Can the earnings fixation hypothesis explain the accrual anomaly?

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Abstract

This paper provides empirical evidence on whether the earnings fixation hypothesis can explain the accrual anomaly originally documented in Sloan (1996). Our analytical model yields the prediction that if investors fixate on reported earnings, the effectiveness of the accrual strategy will increase in the responsiveness of the stock price to earnings and the differential persistence of cash flows relative to accruals. Our empirical evidence confirms our prediction and lends support to the earnings fixation hypothesis.

Keywords: Accrual anomaly; Earnings fixation hypothesis; Responsiveness of stock price to earnings; Persistence of cash flows and accruals.

JEL Classification: G12, M41.

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1. Introduction

Using a sample of NYSE/AMEX firms, Sloan (1996) documents that accruals are negatively correlated with future size-adjusted returns. Labeled as "the accrual anomaly", this finding is robust to different country settings (Pincus et al. 2007), the inclusion of Nasdaq firms (Lev and Nissim 2006; Mashruwala et al. 2006; Zhang 2007), alternative definitions of accruals (Xie 2001; Hribar and Collins 2002), and considerations of additional risk/mispricing factors (Collins and Hribar 2000; Mashruwala et al. 2006; Hirshleifer et al. 2006).

Although extensive evidence exists on the robustness of the finding, consensus has yet to be reached on what causes the accrual anomaly. Four non-mutually exclusive explanations have been proposed.[1] The first explanation, the earnings fixation explanation, is raised in Sloan (1996). He hypothesizes that the accrual anomaly is caused by investors' fixation on reported earnings and their failure to appreciate the lower persistence of accruals. Several papers provide evidence in support of the earnings fixation explanation. One implication of the explanation is that investors' expectations of future earnings are biased upwards (downwards) for firms with high (low) accruals. Consistent with this implication, Sloan (1996) finds that stock returns are reliably positive (negative) for firms with low (high) accruals at subsequent earnings announcements, while Bradshaw et al. (2001) show that financial analysts' forecasts are relatively optimistic (pessimistic) for firms with high (low) accruals. Dechow and Dichev (2002) provide evidence that firms with low accrual quality have less persistent earnings. Richardson et al. (2005) argue that the measurement error in accruals gives rise to the difference in persistence between accruals and cash flows. Consistent with the earnings fixation explanation, they

[1] There is conflicting evidence for each of the four explanations; however, a comprehensive review is outside the scope of this paper. Please refer to Richardson et al. (2010) for a more complete review.

demonstrate that the less reliable accruals, which have a relatively low persistence level, are mispriced to a greater extent. Their finding is also consistent with Xie (2001), who documents that the magnitude of the accrual anomaly is greater for discretionary accruals, a less reliable accrual component. Richardson et al. (2006) provide evidence that temporary accounting distortions contribute significantly to the lower persistence of accruals. Specifically, they document that the lower persistence of accruals extends to the accruals component that is unrelated to sales growth and that extreme accruals are systematically associated with alleged cases of earnings manipulations. Dechow et al. (2008) decompose the cash flows into three components and find that investors misprice the change in the cash balance component in a similar manner to accruals. Their results imply that the accrual anomaly subsumes the external financing anomaly.

The second explanation, the growth explanation, argues that the accrual anomaly is simply a special case of the growth anomaly, i.e., that firms with high growth have lower returns. A key understanding is that accruals, computed as changes in working capital accounts, can also be interpreted as growth in current net operating assets. Fairfield et al. (2003a) argue that, if the accrual anomaly is driven by accruals representing growth, then another growth measure, i.e., the growth in long-term net operating assets, should have the same predictive power for future returns as accruals. Their empirical results support this prediction. While Fairfield et al. (2003a) are not inconsistent with the earnings fixation hypothesis, their findings suggest that the lower persistence of accruals may be due to diminishing returns to growth rather than accrual estimation errors. Evidence in support of this notion is provided in Fairfield et al. (2003b). They hypothesize and find that accruals are more highly associated than cash flows with the growth in invested capital, which is the denominator in the measure of future earnings. In addition, they show that there is no difference in the persistence level between accruals and cash flows once the denominator effect is considered. Zhang (2007) posits that, if the growth anomaly is the underlying reason for the accrual anomaly, then the accrual anomaly should be stronger when accruals are more likely to measure growth. Specifically, Zhang (2007) uses *COVAR*, the slope coefficient from a regression of accruals on the growth in the number of employees, as an indicator of the extent to which accruals represent growth and shows that the accrual strategy return increases in *COVAR*. His evidence thus supports the notion that the accrual anomaly is driven by the growth anomaly.

The third explanation attributes the accrual anomaly to risk. Kahn (2008) measures risk using a four-factor model motivated by the Intertemporal Capital Asset Pricing Model. He finds that risk explains a considerable portion of the cross-sectional variation in average returns to high and low accrual firms. Wu et al. (2010) interpret accruals as working capital investments and attribute the accrual anomaly to firms optimally adjusting investments in response to discount rate changes, as predicted by the *q*-theory of investment.[2]

The fourth explanation links the accrual anomaly with the limit of arbitrage. Mashruwala et al. (2006) find that the accrual anomaly is concentrated in firms with high idiosyncratic volatility and high transaction costs. Their evidence is consistent with the notion that the accrual anomaly is due to idiosyncratic volatility and transactions costs constraining the abilities of risk-averse arbitrageurs. Similar evidence is found in Ali et al. (2008), Collins et al. (2003) and Lev and Nissim (2006). We note that the limit of arbitrage explanation is not mutually exclusive of the earnings fixation and the growth explanations. To the extent that market inefficiencies

[2] Green et al. (2009) provides evidence that the effectiveness of the accrual strategy is related to the capital invested by hedge funds to exploit it. Their evidence is seemingly inconsistent with the risk explanation.

exist, we expect them to be more pronounced and enduring when arbitrage risk is higher.

We are interested in advancing our understanding of what explains the accrual anomaly. We hypothesize that if investors fixate on earnings, then the effectiveness of the accrual strategy will increase in (a) the stock price's responsiveness to current earnings and (b) the differential persistence of cash flows relative to accruals. Our results are consistent with the two predictions and thus lend support to the earnings fixation explanation.

