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Sami Keskek
of
Texas A&M University

will present

“Does market learning explain the disappearance of the accrual anomaly?”

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Does market learning explain the disappearance of the accrual anomaly?

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Abstract: In this study, I investigate whether market learning explains the absence of the accrual anomaly in recent years by examining three conditions associated with the presence of the anomaly in prior research: (i) a differential relation between future earnings and cash flows versus accruals, (ii) incorrect weighting of cash flows and accruals by investors when predicting earnings, and (iii) association of earnings forecast errors with returns. All of these conditions are widely documented in the anomaly period. In the no-anomaly period, I continue to find a differential relation of cash flows and accruals with future earnings. I find, however, that investors appear to correctly weight accruals and cash flows in their earnings predictions implicit in beginning-of-year security prices, consistent with learning. I also investigate whether improvements in analyst forecasts contribute to investor learning and the absence of the anomaly. The association between analyst optimism and accruals is weaker in the no-anomaly period, but is still statistically significant. Furthermore, I find that the anomaly ended simultaneously for firms followed by analysts and for non-followed firms, suggesting that improvements in analyst forecasts alone cannot account for improved market efficiency with respect to accruals. I find that the anomaly was similar for firms held by institutional investors and for firms with no institutional holdings before the discovery of the anomaly while the anomaly ended sooner for held firms than for non-held firms after the discovery of the anomaly, consistent with the conjecture that arbitrage by institutional investors may reduce the anomaly. Overall, the findings are consistent with market learning and suggest that improvement in investors' interpretation of accruals after the discovery of the anomaly explains the absence of the anomaly. This improvement in investor learning is not due to changes in analysts' forecasting behavior, however.

Keywords: M*arket efficiency, accrual anomaly, investor sophistication, analysts' forecast bias*
Data Availability: Data are available from public sources.

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I. Introduction:

Recent evidence suggests that investors' accrual-related mispricing disappeared in 2002 and has been undetectable since then (e.g., Richardson et al. 2010). In this study, I investigate whether improvements in investors' interpretation of accruals explain the absence of mispricing in recent years. I build on Richardson et al.'s (2010) conjecture that adaptive market efficiency (e.g., Grossman and Stiglitz 1980), or market learning, might explain the end of the anomaly.[1] Numerous studies suggest that analysts are sophisticated information processors and improve market efficiency by providing value-relevant information to investors (Ramnath 2008). Other studies suggest, however, that analysts also overweight accruals when they issue forecasts, resulting in forecast errors that are predictably associated with accruals. I therefore also examine whether reductions in analysts' accrual-related bias contribute to the end of the anomaly. Efficient use of accounting information is of fundamental importance to investors and firms as well as regulators. It is useful to document whether market learning can restore efficiency when the market is discovered to be inefficient with respect to particular information. Since analysts are important information intermediaries and their forecasts exert considerable influence on security prices, their possible contribution to market learning is of interest to investors and regulators.

Sloan (1996) finds that a trading strategy that takes a long position in low-accrual firms and a short position in high-accrual firms earns economically large and statistically significant hedge returns, a phenomenon referred to as the accrual anomaly. While a number of studies argue that the excess returns to the trading strategy can be explained by risk-related factors (Khan 2008; Wu et al. 2009), the evidence suggests that the excess returns reflect market inefficiency and are driven by investors' failure to anticipate the lower persistence of accruals

[1] Note that Richardson et al. (2010) do not test this prediction.

relative to cash flows (e.g., Collins and Hribar 2000; Richardson et al. 2001; Xie 2001; Beneish and Vagus 2002; Hirshleifer et al. 2004; Hirshleifer et al. 2006; Richardson et al. 2010). More generally, the anomaly is associated with the following three conditions: (i) a differential relation between future earnings and cash flows versus accruals, (ii) incorrect weighting of accruals by investors, leading to earnings forecast errors that are predictably associated with accruals, and (iii) association of earnings forecast errors with returns. The recent evidence shows that the anomaly disappeared in 2002 (e.g., Richardson et al. 2010). The absence of the anomaly provides a unique opportunity to understand the causes of the anomaly. Most importantly, the absence of the anomaly implies that at least one of the conditions associated with the anomaly changed. Since changes in these conditions lead to distinct inferences about trends in the quality and value-relevance of accounting information or investor sophistication in interpreting accounting information, it is of fundamental importance to understand the contribution of each factor to the absence of the anomaly.

Richardson et al. (2010) conjecture that the end of the anomaly could be driven by market learning, suggesting that investors learn about the relatively low association of accruals with future earnings over time and adjust accordingly. Since the absence of the anomaly coincides with the enactment of the Sarbanes Oxley Act of 2002 (hereafter, SOX), it seems plausible that the accounting scandals that led to the enactment of SOX and the regulatory changes in SOX may have led investors to pay more attention to the implications of cash flows and accruals for future earnings. Other studies suggest that the relation between accruals and future earnings changed after the enactment of the Sarbanes Oxley Act, and this change, rather than investor learning, may explain the absence of the anomaly (e.g., Bhojraj et al. 2009). For example, Cohen et al. (2008) find a substantial decrease in the accruals-based earnings management following SOX. The coincidence of the absence of the anomaly with the enactment of SOX also raises the possibility that the absence of the anomaly could be due to a loss of investor confidence in the financial information provided by firms. If investors rely less on information in earnings, the association of earnings forecast errors with returns may be too low to generate excess returns.

Since analysts play an important role as information intermediaries in the capital market, improvements in analysts' forecast properties, or analyst learning, could contribute to the absence of the anomaly. Consistent with the view that analysts are sophisticated information intermediaries, numerous studies suggest that analysts understand the implications of financial information better than investors and improve market efficiency by providing value-relevant information to investors (e.g., Brennan et al. 1993; Walther 1997; Bhattacharya 2001; Elgers et al. 2001; Elgers et al. 2003; Gleason and Lee 2003). However, prior studies disagree about whether analysts reduce or strengthen the accrual anomaly. Bradshaw et al. (2001) document overoptimism in analysts' earnings forecasts for high accruals firms and conclude that analysts fail to alert investors to the lower association of accruals than cash flows with future earnings.[2] They also conjecture that analysts' accrual-related optimism could be driven by their incentives rather than their inability to interpret accruals. In contrast, Elgers et al. (2003) argue that investors could infer the lower persistence of accruals relative to cash flows from analyst forecasts but fail to do so. Both studies base their inferences about analysts' contribution to market efficiency with respect to accruals on samples of firms followed by analysts. However, the accrual strategy does not require that firms have analysts. Unlike prior studies, I provide a direct test of analysts' role in the accrual anomaly by comparing the magnitude and significance

[2] Bradshaw et al. (2001) do not rule out the possibility that analysts partially see through the subsequent accrual reversals.

of the accrual anomaly for followed and non-followed firms over the anomaly and no-anomaly periods. Evidence that the anomaly declines more rapidly and ends sooner for followed firms than for non-followed firms would support the widely-held notion that analysts contribute to market efficiency.

I examine causes of the end of the anomaly using data over 1988-2008. I begin by documenting annual excess returns to the accrual-related trading strategy of buying firms in the lowest accruals decile and selling firms in the highest decile. The findings confirm prior findings that the accrual anomaly disappeared in 2002. I also confirm prior evidence that the accrual anomaly does not exist among loss firms (Dopuch et al. 2010) and therefore focus on gain firms in subsequent analyses. Among gain firms, the mean excess return to the accrual-related strategy is 18.9 percent during the anomaly period whereas it is 0.6 percent and statistically insignificant during the no-anomaly period. I next investigate whether a change in the differential persistence of accruals and cash flows accounts for the end of the anomaly. If accruals and cash flows have similar relation with future earnings during the no-anomaly period then investors' naïve fixation on earnings would not generate forecast errors that are predictably related to accruals. I examine this by regressing future earnings on current year's accruals and cash flows and find that there is still a substantial difference in the relation of cash flows versus accruals to future earnings. This implies that the accrual anomaly would still exist during the no-anomaly period if investors naively assign the same weight to cash flows and accruals when they predict earnings.

I next employ the Mishkin model to estimate the weights investors attach to the cash flow and accruals earnings components to predict next-period earnings in the anomaly and no-anomaly periods. I infer the weights from the relation between the earnings components and returns in the one-year period beginning four months after earnings are announced. As in prior studies, I find that investors overweighted accruals and underweighted cash flows during the anomaly period. During the no-anomaly period, the implicit weights that investors assign to accruals and cash flows are not significantly different from the time series association of accruals and cash flows with future earnings. Thus, the Mishkin model results suggest that investors learned about the differential persistence of accruals and cash flows and incorporated the correct weights in valuing securities in the no-anomaly period. To provide further evidence on this issue, I estimate earnings forecast errors from a model based solely on prior-year earnings, the naïve model. By construction, this model ignores the lower persistence of accruals than cash flows. Forecast errors from the naïve model are significantly positively associated with accruals during both the anomaly and the no-anomaly periods. Next, I partition the forecast error from the naïve model into a portion related to accruals and a portion that is unrelated to accruals. I find that size-adjusted returns are significantly associated with accrual-related earnings forecast errors in the anomaly period but not in the no-anomaly period. This finding suggests that security pricing is consistent with the naïve model in the anomaly period but with a model that properly weights cash flows and accruals in the no-anomaly period, consistent with learning. I find that investors respond similarly to the portion of the earnings forecast error that is unrelated to accruals in the anomaly and no-anomaly periods. Thus, the end of the anomaly cannot be due to a decline in the value-relevance of earnings for setting security prices.

I next investigate whether the correction in investors' response to cash flows and accruals can be attributed to improvements in analyst forecasts. This inference would be supported if the anomaly and analysts' accrual-related optimism end at the same time and if the accrual anomaly continues for non-followed firms. I find a substantial decrease in analysts' accrual related overoptimism that coincides with the end of the accrual anomaly, but analysts' forecasts are still optimistically biased for firms with high accruals. There is no accrual anomaly among followed firms during the no-anomaly period. This implies that investors are not influenced by the remaining accrual-related overoptimism in analysts' forecasts during the no-anomaly period. Consistent with this, I find that investors' response to analysts' forecast error predictable by a given level of accruals is significant during the anomaly period while it is insignificant during the no-anomaly period. Furthermore, I find that followed and non-followed firms had similar levels of the accrual anomaly in the anomaly period and that the anomaly disappeared at the same time for both samples. These findings indicate that the end of the anomaly is not due to improvements in analyst forecasts, and suggest that analysts' forecasts did not enhance market inefficiency with respect to accruals during the anomaly period.

To provide evidence on how investors correct accrual-related mispricing, I compare excess returns to the accrual strategy for firms held by institutional investors and firms with no institutional investor holdings based on the conjecture that arbitrage by institutional investors may reduce the anomaly. I focus on institutional investors because they may be better positioned than individual investors to trade on knowledge about the anomaly. Consistent with this conjecture, I find that returns to the trading strategy is similar for firms moderately-held by institutional investors, for firms highly-held by institutional investors, and firms with no institutional investor holdings in the pre-1996 period, before the accrual anomaly was discovered. In the 1996 to 2001 period, when the anomaly became widely known and prior studies find continued mispricing, the excess returns to the accrual strategy is significantly lower for moderately-held firms than non-held firms and is insignificant for high-held firms. I repeat the analyses for mutual funds and obtain similar results. Furthermore, I find a substantial increase in the percentage of firms held by institutional investors and/or mutual funds, the number of institutions and funds holding stocks a firm, and percentage of total shares held by institutions and funds in the no-anomaly period. These findings suggest that institutional investors and mutual funds played a significant role in the decline of accrual-related mispricing.

