CHAPTER 5

ACCRUALS AND CASH FLOWS ANOMALIES: EVIDENCE FROM INDIAN STOCK MARKET

5.1 INTRODUCTION

The accruals anomaly has been widely researched for the US market and found to be pervasive. Fama and French (2008) point out that the accrual effect for the U.S market remains strong in all size groups, in cross-sectional regressions, and in tests based on portfolio sorts. They find that the ability of accruals to predict the cross-section of returns is not captured by standard benchmarks such as beta or size and book-to-market characteristics, the 3-factor model of Fama and French (1993). Some of the studies on accrual anomaly for other countries include Navissi, 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) on 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 chapter is twofold: first to investigate the persistence of earnings reported by the firms in the sample considered. Consistent with prior research, earning persistence is measured in the context of persistence from one period to the next. Then a test of whether earnings persistence is more attributed to cash flow or accruals component of earnings is conducted. Secondly the study examines 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 one year ahead earnings.

This study contributes to the existing literature in the following ways. Although Pincus, Rajgopal and Venkatachalam (2007) and Leippold and Lohre (2010) include the Indian case to study the accruals anomaly, they cover an earlier time period. Here the accruals anomaly is re-examined for a longer time period including the more
recent time period. Next the study tests the presence of cash flow anomaly which has
till now not been researched in the Indian context.

The chapter is organized as follows. The next section develops the hypothesis. Section
5.3 describes the data and their sources. Section 5.4 explains the methodology
followed. Section 5.5 gives the empirical results. The last section contains summary,
policy implications and concluding remarks.

5.2 TESTABLE HYPOTHESIS

The study attempts to test the following hypotheses.

- Hypothesis 5.1 There is persistence in current earnings performance.

- Hypothesis 5.2 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 5.3 Stock prices anticipate the average persistence of earnings
performance.

- Hypothesis 5.4 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 accruals component of
earnings.

Next it is assessed whether abnormal returns can be earned by taking trading
positions on the accruals and cash flows variable to provide additional confirmatory
evidence on hypothesis 5.1 and 5.2.

- Hypothesis 5.5 The observed accruals anomaly is fully captured by standard
risk models like CAPM or FF three factor model.

- Hypothesis 5.6 The cash flow anomaly is captured by standard risk models
like CAPM or FF three factor model.
5.3 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-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 of a company’s outstanding shares. It is calculated as the natural log of price times shares outstanding at 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 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.

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

For computing accruals Sloan (1996) employs the balance sheet method as follows

\[
\text{Accruals} = (\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - \text{Dep} \tag{5.1}
\]

where \(\Delta CA\) is the change in current assets.

\(\Delta Cash\) is the change in cash or cash equivalent.

\(\Delta CL\) is the change in current liabilities.

\(\Delta STD\) is the change in debt included in current liabilities.
\( \Delta TP \) is the change in tax payables, and \( Dep \) is the depreciation and amortization expense.

Accruals is the change in non-cash current assets, less the change in current liabilities (exclusive of short term debt and taxes payable), less depreciation expense.

Following Sloan (1996) earnings in the study are measured by operating income after depreciation\(^1\). The cash flow component of earnings is measured as the difference between earnings and the accruals component of earnings. Earnings, and its components i.e. accruals and cash flows are standardized by average total assets i.e. average of beginning and end of calendar year book value of total assets. (This is done to facilitate cross sectional and temporal comparisons of magnitude of earnings and the relative magnitude of accruals and cash components of earnings. Accruals, cash flows and earnings are standardized by firm size to facilitate such comparisons. Measure for firm size used is average of beginning and end of year book value of total assets (Sloan, 1996)).