We deem it a remote possibility that our results are consistent with the risk explanation because it is difficult to justify our finding using risk. Conceptually, the accrual anomaly can be explained by low accruals firms having high risk. It is, however, difficult to theorize that the accrual risk premium depends on the differential persistence of cash flows relative to accruals or the stock price's responsiveness to current earnings.

Our results also cannot be accounted for by the limit of arbitrage explanation because our inferences remain the same after controlling for idiosyncratic volatility and transaction costs.

However, our results are potentially consistent with the growth explanation. The growth explanation suggests that the accrual anomaly is a special case of the more general growth anomaly. The growth anomaly is not well understood, with explanations ranging from risk (Fama and French 1992) to investors naively extrapolating past growth (Dechow and Sloan 1997). Conceptually, it is possible that the growth anomaly results from investors fixating on earnings and thus there is no inconsistency between the growth explanation and the earnings fixation explanation.

Nonetheless, we conduct empirical analysis and find no evidence that our results are entirely driven by the growth explanation.

Our paper contributes to the accounting literature in the following two ways. First, since Sloan (1996), much research has been done to investigate why accruals are negatively correlated with future returns, given the robustness of the accrual anomaly and the unique accounting nature of accruals. Four explanations with supporting evidence have been proposed, and no consensus has been reached after more than a decade of research. Our paper advances our understanding of the accrual anomaly by providing empirical evidence that is consistent with the earnings fixation explanation and is unlikely to be explained by the other three explanations.

Second, this paper shows that the returns to the accrual strategy are positively correlated with the stock price's responsiveness to reported earnings and the differential persistence of cash flows relative to accruals. This finding is interesting from the perspective of investors who attempt to use the accrual anomaly to generate trading profits. For example, we find that the accrual strategy yields a high hedge return of 12 percent when applied to firms in the highest earnings response coefficient (*ERC*) quintile, while it yields a negative return when applied to firms in the lowest *ERC* quintile. Consequently, the accrual arbitrageurs should attempt to apply the accrual strategy to firms whose price is highly responsive to earnings and whose cash flows are much more persistent than accruals. Our finding is thus informative to investors interested in applying the accrual anomaly to stock trading.

The rest of the paper is organized as follows. Section 2 develops predictions based on the earnings fixation explanation. Section 3 discusses sample formation and variable definition. Section 4 reports our main empirical results. Section 5 discusses the growth explanation. Section 6 concludes.

2. Predictions

2.1. A simple model

We argue that if investors fixate on earnings, the association between accruals and future returns will be related to (a) the stock price's responsiveness to reported earnings and (b) the differential persistence of cash flows relative to accruals.

To illustrate this point, assume that earnings ($EARN_t$) consist of two components, cash flows (CF_t) and accruals ($ACCR_t$). We have

$$EARN_t = CF_t + ACCR_t \quad (1)$$

Sloan (1996) provides strong cross-sectional empirical evidence that accruals are less persistent than cash flows. Without loss of generality, we take the persistence level of cash flows as 1 and that of accruals as *Paccr*. Given that accruals are less persistent, *Paccr* is less than 1 in general.

If investors are rational, the expected earnings for year t+1 can be described by the following equation:

$$E_t(EARN_{t+1}) = EARN_{t+1} = CF_t + Paccr{*}ACCR_t \quad (2)$$

where $E_t(.)$ expectation at time t.

If investors fixate on reported earnings and do not differentiate the different persistence of accruals and cash flows, the expected earnings for year t+1 can be described by the following equation:

$$E_t(EARN_{t+1}) = CF_t + ACCR_t \quad (3)$$

In this case, naïve investors will be surprised at year t+1 and abnormal returns for earnings surprise at year t+1 will be:

$$ABNORMAL\ RETURN_{t+1} = c{*}\,(EARN_{t+1} - E_t(EARN_{t+1}))$$

$$= c{*}\,(CF_t + Paccr{*}ACCR_t - CF_t - ACCR_t)$$

$$= - c*(1- Paccr)*ACCR_t \quad (4)$$

where c measures the responsiveness of the stock price to earnings components.

To the extent that $Paccr$ is less than 1 and c is positive, this analysis suggests that future returns will be negatively correlated with accruals, which is consistent with the empirical finding in Sloan (1996). Moreover, the association between accruals and future returns depends upon c, the measure of how responsive the stock price is to current reported earnings, and (1 - $Paccr$), the differential persistence of cash flows relative to accruals. The higher the c or (1 - $Paccr$), the stronger the correlation between accruals and future returns and the higher the arbitrage returns based on the accrual strategy. This leads to three testable empirical predictions:

P1. The accrual strategy return is higher for firms with high responsiveness of stock price to earnings;

P2. The accrual strategy return is higher for firms with high persistence of cash flows relative to accruals.

P3. The combined effect of differential persistence and the price's responsiveness to earnings on the accrual strategy return is greater than the effect of either of the two alone.

If empirical results confirm these predictions, the evidence will be consistent with the earnings fixation hypothesis.

2.2. Model limitations

Like any model, the one described in Section 2.1 makes many simplifying assumptions. The following discussion of the key simplifying assumptions is intended to help readers appreciate the caveats to consider in interpreting our results; it also suggests guidelines for future extensions of our analysis.

The first limitation of our model is that we assume that cash flows are appropriately priced. This assumption is inconsistent with the empirical finding in Dechow et al. (2008) that investors misprice the change in the cash balance component of cash flows. We can potentially relax this assumption and consider mispricing of cash flows. However, doing so takes our focus away from the accrual anomaly. In addition, cash flows are negatively related to accruals (Sloan 1996), and this correlation is likely to introduce a collinearity issue into our empirical analysis.

The second limitation is that we do not distinguish among accruals components. Thomas and Zhang (2002) decompose total accruals according to the working capital account and show that different accrual components are mispriced to different extents. Classifying accrual components according to reliability, Richardson et al. (2005) find that different accrual components have different levels of persistence. We do not make distinctions among accruals components because our priority is to explain the anomaly based on total accruals.