This study contributes to the literature in several ways. First, I extend the literature investigating the absence of the anomaly. Green et al. (2009) find an increase in both assets managed by hedge funds and trading volume in the extreme accruals deciles during the no-anomaly period, and argue that accrual-related trading strategies by large hedge funds advised by academic accountants resulted in a decline in the anomaly. Mohanram (2009) disputes Green et al.'s (2009) conclusion by showing that the increase in trading turnover is not unique to firms with extreme accruals and is driven by small trades rather than by the large trades typically made by hedge funds. He argues that increases in the number of analysts' cash flow forecasts explain the recent absence of the anomaly. The findings in this study suggest, however, that the absence of mispricing is not specific to followed firms, inconsistent with the argument that analysts' cash flow forecasts explain the end of the anomaly. I find the decline in the anomaly started earlier for firms held by institutional investors than for firms with no institutional investor holdings. I also find increases in both the percentage of firms held by institutional investors and the percentage of those firms' shares held by institutional investors. Thus, the findings in this study are more consistent with Green et al. (2009) and suggest that an increase in trading to exploit the accrual anomaly by arbitrageurs is likely to explain the absence of the anomaly. Second, numerous studies suggest that analysts are sophisticated information processors and enhance market efficiency by providing investors with value-relevant information (see Ramnath et al. 2008). Most importantly, Elgers et al. (2003) argue that 60 percent of accrual anomaly would be eliminated if investors naively fixated on analysts' forecasts. My results suggest, however, that analysts' forecasts remain inefficient with respect to accruals while investors appear to have fully learned about the relation of cash flows and accruals to future earnings. This finding is consistent with the conjecture that analysts' accrual-related bias may arise from their incentives to collude with management rather than from their inability to process financial information (e.g., Bradshaw et al. 2001). Finally, prior studies view the biases in analysts' forecast as evidence of market wide inefficiency based on the assumption that analysts' forecasts are a reasonable proxy for market expectations (e.g., Bradshaw et al. 2001; Bradshaw et al. 2006). Richardson et al. (2010) further argue that this should be a standard diagnostic test. I find, however, that although analysts' forecasts continue to be inefficient with respect to accruals in the no-anomaly period, this inefficiency is not reflected in security prices. The results indicate that investors are not influenced by the remaining accrual-related overoptimism in analysts' forecasts during the no-anomaly period, suggesting that market expectations may significantly diverge from analysts' consensus forecasts. Thus, this study has also implications for studies using analysts' earnings forecasts as a proxy for market expectations.

II. Related literature and hypothesis development

a. Behavioral versus risk-based explanations for excess returns to the accrual strategy

Sloan (1996) finds that the accruals component of earnings is less persistent than the cash flows component. He finds that investors price securities as if they naïvely predict next-period earnings using aggregate earnings, ignoring the differential relation between future earnings and cash flows versus accruals. As a result, a strategy that takes a long position in the lowest-accrual firms and a short position in the highest-accrual firms generates economically large and statistically significant excess returns. Following Sloan (1996), a large body of literature investigates the robustness of the accrual anomaly and searches for the ways to refine it. A number of studies argue that the anomaly is illusory and that the excess returns to the trading strategy can be explained by risk-related factors (e.g., Khan 2008 and Wu et al. 2009). Most studies conclude, however, that the anomaly exists and is driven by investors' failure to understand the lower persistence of accruals than cash flows (e.g., Collins and Hribar 2000; Richardson et al. 2001; Xie 2001; Beneish and Vagus 2002; Richardson et al. 2010). Other studies suggest that the anomaly is real and will endure because of significant economic barriers to arbitrage (Lev and Nissim 2006; Mashruwala et al. 2006).

b. The end of the anomaly and conditions associated with the presence of the anomaly

Recent studies find that the anomaly disappeared in 2002 and has been undetectable since then (e.g., Richardson et al. 2010). The absence of the anomaly in recent years implies that at least one of the following three conditions associated with the presence of the anomaly changed: (i) a differential relation between future earnings and cash flows versus accruals, (ii) incorrect weighting of accruals by investors, leading to earnings forecast errors that are predictably associated with accruals, and (iii) association of earnings forecast errors with returns. Among these alternatives, Richardson et al. (2010) conjecture that adaptive market efficiency (e.g., Grossman and Stiglitz 1980; Lo 2004), or market learning, explains the absence of the anomaly. This explanation suggests that investors learn about the lower persistence of accruals relative to cash flows over time and adjust accordingly. It presupposes that accruals continue to have lower persistence than cash flows in the no-anomaly period, but that investors correctly weight cash flows and accruals when predicting earnings in the no-anomaly period. An alternative scenario is that the persistence of accruals and cash flows is similar during the no-anomaly period, in which case earnings forecasts that ignore the cash flow and accruals components of earnings would yield forecast errors that are not associated with accruals. In this scenario, returns would not be associated with accruals even if investors naively rely on aggregate earnings when setting security prices. The absence of the anomaly could also be driven by a decline in value-relevance of the information in earnings rather than market learning or a change in differential persistence of accruals and cash flows. That is, the association of earnings forecast errors with returns may be too small to generate excess returns even if the differential relation between future earnings and cash flows versus accruals persists in the no-anomaly period and investors fail to anticipate the lower persistence of accruals than cash flows.

c. Change in differential persistence of accruals and cash flows for the end of the anomaly

A number of studies find lower absolute discretionary accruals following the enactment of SOX, and conclude that firms engaged in less accrual-based earnings management once SOX became effective (e.g., Cohen et al. 2008). This evidence is particularly important because the absence of the anomaly coincides with the enactment of SOX. Bhojraj et al. (2009) argue that an increase in the quality of accruals due to lower earnings management following the enactment of SOX in 2002 and FAS 146 in 2003 resulted in a decrease in accrual-related mispricing among restructuring firms. Thus, I first test whether a change in the differential persistence of accruals and cash flows rather than market learning accounts for the end of the anomaly. If accruals and cash flows have similar relation with future earnings during the no-anomaly period then investors' naïve fixation on earnings would not generate forecast errors that are predictably related to accruals. This leads to the first hypothesis:

H1: Accruals and cash flows have similar persistence in the no-anomaly period.

d. Market learning explanation for the end of the anomaly

If the persistence of accruals and cash flow components of earnings continues to differ during the no-anomaly period then the absence of the anomaly could be due to either market learning or a decrease in value-relevance of earnings such that the association of earnings forecast errors with returns is too weak to generate excess returns. The absence of the anomaly in recent years would be consistent with market learning explanation if investors learn to correctly weight accruals and cash flows when incorporating the information in current year earnings into their forecasts of future earnings. This leads to the second hypothesis:

H2: Investors fully anticipate the lower persistence of accruals relative to cash flows when forming expectations of future earnings during the no-anomaly period.

e. Decline in value-relevance of earnings as an explanation for the end of the anomaly

Since the absence of the anomaly coincides with the enactment of SOX, finding evidence consistent with market learning would imply that regulatory changes in SOX and associated accounting scandals alerted investors to the differential relation between future earnings and cash flows versus accruals and thereby contributed to market learning. However, the coincidence of the absence of the anomaly with SOX also raises the possibility that investors lost confidence in the financial information provided by firms due to the accounting scandals, resulting in the absence of the anomaly. If investors rely less on information in earnings, the association of earnings forecast errors with returns may be too small to generate excess returns even if investors fail to anticipate differential persistence of accruals and cash flows. This leads to the third hypothesis:

H3: There is no association of earnings forecast errors with returns during the no-anomaly period.

f. Analysts' contribution to the end of the anomaly

Analyst forecasts are an important component of the information set that is reflected in security prices. Numerous studies suggest that analysts are sophisticated information processors who are more likely than investors to understand the implications of financial information for future earnings (e.g., Bradshaw et al. 2001; Ali et al. 2003; Elgers et al. 2003; Chen and Jiang 2005; Ramnath et al. 2008). Consistent with this, a large body of literature concludes that analysts improve market efficiency by providing value-relevant information to investors (e.g., Brennan et al. 1993; Walther 1997; Bhattacharya 2001; Elgers et al. 2001; Elgers et al. 2003; Gleason and Lee 2003; Ramnath et al. 2008). However, prior studies reach conflicting conclusions with respect to analysts' contribution to the accrual anomaly. Some studies find a significant positive association between optimism in analysts' earnings forecasts and accruals (Ahmed et al. 2001, Bradshaw et al. 2001). Bradshaw et al. (2001) conclude that even sophisticated information processors, i.e., analysts, do not understand the lower association of accruals than cash flows with future earnings and thus their forecasts do not alert investors about differential persistence of accruals and cash flows. They further conjecture that analysts' accrual-related optimism could be driven by their incentives to collude with managers rather than their misunderstanding of the differential relation between future earnings and accruals versus cash flows. In contrast, Elgers et al. (2003) argue that analysts warn investors about future earnings problems associated with high accruals. In particular, they find that both analysts and investors fail to fully anticipate the lower persistence of accruals than cash flows and thus overweight the information in accruals in their earnings predictions. They find, however, that the overweighting by analysts is less than one third of the overweighting by investors. They conclude that returns from the accrual anomaly would be reduced by over 60 percent if investors naively relied on analysts' earnings forecasts. Kang and Yoo (2007) dispute the Elgers et al. (2003) finding, arguing it is induced by omitted variables. Following Liu and Thomas (2000), they control for the revision in analysts' one year ahead forecasts and find no significant differences in overweighting of the information in accruals by analyst and investors. They conclude that analyst forecasts do not help investors understand the lower persistence of accruals, a conclusion similar to that reached by Bradshaw et al. (2001).

The absence of the anomaly in recent years offers a unique opportunity to understand analysts' contribution to the accrual anomaly. Moreover, an important feature of prior studies is that they base their inferences solely on samples of firms that are followed by analysts. This research design obscures analysts' contribution to the accrual anomaly. Unlike prior studies, I provide a direct test of analysts' role in increasing or reducing the accrual anomaly by comparing the magnitude and significance of the accrual anomaly for followed and non-followed firms over the anomaly and no-anomaly periods. Since analysts are sophisticated information processors, they are more likely than naïve investors to learn about the lower persistence of accruals relative to cash flows. Thus, a reduction in analysts' accrual-related optimism, or analyst learning, could explain the absence of the anomaly. Analyst learning as an explanation for the absence of the anomaly would be supported if the anomaly and analysts' accrual-related optimism end at the same time and if the accrual anomaly continues for non-followed firms. This leads to the fourth hypothesis:

H4a: Analysts' accrual-related optimism disappears during the no-anomaly period.

H4b: The absence of the accrual anomaly is specific to followed firms during the no-anomaly period.

III. Sample selection and descriptive statistics

a. Sample selection

I obtain financial statement data from the CRSP/COMPUSTAT merged annual database, stock returns data from the CRSP monthly stock returns files, and analyst forecast data from the IBES detail file. As in prior studies, I exclude financial firms (SIC code between 6000 and 6999). I follow Bradshaw et al. (2001) in constructing financial variables. In particular, I use Statement of Financial Accounting Standards No. 95 (SFAS 95) data to measure accruals and cash flows. SFAS data became available in fiscal year 1988, and I therefore begin the sample period in fiscal year 1988 and end it in fiscal year 2008. In addition, identifying firms followed by analysts is of significant importance for the purpose of this study. IBES coverage starts in the late 1970s and data are only available for large firms before the late 1980s. Therefore, beginning the sample in the late 1980s decreases the possibility of erroneously classifying followed firms as having no analyst coverage.

Following Bradshaw et al. (2001), I use two alternative measures for accruals. The first is based on working capital accruals and the second on total net accruals. Bradshaw et al. (2001) find that working capital accruals better capture accruals that lead to earnings reversals that are unanticipated by investors and report results for this measure in their main tests. Following their approach, I only report the results for working capital accruals for conciseness, but find similar results in all my analysis using the total net accruals measure.[3] I measure working capital accruals as follows:

WCAcc= Increase in Accounts Receivable (Compustat item RECCH)

+ Increase in inventory (Compustat item INVCH)

+ Decrease in Accounts Payable and Accrued Liabilities (Compustat APALCH)

+ Decrease in Accrued Income Taxes (Compustat item TXACH)

+ Increase (Decrease) in Assets (Liabilities)-Other (Compustat item AOLOCH)

I use earnings before interest, taxes, depreciation, and amortization (Compustat item OIBDP) as the earnings measure and obtain the corresponding cash flows measure, WCCF, by subtracting WCAcc from Compustat item OIBDP. As in prior research, I deflate all variables by average total assets (Compustat item AT). Table 1 reports the sample selection procedure. The total number of firm-years read from the CRSP/Compustat merged file over 1988 and 2008 period is 113,423. The sample with non-missing earnings (OIBDP), working capital accruals (WCAcc), and corresponding cash flows (WCCF) data consists of 92,988 firm-years.

