Shareholder's Equity	4,223	5,076	7,466	9,984
	Total Liabilities and Stockholder's Equity	6,815	8,050	11,551	17,205
(a) - (b)	**Non-Cash Net Working Capital**	**-732**	**-1,089**	**-1,445**	**-2,072**
	Operating Accruals	-0.04	-0.07	-0.05	-0.06
	Sales Growth	8%	33%	68%	39%
	Employee Growth	11%	-1%	25%	20%
	ΔROA	4%	12%	0%	4%
	Stock Return	201%	123%	18%	133%

Operating Accruals is the change in non-cash working capital less depreciation expense deflated by average total assets, calculated as (ΔCurrent Assets - ΔCash - (ΔCurrent Liabilities - ΔShort Term Debt - ΔTax Payables) - Depreciation)/ Average Assets.
Employee Growth is the percentage change in the number of employees.
Sales Growth is the percentage change in sales.
Return is the annual buy-hold stock return cumulated starting the fourth month after the end of the fiscal year.

Table 1. Correlations among profitability, future stock returns, accruals and growth measures (Pearson coefficients in the upper triangle;Spearman coefficients in the lower triangle). The sample is from 1978 - 2007.

All Firms

		Growth Proxies				Accruals	Profitability and Stock Returns		
	Variable	Sales Growth $_{(t)}$	Employee Growth $_{(t)}$	ACI $_{(t)}$	Asset Growth $_{(t)}$	Op. Accruals $_{(t)}$	ROA $_{(t)}$	ΔROA $_{(t+1)}$	Stock Return $_{(t+1)}$
Growth Proxies	Sales Growth $_{(t)}$	**1.000**	0.497	-0.071	0.434	0.199	-0.063	-0.055	-0.030
		_	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*
	Employee Growth $_{(t)}$	0.571	**1.000**	0.096	0.573	0.257	0.045	-0.079	-0.043
		<.0001	_	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*
	Abnormal Corporate Investment $_{(t)}$	-0.008	0.147	**1.000**	0.156	0.050	-0.015	-0.058	-0.030
		0.030	*<.0001*	_	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*
	Total Assets Growth $_{(t)}$	0.562	0.577	0.214	**1.000**	0.362	0.239	-0.147	-0.080
		<.0001	*<.0001*	*<.0001*	_	*<.0001*	*<.0001*	*<.0001*	*<.0001*
Accruals	Op. Accruals $_{(t)}$	0.304	0.293	0.079	0.366	**1.000**	0.240	-0.192	-0.045
		<.0001	*<.0001*	*<.0001*	*<.0001*	_	*<.0001*	*<.0001*	*<.0001*
Profitability and Stock Returns	ROA $_{(t)}$	0.276	0.221	0.150	0.388	0.246	**1.000**	-0.284	-0.005
		<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	_	*<.0001*	*0.101*
	ΔROA $_{(t+1)}$	-0.127	-0.129	-0.097	-0.199	-0.179	-0.278	**1.000**	0.208
		<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	_	*<.0001*
	Stock Return $_{(t+1)}$	-0.053	-0.065	-0.008	-0.063	-0.048	0.101	0.295	**1.000**
		<.0001	*<.0001*	*0.027*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	_

Sales growth is the change in sales deflated by previous year's sales.
Employee growth is the change in number of employees deflated by previous year's number of employees.
Abnormal Corporate Investment is calculated as 3*CEt /(CEt-1 + CEt-2 – CEt-3) – 1, where CE is capital expenditure deflated by sales.
Total Assets Growth is the change in total assets deflated by average assets.
Operating Accruals is the change in non-cash working capital less depreciation expense deflated by average total assets, calculated as (ΔCurrent Assets - ΔCash - (ΔCurrent Liabilities - ΔShort Term Debt - ΔTax Payables) - Depreciation)/ Average Assets.
ROA is operating income after depreciation deflated by average total assets.
ΔROA is this period's ROA minus last period's ROA.
Stock Return is the annual buy-hold stock return.

Table 2. Time-series means and t-statistics for coefficients from annual cross-sectional regressions of accruals and growth proxies. The sample is from 1978-2007.

Panel A: $ROA_{t+1} = \alpha_0 + \beta_1 ROA_t + \beta_2 Accruals_t + \beta_3 EmployeeGrowth_t + \beta_4 SalesGrowth_t + \beta_5 Ind\_FE + \beta_6 Year\_FE + \varepsilon_{t+1}$ (1)

	Predicted	**ROA (t+1)**			**ROA (t+1)**			**ROA (t+1)**			**ROA (t+1)**		
	Sign	Coefficient	t-Stat	p-Value	Coefficient	t-Stat	p-Value	Coefficient	t-Stat	p-Value	Coefficient	t-Stat	p-Value
ROA (t)	+	0.7990	166.76	<.0001	0.7941	92.03	<.0001	0.7791	91.44	<.0001	0.7752	90.87	<.0001
Operating Accruals (t)	–	-0.1218	-21.73	<.0001	-0.1282	-17.31	<.0001						
Employee Growth (t)	–	-0.0013	-0.84	0.4007				-0.0138	-8.58	<.0001			
Sales Growth (t)	–	-0.0065	-5.49	<.0001							-0.0094	-6.91	<.0001
Number of Observations		93,771			95,137			93,771			95,137		
R-Square		0.66			0.63			0.63			0.63		

Panel B: $Stock\ Returns_{t+1} = \alpha_0 + \beta_1 Accruals_t + \beta_2 EmployeeGrowth_t + \beta_3 SalesGrowth_t + \beta_4 Market\text{-}Rf + \beta_5 SMB + \beta_6 HML + \beta_7 Momentum + \beta_8 Ind\_FE + \beta_9 Year\_FE + \varepsilon_{t+1}$ (2)