The third limitation is the implicit assumption that the differential persistence and the price's responsiveness to earnings are stable when we go from current period to the next period. To see this point, suppose that the stock price's responsiveness to earnings is high in the current period and drops to zero in all future years. In this case, the mispricing will never be reversed, based on a strict interpretation of the fixation hypothesis. The implicit assumption is however supported by our untabulated empirical results.[3]

[3] Specifically, we find that the correlation between the measure estimated using data from year t-8 through year t and the measure estimated using data from year t+1 through year t+9 is positive and significant at the 0.01 level, for both the stock price's responsiveness to earnings (*ERC*) and the differential persistence of cash flows relative to accruals (*PERDIF*). In addition, we find that next-year *ERC* (*PERDIF*) increases in current *ERC* (*PERDIF*). Next-year *ERC* (*PERDIF*) is 234 percent (99 percent) higher for firms in the top decile than for firms in the bottom decile of current *ERC* (*PERDIF*).

3. Sample formation and variable measurement

3.1. Variable measurement

3.1.1. Accruals

This section discusses sample formation and variable measurement. Following Hribar and Collins (2002), we define accruals as follows.

$$ACCR_t = EARN_t - CF_t \qquad (5)$$

where $ACCR_t$ is total accruals in year t, $EARN_t$ is earnings in year t, measured by Income Before Extraordinary Items (Compustat Annual Item #123), and CF_t is cash flows in year t, measured by Cash Flows from Operating Activities (Compustat Annual Item #308) minus Extraordinary Items & Discontinued Operations (Compustat Annual Item #124). All the variables are deflated by average total assets in year t.

3.1.2. Future returns

Following Sloan (1996), we use size-adjusted returns to measure future abnormal returns. Size-adjusted return (SAR_{t+1}) represents the difference between the firm's buy-and-hold return and the buy-and-hold return on a value weighed portfolio of firms in the same CRSP size deciles. Size deciles are determined by the distribution of market values of all the NYSE/AMEX firms at the beginning of the calendar year. SAR_{t+1} is computed over the 12-month holding periods, beginning four months after current fiscal year end. Specifically, SAR_{t+1} is computed using the equation below.

$$SAR_{t+1} = \prod_s (1 + r_{is}) - \prod_s (1 + r_{ps}) \qquad (6)$$

where r_{is} and r_{ps} are returns in month s for firm i and size portfolio p, respectively.

When a firm delists, we use the delisting return in the delisting month and assume a return equal to the firm's size-matched portfolio for the remainder of the year. If a firm's delisting is due to liquidation or a forced delisting and the delisting return is missing, the delisting return is set to -100 percent. This treatment is consistent with Sloan (1996).

3.1.3. Measures of the price's responsiveness to earnings and differential persistence

We use the slope coefficient from the following time-series regression to measure the price's responsiveness to earnings[4]:

$$RET_t = \eta_0 + \eta_1 EARNINGS_t + \varepsilon_t \quad (7)$$

where RET_t is cumulative stock return in year t, and $EARNINGS_t$ is Diluted EPS Excluding Extraordinary Items (Compustat Annual Item #57)[5] in year *t* divided by Closing Price in Fiscal Year End (Compustat Annual Item #199). We use observations from the current year and prior eight years to run this regression. For each regression, we require that there be at least four observations with no missing data. The coefficient from the above regression (η_1, which we refer to as "*ERC*") constitutes our measure of the stock price's responsiveness to earnings.

We measure the persistence of cash flows relative to accruals through the following time-series regression:

$$EARN_{t+1} = \beta_0 + \beta_1 ACCR_t + \beta_2 CF_t + \varepsilon_t \quad (8)$$

where $EARN_{t+1}$, $ACCR_t$, and CF_t are defined as in Equation (5). We use data from the current year and prior eight years and require at least four observations with no missing data in this regression. The coefficients β_1 and β_2 represent the persistence of accruals and cash flow respectively, and $\beta_2 - \beta_1$ measures the differential persistence

[4] We obtain similar evidence when we measure the price's responsiveness to earnings by regressing returns on changes in earnings.

[5] Bens et al. (2003) suggest that managers attempt to manipulate diluted EPS by share repurchases, which implies that the market pays attention to the diluted EPS. In this spirit, we use diluted EPS to estimate stock price responsiveness to earnings. Untabulated results show that using Basic EPS instead of Diluted EPS to estimate *ERC* does not change our empirical results.

level of cash flows relative to accruals and is referred to as "*PERDIF*" for the sake of convenience.

3.2. Sample Formation

Our sample extends from 1988 to 2006, because prior to 1988, the cash flow statement data items needed for computing accruals are unavailable. To maintain consistency with Sloan (1996), we include only NYSE and AMEX firms. We require accruals and next year's size-adjusted returns to be non-missing for a firm-year observation to be included in our sample. Following Gutierrez and Kelly (2008), we require the stock price at the end of the fiscal year to be greater than $5 per share, because the bid-ask bounce contaminates low-price firms' return information. Unlike Sloan (1996), we do not require next year's earnings to be non-missing in our sample to avoid the potential foresight bias documented in Kraft et al. (2006).[6] We also exclude all financial firms according to the SIC code. The final sample consists of 27,373 observations.

4. Empirical results from testing predictions

4.1 Replication of the accrual anomaly

We first replicate the accrual anomaly, using our sample. Specifically, we form ten accrual deciles every year and examine the size-adjusted returns and other firm characteristics for each decile. Our empirical results are reported in Table 1. For size-adjusted returns, we report the mean value, which can be interpreted as returns to an equally weighted portfolio, and the associated t statistics. Consistent with Sloan

[6] Kraft et al. (2006) find that this foresight bias improves the performance of the accrual strategy. Among firms without data on next year's earnings or accruals, the mean and median values of size-adjusted returns are positive (negative) for those classified as high (low) accruals firms.

(1996), the mean value of size-adjusted returns to the lowest decile is significantly higher than that to the highest decile. The hedge portfolio with a long position in the lowest decile and a short position in the highest decile yields an annual return of 5.93 percent. Given that the deciles are formed on accruals, it is not surprising to see that accruals go up from the lowest to the highest deciles. Consistent with Sloan (1996), *CF* is negatively correlated with accruals. The mean (median) value of *CF* is 0.154 (0.174) for the bottom accrual decile and -0.017 (-0.005) for the top accrual decile. We also examine the beta, the market value and the book-to-market ratio, three proxies for risks. Consistent with Sloan (1996), there is no obvious pattern for these three proxies, which implies that the three risk proxies cannot explain the accrual anomaly.

