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By

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Committee in charge:

Professor Patricia Dechow, Chair
Professor Richard Sloan
Professor Sunil Dutta
Professor Adam Szeidl

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Abstract

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The current debate in the literature about whether growth drives accruals is inconclusive because accruals and growth proxies are positively correlated, and most growth proxies are accruals-based. This study first demonstrates that the implications of accruals for future firm performance are not subsumed by the non-accruals-based employee growth in a regression setting. Then I identify a subset of firms for which economic conditions cause accruals to 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 more than current assets. In this setting, higher growth firms tend to have more 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 firm performance.

This dissertation is dedicated to the memory of my late grandfather, Dr. Hung-Fu Chu, who became a Doctor of Philosophy at the University of Illinois, Urbana-Champagne in 1945.

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Chapter I. Introduction

The implications of accrual accounting for earnings persistence and future stock returns constitute an important and heavily debated area in accounting research. Sloan (1996) argues that investors fail to fully anticipate that innovations in accruals are subject to distortions and tend to reverse in the future. Studies following Fairfield et al. (2003) maintain that the implications of accruals for future performance arise from a more general growth anomaly, in which diminishing marginal returns to investment cause depressed future profitability and stock returns. 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 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. It is also important to understand whether the poor future performance of high accruals firms is an accounting phenomenon or a result of an underlying economic process from a policy perspective. Regulators such as the Securities and Exchange Commission (SEC) and the Financial Accounting Standards Board (FASB) should address accounting rules that lead to accounting distortions. But if accruals merely reflect fundamental growth, then the low earnings persistence and future stock returns of high accruals firms do not necessarily entail policy implications for financial regulators and standard setters.

It is difficult to disentangle the accruals and growth effects because the majority of empirical studies in both accruals and growth research use accrual-based proxies. 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, it is challenging to interpret existing accruals and growth research that horse-race accruals and accruals-based growth proxies on future earnings and returns in the same regressions.

To address this difficulty, I use two empirical approaches to investigate whether the implications of accruals for earnings persistence and future stock returns are subsumed by growth. First, this paper builds on Zhang (2007)'s insight that employee change is an accruals-independent growth proxy. Zhang (2007)'s research design focuses on the co-variation between accruals and growth. This study instead follows Cooper et al. (2008) and Fama and French (2006) in studying the incremental predictive power of accruals and growth in a regression setting, but leverages employee growth as a non-accruals-based proxy. Since employee-growth may measure true underlying economic growth with error, sales growth is included as an additional control variable. Sales growth is often the driver for other forms of growth, and unlike asset-based growth proxies,

cannot be re-interpreted as another definition of accruals. Empirical results show that, after controlling for employee and sales growth, working capital accruals (also known as operating accruals) are still statistically and economically significant in predicting lower future earnings and one-year-ahead stock returns.

This study's second contribution to literature is identifying a subset of firms for which accruals *do not* capture growth. Specifically, I focus on firms with negative operating cycles and non-cash net working capital (NWC) balances. These firms typically have declining NWC as they grow because their business models result in current liabilities increasing more rapidly than current assets. For example, companies with significant subscription-based software sales such as Apple incur large deferred revenue liabilities and cash balances as they grow sales. Insurance companies such as Wellpoint receive cash for premiums but have to match revenues to the policy coverage period. Retailers such as Kroger 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. This is an important distinction as the diverging relationship between accruals and growth are due to underlying economic drivers. Therefore, the sample is not one where accruals do not happen to capture growth in a purely statistical sense. This approach then provides a discriminating test 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 growth likely 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. Consistent with the accounting distortions hypothesis, empirical results indicate that high growth firms with low accruals experience high future profitability and stock returns. These results are contrary to the growth hypothesis predictions, thus separating accruals from growth.

In addition, investors appear to value accruals no differently across the negative and positive non-cash NWC samples. Therefore, the negative non-cash NWC sample does not necessarily favor the accounting distortions hypothesis, and the independence of accruals' implications from growth can be generalized across the full sample.

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

Chapter II. Related Literature

2.1. Earnings Persistence

Sloan (1996) was first to document the accruals anomaly, and his primary finding was that the accruals portion of earnings was less persistent than the cash flow component of earnings. Furthermore, the study demonstrates that extreme accruals are the least persistent. 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 working capital 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 operating 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, Dechow et al. (2008) further decompose the cash flow component of earnings and 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 growth subsumes accruals. Of growth studies that do investigate earnings persistence, Fairfield et al. (2003) find that working capital 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 net operating assets (NOA) is defined as total operating 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 from 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 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, mispricing could result from the limited attention of investors who focus on accounting profitability without considering other factors in forecasting future cash profitability. 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 explain 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 working capital accruals and growth in long-term NOA have similar negative associations with future return on assets (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. Zhang (2007)

suggests that the accruals anomaly is attributable to the investment / growth information contained in accruals, which is measured as the covariation between accruals and employee growth. 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 show 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 the use of external financing proceeds 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 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 lower 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 that 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, revenues misstatement represents the most frequently committed type of fraud (54%). 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), 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.

A summary of the research designs and main findings from the above studies can be found in Appendix 1.

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.

Chapter III. Definitions and Sample Selection

3.1. 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 (also known as working capital accruals) are accordingly defined as the change in non-cash net working capital less change in taxes payable and depreciation expense. ROA 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.

3.2. Data

There are two main data sources for the empirical tests in this paper. Financial statement information comes 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 1^{st} and 99^{th} percentiles to mitigate outliers.

The full sample is then divided into positive and negative non-cash NWC firms-year observations. Non-cash NWC 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). This yields a sample of 76,649 firm-year observations with positive non-cash net working capital. The negative non-cash NWC sample contains 18,488 observations.

3.3. Descriptive Statistics

Table 1 provides univariate statistics for key variables. Panel A contains statistics for the sample with positive beginning non-cash NWC 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 NWC. 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.

Chapter IV. Research Questions and Empirical Results

4.1. The Incremental Effects of Accruals and Growth

The inconsistencies in the literature result from the use of accruals-based growth proxies and the positive correlation between operating accruals and growth proxies. Asset-based growth proxies such as total asset growth and NOA growth can be re-interpreted as expanded definitions of accruals. Moreover, Table 2 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). All accruals and growth proxies in Table 2 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 since employee growth is not based on accruals. The author constructs an empirical measure of co-variation between the two effects by regressing accruals on lead, lag, and current employee growth at the industry level. Zhang (2007) finds a high magnitude of the accruals anomaly in firms with accruals that highly co-vary with employee growth, concluding that growth subsumes the accruals anomaly. However, the study also reports that the high accruals portfolios in sub-samples with higher co-variation also tend to have higher average accruals *levels*. This leads to an alternative explanation that the magnitude of the accruals anomaly is simply stronger for portfolios where accruals levels are more extreme, regardless of employee growth. Moreover, even in the sub-sample where accruals do not capture employee growth, hedge returns from the accruals anomaly are still positive, as well as statistically and economically significant. Therefore, the study does not conclusively separate the effects of accruals from growth.

Building on Zhang (2007)'s insight on non-accruals based employee growth, this study offers an alternative approach to investigate whether employee growth subsumes accruals is by directly using the firm-year employee growth data in pooled regressions. The benefit of this approach is that it directly examines the incremental predictive power of the two effects. After controlling for growth, if accruals remain statistically and economically significant in negatively predicting future performance, then the accruals effect is unlikely to be subsumed by growth. The regression of future profitability is specified as follows:

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

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

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

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.

Results from pooled regressions of future profitability and stock returns are reported in Table 3. Following Petersen (2008), standard errors are clustered by firm (Compustat gvkey) and calendar year to correct for time-series dependence in standard errors. Two growth proxies are tested alongside operating accruals. Employee growth is selected because it is a non-accruals measure. However, depending on a firm's business model, employee growth may measure underlying economic growth with error. Therefore, sales growth is also included as an additional control variable. As discussed in Section II, sales growth 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 partially accruals-based, sales growth is an important proxy that drives other growth measures. In addition, unlike other asset-based growth proxies, sales growth is only partially accruals-based.

Panel A of Table 3 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. Likewise, Panel B of Table 3 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. Here 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 qualitatively change the incremental effect of operating accruals and growth proxies on future profitability and returns.

4.2. The Negative Non-Cash NWC Sample

A large part of the confusion in the literature results from the positive correlation between accruals and growth in the full sample. Even as results in Table 3 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. This study makes a second contribution to the literature by identifying a subset of firms for which business models cause accruals and growth proxies to be divergent. This results in differential empirical predictions for the accounting distortions and growth hypotheses. Since the divergent effects are based on economic conditions and not simple statistical correlations, this approach 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 larger magnitude 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 2 provides an example of the growth and NWC patterns of Kroger Co. (Kroger). Kroger is a retailer that operates supermarkets in various formats, including combination food and drug stores, multi-department stores, marketplace stores, price impact warehouse stores, fuel centers, and convenience stores. As Kroger grew in sales and employees, its accounts payable and accrued salaries grew more than its current non-cash assets. This resulted in negative non-cash NWC balances. At the same time, operating accruals became more negative. Therefore, this is an example where positive growth is associated with more negative accruals. The Kroger example illustrates the NWC dynamic of firms exploiting operating leverage.

Appendix 3 provides another example in 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 prior to fiscal year 2010, "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 substantial deferred revenue liability

instead of recognizing the sale in full. Appendix 3 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.