	Predicted	**Return (t+1)**			**Return (t+1)**			**Return (t+1)**			**Return (t+1)**		
	Sign	Coefficient	t-Stat	p-Value	Coefficient	t-Stat	p-Value	Coefficient	t-Stat	p-Value	Coefficient	t-Stat	p-Value
Operating Accruals (t)	–	-0.3366	-9.94	<.0001	-0.4138	-12.76	<.0001						
Employee Growth (t)	–	-0.0596	-6.17	<.0001				-0.0923	-11.05	<.0001			
Sales Growth (t)	–	-0.0111	-1.48	0.1391							-0.0416	-6.74	<.0001
Market - RF	+	1.1326	32.12	<.0001	1.1396	32.42	<.0001	1.1302	31.99	<.0001	1.1395	32.38	<.0001
SMB	+	1.2697	19.58	<.0001	1.2615	19.57	<.0001	1.2671	19.50	<.0001	1.2589	19.48	<.0001
HML	+	0.2138	5.22	<.0001	0.2176	5.34	<.0001	0.2083	5.07	<.0001	0.2143	5.25	<.0001
Momentum	+	0.1166	2.89	0.0038	0.1113	2.77	0.0056	0.1132	2.81	0.0050	0.1102	2.74	0.0061
Number of Observations		93,771			95,137			93,771			95,137		
R-Square		0.12			0.12			0.12			0.12		

ROA is operating income after depreciation deflated by average total assets.
Operating Accruals is the change in non-cash working capital less depreciation expense deflated by average total assets, calculated as (ΔCurrent Assets - ΔCash - (ΔCurrent Liabilities - ΔShort Term Debt - ΔTax Payables) - Depreciation)/ Average Assets.
Employee Growth is the percentage change in the number of employees.
Sales Growth is the percentage change in sales.
Market – RF is the annual excess return on the market, as reported as benchmark factor return by Fama and French.
SMB is the performance of small stocks relative to big stocks, as reported as benchmark factor return by Fama and French.
HML is the performance of value stocks relative to growth stocks, as reported as benchmark factor return by Fama and French.
Momentum is the excess return on high prior return portfolios over low prior return portfolios, as reported as benchmark factor return by Fama and French.
Return is the annual buy-hold stock return minus risk-free return of the same period.

Table 3. Sample Descriptive Statistics. The sample is from 1978 - 2007.

	Panel A. Positive non-cash net working capital firms			Panel B. Negative non-cash net working capital firms				
	Variable	Mean	Median	Variable	Mean	Median	Panel B Mean - Panel A Mean	T-Statistic
	Non-cash NWC ($M)	101.78	21.60	Non-cash NWC ($M)	-42.74	-4.60	-144.52	-114.97
Op. Cycle	Operating Cycle (Days)	105	90	Operating Cycle (Days)	-1	5	-106	-131.01
Op. Cycle	Days Sales - Days Payables Outstanding	16	18	Days Sales - Days Payables Outstanding	-31	-11	-47	-63.42
Growth Proxies	Sales Growth	18.3%	9.9%	Sales Growth	35.6%	12.0%	17.3%	26.50
Growth Proxies	Employee Growth	9.8%	3.0%	Employee Growth	15.3%	5.0%	5.6%	15.97
Growth Proxies	Abnormal Corporate Investment	6.3%	-10.2%	Abnormal Corporate Investment	7.8%	-13.4%	1.5%	1.58
Growth Proxies	Total Assets Growth	11.1%	7.8%	Total Assets Growth	12.0%	7.6%	0.9%	3.42
	Operating Accruals	-0.03	-0.03	Operating Accruals	-0.05	-0.05	-0.02	-22.40
	$ROA_{(t)}$	7.4%	8.9%	$ROA_{(t)}$	-1.7%	5.5%	-9.1%	-50.34
	$\Delta ROA_{(t+1)}$	-0.7%	-0.2%	$\Delta ROA_{(t+1)}$	-0.2%	-0.1%	0.6%	5.96
	Stock Return $_{(t+1)}$	17.8%	6.1%	Stock Return $_{(t+1)}$	17.6%	4.0%	-0.2%	-0.25
	# of Observations in Sample	76,649		# of Observations in Sample	18,488			

Non-cash net working capital is calculated as (Current assets – Cash and Equivalents) – (Current Liabilities – Short Term Debt).
Operating Cycle is calculated as Days Inventory Outstanding (DIO) + Days Sales Outstanding (DSO) – Days Payables Outstanding (DPO), where DIO is calculated as [Average Inventory/(COGS/365)], DSO is calculated as [Average Accounts Receivable/(SALES/365)], and DPO is calculated as [Average Accounts Payables/(COGS/365)].
Sales growth is the change in sales deflated by previous year's sales.
Employee growth is the change in number of employees deflated by previous year's number of employees.
Abnormal Capital Investment is calculated as 3*CEt /(CEt-1 + CEt-2 – CEt-3) – 1, where CE is capital expenditure deflated by sales.
Total Assets Growth is the change in total assets deflated by average assets.
Non-cash net working capital is calculated as (Current assets – Cash and Equivalents) – (Current Liabilities – Short Term Debt).
Operating Accruals is the change in non-cash working capital less depreciation expense deflated by average total assets, calculated as (ΔCurrent Assets - ΔCash - (ΔCurrent Liabilities – ΔShort Term Debt - ΔTax Payables) - Depreciation)/ Average Assets.
ROA is operating income after depreciation deflated by average total assets.
ΔROA is this period's ROA minus last period's ROA.
Stock Return is the annual buy-hold stock return.
Positive non-cash net working capital firms have positive beginning non-cash NWC.
Negative non-cash net working capital firms have negative beginning non-cash NWC.

