“Accruals and cash flows anomalies: evidence from Indian stock market”

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Accruals and cash flows anomalies: evidence from the Indian stock market

Abstract

This study examines the persistence of earnings performance, the contribution of accruals and cash flows in the persistence of earnings and whether investors correctly value the information contained in earnings, accruals and cash flows for equity pricing. Thr authors use data for 493 companies on the BSE from January 1997 to December 2010. The results support the high persistence of earnings for the sample firms and that the stock prices correctly reflect the implications of current earnings for future earnings. It is found that earnings persistence is more attributable to cash flows than accruals. However, the Indian investors seem to under price accruals and overprice cash flows which is in contrast to findings for mature markets. Accruals are found to be positively associated with future returns. The accrual anomaly is not captured by one factor CAPM but is fully explained by the three factor Fama French model due to risk premium on the size factor. A negative relationship is reported between cash flows and returns which is again contrary to the results for mature markets. The cash flow anomaly which is not absorbed by CAPM is explained by the size and value factors of the Fama French model. Hence accruals and cash flow anomalies do not pose serious challenge to popular asset pricing models in the Indian context. The findings will be highly useful for investment analysts and portfolio managers who are in pursuit of trading strategies that promise extra normal returns. The research contributes to asset pricing and behavioral finance literature especially for emerging markets.

Keywords: accruals, cash flows, earnings persistence, CAPM, Fama French model.
JEL Classification: C22, C33, G12, G14, M41.

Introduction

In a seminal paper, Sloan (1996) tests the theory that investors fixate too heavily on corporate earnings in establishing stock prices. He finds that investors focus on current earnings to predict future earnings and fail to fully realize the information conveyed by the two components of earnings which are accruals and cash flows from operations. Although both components contribute to current earnings they have different implications for the assessment of future earnings. The persistence of current earnings is decreasing in the magnitude of the accrual component of earnings and increasing in the magnitude of the cash flow component of earnings. In other words accruals are less persistent than cash flows (Barth & Hutton, 2004; and Bradshaw, Richardson & Sloan, 2001).

If investors do not foresee the lower persistence of earnings performance attributable to the accruals component of earnings and naively "fixate" on earnings then they will be likely to overprice (underprice) stocks in which the accrual component is relatively high (low). This occurs because they do not anticipate the lower persistence of earnings performance attributable to the accruals component of earnings. This mispricing will be corrected when future earnings are realized to be lower (higher) than expected. When this happens the market reacts negatively (positively) to the earnings announcement resulting in predictable negative (positive) abnormal stock returns. This is the accrual anomaly which was first documented by Sloan (1996). A trading strategy taking a long position in the stock of firms reporting relatively low levels of accruals and a short position in the stock of firms reporting relatively high level of accruals generates positive stock returns. Sloan (1996) shows that for the US market low (high) accrual stocks generate positive (negative) abnormal future returns and a hedge strategy that exploits this anomaly generates a significant annual abnormal return of 10.4%.

Sloan (1996) and Bradshaw et al. (2001) examine the relation between components of current earnings and future earnings. They find that the coefficients of accruals and cash flows are significant between 0 and 1 which implies that two components contribute to the mean reversion of earnings. The coefficient of accruals is smaller than that of cash flows indicating the faster mean reversion of accruals than that of cash flows. Hence high earnings performance attributable to the cash flows component of earnings is more likely to persist than the high earnings performance that is attributable to the accrual component of earnings.

The accrual anomaly has been extended and further researched by several studies.

Xie (2001) uses the Jones model[1] to decompose accruals into normal and abnormal accruals and shows that the overpricing of accruals which Sloan (1996) documents is due largely to abnormal accruals which capture accruals arising from mana-

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[1] See Xie (2001, p. 368).

gerial discretion. He provides evidence that use the abnormal accruals to construct hedge portfolios results in higher abnormal returns than those generated by firms partitioned on the basis of accruals more generally. Beneish and Vargus (2002) suggest that accrual mispricing is largely due to mispricing of income increasing accruals and that one-year ahead hedge returns to trading strategies based on the direction of accruals and insider trading are higher than those based on accruals alone. They find some evidence supporting Xie (2001) that high accruals are related to earnings management. Richardson, Sloan, Soliman and Tuna (2004) categorize accruals according to their reliability and find that the accruals mispricing is more severe for the less reliable categories of accruals (working capital accruals and non current operating accruals).

Rationalizing the accrual anomaly from a distress risk perspective Ng (2004) finds that a high level of accruals is a signal of low distress risk and a low level of accruals is a signal of high distress risk. Zach (2003) documents that relative to firms in high accruals portfolios, firms in low accruals portfolios have lower profits, lower sales growth, lower fiscal year cumulative returns, more restructurings and divestitures, less mergers and acquisitions, and higher distress risk based on Z-score and O-score.

Desai et al. (2004) find that the accrual anomaly vanishes when controlling for value glamour effects, provided the value glamour effect is proxied by the ratio of operating cash flow to price. Collins and Hribar (2000) find that the accrual anomaly and the post-earnings announcement drift are distinct from each other and they report that a combined strategy that exploits both anomalies generates higher returns than each individual strategy.