In September 2009, the FASB amended the accounting standards related to revenue recognition in relation to subscription accounting by issuing Accounting Standards Update ("ASU") 2009-14, Software (Topic 985): Certain Revenue Arrangements That Include Software Elements, and ASU 2009-13, Revenue Recognition (Topic 605): Multiple-Deliverable Revenue Arrangements. According to Apple's fiscal 2010 10-K filing, "the new accounting principles require the Company to account for the sale of these devices as two deliverables. The first deliverable is the hardware and software essential to the functionality of the hardware device delivered at the time of sale, and the second deliverable is the right included with the purchase of these devices to receive on a when-and-if-available basis, future unspecified software upgrades and features relating to the product's essential software. The new accounting principles result in the recognition of a substantial portion of the revenue and all product costs from the sale of these devices at the time of their sale." Therefore, future sale growth at Apple will not generate as large an amount of deferred revenue as in the past.

Appendix 4 provides an example of the growth and NWC patterns for an managed healthcare provider, Wellpoint Health Networks (Wellpoint). Through its subsidiaries Wellpoint offers a broad spectrum of network-based managed care plans to the large and small employer, individual, Medicaid and senior markets. Wellpoint's managed care plans include preferred provider organizations ("PPOs"), health maintenance organizations ("HMOs") and point-of-service ("POS") and other hybrid plans and traditional indemnity plans. In addition, Wellpoint offers managed care services, including underwriting, actuarial services, network access, medical management and claims processing. According to the company's filing with the SEC for the fiscal year ended 2002, "For most health care and life insurance contracts, premiums are billed in advance of coverage periods and are recognized as revenue over the period in which services or benefits are obligated to be provided…Premiums applicable to the unexpired contractual coverage periods are reflected in the accompanying consolidated balance sheet as unearned premiums." As Wellpoint grew its membership base and collected premiums, its deferred revenues and accounts payable grew at a larger extent than the company's non-cash current assets. As a result, the company's non-cash NWC balance and working capital accruals became more negative while it grew sales and the number of

employees. However, cash and equivalents grew significantly to make up the difference. This is another example where a firm's business model cause accruals and growth to be divergent.

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, subscription-based software firms subject to the deferred revenue recognition 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) 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 total 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 t-statistic for hedge portfolio returns is first calculated yearly then averaged across the sample years. 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 for hedge portfolio returns is first calculated yearly then averaged across the sample years. 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 average yearly hedge returns are significantly higher than zero with a t-statistics of 3.14 and 3.99 for the positive and negative non-cash NWC firms, respectively. The annual hedge returns have all been positive since 2000 for the negative non-cash NWC sample.

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 how investors price accruals, cash flows and growth proxies, the following regression is specified to establish whether there is a difference in future profitability implications between the positive and negative non-cash NWC samples:

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

Following Petersen (2008), standard errors are clustered by firm (Compustat gvkey) and calendar year to correct for time-series dependence in standard errors. Regression (3) 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 statistically significant at 1%, positive non-cash NWC firms, on average, have lower earnings persistence than negative non-cash NWC firms. This means that the decomposition of earnings into accruals and cash flows in the Mishkin test needs to take into account the differential earnings persistence between the two samples. However, since β_6 and β_7 are both statistically insignificant with p-values larger than 10%, there is no need to differentiate the two samples when controlling for employee growth and sales growth in the Mishkin test.

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:

$$\text{Forecasting Equation: } Earnings_{t+1} = \gamma_0 + \gamma_1 Accruals_t + \gamma_2 Cash\ Flows_t + \gamma_3 I[\text{Pos NWC}]_t + \gamma_4 I[\text{Pos NWC}]*Accruals_t + \gamma_5 I[\text{Pos NWC}]*Cash\ Flows_t + \gamma_6 EmployeeGrowth_t + \gamma_7 SalesGrowth_t + \upsilon_{t+1} \quad (4)$$

$$\text{Valuation Equation: } Abnormal\ Return_{t+1} = \beta(Earnings_{t+1} - \gamma_0 - \gamma^*_1 Accruals_t - \gamma^*_2 Cash\ Flows_t - \gamma^*_3 I[\text{Pos NWC}]_t - \gamma^*_4 I[\text{Pos NWC}]*Accruals_t - \gamma^*_5 I[\text{Pos NWC}]*Cash\ Flows_t - \gamma^*_6 EmployeeGrowth_t - \gamma^*_7 SalesGrowth_t) + \varepsilon_{t+1} \quad (5)$$

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. Note that the results do not qualitatively change if additional interactions between I[Pos NWC] and the two growth proxies are added to the regressions.

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 across the full sample.

Chapter V. Robustness Checks

Since the main results from the second empirical approach in this study derive from the low accruals, high growth portfolio in the negative non-cash NWC sample, it is important to study this sub-sample closely to exclude the results being driven by extreme or uncommon data. This study examines the industry composition of this sub-sample, and takes a closer look at the descriptive statistics. In particular, the low accruals portfolio in the negative non-cash NWC sample is compared to the high accruals portfolio in the same sample, as well as to the low accruals portfolio in the positive non-cash NWC sample.

Table 9 illustrates the industry composition of the low accruals, negative non-cash NWC sub-sample. Given that the prevalence of the deferred revenue rule in the software industry, it is not surprising to find that software is the most represented industry in the sample. Nevertheless, software only represents 19.1% of this sample, and does not on its own drive the general results. In fact, software is the most represented industry in the full sample as well. It is also important to point out that the September 2009 FASB ASUs 2009-13 and 2009-14 only changes the deferred revenue reporting environment for companies with largely hardware-based products with bundled software updates such as Apple, and do not impact all software companies in this sub-sample. As discussed above in the context of descriptive statistics of the negative non-cash NWC sample, oil services, pharmaceuticals, insurance, and retail companies tend to have business models that enable them to generate negative non-cash NWC while they positively grow. Overall the sub-sample is not composed overwhelmingly by any one of these most represented industries, and the results can be reasonably assured to be not driven by the circumstances of a particular industry.

The comparison between the low accruals and high accruals portfolio in the negative NWC sample can be found in Table 10. The low accruals portfolio on average enjoys significantly lower modified cash cycles (the difference between Days Sales Outstanding and Days Payables Outstanding) than the high accruals portfolio. The low accruals portfolio on average has slightly lower Book-to-Market ratios than the high accruals counterparts, making them more likely to be classified as glamour than value stocks. The glamour-value effect predicts lower future performance for glamour stocks, whereas the low accruals portfolio in this study outperforms the high accruals portfolio. Therefore, the results from this study are unlikely to be driven by the glamour-value effect. The average total assets for the low accruals portfolio are US$670 million, and are higher than the US$460 million average for the high accruals portfolio. Therefore, the results from this sub-sample are unlikely to be driven by extreme micro-cap firms. In addition, the size effect predicts smaller firms should outperform larger firms on average, and does not appear to drive the results in this study. To exclude the results being driven by the low accruals firms having taken a "big bath" previously, lagged special items scaled by total assets are calculated for the low accruals and high accruals firms. On average, the low accruals firms are found to have statistically significant lower lagged special items than the high accruals firms. This finding suggests that it is unlikely that the results are driven by previous "big baths." Finally, future earnings persistence in terms if future change in ROA and stock price performance are found to be both significantly higher in the low accruals sample than in the high accruals sample, confirming the

study's results. The t-statistic for the difference in size-adjusted stock returns is first calculated on a yearly basis then averaged across the sample years.

In addition, Table 11 compares the low accruals portfolio in the negative NWC sample to the low accruals portfolio in the positive NWC sample. This comparison is done to make sure that the low accruals portfolio in the negative NWC sample does not have drastically different accruals and future performance characteristics than the general low accruals sample. Without deliberately matching on accruals, average operating accruals for the low accruals portfolio in the negative non-cash NWC sample at -0.20 is the same as average operating accruals for the positive non-cash NWC sample. This finding excludes the possibility of the empirical results in this study being driven by firms with extraordinarily low accruals. Given that lower operating and cash cycles describe the different business models that drive negative non-cash NWC firms, it is not surprising to find that the modified cash cycle on average is lower for the low accruals portfolio in the negative non-cash NWC sample than in the positive non-cash NWC sample. In terms of the Book-to-Market metric, the low accruals portfolio in the negative non-cash NWC sample appears to be significantly lower and is more likely to be composed of glamour stocks. However, the low accruals portfolios in both samples enjoy future firm performance in terms of earnings persistence and stock returns that is not significantly different, again suggesting that the glamour-book effect does not drive results in this study. Similarly, while the low accruals firms in the negative non-cash NWC sample on average have higher total assets, they also enjoy the same future performance as their positive non-cash NWC counterparts. This again suggests that the size effect is not in play here. Finally, average lagged special items scaled by total assets appear to be the same for the low accruals portfolios in both negative and positive non-cash NWC samples, further confirming that the "big bath" story is not the driver for this study's results.

The examination of the low accruals, high growth sub-sample in the negative non-cash NWC sample suggests that the empirical results in this study are not driven by extreme or unusual data, and are independent of the glamour-value and size effects. In addition, there is no evidence of previous "big baths" driving the superior future performance in this sub-sample.

Chapter VI. Conclusion

The current debate in the literature about whether growth drives accruals is inconclusive because accruals and growth proxies are positively correlated, and most growth proxies are accruals-based. This study first builds on Zhang (2007)'s insight that employee-growth is not accruals-based, and establishes that working capital accruals remain statistically and economically significant in negatively predicting earnings persistence and future stock returns after controlling for growth. I then identify a subset of firms for which economic conditions cause accruals and growth to be divergent. 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.

