CHAPTER 3
SURVEY OF LITERATURE

3.1 INTRODUCTION

The literature on asset pricing anomalies has for long been an area of interest for both theoretical and empirical research. This consists of the finding of new anomalies, using a growing arsenal of econometric techniques for detecting such anomalies and, an evolving nature of theories to explain these anomalies as well. In this chapter a brief review of some of the existing studies in this area has been done. The anomalies which shall be covered in this study are size, value, short term prior returns, liquidity, accruals, profitability, stock issues and stock repurchases. Research which has examined size, value and momentum/contrarian anomalies is discussed in Section 3.2. Extensive literature already exists on these anomalies for both mature and emerging markets including India. However literature on liquidity, accruals, profitability and net stock issues anomalies is very recent and sparse. These have been examined in Sections 3.3 to 3.6. The review has been divided into studies on mature capital markets and studies on emerging markets within each anomaly group, depending on availability of literature. Within emerging markets focus is on India. The last section discusses the research gap. It is observed that papers on equity market anomalies differ in the main objectives of the study, the anomalies tested, the econometric methodology used, time period considered for study, variable definitions and thus in some cases also the conclusion.

3.2 SIZE ANOMALY, VALUE ANOMALY AND PRIOR RETURN PATTERNS

In the following studies size, value and momentum/contrarian anomalies either alone or in combination have been examined in various markets.
3.2.1 Mature Markets

**Schiereck, De Bondt and Weber (1999)** study 357 companies listed on Frankfurt stock exchange between Jan 1961-Dec 1991. Momentum and contrarian strategy beat a passive approach which invested in the market index. Beta, risk or firm size do not account for the results. These results for Germany match the findings for the US. They examine stock price reaction to common factors and firm specific information and present a decomposition that directly relates the different components of contrarian profits to their sources identified based on how stock prices respond to information. They report that stock prices on average react with a delay to common factors but overreact to firm specific information.

**Gaunt (2004)** studies the evidence of size effect, BE/ME effect and the application of the Fama and French three factor model in the Australian market. He finds that the betas are less than one which is contrary to Fama and French who find beta to be close to one. Risk tends to be greater for smaller size firms and low BE/ME ratios like the findings of Fama and French. There is evidence that there is a monotonic increase in the HML factor loading from low to high BE/ME portfolios implying that the HML factor plays a significant role in asset pricing. His sample study finds an inconsequential small firm effect and no large firm effect. He finds an improvement in the explanatory power of the three factor model over and above the one factor CAPM when compared to prior studies in the Australian setting.

**Swanson and Lin (2005)** study behavior of the US investor in 18 largest emerging markets and 18 largest developed markets from December 1992-June 2003. They study momentum profits from strategy of buying past winners and selling past losers, measure investment performance for US investor, the effects of adjusting for risk and for momentum effects in evaluating investment performance. The investment performance is evaluated using three measures of returns: raw returns, risk and momentum adjusted returns. US investors employ winner momentum strategy in emerging markets for all time horizons, in developed markets for short and medium term horizons and in global (combined) markets for short and middle term horizons. They employ losers-contrarian strategies for emerging, developed and combined markets at all time horizons. US investor performance is more momentum driven than
risk driven in emerging markets and in combined markets than in developed markets. When viewed from a global perspective including emerging markets and developed markets performance results are slightly better than for emerging markets alone and appreciably better than for developed markets alone. They find significant differences between emerging markets and developed markets trading behavior. Results show that any superior returns result more from momentum trading effects than from risk taking effects and that long term performance is superior to short term and medium term performance.

Pham and Long (2007) construct simple benchmarks for Fama French factors in Japanese market by using 4 commercially available Daiwa style indexes. They use the Daiwa small value index (DSVI), Daiwa small growth index (DSGI), Daiwa large growth index (DLGI). The construction of these indexes is similar with the nature of the original Fama French (1993) constructs. The performance of benchmarks choice is evaluated through a direct and simple GMM test. Utilizing a sample size of 33 industry indexes of all common stocks listed on Tokyo stock exchange they find that results based on formal asset pricing test suggest that the three factor model cannot be rejected over the full sample period (1984-2004) and three sub periods. Size and book to market factors were able to outperform market over this period. During the sub period of 1990-1998, there is a reversal of size effect.