Pincus et al. (2007) using data of twenty countries confirm that the anomaly is more likely to occur in countries having a common law tradition and also in countries allowing extensive use of accrual accounting and a lower concentration of share ownership. However, Leippold and Lohre (2010) who test the anomaly for twenty-six equity markets, after examining the robustness of the results to multiple hypothesis testing, find that few of the risk adjusted returns from accrual based hedge strategy continue to be anomalous in this setting and the returns to the hedge strategy are diminishing in recent times.

Some researchers have interpreted findings in Sloan (1996) and Xie (2001) as evidence that the stock market does not see through managers attempt to manipulate reported earnings. Mashruwala et al. (2006) state that even if smart arbitrageurs see through the implications of accruals for future earnings, they would find eliminating such mispricing difficult. They suggest two sources of barriers to arbitrage i.e. lack of close substitutes and transaction costs which prevent arbitrageurs from eliminating accrual mispricing. Lev and Nissim (2006) show that extreme accrual firms have characteristics such as small size and low stock price and book-to-market ratio, which institutions tend to avoid. Trading in the stocks of extreme accrual firms entails for individuals substantial information processing and transaction costs likely deterring them from exploiting the accruals' gains. Consequently the anomaly persists.

Since accruals and cash flows are negatively related, Sloan (1996) argues that a trading strategy of simultaneously buying high cash flows and selling low cash flows stocks will also generate a positive abnormal return. He postulates that the cash flow anomaly coexists with the accrual anomaly. Empirical evidence on this conjecture is mixed. Houge and Loughran (2000) and Collins and Hribar (2000) provide evidence on the coexistence of the accrual and the cash flow anomaly. Pincus et al. (2007) find that the occurrence of the accrual anomaly in a country does not always imply that the cash flow anomaly coexists or vice versa.

Fama and French (2008) point out that the accrual anomaly is the most pervasive return anomaly as it remains strong in all size groups, in cross-sectional regressions, and in tests based on portfolio sorts.

The accrual anomaly has been widely researched for the US market. Some of the studies on other countries include Farshid, Mirza and Yao (2006) for China, Kho and Kim (2007) for Korea, Koerniadi and Tourani-Rad (2005) for New Zealand, Clinch, Fuller, Govendir and Wells (2010) for Australia, Pasaribu (2009) for Indonesia and Fazeli and Aflatooni (2010) for Iran. While the persistence of earnings and its components i.e. cash flow and accruals and their role in equity pricing has been widely researched in the developed markets, the extent of their presence in an emerging market like India is relatively unexplored. The objective of this paper is twofold: first we investigate the persistence of earnings reported by the firms in our sample. Consistent with prior research, we measure earning persistence in the context of persistence from one period to the next. We then test whether earnings persistence is more attributed to cash flow or accrual component of earnings. Secondly we examine if information intermediaries in India anticipate the information in earnings persistence and whether investors price accruals and cash flows relative to their contribution in projection of earnings one year ahead.

This paper contributes to the existing literature in several important ways. Pincus et al. (2007) and Leippold and Lohre (2010) include the Indian case to study the accrual anomaly, they cover an earlier time period. We re-examine the accrual anomaly for a longer time period including the more recent time period. Next to calculate accruals we use both balance sheet and the cash flow statement definitions and verify if our results are robust to choice of accrual measure. When creating accrual sorted portfolios we use both a mixed model (Sloan, 1996) as well as one in which distinction is made between positive and negative values of accruals (Fama & French, 2008). However the most important contribution of the paper is the test of the presence of cash flow anomaly which has till now not been researched in the Indian context. This also has been examined using definitions based on both balance sheet and cash flow statement.

The paper is organized as follows. In Section 1 we develop the hypothesis. Section 2 describes the data and their sources. Section 3 explains the methodology followed. Section 4 gives the empirical results. The last section contains summary, policy implications and concluding remarks.

1. Testable hypothesis

The study attempts to test the following hypotheses.

Hypothesis 1: There is persistence in current earnings performance.

Hypothesis 2: Current earnings performance is less persistent if it is attributable to the accrual component of earnings than to the cash flow component of earnings.

Hypothesis 3: Stock prices anticipate the average persistence of earnings performance.

Hypothesis 4: The earnings expectations rooted in stock prices fail to reveal fully the higher earnings persistence attributable to the cash flow component of earnings and lower earnings persistence attributable to the accrual component of earnings.

We next assess whether abnormal returns can be earned by taking trading positions on the accrual and cash flows variable to provide additional confirmatory evidence on hypothesis 3 and 4.

Hypothesis 5: The observed accrual anomaly is fully captured by standard risk models like CAPM or FF three factor model.

Hypothesis 6: The cash flow anomaly is captured by standard risk models like CAPM or FF three factor model.