Table 4. Positive and Negative non-cash net working capital firms by industry. Compustat Fundamental Annual File, 1978 - 2007.

	Neg Non-cash NWC		Pos Non-cash NWC			Neg Non-cash NWC		Pos Non-cash NWC	
Industry	Frequency	Percentage	Frequency	Percentage	Industry	Frequency	Percentage	Frequency	Percentage
Softw	629	14.2%	764	7.8%	Food	32	0.7%	190	1.9%
Drugs	398	9.0%	358	3.6%	Hshld	31	0.7%	224	2.3%
Oil	389	8.8%	444	4.5%	Cnstr	28	0.6%	102	1.0%
BusSv	280	6.3%	569	5.8%	ElcEq	27	0.6%	172	1.8%
Telcm	269	6.1%	257	2.6%	Autos	24	0.5%	156	1.6%
Meals	240	5.4%	119	1.2%	Banks	21	0.5%	43	0.4%
Util	210	4.7%	244	2.5%	Paper	19	0.4%	151	1.5%
Trans	178	4.0%	241	2.5%	Mines	18	0.4%	42	0.4%
Chips	155	3.5%	669	6.8%	Toys	18	0.4%	121	1.2%
Rtail	153	3.4%	660	6.7%	Coal	17	0.4%	22	0.2%
Fun	152	3.4%	125	1.3%	Agric	14	0.3%	42	0.4%
MedEq	108	2.4%	368	3.7%	Steel	14	0.3%	171	1.7%
Hardw	104	2.3%	383	3.9%	Beer	12	0.3%	35	0.4%
Fin	103	2.3%	120	1.2%	Rubbr	12	0.3%	149	1.5%
Insur	97	2.2%	65	0.7%	Guns	8	0.2%	18	0.2%
PerSv	94	2.1%	103	1.0%	Ships	8	0.2%	25	0.3%
Whlsl	86	1.9%	483	4.9%	Soda	8	0.2%	24	0.2%
Hlth	83	1.9%	245	2.5%	FabPr	7	0.2%	55	0.6%
Mach	48	1.1%	390	4.0%	Clths	5	0.1%	165	1.7%
Books	46	1.0%	86	0.9%	Smoke	4	0.1%	9	0.1%
Gold	45	1.0%	66	0.7%	Aero	3	0.1%	49	0.5%
RlEst	41	0.9%	58	0.6%	Txtls	3	0.1%	97	1.0%
Chems	39	0.9%	174	1.8%	Boxes	2	0.0%	36	0.4%
LabEq	35	0.8%	256	2.6%	Other	87	2.0%	225	2.3%
BldMt	34	0.8%	258	2.6%	Total	4,438	100%	9,828	100.0%

Non-cash net working capital is calculated as (Current assets – Cash and Equivalents) – (Current Liabilities – Short Term Debt).
Positive non-cash net working capital firms have positive beginning non-cash NWC.
Negative non-cash net working capital firms have negative beginning non-cash NWC.
Industry classification is according to Fama and French 49 Industries.

Table 5. Correlations among profitability, future stock returns, accruals and growth measures (Pearson coefficients in the upper triangle;Spearman coefficients in the lower triangle. The sample is from 1978 - 2007.

Panel A. Positive non-cash net working capital firms

		Growth Proxies				Accruals			Profitability and Stock Returns		
	Variable	Sales Growth $_{(t)}$	Employee Growth $_{(t)}$	ACI $_{(t)}$	Asset Growth $_{(t)}$	Op. Accruals $_{(t)}$	Op. Accruals $_{(t-1)}$	Op. Accruals $_{(t+1)}$	ROA $_{(t)}$	ΔROA $_{(t+1)}$	Stock Return $_{(t+1)}$
Growth Proxies	Sales Growth $_{(t)}$	**1.000**	0.534	-0.042	0.496	0.291	0.164	0.099	0.059	-0.092	-0.033
		_	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*
	Employee Growth $_{(t)}$	0.594	**1.000**	0.089	0.600	0.335	0.118	0.129	0.107	-0.095	-0.043
		<.0001	_	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*
	Abnormal Corporate Investment $_{(t)}$	0.011	0.143	**1.000**	0.163	0.060	0.057	0.033	0.009	-0.071	-0.029
		0.007	*<.0001*	_	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*0.024*	*<.0001*	*<.0001*
	Total Assets Growth $_{(t)}$	0.600	0.597	0.220	**1.000**	0.484	0.150	0.161	0.296	-0.192	-0.075
		<.0001	*<.0001*	*<.0001*	_	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*
Accruals	Op. Accruals $_{(t)}$	0.396	0.377	0.101	0.478	**1.000**	0.176	0.155	0.314	-0.217	-0.052
		<.0001	*<.0001*	*<.0001*	*<.0001*	_	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*
	Op. Accruals $_{(t-1)}$	0.200	0.140	0.060	0.165	0.216	**1.000**	0.112	0.076	-0.084	-0.045
		<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	_	*<.0001*	*<.0001*	*<.0001*	*<.0001*
	Op. Accruals $_{(t+1)}$	0.169	0.176	0.046	0.198	0.207	0.157	**1.000**	0.189	0.188	0.067
		<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	_	*<.0001*	*<.0001*	*<.0001*
Profitability and Stock Returns	ROA $_{(t)}$	0.341	0.272	0.142	0.426	0.300	0.111	0.214	**1.000**	-0.316	-0.006
		<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	_	*<.0001*	*0.091*
	ΔROA $_{(t+1)}$	-0.147	-0.135	-0.103	-0.224	-0.198	-0.093	0.120	-0.294	**1.000**	0.231
		<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	_	*<.0001*
	Stock Return $_{(t+1)}$	-0.050	-0.063	-0.014	-0.064	-0.054	-0.065	0.070	0.083	0.313	**1.000**
		<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*0.091*	*<.0001*	_

Table 5 (Continued).