In this special sample, the accounting distortions hypothesis and the growth hypothesis offer opposite predictions. Consistent with the accounting distortions but 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 across the full sample. Therefore, the effect of accruals on future profitability and stock returns is distinct from the growth hypothesis. This study has policy implications as standard setters should address accounting rules that lead to distortions. The FASB's September 2009 ASUs that amended the revenue recognition rule related to products with multiple software deliverables is a commendable step.

References.

Agrawal, A., J. Jaffe and G. Mandelker, 1992. The post-merger performance of acquiring firms: A re-examination of an anomaly. Journal of Finance.

Allen, E., C. Larson and R. Sloan. 2010. Accrual reversal, earnings and stock returns. Working paper.

Ali, D. A., L. Hwang, and M. Trombley, 2000. Accruals and future stock returns: tests of the naïve investor hypothesis. Journal of Accounting, Auditing & Finance.

Anderson, C. W., and L. Garcia-Feijoo, 2006. Empirical Evidence on Capital Investment, Growth Options, and Security Returns. Journal of Finance.

Chan, K., L. Chan, N. Jegadeesh, and J. Lakonishok, 2006. Earnings quality and stock returns. Journal of Business.

Cheng, C. and W. Thomas, 2006. Evidence of the abnormal accrual anomaly incremental to operating cash flows. The Accounting Review.

Collins, D.W., and P. Hribar, 2000, Earnings-based and accrual-based market anomalies: One effect or two? Journal of Accounting and Economics.

Cooper, M, H. Gulen, and M. Schill, 2008. Asset growth and the cross-section of stock returns. Journal of Finance.

Cusatis, M, and Woolridge, 1993. Restructuring through spinoffs: The stock market evidence. Journal of Financial Economics.

Dechow, P., and I. Dichev, 2002. The quality of accruals and earnings: The role of accrual estimation errors. The Accounting Review.

Dechow, P., and W. Ge, 2006. The persistence of earnings and cash flows and the role of special items: Implications for the accrual anomaly. Review of Accounting Studies.

Dechow, P., S. Richardson, and R. Sloan 2008. The persistence and pricing of the cash component of earnings. Journal of Accounting Research.

Dechow, P., W. Ge, C. Larson, and R. Sloan, 2010. Predicting material accounting misstatements. Contemporary Accounting Research, forthcoming.

Desai, H. M., S. Rajgopal, and M. Venkatachalam, 2004. Value-glamour and accruals mispricing: one anomaly or two? The Accounting Review.

Dutta, S., and S. Reichelstein, 2002. Controlling investment decisions: depreciation and capital charges. Review of Accounting Studies.

Eberhart, A., W. Maxwell, and A. Siddique, 2004. Does the stock market under-react to R&D increases? Journal of Investment Management.

Fairfield, P. M., J. S. Whisenant, and T. L. Yohn, 2003. Accrued earnings and growth: implications for future profitability and market mispricing. Accounting Review.

Fama, E., & French K., 2006. Profitability, investment and average returns. Journal of Financial Economics.

Healy, P. M.,1985. The effect of bonus schemes on accounting decisions. Journal of Accounting and Economics.

Hirshleifer, D., K. Hou, S. Teoh, and Y. Zhang, 2004. Do investors overvalue firms with bloated balance sheets? Journal of Accounting and Economics.

Ibbotson, R., 1975. Price performance of common stock new issues. Journal of Financial Economics.

Jones, J. 1991. Earnings Management during Import Relief Investigations. Journal of Accounting Research.

Lee, K.L., 2010. Purchase obligations, earnings persistence and stock returns. Working paper.

Li, D., and L. Zhang, 2000. Does q-theory with investment frictions explain anomalies in the cross section of returns? Journal of Financial Economics.

Loughran, T., and J. Ritter, 1995. The new issues puzzle. Journal of Finance.

Mishkin, F., 1983. A rational expectations approach to macro econometrics: testing policy effectiveness and efficient markets models. Chicago, IL, University of Chicago Press for NBER.

Penman S. & X. Zhang, 2002. Accounting conservatism, the quality of earnings and stock returns. The Accounting Review.

Petersen, M.A. 2008. Estimating standard errors in Finance panel data sets: Comparing Approaches. Review of Financial Studies.

Richardson, S., R. Sloan, M. Soliman, and I. Tuna, 2005. Accrual reliability, earnings persistence and stock prices. Journal of Accounting & Economics.

Richardson, S., R. Sloan, M. Soliman, and I. Tuna, 2006. The implications of firm growth and accounting distortions for accruals and profitability. The Accounting Review.

Sloan, R, 1996. Do stock prices fully reflect information in accruals and cash flows about future earnings? The Accounting Review.

Stigler, G. 1963. Capital and Rates of Return in Manufacturing Industries. Princeton, NJ: Princeton University Press.

Thomas, J. K., H. Zhang. 2002. Inventory changes and future returns. Review of Accounting Studies.

Titman, S., J. Wei, and F. Xie. 2004. Capital investments and stock returns. Journal of Financial and Quantitative Analysis.

Xie, H. 2001. The mispricing of abnormal accruals. The Accounting Review.

Zach, T. 2007. Evaluating the 'Accrual-Fixation' Hypothesis as an Explanation for the Accrual Anomaly. Working Paper, Ohio State University.

Zhang, F., 2007. Accruals, investment, and the accruals anomaly. The Accounting Review.

Appendix 1. Literature review.

	Accruals	Growth
Earnings Persistence	Sloan (1996): $Earnings_{t+1} = \gamma_0 + \gamma_1 Accruals_t + \gamma_2 Cash\ Flows_t + \upsilon_{t+1}$ $\gamma_1 < \gamma_2$ and $\gamma_1 = \gamma_2$ rejected => accruals portion of earnings less persistent than the cash flow portion.	Fairfield et al. (2003): $ROA_{t+1} = \alpha + \beta_1 \Delta LTNOA_t + \beta_2 Accruals_t + \beta_3 ROA_t + e_{t+1}$ β_1 and β_2 are both negative and not significantly different from each other => Accruals and growth in long-term net operating assets have equivalent incremental negative relations with future profitability.
	Collins and Hribar (2000): Forecasting (quarterly data): $Earnings_{t+1} = Earnings_{t-3} + \gamma_0 + \gamma_1 Accruals_t + \gamma_2 Cash\ Flow_t - \alpha_1 Earnings_{t-4} + \upsilon_{t+1}$ $\gamma_1 < \gamma_2$: accruals are less persistent than cash flows, after controlling for post-earnings announcement drift.	Zach (2006): ~ 25% of firms in portfolios of extreme high (low) accruals have been in the same portfolios in the previous year, and associated with abnormal returns=> "stickiness" inconsistent with the accrual-fixation hypothesis.
	Xie (2001): 1) Estimate abnormal accruals using Jones model: $Accruals_t = a_1[1/Total\ Assets_{t-1}] + a_2[\Delta Revenues_t/TA_{t-1}] + a_3[PPE_t/TA_{t-1}] + e_t$ Regression residuals are abnormal accruals. Forecasting: $Earnings_{t+1} = \gamma_0 + \gamma_1 Cash\ Flows_t + \gamma_2 Normal\ Accruals_t + \gamma_3 Abnormal\ Accruals_t + \upsilon_{t+1}$ $\gamma_1 > \gamma_2 > \gamma_3$ significant: cash flow is more persistent than normal accruals, which in turn is more persistent than abnormal accruals.	Zhang (2007): $Earnings_t = \beta_0 + \beta_1 Accruals_{t-1} + \beta_2 Cash\ Flows_{t-1} + e_t$ $\beta_1 - \beta_2 = PERS$ is negative on average => accruals are less persistent than cash flows. (Industry-level regressions)
	Dechow and Dichev (2002): $\Delta Working\ Capital_t = b_0 + b_1 * Cash\ Flows_{t-1} + b_2 * CFO_t + b_3 * CFO_{t+1} + \varepsilon_t$ The standard deviation of the residuals is a measure of accrual quality, where higher standard deviation denotes lower quality => firms with extreme accrual estimation errors tend to have extreme accruals and low earnings persistence.	
	Thomas and Zhang (2002): Median and mean ROE increase following extreme low ΔInventory, and decrease following extreme high ΔInventory => demand shifts cause both the inventory changes and related profitability reversals.	
	Hirshleifer, Hou, Teoh, and Zhang (2004): Forecasting: $Earnings_{t+1} = \gamma_0 + \gamma_1 Accruals_t + \gamma_2 NOA_t + \gamma_3 Cash\ Flows_t + \upsilon_{t+1}$ γ_2 significantly negative=> net operating assets are a cumulative measure of the deviation between accounting value added and cash value added, therefore past earnings growth does not sustain in the future .	

Appendix 1. Literature review (continued).