2. Data

The sample used consists of 493 companies that form part of BSE-500 equity index. The study uses month end closing adjusted share prices (adjusted for capitalization such as bonus, rights and stock splits) from January 1997 to December 2010 (168 monthly observations). BSE-500 index represents nearly 93% of the total market capitalization, accounts for 95% of trading activity, and covers all 20 major industries of the economy. Hence, the sample is fairly representative of market performance. The Bombay Stock Exchange (BSE)-200 index is used as the market proxy. It is a broad based value weighted index which is constructed on the lines of S&P500 (USA). The month end share price series have been converted into percentage return series for further estimation. Market capitalization (used as the size proxy) is total market value of all the company's outstanding shares. It is calculated as the natural log of price times shares outstanding at the end of December of year *t*-1. Price-to-book value (inverse of BE/ME) per share (used as value proxy) represents the security price over a company's book value. Data on share prices, market index, and all company characteristics required for calculation of accruals has been obtained from the Thomson ONE database of Thomson Reuters. The implicit yields on 91-day treasury bills have been used as a risk-free proxy as is the standard practice in finance literature. The data for this has been taken from the RBI monthly handbook of statistics and RBI website.

We primarily use the balance sheet method for the measurement of accruals, to guarantee comparability with other international studies and with the original study of Sloan (1996).

$$Accruals = (\Delta CA - \Delta Cash) - \\ - (\Delta CL - \Delta STD - \Delta TP) - Dep, \quad (1)$$

where ΔCA is the change in current assets; $\Delta Cash$ is the change in cash or cash equivalent; ΔCL is the change in current liabilities; ΔSTD is the change in debt included in current liabilities; ΔTP is the change in tax payables, and Dep is the depreciation and amortization expense.

Earnings are measured as net operating income before extraordinary items. The cash flow component of earnings is measured as the difference between earnings and the accrual component of earnings. Earnings, and its components i.e. accruals and cash-flows are standardized by the average total assets i.e. average of the beginning and the end of calendar year book value of total assets.

Collins and Hribar (2002) report that the balance sheet approach of measuring accruals introduces

measurement error into the accrual estimate, primarily due to mergers and acquisitions and discontinued operations. When such events occur, the parameter estimates are biased towards the existence of earnings management. However, the cash flow based measure of accruals is not affected by such corporate events. To avoid this source of potential error we estimate accruals using cash flow approach to measure accruals. Accruals are calculated as the difference between earnings and operating cash flows. Operating cash flow data is obtained from statements of cash flows. Earnings are the same as defined above. All three variables are standardized by average total assets.

3. Methodology and estimation procedure

This study applies the balance sheet approach in computing accruals for testing the above four hypothesis. Tests of the last two hypotheses are reconfirmed by using the cash flow statement definition of accruals.

3.1. Test of persistence in earnings and its components. Following Sloan (1996) we use a model that estimates the average persistence of current earnings on future earnings and another model that does not restrict the accruals and cash flows components of current earnings to be equal to examine the different persistence of accruals and cash flows components of current earnings.

$$Earnings_{t-1} = \alpha_0 + \alpha_1 \cdot Earnings_t + \varepsilon_{t+1}, \quad (2)$$

$$Earnings_{t+1} = \gamma_0 + \gamma_1 \cdot Accruals_{it} + \\ + \gamma_2 \cdot Cashflows_{it} + \varepsilon_{t+1}. \quad (3)$$

Equation (2) estimates the average persistence of current earnings on future earnings. Since earnings are defined as operating income scaled by total assets so α_1 measures the persistence of the accounting rate of return on assets. As accounting rates of return are mean reverting, α_1 is less than unity (Sloan, 1996, p. 297). This equation constraints the coefficients on the cash and the accrual components of earnings to be equal. However, the accrual anomaly arises from the different persistence of accruals and cash flows components of earnings. The specification is required to test the equation (3) which decomposes current earnings into accruals and cash flows components of earnings. The smaller coefficient on accruals (γ_1) relative to cash flows (γ_2) reflects the lower persistence of earnings performance attributable to the accrual component of earnings. If cash flows have greater implications for future earnings we expect that $\gamma_2 > \gamma_1$.

3.2. Market efficiency tests. We apply Mishkin test as discussed in Sloan (1996) and Kraft, Leone and Wasley (2007, p. 7) to test the second hypothesis as follows:

$$E_m(Earnings_{t+1}|\phi_t) = E(Earnings_{t+1}|\phi_t), \quad (4)$$

where ϕ_t is the information available at time t, $E_m(Earnings_{t+1}|\phi_t)$ is the market's subjective expectation of earnings for period $t + 1$ and $E(Earnings_{t+1}|\phi_t)$ is the objective expectation of $Earnings_{t+1}$ conditional on ϕ_t. Equation (4) indicates that the market's expectation of earnings is equal to the true expectation of earnings conditional on all past information. Market efficiency implies

$$E(R_{t+1}) = R_{t+1} - E_m(R_{t+1}|\phi_t) = 0, \quad (5)$$

where R_{t+1} is the return in year $t + 1$ and $E_m(R_{t+1}|\ \phi_t)$ is the market's subjective expectation of R_{t+1} conditional on information available at time t. Equation (5) implies R_{t+1} should be uncorrelated with past information.