### 5.4 METHODOLOGY

#### 5.4.1 Test of Persistence in Earnings and Its Components

Following Sloan (1996) 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 is used.

\[
Earnings_{t+1} = \alpha_0 + \alpha_1\text{Earnings}_t + \epsilon_{t+1} \tag{5.2}
\]

\[
Earnings_{t+1} = \gamma_0 + \gamma_1 \text{accruals}_t + \gamma_2 \text{cashflows}_t + \epsilon_{t+1} \tag{5.3}
\]

Equation 5.2 estimates the average persistence of current earnings on future earnings\(^2\). Since earnings are defined as operating income scaled by total assets so \( \alpha_1 \) measures the persistence of the accounting rate of return on assets. As accounting rates of return are mean reverting, \( \alpha_1 \) is less than unity (Sloan, 1996, pg.297). This equation constraints the coefficients on the cash and the accruals components of earnings to be equal. However the accruals anomaly arises from the different persistence of accruals
and cash flows components of earnings. The specification required to test this is equation 5.3 which decomposes current earnings into accruals and cash flows components of earnings. The smaller coefficient on accruals \((\gamma_1)\) relative to cash flows \((\gamma_2)\) reflects the lower persistence of earnings performance attributable to the accruals component of earnings. If cash flows have greater implications for future earnings it is expected that \(\gamma_2 > \gamma_1\).

### 5.4.2 Market Efficiency Tests

Sloan (1996) was the first to use the Mishkin (1983) framework to test the accruals anomaly in the accounting literature. Following him a number of studies have adopted this approach to test capital market efficiency. The Mishkin test is applied as discussed in Sloan (1996) and Kraft, Leone and Wasley (2007, pg.7) to test the second hypothesis as follows:

\[
E_m(Earnings_{t+1} | \phi_t) = E(Earnings_{t+1} | \phi_t) \tag{5.4}
\]

where \(\phi_t\) is the information available at \(t\), \(E_m(Earnings_{t+1} | \phi_t)\) 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 \(\phi_t\). Equation (5.4) indicates that the market’s expectation of earnings is equal to the true expectation of earnings conditional on all past information. Market efficiency implies

\[
E(R_{t+1}) = R_{t+1} - E_m(R_{t+1} | \phi_t) = 0 \tag{5.5}
\]

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 \(t\). Eq. (5.5) implies \(R_{t+1}\) should be uncorrelated with past information.

From equations (5.4) and (5.5), the efficient-markets condition can be written as:

\[
R_{t+1} = \beta (Earnings_{t+1} - E(Earnings_{t+1} | \phi_t)) + e_{t+1} \tag{5.6}
\]

where \(e_{t+1}\) is a disturbance term and \(E(e_{t+1} | \phi_t) = 0\), \(\beta\) 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 equation in (5.2) and
the rational pricing equation in (5.6) the test for market rationality is based on the following system of equations:

\[
\text{Earnings}_{t+1} = \alpha_0 + \alpha_1 \text{Earnings}_t + \nu_{t+1} \tag{5.7}
\]

\[
\text{AR}_{t+1} = \beta (\text{Earnings}_{t+1} - \alpha_0 - \alpha_1 \cdot \text{Earnings}_t) + \varepsilon_{t+1} \tag{5.8}
\]

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 equation in (5.7) uses past information (Earnings\(_t\)) to forecast future earnings, Earnings\(_{t+1}\). The weight placed on past earnings, \(\alpha_1\), is an objective measure of how earnings\(_t\) is related to future earnings. By joint nonlinear estimation of eq. (5.7) and eq. (5.8) one can use information in returns to infer how the market used information in Earnings\(_t\) to forecast Earnings\(_{t+1}\). Eq. (5.4) implies that the market’s subjective expectation of earnings conditional on past information (which one infers from eq. (5.7)), should be equal to the objective expectation of earnings which one can estimate in eq. (5.8). 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 earnings (equation 5.9) and the rational expectations pricing specification (equation 5.10) provide the following system.

\[
\text{Earnings}_{t+1} = \gamma_0 + \gamma_1 \text{accruals}_t + \gamma_2 \text{cashflows}_t + \varepsilon_{t+1} \tag{5.9}
\]

\[
\text{AR}_{t+1} = \beta (\text{Earnings}_{t+1} - \gamma_0 - \gamma_1 \cdot \text{accruals}_t - \gamma_2 \cdot \text{cashflows}_t) + \nu_{t+1} \tag{5.10}
\]

