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Agency Theory of Overvalued Equity as an Explanation for the Accrual Anomaly

Abstract

We show that the agency theory of overvalued equity (see Jensen, 2005) rather than investors' fixation on accruals explains the accrual anomaly, i.e., abnormal returns to an accrual trading strategy (see Sloan, 1996). Under the agency theory of overvalued equity, managers of overvalued firms are likely to manage their firms' accruals upwards to prolong the overvaluation. Thus, high-accrual portfolios are likely to be over-represented with over-valued firms. Overvaluation, however, cannot be sustained indefinitely and we expect price reversals for high accrual firms. In contrast, undervalued firms do not face incentives to report low accruals, so undervalued firms are not concentrated in low accrual decile portfolios. Therefore, across the accrual decile portfolios, we predict and find an asymmetric relation between accruals and both prior and subsequent returns. In addition, consistent with the predictions of the agency theory of overvalued equity, we find high, but not low, accrual firms' investment-financing decisions and insider trading activity are distorted, and analyst forecast optimism is concentrated among the high-accrual decile portfolios. Overall, return behavior, analyst optimism, investment-financing decisions, and insider trading activity are all consistent with the agency theory of overvalued equity, but do not support investor fixation on accruals.

JEL: M41, G3.
Keywords: accrual anomaly, earnings management, agency theory of overvalued equity.

Agency Theory of Overvalued Equity as an Explanation for the Accrual Anomaly

1 Introduction

The prevailing hypothesis in the literature is that investor fixation causes the Sloan (1996) accrual anomaly, i.e., a predictable negative relation between accounting accruals and subsequent stock returns. Our tests show that the agency theory of overvalued equity, the agency hypothesis, explains the accrual anomaly, whereas the evidence does not support the investor-fixation hypothesis. A large body of research articulates the agency theory of overvalued equity and its implications for corporate investment, financing, and financial reporting decisions.[1] One of the predictions of the theory is that overvalued firms' managers attempt to boost their firms' reported performance to meet investor expectations. We therefore expect overvalued firms to aggressively engage in earnings management, and as a result, following a period of overvaluation, such firms gravitate toward the high accrual deciles of the population of firms. Therefore, when firms are sorted according to accruals, firms with prior over-valuation are likely to be over-represented in the high accrual decile portfolios. However, since overvaluation and superior reported performance cannot last indefinitely, we expect, and find, negative abnormal returns for the high accrual decile portfolio.[2]

In contrast, undervalued firms are not expected to actively under-report accruals, i.e., manage earnings downwards. In fact, under-valued firms might also attempt to manage earnings

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[1] See Jensen, Murphy, and Wruck (2004), Jensen (2005), Shleifer and Vishny (2003), Baker, Stein, and Wurgler (2003), Polk and Sapienza (2004), Moeller, Schlingemann, and Stulz (2005), Ritter (1991), Loughran and Ritter (1995), Graham and Harvey (2001), Dong, Hirshleifer, Richardson, and Teoh (2006), and others.

[2] Preceding discussion raises at least two questions. First, how do some firms end up being overvalued (or undervalued) in an efficient market, the maintained assumption underlying the agency theory of overvalued equity? Second, why do managers of overvalued firms attempt to prolong overvaluation and thus face potential adverse consequences when prices revert to their normal level? We address these questions below in section 2.

upward to correct the misevaluation. Therefore, such firms are unlikely to be concentrated in the low accrual deciles of the population of firms; instead they might be dispersed across various accrual deciles of firms. Hence, the low accrual decile portfolios' future stock-price performance is expected to be normal. This prediction differs from that of the investor-fixation hypothesis for the accrual anomaly.

The fixation and agency hypotheses both imply that investors misunderstand company fundamentals for some firms, which leads to mispricing. However, under fixation, accruals cause mispricing, whereas under the agency hypothesis high accruals are, in part, a byproduct of overvaluation. Overvalued firms' managers likely engage in earnings management and report high accruals. The fixation and agency hypotheses therefore generate different predictions. (i) Fixation predicts a linear relation between accruals and future returns. In contrast, the agency hypothesis predicts a kink in the relation between accruals and future returns, with negative future returns for the high, but not positive returns for the low accrual decile portfolios. (ii) Since earnings management is motivated in part by prior overvaluation, the agency hypothesis also predicts an asymmetric relation between *past* returns and current accruals. We expect high returns to precede high accrual decile portfolios, but not particularly low returns preceding the low accrual decile portfolios. The fixation hypothesis does not make predictions about past returns and current accruals. A systematic past return behavior that is consistent with the agency hypothesis constitutes evidence against fixation.[3]

[3] This is much like systematic positive or negative abnormal performance following an event is inconsistent with market efficiency, which does not predict such systematic return behavior. Also see Friedman (1950, p. 9) on choosing between alternative theories based on evidence contradicting and not contradicting the predictions.

Previous research also reports an asymmetry, but only in the relation between accruals and *future* returns.[4] We offer an economic rationale for this asymmetry, and also predict an asymmetric relation between accruals and *past* returns. The latter is the result of agency incentives stemming from prior overvaluation.

We complement the predictions of stock price performance surrounding the year of accrual measurement with predictions of asymmetry in the degree of analyst optimism, insider trading activity, and distortions in firms' investment and financing decisions, i.e., expect these among firms in the high, but not the low, accrual deciles. The predictions about analyst optimism, about distortions in firms' investment-financing decisions, or about unusual amount of insider trading activity among the high-accrual decile firms are distinct from the investor fixation explanation for the accrual anomaly. The differing predictions based on the agency hypothesis versus investor fixation are helpful in discriminating between the competing explanations for the anomaly. We find evidence consistent with all of our predictions based on the agency hypothesis. Collectively, the evidence casts doubt on the prevailing hypothesis that market naïvely fixates on reported financial performance in generating the accrual anomaly.[5]

Background. Following Sloan (1996), the accrual anomaly has received tremendous attention in the literature, with Xie (2001), Thomas and Zhang (2002), Hirshleifer, Hou, Teoh, and Zhang (2004), and Richardson, Sloan, Soliman, and Tuna (2005) replicating and extending

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[4] See Barth and Hutton (2004), Beaver, McNichols, and Price (2005), Beneish and Vargus (2002), Chan, Chan, Jegadeesh and Lakonishok (2006), D'Avolio, Gildor, and Shleifer (2001), Desai, Rajgopal and Venkatachalam (2004), Hirshleifer, Teoh and Yu (2005), Houge and Loughran (2001), Kraft, Leone, and Wasley (2006), Lesmond and Wang (2005), Lev and Nissim (2006), Teoh and Zhang (2006), and Thomas and Zhang (2002). Sloan (1996) also finds an asymmetric pattern when abnormal stock performance is measured using Jensen's alpha.

[5] While finding asymmetry in returns (as well as investment-financing decision, analyst forecasts errors, and insider trading) does not *per se* reject fixation hypothesis, observing systematic patterns in returns consistent with the agency hypothesis undermines the fixation hypothesis.

the anomaly. The most common explanation for the anomaly is that investors naively fixate on accounting accruals without fully recognizing the lesser persistence of accruals (see Sloan, 1996, Hirshleifer and Teoh, 2003, and Dechow, Richardson, and Sloan, 2006). We label this explanation the fixation hypothesis.

Many studies reexamine the accrual anomaly and document evidence that undermines the naïve investor fixation hypothesis, e.g., the evidence of asymmetry in the accrual-return relation. While such evidence is damaging to the fixation hypothesis, the literature does not explain this asymmetry. We propose the agency theory of overvalued equity as an economic rationale for the asymmetric relation between returns and accruals.

Under the agency hypothesis, overvalued firms' managers not only resist market "correction," but they proactively attempt to prolong the overvaluation. Thus, instead of disseminating information that would disappoint capital markets, shareholders, and even the board, managers are likely to take actions designed to meet the market's optimistic performance expectations and sustain the overvaluation.[6] Among the actions, earnings management is expected to feature prominently, which leads to overvalued firms being over-represented among the high accrual firms. In addition, overvalued firms' managers are expected to make excessive debt and equity issues, capital expenditures, acquisitions paid for using equity, and they are likely to engage in insider trading.[7]

Considerable anecdotal evidence suggests managers do indeed attempt to mask bad news and engage in earnings management in the hope of prolonging a favorable assessment of the firm

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[6] See Kothari, Shu, and Wysocki (2006) for systematic evidence that managers delay the dissemination of bad news.

[7] See Jensen et al. (2004), Jensen (2005), Moeller et al. (2005), Baker and Wurgler (2002), Baker et al. (2003), and Polk and Sapienza (2004).

in the investment community. Below we describe two such episodes.[8] First, the software giant, Computer Associates (CA), in the 1990s backdated sales contracts to shift forward the revenues. In 1995, CA awarded nearly $1 billion in shares to top company officers, with the shares vesting when the stocks price hits and stays at a target level. This benchmark was met in 1998. But the sales slowed down subsequently, dragging CA stock down. The company's top executives tried to sustain the overvaluation by engaging in fraudulent practices over 1998-2000, including about $1 billion in sales due to fraudulent and premature revenue recognition practices. The company's stock price declined by more than 50% followed by the SEC investigation and numerous lawsuits alleging management fraud contributing to stock price inflation. In 2004, U.S. District Judge Leo Glasser said that the "central goal" of CA accounting practice was to meet or exceed "revenue expectations." In 2006, the SEC investigation led to the former CEO pleading guilty to orchestrating $2.2 billion accounting fraud (for further detail, see Bloomberg, September 22, 2004; and CFO magazine, April 09, 2004).

The second example is Shell Corporation, one of the world's largest and most profitable firms (and also one of the most conservative and reliable firms, see Guardian, April 20, 2004), which overstated its oil reserves over the period 1997-2001. The company's management began to realize this problem as early as 2000, but was unwilling to disclose this to the market and strived to find new oil reserves in order to back up their overly optimistic estimates.[9] One of the executives wrote to the CEO that he felt they were "caught in a box" due to aggressive booking of reserves over 1997-2000. In 2002, the CEO, Sir Philip Watts, who had a sterling career with

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[8] Additional examples of firms inflating earnings to sustain stock price, and thus benefit from option exercise or share sales, include Xerox, Tyco, and Waste Management (see Bergstresser and Philippon, 2006).

[9] For example, Financial Services Authority, August 24, 2004, Final Notice (to Shell investigation).

the company, sent an internal email emphasizing that it was vital not to take a write-down for the unproven reserves until new reserves had been found to replace them. He suggested the executive to consider the whole spectrum of possibilities and " to leave no stone unturned" (The Independent, April 20, 2004).[10] Eventually in 2004, Shell acknowledged that their reserves were overstated. The CEO and several executives subsequently resigned. The stock price declined by more that 10%, the firm was fined, and S&P downgraded Shell's credit rating.

While the anecdotal evidence is consistent with overvalued firms' managers seeking to prolong their firms' valuation through favorable disclosures and/or earnings management, we now turn to providing systematic evidence consistent with the agency hypothesis as an alternative to the fixation hypothesis to explain the accrual anomaly.

Summary of results. Consistent with the predictions of the agency hypothesis, we find (i) an asymmetric relation between accruals and past, current, and future returns, (ii) asymmetry in the optimism of analysts' long-term growth forecasts, (iii) asymmetric insider trading behavior, and (iv) asymmetric distortion in the investment-financing decisions. Specifically, we report significant return reversals for the high accrual-decile firms, but weak/insignificant for the low accrual-decile firms. To further discriminate between the fixation and agency hypotheses, we examine stock-price performance of the accrual-decile firms for three years *prior* to the year in which we classify firms into accrual deciles. The high accrual-decile firms' abnormal returns for the prior three years are significantly positive at about 18% per year compared to only -3.6% for the low accrual-decile firms. The asymmetric return-accrual relation in the prior years is not

[10] "I am becoming sick and tired about lying about the extent of our reserves issues and the downward revisions that need to be done because of far too aggressive/optimistic bookings," van de Vijver (CEO of Shell's Exploration & Production) wrote in a November 2003 e-mail to Mr. Watts, the CEO. Still, in a subsequent email, when legal advisers sent van de Vijver a memo (saying that Shell should disclose the problems), he responded to Exploration&Production CFO: "This is absolute dynamite, not at all what I expected and needs to be destroyed." (The Associated Press, April 19, 2004; Financial Director, May 2004).

predicted under the fixation hypothesis. We also observe return reversals only for the high accrual decile firms. This evidence is consistent with over-valuation prompting managers to engage in earnings management, which leads such firms to gravitate towards the high accrual deciles.

In addition, we observe unusually high levels of analyst optimism, insider-trading activity, debt and equity issues, capital expenditures, and M&A activity among the high accrual-decile firms prior to and during the year of high accruals compared to the low accrual-decile firms. These phenomena, and their asymmetric relation to accruals, are predicted under the agency hypothesis, but not the fixation hypothesis.

Finally, we conduct Mishkin market efficiency tests separately for companies with income-increasing accruals (deciles 6 through 10) and income-decreasing accruals (deciles 1 through 5). The results confirm the asymmetry as predicted under the agency hypothesis in that pricing is as if investors overestimate accrual persistence only for the high accrual deciles. This asymmetry does not support investor fixation.

Alternative explanations. The fact that predictable stock price reversals follow equity overvaluation and earnings management among firms in the high accrual deciles is consistent with many explanations, including market inefficiency, limited arbitrage (see DeLong, Shleifer, Summers, and Waldmann, 1990, and Shleifer and Vishny, 1997) and trading frictions preventing a speedy adjustment of overvalued firms' stock prices, survival biases, risk misestimation, etc. These are explored in a large stream of research that focuses on survivor biases, risk misestimation, and distributional properties of the data as explanations for the abnormal performance of the accrual strategy (see Zach, 2004, Kraft et al. 2006, Khan, 2005, Kothari, Sabino, and Zach, 2005, etc.). Related research also examines whether trading frictions and

arbitrage risk account for the apparent slow price adjustment to accrual information (e.g., Ali, Hwang, and Trombley, 2000, Lesmond and Wang, 2005, Hirshleifer, Teoh, and Yu, 2005, Mashruwala, Rajgopal, and Shevlin, 2006, and Pontiff, 2006).[11] Our study does not pursue any of the above lines of inquiry.

We believe it is unlikely that limited arbitrage due to higher costs of short-sale constraints for the high accrual firms would explain the observed asymmetry. Short sale constraints can generate the asymmetry because the constraints will impede shorting of the high accrual decile firms, but not affect investors' ability to exploit the mispricing among the lowest accrual decile firms. However, D'Avolio (2002) finds that short-sale constraints are unlikely for 91% of the stocks, and Asquith, Pathak, and Ritter (2005, p. 243) conclude that "For the overwhelming majority of stocks, short interest and institutional ownership levels make short interest constraints unlikely." Therefore, short selling constraints are unlikely to explain three years of subsequent stock underperformance of the high accrual firms.[12]

Outline of the paper. Section 2 summarizes the relevant literature, develops testable hypotheses, and outlines the empirical predictions. Section 3 describes sample selection and variable construction. Section 4 presents our empirical tests and results. We summarize and conclude in Section 5.

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[11] There is no consensus in the literature whether limited arbitrage can explain asset pricing anomalies, e.g., see Brav and Heaton (2006).

[12] An additional relevant factor is that difficulties to borrow the stock are likely to exist when there is a divergence of opinion in investor valuation (Miller, 1977) and thus overvaluation itself (not necessarily accruals) likely contributes to the difficulty of borrowing a stock for short-selling. D'Avolio (2002) argues that investor optimism can limit arbitrage via the loan market mechanism. When market is overly optimistic about a company, non-lending optimists are likely to absorb a large fraction of shares, which leads to higher costs of shorting.

2 Hypothesis Development and Empirical Predictions

In this section we examine the accrual anomaly in the context of the agency theory of overvalued equity. We describe some of the existing evidence surrounding the accrual anomaly, which accords with the implications of the theory of overvalued equity rather than investor fixation on accruals. We then present a set of testable hypotheses and empirical predictions that would discriminate between the agency theory of overvalued equity and fixation as the driving force behind the accrual anomaly.

2.1 Hypothesis Development

The accrual anomaly is that a zero-investment strategy with a short position in the highest accrual-decile firms and a long position in the lowest accrual-decile firms earns an economically significant magnitude of abnormal return. Sloan (1996) and others attribute the abnormal performance to investors' fixation on accruals. Under the fixation hypothesis, investors overestimate the persistence of the accrual component of earnings. Investors thus overvalue high accrual firms and undervalue low accrual firms. This systematic mispricing is corrected in future years, thus generating predictable price reversals for the extreme accrual stocks.

We advance an alternative explanation for the accrual anomaly, namely, agency cost of overvalued equity (see references in the Introduction). Even in an efficient market, some firms can get overvalued for a number of reasons. Optimistic assessment of or withholding of adverse internal information about (i) the demand for a firm's products, (ii) a firm's profitability from revenue growth and cost and scale efficiency, (iii) the prospects of a new technology, (iv) the quality of management, and/or (v) macroeconomic implications for the company's business are some of the reasons that can lead to a particular firm to be overvalued. The management might also genuinely share the optimism about the firm's future and/or might even have proactively

contributed to the market's optimistic assessment. Under these circumstances, the management is expected to make investment, operating, and financing decisions that might validate their and the market participants' expectations.