[Insert Table 1 here]

4.2 Portfolio analysis results

We next use portfolio analysis to test our empirical predictions. We require that both *ERC* and *PERDIF* to be non-missing, reducing the sample size to 21,613 firm-year observations.

4.2.1. The stock price's responsiveness to earnings

We first provide results based on our measure of the stock price's responsiveness to earnings: *ERC*. Specifically, we form five quintiles based on *ERC* and ten deciles based on accruals independently each year. We investigate whether the returns to the accrual strategy are more pronounced for higher *ERC* quintiles.

Panel A of Table 2 reports the empirical results based on *ERC* quintiles. The column "hedge" reports the hedge return to the portfolio with a short position in the top accrual decile and a long position in the bottom accrual decile. The hedge return goes up from -3.51 percent, not significant at the 0.10 level (*p-value*=0.335), for the lowest *ERC* quintile, to 12.26 percent, significant at the 0.01 level (*p-value*=0.001), for the highest *ERC* quintile. When we examine the return to the hedge portfolio each year, we find similar evidence. The mean value of the yearly hedge returns goes up from -2.02 percent for the lowest *ERC* quintile (*p-value*=0.566), to 11.33 percent for the highest *ERC* quintile (*p-value*=0.012). For each *ERC* quintile, we examine the mean and median values of differences in accruals between the bottom and top deciles and find no evidence suggesting that our results can be attributed to wider distributions of accruals in the top *ERC* quintile, as the distributions are the widest for the middle rather than the highest quintile.

[Insert Table 2 here]

In sum, our results suggest that the accrual strategy generates higher returns for firms with high price responsiveness to earnings, lending support to P1.

4.2.2. The differential persistence

Next, we provide results based on the differential persistence of cash flows relative to accruals. Specifically, we form five quintiles based on *PERDIF*[7] and ten deciles based on total accruals independently each year. We investigate whether the returns to the accrual strategy are more pronounced for higher *PERDIF* quintiles.

Panel B of Table 2 reports the empirical results. The "hedge" column reports the hedge return to the portfolio with a short position in the top accrual decile and a long position in the bottom accrual decile. The hedge return goes up from -10.44 percent, significant at the 0.05 level (*p-value*=0.011), for the lowest *PERDIF* quintile,

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7 Section 3.1.3 provides details on how we compute *PERDIF*.

to 17.42 percent, significant at the 0.01 level (*p-value*=0.000), for the highest *PERDIF* quintile. We obtain similar findings when we examine annual hedge returns. The mean value of the annual hedge returns goes up monotonically from -9.37 percent for the lowest *PERDIF* quintile (*p-value*=0.026), to 17.83 percent for the highest *PERDIF* quintile (*p-value*=0.000). For each *PERDIF* quintile, we examine the mean and median values of differences in accruals between the bottom and top deciles, and we find no evidence suggesting that our results can be attributed to different distributions of accruals in different *PERDIF* quintiles.

In sum, our evidence suggests that the returns to the accrual anomaly increase in the differential persistence of cash flows relative to accruals, lending support to P2.

4.2.3. Both the differential persistence and the stock price's responsiveness

Our third prediction is that the combined effect of the differential persistence and the price's responsiveness to earnings on the accrual strategy return is greater than the effect of either of the two alone. We provide related portfolio analysis results in this subsection.

We independently sort firms into five *ERC* quintiles, five *PERDIF* quintiles and ten accrual deciles each year. Combining *ERC* quintiles and *PERDIF* quintiles yields a total of 25 portfolios. For each of the 25 portfolios, we report the accrual strategy return, computed as the return to the hedge portfolio with a short position in the top and a long position in the bottom accrual decile, in Panel C of Table 2.

We find evidence that sorting on both *ERC* and *PERDIF* yields stronger accrual strategy returns. Specifically, when *ERC* and *PERDIF* are both in the lowest quintile, the accrual strategy return is -24.05 percent, the lowest among all 25 portfolios. When *ERC* and *PERDIF* are both in the top quintile, the accrual strategy return is 44.60 percent, the highest among all 25 portfolios. Our un-tabulated results indicate that this finding is not due to uneven distribution of observations among the 25 portfolios.

In sum, our evidence suggests that combining both *ERC* and *PERDIF* leads to greater spread in the accrual strategy return, lending support to P3.

4.3 Multivariate regressions

4.3.1. Model specifications

We next conduct multivariate regressions to alleviate the following two concerns. First, prior literature provides strong evidence that the firm's market value of equity, CAPM beta, the book-to-market ratio, and the earnings-to-price ratio predict future returns (Lakonishok et al. 1994; Fama and French 1992, 1995, 1996). It is interesting to investigate whether our results survive controlling those predictors of future returns. Second, Mashruwala et al. (2006) find that the accrual strategy return increases in idiosyncratic volatility and transaction costs. Their evidence is consistent with the notion that the existence of the accrual anomaly is due to the limits of arbitrage. If the stock price's responsiveness to earnings and the differential persistence of cash flows are related to transaction costs and idiosyncratic volatility, their finding can potentially explain our results.

We first examine whether our results survive controlling known predictors of future returns. Specifically, we regress next year size-adjusted returns on the accrual decile rank, the decile rank of *ERC*/*PERDIF,* and their interaction after controlling for the decile rank of firms' size, beta, book-to-market ratio and earnings-to-price ratio. Our model is as follows:

For *ERC*:

$$SAR_{t+1} = \beta_0 + \beta_1 * RACCR_t + \varphi_1 * RACCR_t * RERC_t + \beta_2 * RSIZE_t + \beta_3 * RBETA_t + \beta_4 * RBTOM_t + \beta_5 * RETOP_t + \varphi_{01} * RERC_t + \varepsilon_t \quad (9)$$

For *PERDIF*:

$$SAR_{t+1} = \beta_0 + \beta_1 * RACCR_t + \varphi_1 * RACCR_t * RPERDIF_t + \beta_2 * RSIZE_t + \beta_3 * RBETA_t + \beta_4 * RBTOM_t + \beta_5 * RETOP_t + \varphi_{01} * RPERDIF_t + \varepsilon_t \quad (10)$$