From equations (4) and (5), the efficient markets condition can be written as:

$$R_{t+1} = [\beta(Earnings_{t+1} - E(Earnings_{t+1}|\phi_t)] + e_{t+1}, \quad (6)$$

where e_{t+1} is a disturbance term and $E(e_{t+1}|\phi_t) = 0$, β is a valuation multiplier. Assuming market efficiency, R_{t+1} should only be related to unexpected earnings and not to any past information. Combining the earnings forecasting in equation (2) and the rational pricing in equation (6) the test for market rationality is based on the following system of equations:

$$Earnings_{t+1} = \alpha_0 + \alpha_1 Earnings_t + v_{t+1}, \quad (7)$$

$$AR_{t+1} = \beta(Earnings_{t+1} - \alpha_0 - \\ - \alpha_1 * \cdot Earnings_t) + \varepsilon_{t+1}. \quad (8)$$

AR is a stock's abnormal return defined as the difference between the stock return and the size matched portfolio return. It is calculated by taking the buy-hold stock return and subtracting the buy-hold return on a size matched equal weighted portfolio of firms. The size portfolios are based on market value of equity quintiles of BSE-500 firms.

The earnings forecasting in equation (7) uses past information ($Earnings_t$) to forecast future earnings, $Earnings_{t+1}$. The weight placed on past earnings, α_1, is an objective measure of how $earnings_t$ is related to future earnings. By joint nonlinear estimation of equations (7) and (8) one can use information in returns to infer how the market used information in $Earnings_t$ to forecast $Earnings_{t+1}$. Equation (4) implies that the market's subjective expectation of earnings conditional on past information (which one infers from equation (7)), should be equal to the objective expectation of earnings which one can

estimate in equation (8). A test for rationality is that $\alpha_1 = \alpha_1^*$. This non-linear constraint requires that stock prices correctly anticipate the average persistence of earnings performance.

When earnings are broken down into accruals and cash flow from operations the forecasting specification for future earning (equation (9)) and the rational expectations pricing specification (equation (10) provides the following system:

$$Earnings_{t+1} = \gamma_0 + \gamma_1 accruals_t + \\ + \gamma_2 cashflows_t + \varepsilon_{t+1}, \quad (9)$$

$$AR_{t+1} = \beta \cdot (Earnings_{t+1} - \gamma_0 + \gamma_1^* \cdot accruals_t + \\ + \gamma_2^* \cdot cashflows_t) + \upsilon_{t+1}. \quad (10)$$

Equation (9) is a forecasting equation which estimates the forecasting coefficient of accruals and cash flows component for predicting earnings one year ahead. Equation (10) is valuation equation that estimates the valuation coefficient that the market assigns to accruals and cash flow components of earnings. The starred coefficients represent estimates of persistence implicit in stock returns while unstarred coefficients are estimated directly from earnings, accruals and cash flow data.

The objective is to see if investors assign a higher valuation coefficient to accruals than the one expected in the association between accruals and future earnings. The dual constraints for market efficiency are γ_1^* from the returns equation (10) is not different than γ_1 from the forecasting equation (9) and γ_2^* from the returns equation (10) is not different than γ_2 from the forecasting equation (9) i.e., the weight applied to cash flow and accruals in the forecasting equation are the same as the weight applied by the market to these components in the equilibrium pricing equation. This means no securities mispricing would occur and therefore no abnormal returns would be available on accrual sorted portfolios. If this condition is defied accrual anomaly will occur.

The two systems (equations (7) and (8)) and (equations (9) and (10)) are estimated using non-linear Generalized Least Squares (GLS). Market efficiency is tested using the following likelihood ratio test (asymptotically distributed as $\chi^2(q)$ under the null hypothesis):

$$2n \times \ln(SSR^c/SSR^u), \quad (11)$$

where q is the number of rational pricing constraints imposed, n is the number of observations in each equation ($2n$ is the number of observations in the stacked regression), SSR^c is the sum of squared residuals from the constrained system and SSR^u is the sum of squared residuals from the unconstrained system.

3.3. Asset pricing tests. While Mishkin test identified whether the accrual anomaly exist in a statistical sense, it provides no indication of its economic significance. To address this we next perform the asset pricing tests.

We group stocks into five portfolios based on the magnitude of accruals as per the balance sheet definition.

In December of year t-1, the securities are ranked on the basis of accruals. The ranked securities are then classified into five portfolios P1 to P5 and equally-weighted monthly excess returns are estimated for these portfolios for the next 12 months (t). P1 is the portfolio consisting of 20% of companies with the lowest attribute while P5 consists of top 20% companies with the highest attribute under consideration. The portfolios are re-balanced at the end of December of year t. Sample securities are sorted in December of each year beginning from December 1996 and portfolio formation process repeated till we reach December 2009.

Companies with missing value of the characteristic are excluded from the analysis. We find that a large number of firms have negative accruals. While forming accrual sorted portfolios we have used two methods. Following Sloan (1996) and a number of other studies we use a mixed model wherein all the stocks have been sorted into quintiles on basis of all values of accruals taken together without any distinction between positive and negative values. In the second method we form separate portfolios for firms with negative and positive values of accruals (similar to the methodology adopted by Fama and French (2008)). We sort stocks with positive values and negative values into 5 portfolios each[1].