However, at some point, the management might come to the realization that it would be a challenge to meet the expectations. At this juncture, the agency hypothesis predicts that an overvalued firm's management has many reasons to generate signals (e.g., via managed earnings) that would maintain the overvaluation. First, the management benefits from the firm's continued growth and overvaluation through higher compensation and high valuation of their stock and options in the firm.[13] Second, the incentive might also come from the managerial labor-market – managers with superior past performance are in demand. A stock-price decline, even if it's a correction, would tarnish the manager's record and thus reduce his/her cache in the labor market. Third, earnings management might also be due in part a CEO's attempt to fulfill the market's expectation of high performance in line with the overvalued stock price. Managers might be hopeful that they will be able to ride out future reversals of current earnings management with good news that will roll in and offset the reversals. Finally, managers engaging in earnings management might have a high discount rate such that they heavily discount the potential future downturn and/or adverse consequences in favor of their high utility for continued good times resulting from the firm's overvaluation. This is consistent with managers' utility function displaying significant loss aversion.

The unwinding of the overvaluation and the earnings management, however, are inevitable, on average. Thus, under the agency hypothesis, the predictability of subsequent

[13] Several studies suggest equity incentives as a motive for earnings management (see Cheng and Warfield, 2005, Burns and Kedia, 2006, and Bergstresser and Phillipon, 2006).

underperformance for the high accruals portfolio is rooted in the prior overvaluation motivating managers to report upward managed earnings.[14] That is, when firms are sorted according to accruals, overvalued firms are likely to be over-represented at the high end of the accrual distribution in part because over-valued firms' managers are expected to have managed earnings up. We emphasize that not all of the accruals of the high accrual portfolio are due to earnings management motivated by prior overvaluation. In fact, a large fraction of a firm's accruals are likely to be an outcome of its underlying economic fundamentals (e.g., sales growth, capital intensity, etc.). It is just that the combination of (i) relatively high levels of accruals due to good economic performance (e.g., high growth), and (ii) upward managed earnings due to the incentives facing managers of overvalued firms makes it likely that overvalued firms will be over-represented in the high-accrual portfolios formed on the basis of ranking the population of stocks on accruals.

In contrast, low accrual firms' subsequent price performance is not predicted to be superior under the agency hypothesis. Low accruals are typically a result of slow-down in growth and poor operating performance, which likely is reflected in adverse prior stock-price performance. Like some over-valued firms, some of these firms might even be undervalued. However, the undervalued firms' managers do not face incentives to under-report their accruals, i.e., lower their performance through earnings management. In fact, managers of undervalued firms might be motivated to manage earnings upward (i) to signal their superior fundamentals relative to the market's valuation and thus attempt to correct the misevaluation, and (ii) for the

[14] In an efficient market, the correction should take place quickly after the public release of information such that even for the high accrual stocks future performance should not be predictably negative for one or more years. The observed evidence of negative abnormal performance for the high-accrual portfolios has multiple potential explanations. They include (i) market inefficiency, (ii) limited arbitrage, trading frictions, and arbitrage risk, which prevent a speedy price adjustment, (iii) survival and hindsight biases, and (iv) risk misestimation, i.e., the fact that inferences from estimated abnormal performance are tests of the joint hypothesis of market efficiency and a model of equilibrium expected returns. Relevant references appear in the Introduction section of the paper.

usual agency incentives stemming from management and/or debt contracts. Such actions could cause these stocks to migrate away from the lowest accrual decile portfolio. Therefore, undervalued firms are unlikely to gravitate toward the low end of the distribution of firms ranked according to accruals. They are more likely to be dispersed among several of the accrual-decile portfolios, probably among the middle and low accrual portfolios. Thus, we do not expect the lowest accrual decile portfolio to be over-represented with undervalued stocks. Hence, the agency hypothesis does not predict positive abnormal future stock-price performance for the low accrual firms. Overall, the agency hypothesis predicts an asymmetric relation between accruals and future returns.

2.2 Related evidence

There is voluminous prior research on the accrual anomaly. While we are unaware of any research linking the accrual anomaly to the agency hypothesis, we note that some of the findings in the accrual anomaly literature are consistent with the agency hypothesis. We classify these findings into five streams. First, Xie (2001), Thomas and Zhang (2001), and DeFond and Park (2001) find that the accrual strategy's success in predicting subsequent returns is primarily related to the discretionary component of accruals. The agency hypothesis directly ties overvaluation to discretionary accruals, i.e., earnings management, motivated in part by a desire to prolong the overvaluation.

Second, mispricing of the accrual component of earnings is observed primarily among specific subsets of the population of firms: (i) firms whose insiders were abnormal sellers of their equity (see Beneish and Vargus, 2002), (ii) glamour stocks (see Desai, Rajgopal, and Venkatachalam, 2005), and (iii) firms engaged in mergers, acquisitions, or divestures (Zach, 2003). These all three subsets of firms are likely to be overvalued. For example, insiders

of overvalued firms sell equity (e.g., Jenter, 2005), glamour stocks are hypothesized to be overvalued (e.g., Lakonishok, Shleifer, and Vishny, 1994), and, as pointed out earlier, overvalued firms excessively engage in M&A activities. The evidence in Zach (2003), though not directly implying overvaluation, is consistent with overvalued firms' managers (i) using equity as cheap currency to make acquisitions to satisfy growth expectations, and (ii) raising external capital to over-invest in risky green-field projects. Additionally, Teoh, Welch and Wong (1998a, 1998b) find that long-term underperformance of initial or seasoned public offerings is associated with high accruals at the time of the issue. Such evidence is consistent with these firms timing the market, i.e., issuing the equity during the periods of overvaluation, while at the same time managing accruals to sustain market's expectations at high level.

Third, research suggests sophisticated and individual investors process accrual information similarly (e.g., Bradshaw, Richardson, and Sloan, 2001, Barth and Hutton, 2004, and Ahmed, Nainar, and Zhou, 2001). This is inconsistent with the naïve fixation hypothesis in which sophisticated investors are more discerning. However, the lack of difference between naïve and sophisticated investors is consistent with the agency hypothesis. Analysts and other sophisticated investors might have fueled the market's expectations about firm performance and led to some firms being overvalued. Therefore, when these firms' managements report superior financial performance, both real and managed, sophisticated investors might find it in line with their expectations and thus might not immediately conclude that it represents earnings management. It is also possible that high performance expectations of sophisticated investors and analysts exert pressure on management to report high performance to meet those expectations (see Degeorge, Patel, and Zechauser, 1999). An overvalued company with more extensive analyst coverage faces more pressure to deliver the expected superior performance.

Ali et al. (2000) find the negative association between accruals and future returns is more pronounced for firms with extensive analysts' coverage and greater institutional ownership.

Fourth, stock underperformance is observed subsequent to periods of high investments, particularly those leading to high current accruals and, more generally, high net operating assets, (Fairfield, Whisenant and Yohn, 2003, Richardson and Sloan, 2003, Wei and Xie 2004, Titman, Wei and Xie, 2004). As the agency hypothesis predicts, in addition to accrual management, overvalued firms to over-invest to increase the probability of meeting market's expectations.

Finally, accrual mispricing is observed primarily among the firms reporting income increasing accruals.[15] While inconsistent with fixation, this asymmetry in the accrual-return relation is suggestive of the agency hypothesis, as described earlier.

2.3 Empirical Predictions

To empirically distinguish between investor fixation, i.e., the fixation hypothesis, and the agency hypothesis, we test four sets of predictions with respect to: (i) the return-accrual relation, (ii) analysts' forecasts, (iii) insider trading, and (iv) firms' investment and financing decisions.

Return predictions. We make predictions about return behavior in the year of, years prior to, and years following the accrual measurement year, year zero. Under the fixation hypothesis, returns in year zero are increasing in accruals, and in years one and beyond, the return-accrual relation is negative. The fixation hypothesis is silent with respect to the pattern of stock returns in the years leading up to year zero.

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[15] See Barth and Hutton (2004), Beaver, McNichols, and Price (2005), Beneish and Vargus (2002), Chan et al. (2006), D'Avolio, Gildor, and Shleifer (2001), Desai et al. (2004), Houge and Loughran (2001), Hirshleifer et al. (2005), Kraft et al. (2006), Lesmond and Wang (2005), Lev and Nissim (2006), Teoh and Zhang (2006), and Thomas and Zhang (2002).

The agency hypothesis implies an asymmetry in the relation between year zero accruals and stock returns of all periods. Specifically, we expect a price run up in the years leading up to and in year zero among the higher accrual decile firms because these portfolios are likely to be over-represented with over-valued firms that might have attempted to prop up reported earnings through accruals.[16] For the high accrual decile firms, this produces a positive relation between leading period returns and year zero accruals. In addition, a contemporaneous positive return-accrual association is expected in year zero. Some of the high accrual decile firms' performance represents earnings management, which is managers' response to overvaluation that began to occur in the years prior to year zero. Therefore, in the years leading up to year zero, we expect positive abnormal returns for the high accrual decile firms, but not the low accrual decile firms. The return reversals in years one and beyond are also expected primarily for the high accrual decile firms because these were overvalued firms that engaged in accrual management to prolong the overvaluation. Overall, asymmetry in the accrual-return relation is predicted under the agency hypothesis, but not under the fixation hypothesis.

Since the agency hypothesis is premised on the assumption that overvaluation motivates earnings management, we expect the subset of relatively more overvalued firms to bear out the return predictions of the agency hypothesis more compellingly than other firms. Using prior one year's abnormal price run-up as a (crude) proxy for overvaluation, we test whether the reversals in stock prices are more pronounced in future years, i.e., years one and beyond, for the highly

[16] Some of the price run up is rational anticipation of superior future accounting performance capturing economic fundamentals of the firm. This is stock prices anticipating future accounting performance, which has been long documented in the literature going back to Ball and Brown (1968) and Beaver, Lambert, and Morse (1980). Unlike overvaluation, the rational price run up is not expected to reverse in the future.

overvalued stocks. In contrast, the fixation hypothesis implies that current period's accruals, not prior abnormal returns, predict return reversals in future years.

Analysts' optimism. The optimistic assessment of the prospects of the overvalued firms is likely to be shared by analysts and thus reflected in their forecasts of the firms' future performance. Therefore, under the agency hypothesis, because we expect over-valued firms to be over-represented in the high accrual portfolios, analysts will exhibit an optimistic bias in forecasting the prospects of the high accrual firms, but not the low accrual firms, in the year of and years prior to the accrual measurement year. Predictions under the naïve fixation hypothesis depend on the maintained hypothesis about analysts' sophistication. If analysts are assumed to be sophisticated, then we would not predict a systematic variation in the degree of analyst optimism across high and low accrual firms. On the other hand, if analysts are also naively fixated on accruals, then we expect analysts to be pessimistic about the low accrual firms and over-optimistic about the high accrual firms. This implies a symmetric relation.

Insider trading. The agency hypothesis predicts asymmetry in the insider trading activity across the accrual deciles. Insiders among the high accrual decile firms are predicted to be net sellers because those firms are overvalued.[17] The agency hypothesis does not expect insiders of the low accrual-decile firms to exhibit abnormal buying of firm equity in the years surrounding year zero of the accrual anomaly. In contrast, under the fixation hypothesis, we expect insiders to be net sellers of firm equity among the high accrual decile firms and net buyers of firm equity among the low accrual decile firms. Thus, insider trading activity is predicted to

[17] Insiders are likely to sell equity on average, and/or it may be more costly for them to purchase additional stock when they believe their firm is undervalued, which may lead to asymmetric insider trading patterns. To address this concern, we adjust our measures of insider trading for mean insider selling of companies of similar size, so that executives who refrain from selling will appear to be net buyers.

be symmetric in its occurrence and magnitude across the accrual deciles under the fixation hypothesis.

Investment-financing decisions. The agency hypothesis makes several predictions about corporations' investment-financing decisions, which are distinct from the behavior predicted under the fixation hypothesis. Specifically, the agency hypothesis predicts that in year zero and prior years the high accrual decile firms will (i) excessively tap the debt and equity markets; (ii) excessively use (overvalued) equity as currency to pay for mergers and acquisitions; and (iii) over-invest in property, plant, and equipment (i.e., capital expenditures) and R&D. Once again, these investment-financing decisions are expected to be asymmetric, i.e., observed among the high accrual decile firms, but not the low accrual decile firms. The fixation hypothesis does not predict (especially discretionary) accruals to impact firms' investment-financing decisions. It also does not predict an asymmetry in the relation between accruals and investment activity.

We acknowledge the possibility that investors are naively fixated on accruals, but managers recognize that stocks are misvalued and that they take actions to exploit the misevaluation. In this scenario, managers of over-valued firms might excessively tap the equity and debt markets, which means both agency and fixation hypotheses make the same prediction. However, (i) we do not expect over-valued firms to make over-investments under the fixation hypothesis, and (ii) we would expect managers of both over- and under-valued firms to engage in insider trading to exploit the misevaluation under the fixation hypothesis. Thus, (i) some of the predictions of the agency and fixation hypotheses differ, and (ii) when they are similar, the predicted behavior under the fixation hypothesis requires an agency relationship to influence management's behavior much like that under the agency hypothesis.

3 Data and Sample Selection

3.1 Sample Selection

We analyze all firms with available data on Compustat and CRSP files excluding closed-end funds, investment trusts and foreign companies. Our initial sample contains 42 years of financial data beginning in 1963 and ending in 2004. Due to the difficulties involved in interpreting accruals for financial firms, consistent with the literature in this area, we drop companies with SIC codes from 6000 to 6999. These procedures yield 157,456 firm-year observations with non-missing total accruals data and 156,000 firm-year observations with discretionary accruals data, where discretionary accruals are estimated using the within-industry cross-sectional modified-Jones model. We do not require firms in our sample to survive through the period of our analysis. We include all valid firm-year observations irrespective of their fiscal-year-end, though some tests in our analysis require December year-end firms (e.g., buy-and-hold abnormal returns). In each sub-section we specify the additional sample restrictions we impose.

For the purpose of our analysis, each year we divide the sample of firms into decile portfolios based on the magnitude of either total accruals or discretionary accruals. We do not restrict our analysis only to discretionary accruals because (i) naïve fixation as a behavioral theory underlying the accrual anomaly is not specified in a particular measure of discretionary accruals, but likely to be in total accruals as distinct from cash flows; and (ii) discretionary accruals as a measure of managed earnings are well-known to contain estimation error, which might induce a bias and/or reduce the power of our tests. Hence, we also use total accrual portfolios. The results are qualitatively similar using the two different measures. For any given measure, the assignment of firm-years to the accrual deciles remains constant throughout the

analysis to insure comparability of results across different sets of tests even though some tests (e.g., insider trading behavior) impose additional filters on our primary sample.

3.2 Total and Discretionary Accrual Variables

We use the balance-sheet method to compute total accruals. Collins and Hribar (2002) show that total accruals measured from the balance-sheet data contain a measurement error while those measured directly from the statement of cash-flows are more accurate. To account for the error, we also implement our empirical tests using the total accruals estimated via statement of cash flows for the sample of financial statements after 1987. The results are qualitatively the same. The total accruals ($TA_{j,t}$) for a firm j in year t are computed as follows:

$$TA_{j,t} = (\Delta CA_{j,t} - \Delta Cash_{j,t}) - (\Delta CL_{j,t} - \Delta STDebt_{j,t} - \Delta TP_{j,t}) - Dep_{j,t} \qquad \textbf{(1)}$$

where $\Delta CA_{j,t}$ is change in current assets (Compustat item #4),

$\Delta Cash_{j,t}$ is change in cash/cash equivalents (Compustat item #1),

$\Delta CL_{j,t}$ is change in current liabilities (Compustat item #5),

$\Delta STD_{j,t}$ is change in debt included in current liabilities (Compustat item #34),

$\Delta TP_{j,t}$ is change in income taxes payable (Compustat item #71), and

$Dep_{j,t}$ is depreciation and amortization expense (Compustat item #14).

For comparability across sample firms, the dollar amount of total accruals is deflated by the beginning of the year total assets (Compustat item #6).

Further, we use cross-sectional modified-Jones model to separate discretionary and non-discretionary accrual components (Jones, 1991, and Dechow et al., 1995). We estimate the following cross-sectional regression for each of 48 Fama-French industry groups in each year *t*:

$$\frac{TA_{j,t}}{Assets_{j,t-1}} = \alpha_1 \frac{1}{Assets_{j,t-1}} + \alpha_2 \frac{(\Delta \mathrm{Re}v_{j,t} - \Delta AR_{j,t})}{Assets_{j,t-1}} + \alpha_3 \frac{PPE_{j,t}}{Assets_{j,t-1}} + \varepsilon_{j,t} \qquad \textbf{(2)}$$

where $\Delta Rev_{j,t}$ is change in sales revenues (Compustat item #12),

$\Delta AR_{j,t}$ is change in accounts receivable (Compustat item #2), and

$PPE_{j,t}$ is gross property, plant and equipment (Compustat item #7).