Panel B. Negative non-cash net working capital firms

		Growth Proxies				Accruals			Profitability and Stock Returns		
	Variable	Sales Growth $_{(t)}$	Employee Growth $_{(t)}$	ACI $_{(t)}$	Asset Growth $_{(t)}$	Op. Accruals $_{(t)}$	Op. Accruals $_{(t-1)}$	Op. Accruals $_{(t+1)}$	ROA $_{(t)}$	ΔROA $_{(t+1)}$	Stock Return $_{(t+1)}$
Growth Proxies	Sales Growth $_{(t)}$	**1.000**	0.444	-0.136	0.345	0.042	-0.054	-0.010	-0.171	-0.002	-0.027
		_	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*0.165*	*<.0001*	*0.763*	*0.000*
	Employee Growth $_{(t)}$	0.488	**1.000**	0.115	0.508	0.007	-0.026	-0.025	-0.031	-0.043	-0.046
		<.0001	_	*<.0001*	*<.0001*	*0.351*	*0.001*	*0.001*	*<.0001*	*<.0001*	*<.0001*
	Abnormal Corporate Investment $_{(t)}$	-0.081	0.169	**1.000**	0.135	0.014	0.039	0.011	-0.065	-0.023	-0.034
		<.0001	*<.0001*	_	*<.0001*	*0.112*	*<.0001*	*0.202*	*<.0001*	*0.007*	*<.0001*
	Total Assets Growth $_{(t)}$	0.437	0.511	0.193	**1.000**	-0.031	-0.023	-0.011	0.160	-0.039	-0.096
		<.0001	*<.0001*	*<.0001*	_	*<.0001*	*0.004*	*0.141*	*<.0001*	*<.0001*	*<.0001*
Accruals	Op. Accruals $_{(t)}$	-0.023	-0.028	-0.027	-0.064	**1.000**	0.039	0.094	0.036	-0.109	-0.020
		0.002	*0.000*	*0.002*	*<.0001*	_	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*0.006*
	Op. Accruals $_{(t-1)}$	-0.049	0.003	0.039	-0.038	0.188	**1.000**	0.093	0.042	-0.059	-0.008
		<.0001	*0.749*	*<.0001*	*<.0001*	*<.0001*	_	*<.0001*	*<.0001*	*<.0001*	*0.314*
	Op. Accruals $_{(t+1)}$	-0.036	-0.037	-0.019	-0.013	0.217	0.212	**1.000**	-0.008	0.149	0.003
		<.0001	*<.0001*	*0.029*	*0.083*	*<.0001*	*<.0001*	_	*0.293*	*<.0001*	*0.729*
Profitability and Stock Returns	ROA $_{(t)}$	0.083	0.072	0.168	0.274	-0.027	-0.008	-0.041	**1.000**	-0.236	-0.005
		<.0001	*<.0001*	*<.0001*	*<.0001*	*0.000*	*0.305*	*<.0001*	_	*<.0001*	*0.502*
	ΔROA $_{(t+1)}$	-0.060	-0.112	-0.072	-0.107	-0.095	-0.047	0.093	-0.219	**1.000**	0.146
		<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	_	*<.0001*
	Stock Return $_{(t+1)}$	-0.061	-0.070	0.014	-0.061	-0.037	0.006	0.003	0.161	0.229	**1.000**
		<.0001	*<.0001*	*<.0001*	*<.0001*	*0.006*	*0.314*	*0.729*	*0.502*	*<.0001*	_

Non-cash net working capital is calculated as (Current assets – Cash and Equivalents) – (Current Liabilities – Short Term Debt).
Sales growth is the change in sales deflated by previous year's sales.
Employee growth is the change in number of employees deflated by previous year's number of employees.
Abnormal Capital Investment is calculated as 3*CEt /(CEt-1 + CEt-2 – CEt-3) – 1, where CE is capital expenditure deflated by sales.
Total Assets Growth is the change in total assets deflated by average assets.
Non-cash net working capital is calculated as (Current assets – Cash and Equivalents) – (Current Liabilities – Short Term Debt).
Operating Accruals is the change in non-cash working capital less depreciation expense deflated by average total assets, calculated as (ΔCurrent Assets - ΔCash - (ΔCurrent Liabilities - ΔShort Term Debt - ΔTax Payables) - Depreciation)/ Average Assets.
ROA is operating income after depreciation deflated by average total assets.
ΔROA is this period's ROA minus last period's ROA.
Stock Return is the annual buy-hold stock return.
Positive non-cash net working capital firms have positive beginning non-cash NWC.
Negative non-cash net working capital firms have negative beginning non-cash NWC.

Table 6. Comparison of positive versus negative non-cash net working capital firms. The sample is from 1978 - 2007.