In the first step of our methodology we observe the unadjusted mean excess returns across the accrual sorted portfolios. If we find a pattern in the unadjusted excess returns, then there exists an anomaly.

Next, CAPM regressions are run on each of the five portfolios using familiar "excess return" version of the market model equation:

$$R_{pt} - R_{ft} = a + b(R_{mt} - R_{ft}) + e_t, \quad (12)$$

where $R_{pt} - R_{ft}$ is the monthly excess return on the portfolio i.e. return on portfolio P minus risk-free return (R_{ft}), $R_{mt} - R_{ft}$ is the excess market return i.e return on market factor minus risk-free return, e_t is the error term, a (intercept) is a measure of abnormal profits and b is the sensitivity coefficient of market factor.

[1] Data is from 2006:01 to 2010:12.

The CAPM implies that excess returns on a portfolio should be fully explained by excess market returns. Hence, the expected value of a (the intercept term) should be 0. A significantly positive (negative) value of a (intercept) implies extra-normal profits (losses). If there is a significant positive or negative intercept in the CAPM specification, then a CAPM anomaly exists. Then we attempt to evaluate if the excess returns of the stylized portfolios that are missed by CAPM can be explained using the three factor model of Fama and French (1993) specified as follows.

The FF model is given by

$$R_{pt} - R_{ft} = a + b(R_{mt} - R_{ft}) + s(SMB_t) + \\ + h(LMH_t) + e_t, \quad (13)$$

where SMB_t is the monthly return on the size mimicking portfolio, LMH_t is the monthly return on the price-to-book mimicking portfolio, s and h are the sensitivity coefficients of SMB_t and LMH_t. The other two terms are the same as defined in equation (12).

We estimate *SMB* and *LMH* as follows. In each year of the sample period t, the stocks are split into two groups − big (B) and small (S) − based on whether their market capitalization at the end of December of every year in the sample period is above or below the median for the stocks of the companies included. The price to book equity ratio is calculated in this month for all the companies. The stocks are now split into two equal P/B groups (L and H). Then we construct four portfolios, namely S/L, S/H, B/L, B/H from the intersection of the two sizes and two P/B groups. Monthly equally-weighted return series are calculated for all portfolios from January of year t to December of year t (see Sehgal, Subramaniam and Morandiere (2012) for details).

The Fama and French model uses three explanatory variables for explaining the cross section of stock returns. The first is the excess market return factor that is the market index return minus the risk-free return. The second is the risk factor in returns relating to size − small minus big (*SMB*). The simple average of the monthly returns of the two big size portfolios (B/L, B/H) is subtracted from the average of the two small size portfolios (S/L, S/H) to get the monthly return of the SMB factor. This factor is free from value effects as it has about the same weighted-average price to book.

$$SMB = (S/L + S/H)/2 - (B/L + B/H)/2. \quad (14)$$

The third factor is related to value. LMH_t is constructed as follows such that it is independent of size factor:

$$LMH = (S/L + B/L)/2 - (S/H + B/H)/2. \quad (15)$$

If the intercepts from the FF regressions are insignificant and the intercepts from the CAPM regressions are significant, then this implies that the FF specification is able to capture cross sectional patterns in average stock returns that are missed by CAPM. On the other hand, statistically significant intercepts of FF model shall suggest missing risk factors which one needs to identify for creating a complete factor structure. Next we form cash sorted portfolios based on both balance sheet and cash flow statement definitions and conduct the asset pricing tests as has been explained above.

To test the attributes of the corner portfolios formed on accruals and cash flows we compute the average market cap, P/B, liquidity, profitability for the corner portfolios.

4. Empirical results

We begin the empirical results by providing mean values of earnings and its components on accrual sorted portfolios. We find evidence of a strong negative relation between accruals and cash flows, which is consistent with existing studies. The mean value of cash flows falls from 0.209 for the lowest accrual portfolio to -0.047 for the highest accrual portfolio. In contrast earnings performance is positively related to accrual which is also in conformity with prior work. The mean value of earnings is 0.076 for the lowest accruals portfolio and 0.109 for the highest accruals portfolio. The above relationships are reconfirmed by the values of the correlation coefficients calculated among earnings and its components. The correlation coefficient between earnings and accruals and between accruals and cash flows is 0.156 and -0.813, respectively.

Table 1. Mean value of earnings and its components for accrual sorted portfolios

	Portfolio accrual ranking				
	P1	P2	P3	P4	P5
Accruals	-0.132	-0.040	-0.0039	0.037	0.1567
Cash flows	0.209	0.112	0.079	0.055	-0.047
Earnings	0.076	0.071	0.074	0.091	0.109

Table 2 provides the results related to the first two hypotheses. Panel A states results from the estimation of equation (2) to establish the average level of persistence in earnings performance. The estimate of α_1 is 0.748. This is verifies that earnings performance is slowly mean reverting. The null hypothesis that earnings performance is purely transitory ($\alpha_1 = 0$) is rejected by a t-statistic of 67.388). Panel B provides the results for equation (3). We find that the coefficients of both accruals and cash flows are significant between zero and one, which means that

the two components contribute to the mean reversion of earnings. The coefficient of accruals (0.797) is smaller than that of cash flows (0.830) indicating that the mean reversion of accruals is faster than that for cash flows. A t-test rejects the hypothesis that the coefficients are equal. This evidence supports the hypothesis that accruals are less persistent than cash flows in shaping future earnings.