We denote the predicted values of the modified-Jones model as non-discretionary accruals ($NDA_{j,t}$) and the residuals as discretionary accruals ($DA_{j,t}$).[18]

3.3 Descriptive Statistics

Table 1 reports descriptive statistics for several variables of interest. Panel A presents the analysis by total accrual decile portfolio and Panel B by discretionary accrual decile portfolio. All variables are measured contemporaneously with accruals. We find the characteristics of firms in our sample to be similar to those reported in earlier studies. First, we find that firms with extreme accruals, those in the lowest and highest accrual deciles, are smaller than the firms in the middle accrual deciles. Both market capitalization and total assets exhibit an inverted U-shaped pattern with respect to the accrual deciles. Moreover, the median size of the lowest accrual decile firms is smaller than that of the highest accrual decile firms, but the mean size of the lowest accrual decile firms is larger than the mean size of the highest accrual decile firms. Second, firms with extreme income increasing accruals have higher market-to-book ratios than firms with income-decreasing accruals. Third, firm performance, measured by median income before extraordinary items as a percentage of total assets, hereafter earnings, is increasing monotonically with accruals. Median earnings increase from -7% for the lowest total accrual decile portfolio to 7.5% for the highest total accrual decile portfolio. Finally, leverage of extreme accrual decile firms is lower than that of firms in the middle of the accrual distribution.

[18] The modified-Jones model likely yields biased estimates of discretionary accruals for firms experiencing extreme growth rates. We nonetheless use the model to maintain comparability with past research.

[Table 1]

4 Empirical Tests and Results

In this section we present the results of our empirical tests that are designed to distinguish between the agency and fixation hypotheses. We analyze the pattern of abnormal stock performance, analysts' earnings growth forecasts, insider trading behavior, and firms' investment-financing decisions in event time period centered on the year in which we form accrual decile portfolios, year 0. We then describe results of the Mishkin market efficiency tests separately for firms with income-increasing and income-decreasing accruals. Finally, we perform quantile regression tests of the relation between accruals and returns.

4.1 Abnormal Stock Returns

We begin by analyzing abnormal stock return performance in the year of, years prior to, and years following the accrual measurement year using two methodologies. First, we compare the size and book-to-market adjusted annual buy-and-hold returns computed by following the procedure outlined in Barber, Lyon, and Tsai (1999). Second, we estimate annualized alphas from Fama-French three factor model based on the calendar-time monthly accrual portfolio returns. In each case we use CRSP monthly stock returns adjusted to include delisting returns using the method detailed in Beaver, McNichols, and Price (2005).

4.1.1 Buy-and-Hold Abnormal Returns

This sub-section summarizes results using size and book-to-market adjusted abnormal buy-and-hold returns. The benchmark portfolio returns are constructed as follows. Each year we compute end of April capitalization quintile cutoffs for the sample of NYSE firms. Based on these cutoff points we assign all of the sample firms to size quintile portfolios. Since the lowest

size quintile contains roughly half of firm-year observations, we further divide this quintile into five additional portfolios. Each of the resulting nine size portfolios is then divided into quintile portfolios based on book-to-market ratio, where book value is taken as of previous fiscal year end and market value is as of the end of the following April. This procedure yields 45 benchmark portfolios. Annual abnormal return for each firm-year is computed as one-year buy-and-hold return (12-month return starting May 1) less average annual return of the corresponding size and book-to-market portfolio. The start date of May 1 for calculating annual return ensures that the market has information about the prior year's financial performance. For consistency between benchmark returns and individual firm returns we limit our sample to December fiscal-year-end firms.

Table 2 presents time-series means and Fama-MacBeth t-statistics for annual abnormal buy-and-hold returns. Average abnormal returns for each accrual decile portfolio are calculated for nine annual periods from event-year -4 to year +4, where event-year 0 is the accrual measurement year. Panel A presents the results for total accrual portfolios while Panel B presents the results for discretionary accrual portfolios. We illustrate the results graphically in Figures 1a and 1c, where we graph annual buy-and-hold abnormal returns for the 1^{st}, 5^{th}, and 10^{th} accrual decile portfolios.

[Table 2 and Figure 1]

Firms with the highest income increasing accruals (both discretionary and total) experience significant abnormal price run-up prior to the accrual measurement year, i.e., year 0, and underperform subsequently. In case of total accruals, the highest accrual decile portfolio experiences 29.43% abnormal return in year -1, which is followed by -7.63% abnormal return (reversal) in year +1. Similarly, the highest discretionary accrual decile portfolio earns 18.3%

abnormal return in year -1, which is followed by -8.3% of underperformance in year +1. Superior performance prior to firms recording high accruals, i.e., high earnings growth, is consistent with the market anticipating strong earnings performance, i.e., returns leading earnings (e.g., Beaver et al. 1980, and Collins, Kothari, and Rayburn, 1987).[19] However, the evidence is also consistent with the agency hypothesis that a portion of the price run-up is overvaluation and that the overvalued firms engage in accrual management, and experience market correction in years +1 and beyond. This latter evidence of return reversal suggests that the prior price run up was not due entirely to rational anticipation of future earnings, i.e., prices leading earnings, but due in part to overvaluation.

The performance behavior of the lowest accrual portfolio in the years subsequent to and prior to year 0 lends further credence to the agency hypothesis and helps us in discriminating between the fixation and agency hypotheses. Specifically, consistent with prior research, the lowest accrual decile portfolio's performance in years +1 and beyond is not significantly positive. In fact, the point estimates of average abnormal return for the lowest accrual decile portfolio are insignificantly negative. Turning to the performance in years prior to 0, the lowest accrual decile portfolio experiences considerably smaller magnitude of negative abnormal performance compared to the highest accrual-decile portfolio. Panel A of Table 1 shows that, in year -1, the lowest accrual decile portfolio's abnormal return is -11.8% compared to 29.4% for the highest decile accrual portfolio. Corresponding numbers when portfolios are formed on the basis of discretionary accruals in Panel B are -5.3% and 18.33%, which again reveals the large disparity in performance in prior years.

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[19] Consistent with the earnings anticipation explanation for the price run-up, we do not observe high levels of accruals in years -4 to -1 for the highest accrual decile portfolio. Thus, past price run up for the high accrual stocks is not due to extraordinary past accounting performance. The accrual behavior in years -4 to -1 is also not unusual for the lowest accrual decile firms.

As a test of asymmetry in the performance of the highest and lowest accrual decile portfolios in prior years, we compare their performance against that of accrual decile portfolio 5. Portfolio 1's, i.e., the lowest accrual decile portfolio's performance is statistically indistinguishable from that of portfolio 5 in years -1 and -2, whereas portfolio 10 statistically outperforms portfolio 5 in years -1 and -2. The considerable asymmetry in abnormal returns across the highest and lowest accrual decile portfolios coupled with the absence of significantly positive subsequent abnormal return for the portfolio of income decreasing accruals is inconsistent with the fixation hypothesis but supports the agency hypothesis.

4.1.2 Annualized Alphas from Fama-French Three-Factor Model

Below we repeat the abnormal return analysis using annualized alphas as a measure of the accrual decile portfolios' abnormal return performance. We estimate the Fama-French three factor model using calendar-time monthly portfolio returns. Intercepts from these regressions for each of the 10 accrual portfolios are estimates of abnormal performance. We estimate the regression over five different event-time horizons: event years -3 to -1, year -1, year zero, year +1, years +1 to +3. As before, the return measurement period is four months after the fiscal year end for each firm included in the analysis. To estimate abnormal performance, i.e., alphas, we regress monthly equal-weighted accrual portfolio returns on the three Fama-French factors, namely market, size, and book-to-market. Similar to Table 2, Panel A of Table 3 reports results for the total accrual portfolios and Panel B for the discretionary accrual portfolios. Figures 1b and 1d present the results graphically.

The tenor of the results based on alphas as a measure of abnormal performance is similar to that based on buy-and-hold abnormal returns. The highest accrual-decile portfolio earns significantly positive abnormal returns prior to year zero and significantly negative abnormal

returns beyond year zero. Prior to year 0, the annualized value of estimated alpha for the highest total-accrual-decile portfolio is 25.58% for year -1 and 17.82% when averaged over years -3 to -1. In contrast, the estimated alphas for the lowest accrual decile firms are negative prior to year 0, but they are remarkably smaller in magnitude when compared to alphas of the highest accrual decile firms. Specifically, in Panel A, the abnormal alpha is -3.92% for the lowest decile versus 17.82% for the highest decile using total accrual portfolios, and, in Panel B, it is -0.06% versus 12.88% using discretionary accrual portfolios.

[Table 3]

The asymmetry in the performance of the highest and lowest accrual decile portfolios is also observed in year +1 and beyond. In Panel A, the estimated annualized alphas for the highest total accrual portfolio are -8.12% for year +1, and -5.36% when averaged over years +1 to +3. In contrast, the lowest accrual decile portfolio's year +1 or year +1 to +3 alphas are statistically and economically insignificant. Furthermore, while the highest accrual decile portfolio alphas are significantly different from those of the 5th accrual decile portfolio, the lowest decile portfolio's alphas are not. The above conclusions are also applicable to the results using discretionary accruals as reported in Panel B of Table 3.

4.1.3 Accrual Anomaly Conditioning on Prior Return Performance

Below we examine whether the extent of future return reversal for the accrual decile portfolios varies with the firms' prior stock-price performance. The fixation hypothesis predicts price reversals as a function of accruals regardless of prior stock price performance.[20] In

[20] To the extent past returns predict future return reversals, the year +1 performance of the portfolios is influenced by not only investor fixation on accruals or the agency hypothesis, but also by predictability of returns as a function of past price performance. This concern, however, is muted by the fact that we form quartile portfolios on price

contrast, under the agency hypothesis, prior performance as a proxy for misvaluation predicts subsequent reversals, especially for the high-accrual portfolios. To perform the tests, we subdivide accrual decile portfolios each year into quartiles based on the annual abnormal buy-and-hold return (calculated by adjusting for size and book-to-market) in year -1. The goal here is to maintain roughly equal accrual performance for the quartile portfolios within each accrual decile portfolio, but form the quartiles to segregate firms into portfolios on the basis of prior price performance. In Table 4 we report return performance in year +1 for the quartile portfolios within each of the accrual-decile portfolios 1, 5, and 10.[21] We present time-series means and Fama-MacBeth t-statistics for the abnormal returns. Panels A and B of Table 4 present results for total and discretionary accrual-decile portfolios.

Table 4 shows that return reversals in Panels A and B both are predominantly observed for the extreme prior return quartiles Q4 and Q3 and that too prominently only within the highest accrual decile portfolio. Specifically, in Panel A, the highest return quartile Q4 within accrual decile portfolio 10 earns an average annual abnormal return of -10.57% compared to -3.99% for Q4 within the lowest accrual decile portfolio. The Q4 portfolio within the lowest accrual decile portfolio earns negative, not positive, abnormal returns in year +1. This is inconsistent with low accrual firms earning positive abnormal returns according to the accrual anomaly. Average abnormal returns of the Q3 portfolios within accrual deciles 1 and 10 are consistent with return reversals, but the magnitudes are markedly smaller. Specifically, Q3 portfolios within accrual deciles 1 and 10 earn average annual abnormal returns of 2.13%and -3.84. The abnormal return

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performance in year -1, whereas the future return performance is for year +1. Thus, we skip year 0 in which most of the effects of predictability based on past price performance are expected to be observed.

[21] In this subsection we only include December fiscal year-end firms. This is similar to the previous analysis using buy-and-hold returns in section 4.1.1.

magnitudes for Q1 and Q2 portfolios are small in absolute magnitude, particularly for those within the lowest accrual decile portfolio. These results reveal the asymmetry in return performance of the high and low accrual portfolios, which is consistent with the agency, but not the fixation, hypothesis. The concentration of reversals in the extreme high prior return portfolio, particularly, conditioning on high accruals, is also consistent with the agency, not fixation, explanation for the accrual anomaly.

[Table 4]

As further evidence of the asymmetry, we compare abnormal returns of quartile portfolios within deciles 1 and 10 with those of the quartile portfolios within the 5^{th} decile. The fifth decile portfolio is used as the benchmark to assess whether performance of the portfolios within decile 1 and 10 is asymmetric as predicted under the agency hypothesis. The results in Panels A and B both reveal that only the performance of the Q4 portfolio within decile 10 is significantly different from that of Q4 within decile 5. Once again, the asymmetry and concentration of abnormal performance in Q4 are consistent with the agency hypothesis, and inconsistent with the fixation hypothesis.

4.2 Analyst Optimism

The second prediction under the agency hypothesis is about analyst optimism across the accrual decile portfolios. In the interest of brevity, we only report results using total accruals. However, the evidence based on discretionary accruals is similar.

We analyze analysts' forecasts of long-term earnings growth (LTG) each year over a 9-year window centered on the accrual measurement year (year 0). LTG forecast error is a measure of analyst optimism, measured as the realized long-term earnings growth rate minus the forecasted long-term earnings growth rate. Unbiased estimates of this measure are difficult to

calculate (see Kothari, 2000). Acknowledging that growth forecast errors are likely to be upward biased as a function of firm size and earnings volatility, we adjust them by subtracting the average forecast error for the companies in the same beginning-of-the-year market capitalization decile. Following Dechow and Sloan (1997) and Dechow, Hutton, and Sloan (2000), the realized earnings growth is computed as the slope coefficient of an ordinary least squares regression of the natural logarithm of annual earnings per share on a constant and a time trend over 5-year moving window (e.g., from the beginning of year 0 to the end of year 5) using a maximum of 6 annual observations. This estimation procedure restricts the sample of firms to those with at least three non-missing earnings per share observations within this 5-year moving window. Negative earnings per share observations are excluded because growth rates with negative earnings denominator are not interpretable. The forecasted long-term earnings growth rate is taken from IBES summary file as of the beginning of each fiscal year (specifically within 4th month after prior fiscal year end). We also leave out outliers by trimming 1% of observations at both tails of the distribution.[22] Since IBES data is sparse before 1980, we restrict our analysis to the period from 1980 to 2004.

[Table 5 and Figure 2]

Table 5 and figure 2 present the results of LTG forecast error analysis. Panels A and B report annual average and median size-adjusted LTG forecast errors for 10 total accrual portfolios. The results show that around the year of accrual measurement (i.e., in the beginning of years -1 through 1) analysts significantly overestimate long-term growth for the highest accrual decile firms compared to the firms in deciles 1 and 5. In year 0, decile 10 firms enjoy 8.15% (8.06%) positive mean (median) analysts' growth forecasts errors. These errors are

[22] The annual means of forecast errors are sensitive to the inclusion of outliers, but the results remain qualitatively similar if outliers are not deleted.

significantly different from the errors of firms in 1st and 5th accrual deciles. Analysts' over-optimism regarding prospects of the highest accrual decile firms is noticeable in years -1 and -2, peaks in year 0, and is virtually unobservable from the beginning of year +2 onwards.

The asymmetry in analyst optimism becomes apparent when we compare the errors for the tenth decile against the lowest accrual decile. Both mean and median size-adjusted forecast errors of portfolio 1 do not appear noticeably different from portfolios 2 through 5 or to its own forecast errors in the prior or future years. In addition they are statistically indistinguishable from the forecast errors for the 5th accrual decile. Thus, the forecast errors also exhibit an asymmetry as predicted under the agency hypothesis.

The earlier evidence of a substantial price run-up experienced by the highest accrual decile portfolio coupled with the evidence of significant analyst optimism for the highest decile portfolio is consistent with the hypothesis that the high accrual decile portfolios are overvalued and exhibit accrual behavior as predicted under the agency hypothesis. Overall, the evidence of asymmetry in analyst optimism and earlier evidence of asymmetry in the return behavior with respect to the accrual decile portfolios support the agency hypothesis.

4.3 Insider Trading Behavior

The agency hypothesis implies differences in the insider trading behavior for the firms in different accrual deciles. The data for the insider-trading analysis comes from Thomson Financial Insider Filing Form 4 that provides all common and ordinary shares transactions of insiders (purchases and sales only). Our definition of insiders includes CEO, COO, CFO, president, and chairman of the board. For firms in each accrual-decile, we analyze insiders' equity transactions over 9 years from year -4 to year 4, where year 0 is the year of accrual measurement. For each year we include transactions occurring during the fiscal year. Consistent

with the earlier literature (see, e.g., Lakonishok and Lee, 2001), we exclude small transactions defined as those with the number of shares traded less than 100. Due to the unavailability of the Thomson Financial Insider Filing Data prior to 1986, the analysis in this subsection covers activities from 1986 to 2004.[23]

Table 6 presents evidence on three measures of insider trading. Figure 3 presents the results graphically comparing insider trading across 1st, 5th, and 10th accrual-decile portfolios. Panel A presents the *average net purchase ratio* calculated according to Lakonishok and Lee (2001) as the number of shares purchased minus the number of shares sold, divided by the total number of shares traded by the insiders. The second measure is the net purchase dollar volume (see Lakonishok and Lee, 2001) calculated as the dollar volume of purchases minus the dollar volume of the sale transactions, divided by the total dollar volume of all transactions by the insiders (Panel B). Finally, we use the *average net shares traded* (see Beneish and Vargus, 2002), which is calculated as the number of shares purchased by insiders minus number of shares sold by insiders, divided by the total number of shares outstanding (Panel C). All three measures are size adjusted by subtracting the average insider trading characteristic of all the companies with the same fiscal year and belonging to the same size decile portfolio.