Antoniou, Lam and Paudyal (2007) study three major European markets viz. France, Germany and UK to test if business cycle variables and behavior biases can explain profitability of momentum trading. They analyze stocks listed on Paris bourse (France), Frankfurt stock exchange and London stock exchanges from Jan 1977-Dec 2002. The six–six price momentum strategy is statistically significant in all countries. They apply the conditional asset pricing model to assess possible business cycle patterns within momentum profits in European markets. Also investigate if momentum profits can be predicted using business cycle variables. Their results show that predictive regression framework cannot capture momentum profits in these markets. Using conditional asset pricing model they find that momentum profits in Europe are largely attributable to asset mispricing that varies with global business conditions. Their model shows a mixed role for behavioral variables across countries.
This means that behavior of investors is less likely to be correlated to business cycles and unlikely to explain momentum profits. The profitability of momentum strategy could be explained by risk factors connected with business cycle.

**Nartea, Ward and Djajadikerta (2009)** compare the performance of CAPM, Fama French and Carhart’s model in explaining stock returns in New Zealand stock market. Using data from 1996-2005 they form six portfolios based on 2*3 size-BM ratio sort. Both CAPM and FF model are estimated for the six size BM sorted portfolios. The results show that FF model is able to explain BM and size effects. They also test for January and April effects by adding two binary variables, Jan(t) and April(t) to FF model. On estimation they do not find strong evidence to support the idea of January effect and April effect. They form portfolios based on past returns to verify the existence of a momentum effect. There is presence of a significant BM and momentum effect and a weak size effect. Fama French model is unable to explain the strong momentum effect. Regression results show that the Carhart four factor model performs empirically better than the Fama French model due to its ability to explain the momentum effect. It is also able to explain the size and BM effects.

**Lam, Li and So (2009)** investigate the performance of four factor asset pricing model using Hong Kong stock returns. Using data on 689 companies listed on Hong Kong stock market from July1981-Jun 2001, the study augments the three factor Fama French model with a momentum factor following Carhart (1997). Under the four factor asset pricing model all the four factors help in explaining the variation of average returns in Hong Kong stock market. They further extend the analysis to check seasonality effect on four factor model using nonparametric method Wilcoxon rank sum test. Evidence of significant coefficients on four factors and insignificant intercepts provide strong support to applicability of four factor model to Hong Kong stock market. Supportive evidence is also provided by the high values of adjusted R² and insignificance of an additional explanatory variable of residual standard deviation. The paper also checks the robustness of the model on two effects: up and down market conditions and seasonal behavior. Results show that market conditions do not affect the explanatory power of the four factors model very much. There is no evidence of seasonality.
Dapaah and Peiying (2009) use data on REITS stocks traded on NYSE, AMEX and NASDAQ from 1990 to 2007 to test the relative superiority of the contrarian and momentum REITS investment strategy. They use book to market strategy and six month momentum strategy. They find value investing is more profitable than risk investing. Results of the risk analysis reveal that return for the value strategy is not a compensation for risk, which means it could be attributed to investor psychology. Two methods viz. a simple sorting procedure based on the book to market value ratio (for contrarian) and six months price momentum(for the price strategy) vis-à-vis Fama French model are used. Results show that both strategies provide superior performance and that of momentum is limited to only 6-12 months holding period. The superior performance of contrarian strategy increases overtime and is found to be statistically significant for holding period of more than or equal to six months.

3.2.2 Emerging Markets

Hameed and Kusnadi (2002) study profitability of momentum investment strategy in six Asian stock markets viz. Hong Kong, Malaysia, Singapore, South Korea, Taiwan and Thailand from 1981-1994. They also form an international portfolio that invests equally. However they do not find evidence for price momentum in Asian markets.

De Groot and Verschoor (2002) study relationship between expected returns and size and market to book ratio in five Asian emerging markets viz. India, South Korea, Malaysia, Taiwan and Thailand from Jan 1984-Jan 2000. They observe a strong size effect in all markets and significant book to market effect in South Korea, Malaysia and Thailand. They apply the Fama and Macbeth (1973) procedure. Using both variables, a negative relation between size and average returns is less robust. The inclusion of market to book equity seems to absorb the role of size in Asian stock returns. Market to book variable seems to have a consistently stronger role in average returns and would suggest that value stocks have higher average returns than growth stocks.

Rahman and Baten (2006) explore whether the CAPM is a suitable description of asset pricing in Bangladesh. Using data from listed non financial sectors on Dhaka
stock exchange from 1999 to 2003, the study conducts five yearly average cross section analyses and pooled multiple regression analysis using OLS. Results strongly support significant effect of beta, size and book to market value on stock return. In this paper the impact of time is observed and it is found that time variability causes the stock return to vary and all variables become significant with the time factor. Size is proxied by two variables, market cap and sales. Empirical results obtained through OLS strongly support significant effect of beta, size and book to market value on stock return.