Table 2. Empirical results of the tests of persistence of earnings and its components

Panel A. Results of tests of persistence of earnings		
α_0	α_1	Adj. R^2
0.019	0.742	0.547
(14.620)*	(66.142)*	
Panel B. Results of the test of persistence of accruals and cash flow components		
γ_0	γ_1	γ_2
0.012	0.784	0.828
6.279*	45.694*	53.321*

Notes: t-statistics are in parentheses. *Denotes significance at the 5% level using two tailed t-test. T-test of $\gamma_1 = \gamma_2$, -3.34*, p-value = 0.000.

Whether the market accurately anticipates the persistence of earnings is considered first in Table 3, Panel A. The difference in the two estimated coefficients α_1 = 0.748 and α_1* = 1.04 is statistically insignificant using a LR test statistic (Chi-sq = 3.414, p-value = 0.0.065). This indicates that stock prices anticipate the average persistence of earnings performance, since the null hypothesis of market efficiency is not rejected. This is in line with results in Sloan (1996) where there is no evidence of a difference. Since stock prices correctly reflect the implications of current annual earnings for future annual earnings, it points towards the absence of a post earnings announcement drift in annual earnings. This means that the drift documented in Bernard and Thomas (1990) is probably unique to quarterly earnings changes and needs to be investigated in the Indian context.

Having established that accruals and cash flows have different implications for the persistence of earnings we investigate whether these implications are reflected in share returns, with the results reported in Table 3 Panel B. In the forecasting equation (equation 4), the coefficient on accruals is 0.779 and the coefficient on cash flows is 0.827. Market efficiency implies that the differing implications of the accrual and cash flow components of current earnings for future earnings should be reflected in stock prices i.e. γ_1* < γ_2*. The results from the stock return equation (equation (5)) support this statement. In the stock return equation the coefficient on accruals γ_1^* is 0.471 and the coefficient on cash flows is 0.961. The LR statistic is 4.097 accepting the null hypothesis of market efficiency. Therefore the results from Mishkin test indicate that on average the investors in India under price the information in accrual component of earnings ($\gamma_1^* < \gamma_1$) and overprice the information in the cash flow component of earnings ($\gamma_2^* > \gamma_2$).

Table 3. Empirical results of the tests of market efficiency

Panel A. Test of market efficiency using earnings			
Parameter	Estimate	Asymptotic standard error	p-value
α_0	0.019	0.001	0.000
α_1	0.748	0.011	0.000
α_1*	1.049	0.162	0.000
β	2.116	0.466	0.000
Panel B. Tests of market efficiency using accruals and cash flows			
Parameter	Estimate	Asymptotic standard error	p-value
γ_0	0.012	0.002	0.0000*
γ_1	0.780	0.017	0.0000*
γ_2	0.828	0.015	0.0000*
γ_1*	0.472	0.281	0.0935**
γ_2*	0.961	0.239	0.0001*
β	1.638	0.583	0.0050*

Market efficiency tests		
Null hypothesis	LR test statistic	p-value
$\gamma_1 = \gamma_1$*	χ_1^2 = 1.1955	0.2742
$\gamma_2 = \gamma_2$*	χ_1^2 = 0.3125	0.5762
$\gamma_1 = \gamma_1$* and $\gamma_2 = \gamma_2$*	χ_2^2 = 4.0977	0.1302

Notes: Test of market efficiency $\alpha_1 = \alpha_1$*. Likelihood ratio statistic chi-sq(1) = 3.41, p-value = 0.065. Chi-sq(1) = 3.84, Chi-sq(2) = 5.99. * Denotes significance at the 5% level. ** Denotes significance at the 10% level.

Since γ_1* < γ_2* investors think the accrual component of earnings is less persistent than the cash component. Hence investors seem to understand the lower quality of the accrual component of earnings and higher quality of the cash flow component of earnings. We find that the relative difference between γ_1 and γ_1* is far greater than the difference between γ_2 and γ_2*. This shows that investors who develop forecasts tend to underestimate the lower level of persistence in accruals and overestimate the higher level of persistence in cash flows. However, the level of underestimation in the former seems to be far stronger than the level of overestimation in latter. This pushes prices up resulting in higher returns for higher accruals portfolio.

A similar case of accruals under weighing and cash flows overweighing is also found in the case of the Indonesian market by Pincus et al. (2005) and accruals under weighing by Farshid et al. (2006) for China. Since Mishkin tests indicate accrual underweighing, hence there is evidence of positive returns

for an accrual underweighing strategy in India. We confirm this next by conducting the asset pricing tests on accrual sorted portfolios in Table 4.