[Table 6 and Figure 3]

Management of firms in the highest accrual decile engage in insider trading behavior consistent with firm overvaluation prior to and during the year of accrual measurement, i.e., year 0. Specifically, the insiders are abnormal sellers of their equity in the firm in years -1 and 0, and continue to do so in year +1. As seen from Figure 3 and Table 6, the selling activity of insiders of decile 10 firms is the highest of all the portfolios using all three measures of insider selling. In

[23] The limited number of years for which the data is available also prevents us from presenting Fama-MacBeth standard errors in our analysis. Instead we present means and t-statistics based on pooled sample.

year 0, the highest accrual decile firms' insiders sell around 19% more shares (in terms of number of shares and dollar volume) than they buy. This is equivalent to selling, on average, 3.7% of company shares outstanding (see Panel C), which likely represents a substantial fraction of the insiders' stake in the company. To assess statistical significance, we compare decile 10 insider selling with that of decile 5. In year 0, all three measures indicate insiders of decile 10 firms sell more equity than insiders of decile 5. In years -1 and -2, the net purchase ratio and the net dollar volume of transactions ratio in Panels A and B for decile 10 are significantly greater than those measures for decile 5. The third measure has a negative point estimate, as predicted, but they are not statistically significant in years -1 and -2.

The insiders of the lowest accrual decile firms do not exhibit a consistent buying or selling behavior around year 0. They are net buyers of company stock in year 0, but the magnitude is neither economically nor statistically different from the buying behavior of the insiders of decile 5 firms. In fact, the buying of firm equity by the insiders of the firms in decile 1 is generally lower than that of decile 5 insiders. If low accruals were to indicate undervaluation, the insiders of firms with extreme low accruals, i.e., decile 1, should be more aggressive in acquiring equity than the insiders of the firms with the average magnitude of accruals, i.e., decile 5, which should not be mispriced, on average.

The insider trading evidence described above is consistent with the agency hypothesis. The asymmetry in the insider behavior across the high and low accrual-decile portfolios is as predicted under the agency hypothesis. Decile 1 insiders' net selling prior to year 0 also suggests the management of these firms were aware of overvaluation and attempt to take advantage of it by unloading their ownership stake in the firm. The fixation hypothesis does not predict such asymmetry.

4.4 Investment-Financing Decisions

Management might attempt to prolong the overvaluation by making certain investment-financing decisions that are not necessarily value-maximizing for the shareholders. Managers of overvalued firms are likely to (i) raise excessive amount of equity cheaply, (ii) use overvalued equity as currency in merger and acquisition transactions; and (iii) overinvest in capital assets, i.e., PP&E, and in R&D.

Table 7 and figure 4 report the investment and financing decisions of the firms in various accrual deciles. In Panel A we report firms' average external equity issues as a percentage of total assets (Compustat data item #108/item #6). Panel B summarizes the contribution of new equity through mergers and acquisitions, as a percentage of total assets (Compustat data item #129/item #6). Finally, Panel C examines the firms' intensity of investment in capital assets and R&D, which we measure as the growth in the sum of capital assets and R&D expenditures (Compustat data item #128 + item #46). All three investment-financing variables are size adjusted by subtracting the average investment-financing amount for the portfolio of companies in the same year and size decile portfolio of the sample firms. The sample contains all CRSP-Compustat firm-years from 1963 to 2004 for which sufficient data exists to construct considered firm characteristics. Figure 4 presents our results where we graphically compare firms' investment and financing decisions across 1^{st}, 5^{th}, and 10^{th} accrual-decile portfolios.

Panels A-C of Table 7 demonstrate that firms in decile 10 exhibit very high levels of investment-financing activity in year 0 and in prior years compared to decile 5. In Panel A, mean amount of equity issued as a percentage of total assets is 30.62% for decile 10 compared to -2.75% for decile 5 in year 0, and the difference is highly significant. While the decile 10's equity issues are of considerably smaller magnitudes in year -4 through -1, they are nonetheless

significantly greater than those of the firms in decile 5. The lowest accrual decile firm, contrary to the fixation hypothesis, also raises equity in year 0, but the magnitude is considerably smaller at 7.21% of its total assets.[24] Overall, the evidence on firms' equity issues reinforces the asymmetric pattern as predicted under the agency hypothesis.

[Table 7 and Figure 4]

Besides equity issues, the M&A activity as well as the growth in capital expenditures and R&D expenditures for decile 10, but not decile 1, are high in year 0. The differences between the highest and the lowest accrual firms increase in years prior to and peak in year zero, when the highest accrual-decile firms have 10 times larger levels of M&A activity, and 6 times higher growth in capital and R&D expenditures compared to the lowest accrual decile firms. This supports the overvaluation hypothesis, but the asymmetry in the investment-financing decisions is not predicted under the fixation hypothesis.

4.5 Mishkin Test

In addition to documenting the predictability of returns using accruals, the literature shows that investors overestimate the persistence of the (discretionary) accrual component of earnings. Such evidence is consistent with the fixation hypothesis. Following the literature, in this sub-section we use the Mishkin (1983) test to determine whether the relation between accruals and stock returns is asymmetric, i.e., non-linear. Evidence of asymmetry would be inconsistent with the fixation hypothesis. We apply the Mishkin (1983) framework of testing the rational expectations hypothesis and estimate the following system of simultaneous equations:

[24] The surprising positive equity issues for the 1st decile could be due in part to the low value of assets of the firms reporting losses, i.e., low accruals.

$$\text{Earnings}_{t+1} = \gamma_0 + \gamma_1 \text{ Cash Flows}_t + \gamma_2 \text{ Total Accruals}_t + \xi_{t+1} \quad (3)$$

$$\text{Abnormal Returns}_{t+1} = \beta_0 + \beta_1(\text{Earnings}_{t+1} - \gamma_0^* - \gamma_1^* \text{ Cash Flows}_t - \gamma_2^* \text{ Total Accruals}_t) + \zeta_{t+1} \quad (4)$$

Equation (3) is the forecasting equation for predicting one-year-ahead earnings and γ coefficients reflect the persistence of the earnings components. Equation (4) is the valuation equation and γ^* coefficients reflect the market persistence beliefs in valuing stocks. Sloan (1996) and others document that market underestimates the persistence of cash flows ($\gamma_1 > \gamma_1^*$) and overestimates the persistence of accruals ($\gamma_2 < \gamma_2^*$), which contributes to the predictability of returns using accruals. Under the fixation hypothesis, investors are expected to overestimate the persistence of accruals in a similar fashion for income-increasing and income-decreasing accrual firms. That is, fixation should be symmetric. Hence, we predict $\gamma_2 - \gamma_2^*$ of a similar magnitude across sub-samples under the fixation hypothesis. In contrast, the agency cost of overvalued equity hypothesis predicts that $\gamma_2 - \gamma_2^*$ would be negative for high accrual firms and zero for the low accrual firms.

We briefly comment on whether potential differences in the persistence of low and high accrual firms due to accounting conservatism might generate the observed asymmetry and thus confound with the predictions of the agency hypothesis. Low accrual firms typically report losses. As reported in table 1, mean and median earnings before extraordinary items for the lowest accrual decile firms are negative. Because of accounting conservatism, losses often represent a capitalized amount of accruals, including asset write-offs and impairments, which are less persistent than gains. Therefore, naïve investor fixation on earnings and over-estimation of

persistence are expected to be a more severe problem with low accruals than high accruals.[25] Thus, the conservatism phenomenon is likely to bias against finding the hypothesized asymmetric relation predicted under the agency hypothesis.

Table 8 presents results of the Mishkin test for the full sample and two sub-samples of firm-years in the top and bottom five deciles of the accrual distribution. Panel A reports results of the market pricing for the cash flow and accrual components of earnings. Panel B further decomposes the accruals into discretionary and non-discretionary components. In panel B, we split the full sample into sub-samples at the median of the discretionary-accrual distribution. We report coefficients estimated using the pooled sample regressions as well as the Fama-MacBeth coefficient estimates of the non-linear system (3)-(4) and test whether $\gamma_1 = \gamma_1^*$ and $\gamma_2 = \gamma_2^*$.

[Table 8]

We find that investors' mis-processing of the persistence of accruals differs dramatically between income-increasing and income-decreasing accruals. Surprisingly, investors *underestimate*, not overestimate, the persistence of accruals for the low accrual decile portfolios 1 through 5. For these firms, $(\gamma_2 - \gamma_2^*)$ is positive 0.29 when estimated for the pooled-sample and 0.24 using the Fama-MacBeth estimates, both significant at the 1% level. Similarly, when we decompose accruals into discretionary and non-discretionary components, the bias is due mostly to investors *underestimating* the persistence of discretionary accruals. In contrast, investors *overestimate* the persistence of accruals for the high accrual decile portfolios 6 through 10. Based on the pooled-sample estimates, $(\gamma_2 - \gamma_2^*)$ is -0.18 for total accruals in Panel A and -0.17 for discretionary accruals in Panel B, both significant at the 1% level. The Fama-MacBeth

[25] Alternatively, investor naiveté varies systematically across accrual deciles, which makes it impossible to predict *ex ante* how it will affect the relation between accruals and future returns.

estimates suggest that investors' pricing of total and discretionary accruals is indistinguishable from rational pricing in an efficient market.

We also performed the Mishkin test by each decile. We do not find a consistent pattern of over- or under-estimation of the persistence of accruals across the deciles. This is not surprising. There is very little variation in the independent variable (accruals) when the analysis is conducted by deciles formed on the basis of accruals, which econometrically leads to imprecise estimation and large standard errors. Naturally, a consistent pattern in the results fails to emerge.

Overall, results using the Mishkin test reinforce the asymmetry in investors' pricing of income-increasing and income-decreasing accruals. Since we are able to replicate the accrual anomaly for the full sample, the evidence of asymmetry is unlikely to be due to some unusual attributes of our sample. The observed asymmetry is inconsistent with investor fixation on accruals. The results are consistent with the agency hypothesis in that investors over-estimate the persistence of high accrual firms. Surprisingly, however, we also find that investors underestimate the persistence when accruals are low. This result is not predicted under the agency hypothesis or the fixation hypothesis.

4.6 Relation between Stock Returns and Accruals

To further discriminate between the fixation and agency hypotheses, in this section we test for the causality implications of the two hypotheses. The fixation hypothesis implies that investors' over-estimation of accrual persistence leads to stock-price over-reaction, especially in the extreme accrual portfolios. This means extreme accruals should forecast future return reversals, whereas past returns should not predict future accruals. The agency theory, on the other hand, contends that it is over-valuation in the first place that leads to overstated accruals.

Below we discriminate between the hypotheses by first performing an instrumental variable analysis, which shows that overvaluation causes earnings management. Second, we perform quantile regressions (described below), which demonstrate a striking asymmetry in the relation between accruals and past and current returns.

4.6.1 Instrumental Variables Analysis

We regress accruals on past and present abnormal returns, with abnormal returns as a crude proxy for overvaluation. However, we recognize that returns contain information about (future) earnings and hence accruals (see Beaver et al. 1980, and Collins et al. 1987), so past returns' predictive ability can be due to returns leading earnings, not just overvaluation. To enhance the quality of abnormal returns as a proxy for overvaluation, we propose instruments that are likely to be correlated with overvaluation, but not with the information about future unmanaged accruals or earnings. This set of instruments, when used in the two-stage least squares framework, allows us to identify the causal relation between overvaluation and future accruals as implied by the agency hypothesis.

One set of instruments is managerial actions, except earnings management, which firms are likely to take to prolong the overvaluation. Our instruments include: (i) equity issuance as a percentage of total assets, (ii) acquisitions as a percentage of total assets, (iii) growth in PPE and PPE as a fraction of total assets, (iv) growth in R&D and R&D as a fraction of total assets, (v) growth in capital expenditures and capital expenditures as a fraction of total assets, (vi) dummy for a positive income contribution from acquisitions, and (vii) dummy for a positive change in goodwill. Under the agency hypothesis, an increase in each of these variables is indicative of overvaluation, but is unlikely to be correlated with future unmanaged accruals.

Table 9 reports the results of 2SLS regressions of accruals on one year lagged returns (Panel A) and contemporaneous returns (Panel B), where the returns are instrumented using firm characteristics above. In our analysis we require non-missing data on the instrumental variables and buy-and-hold abnormal returns (described in Section 4.1.1).[26] The instruments are measured contemporaneously with the independent variable (abnormal return). The table presents time-series average coefficients and associated Fama-MacBeth test statistics.

[Table 9]

Panel A shows year -1 abnormal returns' effect on year zero total and discretionary accruals. The coefficients on lagged returns are 0.076 (p-value 0.02) for total accruals and 0.039 (p-value 0.04) for discretionary accruals. The coefficient magnitudes imply one percentage point increase in lagged buy-and-hold abnormal returns leads to a 7.6 basis-point increase in total accruals as a percentage of total assets and a 3.9 basis-point increase in discretionary accruals. Since the highest accrual-decile firms exhibit 29.5% abnormal buy-and-hold return in year -1, it translates into a 2.24% increase in total accruals as a percentage of assets. Panel B reports contemporaneous 2SLS regression of year zero accruals on year zero returns. The coefficient magnitudes more than double to 0.157 and 0.124 in the total and discretionary accrual cases, with both being significant at the 1% level. Since the return variable in these regressions is the fitted value of returns using proxies for overvaluation, the evidence supports our conjecture that the agency hypothesis contributes to the accrual anomaly.

Finally, Panel C of Table 9 shows that overvaluation proxies predict managements' investment-financing decisions. We show that lagged buy-and-hold abnormal returns lead to increased levels of equity and debt issuance, participation in acquisitions, and investments in

[26] Since we use the buy-and-hold abnormal return we limit our consideration to December fiscal-year-end firms.

capital and R&D. This evidence validates our choice of instrumental variables and also provides evidence consistent with the agency hypothesis.

4.6.2 Relation between Accruals and Returns: Quantile Regression Results

We evaluate the symmetry in the accrual-return relation by examining the effect of returns on the tails of accrual distribution. This is done using the Quantile regression framework. Similar to an OLS regression, which models the relation between regressors and conditional mean of the distribution of the dependent variable, a quantile regression estimates the relation between regressors and the conditional quantiles of the distribution of interest (see Koenker and Hallock, 2001, for details and economic applications). Specifically, a Quantile regression estimates the linear conditional quantile function $Q(q \mid x) \equiv \min\{y \mid F(y \mid x) \geq q\} = x'\beta^q$, where the estimated $\hat{\beta}^q = \arg\min_{\beta} \sum_{i=1}^{n} \rho_q(y_i - x_i'\beta)$, where $\rho_q(z) = z(q - 1_{\{z<0\}})$.

For each quantile $q \in \{0.05, 0.1, 0.2, 0.3, 0.5, 0.6, 0.7, 0.8, 0.9, 0.95\}$ of the dependent variable, we estimate the following models:[27]

$$\text{Accruals}_t = \alpha^q + \beta^q \text{Abnormal Returns}_{t-1} + \zeta_t^q \quad (5)$$

$$\text{Accruals}_t = \alpha^q + \beta^q \text{Abnormal Returns}_t + \zeta_t^q \quad (6)$$

Table 10 presents time-series average coefficient estimates and Fama-MacBeth t-statistics for the quartile regressions. Panel A and Panel B report the slope coefficients for the cases of total and discretionary accruals. Figure 5 presents our results graphically showing not

[27] Although we estimate the quantile regression model for each quantile of the dependent variable, quantile regressions are not equivalent to the OLS regressions estimated over subsets of observations partitioned on the dependent variable into quantiles. It's well-known that the latter lead to biased and inconsistent slope coefficient estimates because the regression errors are likely to be non-zero for different partitions of the data on the dependent variable. In contrast, quantile regressions employ all of the data when fitting the quantiles and therefore produce unbiased and consistent effects of the independent variables on conditional quantiles.

only Fama-MacBeth slope coefficient estimates but also pooled sample estimates plotted against different quantiles q.[28]

[Table 10 and Figure 5]

Estimation of model (5) reveals that high abnormal returns of year -1 positively impact year 0 accruals, but this phenomenon is observed primarily for the upper tail of the accrual distribution. In case of total accruals, the slope coefficient $\beta^{0.95}$ is 0.09, which is 4.5 times as large as the $\beta^{0.05}$ coefficient of 0.02. A similar order of magnitude difference is observed when the regressions use discretionary accruals. Figures 5a and 4b reveal striking patterns in quantile coefficients where the relation appears to grow geometrically as we approach the tail of the income increasing accruals. The evidence suggests that variation in prior returns drives higher accrual quantiles to a much greater extent. This is consistent with abnormal price run-ups driving accruals of those firms that are likely to be manipulate them.

Estimation of model (6) shows that contemporaneous return-accrual relation is weak over the range of accrual distribution except for its highest quantiles. The evidence is in line with that of the predictive model (5) and confirms pronounced asymmetry in the accruals-return relation. Overall the results of this section confirm the pronounced asymmetry in the relation between abnormal returns and accruals.

5 Summary and conclusions

Agency theory of overvalued equity predicts that the overvalued firms are likely to engage in income increasing earnings management in order to meet the unrealistic performance expectations incorporated in the stock prices. This prediction suggests an alternative explanation

[28] In this section of our analysis we use December fiscal-year-end firms for which the data on total (discretionary) accrual and returns in years -1, and 0.

for accrual anomaly as we expect that a sub-sample of firms with upward managed accruals will be more heavily populated with overvalued firms and the subsequent negative stock performance of such companies is a mere overvaluation reversal. We formulate a number of testable predictions that allow us to distinguish between the agency theory of overvalued equity and the traditional naïve investor fixation hypothesis as the driving force behind the accrual anomaly.