Equation 5.9 is a forecasting equation which estimates the forecasting coefficient of accruals and cash flows component for predicting one year ahead earnings. Equation 5.10 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. If markets are efficient the two coefficients should not be statistically different from each other. The dual constraints for market efficiency therefore are $\gamma_1^*$ from the returns equation (5.10) is not different than $\gamma_1$ from the forecasting equation (5.9) and $\gamma_2^*$ from the returns equation (5.10) is not different than $\gamma_2$ from the forecasting equation (5.9) 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 accruals sorted portfolios. If this condition is defied accruals anomaly will occur. Since the test of second hypothesis indicates that $\gamma_1 < \gamma_2$, so market efficiency requires $\gamma_1^* < \gamma_2^*$. Accruals(cash flows) mispricing is observed if the market assigns a significantly larger or smaller coefficient than implied in the association between accruals(cash flows) and future earnings.

The two systems ((equation 5.7, 5.8) and (equations 5.9, 5.10)) are estimated using non-linear Generalised Least Squares (GLS). Market efficiency is tested using the following likelihood ratio test (asymptotically distributed as $\chi^2(q)$ under the null hypothesis):

$$2n(ln(SSR^c/SSR^u))$$

(5.11)

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.
5.4.3 Asset Pricing Tests

While the Mishkin test identified whether the accruals anomaly exists in a statistical sense, it provides no indication of its economic significance. To address this asset pricing tests are conducted next.

Stocks are grouped into five portfolios based on the magnitude of accruals. 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). The portfolios have been constructed to be equally weighted as suggested by Lakonishok, Shliefer and Vishny (1994), since they contain less estimation errors compared to the value weighted portfolios. Fama and French (1996) document that the three-factor model does a better job in explaining equally weighted portfolios than value weighted portfolios. P1 is the portfolio consisting of 20% of companies with lowest attribute while P5 consists of top 20% companies with highest attribute under consideration. P1 and P5 are referred henceforth as corner portfolios in the study. The portfolios are re-balanced at the end of December of year t. A year is defined as calendar year from January to December. Sample securities are sorted in December of each year beginning in December 1996 and portfolio formation process repeated till December 2009.

Companies with missing value of the characteristic are excluded from analysis. It is observed that a large number of firms have negative accruals. While forming accruals sorted portfolios the study used Sloan (1996)’s method 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 first step of the methodology the unadjusted mean excess returns across the accruals sorted portfolios are observed and the relationship between accruals and returns is ascertained.

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

\[ R_{pt} - R_{ft} = a + b (R_{mt} - R_{ft}) + e_t \]  

(5.12)
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.

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. Significant intercepts imply that CAPM fails to explain the returns of the test portfolios. Then the study evaluates 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

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

(5.13)

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 same as defined in equation (5.12).

The SMB and LMH are estimated as follows. In each year of the sample period t-1, 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 four portfolios are constructed viz.
S/L, S/H, B/L, B/H from the intersection of the two size and two P/B groups. Monthly equally weighted return series are calculated for all portfolios from Jan of year t to December of year t.

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.

\[
SMB=\frac{(S/L+S/H)}{2}-\frac{(B/L+B/H)}{2} \tag{5.14}
\]

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

\[
LMH=\frac{(S/L+B/L)}{2}-\frac{(S/H+B/H)}{2} \tag{5.15}
\]

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. Greater sensitivity of sample portfolio returns to the size and value risk factors is shown by higher factor loadings i.e s and h for these factors.

Next cash sorted portfolios are formed the asset pricing tests are conducted as has been explained above.

To test the attributes of the corner portfolios formed on accruals and cash flows the study computes the average market cap, P/B, liquidity, profitability for the corner portfolios.
5.5 EMPIRICAL RESULTS

The mean values of earnings and its components i.e. accruals and cash flows, on accruals sorted portfolios are reported in Table 5.1. There is 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 accruals portfolio to -0.047 for the highest accruals portfolio. In contrast earnings performance is positively related to accruals, 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. Also the highest accruals portfolio has significantly higher earnings than the lowest 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 5.2 provides the results related to the first two hypotheses. Panel a states results from the estimation of equation 5.2 to establish the average level of persistence in earnings performance. The estimate of $\alpha_1$ is 0.748. This verifies that earnings performance is slowly mean reverting. Panel b provides the results for equation 5.3 which does not constrain the persistence coefficients on the accruals and cash flow component of earnings to be equal. 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 (0.79) 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 (t-stat=-3.34, p-value=0, for $\gamma_1=\gamma_2$). This evidence supports the hypothesis that accruals are less persistent than cash flows in shaping future earnings. On the whole the evidence that found on earnings persistence and the fact the persistence is more attributable to cash flows is similar to the evidence reported for developed markets.