For the combined effect of *ERC* and *PERDIF*:

$$SAR_{t+1} = \beta_0 + \beta_1 * RACCR_t + \varphi_1 * RACCR_t * RERC_t * RPERDIF_t + \beta_2 * RSIZE_t + \beta_3 * RBETA_t + \beta_4 * RBTOM_t + \beta_5 * RETOP_t + \varphi_{01} * RERC_t * RPERDIF_t + \varepsilon_t \quad (11)$$

where

SAR_{t+1} is the size-adjusted return for the 12-month return window starting four months after the current fiscal year end;

$RERC_t$ and $RPERDIF_t$ are, respectively, the decile rank of *ERC* and *PERDIF*;

$RACCR_t$ is the accrual decile rank;

$RSIZE_t$ $RBETA_t$, $RBTOM_t$ *and* $RETOP_t$ are, respectively, the decile rank of the firm's market value of equity, CAPM beta, the book-to-market ratio and the earnings-to-price ratio.

All the deciles are formed annually. The decile ranks are all scaled between 0 and 1 so that the lowest decile takes the value of 0 and the highest decile takes the value of 1.

If the accrual strategy is more effective for firms with high *ERC*/*PERDIF*, we expect the interaction term between the accrual decile rank and the decile rank of *ERC*/*PERDIF* to be negative and significant in Model (9) and Model (10). If combining *ERC* and *PERDIF* yields higher spreads in accrual strategy returns, we expect the coefficient on the interaction term, *RACCR*RERC*RPERDIF*, in Model

(11) to be negative and of higher magnitude than the coefficient on the interaction term in either Model (9) or Model (10).

We additionally examine whether our results are explained by idiosyncratic volatility and transaction costs (Mashruwala et al. 2006). Our empirical models are specified as follows.

For *ERC*:

$$\begin{aligned} SAR_{t+1} &= \beta_0 + \beta_1 * RACCR_t + \varphi_1 * RACCR_t * RERC_t \\ &+ \varphi_2 * RACCR_t * RARBRISK_t + \varphi_3 * RACCR_t * RPRICE_t \\ &+ \varphi_4 * RACCR_t * RVOLUME_t + \beta_2 * RSIZE_t + \beta_3 * RBETA_t \\ &+ \beta_4 * RBTOM_t + \beta_5 * RETOP_t + \varphi_{01} * RERC_t + \varphi_{02} * RARBRISK_t \\ &+ \varphi_{03} * RPRICE_t + \varphi_{04} * RVOLUME_t + \varepsilon_t \end{aligned} \tag{12}$$

For *PERDIF*:

$$\begin{aligned} SAR_{t+1} &= \beta_0 + \beta_1 * RACCR_t + \varphi_1 * RACCR_t * RPERDIF \\ &+ \varphi_2 * RACCR_t * RARBRISK_t + \varphi_3 * RACCR_t * RPRICE_t \\ &+ \varphi_4 * RACCR_t * RVOLUME_t + \beta_2 * RSIZE_t + \beta_3 * RBETA_t \\ &+ \beta_4 * RBTOM_t + \beta_5 * RETOP_t + \varphi_{01} * RPERDIF_t + \varphi_{02} * RARBRISK_t \\ &+ \varphi_{03} * RPRICE_t + \varphi_{04} * RVOLUME_t + \varepsilon_t \end{aligned} \tag{13}$$

For the combined effect of *ERC* and *PERDIF*:

$$\begin{aligned} SAR_{t+1} &= \beta_0 + \beta_1 * RACCR_t + \varphi_1 * RACCR_t * RERC_t * RPERDIF_t \\ &+ \varphi_2 * RACCR_t * RARBRISK_t + \varphi_3 * RACCR_t * RPRICE_t \\ &+ \varphi_4 * RACCR_t * RVOLUME_t + \beta_2 * RSIZE_t + \beta_3 * RBETA_t \\ &+ \beta_4 * RBTOM_t + \beta_5 * RETOP_t + \varphi_{01} * RERC_t * RPERDIF_t \\ &+ \varphi_{02} * RARBRISK_t + \varphi_{03} * RPRICE_t + \varphi_{04} * RVOLUME_t + \varepsilon_t \end{aligned} \tag{14}$$

where

RARBRISK is the decile ranks of residual variance from a regression of firm-specific returns on the returns of the CRSP equal weighted market index over the 12 months ending one month before the accrual portfolio formation date[8];

[8] Our results hold when we form quintiles instead of deciles.

RPRICE is the decile ranks of CRSP closing stock price one month before the accrual portfolio formation date;

RVOLUME is the decile ranks of CRSP trading volume one month before the accrual portfolio formation date.

We form all deciles annually, and the value of the decile ranks is scaled between 0 and 1. The other variables are defined above.

If our findings are robust towards considerations of transaction costs and idiosyncratic volatility, we expect the coefficient on the interaction term between the accrual decile and the decile rank of *ERC*/*PERDIF* to be negative and significant. If combining *ERC* and *PERDIF* yields higher spreads in accrual strategy returns, we expect the coefficient on the interaction term, *RACCR*RERC*RPERDIF*, in Model (14) to be negative and of higher magnitude than the coefficient on the interaction term, *RACCR*RERC*, in Model (12) or the coefficient on the interaction term, *RACCR*RPERDIF,* in Model (13).

4.4.2. Regression results

To control for the cross-sectional correlation in residuals, we use the Fama-MacBeth regression (Fama and MacBeth 1973). Specifically, we run the regression annually and report the mean value of the annual coefficient estimates with its *p-value* based upon the distribution of annual coefficient estimates. We additionally require measures of risk factors, idiosyncratic volatility and transaction costs to be non-missing, reducing our sample size to 20,845 firm-year observations.

Panel A of Table 3 reports the regression results based on *ERC*. Model 1 shows that the coefficient on *RACCR* is -0.02, not significant (*p-value*=0.392), while the coefficient on *RACCR*RERC* is -0.07, significant at the 0.10 level (*p-*

value=0.060). This result suggests that the return to the arbitrage portfolio with a long position in the bottom accrual decile and a short position in the top accrual decile generates a positive and insignificant return of 2 percent for firms in the lowest *ERC* decile, while it generates a return of 9 percent for firms in the highest *ERC* decile, with the return difference significant at the 0.10 level. Results from Model 2 suggest that this finding is robust towards consideration of transaction costs and idiosyncratic volatility, as the coefficient on *RACCR*RERC* remains negative and significant after we control for the stock price, trading volume and idiosyncratic risk.