Nawazish (2008) evaluates the performance of the Fama French three factor model for the Karachi stock exchange. Daily returns were used for a period of five years starting from Jan 2003-Dec 2007. The three factor model was able to explain the variations in returns for most of the portfolios and the results remained consistent when the sample was reduced to control for size effect.

Bundoo (2008) investigates the existence of size and book to market equity effects on the stock exchange of Mauritius from 1997-2003. The study augments the Fama French three factor model by taking into account the time variation in systematic risk (beta). Conditional market volatility is estimated using an MA(1)-GARCH(1,1) model. Fama French three factor model shows that beta is significant for all portfolios. Small and high book to market equity firms have positive slopes on SMB and HML whereas big and low book–to-market equity firms load negatively on SMB and HML. Small firms and firms with high book to market equity on average earn higher returns. When he augments the Fama French model to include time variation in beta, he finds that the coefficients for size effect and book to market effect are all significant at the 1% level and with the expected signs. This shows that the Fama French model is robust to taking into account time varying betas.

McInish, Ding, Pyun and Wongchoti (2008) study stock markets of Japan, Taiwan, Korea, Hong Kong, Malaysia, Thailand and Singapore during 1990-2000. They test the profitability of short term contrarian and momentum strategy considering the effects of trading activity, size, value characteristics and asymmetric investor response to news. Trading strategies that combine both winners and losers fail to produce
significant profits that last for more than a week. They find that trading strategies based on past price patterns are not effectively profitable in most Pacific Basin markets. Momentum profits are significant and persistent only in Japan and Hong Kong.

**Homsud, Wasunsakul, Phuangnark and Joongpong (2009)** measure the efficiency of the Fama French three factors model in the stock exchange of Thailand for the period July 2002-May 2007. Using data on 421 companies they find that the Fama French three factor model can explain risk in stock return better than the CAPM.

**Chen and Fang (2009)** study stock markets of Japan, Hong Kong, Singapore, Malaysia, Thailand, Indonesia and Singapore between 1985-1995. They find that dynamic trading strategies based on Carhart and FF models produce larger average risk adjusted return differences from benchmark buy and hold strategy than from CAPM. Univariate tests show strong evidence that trading strategy based on value and size effects are profitable in Pacific Basin markets. Excepting Thailand, trading strategy based on size effects is more risky than value/growth strategy. Results do not support momentum effects in Asian markets. Overall they find that size factor is more pronounced than value factor.

**Teixeira (2011)** studies 1140 stocks listed at Bovespa from July 2002-Dec 2010. He analyses the value, momentum and value-momentum combo strategies. It is found that the value strategy has the higher cumulative return compared to momentum and combo strategy even after adjusting the returns for portfolio risk. He has split the period of analysis into pre crisis (2001-2007) and post crisis (2008-2010) and finds that value strategy performed well in first period but combo strategy performed better in second period. Momentum strategy does not appear to be a good option for the investor.

**Vu (2012)** explored the profitability of momentum strategies on capital markets of Africa, Asia, Europe, Latin America and Middle East. The sample set included 28 emerging and 20 developed markets from Jan 1987-Dec 2001. He first applies momentum strategy to a global portfolio of the whole sample and entire time period. Then he constructs regional portfolios of emerging markets of Africa, Europe, Middle
East, Asia and Latin America and a portfolio of developed countries. He next investigates momentum strategies for individual countries. The sample is divided into sub periods to test the impact of market liberalization reforms on profits from momentum strategy. He concludes that momentum strategy generates statistically and economically significant profits for all countries portfolio and for regional portfolios. Momentum strategies are large for emerging markets. These profits are higher in pre liberalization period than in post liberalization period. For some individual countries momentum profits are important for short horizons.

**Indian Stock Market**

**Behl (2006)** studies the Fama and French three-factor model of stock returns along with its variants, including the one-factor Capital Asset Pricing Model for 79 stocks listed on the BSE-100 stock market index for India. The time period is from June 2001-June 2006. The sample stocks are split into six portfolios sorted on size and book to market equity ratio. The author finds that the three-factor model captures better the common variation in the stock returns than the CAPM. The results show the presence of a size effect and value effect. There is strong evidence for the market factor in all the portfolios, it being regarded with having highest explanatory power. Results do not suggest which of the two additional factors for estimation of expected returns, SMB and HML provide more significant benefits. The author also checked for any seasonal effects viz. April effect, January effect and Diwali effect (Oct-Nov). Results do not show presence of any significant seasonal effect.