Panel A. Positive non-cash net working capital firms, 76,649 observations

Accruals Rank	Accruals $_{(t)}$	Sales Growth $_{(t)}$	Employee Growth $_{(t)}$	ΔROA $_{(t+1)}$	Return $_{(t+1)}$
Low =1	-0.20	5.0%	-3.6%	3.1%	8.2%
2	-0.10	9.2%	2.0%	0.6%	5.7%
3	-0.07	10.4%	3.7%	-0.2%	4.3%
4	-0.05	11.8%	4.6%	-0.5%	2.6%
Middle =5	-0.03	13.5%	6.0%	-0.7%	1.5%
6	-0.01	16.3%	8.1%	-1.0%	2.1%
7	0.01	19.7%	12.3%	-1.5%	0.7%
8	0.05	27.0%	18.2%	-2.3%	-1.5%
High=9	0.15	51.7%	36.7%	-4.0%	-6.6%
Low - High	-0.36	-46.7%	-40.3%	7.1%	14.8%
T-Stat	-315.68	-46.39	-57.26	36.42	10.38

Panel B. Negative non-cash net working capital firms, 18,488 observations

Accruals Rank	Accruals $_{(t)}$	Sales Growth $_{(t)}$	Employee Growth $_{(t)}$	ΔROA $_{(t+1)}$	Return $_{(t+1)}$
Low =1	-0.20	50.1%	22.9%	3.2%	9.4%
2	-0.11	33.0%	15.5%	0.3%	0.0%
3	-0.08	27.3%	12.2%	0.3%	5.7%
4	-0.06	28.3%	12.8%	-0.2%	6.9%
Middle =5	-0.05	28.7%	12.9%	-0.3%	1.6%
6	-0.03	28.3%	12.7%	-0.9%	0.6%
7	-0.02	29.2%	13.0%	-1.2%	2.6%
8	0.01	37.7%	14.8%	-0.9%	-1.2%
High=9	0.12	58.1%	21.5%	-1.6%	-1.4%
Low - High	-0.33	-8.1%	1.5%	4.7%	10.8%
T-Stat	-133.23	-2.35	0.82	8.91	3.37

Panel C. Positive non-cash net working capital firms, 76,649 observations

Accruals Rank	Accruals $_{(t)}$	Sales Growth $_{(t)}$	Employee Growth $_{(t)}$	ΔROA $_{(t+1)}$	Return $_{(t+1)}$
Low =1	-0.20	5.0%	-3.6%	3.1%	8.2%
Middle =5	-0.05	13.5%	6.0%	-0.7%	1.5%
Low - Middle	-0.17	-8.5%	-9.6%	3.8%	6.7%
T-Stat	-211.65	-11.62	-19.29	23.11	5.59

Panel D. Negative non-cash net working capital firms, 18,488 observations

Accruals Rank	Accruals $_{(t)}$	Sales Growth $_{(t)}$	Employee Growth $_{(t)}$	ΔROA $_{(t+1)}$	Return $_{(t+1)}$
Low =1	-0.20	50.1%	22.9%	3.2%	9.4%
Middle =5	-0.05	28.7%	12.9%	-0.3%	1.6%
Low - Middle	-0.16	21.3%	10.1%	3.5%	7.8%
T-Stat	-99.64	7.88	6.99	8.48	2.60

Portfolios are formed by ranking firm-year observations annually on accruals and assigning equal numbers to decile portfolios.
Hedge return represents the net return from taking a long position in the "Low" portfolio and an equal sized short position in the "High" portfolio.
Portfolio returns are equal-weighted mean annual buy-hold size-adjusted returns. The returns are cumulated starting from four months after the end of the fiscal year.
ΔROA is this period's ROA minus last period's ROA; ROA is operating income after depreciation deflated by average total assets.
Operating Accruals is the change in non-cash working capital less depreciation expense deflated by average total assets, calculated as (ΔCurrent Assets - ΔCash - (ΔCurrent Liabilities - ΔShort Term Debt - ΔTax Payables) - Depreciation)/ Average Assets.
Non-cash net working capital is calculated as (Current assets – Cash and Equivalents) – (Current Liabilities – Short Term Debt).
Sales growth is the change in sales deflated by previous year's sales.
Employee growth is the change in number of employees deflated by previous year's number of employees.
Positive non-cash net working capital firms have positive beginning non-cash NWC.
Negative non-cash net working capital firms have negative beginning non-cash NWC.

Table 7. Time-series means and t-statistics for coefficients from annual cross-sectional regressions of earnings persistence. The sample is from 1978-2007.

$$ROA_{t+1} = \alpha_0 + \beta_1 ROA_t + \beta_2 I[Pos\ NWC] + \beta_3 I[Pos\ NWC]*ROA_t + \beta_4 EmployeeGrowth_t + \beta_5 SalesGrowth_t + \beta_6 Ind\_FE + \beta_7 Year\_FE + \varepsilon_{t+1} \quad (3)$$

All Firms

	ROA $_{(t+1)}$		
	Coefficient	t-Stat	p-Value
ROA $_{(t)}$	0.8166	109.77	<.0001
I[Pos NWC] $_{(t-1)}$	0.0116	9.68	<.0001
ROA $_{(t)}$ * I[Pos NWC] $_{(t-1)}$	-0.0636	-7.15	<.0001
Employee Growth $_{(t)}$	-0.0072	-4.59	<.0001
Sales Growth $_{(t)}$	-0.0077	-6.41	<.0001
Number of Observations	93,771		
R-Square	0.65		

ROA is operating income after depreciation deflated by average total assets.
I[Positive NWC] is an indicator variable that equals 1 when the firm-year observation has positive beginning non-cash net working capital.
Non-cash net working capital is calculated as (Current assets – Cash and Equivalents) – (Current Liabilities – Short Term Debt).
Sales growth is the change in sales deflated by previous year's sales.
Employee growth is the change in number of employees deflated by previous year's number of employees.
Positive non-cash net working capital firms have positive beginning non-cash NWC.
Negative non-cash net working capital firms have negative beginning non-cash NWC.