Consistent with the agency theory of overvalued equity, we find an asymmetry in the relation between accruals and returns, accruals and analyst optimism, accruals and insider-trading patterns, and accruals and corporate investment-financing decisions. Such asymmetry is not predicted under the naïve investor fixation on accruals. We find that companies in the highest income increasing accrual decile experience an economically large abnormal price run-up prior to the accrual management year, which is followed by stock underperformance in the subsequent years. This type of relation is not observed for the lowest accrual decile portfolio. Finally we find evidence consistent with the prediction of the agency theory of overvalued equity using the instrumental variable framework which allows us to isolate a casual relationship from overvaluation to accrual management.

Overall, the evidence in our study casts doubt on the prevailing hypothesis that market naively fixates on accruals or earnings. In contrast to earlier studies that merely present evidence inconsistent with fixation, we provide an alternative economic mechanism rooted in the agency theory of overvalued equity to explain the relation between returns and accruals.

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Figure 1a. Annual Buy-and-Hold Abnormal Returns For Total Accrual Portfolios

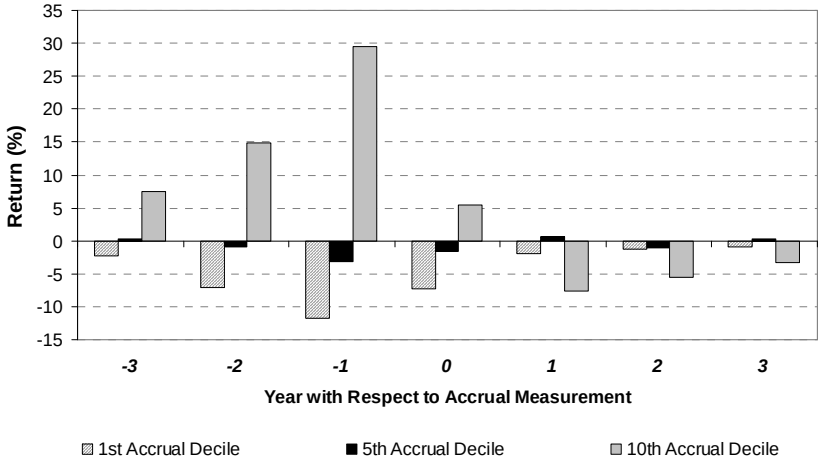

Figure 1c. Annual Buy-and-Hold Abnormal Returns For Discretionary Accrual Portfolios

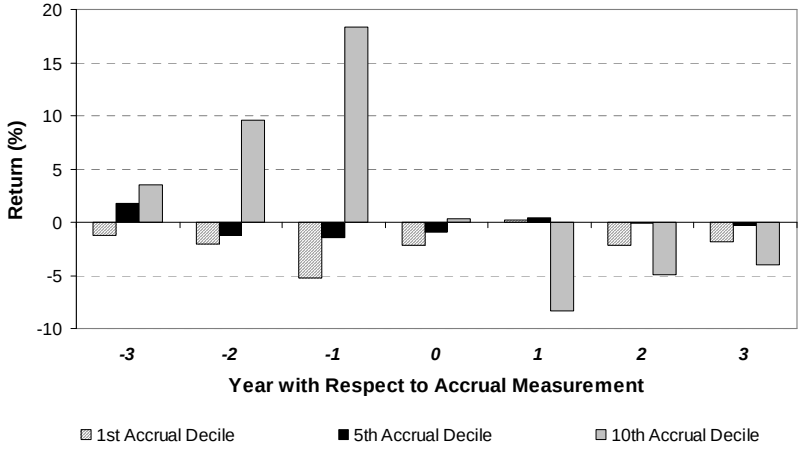

Figure 1b. Annualized Alphas From Fama-French Three Factor Model For Total Accrual Portfolios

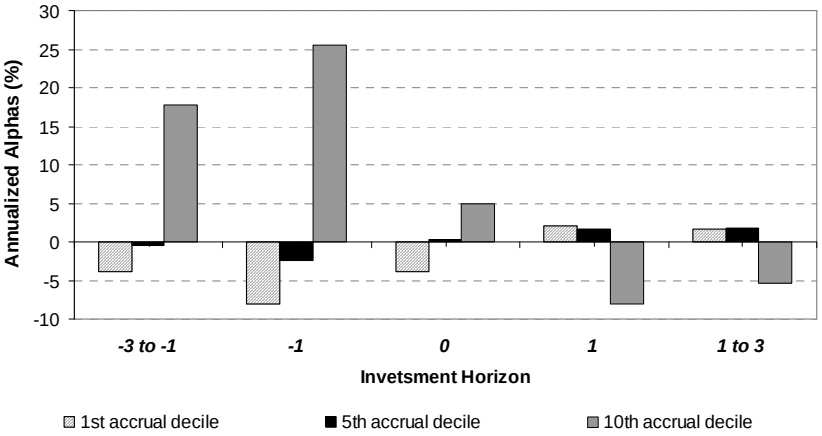

Figure 1d. Annualized Alphas From Fama-French Three Factor Model For Discretionary Accrual Portfolios

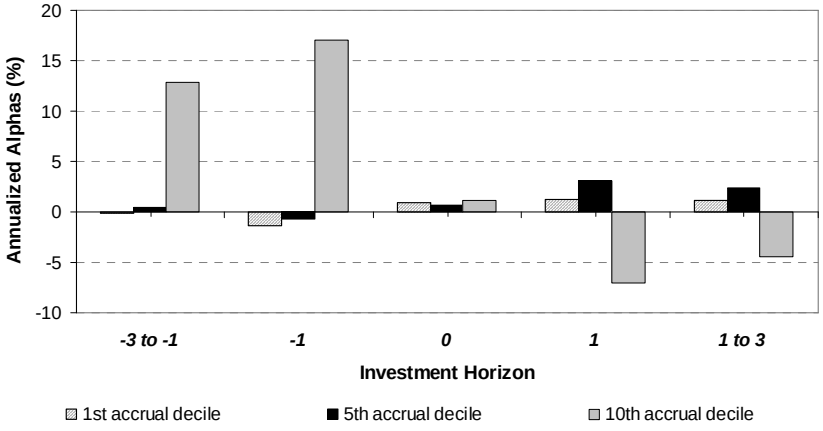

Figure 1 graphs the abnormal stock performance of accrual (total and discretionary) portfolios constructed in year zero. Only 1st, 5th, and 10th decile accrual portfolios are depicted. Figures 1a and 1b graph performance of the total accruals portfolios, whereas Figures 1c and 1d graph performance for the discretionary accrual portfolios. The buy-and-hold annual abnormal returns in Figures 1a and 1c are size and book-to-market adjusted. The details of the calculation appear in Table 2. The estimation of annualized alphas from the Fama-French three factor model for various return horizons, as graphed in Figures 1b and 1d, is described in Table 3.

Figure 2a. Mean Size-adjusted LTG Forecast Error (%)

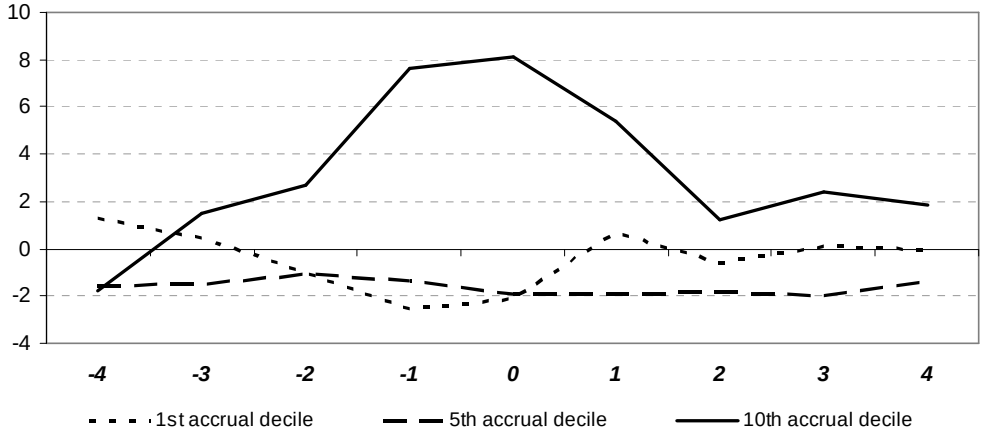

Figure 2b. Median Size-adjusted LTG Forecast Error (%)

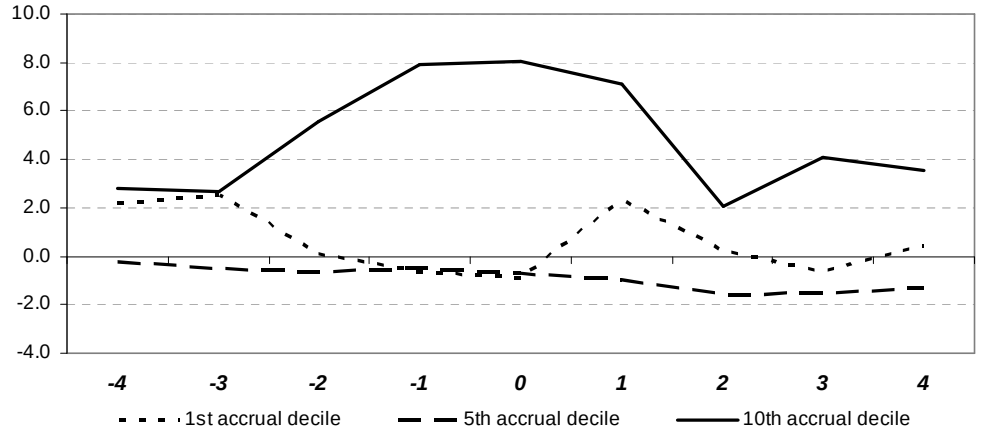

Figure 2 graphs time-series means (Panel A) and medians (Panel B) of analysts' long-term earnings growth forecast errors (LTG forecast error) for firms in 1st, 5th, and 10th total accrual deciles. The total accruals portfolios are formed in the accrual measurement year *zero* by ranking stocks according to total accruals calculated using the balance sheet method. LTG forecast error is computed as the difference between LTG forecasted by analysts and realized long-term earnings growth. The LTG forecast errors are size adjusted by subtracting the average LTG forecast error of companies in the same year and size decile portfolio. The sample contains firm-years from 1980 to 2004.

Figure 3a. Size Adjusted Net Purchase Ratio

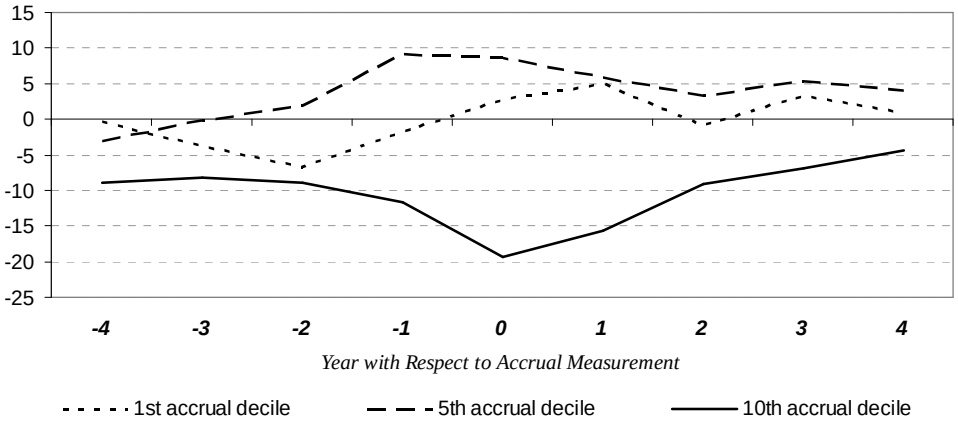

Figure 3b. Size Adjusted Volume Net Purchase Ratio

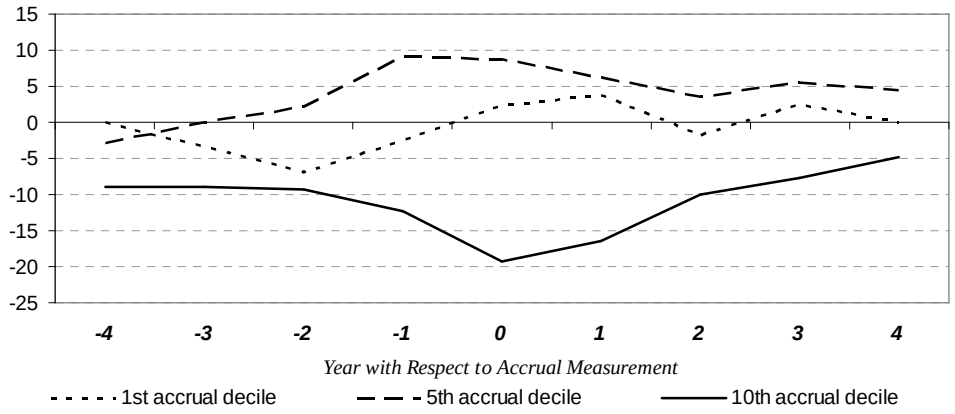

Figure 3c. Size Adjusted Net Shares Traded

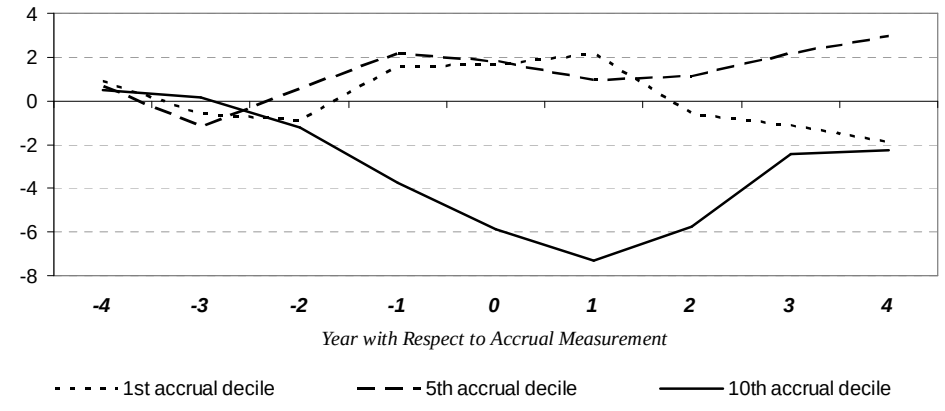

Figure 3 graphs the abnormal frequency of insider trading for firms in total accruals deciles 1, 5, and 10. Total accruals are calculated in year 0 using the balance sheet method. Figure 3a graphs the average net purchase ratio, Figure 3b the average net purchase volume, and Figure 3c presents the average net shares traded. All three measures are size adjusted (see Table 6 for calculation details). Insiders include: CEO, CO, President, Chairman of the board, and CFO. The insider trading data is the common/ordinary shares transactions (purchases and sales only) recorded in Form 4 of Thomson Financial Insider Filing Data.