	Accruals	Growth
Earnings Persistence	Richardson et al. (2005): 1) Accruals = ΔWorking Capital + ΔNon-Current Operating Assets +ΔFinancial Assets 2) $ROA_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2 \Delta WC_t + \rho_3 \Delta NCO_t + \rho_4 \Delta FIN_t + \upsilon_{t+1}$ ρ_2 and $\rho_3 < \rho_4$ => less reliable accruals are less persistent.	
	Chan, Chan, Jegadeesh, and Lakonishok (2006): In top quintile accrual portfolio, special items average -0.14% of total assets before portfolio formation, and -0.56% after => The increase in income-decreasing special items following high accrual year may reflect the effects of managerial manipulation of earnings in prior years being reversed over time.	
	Dechow and Ge. (2006): $Earnings_{t+1} = \alpha + \delta_1 Cash\ Flows_t + \delta_2 Pre\text{-}special\ item\ accruals_t + \delta_3 Special\ Items_t + \varepsilon_{t+1}$ $\delta_3 < \delta_2$ significant => special item component of accruals is less persistent than other accrual components; firms with special items appear to be an important driver of the lower coefficient on accruals relative to cash flows.	
	Richardson et al. (2006): 1) $RNOA_{t+1} = \gamma_0 + \gamma_1 RNOA_t + \gamma_2 \Delta TACC_t + \upsilon_{t+1}$ $\gamma_2 < 0$ significant => new accrual categorization of change in net operating assets is still less persistent than cash flows. 2) Accrual decomposition: $TACC_t = \Delta Sales_t/Sales_{t-1} - \Delta Asset\ Turnover_t/AT_t - (\Delta Sales_t/Sales_{t-1})*(\Delta AT_t/AT_t)$ $RNOA_{t+1} = \gamma_0 + \gamma_1 RNOA_t + \gamma_2 \Delta Sales_t - \gamma_3 \Delta AT_t - \gamma_2(\Delta Sales_t * \Delta AT_t) + \upsilon_{t+1}$ $\gamma_3 < \gamma_2$ significant => diminishing marginal returns to investment are not the primary driver of the lower persistence of accruals.	
	Dechow, Richardson and Sloan (2008): Forecasting: $Earnings_{t+1} = \alpha_0 + \alpha_1 Accruals_t + \alpha_2 \Delta Cash\ Balance_t + \alpha_3 Net\ Equity\ Distributions_t + \alpha_4 Net\ Debt\ Distributions_t + \upsilon_{t+1}$ $\alpha_2 < \alpha_4 < \alpha_3$ significant => cash flows are only more persistent when they are distributed to equityholders.	Hirshleifer, Hou and Teoh (2009): $Earnings_{t+1} = \alpha + \beta_1 Accruals_t + \beta_2 Cash\ Flow_t + \upsilon_{t+1}$, variables in aggregate values. $\beta_1 < \beta_2$ significant=> accruals are less persistent than cash flows in the aggregate.
	Allen, Larson, and Sloan (2010): $\Delta Earnings_{t+1} = \alpha_0 + \alpha_1(Accruals_t - Inventory_t) + \alpha_2(Accruals\ Reversals_t - Inventory\ Reversals_t) + \alpha_3 \Delta Inventory_t + \alpha_4\ Inventory\ Reversals_{t+1} + \upsilon_{t+1}$ α_2 and α_4 significantly positive while α_1 and α_3 are no longer significant => accrual reversals are responsible for the negative relation between accruals and future changes in net income.	

Appendix 1. Literature review (continued).

	Accruals	Growth
Valuation Anomaly	Sloan (1996): Forecasting: $Earnings_{t+1} = \gamma_0 + \gamma_1 Accruals_t + \gamma_2 Cash\ Flows_t + \upsilon_{t+1}$ Valuation: Abnormal $Return_{t+1} = \beta(Earnings_{t+1} - \gamma_0 - \gamma^*_1 Accruals_t - \gamma^*_2 Cash\ Flows_t) + \varepsilon_{t+1}$ Mishkin test of market efficiency $\gamma_1 = \gamma^*_1$ and $\gamma_2 = \gamma^*_2$ rejected => investors fail to anticipate fully the lower (higher) persistence of earnings performance attributable to the accrual (cash flow) component of earnings. Significant annual hedge return of 11.2% from portfolios sorted on accruals => valuation anomaly.	Agrawal et al. (1992): Acquiring firms experience post-merger cumulative average market-adjusted abnormal return of -10% over five years. Post-merger CAR = $b_0 + b_1$Announcement CAR + ε b_1 is significantly negative => inconsistent with the hypothesis that market is slow to adjust to the merger announcement. Authors speculate that the subsequent long-run underperformance is due to unrelated causes.
	Collins and Hribar (2000) using quarterly data: 1) Forecasting: $Earnings_{t+1} = Earnings_{t-3} + \gamma_0 + \gamma_1 Accruals_t + \gamma_2 Cash\ Flow_t - \alpha_1 Earnings_{t-4} + \upsilon_{t+1}$ Valuation: Abnormal $Return_{t+1} = \beta_0 + \beta_1 (Earnings_{t+1} - Earnings_{t-3} - \gamma_0 - \gamma^*_1 Accruals_t - \gamma^*_2 Cash\ Flows_t + \alpha^*_1 Earnings_{t-4}) + \varepsilon_{t+1}$ Mishkin test of market efficiency $\gamma_1 = \gamma^*_1$ and $\gamma_2 = \gamma^*_2$ rejected => investors fail to anticipate fully the lower persistence of accruals compared to cash flows after controlling for post-announcement earnings drift. 2) Abnormal $Return_{t+1} = \alpha + \beta_1 SUE1_t + \beta_2 SUE5_t + \beta_3 Accruals1_t + \beta_4 Accruals5_t + \beta_5 SUE1*ACC1_t + \beta_6 SUE1*ACC5_t + \beta_7 SUE5*ACC1_t + \beta_8 SUE5*ACC5_t + e_{t+1}$ β_5, β_6 and β_7 significantly negative => post-earnings announcement drift (proxied by unexpected earnings SUE) is largely mitigated when the mispricing associated with accruals moves in the opposite direction. Joint SUE and accrual strategy yield hedge returns larger than individual strategies => SUE and accrual strategies measure different forms of mispricing.	Cusatis and Wooldridge (1993): Spin-off firms earn significant positive raw buy-hold returns 6months, 1 to 3 years after stock listing. Matched-firm-adjusted-returns are significantly positive returns only for 2 year (25%) and 3 year windows. Parent firms earn significant positive raw returns 6months, 1 to 3 years after completion of spin-off. Matched-firm-adjusted-returns are significantly positive returns only for 6 month, 1 and 2 year windows (26.7%). => Investors underestimated the value created by spinoffs. => spinoffs, by dividing a company into separate businesses and thereby effectively creating pure plays for prospective bidders, create value by providing a relatively low-cost method of transferring control of corporate assets to acquiring firms.
		Loughran and Ritter (1995): IPO firms earn geometric mean annual return of 5.1% in 5 years while matched firms earn 11.8%. SEO firms earn geometric mean annual return of 7% in 5 years while matched firms earn 15.3%. For SEOs, past extreme winners that do not issue equity dramatically outperform extreme winners that do issue; firms issuing during years when there is little issuing activity do not underperform much at all, whereas firms selling stock during high-volume periods severely underperform => not merely long term return reversals. traditional measure of risk, beta, is slightly higher for issuing firms than nonissuers, implying that issuers should have higher, not lower, returns => new issue puzzle.

Appendix 1. Literature review (continued).

	Accruals	Growth
Valuation Anomaly	Xie (2001): Forecasting: $Earnings_{t+1} = \gamma_0 + \gamma_1 Cash\ Flows_t + \gamma_2 Normal\ Accruals_t + \gamma_3 Abnormal\ Accruals_t + \upsilon_{t+1}$ Valuation: $Abnormal\ Return_{t+1} = \alpha + \beta(Earnings_{t+1} - \gamma_0 - \gamma^*_1 Cash\ Flows_t - \gamma^*_2 NAC_t - \gamma^*_3 ABNAC_t) + \varepsilon_{t+1}$ Mishkin test $\gamma^*_2 = \gamma^*_3$ and $\gamma_2 = \gamma_3$ rejected => the market significantly overprices abnormal accruals more than normal accruals. Significant annual hedge return of 11% from portfolios sorted on abnormal accruals while hedge returns on normal accrual portfolios are insignificant=> valuation anomaly for discretionary accruals.	Fairfield et al. (2003): Forecasting: $ROA_{t+1} = \alpha + \beta_1 \Delta LTNOA_t + \beta_2 Accruals_t + \beta_3 ROA_t + e_{t+1}$ Valuation: $Abnormal\ Return_{t+1} = \alpha + \theta(ROA_{t+1} - \beta_0 - \beta^*_1 \Delta LTNOA_t - \beta^*_2 Accruals_t - \beta^*_3 ROA_t) + \varepsilon_{t+1}$ Mishkin test fail to reject $\beta^*_1 = \beta^*_2$ and $\beta_1 = \beta_2$ => the market's mispricing of growth in long-term net operating assets (LTNOA), relative to its implications for one-year-ahead ROA, does not differ significantly from the mispricing of accruals. Significant Fama-French alphas are found for both low LTNOA growth (0.45% monthly) and low accrual firms (0.53% monthly). => the market does not misprice long-term growth and accruals differently.
	Thomas and Zhang (2002): Significant annual hedge return of 11.4% from portfolios sorted on ΔInventory => inventory accruals are a major contributor to the accrual anomaly.	Desai (2004): Double-sorted hedge portfolio returns show that: 1) sales growth strategy is subsumed by accruals; 2) accruals and Book-to-Market capture different mispricing but predictive ability of B/M is weakened in the presence of accruals; 3) accruals earn abnormal returns incremental to Earnings-to-Price; 4) accruals earn abnormal returns incremental to CF(E-Depreciation)-to-Price; 5) Operating Cash Flows-to-Price subsumes accruals. $Return_{t+1} = \alpha_0 + \alpha_1 Accruals_t + \alpha_2 \Delta Sales_t + \alpha_3 B/M_t + \alpha_4 CFO/P_t + \varepsilon_{t+1}$ α_1 becomes insignificant while α_4 is significant=> accrual anomaly subsumed by CFO/Price, which can be viewed as an expanded value-glamour proxy.
	Hirshleifer et al. (2004): Forecasting: $Earnings_{t+1} = \gamma_0 + \gamma_1 Accruals_t + \gamma_2 NOA_t + \gamma_3 Cash\ Flows_t + \upsilon_{t+1}$ Valuation: $Abnormal\ Return_{t+1} = \beta(Earnings_{t+1} - \gamma_0 - \gamma^*_1 Accruals_t - \gamma^*_2 NOA_t - \gamma^*_3 Cash\ Flows_t) + \varepsilon_{t+1}$ Mishkin test $\gamma_2 = \gamma^*_2$ rejected and significant annual hedge return of 12.4% from portfolios sorted on net operating asset level => the market significantly overprices NOA because it fails to discount the unsustainability of earnings growth . The ability of NOA to predict returns is robust to eliminating from the sample firms with equity issuance and M&A activity exceeding 10% of total assets => anomaly incremental to new issue and investment anomaly.	
	Richardson et al. (2005): $Return_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2 \Delta WC_t + \rho_3 \Delta NCO_t + \rho_4 \Delta FIN_t + \upsilon_{t+1}$ ρ_2 and $\rho_3 < \rho_4$ => investors fail to anticipate fully the lower persistence of less reliable accruals. Largest significant annual hedge return of 18% is obtained by combining current and non-current accruals (ΔWC + ΔNCO = ΔNOA) to form portfolios. By contrast the more persistent financing accrual yields negative hedge returns => valuation anomaly.	McConnell and Ovtchinnikov (2004): $(Ret_t - RetRF_t) = \alpha + \beta_1 (RetMKT_t - RetRF_t) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 UMD_t) + \varepsilon_t$ Spin-off subsidiaries earn significantly positive α. Spin-off parents, however, after correcting for one very large positive outlier, earn α that are not statistically or economically different from zero.