Table 8. Nonlinear generalized least squares estimation (the Mishkin Test) of the market pricing of accruals, cash flows and growth with respect to their implications for earnings persistence. The sample is from 1978-2007.

Forecasting Equation: $\text{Earnings}_{t+1} = \gamma_0 + \gamma_1\text{Accruals}_t + \gamma_2\text{Cash Flows}_t + \gamma_3 I[\text{Pos NWC}]_t + \gamma_4 I[\text{Pos NWC}]*\text{Accruals}_t + \gamma_5 I[\text{Pos NWC}]*\text{Cash Flows}_t + \gamma_6\text{EmployeeGrowth}_t + \gamma_7\text{SalesGrowth}_t + \upsilon_{t+1}$ (4)

Valuation Equation: $\text{Abnormal Return}_{t+1} = \beta(\text{Earnings}_{t+1} - \gamma_0 - \gamma^*_1\text{Accruals}_t - \gamma^*_2\text{Cash Flows}_t - \gamma^*_3 I[\text{Pos NWC}]_t - \gamma^*_4 I[\text{Pos NWC}]*\text{Accruals}_t - \gamma^*_5 I[\text{Pos NWC}]*\text{Cash Flows}_t - \gamma^*_6\text{EmployeeGrowth}_t - \gamma^*_7\text{SalesGrowth}_t) + \varepsilon_{t+1}$ (5)

Panel A. Market pricing of persistence of accruals, cash flows, and growth

Forecasting Coefficients				Valuation Coefficients			
Parameter	Estimate	Asymptotic Std. Error	T-Value	Parameter	Estimate	Asymptotic Std. Error	T-Value
γ_1	0.6587	0.009	76.97	γ^*_1	0.7986	0.037	21.37
γ_2	0.8404	0.003	265.52	γ^*_2	0.8539	0.014	61.86
γ_3	0.0177	0.001	18.57	γ^*_3	0.0279	0.004	6.72
γ_4	0.0361	0.009	3.81	γ^*_4	0.0772	0.041	1.87
γ_5	-0.0716	0.004	-17.3	γ^*_5	-0.1128	0.018	-6.25
γ_6	-0.0020	0.001	-1.86	γ^*_6	0.0264	0.005	5.7
γ_7	-0.0062	0.001	-9.05	γ^*_7	-0.0015	0.003	-0.49

Panel B. Test of rational pricing of accruals, cash flows, and growth

Null Hypothesis	Likelihood Ratio Statistic	Marginal Significance Level
$\gamma_1 = \gamma_2$	498.94	<.0001
$\gamma^*_1 = \gamma^*_2$	2.42	0.1196
$\gamma_1 = \gamma^*_1$	13.33	0.000
$\gamma_2 = \gamma^*_2$	0.9	0.343
$\gamma_3 = \gamma^*_3$	5.77	0.016
$\gamma_4 = \gamma^*_4$	0.94	0.333
$\gamma_5 = \gamma^*_5$	4.96	0.026
$\gamma_6 = \gamma^*_6$	35.95	<.0001
$\gamma_7 = \gamma^*_7$	2.39	0.122
$\gamma_n = \gamma^*_n$ where n=1-7	296.87	<.0001

Earnings is operating income after depreciation deflated by average total assets.
Operating Accruals is the change in non-cash working capital less depreciation expense deflated by average total assets, calculated as (ΔCurrent Assets - ΔCash - (ΔCurrent Liabilities - ΔShort Term Debt - ΔTax Payables) - Depreciation)/ Average Assets.
Cash flows is the difference between Earnings and Operating Accruals.
I[Positive NWC] is an indicator variable that equals 1 when the firm-year observation has positive beginning non-cash net working capital.
Non-cash net working capital is calculated as (Current assets – Cash and Equivalents) – (Current Liabilities – Short Term Debt).
Employee Growth is the percentage change in the number of employees.
Sales Growth is the percentage change in sales.
Abnormal Return is the annual buy-hold size-adjusted stock return.

Figure 1. Graphical illustration of a supply shock in competitive industries.

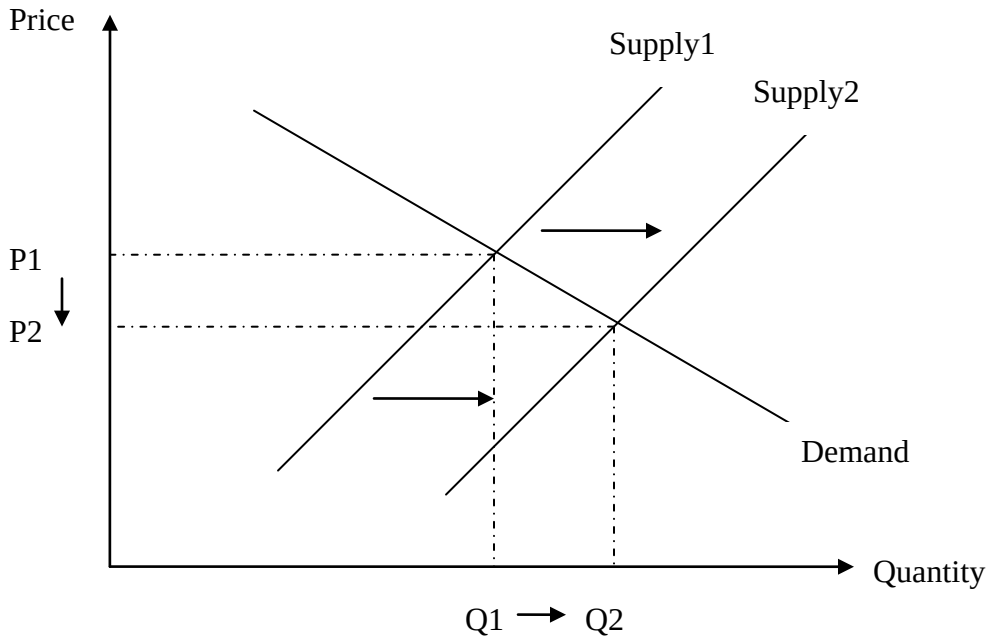


Figure 2. Comparison of positive versus negative non-cash net working capital firms. The sample is from 1978 - 2007.