Whether the market accurately anticipates the persistence of earnings is considered first in Table 5.3 Panel a. The coefficient $\alpha_1$ represents the estimated persistence of earnings based on earnings numbers while the coefficient $\alpha_1^*$ represents the
Persistence of earnings implicit in market prices. If the market accurately assesses the persistence of earnings the coefficients should be the same. Table 5.4 indicates that the difference in the two estimated coefficients $a_1 = 0.748$ and $a_1^* = 1.04$ is statistically insignificant using a LR test statistic (Chi-sq = 3.414, p-value = 0.065) at 5% level of significance. 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 was 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 it is next investigated whether these implications are reflected in share returns, with the results reported in Table 5.3, Panel b. The table reports the results of non-linear GLS regression of future abnormal returns on components of current earnings. In the forecasting equation (equation 5.9), the coefficient on accruals is 0.784 and the coefficient on cash flows is 0.828. Market efficiency implies that the differing implications of the accruals and cash flow components of current earnings for future earnings should be reflected in stock prices i.e. $\gamma_1^* < \gamma_2^*$. The results from the stock return equation (equation 5.10) show that the coefficient on accruals $\gamma_1^*$ is 0.472 and the coefficient on cash flows $\gamma_2^*$ is 0.961. The LR statistic is 4.08 accepting the null hypothesis of market efficiency.

Therefore the results from Mishkin test indicate that on average the investors in India underprice the information in accruals component of earnings ($\gamma_1^* < \gamma_1$) and overprice the information in the cash flow component of earnings ($\gamma_2^* > \gamma_2$). Since $\gamma_1^* < \gamma_2^*$ investors think the accruals component of earnings is less persistent than the cash component. Hence investors seem to understand the lower quality of the accruals component of earnings and higher quality of the cash flow component of earnings. It is observed that the relative difference between $\gamma_1$ and $\gamma_1^*$ is far greater than the difference between $\gamma_2$ and $\gamma_2^*$. This shows that investors who are developing 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.

Accruals under weighing and cash flows overweighing is found in the case of the Indonesian market by Pincus, Rajgopal and Venkatachalam (2007) and accruals under weighing by Navissi et al(2006) for China. Since the Mishkin tests indicate accruals underweighting, hence there is evidence of positive returns for an accruals underweighting strategy in India. This is confirmed next by conducting the asset pricing tests on accruals sorted portfolios in Table 5.4. Panel a shows the unadjusted excess returns obtained on accruals sorted portfolios. The results show that accruals are positively associated with average returns which is contrary to existing studies on mature markets. The high accruals firms report an average monthly excess return of 2.3% (t-stat=2.54) while low accruals firms provide a monthly return of 1.9 % (t-stat=2.53). This reiterates the results obtained from Mishkin tests which show that there is accruals under weighing. These results are in line with Leippold and Lohre (2010) who finds that the monthly average buy and hold returns on low accruals sorted portfolios generate 1.9% per month while high accruals stocks generate 2.2% per month from May 1994 to April 2008 for the Indian market.

Next it is assessed whether the accruals 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-stat=2.09) is generated on low accruals firms and significant abnormal excess return of 1% per month on high accruals firms (t-stat=2.22). The market beta is lower for the low accruals portfolio as compared to the high accruals 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 accruals sorted portfolios. Hence accruals seem to be an equity market anomaly when one uses the CAPM framework. Next the study evaluates if the FF three factor model could absorb the returns on these accruals sorted portfolios which is missed by CAPM. Table 5.8 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 accruals portfolios vis-a-vis high accruals portfolios indicating that low accruals portfolios are big stocks contrary to small size firms in low accruals stocks found by other studies for mature markets. This is reconfirmed by looking at the average market cap of the corner portfolios (Table 5.5). LMH however does not play any significant role in explaining returns on accruals sorted portfolios. It is observed that low accruals stocks are low P/B, illiquid but not small as compared to the high accruals stocks (in line with Leippold and Lohre (2010) (see Table 5.5). 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 accruals anomaly does not pose any serious challenge to asset pricing in the Indian context provided one uses multifactor benchmarks. In fact the role of accruals factor seems to be absorbed by role of size factor in returns. These results are in line with Pincus, Rajgopal and Venkatachalam (2007) who did not find the presence of a significant accruals anomaly for India.