**Sehgal and Tripathi (2007)** test the size effect in the Indian stock market using data on 482 Indian companies from 1990-2003. Six alternative measures of company size viz. market capitalization, enterprise value, net fixed assets, net annual sales and net working capital are used. Using data from Sep 1990 to Sep 2003, the study estimates the market model equation. The findings indicate the presence of a strong size effect in Indian stock market irrespective of the size measure used. Size premium is high when market capitalization is used. The entire sub period is divided into 2 sub periods viz.Oct1990-Sep 1998 and Oct1998-Sep2003. The results indicate that size effect has become more pronounced in Indian stock market during recent time period.
Sehgal and Balakrishnan (2008) using data on Indian stock market from July 1990-May 2003 find reversals in long term returns once short term momentum effect has been controlled. The authors observe short term continuation in stock returns and that investment strategy based on momentum effect provides significantly higher returns.

Tripathi (2008) examines the relationship between market cap, book equity to market equity, price earnings ratio and debt equity ratio in Indian stock market from June 1997 to June 2007. The study estimates the two factor model, three factor model, four factor models (using various combinations of the market factor and company fundamentals as explanatory variables) and the five factor model. Empirical results show that three factor models based on market, size and value explain cross sectional variation in equity returns in India in a better way than single factor CAPM or any other two factor model. The results show that market capitalization and price earnings have statistically significant negative relation with equity returns while book equity to market equity ratio and debt equity ratio have statistically significant positive relation with equity returns in India. Four factor or five factor models did not improve the results regarding cross sectional variation in equity returns in any significant manner.

Nair, Sarkar, Ramanathan and Subramanyam (2009) test the existence of factors other than CAPM beta that explain equity returns in Indian stock market. First informal tests including (i) evaluation of the independent impacts of beta and size on asset returns and (ii) a two-pass sort analysis of the marginal impacts of size and beta on asset returns are done. Then confirmatory tests are conducted using FM cross-sectional regression to ascertain the findings of the informal tests. The study uses Fama and McBeth cross sectional regression, pooled data analysis using OLS and LSDV technique. The time period for the study is Jan 1993-Aug 2004 covering nonfinancial firms from BSE-100. The results show size and value to be important factors anomalous to CAPM in Indian stock market conditions. As in prior literature, a negative size effect and positive value effect is witnessed.

Manjunatha and Mallikarjunappa (2009) test the validity of the combination effect of two parameter CAPM (the combination of two variables-beta and size, beta and E/P, beta and BE/ME, beta and R_m-R_f, size and BE/ME, size and E/P, E/P and
BE/ME) on Indian stock returns. Using data on 66 companies for Jan1990-June2005, the study uses cross sectional regression technique. Results show that beta alone does not explain variation in security/portfolio returns. The combination of beta and $R_m - R_f$ explain the variation in portfolio returns and beta and log BE/ME explain portfolio percentage returns when market value weights are used.

Rastogi, Chaturvedula and Bang (2009) study the momentum and overreaction phenomena in Indian equity markets. The effect of size has also been taken into account by sorting the sample by market capitalization and dividing it into low cap, mid cap and high cap categories. They find strong evidence for the presence of momentum in all the categories, but weak evidence for the presence of overreaction in the low and high cap stocks. The mid cap stocks demonstrate strong overreaction. They try to explain the obtained results on the basis of investor psychology.

Senthilkumar (2009) examines relation between stock returns and size and market to book ratio of selected companies which have more than Rupees 500 crore turnover. Industries are grouped into automobiles, cement, diversified, pharmaceuticals and textiles. The study uses monthly data on 63 companies from April 2002- March 2008. The cross section of stock returns is regressed on size alone, value alone and size and value together. The study uses the Fama and McBeth(1973) methodology. When the test allows for both the variables, the negative relation between size and average returns is significant. Size variable helps to explain the cross section of average returns. In contrast to significant explanatory power of size, market to book equity has a less consistent role in explaining cross section of average returns. The inclusion of market to book equity seems to absorb the role of size in selected industries of Indian companies in stock returns. Small firms have to a certain extent higher average returns than large firms in selected industries (in fact for all except cement). The market to book variable seems to have a consistently stronger role in average returns.