Panel A. Number of firm-year observations

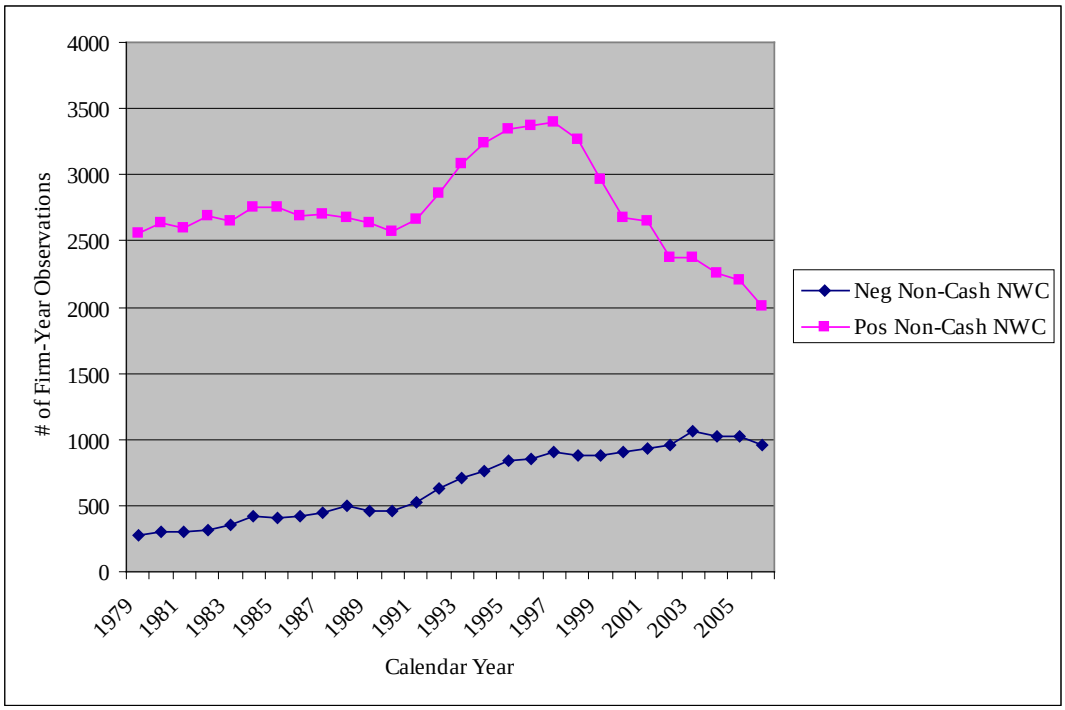
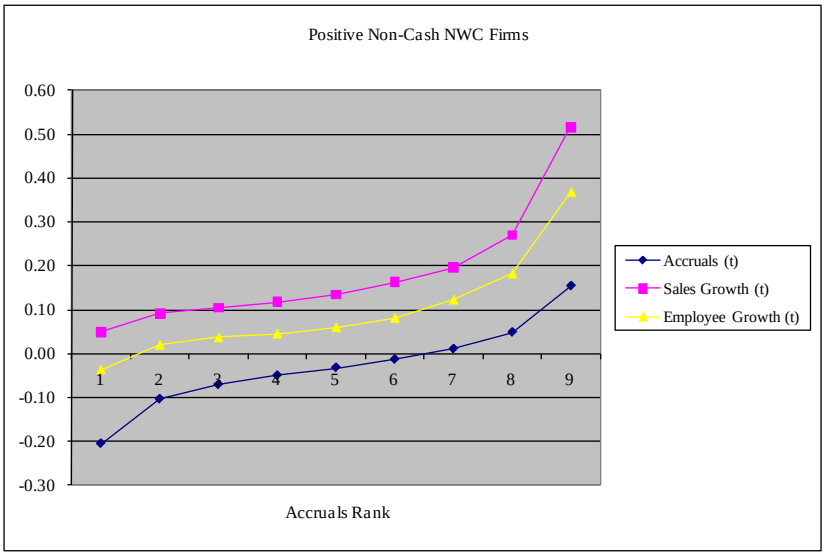
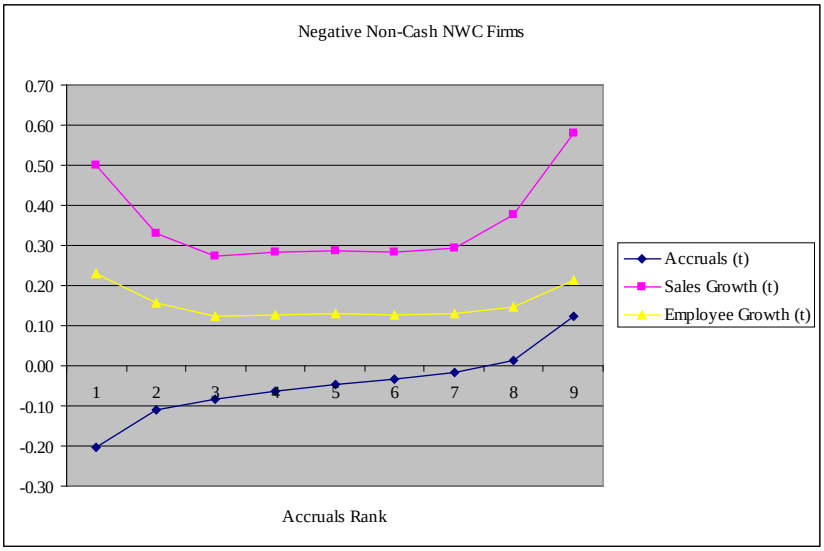


Figure 2 (Continued).