[3] Bradshaw et al. (2001) also find that the results are very similar for total net accruals and working capital accruals measures. Following Bradshaw et al. (2001), I measure total net accruals as follows: TAcc= Income before extraordinary items (Compustat item IBC)- Net Cash Flows from Operating Activities (Compustat item OANCF).

Stock returns are obtained from CRSP monthly returns file and are inclusive of dividends. I obtain compounded buy-and-hold returns over twelve months beginning four months after the end of the fiscal year, and compute size adjusted returns by deducting a firm's size-matched portfolio buy-and-hold return from its raw buy-and-hold return. As in Kraft et al. (2006), I obtain size portfolios from CRSP calculations of size deciles of NYSE and AMEX firms. Kraft et al. (2006) identify several sample selection biases that affect excess returns to the accrual related strategy, and I follow their procedures to mitigate these problems. One sample selection bias they identify is selecting stocks based on the current listing exchange instead of the actual exchange for the period during which stock returns are measured. Since I use stocks listed in all exchanges, the results do not suffer from this selection bias (Kraft et al. 2006).[4] Following their procedures, I set a firm's return to zero for any month in which it is missing (WRDS code ".B"). If a firm is not assigned to a size decile by CRSP, I manually determine its size portfolio by using its market capitalization as of the beginning of the year. In addition, if a firm is delisted during the return accumulation period, I use the delisting return in the month in which the firm delists and assume that the firm's return is equal to the return of its size-matched portfolio for the rest of the year. The delisting return is set to -100% if a firm's delisting return is missing and the delisting is forced by the exchange or Securities and Exchange Commission (SEC) or is due to liquidation. Finally, I restrict the sample to firm-year observations with fiscal-year-end stock prices greater than one dollar.[5] The final number of firm–years having financial information and stock returns data is 78,045.

[4] Another sample selection bias identified by Kraft et al. (2006) is the exclusion of firms not reporting earnings or accruals in year t+1 from the trading strategy sample. I also do not have this sample selection issue.

[5] I exclude these firm-years to mitigate the concern about the real underlying cause of the inefficiency driven by low priced stocks (Kothari 2001; Kraft et al. 2006). However, I obtain similar results when I include these firm-years in the sample or when I use $5 as the cut-off price.

My tests require identifying firms followed by analysts and those with no analyst following and measures of analysts' forecast error for followed firms. I obtain analyst forecast data from the IBES detail file and adjust analyst forecasts for stock splits and stock dividends using the IBES adjustment factors. I find that 30,348 firm-years have no analyst forecasts from the announcement of year t earnings to the portfolio formation date, and classify these firm years as non-followed firms.[6] For firms followed by analysts, I manually compute the mean consensus forecasts using forecasts over the 60-day period ending prior to the portfolio formation date.[7] There are 40,017 firm-years for which I can obtain the mean consensus forecast. Finally, I obtain institutional investor holdings from the Thomson Financial Spectrum 13F Institutional Holdings Database.

b. Descriptive statistics

I begin by calculating yearly returns to the accrual-related trading strategy of buying firms in the lowest-accrual decile and selling firms in the highest-accrual decile and plot the returns in Figure 1. This evidence confirms prior findings that the accrual anomaly ended in 2002. I therefore calculate descriptive statistics separately for the anomaly period (1988-2001) and the no-anomaly period (2002-2008) and test for differences across the two samples. I report the results in Table 2, Panel A. Firms are on average larger and more likely to be followed by analysts during the no-anomaly period. I also find that both the percentage of firms held by institutional investors and the percentage of those firms' shares held by institutional investors

[6] Of the firms having no analyst forecasts before the portfolio formation date, 7,793 firm-years have analyst forecasts during the year after the portfolio formation date. Eliminating them from no analyst following group does not affect the results.

[7] Following prior studies, I prefer not to use IBES consensus forecast and restrict the forecast age to 60 days to mitigate the effects of stale forecasts. In addition, analysts' consensus forecasts may better reflect the investors' expectations if the forecast horizon is kept shorter but it results in a decrease in sample of firm-years having consensus forecast.

increased in the no-anomaly period. Firms are also on average less profitable in the no-anomaly period. In the anomaly period, mean asset-deflated earnings are 0.063, and 20 percent of the firms report losses. In the no-anomaly period, asset-deflated earnings are 0.048 and 22.1 percent of the firms report losses. The differences are statistically significant. The distributions of accruals and cash flow components of earnings suggest that the decrease in firms' profitability is driven by a decrease in mean accruals. The mean asset-deflated working capital accruals are 0.021 and 0.008 in the anomaly and no-anomaly periods, respectively, and the difference is statistically significant. The corresponding numbers for mean cash flows are 0.042 and 0.041 in the anomaly and no-anomaly periods, respectively, and the difference is insignificant. Untabulated results show that the mean accruals for the firms in the lowest accruals decile are -0.125 and -0.119 in the anomaly and no-anomaly periods, respectively, and the difference is statistically insignificant. In the highest accruals decile, the mean accruals in the anomaly period are 0.186 and are significantly larger than the mean accruals in the no-anomaly period, 0.137. This suggests that the decrease in mean accruals in the no-anomaly period is due to a decrease in mean accruals of firms in the highest accruals decile. This is consistent with prior studies that find a significant decrease in discretionary accruals following the enactment of SOX (e.g., Cohen et al. 2008). Thus, the findings suggest that an increase in the quality of accruals due to a decrease in accruals-based earnings management may contribute to the absence of the anomaly.

Table 2, Panel A also provides descriptive statistics for analysts' mean consensus forecast error, *AnalystFERROR.* The mean (median) consensus forecast errors are -0.024 (-0.003) and -0.013 (-0.0004) in the anomaly and no-anomaly periods respectively and untabulated results show that the difference in means is statistically significant. This is consistent with prior findings suggesting that optimism in analysts' consensus forecasts early in the year decreased in recent years (Hovakimian and Seanyasiri 2009). In Table 2, Panel B, I report the correlations for earnings, accruals, and cash flows separately for anomaly and no-anomaly periods. Consistent with prior research, accruals are positively correlated with earnings and negatively correlated with cash flows. The correlation coefficients are similar in the anomaly and no-anomaly periods.

IV. Research Methods, Specification of Empirical Tests, and Results

a. Accrual anomaly over time

In this section, I first document the excess return to the accrual related strategy of buying firms in the lowest and selling firms in the highest accruals deciles. Figure 1 confirms prior evidence that the accrual anomaly disappeared in 2002. Therefore, I separately examine the anomaly and no-anomaly periods. Hayn (1995) shows that security prices are insensitive to losses, and argues that this is because of equity investors' liquidation option. This suggests that one of the conditions required for the presence of the accrual anomaly, namely the association between earnings and returns, is weak or missing for loss firms. Consistent with this, Dopuch et al. (2010) find that there is no anomaly among loss firms. Therefore, I report the excess return to the accrual strategy for the full sample as well as separately for gain firms and loss firms.

Table 3, Panel A reports the excess return to the accrual strategy in the anomaly period. For the full sample, the excess return to accrual strategy is about 10.7 percent per year. Consistent with Kraft et al. (2006), I find that the accrual anomaly is mainly driven by negative excess return to the firms in the highest accruals decile. The excess return to the firms in the lowest accruals decile is small and statistically insignificant whereas it is larger and significantly positive for the firms in the second decile of accruals. Thus, the results for the full sample suggest an inverted U-shaped relation between accruals and future stock returns as in Kraft et al.

(2006). An inverted U-shaped relation is inconsistent with Sloan (1996)'s earnings fixation hypothesis that the accrual anomaly is driven by investors' failure to anticipate lower persistence of accruals with respect to cash flows. I find that the inverted U-shaped relation is induced by loss firms, and that the mean excess return to the accrual strategy increases to 18.9 percent per year when I exclude loss firms from the sample. This change is almost entirely due to the lowest accrual decile, which has insignificant excess returns when loss firms are in the sample but has statistically significant mean excess returns of 8.8 percent per year when loss firms are excluded from the sample.[8] Unlike the results for the full sample, the future stock returns decline monotonically from lowest- to highest-accrual portfolios. Because loss firms distort returns to the accrual strategy, I focus on gain firms in subsequent analyses.

Table 3, Panel B reports the excess returns to the accrual strategy over the no-anomaly period. Among gain firms, the average excess return to the accrual strategy is 0.6 percent over 2002-2007. Figure 1 shows the excess return to the accrual strategy for gain firms over time. The results confirm prior findings that the accrual strategy does not earn significant excess returns after 2001.

b. Persistence of accruals in the anomaly and no-anomaly periods

In this section, I test whether a change in the differential relation between future earnings and cash flows versus accruals explains the absence of the anomaly in recent years. I examine this by regressing next year's realized earnings on the accruals and cash flows components of this year's earnings:[9]

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[8] These findings suggest that having loss firms in the accrual strategy is likely to influence the inferences with respect to causes of the accrual anomaly in prior studies. For example, motivated by the evidence that the anomaly is mainly driven by the negative excess return to firms with high accruals, Kothari et al. (2005) argue that agency theory of overvalued equity rather than investors' failure to anticipate lower persistence of accruals explains the anomaly.

[9] Requiring firms to have next year's earnings reduces the sample from 43,378 to 41,028 and from 16,085 to 15,254 in the anomaly and no-anomaly periods, respectively.

$$EARN_{t+1} = \alpha_0 + \gamma_1 WCAcc_t + \gamma_2 WCCF_t + u_t \ . \tag{1}$$

I estimate the model on a year-by-year basis for 1988-2008 and report Fama MacBeth coefficients and corresponding t-statistics separately for the anomaly and no-anomaly periods in Table 4. I find that the coefficient on accruals increases from 0.635 in the anomaly period to 0.700 in the no-anomaly period and the increase is statistically significant. There is also a significant increase in the persistence of cash flows in the no-anomaly period. I find that the coefficient on accruals is significantly smaller than the coefficient on cash flows in both the anomaly and no-anomaly periods. Furthermore, the gap between the persistence of cash flows and accruals is 0.178 and 0.142 in the anomaly and no-anomaly periods respectively, and the change in the gap is not statistically significant. Overall, although there is an increase in the persistence of accruals in the no-anomaly, the differential relation between future earnings and cash flows versus accruals persists in that period. This suggests that a decrease in the differential persistence of accruals and cash flows cannot explain the absence of the anomaly in the no-anomaly period.

c. Investors' pricing of accruals and cash flows in the anomaly and no-anomaly periods

In this section, I use the Mishkin model to measure changes in investors' pricing of accruals and cash flows components of earning in the no-anomaly period. This procedure allows me to infer the weights that investors assign to accruals and cash flows in predicting next-period earnings and the consistency of those weights with their empirical relation with earnings in equation 1. Since accruals continue to be less persistent than cash flows in the no-anomaly period, finding that investors correctly weight accruals and cash flows would support the market learning explanation for the absence of the anomaly. To examine this, I estimate the following model:

Forecasting Model:

$$EARN_{t+1} = \gamma_0 + \gamma_1 WCAcc_t + \gamma_2 WCCF_t + u_{t+1} \text{ , and} \tag{2a}$$

Pricing Model:

$$ARET_{t+1} = \beta_0 + \beta_0 (EARN_{t+1} - \gamma_1^* WCAcc_t - \gamma_2^* WCCF_t) + \nu_{t+1} \text{ .} \tag{2b}$$

I estimate the model on a year-by-year basis for 1988-2008.[10] Table 5 reports Fama MacBeth coefficients and corresponding t-statistics separately for the anomaly and no-anomaly periods. Market efficiency with respect to the accruals component of earnings requires that $\gamma_1 = \gamma_1^*$. As in prior studies, the results for the anomaly period show that γ_1^* is significantly larger than γ_1 while γ_2^* is significantly smaller than γ_2. This implies that investors overweight the information in accruals and underweight the information in cash flows when forming expectations of future earnings.