Figure 4a. Equity Issues as a Percentage of Total Assets (%)

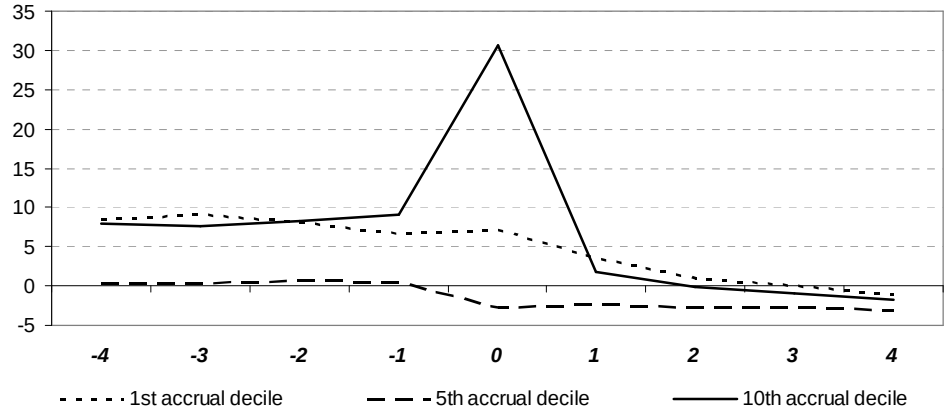

Figure 4b. Contribution from Acquisition as a Percentage of Total Assets (%)

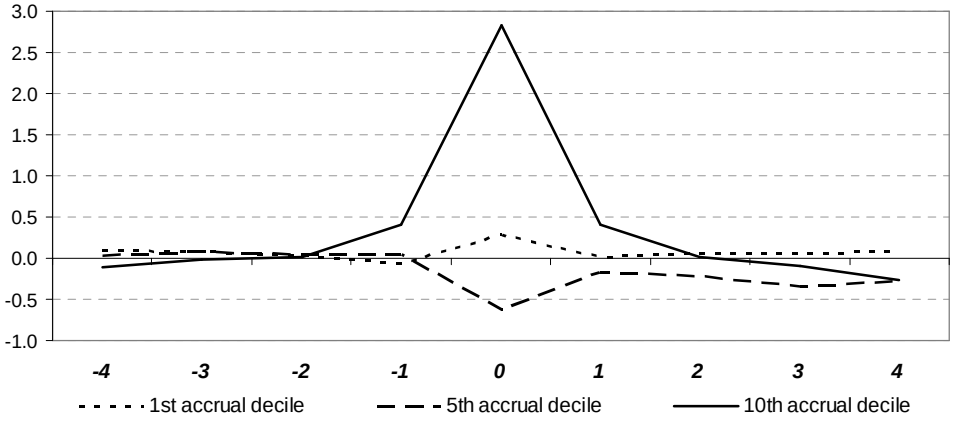

Figure 4c. Growth in Capital Expenditures and R&D (%)

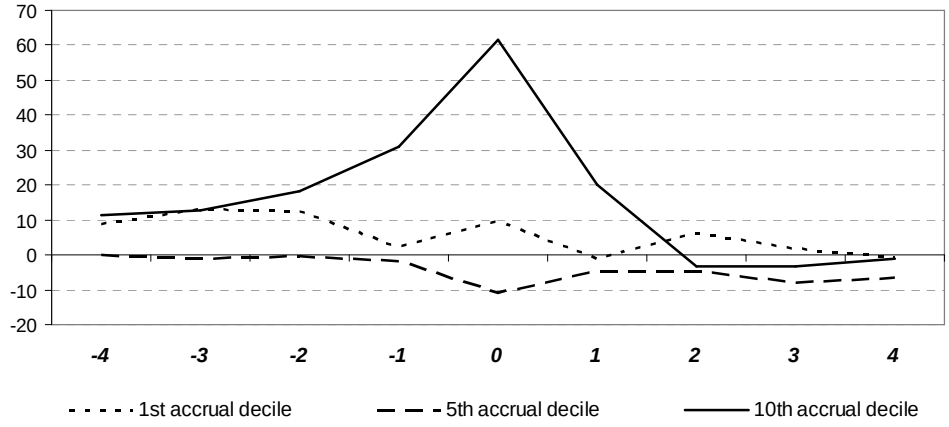

Figure 4 graphs the time-series means of the operating decision characteristics for firms in the 1st, 5th, and 10th total accrual deciles. The total accruals portfolios are formed in the accrual measurement year *zero*, with total accruals calculated using the balance sheet method. Figure 4a graphs the firm's equity issues as a percentage of total assets (Compustat data item 108/item 6), Figure 4b the contributions from acquisitions as a percentage of total assets (Compustat data item 129/item 6), and Figure 4c the growth in capital expenditures and R&D (Compustat data item 128 + item 46). All three measures are size adjusted. The sample contains firm-years from 1963 to 2004.

Figure 5a. Quantile Regressions of Total Accruals on Past Returns

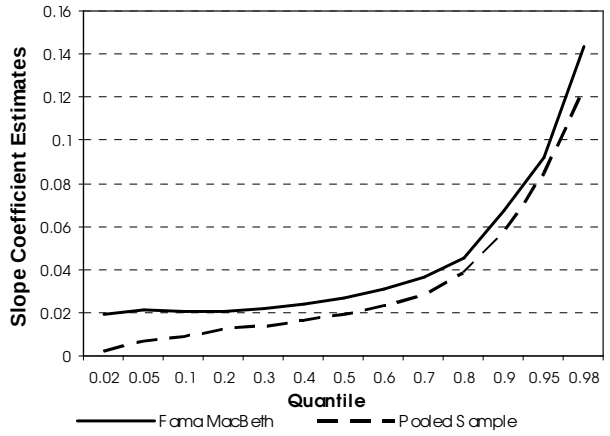

Figure 5b. Quantile Regressions of Discretionary Accruals on Past Returns

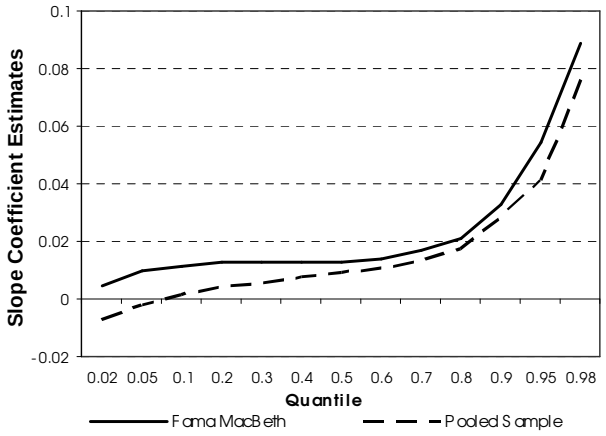

Figure 5c. Quantile Regressions of Total Accruals on Contemporaneous Returns

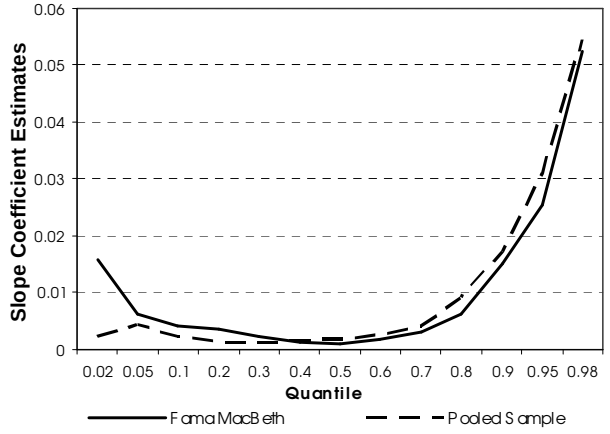

Figure 5d. Quantile Regressions of Discretionary Accruals on Contemporaneous Returns

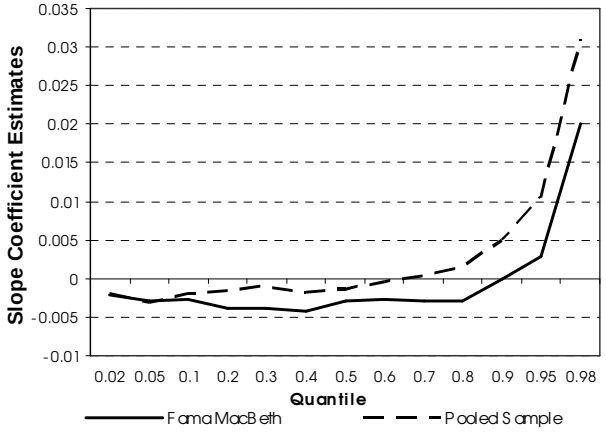

Figure 5 graphs the slope coefficients for quantile regressions of accruals in year 0 on annual abnormal buy-and-hold returns in year -1 (Figures 5a and 5b), and slope coefficients for the quantile regressions of accruals in year 0 on annual abnormal buy-and-hold returns in year 0 (Figures 5c and 5d). The slope coefficients are estimated for the following set of percentiles: 2%, 5%, 10% through 90%, 95%, and 98%. The buy-and-hold annual abnormal returns are size and book-to-market adjusted (see Table 2 for calculation details). Figures 5a and 5c graph results for the total accrual portfolios, while Figures 5b and 5d present for the discretionary accrual portfolios.

Table 1

Summary of the Sample Firms Financial Characteristics

The table presents summary statistics for various firm characteristics in our sample. Panel A presents the mean (median) characteristics for total accrual-decile portfolios, and panel B for discretionary accrual decile portfolios. Total accruals are computed using the balance-sheet method and discretionary accruals using the within industry, cross-sectional modified-Jones model. Descriptive statistics are reported: (i) market capitalization (Compustat data item #24*item #25), (ii) total assets (Compustat data item #6), (iii) leverage (Compustat data item #142/item #6), (iv) market-to-book ratio (Compustat data item #24*item #25/item #60), and (v) income before extraordinary items (Compustat data item #18/ item 6). The sample contains all firm-years from 1963 to 2004. To be included in the sample, a firm-year should contain sufficient information in Compustat to calculate of the presented characteristics and be present in the CRSP Monthly Returns file.

Panel A: Total Accrual Decile Portfolios

	1	2	3	4	5	6	7	8	9	10
Total Accruals, % of Total Assets	-26.37	-12.55	-8.69	-6.28	-4.36	-2.57	-0.53	2.27	7.21	31.27
	(-22.40)	(-12.59)	(-8.91)	(-6.49)	(-4.53)	(-2.75)	(-0.66)	(2.23)	(7.18)	(21.01)
Market Capitalization, $ mil.	493.42	1053.18	1526.34	1672.11	1728.15	1558.34	1287.55	925.52	508.45	315.60
	(18.60)	(41.24)	(68.59)	(100.66)	(121.08)	(109.69)	(88.68)	(65.35)	(48.26)	(38.91)
Total Assets, $ mil.	339.68	1031.49	1501.26	1754.26	1876.27	1708.06	1198.94	873.80	427.17	200.00
	(24.41)	(62.16)	(100.16)	(146.54)	(167.84)	(148.88)	(108.55)	(75.87)	(50.90)	(31.84)
Leverage, in %	17.85	19.50	20.65	21.25	21.58	20.71	20.18	16.81	16.50	14.25
	(6.11)	(12.03)	(15.64)	(17.49)	(18.08)	(16.69)	(14.58)	(11.53)	(8.70)	(5.11)
Market-to-Book Ratio	3.41	2.66	2.04	3.10	2.42	2.18	2.43	2.76	3.14	3.97
	(1.42)	(1.40)	(1.39)	(1.43)	(1.43)	(1.44)	(1.52)	(1.61)	(1.75)	(2.29)
Income Before Extraordinary items, % of Total Assets	-21.83	-5.33	-1.45	0.58	1.30	1.81	2.06	2.40	1.87	-3.71
	(-7.00)	(2.08)	(3.50)	(4.06)	(4.35)	(4.53)	(4.87)	(5.52)	(6.21)	(7.53)

Panel B: Discretionary Accrual Decile Portfolios

	1	2	3	4	5	6	7	8	9	10
Discretionary Accruals,	-25.66	-10.74	-6.34	-3.65	-1.63	0.11	1.87	4.12	7.98	26.39
% of Total Assets	(-21.60)	(-10.50)	(-6.28)	(-3.60)	(-1.59)	(0.14)	(1.86)	(4.03)	(7.67)	(18.34)
Market Capitalization, $ mil.	452.95	774.56	1022.48	1364.80	1559.26	1737.18	1554.80	1422.63	849.97	363.38
	(19.00)	(34.75)	(56.57)	(84.59)	(108.90)	(126.88)	(118.29)	(80.99)	(51.29)	(35.88)
Total Assets, $ mil.	288.32	548.20	863.89	1259.01	1606.73	1909.29	1805.52	1450.73	893.89	293.60
	(20.99)	(45.05)	(75.87)	(108.36)	(142.57)	(169.93)	(155.50)	(106.77)	(62.53)	(33.98)
Leverage	15.15	16.70	18.55	19.95	20.61	21.42	21.47	20.40	19.32	15.99
	(3.94)	(8.69)	(12.58)	(15.25)	(15.98)	(16.93)	(17.93)	(16.54)	(12.83)	(7.21)
Market-to-Book Ratio	4.43	2.61	2.53	2.21	2.49	2.40	1.98	2.85	2.92	3.62
	(1.64)	(1.54)	(1.50)	(1.50)	(1.48)	(1.45)	(1.47)	(1.49)	(1.57)	(1.96)
Income Before Extraordinary	-19.74	-5.26	-1.71	0.30	1.45	2.13	2.75	2.44	1.79	-4.89
Items, % of Total Assets	(-2.94)	(2.60)	(3.77)	(4.39)	(4.51)	(4.58)	(4.77)	(4.85)	(5.30)	(5.75)

Table 2

Buy-and-Hold Abnormal Returns

This table presents time-series means, with associated Fama-MacBeth t-statistics, for annual abnormal returns on 10 accrual portfolios. The accrual portfolios are constructed in year zero, and abnormal returns are computed as follows. Each year we use end of April market capitalization to allocate all companies in our sample into size quintiles based on cutoffs computed for NYSE sub-sample. We further allocate lowest size quintile firms into another 5 quintiles. Subsequently each of the resulting nine size portfolios is allocated into quintiles based on book-to-market ratio, which results in 45 benchmark portfolios in total. The book value is measured as of December of the previous (fiscal) year. The annual abnormal return for each stock is computed as one-year buy-and-hold return (12 month return starting in April) less average annual return of the corresponding size – book-to-market portfolio. Panel A presents the results for total accruals portfolios. Total accruals are computed using the balance sheet method. Panel B presents results for discretionary accruals portfolios. Discretionary accruals are estimated using the within industry, cross-sectional modified Jones model. ***, **, and * indicate significance of the t-statistics for the tests of difference in means at 1, 5, and 10 percent levels, respectively. The sample contains all firm-years from 1963 to 2004. To be included in the sample, a firm-year should contain sufficient information in Compustat to calculate of the presented characteristics and be present in the CRSP Monthly Returns file.

Accrual Decile	*Year With Respect to Accrual Measurement*								
	-4	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***	***4***
Panel A: Case of Total Accruals									
Lowest	0.49	-2.35	-7.02	-11.82	-7.22	-1.92	-1.29	-0.83	0.57
2	-0.29	-1.02	-5.24	-8.74	-3.23	1.17	-1.11	-0.50	-1.93
3	1.87	-0.92	-3.42	-5.91	-1.20	-0.43	0.33	-0.72	-0.03
4	0.49	-0.94	-2.60	-4.87	-0.95	0.14	0.28	-0.98	-1.57
5	-0.69	0.28	-0.92	-3.09	-1.61	0.57	-1.15	0.25	-0.81
6	1.02	1.29	0.54	-2.03	-1.71	-0.19	-0.53	-0.97	-0.96
7	1.33	1.12	1.06	-0.28	-1.60	-1.22	-1.24	-1.57	-2.40
8	3.33	3.19	5.05	2.86	-2.40	-1.69	-0.20	-0.71	-1.12
9	4.46	3.38	9.74	10.23	0.28	-4.07	-2.40	-2.09	-0.98
Highest	0.41	7.48	14.83	29.43	5.45	-7.63	-5.53	-3.34	-0.84
10th - 1st	-0.08	9.82***	21.84***	41.25***	12.66***	-5.70***	-4.23**	-2.50	-1.41
1st - 5th	1.17	-2.63	-6.09	-8.72	-5.61	-2.48	-0.14	-1.07	1.37
10th - 5th	1.09	7.19***	15.74***	32.52***	7.05***	-8.19***	-4.37***	-3.58**	-0.03
Panel B: Case of Discretionary Accruals									
Lowest	-0.38	-1.20	-2.10	-5.29	-2.19	0.21	-2.18	-1.91	-2.06
2	-0.47	-0.23	-4.36	-6.53	-0.96	0.11	-0.96	-0.30	-0.54
3	2.49	1.11	-2.22	-4.28	-1.32	0.16	0.24	0.25	-1.56
4	2.72	0.42	-1.14	-3.53	-0.02	0.07	-0.13	-1.57	-1.01
5	1.25	1.76	-1.27	-1.39	-0.95	0.41	-0.09	-0.33	0.07
6	1.52	-0.76	-0.29	-1.34	-2.66	-0.20	1.50	-0.38	-1.29
7	-0.04	1.02	0.63	-1.32	-1.77	-1.48	-0.75	-0.30	-1.64
8	0.67	1.62	2.39	-0.49	-2.28	-1.79	-2.96	-0.87	-0.17
9	2.77	1.16	5.63	2.78	-2.46	-2.39	-2.85	-1.77	-2.86
Highest	-1.22	3.46	9.57	18.33	0.33	-8.36	-4.91	-3.97	0.13
10th - 1st	-0.84	4.65**	11.67***	23.63***	2.51	-8.57***	-2.73	-2.07	2.20
1st - 5th	-1.63	-2.96	-0.83	-3.90	-1.24	-0.20	-2.09	-1.57	-2.14
10th - 5th	-2.46*	1.69	10.84***	19.73***	1.27	-8.76***	-4.82***	-3.64**	0.06

Table 3
Annualized Alphas from Fama-French Three Factor Model

This table presents annualized Jensen's alphas for 10 accrual portfolios and for different holding horizons. The accrual portfolios are constructed in Year *t*. The alphas are estimated from calendar time regressions based on Fama-French's three-factor model using monthly returns: $R_{pt} - R_{ft} = \alpha + \beta(R_{mt} - R_{ft}) + s \cdot SMB_t + h \cdot HML_t + \varepsilon_t$

where R_{pt} is the return on the accrual portfolio in month *t*; R_{mt} is the return on the CRSP value-weighted index in month *t*; R_{ft} is the 3-month T-bill yield in month *t*; SMB_t is the return on small firms minus the return on large firms in month *t*; and HML_t is the return on high book-to-market stocks minus the return on low book-to-market stocks in month *t*. The factor definitions are described in Fama and French (1993). The accrual portfolios are constructed in the following way. For companies in each accrual decile in year *t*, we include monthly returns earned over five different horizons (around year *zero*): *Years -3 to -1*, *Year -1*, *Year zero*, *Year 1*, *Years 1 to 3*. Monthly returns are included starting from 4 months after the beginning and 4 months after the end of each horizon. Panel A presents results for total accruals portfolios. Total accruals are computed using balance sheet data. Panel B presents results for discretionary accruals portfolios. Discretionary accruals are estimated using the within industry, cross-sectional modified Jones model. The sample contains all firm-years from 1963 to 2004. To be included in the sample, a firm-year should contain sufficient information in Compustat to calculate of the presented characteristics and be present in the CRSP Monthly Returns file. T-statistics are presented in parentheses. ***, **, and * indicate significance of the t-statistics for the tests of difference in means at 1, 5, and 10 percent significance levels.