[Insert Table 3 here]

Panel B of Table 3 reports the results based on *PERDIF*. The coefficient on *RACCR* is positive in both Model 1 and Model 2. This suggests that the accrual strategy generates negative returns when applied to firms in the lowest persistence difference decile. The coefficient on *RACCR*RPERDIF* is negative and significant for both Model 1 and Model 2, suggesting that the higher the persistence of cash flows relative to accruals, the higher the accrual strategy returns; this inference is robust towards considerations of transaction costs and idiosyncratic volatility. The magnitude of the coefficient indicates that the difference in the accrual strategy return is 23 percent between the lowest and the highest persistence difference decile. This finding is economically significant.

Panel C of Table 3 reports the results based on combining *PERDIF* and *ERC*. The coefficient on *RACCR* is insignificant in both Model 1 and Model 2. This suggests that the accrual strategy generates no significant returns when applied to firms in the lowest *PERDIF* and the lowest *ERC* decile. The coefficient on *RACCR*RERC*RPERDIF* is negative and significant in both Model 1 and Model 2, suggesting that the higher the value of *RERC*RPERDIF*, the higher the accrual strategy returns, regardless whether transaction costs and idiosyncratic volatility are considered in the analysis. The magnitude of the coefficient is 27 percent, suggesting that the combined effect of *ERC* and *PERDIF* on the accrual strategy return is more pronounced than the effect of *ERC* (7 percent) or *PERDIF* (23 percent) alone.

To summarize, our multivariate regression results suggest that our main finding – i.e., that the accrual strategy return increases in the stock market's responsiveness and the differential persistence of cash flows relative to accruals – is robust towards controlling for transaction costs, idiosyncratic volatility and more risk factors.

5. The growth explanation

As we discussed in the Introduction, our findings are seemingly inconsistent with the risk explanation and cannot be accounted for by the limits of arbitrage explanation. However, it is possible that the growth explanation yields the same predictions, raising the concern that our results are driven by the growth explanation. In this section, we discuss papers in support of the growth explanation and the results of the empirical test we conduct to alleviate this concern.

There are mainly two papers in support of the growth explanation: Fairfield et al. (2003a) and Zhang (2007). Fairfield et al. (2003a) find that another growth measure, the growth in long-term net operating assets (*GRLTNOA*), predicts future returns in the same way as accruals. They argue that their evidence supports the notion that the accrual anomaly is a special case of the growth anomaly. However, the growth anomaly is not clearly understood and earnings fixation is a possible explanation for it. Thus, Fairfield et al. (2003a) do not provide evidence against the earnings fixation hypothesis. Rather, they suggest that the lower persistence of accruals is due to diminishing returns to growth.

Zhang (2007) posits that if the growth anomaly is the underlying reason for the accrual anomaly, then the accrual anomaly should be stronger when accruals are more likely to measure growth. Specifically, Zhang (2007) uses *COVAR*, the slope coefficient from a regression of accruals on the growth in the number of employees, as an indicator of the extent to which accruals represent growth and shows that the accrual strategy return increases in *COVAR*. Zhang's evidence thus supports the notion that the accrual anomaly is driven by the growth anomaly.

At first, our results may appear to be consistent with the growth explanation because *ERC* is related to growth. We agree that *ERC* is related to growth, but we are not aware of any theoretical or empirical evidence suggesting that higher *ERC* indicates a higher likelihood that accruals represent growth.

To empirically test whether *ERC*/*PERDIF* is related to growth, we obtain *COVAR* by regressing total accruals on the percentage change in the number of employees, similar to Zhang (2007). We find no statistically significant relation between *ERC*/*PERDIF* and *COVAR*. This finding is inconsistent with the notion that the growth explanation drives our results.

6. Conclusions

Sloan's (1996) finding that accruals are negatively correlated with future returns remains an intriguing research issue. Although the robustness of the finding is corroborated by many research papers, it is not clear what causes the accrual anomaly. Four explanations have been proposed: the earnings fixation explanation, the growth explanation, the risk explanation and the limits of arbitrage explanation. This paper attempts to advance our understanding of the accrual anomaly. Using a simple theoretical model, we predict that if investors fixate on earnings, the returns to the accrual strategy increase in the responsiveness of the stock price to earnings (*ERC*) and the differential persistence level of cash flows relative to accruals (*PERDIF*). We find strong supporting empirical evidence, lending support to the earnings fixation hypothesis. Our results are seemingly inconsistent with the risk explanation and cannot be accounted for by the limits of arbitrage explanation.

Theoretically, it is possible that the growth explanation, advocated by Fairfield et al. (2003a) and Zhang (2007), yields the same empirical predictions as the earnings fixation explanation. We note that Fairfield et al. (2003a) do not argue against the earnings fixation hypothesis. Rather they suggest that the lower persistence of accruals results from diminishing returns to growth. Following Zhang (2007), we compute a measure of the extent to which accruals represent growth. We find no statistically significant correlation between this measure and *ERC/PERDIF*. Our finding suggests that the growth explanation does not drive our results.

Our paper contributes to the accounting literature in that our evidence helps to answer an important research question, what causes the accrual anomaly. At the minimum, our findings are interesting to investors who apply the accrual strategy in stock trading, as we document that the accrual strategy is more effective when applied to firms whose stock prices are more responsive to earnings and whose cash flows are much more persistent than accruals.

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Table 1: Descriptive statistics. The sample consists of 27,373 firm-year observations from 1988-2006.