In the no-anomaly period, I find that that γ_1^* is not significantly different than γ_1 and that γ_2^* is not significantly different than γ_2, suggesting that investors correctly weight the information in accruals and cash flows when setting security prices. The results so far show that the differential association of future earnings with accruals versus cash flows persists in the no-anomaly period. However, investors correctly price the components of earnings by lowering the weight that they assign to accruals and increasing the weight that they assign to cash flows. The findings are consistent with market learning explanation for the absence of the anomaly,

[10] The results and inferences are similar when I estimate the model over separate pooled samples in the anomaly and no-anomaly periods.

suggesting that investors learned about the differential persistence of accruals and cash flows and eventually incorporated the correct weights in valuing securities. Furthermore, I find that the return response coefficient, β_1, is statistically similar in the anomaly and no-anomaly periods. Thus, I fail reject the hypothesis that there is no association of earnings forecast errors with returns during the no-anomaly period. This suggests that a loss of investor confidence in the financial information provided by firms is not likely to account for the absence of the anomaly.

d. Investors' response to earnings forecast errors that are predictable versus unpredictable from accruals

I provide further evidence on market learning by studying investors' response to earnings forecasts errors predictable by a given level of accruals in the anomaly and no-anomaly periods. Sloan (1996) argues that investors naively rely on aggregate earnings and ignore the lower persistence of accruals than cash flows when forming expectations of future earnings. Following Sloan (1996), I estimate earnings forecast errors from a model based solely on prior-year earnings, the naïve model:

$$EARN_{t+1} = \gamma_0 + \gamma_1 EARN_t + u_{t+1} \quad . \tag{3}$$

The results, reported in Table 6, Panel A, suggest that the relation between future earnings and current earnings is similar in the anomaly and no-anomaly periods. The coefficient on current earnings is 0.814 in the anomaly period and 0.844 in the no-anomaly period. The residuals from Model (3), u_{t+1}, represent the earnings forecast errors from the naïve model, *NaiveFerror*. Because the naive model ignores the lower persistence of accruals than cash flows, forecast errors from this model will be positively associated with accruals. I regress earnings forecast errors, *NaiveFerror*, on current year accruals to obtain the component of earnings forecast errors predictable by a given level of accruals. In particular, I estimate the following model:

$$NaiveFerror_{t+1} = \alpha_0 + \alpha_1 WCAcc_t + e_{t+1} \ . \tag{4}$$

The results are reported in Table 6, Panel B, and suggest that earnings forecast errors are significantly positively associated with current-year accruals in the anomaly and no-anomaly periods, consistent with the findings that accruals are less persistent than cash flows in both periods. This implies that the accrual anomaly would still exist during the no-anomaly period if investors naively assigned the same weight to cash flows and accruals when they predict earnings. I next examine investors' response to the components of *NaïveFerror* that are predictable versus unpredictable using accruals. The predicted part of *NaïveFerror* in Model (4), *Pred_NaiveFerror*, is the fitted value using accruals. The residuals from Model (4) are the unpredictable component of earnings forecast errors, *Unpred_NaiveFerror*. Market learning would suggest that investors stop responding to predictable earnings forecast errors while they respond similarly to unpredictable errors in the anomaly and no-anomaly periods. To examine this, I estimate the following model:

$$ARET_{t+1} = \delta_0 + \delta_1 Pred\_NaiveFerror_{t+1} + \delta_2 Unpred\_NaiveFerror_{t+1} + \varepsilon_{t+1} \ . \tag{5}$$

The results, reported in Table 6, Panel C, suggest that investors responded strongly to earnings forecast errors predictable by a given level of accruals during the anomaly period while their response is insignificant during the no-anomaly period. In particular, the coefficient on *Pred_NaiveFerror* in the anomaly period is 4.113 and is statistically significant. The corresponding coefficient in the no-anomaly period is 0.908 and is insignificant. Thus, I find that investors' response to the information in earnings is consistent with the naïve model in the anomaly period but is consistent with a model that properly weights cash flows and accruals in the no-anomaly period. The results further support the market learning explanation for the end of the anomaly. Furthermore, I find that investors respond similarly to the unpredictable component of earnings forecast errors, *Unpred_NaiveFerror*, in the anomaly and no-anomaly periods. This indicates that returns respond to earnings forecast errors in the anomaly and no-anomaly periods, and is consistent with the results from the Mishkin model. The findings suggest that the end of the anomaly is not due to a decline in the value-relevance of earnings for setting security prices.

e. Analysts' contribution to the end of the anomaly

In this section, I examine whether a reduction in accrual-related bias in analysts' earnings forecasts, or analyst learning, explains the absence of the anomaly in recent years. If analyst forecasts are the cause of improved market efficiency then analysts' accrual-related optimism should disappear at the same time as the anomaly. Furthermore, the anomaly should only end for followed firms. To examine this, I first regress analysts' mean consensus forecast error on accruals. That is, I estimate the following model:

$$AFerror_{t+1} = \alpha_0 + \alpha_1 WCAcc_t + e_{t+1} \ . \tag{6}$$

I estimate the model on a year-by-year basis for 1988-2008. Table 7, Panel A reports Fama MacBeth coefficients and the corresponding t-statistics separately for the anomaly and no-anomaly periods. The mean coefficients on accruals are -0.134 and -0.082 in the anomaly and no-anomaly periods respectively, and both coefficients are statistically significant, indicating that analysts' earnings forecasts are optimistically biased for firms with high accruals in both periods. The difference in the coefficients is statistically significant, suggesting a significant decrease in analysts' accrual-related overoptimism in the no-anomaly period. The findings suggest that the anomaly would still exist if investors naively fixated on analysts' consensus earnings forecasts. I examine this question by regressing returns on the component of analysts' forecast errors that is predictable based on accruals and the unpredictable portion. I estimate the following model:

$$ARET_{t+1} = \delta_0 + \delta_1 Pred\_AFerror_{t+1} + \delta_2 Unpred\_AFerror_{t+1} + \varepsilon_{t+1} \ , \qquad (7)$$

where

Pred_AFerror is the component of AFerror predicted by accruals in Model (7), equal to the fitted values from Model (7), and

Unpred_AFerror is the component of AFerror that is not predictable by accruals, equal to the residuals from Model (7).

The results, reported in Table 7, Panel B, suggest that investors strongly responded to analysts' earnings forecast errors predictable by a given level of accruals during the anomaly period while their response is insignificant during the no-anomaly period. In particular, the coefficient on *Pred_AFerror* is 5.568 and statistically significant in the anomaly period while it is 0.710 and insignificant in the no-anomaly period. Thus, I find that investors are not influenced by the remaining accrual-related overoptimism in analysts' forecasts during the no-anomaly period. These results suggest that market expectations may significantly diverge from analysts' consensus forecasts. The evidence that analysts continue to issue optimistically biased forecasts for firms with high accruals while investors appear to fully learn about the lower persistence of accruals than cash flows is consistent with the conjecture that analysts' accrual-related bias could be intentional (e.g., Bradshaw et al. 2001). The results in this study suggest, however, that investors also learn about the biases in analysts' forecasts and adjust accordingly. I find that investors respond similarly to the unpredictable component of analysts' earnings forecast errors, *Unpred_AFerror*, in the anomaly and no-anomaly periods. Similar to the results in the Miskin model analysis and the analysis of unpredictable from the naïve forecast model, this suggests that the decrease in investors' response to predicted component of analysts' forecast errors is not attributable to a decline in value-relevance of analysts' forecasts.

The results so far suggest that reduction in accrual-related bias in analysts' earnings forecasts cannot explain the absence of the anomaly in recent years. I provide further evidence on analysts' role in the market inefficiency with respect to accruals by comparing the magnitude and significance of the accrual anomaly for followed and non-followed firms in the anomaly and no-anomaly periods. I classify the anomaly period into two sub-periods, 1988-1996 and 1996-2001, based on the publication date of Sloan (1996).[11] I conduct this analysis to determine whether investors appear to have started learning about the anomaly when the accrual anomaly became widely known. Furthermore, if analysts contributed to market learning about the anomaly, the decline in the anomaly would be more rapid and end sooner for followed firms than for non-followed firms. Table 8 reports the excess returns to the accrual strategy for the full sample as well as separately for followed and non-followed firms in each sub-period. In Table 9, I formally test the differences in the accrual anomaly for followed and for non-followed firms by estimating a model that includes numerous control variables to account for differences across followed and non-followed firms. Both portfolio and regression results suggest that the anomaly is similar for followed and non-followed firms in each sub-period. Between the years 1988 and 1995, prior to publication of Sloan (1996), the mean excess returns to the accrual strategy were

[11] Green et al. (2009) use a similar classification.

17.1 percent and 16.8 percent per year for followed and non-followed firms respectively. The corresponding mean excess returns are 21.7 percent and 24.4 percent between the years 1996 and 2001. In particular, the accrual strategy does not generate significant excess return in the no-anomaly period for either followed or non-followed firms. The results suggest that the absence of the anomaly is not due to improvements in analyst forecasts, and suggest further that analysts' forecasts did not enhance market inefficiency with respect to accruals during the anomaly period.

f. Institutional investors and learning

To provide further evidence on how investors correct accrual-related mispricing, I examine the differences in the excess returns to the accrual strategy between firms held by institutional investors and firms with no institutional investor holdings. Prior studies consider institutional investors as sophisticated investors, suggesting that institutional investors may better understand the differential association of future earnings with cash flows versus accruals (e.g., Ali et al. 2003; Collins et al. 2003). Since institutional investors have greater resources for collecting and processing information, they are also less likely than individual investors to be influenced by accrual-related bias in analysts' earnings forecasts. In addition, a significant part of the anomaly lies on the short side. Thus, even if individual investors know about the accrual anomaly, they may be unable to act on this knowledge. This suggests that the accrual-related mispricing could be better corrected by the actions of arbitrageurs, i.e., institutional investors. If institutional investors played a significant role in removing accruals mispricing then the excess returns to the accrual strategy should be lower for firms held by institutional investors than firms with no institutional investor holdings once the anomaly became widely known. I examine this possibility by comparing the magnitude and significance of the accrual anomaly for firms held by institutional investors (Held firms) and firms with no institutional holdings (Non-Held firms) over each sub-period as defined before. Prior studies suggest that dedicated institutions follow passive investment strategies and therefore unlikely to trade on information in the accruals signal (e.g., Collins et al. 2003). Therefore, I further classify Held firms based on dedicated and transient institutional investors holding the securities of the firm. Institutions holding at least one percent of shares of a firm-year are labeled as dedicated institutions. I label firm-years as High-IH if the percentage of shares held by transient institutions are at least 15 percent of shares of a firm-year and percentage of shares held by dedicated institutions is not in the upper quartile of the dedicated institutional investor holdings distribution and as Moderate-IH otherwise.

In Table 10, Panel A, I formally examine this issue by estimating a model of accrual-related returns in three periods—the pre-1996 period, before the accrual anomaly was discovered, 1996 to 2001, where prior studies find continued mispricing, and 2002 to 2008, where the accrual strategy earns insignificant returns. I include numerous control variables used in prior studies in my model (e.g., Collins et al. 2003). The model is:

$$\begin{aligned} ARET_{t+1} &= \alpha_0 + \alpha_1 Moderate-IH + \alpha_1 High-IH + \beta_1 DWCAcc_t + \beta_2 Moderate-IH * DWCAcc_t \\ &+ \beta_3 High-IH * DWCAcc_t + \beta_4 LMV_t + \beta_5 LMB_t + \beta_6 INSTOWN_t + \beta_7 EP_t + \beta_8 Beta_t + v_{t+1} \end{aligned} \tag{9}$$

The regression results, reported in Table 10, Panel A, suggest that the anomaly is similar for Non-Held, Moderate-IH, and High-IH firms before the discovery of the anomaly, between 1988 and 1995. The coefficient on the scaled decile accrual rankings is -0.146, indicating a mean excess return to the accrual strategy of 14.6 percent for Non-Held firms in this period. I find that the mean excess returns to Non-Held and Moderate-IH firms are around 27.9 percent and 18.5 percent per year in the 1996 and 2001 period, respectively. Untabulated results suggest that the mean excess return is significantly lower for Moderate-IH firms than for Non-Held firms. Furthermore, the mean excess return to the accrual strategy is around 5.1 percent and insignificant for High-IH firms during the 1996 and 2001 period. I also estimate Model (9) on a year by year basis and report the coefficient on the scaled decile accrual rankings for Non-Held and High-IH firms in Figure 2. The results reported in Figure 2 show that the accrual strategy does not earn significant excess returns for High-IH firm-years after the discovery of the anomaly except the year 1998. Overall, I find that institutional investors played a significant role in removing accruals mispricing once the anomaly became widely known.