Panel A: Case of Total Accruals

Accrual Decile	*Years -3 to -1*		*Year -1*		*Year 0*		*Year 1*		*Years 1 to 3*	
	Alpha	T-Stat	Alpha	T-Stat	Alpha	T-Stat	Alpha	T-Stat	Alpha	T-Stat
Lowest	-3.92	(1.97)**	-8.03	(3.70)***	-3.94	(1.74)*	2.11	(0.98)	1.64	(0.87)
2	-2.79	(2.29)**	-6.12	(4.41)***	0.12	(0.08)	3.80	(2.76)***	3.45	(2.82)***
3	-1.65	(1.66)*	-4.09	(3.60)***	1.66	(1.37)	4.57	(4.24)***	3.98	(4.14)***
4	-1.14	(1.37)	-2.73	(2.88)***	0.46	(0.47)	2.77	(3.05)***	2.23	(2.85)***
5	-0.39	(0.51)	-2.35	(2.74)***	0.36	(0.39)	1.57	(1.83)*	1.78	(2.37)**
6	0.82	(1.09)	-0.27	(0.32)	1.03	(1.13)	2.25	(2.23)**	1.99	(2.52)**
7	3.00	(3.50)***	2.17	(2.32)**	-0.15	(0.17)	1.83	(2.02)**	1.65	(1.99)**
8	5.08	(6.04)***	4.96	(5.23)***	0.91	(0.99)	0.22	(0.24)	1.19	(1.34)
9	8.59	(8.21)***	10.74	(9.90)***	1.50	(1.44)	-2.13	(1.80)*	-0.87	(0.77)
Highest	17.82	(12.29)***	25.58	(17.06)***	4.88	(3.62)***	-8.12	(5.18)***	-5.36	(3.51)***
10th - 1st	21.73	(8.82)***	33.61	(12.75)***	8.82	(3.35)***	-10.24	(3.84)***	-7.00	(2.89)***
1st - 5th	-3.52	(1.65)*	-5.69	(2.44)**	-4.30	(1.76)*	0.54	(0.23)	-0.14	(0.07)
10th - 5th	18.21	(11.11)***	27.93	(16.17)***	4.51	(2.74)***	-9.69	(5.42)***	-7.14	(4.20)***

Panel B: Case of Discretionary Accruals

Accrual Decile	*Years -3 to -1*		*Year -1*		*Year 0*		*Year 1*		*Years 1 to 3*	
	Alpha	T-Stat	Alpha	T-Stat	Alpha	T-Stat	Alpha	T-Stat	Alpha	T-Stat
Lowest	-0.06	(0.04)	-1.40	(0.73)	0.94	(0.45)	1.30	(0.65)	1.12	(0.63)
2	-1.04	(0.80)	-3.10	(2.13)**	2.49	(1.63)	4.35	(2.90)***	3.74	(2.90)***
3	-0.34	(0.33)	-1.82	(1.56)	1.34	(1.17)	3.53	(3.19)***	2.82	(2.73)***
4	0.33	(0.39)	-1.42	(1.55)	0.69	(0.64)	2.08	(2.09)**	2.09	(2.25)**
5	0.48	(0.62)	-0.71	(0.80)	0.64	(0.66)	3.07	(3.54)***	2.43	(3.11)***
6	0.88	(1.29)	0.14	(0.17)	-0.13	(0.16)	0.70	(0.86)	1.57	(2.09)**
7	1.49	(2.25)**	0.54	(0.73)	-0.24	(0.30)	0.87	(1.06)	1.26	(1.76)*
8	2.46	(3.09)***	1.52	(1.74)*	0.40	(0.45)	0.02	(0.02)	0.55	(0.66)
9	5.21	(5.14)***	5.88	(5.66)***	0.16	(0.16)	-0.35	(0.27)	0.13	(0.13)
Highest	12.88	(9.02)***	17.04	(11.46)***	1.10	(0.84)	-7.10	(4.58)***	-4.48	(3.02)***
10th - 1st	12.94	(5.71)***	18.44	(7.60)***	0.16	(0.06)	-8.40	(3.33)***	-5.60	(2.42)**
1st - 5th	-0.54	(0.28)	-0.69	(0.32)	0.30	(0.13)	-1.77	(0.82)	-1.31	(0.68)
10th - 5th	12.40	(7.62)***	17.76	(10.24)***	0.46	(0.28)	-10.17	(5.73)***	-6.91	(4.13)***

Table 4
Magnitude of the Accrual Anomaly and Prior Overvaluation

This table presents time-series means and Fama-MacBeth t-statistics for the average annual abnormal stock return in year +1 for accrual portfolios constructed in year 0. The abnormal returns are size and book-to-market adjusted as described in Table 2. Within each decile accrual portfolio, we assign sample companies to quartile portfolios based on their abnormal return in year -1, i.e., they year prior to the accrual measurement year. We report abnormal returns for each quartile portfolio within selected accrual-decile portfolios. The sample contains all firm-years from 1963 to 2004. To be included in the sample, a firm-year should contain sufficient information in Compustat to calculate of the presented characteristics and be present in the CRSP Monthly Returns file.
Panel A presents the results for total accruals portfolios. Total accruals are computed using the balance sheet method. Panel B presents results for discretionary accrual portfolios. Discretionary accruals are estimated using the within industry, cross-sectional modified Jones model.
T-statistics are reported in parentheses. ***, **, and * indicate significance of the t-statistics for the tests of difference in means at 1, 5, and 10 percent significance levels.

Panel A: Abnormal Returns in Year +1 for Total Accruals Portfolios (%)

	For quartile portfolios formed on the basis of abnormal return in year -1			
Accrual Decile	**Q1**	**Q2**	**Q3**	**Q4**
1	0.48	-0.25	2.13	-3.99
	(0.20)	(0.10)	(0.74)	(1.49)
5	2.34	-1.21	0.54	0.34
	(1.30)	(1.11)	(0.49)	(0.18)
10	-1.54	-1.14	-3.84	-10.57
	(0.43)	(0.33)	(1.41)	(6.34)
10th-1st	-2.02	-0.89	-5.97	-6.58**
	(0.47)	(0.21)	(1.51)	(2.08)
1st-5th	-1.86	0.96	1.59	-4.33
	(0.61)	(0.36)	(0.52)	(1.32)
10th-5th	-3.88	0.07	-4.38	-10.91***
	(0.97)	(0.02)	(1.49)	(4.34)

Panel B: Abnormal Returns in Year +1 for Discretionary Accruals Portfolios (%)

	For quartile portfolios formed on the basis of abnormal return in year -1			
Accrual Decile	**Q1**	**Q2**	**Q1**	**Q4**
1	2.70	2.11	2.10	-4.92
	(0.80)	(0.56)	(0.69)	(1.57)
5	-0.27	1.64	2.09	-2.27
	(-0.13)	(1.32)	(1.53)	(1.38)
10	-2.94	-6.19	-3.98	-11.68
	(0.86)	(2.97)	(1.47)	(7.19)
10th-1st	-5.64	-8.30*	-6.07	-6.76*
	(1.18)	(1.92)	(1.49)	(1.91)
1st-5th	2.97	0.47	0.00	-2.65
	(0.75)	(0.12)	(0.00)	(0.75)
10th-5th	-2.67	-7.83***	-6.07**	-9.41***
	(0.66)	(3.25)	(2.00)	(4.07)

Table 5
Long-Term Earnings Growth: Analysts' Forecast Errors

This table presents the analysis of the relation between total accruals and analysts' long-term earnings growth forecast errors (LTG forecast error). LTG forecast error is computed as a difference between forecasted by analysts and realized long-term earnings growth rates. Subsequently LTG forecast errors are size adjusted by subtracting the average LTG forecast error of companies in the same year and size decile portfolio. Panels A and B present the time-series means of the annual size-adjusted mean and median LTG forecast errors respectively, conditional on year 0 accrual decile. Analysts' forecasts of long term growth rate are from the IBES summary file as of the beginning of each fiscal year (specifically within 4th month after prior fiscal year end). Following Dechow and Sloan (1997) and Dechow, Hutton, and Sloan (2000), we compute realized long-term growth rate from the slope coefficient of the OLS regression of natural log of realized EPS on a constant and the time trend over 5-year moving window (using maximum of 6 annual observations). This estimation procedure restricts the sample of firms to those with at least three non-missing and positive earnings per share observations within the 5-year moving window. Furthermore, since IBES data is sparse before 1980 we restrict our analysis to the period from 1980 to 2004. To reduce the influence of outliers 1% of observations is left out from each tail of the distribution before any statistics are computed. ***, **, and * indicate significance of the t-statistics for the tests of difference in means at 1, 5, and 10 percent significance levels.

Accrual Decile	**Panel A: Mean Size-adjusted LTG Forecast Error (%)** Year With Respect to Accrual Measurement								
	-4	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***	***4***
Lowest	1.32	0.47	-1.03	-2.54	-2.13	0.68	-0.58	0.10	0.00
2	2.35	0.60	-1.86	-2.59	-2.61	-0.69	-0.12	1.20	0.92
3	0.10	-0.87	-1.83	-1.66	-2.54	-1.58	-1.78	-2.60	-1.90
4	-0.80	-1.60	-2.04	-2.46	-2.34	-1.70	-1.03	-0.98	-1.37
5	-1.55	-1.46	-1.06	-1.37	-1.89	-1.90	-1.82	-1.99	-1.34
6	-2.28	-1.65	-1.44	-1.31	-1.03	-1.20	-0.99	-1.19	-1.66
7	-0.94	0.22	0.52	1.17	1.04	0.15	-0.40	-0.21	-0.88
8	-0.37	0.16	1.75	3.03	3.01	2.02	1.63	0.49	-0.12
9	-1.12	1.54	3.44	5.41	5.47	2.86	1.83	1.32	1.40
Highest	-1.80	1.49	2.70	7.63	8.15	5.38	1.25	2.38	1.84
10th - 1st	-3.12	1.02	3.73**	10.17***	10.28***	4.71***	1.83	2.28	1.85
1st - 5th	-2.86	-1.92	-0.03	1.17	0.24	-2.57*	-1.24	-2.09	-1.34
10th - 5th	-0.25	2.95**	3.75***	9.00***	10.04***	7.28***	3.07**	4.37***	3.19***
	Panel B: Median Size-adjusted LTG Forecast Error (%)								
Lowest	2.18	2.54	0.12	-0.61	-0.91	2.34	0.24	-0.66	0.47
2	3.33	2.15	-0.08	-0.40	-0.91	0.78	1.41	1.91	1.43
3	1.32	-0.21	-0.92	-1.17	-0.84	-0.62	-0.71	-1.08	-1.51
4	0.05	-0.48	-0.82	-1.63	-1.15	-1.06	-0.25	-0.33	-0.86
5	-0.26	-0.47	-0.61	-0.51	-0.73	-0.97	-1.57	-1.54	-1.30
6	-1.46	-1.09	-0.87	-0.74	-0.62	-0.47	-0.44	-0.38	-1.11
7	0.14	0.65	0.69	1.50	1.24	0.59	0.78	0.55	0.10
8	0.13	1.16	2.26	2.52	3.35	2.37	2.07	1.28	1.12
9	-0.23	2.17	4.40	5.57	4.82	3.95	3.17	2.46	1.81
Highest	2.78	2.64	5.57	7.91	8.06	7.10	2.06	4.08	3.54
10th - 1st	0.59	0.10	5.45***	8.52***	8.97***	4.75**	1.82	4.74***	3.08
1st - 5th	-2.44	-3.01**	-0.73	0.10	0.18	-3.31**	-1.81	-0.88	-1.77
10th - 5th	3.04**	3.11*	6.18***	8.42***	8.79***	8.06***	3.63***	5.63***	4.84***

Table 6
Insider Trading By Total Accrual Deciles

This table presents insider trading activity for companies in different *total* accruals deciles. Total accruals are computed in year *t* using balance sheet data. Panel A presents mean net purchase ratio as number of shares purchased minus number of shares sold divided by total number of shares traded by the insiders. Panel B presents mean net purchase volume ratio as volume of purchase transactions minus volume of sale transactions divided by total volume of shares traded by the insiders. Panel C presents mean net shares traded as number of shares purchased by the insiders minus number of shares sold by the insiders divided by total number of shares outstanding. All three measures are size adjusted by subtracting the average insider trading characteristic of companies in the same year and size decile portfolio. The definition of insiders includes: CEO, COO, President, Chairman of the board, and CFO. The insider trading data is the common shares transactions (purchases and sales only) recorded in Form 4 from Thomson Financial Insider Filing Data. We exclude small transactions with number of shares traded less than 100. The sample period is 1986-2004. ***, **, and * indicate significance of the t-statistics for the tests of difference in means at 1, 5, and 10 percent significance levels.

Accrual Decile	*Year With Respect to Accrual Measurement*								
	-4	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***	***4***
Panel A: Size Adjusted Net Purchase Ratio (%)									
Lowest	-0.389	-3.726	-6.806	-1.718	2.848	4.968	-0.804	3.356	0.903
2	-10.367	-7.520	-6.012	-1.701	2.333	-1.250	-1.213	-2.192	-0.845
3	-4.383	-2.395	-4.215	-1.531	1.974	-1.035	-3.087	-2.334	-3.025
4	-6.039	-0.974	-1.009	2.443	7.633	6.437	3.700	0.929	5.599
5	-3.024	-0.117	1.828	9.075	8.649	5.801	3.318	5.349	3.975
6	1.797	2.471	4.782	3.980	6.698	6.477	4.545	5.050	2.439
7	-2.425	-2.590	1.091	0.762	2.275	-1.173	-2.206	-1.475	-1.103
8	-8.741	-6.696	-8.483	-5.031	-2.152	-5.882	-3.261	0.144	-4.918
9	-8.488	-12.765	-16.412	-17.465	-11.031	-9.406	-8.370	-7.690	-4.842
Highest	-8.899	-8.168	-8.919	-11.686	-19.374	-15.670	-9.029	-6.944	-4.270
10th - 1st	-8.509	-4.442	-2.113	-9.969	-22.223***	-20.638***	-8.225***	-10.300**	-5.173**
1st - 5th	2.635	-3.609	-8.634	-10.793**	-5.801***	-0.833**	-4.122	-1.993	-3.072
10th - 5th	-5.874	-8.051	-10.747*	-20.761***	-28.024***	-21.471***	-12.347***	-12.294***	-8.245***
Panel B: Size Adjusted Volume Net Purchase Ratio (%)									
Lowest	0.024	-3.352	-6.980	-2.536	2.393	3.738	-1.742	2.534	-0.084
2	-10.318	-7.452	-6.298	-2.429	2.186	-1.279	-1.819	-2.399	-0.177
3	-5.017	-2.841	-5.187	-1.834	1.738	-1.533	-3.372	-2.262	-3.047
4	-6.603	-1.208	-0.763	2.260	7.819	5.924	3.554	0.828	5.245
5	-2.904	0.012	2.159	9.189	8.669	6.270	3.591	5.484	4.464
6	2.070	2.432	5.019	4.074	6.793	6.723	4.927	4.843	2.622
7	-2.099	-2.621	0.871	0.534	2.451	-0.983	-2.260	-1.652	-1.119
8	-8.835	-6.400	-8.415	-4.755	-2.010	-6.428	-3.552	-0.387	-5.648
9	-8.765	-13.058	-16.340	-17.389	-11.049	-9.946	-9.140	-8.183	-4.439
Highest	-8.920	-8.913	-9.364	-12.409	-19.221	-16.365	-9.986	-7.758	-4.862
10th - 1st	-8.943	-5.562	-2.383	-9.873	-21.614***	-20.103***	-8.243***	-10.291**	-4.777**
1st - 5th	2.928	-3.364	-9.140	-11.725**	-6.276***	-2.532**	-5.334	-2.950	-4.548
10th - 5th	-6.015	-8.926	-11.523*	-21.598***	-27.890***	-22.635***	-13.577***	-13.241***	-9.326***

Panel C: Size Adjusted Net Shares Traded (%)									
Lowest	0.881	-0.585	-0.897	1.599	1.661	2.173	-0.591	-1.124	-1.861
2	-1.842	0.144	-1.184	-1.552	0.021	-0.376	0.831	-0.048	-1.403
3	-1.544	-1.047	-0.495	-0.375	-1.568	-1.543	-0.018	-0.430	-0.256
4	-0.522	0.666	2.911	1.096	1.510	2.956	2.928	2.519	2.695
5	0.693	-1.157	0.583	2.143	1.820	0.952	1.126	2.152	2.974
6	0.239	2.442	2.265	2.505	2.238	1.648	3.231	3.473	2.761
7	0.277	0.036	0.845	1.506	2.136	1.234	0.431	1.157	0.861
8	1.044	0.442	-0.520	-0.468	0.328	0.141	0.580	1.697	0.682
9	1.394	-0.564	-5.172	-5.363	-2.294	-1.734	0.662	1.638	2.073
Highest	0.512	0.140	-1.203	-3.736	-5.848	-7.318	-5.789	-2.451	-2.235
10th - 1st	-0.369	0.725	-0.306	-5.335	-7.508***	-9.491***	-5.198**	-1.327*	-0.374
1st - 5th	0.188	0.572	-1.480	-0.544	-0.160	1.222	-1.716	-3.276	-4.835**
10th - 5th	-0.181	1.297	-1.786	-5.879	-7.668***	-8.270***	-6.915***	-4.603***	-5.209***

Table 7
Financing and Investing Decisions of Firms in Total Accrual Deciles

This table presents time-series means and Fama-McBeth t-statistics for the operating decision of companies in different total accruals deciles. The deciles are formed in the accrual measurement year zero using balance sheet data. Panel A presents portfolio means of equity issues as a percentage of total assets (Compustat data item 108/item 6). Panel B presents mean contributions from acquisitions as a percentage of total assets (Compustat data item 129/item 6). Panel C presents mean growth in capital and R&D expenditures (Compustat data item 128 + item 46). All three measures are size adjusted by subtracting the average operating decision characteristic of companies in the same year and size decile portfolio. The sample contains all firm-years from 1963 to 2004. To be included in the sample, each firm-year observation should contain sufficient Compustat data to calculate the presented characteristics and also have data on the CRSP Monthly Returns file. ***, **, and * indicate significance of the t-statistics for the tests of difference in means at 1, 5, and 10 percent significance levels.