Appendix 1. Literature review (continued).

	Accruals	Growth
Valuation Anomaly	Chan et al. (2006): Abnormal $Return_{t+1} = \alpha_0 + \alpha_1 \Delta Accounts\ Receivable_t + \alpha_2 \Delta Inventory_t + \alpha_3 \Delta Accounts\ Payable_t + \varepsilon_{t+1}$ α_1 is -0.149; α_2 is -0.2661 similar to coefficient on accruals alone => The bulk of the predictive power of accruals stems from changes in inventory and changes in accounts receivable.	Titman Wei and Xie (2004): $(Ret_t - RetRF_t) = \alpha + \beta_1 (RetMKT_t - RetRF_t) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 UMD_t) + \varepsilon_t$ Significantly negative α are obtained for high quintile (both 4 and 5) portfolios sorted on abnormal CI (capital expenditure in excess of past three-year average). $Return_t = \lambda_0 + \lambda_1 CI_{t-1} + \lambda_2 (CI_{t-1})(Cash\ Flow_{t-1}) + \lambda_3 (CI_{t-1})(Debt/Assets_{t-1}) + \varepsilon_{t+1}$ λ_1 and λ_2 are significantly negative while λ_3 is positive => consistent with the idea that investors tend to underreact to the empire building implications of increased investment expenditures.
	Cheng and Thomas (2006): 1) Estimate abnormal accruals using modified Jones model: $Accruals_t = a_1[1/Total\ Assets_{t-1}] + a_2[(\Delta Revenues_t - \Delta Receivables_t)TA_{t-1}] + a_3[PPE_t/TA_{t-1}] + e_t$ Regression residuals are abnormal accruals. 2) $Return_{t+1} = \beta_0 + \beta_1$(- Rank of abnormal accruals) + β_2(Rank of OCF/P) + β_3(Rank of B/M) + β_4(Rank of sales growth) + ε_{t+1} β_1 significantly positive => the accrual anomaly is incremental to Operating Cash Flow/Price, a proxy for value/glamour anomaly.	Anderson and Garcia (2006): Since market value increases following investment in sufficiently positive net present value projects, and by more than book value, firms classified as growth stocks appear to be exercising investment options around the portfolio formation period while firms classified as value stocks appear to be disinvesting. $Return_{t+1} = \alpha_0 + \alpha_1 FF\text{-}Beta_{t+1} + \alpha_2 Size_{t+1} + \alpha_3 B/M_{t+1} + \alpha_4 \Delta Capex_{t,\ t-k} + \varepsilon_{t+1}$ where $_{k=2\ or\ 3}$ α_4 coefficients are significantly negative, and value effect is weakened within portfolios sorted on past investment growth=> firm-specific capital investment appears to condition not only valuation ratios, but also expected stock returns.
	Dechow et al. (2008): Forecasting: $Earnings_{t+1} = \alpha_0 + \alpha_1 Accruals_t + \alpha_2 \Delta Cash\ Balance_t + \alpha_3 Net\ Equity\ Distributions_t + \alpha_4 Net\ Debt\ Distributions_t + \upsilon_{t+1}$ Valuation: $Return_{t+1} = \beta(Earnings_{t+1} - \alpha_0 - \alpha_1 Accruals_t - \alpha_2 \Delta Cash_t - \alpha_3 Net\ Equity\ Distributions_t - \alpha_4 Net\ Debt\ Distributions_t) + \varepsilon_{t+1}$ Mishkin test $\alpha_3 = \alpha^*_3$ and $\alpha_3 = \alpha^*_3$ cannot be rejected while $\alpha_1 = \alpha^*_1$ and $\alpha_2 = \alpha^*_2$ was rejected => investors correctly estimate the persistence of profitability associated with distributed capital, but overestimate the persistence of profitability associated with retained capital.	Zach (2006): $R(E^q_{t+1}) = \alpha + \beta_q R(E^4_t) + \varepsilon$ Where $R(E^q_{t+1})$ is the earnings announcement return around the q^{th} quarter of year t, the fiscal year at the end of which accruals are measured and ranked. βs are mostly NOT significantly negative and are NOT stronger in extreme accruals quintiles => inconsistent with the accrual-fixation hypothesis.

Appendix 1. Literature review (continued).

	Accruals	Growth
Valuation Anomaly	Dechow and Ge. (2006): 1) Forecasting: $Earnings_{t+1} = \gamma_0 + \gamma_1 CFO_t + \gamma_2$Pre-SI operating $accruals_t + \gamma_3$Special $Items_t + \upsilon_{t+1}$ Valuation: Abnormal $Return_{t+1} = \beta(Earnings_{t+1} - \gamma_0 - \gamma^*_1 CFO_t - \gamma^*_2$Pre-SI operating $accruals_t - \gamma^*_3$Special $Items_t) + \varepsilon_{t+1}$ Mishkin test of market efficiency $\gamma_1 = \gamma^*_1$ and $\gamma_2 = \gamma^*_2$ and $\gamma_3 = \gamma^*_3$ rejected; $\gamma^*_3 < \gamma^*_1 < \gamma^*_2$ and $\gamma_3 < \gamma^*_3$ economically large => Investors appear to recognize that special items are less persistent than other components of accruals, but they overweigh their persistence. 2) Compares special item-low accrual firms to other low accrual Firms => special item firms have significantly lower asset growth, lower past sales growth more negative changes in earnings, and a greater percentage of firms reporting losses => performed very poorly during the fiscal year in which they report the special item.	Zhang (2007): 1) calculate COVAR = $\alpha_1 + \alpha_2 + \alpha_3$ from industry-level regressions $Accruals_t = \alpha_0 + \alpha_1 \Delta Employees_{t-1} + \alpha_2 \Delta Employees_t + \alpha_3 \Delta Employees_{t+1} + \varepsilon_t$ 2) $Return_{t+1} = \alpha_0 + \alpha_1 Accruals_t + \alpha_2 COVAR_t + \alpha_3 COVAR*Accruals_t + \varepsilon_{t+1}$ α_3 is negative and significant=> accrual anomaly is stronger for firms whose accruals capture more fundamental investment information. 3) $Return_{t+1} = \alpha_0 + \alpha_1 Accruals_t + \alpha_2 PERS_t + \alpha_3 PERS*Accruals_t + \varepsilon_{t+1}$ α_3 is negative but insignificant => accrual anomaly should predict positive α_3 as lower persistence should lead to higher returns. Significant annual hedge return of more than 10% documented for portfolios formed on accruals, ΔEmployees and other growth proxies => accruals and growth proxies may be correlated.
	Allen et al. (2010): Abnormal $Return_{t+1} = \alpha_0 + \alpha_1(Accruals_t - Inventory_t) + \alpha_2(Accruals\ Reversals_t - Inventory\ Reversals_t) + \alpha_3 \Delta Inventory_t + \alpha_4\ Inventory\ Reversals_{t+1} + \upsilon_{t+1}$ α_2 and α_4 significantly positive while α_1 and α_3 are now positive => accrual reversals, and their associated impact on earnings, are what drives the predictable future stock returns.	Cooper, Gulen and Schill (2008): 1) $Return_t = \alpha_0 + \alpha_1 \Delta Total\ Assets_{t-1} + \alpha_2\ \Delta Total\ Assets_{t-2} + \alpha_3 B/M_t + \alpha_4 MV_t + \alpha_5 Return_{t-0.5,\,t} + \alpha_5 Return_{t-3,\,t} + \alpha_6$ (Other Growth Proxy) $+ \varepsilon_t$ Where other growth proxies include mean $\Delta Sales_{t-5,t}$, Titman et al. (2004) CI_{t-1}, Hirshleifer et al. (2004) NOA/A_{t-1}, Sloan (1996) $Accruals_{t-1}$, and 5-year weighted average rank of asset growth. α_1 is significantly negative after controlling for other growth proxies individually => investors overextrapolate past gains to growth. 2) Total asset growth decomposition: $Return_t = \alpha_0 + \alpha_1 \Delta Cash_{t-1} + \alpha_2\ \Delta Current\ Assets_{t-1} + \alpha_3 \Delta PPE_{t-1} + \alpha_4\ \Delta Other\ Assets_{t-1} + \varepsilon_t$ $Return_t = \beta_0 + \beta_1 \Delta OpLiab_{t-1} + \beta_2\ \Delta Debt_{t-1} + \beta_3 \Delta Stock_{t-1} + \beta_4\ \Delta RE_{t-1} + \varepsilon_t$ α_3, β_2 and β_3 significantly negative => ability of asset growth to predict the cross-section of returns is due to its ability to capture common return effects across components of a firm's total investment or financing activities.