In Table 10, Panel B, I find that differential relation of future earnings with accruals versus cash flows is similar for Non-Held, Moderate-IH, and High-IH firms in each sub-period. This suggests that the differences in mean excess returns to the accrual strategy are not driven by differences differential persistence of accruals and cash flows for Held and Non-Held firms. I also examine whether the smaller returns to Held firms than Non-Held firms could be due to the differences in analysts' accrual-related bias for Held and Non-Held firms. The results, reported in Panel C, indicate that analysts' accrual related overoptimism is similar for Non-Held, Moderate-IH, and High-IH firms in each sub-period. These findings suggest that the differences in analysts' forecast efficiency with respect to accruals cannot explain the differences in the anomaly for Held and Non-Held firms. Thus, the smaller returns to the accrual-related strategy for Held firms are consistent with arbitrage trading by institutional investors.

In Table 10, Panel D, I repeat the analyses for mutual funds and obtain results that are similar to those for institutional investors. In particular, I find no significant difference in excess returns to Non-Held, moderate mutual holdings (Moderate-MH), and high mutual holdings (High-MH) firms in the period prior to discovery of the anomaly. The excess returns to Non-

Held and Moderate-MH firms are around 28.2 percent and 18.7 percent per year during the 1996 and 2001 period, respectively, and the difference is statistically significant. The mean excess return to the accrual strategy is around 2.2 percent and insignificant for High-MH firms during the 1996 and 2001 period, suggesting that the end of the anomaly started earlier for firms held by mutual funds. Additional findings suggest that the smaller excess returns to the accrual strategy for High-MH than for Non-Held firms is not driven by differences in the lower persistence of accruals with respect to cash flows.

In sum, I find that the decline in the anomaly started earlier for held firms than for non-held firms. Moreover, there is no significant anomaly among High-Held firms after the discovery of the anomaly. However, the anomaly ends for both Held and Non-Held firms by 2002. Thus, institutional investor holdings and mutual fund holdings alone cannot account for the absence of the anomaly. The results reported in Figure 3 show increases in both the percentage of firms held by institutional investors and the percentage of those firms' shares held by institutional investors. There is also substantial increase in the number of institutional investors following a particular firm. Moreover, the number of mutual funds following a particular firm and percentage of firms held by mutual funds also increase. Green et al. (2009) find an increase in investment by hedge funds advised by academic accountants. Overall, these findings suggest that an increase in trading to exploit the accrual anomaly is likely to explain the absence of the anomaly, consistent with learning.

V. Conclusion

The accrual anomaly, first documented by Sloan (1996), has been one of the most studied topics in accounting research. Because of the simplicity of the accrual-related investment strategy and the economic significance of returns it generates, prior studies has questioned whether the anomaly is real and, if so, why it persisted for years after its discovery. Recent evidence suggests that the anomaly eventually disappeared in 2002 and has been undetectable since then (e.g., Richardson et al. 2010). In this study, I examine whether improvements in investors' understanding of the lower persistence of accruals with respect cash flows, market learning, explain the absence of the anomaly in recent years. The absence of the anomaly requires that at least one of the following conditions associated with the presence of the anomaly changed in the no-anomaly period: (i) a differential relation between future earnings and cash flows versus accruals, (ii) incorrect weighting of cash flows and accruals by investors when predicting earnings, leading to forecast errors that are predictable from the level of cash flows and accruals, and (iii) association of earnings forecast errors with returns. I find that all of the conditions are present in the anomaly period. The differential relation between future earnings and cash flows versus accruals persists in the no-anomaly period and there is no evidence of a decrease in the association of earnings forecast errors with returns. I find, however, that investors correctly incorporated the differential persistence of accruals and cash flows when forming predictions of future earnings implicit in beginning-of-year security prices. This finding is consistent with Richardson et al.'s (2010) conjecture that market learning explains the absence of the anomaly.

Analysts are commonly viewed as sophisticated information processors, and I investigate whether improvements in their forecasts might have contributed to the disappearance of the anomaly. Prior evidence suggests that analysts' earnings forecasts are optimistically biased for firms with high accruals in the anomaly period, implying that analysts are at least partly subject to biases that lead to the anomaly (e.g., Bradshaw et al. 2001). I find that the association between analyst optimism and accruals is weaker in the no-anomaly period, but is still statistically significant. Furthermore, I find that followed and non-followed firms had similar levels of the accrual anomaly in the anomaly period and that the anomaly ended simultaneously for both samples. This suggests that improvements in analyst forecasts alone cannot account for improved market efficiency with respect to accruals.

This study provides insights on the factors contributing to the accrual anomaly and its apparent correction in recent years. My study also sheds light on analysts' role in market inefficiency with respect to accruals. Green et al. (2009) argue that the absence of the anomaly is driven by greater investments to the accrual strategy by large hedge funds advised by academic accountants, consistent with learning. Mohanram (2009) finds, however, that the increase in turnover is not unique to firms with extreme accruals and is driven by a large number of small trades rather than large trades by hedge funds. He argues that increases in the number of analysts' cash flow forecasts explain the recent absence of the anomaly. The findings in this study suggest that the absence of the anomaly is not restricted to followed firms, and are inconsistent with the argument that analysts' cash flow forecasts are responsible for market learning and the absence of the anomaly. Instead, the results suggest that learning by investors is independent of analysts. I find that the anomaly was significantly lower for firms held by institutional investors than for firms with no institutional investor holdings once the anomaly became widely known, while the anomaly was similar for both groups before the discovery of the anomaly. I also find both the percentage of firms held by institutional investors and the percentage of those firms' shares held by institutional investors increased in the no-anomaly period. These findings are consistent with Green et al. (2009) and suggest that an increase in trading to exploit the accrual anomaly is likely to explain the absence of the anomaly.

Bradshaw et al.'s (2001) conjecture that analysts' accrual-related optimism could be driven by their incentives to collude with the management rather their lack of sophistication to understand the differential persistence of accruals and cash flows. Although investors appears to fully learn about the accrual anomaly, I continue to find accrual-related optimism in analysts' earnings forecasts, consistent with Bradshaw et al.'s (2001) conjecture that analysts' accrual-related optimism is likely to be intentional. Prior studies view the inefficiencies in analysts' forecasts as evidence of market wide inefficiency (e.g., Bradshaw et al. 2001; Bradshaw et al. 2006). Richardson et al. (2010) further argue that this should be a standard diagnostic test. The findings in this study indicate, however, that investors are not influenced by the remaining accrual-related overoptimism in analysts' forecasts during the no-anomaly period. These results suggest that market expectations may significantly diverge from analysts' consensus forecasts. In future research, I will examine the implications of this divergence for the common practice of using analysts' earnings forecasts as a proxy for market expectations.

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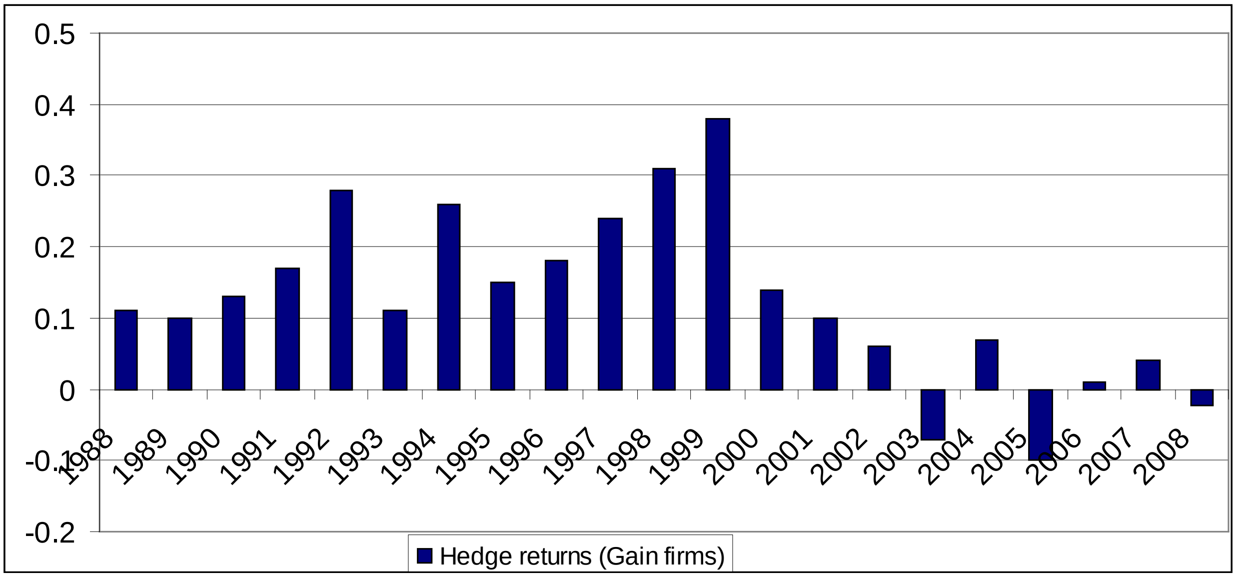
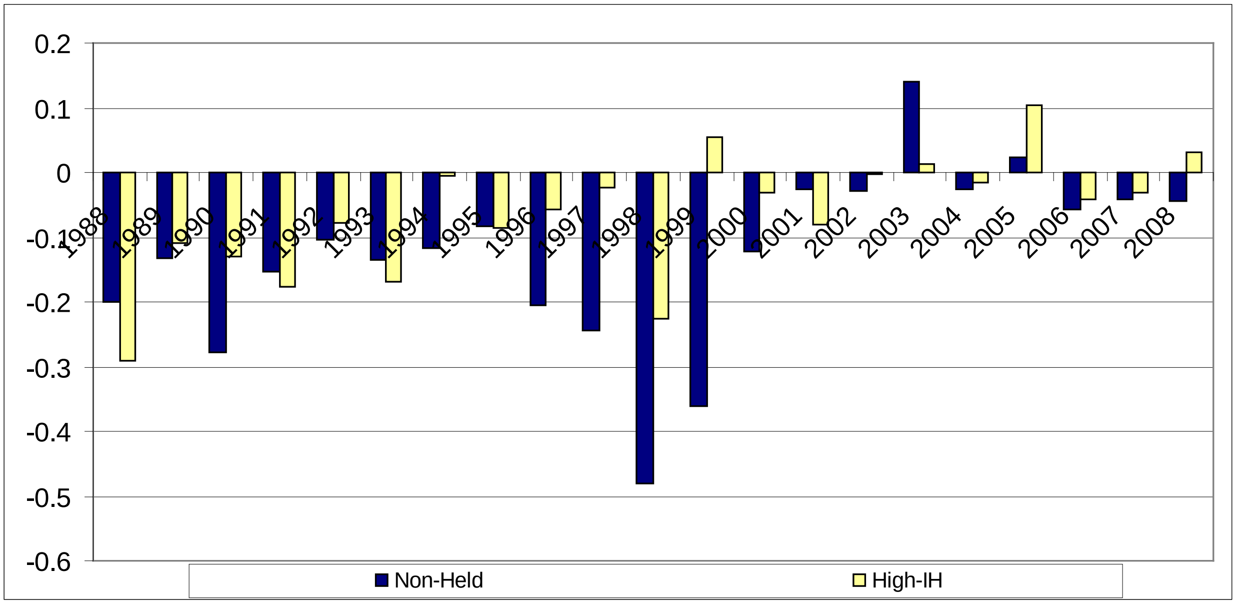
Figure 1: Returns to the accrual-related trading strategy over time



This figure reports the size adjusted excess return to the accrual strategy for gain firms over time. Firm-year observations are ranked annually and assigned in equal numbers to decile portfolios based on WCAcc. The accrual strategy buys the firms in the lowest decile and selling firms in the highest decile of accruals.