Accrual Decile	***Year With Respect to Accrual Measurement***								
	-4	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***	***4***
Panel A: Equity Issues as Percentage of Total Assets (%)									
Lowest	8.42	9.03	8.06	6.64	7.21	3.66	0.97	-0.03	-1.18
2	3.26	3.16	2.15	1.66	-1.43	-1.80	-2.38	-2.83	-3.25
3	1.46	1.31	0.75	-0.35	-2.93	-2.31	-2.80	-3.15	-3.71
4	0.09	1.28	0.67	-0.10	-2.92	-2.97	-3.07	-3.29	-3.78
5	0.37	0.41	0.62	0.49	-2.75	-2.47	-2.75	-2.76	-3.13
6	0.47	0.61	0.88	1.22	-2.92	-2.89	-2.60	-3.07	-3.40
7	1.32	1.12	2.01	1.81	-2.65	-2.69	-2.68	-3.23	-3.61
8	1.86	2.09	2.65	3.17	-2.12	-2.37	-3.22	-3.66	-3.75
9	2.67	3.04	3.22	4.73	2.76	-1.71	-2.68	-3.69	-4.00
Highest	7.98	7.60	8.32	9.14	30.62	1.77	-0.06	-0.95	-1.73
10th - 1st	-0.435	-1.427	0.258	2.500	23.415***	-1.888**	-1.034	-0.915	-0.550
1st - 5th	8.046***	8.623***	7.449***	6.155***	9.959***	6.130***	3.722***	2.731***	1.945***
10th - 5th	7.611***	7.196***	7.707***	8.655***	33.375***	4.241***	2.689***	1.816***	1.394**
Panel B: Contribution from Acquisition as Percentage of Total Assets (%)									
Lowest	0.09	0.08	0.03	-0.06	0.28	0.01	0.06	0.07	0.08
2	0.01	0.11	0.07	-0.07	-0.30	-0.11	-0.15	-0.19	-0.18
3	0.06	0.01	0.02	-0.10	-0.55	-0.18	-0.24	-0.15	-0.17
4	0.17	0.22	0.12	0.06	-0.68	-0.19	-0.24	-0.25	-0.42
5	0.03	0.07	0.05	0.04	-0.62	-0.18	-0.22	-0.34	-0.28
6	0.02	0.07	0.00	-0.01	-0.62	-0.27	-0.32	-0.39	-0.42
7	0.02	0.02	0.13	0.14	-0.36	-0.15	-0.19	-0.32	-0.35
8	0.00	0.00	0.15	0.21	0.04	-0.10	-0.21	-0.22	-0.28
9	-0.03	-0.09	0.17	0.29	0.83	0.24	0.03	-0.13	-0.22
Highest	-0.11	-0.02	0.01	0.41	2.82	0.41	0.02	-0.10	-0.26
10th - 1st	-0.196*	-0.103	-0.016	0.471***	2.541***	0.402***	-0.039	-0.169*	-0.340***
1st - 5th	0.056	0.007	-0.022	-0.103	0.905***	0.186**	0.283***	0.406***	0.360***
10th - 5th	-0.140	-0.097	-0.038	0.368***	3.446***	0.589***	0.244***	0.237**	0.020
Panel C: Growth in Capital Expenditures and R&D (%)									
Lowest	8.67	13.04	12.34	2.38	9.55	-1.22	6.21	1.89	-0.70
2	6.93	7.81	3.84	-3.85	-7.20	-6.83	-3.62	-3.50	-4.76
3	5.53	2.60	0.98	-3.39	-11.18	-5.45	-5.68	-5.77	-5.86
4	3.01	2.10	1.19	-2.96	-10.63	-5.81	-6.10	-7.06	-10.36
5	-0.02	-1.10	-0.35	-1.62	-10.74	-4.73	-4.86	-7.80	-6.46
6	-1.98	0.86	-1.15	-0.12	-9.15	-6.14	-6.56	-5.96	-8.24
7	3.42	0.65	3.07	3.50	-5.87	-4.34	-7.04	-7.22	-7.73
8	3.82	3.54	5.36	8.32	2.38	-2.37	-7.13	-6.43	-7.40
9	4.61	6.16	7.55	13.85	13.93	0.66	-5.33	-6.82	-5.41
Highest	11.21	12.62	18.38	30.84	61.48	20.03	-3.29	-3.37	-1.10
10th - 1st	2.539	-0.427	6.040	28.469***	51.929***	21.247***	-9.501***	-5.257*	-0.402
1st - 5th	8.689***	14.143***	12.684***	3.998	20.290***	3.516	11.067***	9.691***	5.760**
10th - 5th	11.228***	13.717***	18.724***	32.467	72.220***	24.762	1.567***	4.434***	5.357**

Table 8
Mishkin Test of the Market Pricing of Cash Flows and Accruals

This table presents results of the Mishkin test. Panel A reports the market pricing of the cash flow and total accrual components of earnings. Panel B reports the market pricing of the cashflow, discretionary accrual, and non-discretionary accrual components of earnings. We present two sets of estimates: (i) the coefficients estimated via the iterated non-linear least squares using full sample of firm-years ("Pooled Estimates"); and (ii) Fama-MacBeth coefficients and t-statistics generated from annual estimates of the iterated non-linear least squares. In addition, we implement the Mishkin test for two subsets of the sample. Based on accruals in year t (total accruals in Panel A and discretionary accruals in Panel B) we separate the sample into bottom five accrual decile firm-years (1st through 5th deciles) and top five accrual decile firm-years (6th through 10th deciles). The sample contains all non-financial firms from 1963 to 2004 with data on both CRSP and Compustat in year *t* and *t+1* for which abnormal buy-and-hold returns can be calculated. The t-statistics for the difference in the coefficients are reported in round parentheses and the chi-square statistics for the difference in the estimated coefficients are reported in square parentheses. ***, **, and * indicate significance of the test statistics for the difference in estimates at 1, 5, and 10 percent significance levels.

Panel A: Total Accruals

$$\text{Earnings}_{t+1} = \gamma_0 + \gamma_1 \text{ Cash Flows}_t + \gamma_2 \text{ Total Accruals}_t + \xi_{t+1}$$

$$\text{Abnormal Returns}_{t+1} = \beta_0 + \beta_1(\text{Earnings}_{t+1} - \gamma_0^* - \gamma_1^* \text{ Cash Flows}_t - \gamma_2^* \text{ Total Accruals}_t) + \zeta_{t+1}$$

	Pooled Estimates			Fama-MacBeth Estimates		
	Full Sample	1st to 5th Accrual Decile Firm-Years	6th to 10th Accrual Decile Firm-Years	Full Sample	1st to 5th Accrual Decile Firm-Years	6th to 10th Accrual Decile Firm-Years
γ_1	0.746	0.763	0.732	0.761	0.764	0.770
γ_1*	0.613	0.620	0.663	0.677	0.595	0.722
$\gamma_1 - \gamma_1$*	0.133	0.143	0.069	0.084	0.169	0.047
	[38.17]***	[18.35]***	[5.61]**	(1.85)*	(3.71)***	(0.69)
γ_2	0.703	0.701	0.713	0.706	0.695	0.709
γ_2*	0.796	0.411	0.899	0.833	0.454	0.698
$\gamma_2 - \gamma_2$*	-0.092	0.291	-0.186	-0.127	0.240	0.011
	[6.34]**	[11.12]***	[13.14]***	(1.03)	(3.33)***	(0.18)

Panel B: Discretionary and Non-discretionary Accruals

$$\text{Earnings}_{t+1} = \gamma_0 + \gamma_1 \text{ Cash Flows}_t + \gamma_2 \text{ Discretionary Accruals}_t + \gamma_3 \text{ Non - discretionary Accruals}_t + \xi_{t+1}$$

$$\text{Abnormal Returns}_{t+1} = \beta_0 + \beta_1(\text{Earnings}_{t+1} - \gamma_0^* - \gamma_1^* \text{ Cash Flows}_t - \gamma_2^* \text{ Discretionary Accruals}_t - \gamma_3^* \text{ Non - discretionary Accruals}_t) + \zeta_{t+1}$$

	Pooled Estimates			Fama-MacBeth Estimates		
	Full Sample	1st to 5th Accrual Decile Firm-Years	6th to 10th Accrual Decile Firm-Years	Full Sample	1st to 5th Accrual Decile Firm-Years	6th to 10th Accrual Decile Firm-Years
γ_1	0.746	0.762	0.726	0.760	0.758	0.770
γ_1*	0.612	0.617	0.647	0.636	0.596	0.686
$\gamma_1 - \gamma_1$*	0.134	0.145	0.079	0.124	0.163	0.084
	[38.99]***	[16.33]***	[8.97]***	(3.08)***	(3.42)***	(1.79)*
γ_2	0.709	0.705	0.683	0.710	0.703	0.699
γ_2*	0.837	0.500	0.860	0.692	0.481	0.697
$\gamma_2 - \gamma_2$*	-0.128	0.204	-0.177	0.018	0.222	0.002
	[9.91]***	[4.44]**	[9.80]***	(0.41)	(2.08)**	(0.04)
γ_3	0.685	0.648	0.710	0.688	0.675	0.704
γ_3*	0.668	0.449	0.756	0.617	0.547	0.671
$\gamma_3 - \gamma_3$*	0.017	0.199	-0.047	0.071	0.129	0.033
	[0.07]	[2.81]*	[0.43]	(0.75)	(0.92)	(0.37)

Table 9
Relations between Returns, Accruals, and Operating Decisions

This table presents evidence of a causal relation between prior/present returns (as proxies for overvaluation) and current accruals and operating decision characteristics. Panel A reports time series means of slope coefficients from cross-sectional regressions of accruals at time *t* on annual buy-and-hold abnormal returns at time *(t-1)* where the returns are instrumented using instrumental variables measured at time *(t-1).* Panel B reports time series means of slope coefficients from cross-sectional regressions of accruals at time *t* on annual buy-and-hold abnormal returns at time *t* where the returns are instrumented using instrumental variables measured at time *t.* Annual buy-and-hold abnormal returns are size and book-to-market adjusted as described in Table 2. In both panels the instrumental variables are (i) equity issuance as percentage of total assets, (ii) acquisitions as percentage of total assets, (iii) growth in PPE and PPE as a fraction of total assets, (iv) growth in R&D and R&D as a fraction of total assets, (v) growth in CapEx and CapEx as a fraction of total assets, (vi) dummy for positive income contributions from acquisitions, and (vii) dummy for positive change in good-will. Panel C reports the time series means of the slope coefficient of the cross-sectional regression of operating decisions at time *t* on annual buy-and-hold abnormal returns at time *(t-1).* We consider six operating decisions characteristics: (i) equity issues as a percentage of total assets (Compustat data item 108/item 6), (ii) debt issues as a percentage of total Assets (Compustat data item 111/item 6), (iii) contributions from acquisitions as a percentage of total assets (Compustat data item 129/item 6), (iv) growth in capital expenditures (Compustat data item 128), (v) growth in R&D expenditures (Compustat data item 46), and (vi) growth in property plant and equipment (Compustat data item 7). The sample contains all non-financial firms from 1963 to 2004 with data available on both CRSP and Compustat in year *t* and *(t-1)*. T-statistics are based on Fama-MacBeth standard errors.

Panel A: $\text{Accruals}_t = \alpha + \beta \cdot \text{Abnormal Return}_{t-1} + \varepsilon_t$

$\text{Abnormal Return}_{t-1} = c + D \cdot \text{Instrumental Variables}_{t-1} + \xi_{t-1}$

	Coefficient (β)	*T-stat*	*P-value*	*Number of observations*
Total Accruals	0.0764	2.556	0.015	38
Discretionary Accruals	0.0390	2.111	0.041	38

Panel B: $\text{Accruals}_t = \alpha + \beta \cdot \text{Abnormal Return}_t + \varepsilon_t$

$\text{Abnormal Return}_t = c + D \cdot \text{Instrumental Variables}_t + \xi_t$

	Coefficient (β)	*T-stat*	*P-value*	*Number of observations*
Total Accruals	0.1568	4.101	0.001	38
Discretionary Accruals	0.1240	4.014	0.001	38

Panel C: $\text{Operating Decision}_t = \alpha + \beta \cdot \text{Abnormal Return}_{t-1} + \varepsilon_t$

	Coefficient (β)	*T-stat*	*P-value*	*Number of observations*
Equity Issues (% of Total Assets)	0.0565	6.468	0.001	32
Debt Issues (% of Total Assets)	0.0268	6.444	0.001	32
Acquisitions (% of Total Assets)	0.0086	7.691	0.001	32
Growth in Capital Expenditures	0.5610	11.157	0.001	38
Growth in R&D	0.0725	10.906	0.001	38
Growth in PPE	0.1356	11.157	0.001	38

Table 10
Quantile Regression Analysis of the Relation between Returns and Accruals

The table reports the time series means and Fama-MacBeth t-statistics for the slope coefficients from cross-sectional regressions: (i) of accruals in year 0 on annual abnormal buy-and-hold return in year -1, and (ii) of annuals abnormal buy-and-hold return in year +1 on accruals in year 0. The coefficients for each quantile ***q*** regression are estimated as follows:

$$\begin{cases} \hat{\beta}^q = \arg\min_{\beta} \sum_{i=1}^{n} \rho_q(y_i - x_i'\beta) \\ \rho_q(z) = z(q - 1_{\{z<0\}}) \end{cases}$$

Panel A presents the results for total accruals, whereas Panel B presents the results for discretionary accruals. Annual buy-and-hold abnormal returns are size and book-to-market adjusted as discussed in Table 2. The total accruals are computed using the balance sheet data. The discretionary accruals are estimated via within industry, cross-sectional modified Jones model. The sample contains all non-financial firms that are present in both CRSP and Compustat in years -1, 0, and 1 and covers period from 1963 to 2004.

Quantile of Distribution	$Accruals_{it} = \alpha + \beta\ Ret_{it-1} + \varepsilon_{it}$		$Accruals_{it} = \alpha + \beta\ Ret_{it} + \varepsilon_{it}$	
q	**Slope Coefficient**	**T-Stat**	**Slope Coefficient**	**T-Stat**
Panel A: Total Accruals				
5%	0.021	(4.88)	0.006	(1.37)
10%	0.020	(5.39)	0.004	(1.28)
20%	0.021	(6.83)	0.004	(1.40)
30%	0.022	(7.89)	0.002	(0.88)
40%	0.024	(8.78)	0.001	(0.49)
50%	0.027	(9.59)	0.001	(0.47)
60%	0.031	(11.44)	0.002	(0.75)
70%	0.036	(11.50)	0.003	(1.20)
80%	0.045	(12.43)	0.006	(1.97)
90%	0.067	(13.45)	0.015	(3.29)
95%	0.092	(13.93)	0.026	(3.79)
95%-5%	0.071	(13.23)	0.019	(2.59)
95%-50%	0.066	(12.17)	0.024	(4.18)
5%-50%	-0.005	(1.69)	0.005	(1.37)
Panel B: Discretionary Accruals				
5%	0.010	(2.69)	-0.003	(0.58)
10%	0.011	(3.89)	-0.003	(0.91)
20%	0.013	(5.32)	-0.004	(1.83)
30%	0.013	(6.22)	-0.004	(2.23)
40%	0.013	(7.00)	-0.004	(2.59)
50%	0.013	(8.33)	-0.003	(1.87)
60%	0.014	(9.72)	-0.003	(1.64)
70%	0.017	(11.76)	-0.003	(1.69)
80%	0.021	(12.68)	-0.003	(1.29)
90%	0.033	(12.93)	0.001	(0.01)
95%	0.054	(9.68)	0.003	(0.52)
95%-5%	0.045	(8.78)	0.006	(0.87)
95%-50%	0.042	(8.08)	0.006	(1.18)
5%-50%	-0.003	(1.17)	0.001	(0.01)