Ranking on total accruals	Lowest	2	3	4	5	6	7	8	9	Highest
					SAR_{t+1}					
Mean	2.99%	2.44%	1.94%	2.79%	1.37%	1.53%	-0.37%	-0.51%	-1.90%	-2.94%
t-value	2.820	2.710	2.430	3.580	1.940	2.220	-0.530	-0.560	-2.130	-2.790
					ACCR					
Mean	-0.202	-0.105	-0.080	-0.064	-0.051	-0.039	-0.027	-0.012	0.013	0.104
Median	-0.163	-0.103	-0.079	-0.062	-0.050	-0.038	-0.026	-0.012	0.012	0.074
					CF					
Mean	0.154	0.144	0.130	0.112	0.102	0.090	0.080	0.072	0.051	-0.017
Median	0.174	0.144	0.126	0.109	0.096	0.083	0.075	0.064	0.045	-0.005
					MV					
Mean	2255	4052	4550	5747	5333	4956	4910	4301	3361	1653
Median	479	783	899	1061	1133	936	906	749	528	283
					Book-to-market					
Mean	-0.453	0.544	0.543	0.552	0.552	0.587	0.578	0.578	0.572	0.546
Median	0.418	0.472	0.478	0.487	0.510	0.539	0.526	0.509	0.501	0.483
					CAPM Beta					
Mean	1.209	1.035	1.000	0.917	0.886	0.891	0.918	0.950	1.034	1.215
Median	1.132	0.962	0.926	0.883	0.815	0.847	0.860	0.899	0.963	1.146

Notes:
SAR_{t+1}-Size-adjusted return during the next year: $SAR_{t+1} = \prod(1 + r_{it}) - \prod(1 + r_{mt})$, where r_{is} and r_{ps} are returns in month s for firm i and size portfolio p. Size deciles are determined by the distribution of the market values of all the NYSE/AMEX firms at the beginning of the calendar year. *SAR* is computed over the 12-month holding periods, beginning four months after the fiscal year end. When a firm delists, we use the delisting return in the delisting month and assume a return equal to the firm's size-matched portfolio for the remainder of the year. If a firm's delisting is due to liquidation or a forced delisting and the delisting return is missing, the delisting return is set to -100%. *CF* is cash flows in year t, which is calculated by Cash Flows from Operating Activities (Compustat Annual Item #308) – Extraordinary Items & Discontinued Operation (Annual Item #124), deflated by average total assets. *ACCR* is total accruals in year t, calculated as Income Before Extraordinary Items (Compustat Annual Item #123) deflated by average total assets, minus cash flows (*CF*). *MV* is the market value of equity, which is the value of Closing Price in Fiscal Year End (Compustat Item #199) multiplied by Shares Outstanding (Compustat Annual Item #25). *Book-to-market* is the book value (Compustat Annual Item #60) divided by the market value (*MV*). *CAPM Beta* is computed from the regression of $R_{it} = \alpha_{it} + \beta_{it} R_{mt} + \epsilon_{it}$ where R_{it} is monthly return of security i, and R_{mt} is the equally weighted index in NYSE/AMEX, using prior 36 months' data.

Table 2: Portfolio analysis results. The sample consists of 21,613 firm-year observations from 1988-2006.

Panel A: Size-adjusted returns in accrual deciles across *ERC* quintiles

	Ranking on $ACCR_t$										Pooled		Year-by-year		Range of accruals	
ERC	**Lowest**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Highest**	**hedge**	p^a	**mean**	p^b	**dmean**	**dmedian**
1	-1.35%	0.12%	1.42%	3.76%	0.83%	4.42%	1.35%	-0.96%	1.64%	2.16%	-3.51%	0.335	-2.02%	0.566	-0.27	-0.21
2	0.77%	3.62%	1.53%	2.24%	1.06%	0.93%	0.73%	0.97%	0.44%	3.03%	-2.27%	0.552	-1.11%	0.750	-0.29	-0.23
3	6.59%	6.67%	2.44%	2.05%	1.53%	2.06%	-0.99%	1.27%	-3.62%	-2.69%	9.28%	0.002	9.34%	0.003	-0.27	-0.23
4	2.12%	3.36%	-0.28%	5.51%	-0.31%	0.58%	-0.62%	-1.00%	-0.02%	-2.64%	4.76%	0.130	3.37%	0.323	-0.25	-0.21
5	7.35%	0.64%	2.21%	1.55%	-0.66%	0.24%	-1.12%	-1.08%	1.40%	-4.91%	12.26%	0.001	11.33%	0.012	-0.24	-0.21

Panel B: Size-adjusted returns in accrual deciles across *PERDI*F quintiles

	Ranking on $ACCR_t$										Pooled		Year-by-year		Range of accruals	
PER DIF	**Lowest**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Highest**	**hedge**	p^a	**mean**	p^b	**dmean**	**dmedian**
1	-4.13%	0.89%	-0.87%	-1.79%	-1.72%	3.78%	0.70%	-0.58%	1.43%	6.31%	-10.44%	0.011	-9.37%	0.026	-0.28	-0.22
2	3.65%	-0.17%	2.11%	-0.14%	0.39%	-0.27%	-0.28%	2.15%	0.57%	3.94%	-0.29%	0.928	-2.14%	0.662	-0.26	-0.22
3	3.04%	2.53%	1.82%	2.23%	-0.77%	2.50%	0.79%	-1.83%	0.85%	-2.27%	5.32%	0.056	4.72%	0.116	-0.25	-0.21
4	4.98%	5.82%	2.92%	7.49%	0.69%	-0.36%	-0.89%	-0.70%	0.81%	-6.45%	11.43%	0.002	12.05%	0.005	-0.25	-0.21
5	8.59%	5.46%	1.44%	6.18%	4.01%	2.37%	-1.43%	0.25%	-3.03%	-8.83%	17.42%	0.000	17.83%	0.000	-0.28	-0.22

Panel C: The accruals strategy return in *ERC* and *PERDIF* quintile combinations

		PERDIF				
		Lowest	**2**	**3**	**4**	**Highest**
	Lowest	-24.05%	-1.75%	-0.82%	9.77%	6.24%
	2	-24.31%	1.75%	4.78%	12.52%	3.88%
ERC	**3**	-5.98%	6.61%	3.62%	19.53%	31.04%
	4	4.65%	-5.82%	6.41%	5.07%	13.28%
	Highest	8.92%	-5.44%	9.41%	12.47%	44.60%

Notes:

ERC is the coefficient on $EARNINGS_t$ (η_1) from the following regression: $RET_t = \eta_0 + \eta_1 EARNINGS_t + \varepsilon_t$ where RET_t is return in year t, and $EARNINGS_t$ is Diluted EPS Excluding Extraordinary Items (Compustat Annual Item #57) in year t divided by Closing Price in Fiscal Year End (Compustat Item #199) in fiscal year t-1. We require at least four observations from the current year and previous eight years for this regression.