Figure 2: The anomaly for Non-Held and High-IH firms over time

$$ARET_{t+1} = \alpha_0 + \alpha_1 Moderate - IH + \alpha_1 High - IH + \beta_1 DWCAcc_t + \beta_2 Moderate - IH * DWCAcc_t + \beta_3 High - IH * DWCAcc_t + \beta_4 LMV_t + \beta_5 LMB_t + \beta_6 INSTOWN_t + \beta_7 EP_t + \beta_8 Beta_t + v_{t+1} \quad (10)$$



This figure shows the anomaly for Non-Held firms and High-IH firms over 1988-2008 period. In particular, I estimate Model (10) in Table 10, Panel A, year by year and report the coefficient on scaled decile rankings of accruals for Non-Held firms, β_1, and for High-IH firms, $\beta_1 + \beta_3$. The coefficient for High-IH is not significant after 1995, except year 1998.

Figure 3: Increase in sophisticated investors

Figure 3a: Percentage of firms held by transient Institutional investors (left scale) and mean number of transient Institutions holding stocks of a firm (right scale).

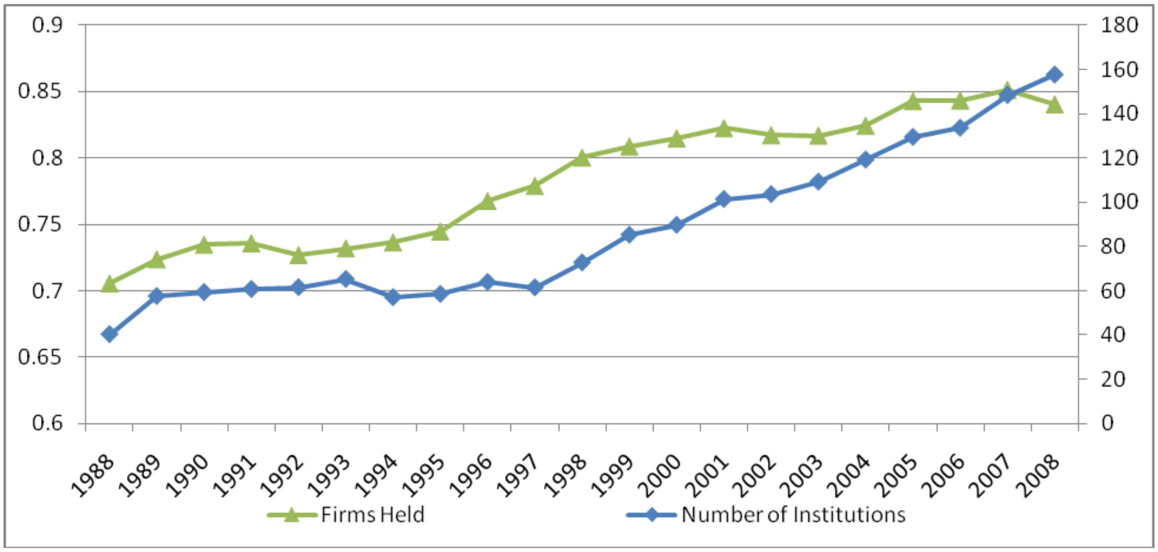


Figure 3b: Percentage of firms held by transient Mutual Funds (left scale) and mean number of transient Mutual Funds holding stocks of a firm (right scale).

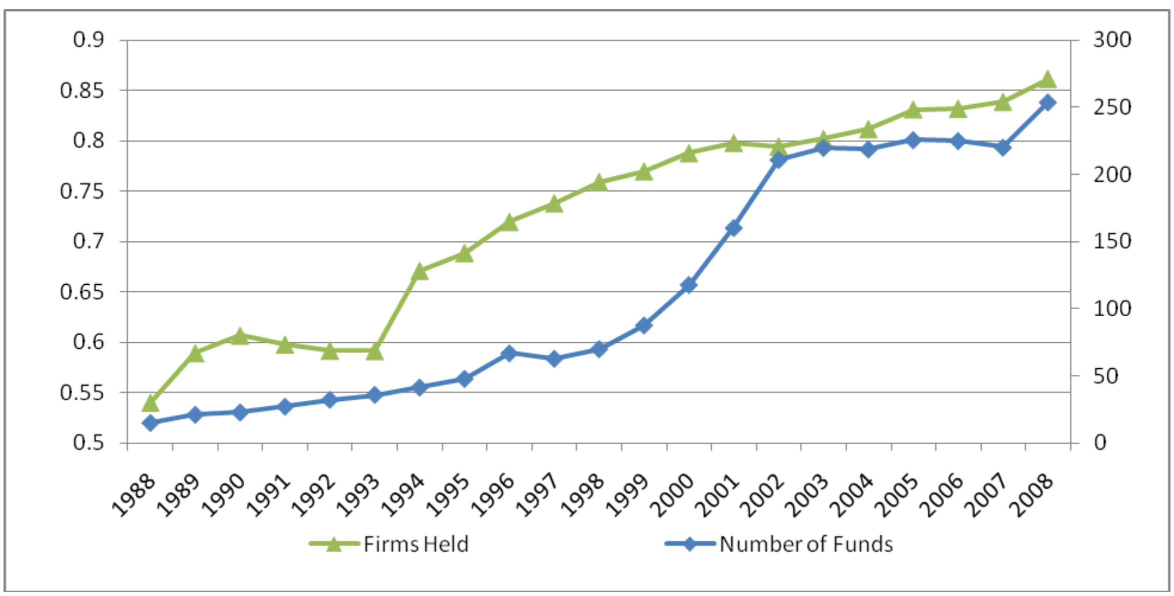


Table 1: Sample selection

Criteria	Number of observations remaining
Panel A: Accounting information sample	
All CRSP/Compustat merged firms from 1988 through 2007	113,423
Sample with non-missing Earnings (OIBDP), Cash flow (WCCF), and Accruals (WCAcc) data	92,988
Panel B: Stock return data from CRSP	
Firm-years with return data from CRSP	86,619
Firm-years with Price>1	78,045
Panel C: Analyst forecast sample	
IBES firm-year sample from 1988 through 2007	100,562
Observations with return data from CRSP	69,203
Observations with data to calculate consensus forecast within 60 days prior to portfolio formation	50,287
Panel D: Combining accounting information and return sample (78,045) with analyst sample	
Observations with no analyst forecast data over the fiscal year	30,438
Observations with at least one analyst forecast within 60 days prior to portfolio formation	40,017
Observations with analyst forecasts before portfolio formation but no forecast within 60 days prior to portfolio formation	7,590

Table 2: Descriptive statistics and correlations

Panel A: Descriptive statistics of key variables over the anomaly and no-anomaly periods

	Anomaly period (N=54,269)				No-anomaly period (N=23,776)				Differences in Mean	(t-statistics)
	Mean	25%	Median	75%	Mean	25%	Median	75%		
Assets	933.589	29.599	101.687	418.945	1,911.73	77.238	285.694	1,157.46	978.14	(29.58)
Market to Book	3.442	1.232	2.028	3.669	3.359	1.390	2.199	3.718	-0.083	(1.89)
EARN	0.063	0.035	0.114	0.172	0.048	0.019	0.098	0.156	-0.015	(-9.11)
WCAcc	0.021	-0.015	0.014	0.056	0.008	-0.019	0.005	0.034	-0.013	(-24.85)
WCCF	0.042	-0.005	0.091	0.158	0.041	0.001	0.089	0.154	-0.001	(-0.48)
Loss	0.200	0	0	0	0.221	0	0	0	0.021	(6.61)
ARET	-0.011	-0.418	-0.112	0.203	0.005	-0.312	-0.061	0.192	0.016	(2.95)
AnalystFERROR	-0.024	-0.023	-0.003	0.002	-0.014	-0.016	-0.001	0.007	0.010	(13.46)
AnalystFollow	0.687	0	1	1	0.751	1	1	1	0.064	(17.17)
Instown	0.240	0.003	0.160	0.412	0.371	0.031	0.334	0.659	0.131	(8.02)
InstownHeld	0.752	1	1	1	0.807	1	1	1	0.055	(9.25)

Table 2: (continued)

Panel B: Pearson (above diagonal) and Spearman (below diagonal) correlations (p-values are reported below correlations)

	Anomaly period N = 54,269				No-anomaly period N = 23,776		
	EARN	WCCF	WCAcc		EARN	WCCF	WCAcc
EARN	1	0.909	0.167		1	0.938	0.127
		<.0001	<.0001			<.0001	<.0001
WCCF	0.808	1	-0.235		0.873	1	-0.201
	<.0001		<.0001		<.0001		<.0001
WCAcc	0.162	-0.331	1		0.106	-0.278	1
	<.0001	<.0001			<.0001	<.0001	

Notes:

The number of observations for Market to Book is 52,529 and 23,015 in the anomaly and no-anomaly periods respectively. The corresponding sample size for AnalystFERROR is 26,350 and 13,649.

Assets: Average total assets

Market to Book: Market value to book value of common. I exclude negative book value observations when obtaining Market to Book ratio.

EARN: Earnings before interest, taxes, depreciation, and amortization, scaled by average assets (AT).

WCAcc: Working-capital accruals, calculated as the sum of (appropriately signed) changes in working capital accounts from the statement of cash flows (RECCH. INVCH, APALCH, TXACH, AOLOCH), scaled by average assets (AT). Missing values for APALCH, TXACH, and AOLOCH are set to zero.

WCCF: An estimate of cash flows attributable to recurring operations, calculated as the difference between EARN and WCAcc, scaled by average assets (AT).

ARET: the annual size adjusted buy-and-hold return. The accumulation period begins four months after the firm's fiscal year-end. The size-adjusted returns are calculated by deducting a firm's size-matched portfolio buy-and-hold return from its raw buy-and-hold return, where size portfolios are obtained from CRSP and are based on size deciles of NYSE and AMEX firms.

Loss: Indicator variable taking value of one if the firm incurred loss in prior year, zero otherwise

AnalystForecast: Analysts' mean consensus forecast, measured by the average of the most recent forecast by each analyst following the firm-year within the 60 days prior to the portfolio formation date. Analysts' earnings per share forecasts are adjusted for stock splits, multiplied by outstanding shares, and scaled by average total assets.

AnalystFERROR: Analysts' mean consensus forecast error, measured by subtracting the actual IBES earnings, EarnIBES from analysts' mean consensus forecast, AnalystForecast.

AnalystFollow: Indicator variable taking value of one for firm-years having at least one analyst forecast prior to the portfolio formation date.

Instown: Percentage of shares held by institutional investors

InstownHeld: Indicator variable taking value of one if the firm has institutional investor holdings, and zero otherwise.

Table 3: Excess return to the accrual strategy

	Panel A: Anomaly period (1988-2001)			Panel B: No-anomaly period (2002-2008)		
Accruals Decile	Full sample	Gain firms	Loss firms	Full sample	Gain firms	Loss firms
Low	0.015	0.088	-0.124	-0.039	0.005	-0.056
Decile 2	0.039	0.059	-0.065	0.002	0.016	-0.079
Decile 3	0.020	0.036	-0.025	0.007	0.015	-0.032
Decile 4	-0.002	0.019	-0.102	0.008	0.009	-0.007
Decile 5	0.007	0.022	-0.062	0.048	0.017	-0.077
Decile 6	-0.018	-0.004	-0.125	0.031	0.046	0.004
Decile 7	-0.003	0.003	-0.039	0.021	0.020	-0.035
Decile 8	-0.023	-0.024	-0.063	0.024	0.036	-0.046
Decile 9	-0.049	-0.032	-0.096	-0.002	0.015	0.025
High	-0.092	-0.101	-0.074	-0.008	-0.001	-0.113
Low-High	0.107*** (3.51)	0.189*** (7.75)	-0.050 (-0.93)	-0.031 (-0.93)	0.006 (0.16)	0.057 (0.69)
N	54,269	43,399	10,870	23,776	18,512	5,264

This table reports the size adjusted excess return to the accrual strategy separately for the full sample, gain firms, and loss firms over the anomaly and no-anomaly periods. Firm-year observations are ranked annually and assigned in equal numbers to decile portfolios based on WCAcc. The accrual strategy buys the firms in the lowest decile and selling firms in the highest decile of accruals.