Gupta and Kumar (2009) examine empirically the effectiveness of three factor Fama French model i.e. by testing its validity in different time periods and on different data sets in explaining the cross section of returns in Indian market. They use a large monthly sample data from Aug 1990-Mar 2006. Using FF (1993)
methodology they construct size (SMB) and value (HML) portfolios. Time series regressions are run to capture variations in returns by using various combinations of market, SMB and HML. Regressions are estimated using only market factor, using SMB and HML, using market and SMB, market and HML. To test for multicollinearity they use the variance inflating factor (VIF) test. Regressions results suggest that the market, SMB and HML proxy for common risk factors in returns. They find a strong size effect and strong value effect. Significant correlation between market, SMB and HML suggest some overlap among factors. Significant intercept terms confirm that the three factor model captures most of the variations in stock returns that is missed by the single factor model. They reject the data snooping hypothesis.

Sehgal and Jain (2011) using data on 450 companies traded on BSE from January 1993-Feb 2008, find that momentum profits for prior returns are stronger for 6-6 compared to 12-12 strategies. These momentum profits are higher for some characteristic sorted portfolios. The CAPM and FF fail to absorb momentum profits. The results support strong momentum profits in sectoral returns. They find that sector momentum factor accounts for a large part of stock momentum and hence sector selection is more important than security selection in developing momentum based trading strategy.

3.3 LIQUIDITY ANOMALY

3.3.1. Mature Markets

Chan and Faff (2003) use a cross sectional regression framework to study the effects of liquidity proxied by share turnover on Australian market from 1990-1999. They find a negative relationship between turnover and share returns which persists even after controlling for book to market, size, stock beta and momentum. They also find that role of turnover is not greatly affected by modeling the potential for non linear relationships.

Abbott (2004) introduced a directly observable measure of liquidity and compares its performance to bid-ask spread. Using data on 795118 firms spanning all listed securities for 3 equity markets in the US viz. NYSE, AMEX and NASDAQ, the
sample period is from Jan 1993 to Dec 2003. Two measures of liquidity viz. bid ask spread and a new measure (lambda) are used. The study examines both measures of liquidity in a risk adjusted Fama French framework. Results show that both measures are significant in measuring liquidity premium for stocks and the lambda based measure performs better than the spread based measure.

Bali and Cakici (2004) find that size, liquidity and value at risk (VAR) explain the cross sectional variation in expected returns on the NYSE, Amex and NASDAQ stocks from Jan 1963-Dec 2001. Empirical results show that average stock returns are not positively related to market beta at the company level and find strong positive relationship between stock illiquidity and expected returns at the company level. To test empirical performance of total volatility, illiquidity and VAR based on 25 portfolios of Fama and French (1993) they introduced a factor for total volatility and a factor for liquidity. The factor for volatility is the difference between a simple average of returns on a portfolio of high total volatility stocks and a portfolio of low total volatility stocks (HTVL). The factor for illiquidity is the difference between the simple average of the returns for the high illiquidity and low illiquidity portfolios (HILLIQ). Their results indicate that VAR has additional explanatory power after market return, size, book to market ratio and liquidity are controlled for. The three factor FF model was rejected in favor of the five factor model implying that HTVL and HILLIQ help to explain the time series variation in stock returns.

Chan and Faff (2005) study the role of liquidity as an additional factor in Fama French (1993) model. Using monthly data from Jan 1989-Dec 1998 for Australian stock market, they use share turnover as proxy for liquidity. The share turnover mimicking portfolio is created to be approximately orthogonal to size and book to market factors. They find support for the four factor model that incorporates a share turnover factor. The estimated premiums on market, size, book to market and turnover factors are found to be significant. Turnover has an important role in pricing and captures the liquidity effect.

turnover rate and bid ask spread. They use the portfolio approach to form six size-liquidity portfolios and three zero investment portfolios formed at the intersection of two size and three liquidity portfolios to investigate the relationship between firm size, liquidity and expected returns. Their results show that small and less liquid firms have positive premium after accounting for firm size and market returns.


**Miralles and Miralles (2006)** construct an illiquidity risk factor for the Spanish stock market from 1994-2002 using Amihud (2002) measure. They investigate the role of liquidity as an additional factor in asset pricing. They next generate a mimicking portfolio for illiquidity by using orthogonalizing procedure of FF (1993) and use it as an additional variable in FF model and CAPM. Each factor was formed while controlling for the effects of the other. Time varying expected excess returns can be explained by the two models when illiquidity risk factor is included as an augmented variable. They also perform the two step cross section regression by Fama and Macbeth (1973) to test if risk premium associated with illiquidity factor is statistically positive and significant. There is an improvement in variability of portfolio returns explained by the illiquidity adjusted models. They further check for seasonality by repeating the basic analysis for January and non-January months. They find presence of January effect in Spanish stock market over the sample period. They also considered 10 size based portfolios where significant illiquidity risk premium was found.