PERDIF is the persistence difference between cash flows and accruals (β_2-β_1) from the following regression: $EARN_{t+1} = \beta_0 + \beta_1 ACCR_t + \beta_2 CF_t + \varepsilon_t$ where $ACCR_t$ and CF_t are total accruals and cash flows, respectively, in year t and $EARN_{t+1}$ is earnings in year t+1. For more detailed definition of *ACCR*, *CF* and *EARN*, please refer to Table 1. We require at least four observations from the current year and previous eight years for this regression.

Decile ranks are based on total accruals each year.

hedge: the return to the hedge portfolio with a long position in the bottom accrual decile and a short position in the top accrual decile.

[pa] : the *p-value* associated with "hedge", using a two-tailed *t* test.

mean: the mean value of annual hedge portfolio returns.

[pb] : the *p-value* associated with "mean", using a two-tailed *t* test.

dmean: the mean value of differences in accruals between the lowest and highest accrual deciles.

dmedian: the median value of differences in accruals between the lowest and highest accrual deciles.

Table 3: Fama-MacBeth regression results. The dependent variable is size-adjusted returns in year t+1 (SAR_{t+1}). The sample consists of 20,845 firm-year observations from 1988-2006.

Panel A: The effect of *ERC*

	Model 1		Model 2	
	Coeff.	*p-value*	*Coeff.*	*p-value*
Intercept	-0.02	0.435	0.00	0.948
RACCR	-0.02	0.392	-0.06	0.056
RACCR*RERC	**-0.07**	**0.060**	**-0.06**	**0.076**
*RACCR*RARBRISK*			0.04	0.202
*RACCR*RPRICE*			0.03	0.445
*RACCR*RVOLUME*			0.00	0.991
RSIZE	-0.01	0.415	-0.03	0.352
RBTOM	0.02	0.473	0.02	0.408
RETOP	0.04	0.061	0.04	0.099
RBETA	0.04	0.275	0.05	0.151
RERC	0.03	0.189	0.02	0.242
RARBRISK			-0.03	0.327
RPRICE			0.01	0.724
RVOLUME			0.00	0.932
Adjusted R^2	0.0258		0.0337	

Panel B: The effect of *PERDIF*

	Model 1		Model 2	
	Coeff.	*p-value*	*Coeff.*	*p-value*
Intercept	-0.07	0.019	-0.05	0.109
RACCR	0.06	0.033	0.01	0.581
RACCR*RPERDIF	**-0.23**	**0.000**	**-0.23**	**0.000**
*RACCR*RARBRISK*			0.05	0.155
*RACCR*RPRICE*			0.04	0.362
*RACCR*RVOLUME*			0.01	0.807
RSIZE	-0.01	0.422	-0.03	0.449
RBTOM	0.02	0.344	0.02	0.298
RETOP	0.04	0.091	0.03	0.135
RBETA	0.04	0.282	0.05	0.148
RPERDIF	0.13	0.000	0.13	0.000
RARBRISK			-0.03	0.259
RPRICE			0.00	0.967
RVOLUME			-0.01	0.880
Adjusted R^2	0.0298		0.0378	

Panel C: The effect of combining *ERC and PERDIF*

	Model 1		Model 2	
	Coeff.	*p-value*	*Coeff.*	*p-value*
Intercept	-0.04	0.074	-0.02	0.399
RACCR	0.02	0.332	-0.03	0.221
RACCR*RERC*RPERDIF	**-0.27**	**0.000**	**-0.27**	**0.000**
*RACCR*RARBRISK*			0.04	0.185
*RACCR*RPRICE*			0.04	0.301
*RACCR*RVOLUME*			0.00	0.926
RSIZE	-0.01	0.476	-0.03	0.413
RBTOM	0.02	0.375	0.02	0.323
RETOP	0.04	0.102	0.03	0.156
RBETA	0.04	0.282	0.05	0.152
*RERC*RPERDIF*	0.16	0.000	0.16	0.000
RARBRISK			-0.03	0.293
RPRICE			0.00	0.921
RVOLUME			0.00	0.997
Adjusted R^2	0.0273		0.0352	

Notes:
SAR_{t+1}: Size-adjusted return for firm in year t+1. Please refer to Table 1 for detailed definition.
RACCR: Decile ranks of *ACCR* for each year t, scaled between 0 and 1. Please refer to Table 1 for the definition of *ACCR*.
RERC: Decile ranks of *ERC* in year t, scaled between 0 and 1. Please refer to Table 2 for the definition of *ERC*.
RPERDIF: Decile ranks of *PERDIF* (persistence difference between cash flows and accruals) in year t, scaled between 0 and 1. Please refer to Table 2 for the definition of *PERDIF*.
RARBRISK: Decile ranks of *ARBRISK*, scaled between 0 and 1. *ARBRISK* is the residual variance from a regression of firm-specific returns on the returns of the CRSP equally weighted market index over the 12 month ending one month before the accrual portfolio formation date.
RPRICE: Decile ranks of *PRICE*, scaled between 0 and 1. *PRICE* is the CRSP closing stock price one month before the accrual portfolio formation date.
RVOLUME: Decile ranks of *VOLUME*, scaled between 0 and 1. *VOLUME* is the CRSP trading annual volume one month before the accrual portfolio formation date.
RSIZE: Decile ranks of MV by the end of fiscal year t, scaled between 0 and 1. Please refer to Table 1 for definition of *MV*.
RBTOM: Decile ranks of *Book-to-market* ratio by the end of fiscal year t, scaled between 0 and 1. Please refer to Table 1 for definition of *Book-to-market*.
RETOP: Decile ranks of *Earnings-to-price* ratio by the end of fiscal year t, scaled between 0 and 1. *Earnings-to-price* = Diluted EPS Excluding Extraordinary Items (Compustat Annual Item #57) divided by Fiscal Year End Price (Compustat Annual Item #199) by the end of each fiscal year t.
RBETA: Decile ranks of *CAPM Beta* in year t, scaled between 0 and 1. Please refer to Table 1 for definition of *CAPM Beta*.