Table 4: The relation of accrual and cash flow components of income with next-period earnings

$$EARN_{t+1} = \alpha_0 + \gamma_1 WCAcc_t + \gamma_2 WCCF_t + u_t \quad . \tag{1}$$

Coefficient	Anomaly period	No-anomaly period	Difference: Anomaly – No-anomaly
α_0	0.012	0.013	
	(6.72)	(5.42)	
γ_1	0.635	0.700	-0.065**
	(39.86)	(30.32)	(-2.37)
γ_2	0.813	0.842	-0.029*
	(88.63)	(89.94)	(-1.98)
Test:	-0.178***	-0.142***	-0.036
γ_1- γ_2= 0	(-10.67)	(-7.28)	(-1.35)
N	41,028	17,171	
Adj. R^2	0.343	0.452	

Notes:
This table reports the results for the persistence of the accruals and cash flows components of earnings for gain firms. The model is estimated in each year separately. I report Fama-MacBeth coefficient estimates and corresponding t-statistics. Each annual coefficient estimate is treated as a single observation and statistical tests of differences are based upon the means and standard deviations of the annual observations. The difference column shows whether the coefficient on the accruals and cash flow component of earnings significantly difference from the mean coefficient on accruals and cash flows during the no-anomaly period.

EARN: Earnings before interest, taxes, depreciation, and amortization, scaled by average assets (AT).

WCAcc: Working-capital accruals, calculated as the sum of (appropriately signed) changes in working capital accounts from the statement of cash flows (RECCH. INVCH, APALCH, TXACH, AOLOCH), scaled by average assets (AT). Missing values for APALCH, TXACH, and AOLOCH are set to zero.

WCCF: An estimate of cash flows attributable to recurring operations, calculated as the difference between EARN and WCAcc, scaled by average assets (AT).

Table 5: Investors' pricing of accruals and cash flows over the anomaly and no-anomaly periods (Mishkin Test):

$$EARN_{t+1} = \gamma_0 + \gamma_1 WCAcc_t + \gamma_2 WCCF_t + u_{t+1} \tag{2a}$$
$$ARET_{t+1} = \beta_0 + \beta_1 (EARN_{t+1} - \gamma_1^* WCAcc_t - \gamma_2^* WCCF_t) + \nu_{t+1} \tag{2b}$$

	Anomaly period (N=41,028)		No-anomaly period (N=17,171)	
Parameter	Estimate	t-statistics	Estimate	t-statistics
γ_0	0.012	6.63	0.013	5.43
γ_1	0.639	36.02	0.703	29.35
γ_1^*	0.912	8.45	0.684	9.40
γ_2	0.813	80.77	0.841	89.99
γ_2^*	0.625	13.28	0.811	6.75
β_0	0.025	4.24	0.027	1.08
β_1	1.721	17.99	1.830	9.28
Test: $\gamma_1 - \gamma_1^* = 0$	-0.273***	-3.15	0.019	0.25
Test: $\gamma_2 - \gamma_2^* = 0$	0.188***	4.03	0.030	0.65

Notes:
The sample is restricted to gain firms.

This table reports the results for investors' pricing of the accruals and cash flows components of earnings. The model is estimated in each year separately. I report Fama-MacBeth coefficient estimates and corresponding t-statistics. Each annual coefficient estimate is treated as a single observation and statistical tests of differences are based upon the means and standard deviations of the annual observations.

EARN: Earnings before interest, taxes, depreciation, and amortization, scaled by average assets (AT).

WCAcc: Working-capital accruals, calculated as the sum of (appropriately signed) changes in working capital accounts from the statement of cash flows (RECCH. INVCH, APALCH, TXACH, AOLOCH), scaled by average assets (AT). Missing values for APALCH, TXACH, and AOLOCH are set to zero.

WCCF: An estimate of cash flows attributable to recurring operations, calculated as the difference between EARN and WCAcc, scaled by average assets (AT).

ARET: the annual size adjusted buy-and-hold return. The accumulation period begins four months after the firm's fiscal year-end. The size-adjusted returns are calculated by deducting a firm's size-matched portfolio buy-and-hold return from its raw buy-and-hold return, where size portfolios are obtained from CRSP and are based on size deciles of NYSE and AMEX firms.

Table 6: Testing the implications of investors' naïve fixation on earnings

Panel A: Naïve fixation model

$$EARN_{t+1} = \gamma_0 + \gamma_1 EARN_t + u_{t+1} \ . \tag{3}$$

	Anomaly period (N=41,028)		No-anomaly period (N=17,171)	
Parameter	Estimate	t-statistics	Estimate	t-statistics
γ_0	0.009	5.96	0.011	4.81
γ_1	0.814	89.40	0.844	69.74
Adj. R^2	0.419		0.495	

Panel B: Accrual related bias in forecasts from the naïve fixation model

$$NaiveFerror_{t+1} = \alpha_0 + \alpha_1 WCAcc_t + e_{t+1} \ . \tag{4}$$

	Anomaly period (N=41,028)		No-anomaly period (N=17,171)		Difference
Parameter	Estimate	t-statistics	Estimate	t-statistics	
α_0	0.005	14.13	0.002	2.97	
α_1	-0.159	-15.96	-0.122	-4.79	-0.037 (-3.01)
Adj. R^2	0.028		0.017		

Panel C: Investors' response to predictable and unpredictable components of NaiveFerror

$$ARET_{t+1} = \delta_0 + \delta_1 Pred\_NaiveFerror_{t+1} + \delta_2 Unpred\_NaiveFerror_{t+1} + \varepsilon_{t+1} \ . \tag{5}$$

	Anomaly period (N=41,028)		No-anomaly period (N=17,171)	
Parameter	Estimate	t-statistics	Estimate	t-statistics
δ_0	-0.005	-0.49	0.013	0.69
δ_1	4.113	10.81	0.908	0.97
δ_2	2.390	13.69	2.357	7.79
Adj. R^2	0.081		0.073	

Table 6: Continued

Notes:
This table reports the results for the accrual related optimism in forecasts from the naïve earnings fixation model and tests whether the naïve fixation is consistent with investors' pricing of the accruals and cash flows components of earnings. The models are estimated in each year separately. I report Fama-MacBeth coefficient estimates and corresponding t-statistics. Each annual coefficient estimate is treated as a single observation and statistical tests of differences are based upon the means and standard deviations of the annual observations.

EARN: Earnings before interest, taxes, depreciation, and amortization, scaled by average assets (AT).

WCAcc: Working-capital accruals, calculated as the sum of (appropriately signed) changes in working capital accounts from the statement of cash flows (RECCH. INVCH, APALCH, TXACH, AOLOCH), scaled by average assets (AT). Missing values for APALCH, TXACH, and AOLOCH are set to zero.

NaiveFerror is equal to residual from the model (4) and winsorized at the 1st and 99th percentiles.

Pred_NaiveError is the component of NaiveError that is predictable by a given level of accruals. It is equal to the predicted part of NaïveError in Model (5).

Unpred_NaiveError is the component of NaiveError that is not predictable by a given level of accruals. It is equal to the residuals from Model (5).

Table 7: Analysts' forecast inefficiency with respect to accruals and market reaction to predictable bias in analysts' forecasts

Panel A: Analysts' accrual related optimism

$$AFerror_{t+1} = \alpha_0 + \alpha_1 WCAcc_t + e_{t+1} \quad . \tag{6}$$

	Anomaly period (N=23,516)		No-anomaly period (N=11,319)		Difference
Parameter	Estimate	t-statistics	Estimate	t-statistics	
α_0	-0.014	-25.79	-0.008	-5.15	
α_1	-0.134	-16.35	-0.082	-5.73	-0.052 (-6.33)
Adj. R^2	0.035		0.013		

Panel B: Investors' response to predictable and unpredictable components of analysts' forecast error

$$ARET_{t+1} = \delta_0 + \delta_1 Pred\_AFerror_{t+1} + \delta_2 Unpred\_AFerror_{t+1} + \varepsilon_{t+1} \quad . \tag{7}$$

	Anomaly period (N=23,516)		No-anomaly period (N=11,319)	
Parameter	Estimate	t-statistics	Estimate	t-statistics
δ_0	0.110	6.94	0.014	1.11
δ_1	5.568	7.73	0.710	1.18
δ_2	3.598	18.84	3.471	14.28
Adj. R^2	0.098		0.099	

Notes:

This table reports the results for the accrual related optimism in analysts' earnings forecasts and tests whether investors anticipate analysts' accrual related optimism. The models are estimated in each year separately. I report Fama-MacBeth coefficient estimates and corresponding t-statistics. Each annual coefficient estimate is treated as a single observation and statistical tests of differences are based upon the means and standard deviations of the annual observations.

AFerror is obtained by subtracting analysts' mean earnings forecasts from the actual earnings and winsorized at the 1st and 99th percentiles.

Pred_AFerror is the component of AFerror that can be predictable by using accruals. It is equal to predicted part of AFerror from Model (5).

Unpred_AFerror is the component of AFerror that is not predictable by accruals. It is equal to the residuals from Model (5).

Table 8: Excess returns to the accrual strategy by analyst following over sub-periods

	Full Sample: N=61,890	Followed N=34,874	Non-followed: N=20,903	Difference: Followed minus Non-followed
1988-1995	0.164 (5.68)	0.171 (4.97)	0.168 (4.01)	0.003 (0.02)
1996-2001	0.226 (6.51)	0.217 (4.44)	0.244 (3.44)	-0.027 (-0.46)
2002-2008	0.005 (0.16)	-0.021 (-0.62)	0.020 (0.21)	-0.041 (-0.72)

Notes:
This table reports the size adjusted excess return to the accrual strategy over different sub-periods. In particular, I report the excess return to accrual strategy for pre-Sloan period, 1988-1995, after Sloan and anomaly period, 1996-2001, and no-anomaly period, 2002-2008. Firm-year observations are ranked annually and assigned in equal numbers to decile portfolios based on WCAcc. The excess return to the accrual strategy of buying firms in the lowest accruals decile and selling firms in the hightest accruals decile is obtained in each year. Each annual excess return is treated as a single observation and statistical tests of differences are based upon the means and standard deviations of the annual observations. Followed firms do not include firms if forecast age is over 60 days prior to the portfolio formation date. The results are very similar when I consider them as followed firms.

Table 9: Testing the difference in the accrual anomaly for followed and non-followed firms

$$ARET_{t+1} = \alpha_0 + \alpha_1 Follow + \beta_1 DWCAcc_t + \beta_2 Follow * DWCAcc_t + \beta_3 LMV_t + \beta_4 LMB_t + \beta_5 INSTOWN_t + \beta_6 EP_t + \beta_7 Beta_t + v_{t+1} \quad (8)$$

	Anomaly Sub-period: (1988-1995)	Anomaly Sub-period: (1996-2001)	No-anomaly period: (2002-2008)
Intercept	0.091	0.055	-0.028
	(3.50)	(1.73)	(-1.06)
Follow	0.012	0.033	0.001
	(1.24)	(2.35)	(0.10)
DWCAcc	-0.128	-0.176	0.019
	(-5.05)	(-4.81)	(0.62)
Follow*DWCAcc	-0.009	0.012	-0.006
	(-0.28)	(0.29)	(-0.17)
LMV	-0.013	-0.007	0.004
	(-3.73)	(-1.89)	(1.29)
MB	-0.007	-0.030	-0.021
	(-0.83)	(-2.78)	(-2.54)
INSTOWN	-0.004	0.025	-0.006
	(-0.20)	(1.06)	(-0.53)
EP	0.071	0.150	0.201
	(1.49)	(2.17)	(3.41)
Beta	0.028	0.029	0.002
	(3.06)	(1.98)	(0.19)
Adj. R2	0.007	0.009	0.006
N	18,613	17,948	15,721

Notes:
This table reports the results obtained from OLS regressions of size-adjusted returns on scaled decile rankings of WCAcc and control variables over different sub-periods. Standard errors are clustered at the firm and year level. t-statistics are reported in parentheses.