Appendix 1. Literature review (continued).

	Accruals	Growth
Valuation Anomaly		Hirshleifer, Hou and Teoh (2009): 1) $Returns_{t+1} = \alpha + \beta_1 Accruals_t + \beta_2 Cash\ Flow_t + \beta_3 B/M_t + \beta_4 (Equity\ Issues/Debt\ Issues)_t + \beta_5 Dividend/P_t + \beta_6 (Baa\ yield\text{-}Aaa\ yield)_t + \beta_7 (10\text{-}yr\ treasury\ rate - 1\text{-}yr\ treasury\ rate)_t + \beta_8 TBill\ Rate_t + \upsilon_{t+1}$, variables in aggregate values. $\beta_1 > 0$ and $\beta_2 < 0$ significant=> accruals, though less persistent, predict positive future returns in the aggregate; inconsistent with the earnings fixation hypothesis. Note that aggregate accruals have mean of -0.044, SD of 0.017, Q1 of -0.050 and Q3 of -0.038. In contrast, firm-level accruals have mean of -0.020, SD of 0.101, Q1 of -0.065 and Q3 of 0.017. Unlike firm-level accruals, aggregate accruals exhibit less variation and are mostly negative. 2) $Returns_t = \alpha + \beta_1 \Delta Accruals_t + \beta_2 \Delta Cash\ Flow_t + \beta_3 \Delta (Equity\ Issues/Debt\ Issues)_t + \beta_4 \Delta (Baa\ yield\text{-}Aaa\ yield)_t + \beta_5 \Delta (10\text{-}yr\ treasury\ rate - 1\text{-}yr\ treasury\ rate)_t + \beta_6 \Delta TBill\ Rate_t + \upsilon_{t+1}$, variables in aggregate values. $\beta_1 < 0$ significant=> innovations in accruals are associated with negative contemporaneous returns in the aggregate; accruals are positively related to a rise in discount rate.
		Li and Zhang (2010): 1) 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: Frictions mean that investment entails investment costs => higher investment entails higher investment costs => investment less elastic to changes in the discount rate under higher investment. 2) Using financing constraints as proxies for investment frictions (asset size, dividend payout ratio and bond-rating availability), examine the prediction of q-theory that investment costs make the relations of expected returns with investment-to-assets and asset growth steeper. Accounting for investment costs does not enable q-theory to explain the investment growth, net stock issues, abnormal corporate investment, or net operating assets anomalies. 3) Proxies for limits-to-arbitrage motivated by mispricing (idiosyncratic volatility and dollar trading volume) dominate proxies for investment frictions in direct comparisons. Double sorts on a limits-to-arbitrage measure and an investment friction measure => slope differences across extreme investment frictions subsamples in the low limits-to-arbitrage subsample are insignificant; while slope differences across limits-to-arbitrage subsamples across investment frictions subsample are significant.

Appendix 2. Kroger Co. (gvkey 006502) selected financial information. Balance sheet information is in $ millions.

	Fiscal Year	1992	1993	1994
	Cash and Equivalents	104	121	27
(a)	**Non-Cash Current Assets**	**2,065**	**2,105**	**2,125**
	Total Current Assets	2,168	2,226	2,152
	Non-Current Assets	2,135	2,255	2,556
	Total Assets	4,303	4,480	4,708
	Debt in Current Liabilities	81	71	16
	Deferred Revenues - Current	0	0	0
	Accounts Payable	1,298	1,358	1,426
	Accrued Expenses and Other Current Liabilities	796	822	953
(b)	**Non-Cash Current Liabilities**	**2,093**	**2,180**	**2,379**
	Total Current Liabilities	2,174	2,251	2,395
	Non-Current Liabilities	4,829	4,689	4,466
	Shareholder's Equity	-2,700	-2,460	-2,154
	Total Liabilities and Stockholder's Equity	4,303	4,480	4,708
(a) - (b)	**Non-Cash Net Working Capital**	**-29**	**-75**	**-254**
	Operating Accruals	-0.06	-0.07	-0.10
	Sales Growth	4%	1%	3%
	Employee Growth	12%	0%	5%
	ΔROA	0%	0%	1%
	Stock Return	25%	10%	54%

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 - ΔCurrent 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.

Appendix 3. 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 and Other Current Liabilities	531	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 - ΔCurrent 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.

Appendix 4. Wellpoint Health Networks Inc. (gvkey 027766) selected financial information. Balance sheet information is in $ millions.

	Fiscal Year	1999	2000	2001	2002
	Cash and Equivalents	3,150	3,663	4,861	6,639
(a)	**Non-Cash Current Assets**	**666**	**837**	**1,011**	**1,574**
	Total Current Assets	3,816	4,500	5,873	8,213
	Non-Current Assets	777	1,004	1,599	3,090
	Total Assets	4,593	5,505	7,472	11,303
	Debt in Current Liabilities	0	0	0	0
	Deferred Revenues - Current	230	232	333	496
	Accounts Payable	1,583	2,080	2,718	3,567
	Other Current Liabilities	714	761	1,015	1,689
(b)	**Non-Cash Current Liabilities**	**2,527**	**3,073**	**4,066**	**5,752**
	Total Current Liabilities	2,527	3,073	4,066	5,752
	Non-Current Liabilities	753	787	1,274	1,574
	Shareholder's Equity	1,313	1,644	2,133	3,977
	Total Liabilities and Stockholder's Equity	4,593	5,505	7,472	11,303
(a) - (b)	**Non-Cash Net Working Capital**	**-1,862**	**-2,236**	**-3,055**	**-4,178**
	Operating Accruals	-0.10	-0.10	-0.14	-0.12
	Sales Growth	16%	23%	35%	40%
	Employee Growth	0%	3%	28%	17%
	ΔROA	0%	0%	1%	-1%
	Stock Return	36%	34%	21%	48%

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 - ΔCurrent 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. Sample Descriptive Statistics. The sample is from 1978 - 2007.

Panel A. Positive non-cash net working capital firms

	Variable	Mean	Median
	Non-cash NWC ($M)	101.78	21.60
Op. Cycle	Operating Cycle (Days)	105	90
	Days Sales - Days Payables Outstanding	16	18
Growth Proxies	Sales Growth	18.3%	9.9%
	Employee Growth	9.8%	3.0%
	Abnormal Corporate Investment	6.3%	-10.2%
	Total Assets Growth	11.1%	7.8%
	Operating Accruals	-0.03	-0.03
	$ROA_{(t)}$	7.4%	8.9%
	$\Delta ROA_{(t+1)}$	-0.7%	-0.2%
	Stock Return $_{(t+1)}$	17.8%	6.1%
	# of Observations in Sample	76,649	

Panel B. Negative non-cash net working capital firms

	Variable	Mean	Median	Panel B Mean - Panel A Mean	T-Statistic
	Non-cash NWC ($M)	-42.74	-4.60	-144.52	-114.97
Op. Cycle	Operating Cycle (Days)	-1	5	-106	-131.01
	Days Sales - Days Payables Outstanding	-31	-11	-47	-63.42
Growth Proxies	Sales Growth	35.6%	12.0%	17.3%	26.50
	Employee Growth	15.3%	5.0%	5.6%	15.97
	Abnormal Corporate Investment	7.8%	-13.4%	1.5%	1.58
	Total Assets Growth	12.0%	7.6%	0.9%	3.42
	Operating Accruals	-0.05	-0.05	-0.02	-22.40
	$ROA_{(t)}$	-1.7%	5.5%	-9.1%	-50.34
	$\Delta ROA_{(t+1)}$	-0.2%	-0.1%	0.6%	5.96
	Stock Return $_{(t+1)}$	17.6%	4.0%	-0.2%	-0.25
	# 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.
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 - ΔCurrent 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 2. 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 - ΔCurrent 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 3. Means and t-statistics for coefficients from cross-sectional regressions of accruals and growth proxies. The sample is from 1978-2007. T-statistics are clustered on both firm and year.

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

	Predicted	**ROA $_{(t+1)}$**		**ROA $_{(t+1)}$**		**ROA $_{(t+1)}$**		**ROA $_{(t+1)}$**	
	Sign	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
ROA $_{(t)}$	+	0.8179	70.93	0.8213	69.55	0.8039	66.95	0.7993	65.09
Operating Accruals $_{(t)}$	–	-0.1205	-17.80	-0.1342	-18.92				
Employee Growth $_{(t)}$	–	-0.0032	-1.59			-0.0177	-9.78		
Sales Growth $_{(t)}$	–	-0.0083	-5.99					-0.0135	-10.23
Number of Observations		93,771		95,137		93,771		95,137	
R-Square		0.66		0.63		0.63		0.63	

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 - ΔCurrent 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. Continued.