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

Sorting firms based on the magnitude of cash flows (defined on balance sheet definition) presents a different picture. Table 5.6 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. It is observed that returns are negatively related with cash flows which is in contrast to results obtained for the mature markets. Table 5.7 Panel a shows that firms with high cash flows exhibit the lowest performance in future returns. The unadjusted average monthly excess return of high cash flow firm (0.014) is significantly lower vis-à-vis that of low cash flow firm (0.0267). 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. A test of 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) is conducted. The CAPM is unable to explain the abnormal returns on the low cash flow portfolio. It is then assessed 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 in the FF model. 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 5.8). The corner portfolios do not provide significant abnormal returns in FF framework. Hence the cash flow anomaly is not very relevant in Indian market. It is found that that the characteristics of cash flow sorted portfolios are different from those based on accruals. While high accruals stocks are small, low cash stocks are small and value stocks.

5.6 CONCLUDING REMARKS

The results point towards a high level of earnings persistence and that this persistence is more attributable to the cash flows component than the accruals component. Results from Mishkin tests indicate that information in earnings persistence is utilized by investors promptly since stock prices correctly reflect the implications of current earnings for future earnings. It is observed that on average investors in India under price the information in accruals component of earnings and over price the information in cash flows component of earnings which is in contrast to findings for developed markets. High accruals portfolios tend to provide higher returns as compared to low accruals portfolios which is in contrast with the findings for developed markets. The accruals 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 accruals anomaly seems to be absorbed by the role of the size factor in returns in the Indian context.

Investigating the cash flow anomaly, it is seen 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 accruals 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. From the academic point of view, these results are in conflict with the findings for developed markets, suggesting differences in investor behavior across markets. The present research contributes to asset pricing and behavior finance literature for emerging markets.
NOTES

1. It excludes extraordinary items, interest expense and tax expense. Debt in current liabilities is excluded from current liabilities to calculate accruals because it relates to financing activities and not operating activities. The definition of earnings used excludes tax expense, so income taxes payable are excluded from definition of accruals for consistency with definition of earnings employed in the empirical tests (Sloan(1996, pg.293). Sloan’s(1996) definition focuses on changes in current net operating assets.

2. Firm specific subscripts are suppressed.

3. The smaller the component from the other, the faster it is to mean revert, indicating less persistence of the component (see Koerniadi & Tourani-Rad, 2005).

4. Both systems of equations are estimated using random effects panel OLS method, which has been chosen over the fixed effects method based on Wu-Hausman statistic. For equation 5.2, Chi-sq(1)=0.917, p-value=0.338, for equation 5.3, Chi-sq(1)=2.088, p-value=0.352. Annual data over the study period has been used for the panel OLS tests and Mishkin test.

5. The coefficient of $\alpha_1$ obtained here is identical to that estimated from OLS regression in Table 5.2.

6. Although market efficiency is accepted at 5% level of significance; the value of the chi-square test statistic is very close to critical value at 10% level of significance and gets rejected at 15% level of significance. It is observed that the gap between starred and unstarred coefficients is very large. Hence the results are interpreted in economic significance terms. It is concluded that there is accruals underweighing and cash flows overweighing.
Table 5.1 Mean value of earnings and its components for accruals sorted portfolios.