Panel B. Accruals and growth for positive non-cash net working capital firms



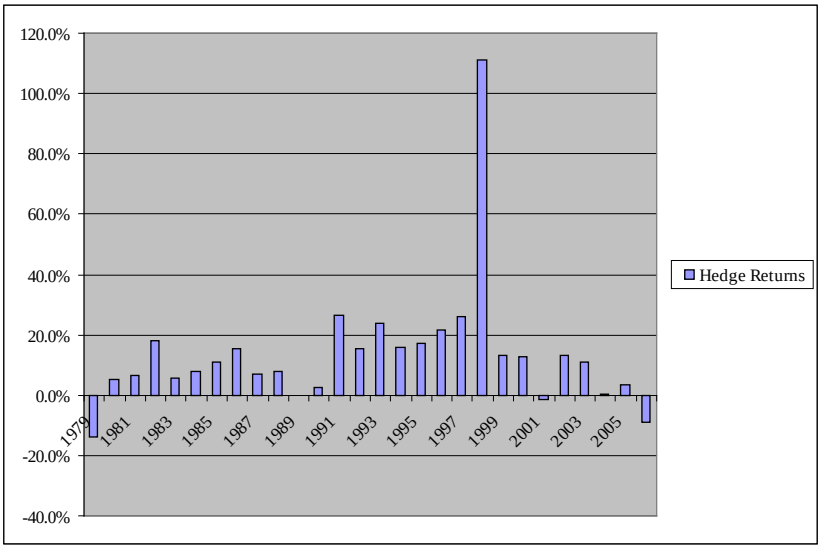
Panel C. Accruals and growth for negative non-cash net working capital firms



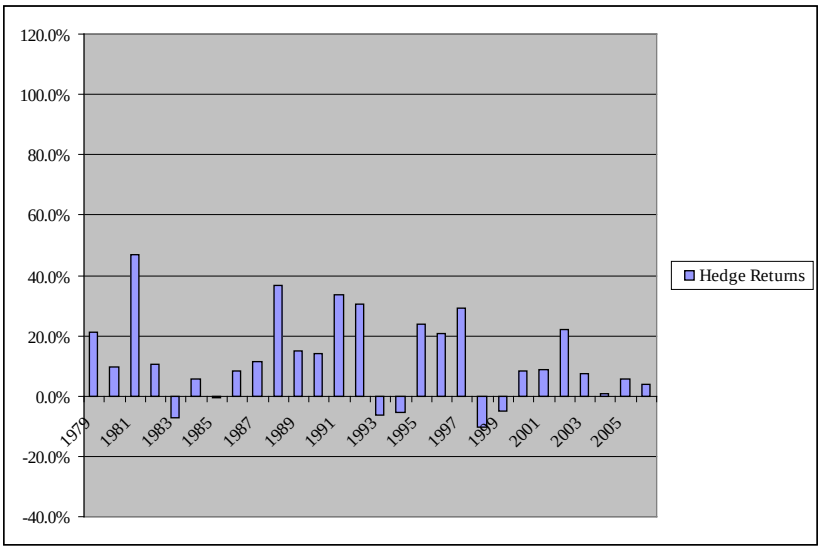
Portfolios are formed by ranking firm-year observations annually on accruals and assigning equal numbers to decile portfolios.
Operating Accruals is the change in non-cash working capital less depreciation expense deflated by average total assets, calculated as (ΔCurrent Assets - ΔCash - (ΔCurrent Liabilities - ΔShort Term Debt - ΔTax Payables) - Depreciation)/ Average Assets.
Non-cash net working capital is calculated as (Current assets – Cash and Equivalents) – (Current Liabilities – Short Term Debt).
Sales growth is the change in sales deflated by previous year's sales.
Employee growth is the change in number of employees deflated by previous year's number of employees.
Positive non-cash net working capital firms have positive beginning non-cash NWC.
Negative non-cash net working capital firms have negative beginning non-cash NWC.

Figure 3. Hedge returns by year for portfolios formed on accruals.

Panel A. Accruals and growth for positive non-cash net working capital firms



Panel B. Accruals and growth for negative non-cash net working capital firms



Portfolios are formed by ranking firm-year observations annually on accruals and assigning equal numbers to decile portfolios.
Hedge return represents the net return from taking a long position in the "Low" portfolio and an equal sized short position in the "High" portfolio.
Portfolio returns are equal-weighted mean annual buy-hold size-adjusted returns. The returns are cumulated starting from four months after the end of the fiscal year.
Operating Accruals is the change in non-cash working capital less depreciation expense deflated by average total assets, calculated as (ΔCurrent Assets - ΔCash - (ΔCurrent Liabilities - ΔShort Term Debt - ΔTax Payables) - Depreciation)/ Average Assets.
Non-cash net working capital is calculated as (Current assets – Cash and Equivalents) – (Current Liabilities – Short Term Debt).
Positive non-cash net working capital firms have positive beginning non-cash NWC.
Negative non-cash net working capital firms have negative beginning non-cash NWC.