**Keene and Peterson (2007)** employ the Fama French time series regression to examine liquidity as a risk factor affecting stock returns for the US market from 1963-2002. They examine the importance of liquidity in isolation and in combination with...
other risk factors viz. size, book to market equity, momentum and include a market portfolio and mimicking portfolios for size, book-to-market equity and momentum. Excess returns are calculated for 54 stock portfolios using CRSP data file. Portfolios are formed on size, book to market equity, liquidity and momentum. The paper uses six alternative measures for liquidity viz. dollar volume of trading, share turnover, standard deviation of trading volume, standard deviation of turnover, coefficient of variation of trading volume and coefficient of variation of turnover. They examine liquidity both in its original form as one of the six measures and as a residual effect measured independent of the other variables. Time series regressions are estimated with monthly data from July 1963-Dec 2002. Main finding in the 54 time series regressions is that liquidity is priced and explains a portion of shared variation in returns. It is observed that the other four factors also remain important. The authors find that the presence of liquidity in the model alters the effect of the other four factors on returns.

Hwang and Lu (2007) study the UK stock market between Jan 1987- Dec 2004. There is no size anomaly in UK as CAPM can explain excess returns of small over big stocks. However a value anomaly exists which CAPM fails to explain. They create a modified relative liquidity measure which modifies Amihud (2002) illiquidity measure by replacing trading volume with share turnover rate and by taking natural log of values to minimize outliers. Comparing Amihud (2002) illiquidity measure with their relative liquidity measure they find that former is correlated with stock size whereas the latter displays little correlation with stock size and any other pervasive risk factor. Using their liquidity measure they find return difference of 18% between liquid and illiquid decile portfolios. The value anomaly which exists can be explained by liquidity augmented CAPM. They show that there is a significant liquidity premium in the UK market which is not explained by CAPM, three factor FF model or FF with a momentum factor.

Gharghori, Lee and Veeraraghavan (2009) empirically test for the existence of a number of well known effects using data from the Australian equities market. Specifically, they investigate the size effect, book-to-market effect, earnings to price effect, cash flow to price effect, leverage effect and the liquidity effect. They
investigate the capability of the CAPM and the Fama and French (1993) multifactor model (FFM) in explaining any observed anomalies. They document a size, book to market, earnings to price and cash flow to price effect but fail to find evidence of a leverage or liquidity effect. FFM is a superior model in explaining equity returns particularly in portfolios sorted on size, BE/ME, E/P, C/P. It however fails to capture the variation in returns for all the portfolios and is thus less than satisfactory in asset pricing tests in Australia.

3.3.2 Emerging Markets

Rahim and Mohd Nor (2006) evaluate the forecasting accuracy of 2 liquidity based 3 factor models which have been developed as potential improvements over Fama French. Using common stocks of 230-480 listed firms traded on Bursa Malaysia from Jan 1987 to Dec 2000, they construct 27 test portfolios which are double sorted on (i) size and B/M, (ii) size and liquidity and (iii) B/M and liquidity. The study takes Jan 2001-Dec 2004 as forecast sample. To measure forecast errors, the authors use MAPE and Theil’s inequality coefficient. Results show that the three factor models outperform CAPM. There is a marginal difference in errors of competing models which indicate that predicting returns on stocks traded on Bursa Malaysia can be improved slightly by using the 3 factor model with market factor, distress and liquidity as explanatory variables.

Naughton, Troung and Veeraraghavan (2008) investigate the role of trading volume to examine relationship between stock returns and past trading volume for 1995-2005 for stocks traded on the Shanghai stock exchange. The authors use turnover ratio as proxy for liquidity. Their results confirm a strong momentum effect in stock returns. However no explicit role of trading volume in determining magnitude of momentum effect is seen. Results do not support any relation in stock returns between high volume and low volume portfolio controlling for momentum.

Machado and Mediros (2012) study liquidity effect in Brazilian stock market. They analyze companies traded on Bovespa from 1995-2008. They find the existence of a monthly liquidity premium which varied from 1.24% to 3.04% after adjusting for risk according to the Fama French model. This was not restricted to the month of January.
They find that both the CAPM and FF fail to explain liquidity effect in the Brazilian stock market.

Unlu (2013) explains stock returns on Istanbul Stock Exchange using three factor, four factor and five factor models instead of single factor CAPM for the period July 1992-June 2011. He finds that size and value effect exist on Istanbul Stock exchange. He tests the three factor FF model, four factor model including momentum and five factor model including momentum and liquidity factor. He then conducts the F(GRS) test to check if alpha is significantly different from zero. Results show in addition to market risk, factors of firm size, B/M ratio, momentum and liquidity also constitute significant risk factors which affects stock returns and that risk premium belonging to these five factors are priced by the market.