Panel A shows the unadjusted excess returns obtained on accrual sorted portfolios. Contrary to existing studies on mature markets we find that accruals are positively associated with average returns. The high accrual firms report an average monthly excess return of 2.3% (*t*-stat = 2.54) while low accrual firms provide a monthly return of 1.9 % (*t*-stat = 2.53). This reiterates our results obtained from Mishkin tests which show that there is accruals underweighing. However the return differential of 0.04% between high and low accrual firms is not statistically significant.

Table 4. Empirical results for accrual sorted portfolios

Panel A. Unadjusted average monthly excess returns on accruals sorted portfolios									
P1		P2		P3		P4		P5	
Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat
0.019	2.533	0.015	2.050	0.019	2.510	0.019	2.384	0.023	2.542
Panel B. Empirical results based on one factor CAPM									
Portfolio	*a*	*b*		*t*(*a*)		*t*(*b*)		Adj. R^2	
P1	0.008	0.972		2.092		19.514		0.694	
P2	0.005	0.948		1.221		18.974		0.682	
P3	0.008	1.018		2.084		20.475		0.714	
P4	0.008	1.065		1.838		20.013		0.705	
Panel C. Empirical results for the three factor Fama French model based on market, size & value factors									
Portfolio	*a*	*b*	*S*	*H*	*t*(*a*)	*t*(*b*)	*t*(*s*)	*t*(*h*)	Adj. R^2
P1	0.000	0.927	0.487	0.130	0.170	21.022	6.414	1.648	0.769
P2	-0.003	0.897	0.444	0.209	-0.771	20.279	5.820	2.635	0.760
P3	-0.003	0.962	0.505	0.221	-0.094	22.911	6.974	2.943	0.803
P4	0	1.001	0.443	0.331	-0.193	21.847	5.614	4.029	0.789
P5	0.000	1.151	0.623	0.029	0.158	25.237	7.934	0.363	0.823

We next assess whether the accrual trading strategy is robust to return predictability associated with CAPM beta (Panel B) and three factor FF model (Panel C). The market model results show that an abnormal return of 0.8% per month (t = 2.09) is generated on low accrual firms and significant abnormal excess return of 1% per month on high accrual firms (*t*-stat = 2.22). The market beta is lower for the low accrual portfolio as compared to the high accrual portfolio, which is in contrast to equally high betas found by Sloan (1996) for extreme quintiles for the US. The CAPM fails to explain the returns in extreme quintile accrual sorted portfolios. Hence accruals seem to be an equity market anomaly when one uses the CAPM framework. Panel C shows that the FF model is successful in absorbing the extra normal returns that are missed by CAPM. This is made possible by additional contribution of the size factor. Slope of *SMB* value is low for low accrual portfolios vis-a-vis high accrual portfolios indicating that low accrual portfolios are big stocks contrary to small size firms in low accrual stocks found by other studies for mature markets. This is reconfirmed by looking at the average market cap of the corner portfolios (Table 5). LMH however does not play any significant role in explaining returns on accrual sorted portfolios. We find that low accrual stocks are low *P*/*B*, illiquid but not small as compared to the high accrual stocks (see Table 5). This is understandable as big fundamentally strong firms have stronger bargaining power compared to small firms and hence can generate more cash sales from customers. The corner portfolios do not provide significant abnormal returns in FF framework. Thus the accrual anomaly does not pose any serious challenge to asset pricing in the Indian context provided one uses multifactor benchmarks. In fact the role of accrual factor seems to be absorbed by role of size factor in returns. Our results are in line with Pincus et al. (2007) who did not find the presence of a significant accrual anomaly for India.

Table 5. Mean value of selected characteristics for five portfolios formed annually by assigning firms to quintiles based on the magnitude of accruals

	Portfolio accrual ranking				
	Lowest	P2	P3	P4	Highest
Size	23.388	23.370	23.250	23.231	23.17
Value	4.309	4.079	3.123	3.748	4.835
Liquidity	0.196	0.196	0.261	0.226	0.324

However our findings are in contrast with Sloan (1996) who finds that lower accrual based portfolios provide higher returns than higher accrual based portfolios. The Sloan (1996) results are an outcome of the fact that investors in general over estimate the lower persistence in accrual component and underestimate the higher persistence in cash component, the former being stronger than the latter resulting in overall overestimation of earnings.

When we repeated the asset pricing tests based on the cash flow statement definition for accruals, we find that results are similar[1]. The accrual anomaly seems to be explained by the Fama French model. Results are robust when we form separate portfolios based on positive and negative values of accruals[2].

Sorting firms based on the magnitude of cash flows presents a different picture. Table 6 presents mean values of earnings and its components on cash sorted portfolios. Earnings are positively related with cash flows and accruals are negatively related with cash flows. We find that returns are negatively related with cash flows which is in contrast to results obtained for the mature markets. Table 7 (Panel A) shows the unadjusted average monthly excess return of high cash flow firm (0.0144) is significantly lower vis-a-vis that of low cash flow firm (0.0257). A hedge strategy simultaneously taking a long position in the low cash flow portfolio and a short position in the high cash flow portfolio generates a significant positive abnormal return of 1.1% per month (*t*-stat = 2.23). This suggests the investors overweigh the persistence of cash flow component of current earnings. However these positive abnormal returns may also reflect other unidentified risk factors.