ARET: The annual size adjusted buy-and-hold return. The accumulation period begins four months after the firm's fiscal year-end. The size-adjusted returns are calculated by deducting a firm's size-matched portfolio buy-and-hold return from its raw buy-and-hold return, where size portfolios are obtained from CRSP and are based on size deciles of NYSE and AMEX firms.

Follow: Indicator variable taking value of one for firm-years having at least one analyst forecast prior to the portfolio formation date.

DWCAcc: Scaled decile rankings of WCAcc. Accruals are ranked in each year and sorted into decile portfolios and scaled to range between zero and one.

LMV: The natural log of market value of equity.

LMB: The natural log of market value to book value of common equity. I exclude negative book value observations when obtaining Market to Book ratio.

INSTOWN: Percentage of shares held by institutional investors. I obtain institutional investor holdings from the Thomson Financial Spectrum 13F Institutional Holdings Database.

EP: Earnings price ratio, measures as operating income before depreciation divided by market value of equity.

BETA: The slope coefficient of the regression of the firm's return on the return to the equally weighted CRSP index, estimated using daily returns over calendar year t (about 250 trading days).

Table 10: Accrual anomaly by institutional investor holdings

Panel A: Testing the difference in the accrual anomaly for held and non-held firms

$$ARET_{t+1} = \alpha_0 + \alpha_1 Moderate-IH + \alpha_1 High-IH + \beta_1 DWCAcc_t + \beta_2 Moderate-IH * DWCAcc_t + \beta_3 High-IH * DWCAcc_t + \beta_4 LMV_t + \beta_5 LMB_t + \beta_6 INSTOWN_t + \beta_7 EP_t + \beta_8 Beta_t + \nu_{t+1} \quad (9)$$

	Non-Held: N=12,673	Moderate-IH N=31,633	High-IH N=13,679	Difference: High-Held Minus Non-Held
Parameter	β_1	$\beta_1 + \beta_2$	$\beta_1 + \beta_3$	
1988-1995	-0.146*** (-5.37)	-0.124*** (-5.51)	-0.109*** (-4.75)	-0.037 (-1.04)
1996-2000	-0.279*** (-4.78)	-0.185*** (-6.95)	**-0.051 (-1.05)**	-0.228*** (-3.09)
2001-2008	-0.001 (-0.04)	0.020 (0.98)	0.020 (0.73)	-0.021 (0.51)

Notes:
Panel A reports the results obtained from OLS regressions of size-adjusted returns on scaled decile rankings of WCAcc and control variables over different sub-periods. I interact scaled decile rankings of WCAcc with Moderate-IH and High-IH indicator variables to examine the possibility that the anomaly may differ by institutional investor holding. Standard errors are clustered at the firm and year level. t-statistics are reported in parentheses.

ARET: The annual size adjusted buy-and-hold return. The accumulation period begins four months after the firm's fiscal year-end. The size-adjusted returns are calculated by deducting a firm's size-matched portfolio buy-and-hold return from its raw buy-and-hold return, where size portfolios are obtained from CRSP and are based on size deciles of NYSE and AMEX firms.

Non-Held is an indicator variable taking value of one for firm-years not held by transient institutional investors, zero otherwise.

High-IH is an indicator variable taking value of one for the firm-years if at least 15 percent of shares are held by transient institutions and the firm-year is not in the upper quartile of dedicated institution investor holdings distribution.

Transient institutions are institutional investors holding less than 1 percent of shares of a given firm-year.

Dedicated institutions are institutional investors holding more than 1 percent of shares of a given firm-year.

Moderate-IH is an indicator variable taking value of one for held firms which are not classified as High-IH, zero otherwise.

DWCAcc: Scaled decile rankings of WCAcc. Accruals are ranked in each year and sorted into decile portfolios and scaled to range between zero and one.

LMV: The natural log of market value of equity.

LMB: The natural log of market value to book value of common equity. I exclude negative book value observations when obtaining Market to Book ratio.

INSTOWN: Percentage of shares held by institutional investors. I obtain institutional investor holdings from the Thomson Financial Spectrum 13F Institutional Holdings Database.

EP: Earnings price ratio, measures as operating income before depreciation divided by market value of equity.

BETA: The slope coefficient of the regression of the firm's return on the return to the equally weighted CRSP index, estimated using daily returns over calendar year t (about 250 trading days).

Panel B: Differential persistence of accruals and cash flows by institutional investor holdings over sub-periods

$$
\begin{aligned}
&EARN_{t+1} = \alpha_0 + \alpha_1 Moderate - IH + \alpha_2 High - IH \\
&+ \gamma_{11} WCAcc_t + \gamma_{12} Moderate - IH * WCAcc_t + \gamma_{13} High - IH * WCAcc_t \qquad (10) \\
&+ \gamma_{21} WCCF_t + \gamma_{22} Moderate - IH * WCCF_t + \gamma_{23} High - IH * WCCF_t + u_t
\end{aligned}
$$

	Non-Held: N=12,673	Moderate-IH N=31,633	High-IH N=13,679	Difference: High-IH minus Non-Held
Parameter	$\gamma_{21} - \gamma_{11}$	$\gamma_{21} + \gamma_{22} - (\gamma_{11} + \gamma_{12})$	$\gamma_{21} + \gamma_{23} - (\gamma_{11} + \gamma_{13})$	
1988-1995	0.138 (5.94)	0.152 (6.93)	0.155 (6.60)	0.017 (0.53)
1996-2000	0.163 (5.19)	0.198 (9.42)	0.178 (4.18)	0.015 (0.29)
2001-2008	0.144 (4.07)	0.161 (5.38)	0.191 (5.38)	0.047 (1.10)

Notes:
Panel B reports the results for the differential persistence of the accruals and cash flows components of earnings for gain firms. In particular, I estimate Model (11) and obtain the difference between the coefficients on cash flow and accruals component of earnings, the coefficient on cash flows minus the coefficient on accruals. The model is estimated in each year separately. Each annual coefficient estimate is treated as a single observation and statistical tests of differences are based upon the means and standard deviations of the annual observations.
The difference column shows whether the difference in coefficients on the accruals and cash flow component of earnings is significantly different for High-IH firms and Non-Held firms.

Panel C: Analysts' accrual related bias by institutional investor holdings over sub-periods

$$AFerror_{t+1} = \alpha_0 + \alpha_1 Moderate-IH + \alpha_2 High-IH + \gamma_{11} WCAcc_t + \gamma_{12} Moderate-IH * WCAcc_t + \gamma_{13} High-IH * WCAcc_t + u_t \quad (11)$$

	Non-Held: N=6,286	Moderate-IH N=16,312	High-IH N=11,329	Difference: High-IH minus Non-Held
Parameter	γ_{11}	$\gamma_{11}+\gamma_{12}$	$\gamma_{11}+\gamma_{13}$	
1988-1995	-0.108 (-4.87)	-0.162 (-7.44)	-0.125 (-6.04)	-0.017 (-0.56)
1996-2000	-0.165 (-6.05)	-0.167 (-8.61)	-0.119 (-5.05)	0.046 (1.30)
2001-2008	-0.076 (-2.67)	-0.086 (-5.55)	-0.125 (-5.35)	-0.049 (-1.35)

Notes:
Panel C reports the results obtained from OLS regressions of analysts' forecast error on WCAcc by institutional investor holdings over different sub-periods. Standard errors are clustered at the firm and year level. t-statistics are reported in parentheses.

AFerror is obtained by subtracting analysts' mean consensus earnings forecasts from the actual earnings and winsorized at the 1st and 99th percentiles.

Other variables are as defined before.

Panel D: Testing the difference in the accrual anomaly for held by mutual funds and non-held firms

$$ARET_{t+1} = \alpha_0 + \alpha_1 Moderate-MH + \alpha_1 High-MH + \beta_1 DWCAcc_t + \beta_2 Moderate-MH * DWCAcc_t + \beta_3 High-MH * DWCAcc_t + \beta_4 LMV_t + \beta_5 LMB_t + \beta_6 INSTOWN_t + \beta_7 EP_t + \beta_8 Beta_t + \nu_{t+1} \quad (12)$$

	Non-Held: N=12,464	Moderate-MH N=32,908	High-MH N=12,613	Difference: High-Held Minus Non-Held
Parameter	β_1	$\beta_1 + \beta_2$	$\beta_1 + \beta_3$	
1988-1995	-0.146*** (-5.48)	-0.122*** (-6.13)	-0.107*** (-3.28)	-0.039 (-0.93)
1996-2000	-0.282*** (-4.80)	-0.187*** (-6.12)	**-0.022 (-0.42)**	-0.260*** (-3.44)
2001-2008	-0.004 (-0.13)	0.012 (0.59)	-0.006 (-0.27)	-0.003 (-0.07)

Notes:
Panel D reports the results obtained from OLS regressions of size-adjusted returns on scaled decile rankings of WCAcc and control variables over different sub-periods. I interact scaled decile rankings of WCAcc with Moderate-MH and High-MH indicator variables to examine the possibility that the anomaly may differ by mutual fund holding. Standard errors are clustered at the firm and year level. t-statistics are reported in parentheses.

Non-Held is an indicator variable taking value of one if the firm-year is not held by transient institutions or transient funds, zero otherwise.

High-MH is an indicator variable taking value of one for the firm-years having at least 28 transient mutual funds, the median number of transient funds holding stocks a firm-year, and the firm-year is not in the upper quartile of dedicated institutional investor holdings distribution.

Moderate-MH is an indicator variable taking value of one for held firms which are not classified as High-MH, zero otherwise.

Transient mutual funds are funds holding less than 1 percent of shares of a given firm-year.

Dedicated mutual funds are funds holding at least 1 percent of shares of a given firm-year.

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EDUCATION

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PhD Student in Economics, GPA: 3.90/4.00

Fatih University, Istanbul, Turkey — 2002-2004
MS in Economics, GPA: 3.96/4.00

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BS in Economics, GPA: 3.00/4.00

RESEARCH INTEREST

- Market pricing of accounting information, market inefficiencies, analyst forecasts, management earnings guidance, earnings management, firm valuation

WORKING PAPERS

1. **"Does market learning explain the disappearance of the accrual anomaly?",** dissertation

2. **"Does intentional forecast bias reduce financial analysts' market influence?"** *under review at Journal of Accounting and Economics,* coauthored with Senyo Tse

3. **"Short sale constraints versus management earnings guidance: Competing explanations for the relation between differences of opinion and earnings announcement return"** *under review at Journal of Financial Economics,* coauthored with Lynn Rees and Wayne Thomas

4. **"Why timing matters: The role of earnings announcements in demarcating distinct phases of analysts' information production activities"** *submitted to 2011 AAA Annual Meeting,* coauthored with Senyo Tse and Jennifer Wu Tucker

5. **"Does Earnings Predictability Affect the Influence of Analyst and Forecast Characteristics on Analyst Forecast Accuracy?"** *under review for resubmission,* coauthored with Linda Myers, and Thomas Omer, and Marjorie Shelley

WORK IN PROGRESS

1. **"Can investors benefit from analysts' characteristics when analysts disagree?",** joint work with Linda Myers, and Thomas Omer, and Marjorie Shelley

2. **"The information in analysts' forecast revisions for predicting the news at earnings announcement?"** joint work with Senyo Tse
3. **"Is accrual related optimism in management earnings forecasts really unintentional?"** joint work with Nate Sharp and Thomas Omer
4. **"Does investors' reliance on analysts' incomplete forecast revisions affect market price discovery?"**

TEACHING EXPERIENCE

Instructor, Texas A&M University

- Financial accounting (Undergraduate)
    - Fall 2009: (Average Evaluation: 4.1/5)

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TEACHING INTEREST

- Financial accounting, Financial statement analysis, Managerial accounting

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- Research Specialist, Activefinans research center, 2001-2004
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- Conference reviewer: 2010 AAA Financial accounting and reporting section

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- AAA Doctoral Consortium Fellow, August 2009
- Texas A&M University, Graduate Studies Scholarship, 2004 – Present
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