Panel B: $\text{Stock Returns}_{t+1} = \alpha_0 + \beta_1 \text{ROA}_t + \beta_2 \text{Accruals}_t + \beta_3 \text{EmployeeGrowth}_t + \beta_4 \text{SalesGrowth}_t + \beta_5 \text{Market-Rf} + \beta_6 \text{SMB} + \beta_7 \text{HML} + \beta_8 \text{Momentum} + \varepsilon_{t+1}$ (2)

	Predicted	**ROA $_{(t+1)}$**		**ROA $_{(t+1)}$**		**ROA $_{(t+1)}$**		**ROA $_{(t+1)}$**	
	Sign	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
ROA $_{(t)}$	+	0.8179	70.93	0.8213	69.55	0.8039	66.95	0.7993	65.09
Operating Accruals $_{(t)}$	–	-0.1205	-17.80	-0.1342	-18.92				
Employee Growth $_{(t)}$	–	-0.0032	-1.59			-0.0177	-9.78		
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Number of Observations		93,771		95,137		93,771		95,137	
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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 - ΔCurrent 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 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 - ΔCurrent 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. T-statistics are clustered by year.

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

Accruals Rank	Accruals $_{(t)}$	Sales Growth $_{(t)}$	Employee Growth $_{(t)}$	ΔROA $_{(t+1)}$	Size Adj. 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		-46.7%	-40.3%	7.1%	14.8%
T-Stat		-20.36	-20.56	22.17	3.14

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

Accruals Rank	Accruals $_{(t)}$	Sales Growth $_{(t)}$	Employee Growth $_{(t)}$	ΔROA $_{(t+1)}$	Size Adj. 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		-8.1%	1.5%	4.7%	10.8%
T-Stat		-1.54	0.51	6.38	3.99

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 - ΔCurrent 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 6. Continued.

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		-8.5%	-9.6%	3.8%	6.7%
T-Stat		-8.07	-14.46	15.47	2.93

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		21.3%	10.1%	3.5%	7.8%
T-Stat		5.06	4.59	5.66	2.50

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 - ΔCurrent 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. Means and t-statistics for coefficients from cross-sectional regressions of earnings persistence. The sample is from 1978-2007. T-statistics are clustered on both firm and year.

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

All Firms

	ROA $_{(t+1)}$	
	Coefficient	t-Stat
ROA $_{(t)}$	0.8451	68.70
I[Pos NWC] $_{(t-1)}$	0.0127	6.22
ROA $_{(t)}$ * I[Pos NWC] $_{(t-1)}$	-0.0796	-5.93
Employee Growth $_{(t)}$	-0.0061	-1.41
Sales Growth $_{(t)}$	-0.0062	-2.50
Employee Growth $_{(t)}$ * I[Pos NWC] $_{(t-1)}$	-0.0027	-0.66
Sales Growth $_{(t)}$ * I[Pos NWC] $_{(t-1)}$	-0.0055	-1.88
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: $\text{Earnings}_{t+1} = \gamma_0 + \gamma_1\text{Accruals}_t + \gamma_2\text{Cash Flows}_t + \gamma_3\text{I[Pos NWC]}_t + \gamma_4\text{I[Pos NWC]*Accruals}_t + \gamma_5\text{I[Pos NWC]*Cash Flows}_t + \gamma_6\text{EmployeeGrowth}_t + \gamma_7\text{SalesGrowth}_t + \upsilon_{t+1}$ (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)

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

Forecasting Coefficients				Valuation Coefficients			
		Asymptotic				Asymptotic	
Parameter	Estimate	Std. Error	T-Value	Parameter	Estimate	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 - ΔCurrent 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.

Table 9. Industry composition of low accruals, negative non-cash net working capital firms (accruals rank = 1 in Table 6, Panel A). Compustat Fundamental Annual File, 1978 - 2007.

	Neg Non-cash NWC Low Accruals			All Firms	
	Industry	Frequency	Percentage	Industry	Frequency	Percentage
1	Softw	224	19.1%	Softw	999	8.8%
2	Oil	160	13.7%	Rtail	692	6.1%
3	Drugs	108	9.2%	Chips	690	6.1%
4	Meals	79	6.7%	BusSv	656	5.8%
5	BusSv	76	6.5%	Oil	563	5.0%
6	Telcm	73	6.2%	Drugs	552	4.9%
7	Trans	53	4.5%	Whlsl	501	4.4%
8	Insur	40	3.4%	Mach	397	3.5%
9	Fun	36	3.1%	Hardw	395	3.5%
10	Rtail	35	3.0%	MedEq	391	3.5%
	Others	287	24.5%	Others	5,495	48.5%
	# of Firms	1,171		# of Firms	11,331	

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 - ΔCurrent Debt - ΔTax Payables) - Depreciation)/ Average Assets.
Negative non-cash net working capital firms have negative beginning non-cash NWC.
Industry classification is according to Fama and French 49 Industries.

Table 10. Descriptive statistics of the low accruals (rank = 1) and high accruals (rank = 9) portfolios in the negative non-cash net working capital sample. The sample is from 1978-2007.

Negative NWC - Low Accruals		Negative NWC - High Accruals			
	Mean		Mean	Low - High Mean	T-Statistic
Op. Accruals $_{(t)}$	-0.20	Op. Accruals $_{(t)}$	0.12	-0.33	-133.23
Days Sales - Days Payables Outstanding $_{(t)}$	-62	Days Sales - Days Payables Outstanding $_{(t)}$	-24	-37	-10.21
Book/Market $_{(t)}$	0.40	Book/Market $_{(t)}$	0.43	-0.03	-1.91
Total Assets $_{(t)}$ ($M)	670	Total Assets $_{(t)}$ ($M)	460	210	2.43
Special Items/Total Assets $_{(t-1)}$	-0.02	Special Items/Total Assets $_{(t-1)}$	-0.03	0.01	6.61
ΔROA $_{(t+1)}$	3.2%	ΔROA $_{(t+1)}$	-1.6%	5%	8.91
Stock Return $_{(t+1)}$	9.4%	Stock Return $_{(t+1)}$	-1.4%	10.8%	3.99

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 - ΔCurrent Debt - ΔTax Payables) - Depreciation)/ Average Assets.
DSO is calculated as [Average Accounts Receivable/(SALES/365)], and DPO is calculated as [Average Accounts Payables/(COGS/365)].
Book/Market is the book value of equity divided by the market value of equity.
Total Assets Growth is the change in total assets deflated by 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.
Negative non-cash net working capital firms have negative beginning non-cash NWC.

Table 11. Descriptive statistics of the low accruals (rank = 1) portfolios in the positive and negative non-cash net working capital samples. The samples are from 1978-2007.

Negative NWC - Low Accruals		Positive NWC - Low Accruals			
	Mean		Mean	Low - High Mean	T-Statistic
Op. Accruals $_{(t)}$	-0.20	Op. Accruals $_{(t)}$	-0.20	0.00	0.83
Days Sales - Days Payables Outstanding $_{(t)}$	-62	Days Sales - Days Payables Outstanding $_{(t)}$	12	-73	-26.06
Book/Market $_{(t)}$	0.40	Book/Market $_{(t)}$	0.77	-0.37	-29.97
Total Assets $_{(t)}$ ($M)	670	Total Assets $_{(t)}$ ($M)	446	224	3.21
Special Items/Total Assets $_{(t-1)}$	-0.02	Special Items/Total Assets $_{(t-1)}$	-0.02	0.00	0.75
ΔROA $_{(t+1)}$	3.2%	ΔROA $_{(t+1)}$	3.1%	0%	0.12
Stock Return $_{(t+1)}$	9.4%	Stock Return $_{(t+1)}$	8.2%	1.2%	0.43

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 - ΔCurrent Debt - ΔTax Payables) - Depreciation)/ Average Assets.
DSO is calculated as [Average Accounts Receivable/(SALES/365)], and DPO is calculated as [Average Accounts Payables/(COGS/365)].
Book/Market is the book value of equity divided by the market value of equity.
Total Assets Growth is the change in total assets deflated by 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.

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

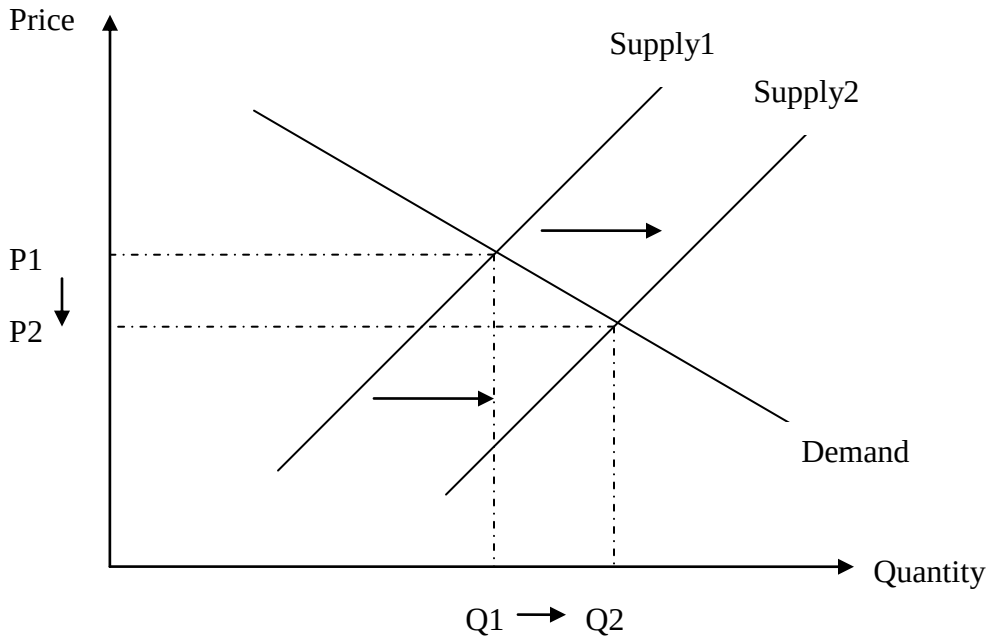


Figure 2. Comparison of positive versus negative non-cash net working capital firms. The sample is from 1978 - 2007.