3.4. ACCRUALS ANOMALY

3.4.1. Mature Markets

Fond (2005) studies accrual anomaly across 17 developed international equity markets over 1989-2003. He finds that different factors influence the degree of mispricing across countries. Using balance sheet method to measure accruals, they find significant abnormal returns to total accruals hedge portfolios in 15 out of 17 countries, which proves that accrual anomaly does exist in non US markets. However the factors affecting accrual anomaly differ across countries due to effect of managerial discretion, analyst following and ownership structure. He uses alternative statistical techniques to the Mishkin test and concludes that accrual anomaly results due to use of accrual accounting and because accrual returns are uncorrelated across markets.

Koerniadi and Tourani-Rad (2005) test the presence of accruals and cash flow anomalies in the New Zealand stock market from 1987-2003. Using data on 1127 non-financial firms listed on New Zealand stock exchange from 1987-2003, they compute accruals using balance sheet approach of Sloan (1986). They use the Mishkin tests and hedge portfolio tests to examine whether market efficiently prices the accruals and the cash flow component of earnings. They estimate the three factor
model for cash flow portfolios and find strong evidence of presence of cash flow anomaly. The study finds that on average accruals are not associated with future returns. They do observed a significant accrual anomaly in New Zealand. They find that the magnitude of cash flows is positively and significantly associated with future stock returns.

**Leippold and Lohre (2007)** compute accruals using the balance sheet method as in Sloan (1996). They test for accruals mispricing in 28 equity markets one at a time. They check whether the long short portfolio returns can be attributed to common risk factors. They categorize countries on the basis of legal system i.e common law or code law legal tradition. To quantify the accrual anomaly they construct a long short hedge strategy. They then apply the same battery of tests to international momentum effect. Using data from May1989-April 2006 the authors estimate the Fama French model after adjusting for momentum. They perform multiple testing to avoid data snooping. They find that the accrual anomaly is not robust. It is most likely due to data snooping and therefore does not allow any economic inference. For the international momentum effect there is some statistical evidence. Controlling for common risk factors in an extended Fama French model they find that only a small number of markets (ten) provide returns that are both statistically and economically significant. They feel that the detected alphas may be spurious in the absence of multiple testing controls. They then use multiple testing procedures to control for the possibility of data snooping biases. Using multiple testing procedures to test if the abnormal returns of hedge strategies in some countries may have happened by chance alone, they find that evidence for anomalous pattern within both common law and code law countries is further diminished.

The study of **Pincus, Rajgopal and Venkatachalam (2007)** on the accrual anomaly is based on a sample of 20 countries from 1994-2002. They investigate (i) whether the accrual anomaly generalizes to other countries, (ii) whether the occurrence of the accrual anomaly is associated with country level accounting and institutional structures, (iii) various alternative explanations of the accrual anomaly proposed in the literature. For the first objective they initially pool firm level data across the 20 countries and conduct Mishkin tests to document the occurrence of accruals
overweighing outside of the US in general and by a country’s legal tradition viz. common law versus code law. Then they analyze each country separately. For the second objective they use country level data to test a set of conjectures. They then use firm level data on a country by country basis and perform a series of abnormal return tests to investigate alternative explanations for accrual anomaly. They examine the presence of the accrual and cash flow anomalies and find that the presence of one of these anomalies does not imply the coexistence of the other anomaly. The occurrence of the accrual anomaly is not a global phenomenon and seems to be correlated with a country’s legal system and corporate governance. Their findings support accrual anomalous returns (but not cash flow anomaly) in UK, US, Canada and Australia while the opposite is true in eight other countries. They propose that the anomaly may be due to earnings management and barriers to arbitrage. Using country level data they find that the occurrence of the accrual anomaly is correlated with extensive use of accruals counting, with a common law tradition, with weak shareholder protections and with low share-ownership concentration.