Table 6. Mean value of earnings and its components for cash flows sorted portfolios

	Lowest	P2	P3	P4	Highest
Cash flows	-0.084	0.028	0.076	0.130	0.260
Accruals	0.126	0.021	-0.004	-0.034	-0.094
Earnings	0.0415	0.049	0.071	0.096	0.1664

Table 7. Empirical results for cash flows sorted portfolios

Panel A. Unadjusted average monthly excess returns on cash flows sorted portfolios

P1		P2		P3		P4		P5	
Mean	t-stat	Mean	t-stat	Mean	t-stat	Mean	t-stat	Mean	t-stat
0.026	2.625	0.022	2.478	0.016	2.058	0.020	2.695	0.014	2.187

Panel B. Empirical results based on one factor CAPM

Portfolio	*a*	*b*	*t*(*a*)	*t*(*b*)	Adj. R^2
P1	0.012	1.224	2.230	18.915	0.681
P2	0.010	1.099	1.949	18.176	0.663
P3	0.005	1.020	1.248	20.909	0.723
P4	0.009	0.979	2.488	21.667	0.738
P5	0.005	0.878	1.542	23.577	0.768

Panel C. Empirical results for the three factor Fama French model based on market, size & value factors

Portfolio	*a*	*b*	*S*	*H*	*t*(*a*)	*t*(*b*)	*t*(*s*)	*t*(*h*)	Adj. R^2
P1	0	1.140	0.631	0.402	-0.031	21.524	6.918	4.239	0.794
P2	-0.001	1.024	0.574	0.356	-0.272	20.292	6.604	3.940	0.774
P3	-0.003	0.969	0.418	0.231	-0.736	22.453	5.620	2.984	0.791
P4	0.002	0.942	0.443	0.084	0.670	23.311	6.370	1.160	0.797
P5	0	0.868	0.426	-0.157	-0.075	26.381	7.519	-2.666	0.825

We test whether the cash flow trading strategy is robust to return predictability associated with the CAPM (Panel B) and the three factor FF model (Panel C). The CAPM is unable to explain the abnormal returns on the low cash flow portfolio. We then assess if the FF three factor model could absorb the returns on these cash flows sorted portfolios. The FF model is successful in absorbing the extra normal returns that are missed by CAPM. This is made possible by additional contribution of both size and value factors. Slope of *SMB* is high for low cash flow portfolios vis-a-vis high cash flow portfolios indicating that low cash flow portfolios are small stocks. The coefficient of *LMH* is also high for low cash flow stocks vis-a-vis high cash flow stocks implying that low cash flow stocks are value stocks and high cash flow firms are growth stocks. This is validated by looking at the average market cap and price-to-book ratios of the corner portfolios (Table 8). The corner portfolios do not provide significant abnormal returns in FF framework. Hence the cash flow anomaly is not very relevant in Indian market. We find that the characteristics of cash flow sorted portfolios are different from those based on accruals. While high accrual stocks are small, low cash stocks are small and value stocks.

Table 8. Mean value of selected characteristics for cash sorted portfolios

	Cash flows sorted portfolio				
	Lowest	P2	P3	P4	Highest
Size	22.742	22.879	23.313	23.446	24.026
Value	3.489	2.830	3.042	3.786	6.995
Liquidity	0.289	0.183	0.278	0.176	0.286

Summary and concluding remarks

Our results point towards a high level of earnings persistence and that this persistence is more attribut-

[1] Results have not been reported due to space constraints.
[2] Results have not been reported due to space constraints.

able to the cash flows component than the accruals component. Results from Mishkin tests indicate that information in earnings persistence is used by investors promptly since stock prices correctly reflect the implications of current earnings for future earnings. We find that on average investors in India underprice the information in accruals component of earnings and overprice the information in cash flows component of earnings which is in contrast to findings for developed markets. This accruals underweighing paves way for an accruals underweighing strategy in India. We find that high accrual portfolios tend to provide higher returns as compared to low accrual portfolios which is in contrast with the findings for developed markets. The accrual anomaly is not captured by one factor CAPM but is fully explained by the three factor Fama French model due to risk premiums on the size factor. Thus the accrual anomaly seems to be absorbed by the role of the size factor in returns in the Indian context. The results of the accrual anomaly are robust to choice of accrual measure (balance sheet or cash flow statement based). Investigating the cash flow anomaly, we find that returns are negatively related with the level of cash flows which is again in contrast to the findings for developed markets. However the anomaly is again missed by CAPM, but is absorbed by the contribution of both size and value factors in the Fama French model. Hence both the accrual anomaly and the cash flow anomaly do not pose serious challenge to asset pricing if one uses a multifactor framework.

From the perspective of portfolio managers, information in accruals/cash flows does not hold strong promise of providing extra normal returns in the Indian context. It may, therefore, be more relevant for them to pay attention to other prominent equity market anomalies such as size and momentum (see Sehgal et al. 2012). From the academic point of view, our results are in conflict with the findings for developed markets, suggesting differences in investor behaviour across markets. The present research contributes to asset pricing and behavior finance literature for emerging markets.

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