<table>
<thead>
<tr>
<th></th>
<th>Accruals sorted portfolios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
</tr>
<tr>
<td>Accruals</td>
<td>-0.132</td>
</tr>
<tr>
<td>Cash flows</td>
<td>0.209</td>
</tr>
<tr>
<td>Earnings</td>
<td>0.076</td>
</tr>
</tbody>
</table>

The table shows average values of earnings and its components for portfolios formed on the basis of accruals. P1 is the portfolio consisting of 20% of companies with lowest accruals while P5 consists of top 20% companies with highest accruals.
Table 5.2 Empirical results of the tests of persistence of earnings and its components

Panel a. Results of tests of persistence of earnings

<table>
<thead>
<tr>
<th>$\alpha_0$</th>
<th>$\alpha_1$</th>
<th>Adj.$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.018</td>
<td>0.748</td>
<td>0.556</td>
</tr>
<tr>
<td>(4.75)*</td>
<td>(67.38)*</td>
<td></td>
</tr>
</tbody>
</table>

$t$-statistics in parentheses. * Denotes significance at the 5% level using a two tailed $t$-test. Number of observations=3627

Panel b. Results of the test of persistence of accruals and cash flow components.

<table>
<thead>
<tr>
<th>$\gamma_0$</th>
<th>$\gamma_1$</th>
<th>$\gamma_2$</th>
<th>Adj.$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.011</td>
<td>0.790</td>
<td>0.830</td>
<td>0.632</td>
</tr>
<tr>
<td>(2.46)*</td>
<td>(47.17)*</td>
<td>(55.17)*</td>
<td></td>
</tr>
</tbody>
</table>

(t-statistics in parentheses). * Denotes significance at the 5% level using a two tailed $t$-test. Included observations=1787

$t$-test of $\gamma_1 - \gamma_2$, -3.34*, p-value=0

Panel a of the table reports the results from OLS regression of future earnings performance on current earnings performance using the following equation

$$Earnings_{t+1} = \alpha_0 + \alpha_1 Earnings_t + \epsilon_{t+1}$$

Panel b of the table reports the results from OLS regression of future earnings performance on the accruals and cash flow components of current earnings performance using the following equation.

$$Earnings_{t+1} = \gamma_0 + \gamma_1 accruals_t + \gamma_2 cashflows_t + \epsilon_{t+1}$$
Table 5.3  Empirical Results of the Tests of Market Efficiency

Panel a. Test of Market Efficiency using Earnings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Asymptotic standard error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha_0$</td>
<td>0.019</td>
<td>0.001</td>
<td>0.000</td>
</tr>
<tr>
<td>$\alpha_1$</td>
<td>0.748</td>
<td>0.011</td>
<td>0.000</td>
</tr>
<tr>
<td>$\alpha_1^*$</td>
<td>1.049</td>
<td>0.162</td>
<td>0.000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2.116</td>
<td>0.466</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Test of market efficiency: $\alpha_1 = \alpha_1^*$

Likelihood ratio statistic chi-sq (1) = 3.41, p-value 0.065

Included observations=3400


<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Asymptotic standard error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma_0$</td>
<td>0.012</td>
<td>0.002</td>
<td>0.0000</td>
</tr>
<tr>
<td>$\gamma_1$</td>
<td>0.784</td>
<td>0.017</td>
<td>0.0000</td>
</tr>
<tr>
<td>$\gamma_2$</td>
<td>0.828</td>
<td>0.015</td>
<td>0.0000</td>
</tr>
<tr>
<td>$\gamma_1^*$</td>
<td>0.472</td>
<td>0.281</td>
<td>0.0935</td>
</tr>
<tr>
<td>$\gamma_2^*$</td>
<td>0.961</td>
<td>0.239</td>
<td>0.0001</td>
</tr>
<tr>
<td>$\beta$</td>
<td>1.638</td>
<td>0.583</td>
<td>0.0050</td>
</tr>
</tbody>
</table>
Market Efficiency Tests

<table>
<thead>
<tr>
<th>Null hypothesis</th>
<th>LR test statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma_1 = \gamma_1^* ) and ( \gamma_2 = \gamma_2^* )</td>
<td>( \chi^2_2 = 4.09 )</td>
<td>0.130</td>
</tr>
</tbody>
</table>

Included observations=1787

Panel a of the table reports results from nonlinear GLS estimation of the stock price reaction to information in current earnings about future earnings using the following equations.

\[
\text{Earnings}_{t+1} = \alpha_0 + \alpha_1 \text{Earnings}_t + \nu_{t+1}
\]

\[
\text{AR}_{t+1} = \beta (\text{Earnings}_{t+1} - \alpha_0 - \alpha_1 \text{Earnings}_t) + \nu_{t+1}.
\]

Where the former is the earnings forecasting equation and the latter is the rational pricing equation.