Panel A. Number of firm-year observations

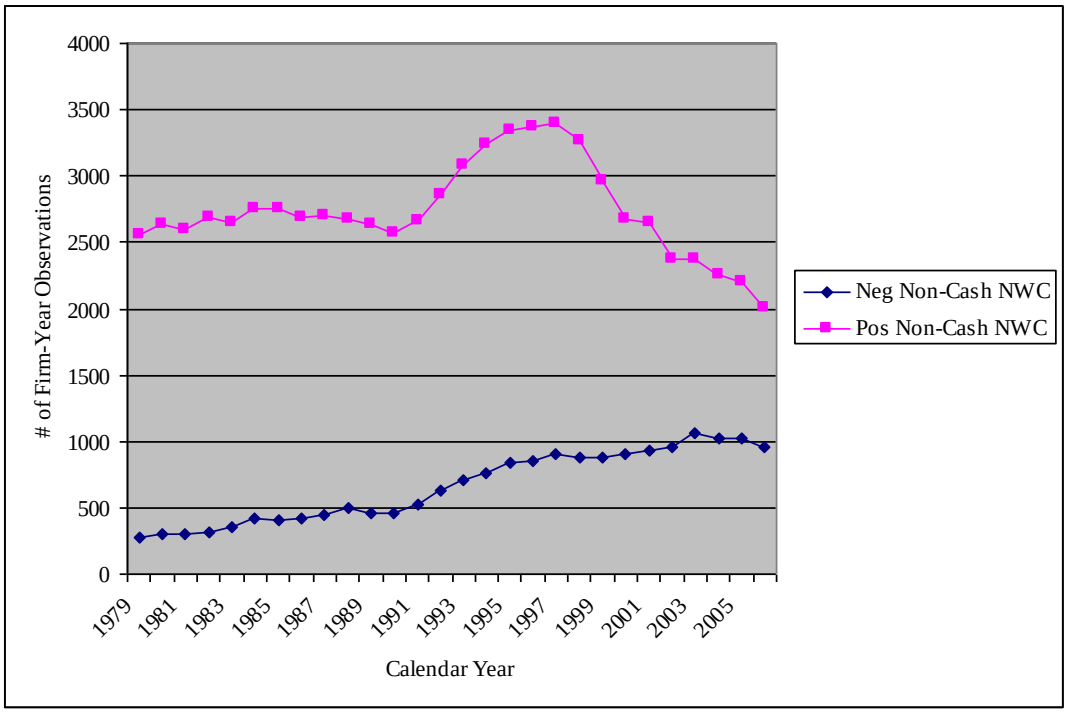
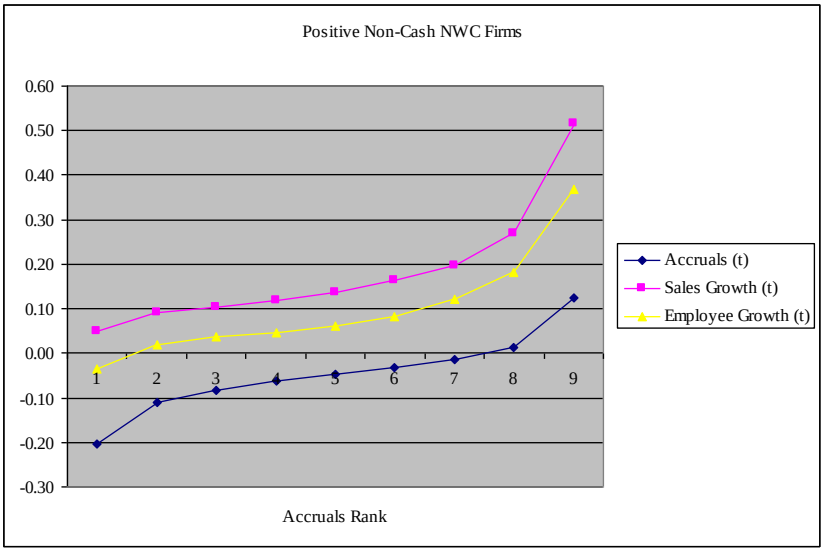
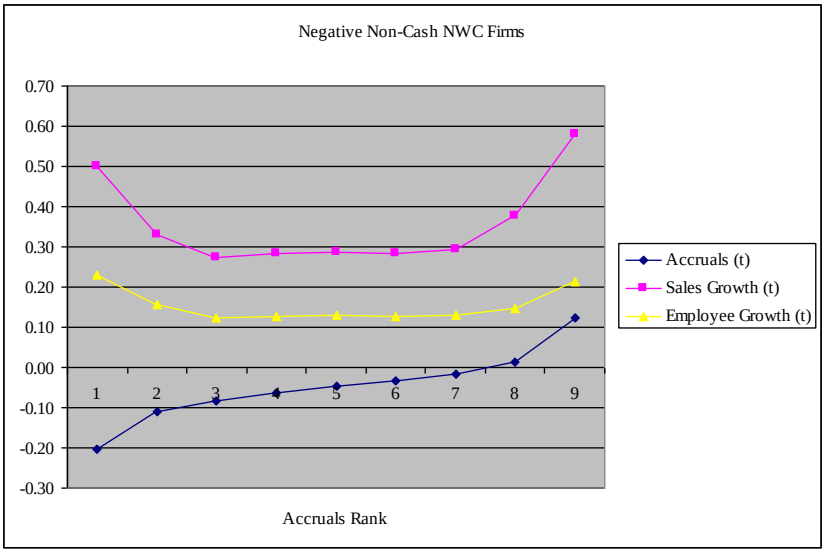


Figure 2 (Continued).

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



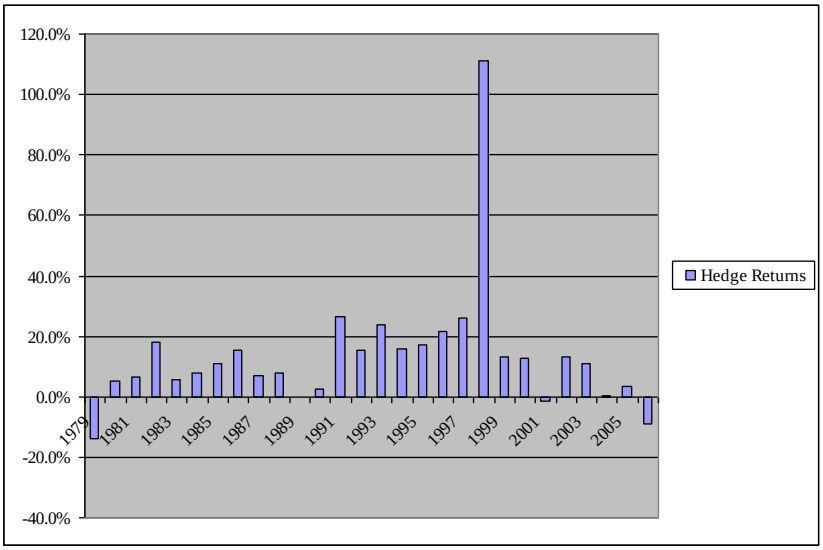
Panel C. Accruals and growth for negative non-cash net working capital firms



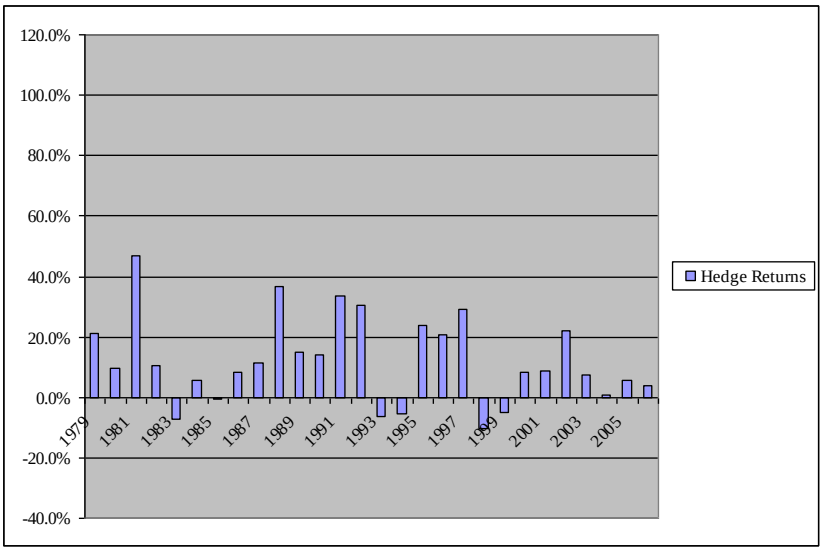
Portfolios are formed by ranking firm-year observations annually on accruals and assigning equal numbers to decile portfolios.
Operating Accruals is the change in non-cash working capital less depreciation expense deflated by average total assets, calculated as (ΔCurrent Assets - ΔCash - (ΔCurrent Liabilities - ΔCurrent 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 - ΔCurrent 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.