Panel b reports the results from nonlinear GLS estimation of the stock price reaction to information in the accruals and cash flow components of current earnings about future earnings using the following system of equations.

\[
\text{Earnings}_{t+1} = \gamma_0 + \gamma_1 \text{accruals}_t + \gamma_2 \text{cashflows}_t + \epsilon_{t+1}
\]

\[
\text{AR}_{t+1} = \beta (\text{Earnings}_{t+1} - \gamma_0 - \gamma_1 \text{accruals}_t - \gamma_2 \text{cashflows}_t) + \nu_{t+1}.
\]

where the former is the forecasting specification for future earnings using accruals and cash flows and the latter is the rational expectations pricing specification.
Table 5.4 Empirical results for accruals sorted portfolios

Panel a. Unadjusted average monthly excess returns on accruals sorted portfolios

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th></th>
<th>P5</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>t-stat</td>
<td>Mean</td>
<td>t-stat</td>
</tr>
<tr>
<td></td>
<td>0.019</td>
<td>2.533</td>
<td>0.023</td>
<td>2.542</td>
</tr>
</tbody>
</table>

Panel b. Empirical results based on one factor CAPM

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>a</th>
<th>b</th>
<th>t(a)</th>
<th>t(b)</th>
<th>Adj. R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>0.008</td>
<td>0.972</td>
<td>2.092</td>
<td>19.514</td>
<td>0.694</td>
</tr>
<tr>
<td>P5</td>
<td>0.010</td>
<td>1.194</td>
<td>2.222</td>
<td>22.371</td>
<td>0.749</td>
</tr>
</tbody>
</table>

Panel c. Empirical Results for the three factor Fama French Model based on market, size and value factors.

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>a</th>
<th>b</th>
<th>s</th>
<th>h</th>
<th>t(a)</th>
<th>t(b)</th>
<th>t(s)</th>
<th>t(h)</th>
<th>Adj.R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>0.000</td>
<td>0.927</td>
<td>0.487</td>
<td>0.130</td>
<td>0.170</td>
<td>21.022</td>
<td>6.414</td>
<td>1.648</td>
<td>0.769</td>
</tr>
<tr>
<td>P5</td>
<td>0.000</td>
<td>1.151</td>
<td>0.623</td>
<td>0.029</td>
<td>0.158</td>
<td>25.237</td>
<td>7.934</td>
<td>0.363</td>
<td>0.823</td>
</tr>
</tbody>
</table>

Panel a of the table shows unadjusted average monthly excess returns for accruals sorted portfolios. P1 is the portfolio consisting of 20% of companies with lowest accruals while P5 consists of top 20% companies with highest accruals.

Panel b of the table reports the regression estimates from time series regressions of excess portfolio returns on accruals sorted portfolios on the returns for the market factor. The CAPM has been operationalised using the excess return version of the market model as stated below:

\[
R_{pt} - R_{ft} = a + b (R_{mt} - R_{ft}) + e_t
\]

Panel c of the table shows the excess returns on accruals sorted portfolios regressed on the returns for the market \((R_{mt} - R_{ft})\) factor and the two proxy portfolios that mimic for size (SMB) and price to book equity (LMH) factors.

\[
R_{pt} - R_{ft} = a + b (R_{mt} - R_{ft}) + s (SMB_t) + h (LMH_t) + e_t
\]
Table 5.5 Mean value of selected characteristics for portfolios formed annually by assigning firms to quintiles based on the magnitude of accruals

<table>
<thead>
<tr>
<th></th>
<th>Accruals sorted portfolios</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
<td>P5</td>
<td></td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>23.388</td>
<td>23.17</td>
<td></td>
</tr>
<tr>
<td><strong>Value</strong></td>
<td>4.309</td>
<td>4.835</td>
<td></td>
</tr>
<tr>
<td><strong>Liquidity</strong></td>
<td>0.196</td>
<td>0.324</td>
<td></td>
</tr>
</tbody>
</table>

The table shows the average size, price to book and liquidity for portfolios formed on the basis of accruals.

Table 5.6 Mean value of earnings and its components for cash flows sorted portfolios

<table>
<thead>
<tr>
<th></th>
<th>Cash flows sorted portfolios</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
<td>P5</td>
<td></td>
</tr>
<tr>
<td><strong>Cash flows</strong></td>
<td>-0.084</td>
<td>0.260</td>
<td></td>
</tr>
<tr>
<td><strong>Accruals</strong></td>
<td>0.126</td>
<td>-0.094</td>
<td></td>
</tr>
<tr>
<td><strong>Earnings</strong></td>
<td>0.0415</td>
<td>0.1664</td>
<td></td>
</tr>
</tbody>
</table>

The table shows average values of earnings and its components for portfolios formed on the basis of cash flows. P1 is the portfolio consisting of 20% of companies with lowest cash flows while P5 consists of top 20% companies with highest cash flows.
Table 5.7 Empirical results for cash flows sorted portfolios

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

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th></th>
<th>P5</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.026</td>
<td>t-stat</td>
<td>2.625</td>
<td>t-stat</td>
</tr>
<tr>
<td></td>
<td>0.014</td>
<td></td>
<td>2.187</td>
<td></td>
</tr>
</tbody>
</table>

Panel b. Empirical results based on one factor CAPM

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>a</th>
<th>b</th>
<th>t(a)</th>
<th>t(b)</th>
<th>Adj. R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>0.012</td>
<td>1.224</td>
<td>2.230</td>
<td>18.915</td>
<td>0.681</td>
</tr>
<tr>
<td>P5</td>
<td>0.005</td>
<td>0.878</td>
<td>1.542</td>
<td>23.577</td>
<td>0.768</td>
</tr>
</tbody>
</table>

Panel c. Empirical Results for the three factor Fama French Model based on market, size and value factors.

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>a</th>
<th>b</th>
<th>s</th>
<th>h</th>
<th>t(a)</th>
<th>t(b)</th>
<th>t(s)</th>
<th>t(h)</th>
<th>Adj.R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>0</td>
<td>1.140</td>
<td>0.631</td>
<td>0.402</td>
<td>-0.031</td>
<td>21.524</td>
<td>6.918</td>
<td>4.239</td>
<td>0.794</td>
</tr>
<tr>
<td>P5</td>
<td>0</td>
<td>0.868</td>
<td>0.426</td>
<td>-0.157</td>
<td>-0.075</td>
<td>26.381</td>
<td>7.519</td>
<td>-2.666</td>
<td>0.825</td>
</tr>
</tbody>
</table>

Panel a of the table shows unadjusted average monthly excess returns for stocks portfolios formed on the basis of cash flows. P1 is the portfolio consisting of 20% of companies with lowest cash flows while P5 consists of top 20% companies with highest cash flows.

Panel b of the table reports the regression estimates from time series regressions of excess portfolio returns on cash flows sorted portfolios on the returns for the market factor. The CAPM has been operationalised using the excess return version of the market model as stated below:

\[ R_{pt} - R_{ft} = a + b (R_{mt} - R_{ft}) + e_t \]

Panel c of the table shows the excess returns on cash flows sorted portfolios regressed on the returns for the market \( R_{mt} - R_{ft} \) factor and the two proxy portfolios that mimic for size (SMB) and price to book equity (LMH) factors.

\[ R_{pt} - R_{ft} = a + b (R_{mt} - R_{ft}) + s (SMB_t) + h (LMH_t) + e_t \]
Table 5.8 Mean value of selected characteristics for cash sorted portfolios

<table>
<thead>
<tr>
<th></th>
<th>Cash flows sorted portfolios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
</tr>
<tr>
<td>Size</td>
<td>22.742</td>
</tr>
<tr>
<td>Value</td>
<td>3.489</td>
</tr>
<tr>
<td>Liquidity</td>
<td>0.289</td>
</tr>
</tbody>
</table>

The table shows the average size, price to book and liquidity for portfolios formed on the basis of cash flows.