Hirschleifer, Hou and Teoh (2007) test whether accrual anomaly exists in the US stock market and whether it can be explained by risk or mispricing. Using data on NYSE/AMEX and NASDAQ from July 1967-Dec 2005 the paper estimates the three factor Fama French model and the 3 factor Fama French model augmented by an accruals factor mimicking portfolio. Accruals are calculated using the balance sheet method. In addition to the three factor Fama French factors they introduce a new accruals based factor CMA (conservative minus aggressive). Six portfolios are formed as the intersection of 2 size groups and 3 accrual groups. Time series regression results show that the four factor model captures accrual anomaly. Results show that the accrual factor mimicking return CMA captures co movement in stock returns associated with accruals that are missed by $R_m-R_f$, SMB and HML. Adding CMA to Fama French three factor model captures the accruals effect in average returns. They conduct characteristics versus covariance test to disentangle the risk and mispricing hypothesis. Both in time series and cross sectional tests find that the CMA loading cannot predict returns after controlling for the accrual characteristic. On the other hand accrual characteristic predicts returns irrespective of the CMA loading.
Thus their findings favor the misevaluation hypothesis over the rational risk pricing hypothesis as an explanation for accrual anomaly.

**Clinch, Fuller, Govendir and Wells (2010)** investigate accrual anomaly in Australia. Using both balance sheet and cash flow statement definitions for calculating accruals from 1996-2008, they find that accruals and cash flows anomalies exist in Australia. In Australia, investors underestimate the persistence of earnings. Returns to hedge portfolio strategy are decreasing over the years subsequent to portfolio formation and only significant in the first year. They find that results with balance sheet definition are similar but weaker.

### 3.4.2. Emerging Markets

**Kho and Kim (2007)** confirm the presence of the accrual anomaly in South Korean market from 1987-2005 irrespective of the alternative accrual measure used. Low accrual stocks significantly outperform high accrual stocks by 16% p.a. over the next three years when the total accrual measure is used and by 10% p.a over the next one year, when the net operating measure is used. They construct accrual based factor mimicking portfolio (low accrual minus high accrual (ALMH)). The three factor FF and four factor with ALMH fail to explain fully the average stock returns on various asset portfolios formed on size and accruals. However the FF model explains anomalous returns on accruals sorted portfolios for medium sized small and large value stocks for the 1993-2005 period.

**Pasaribu (2009)** using data on Jakarta stock exchange from 2003-2006 studies the significance of accrual information on stock portfolio returns. He evaluates the performance of stock portfolios constructed by Treynor index, Jensen-alpha and Sharpe index. He forms a factor mimicking portfolio that goes long on low accrual firms and short on high accrual firms (Conservative minus Aggressive (CMA)). Results show that partially CMA has a significant positive(negative) influence to stock portfolio with low(high) level accrual, both for single, two and three factor model especially at size-accrual category.
**Fazeli and Aflatooni (2010)** test the mispricing of components of earnings on firms listed at Tehran stock exchange using annual data on 447 firms from 2002 to 2008. They divide total accruals into discretionary and non-discretionary components and then apply Mishkin (1983) test. They find that discretionary accruals are less persistent. Market overprices non-discretionary accruals to a greater extent than discretionary accruals. Operating cash flows is a more persistent component of earnings. Market overprices both abnormal and normal accruals.

**Cupertino, Martinez and Costa Jr (2012)** study the accrual anomaly in the Brazilian market using data on firms listed on Sao Paulo stock exchange between 1990 and 2008. They use the balance sheet definition to calculate accruals and apply Mishkin test following Sloan (1996). They also evaluate if the zero investment portfolio based on accruals produce consistently positive returns in Brazilian market. It is found that market is efficient in pricing the variation of earnings. Results suggest that market exaggerates in pricing cash flows but rationally prices accruals. They show that returns are lower for firms with low accruals and thus the occurrence of accrual anomaly is not favorable to the existence of arbitrage opportunities in Brazilian market.

### 3.5 PROFITABILITY ANOMALY

#### 3.5.1 Mature Markets

**Fitzpatrick and Ogden (2009)** find that the lowest future returns are associated with the lowest profit quintile and vice versa. They use panel data on NYSE, AMEX and NASDAQ listed stocks from 1980-2001. They study six asset pricing anomalies viz. raw profitability anomaly, failure risk anomaly, post earnings announcement drift, external financing anomaly, book to market anomaly and the accruals anomaly. Defining profits as operating profits, they sort firms into quintiles on the basis of profitability and find that high profit firms are larger in size, have lower book to market and lower leverage. Yet high profit firms have highest mean values of future returns (both 6 months and one year).
Artmann, Finter and Kempf (2011) study firms listed on the Frankfurt stock exchange from 1963-2006. They use two methods to examine relationship between returns and profitability and other firm characteristics: one dimensional sorts and Fama and Mcbeth (1973) regressions. They measure profitability with ROA (net earnings divided by total assets). Using one dimensional sorts they find that average returns increase with ROA. They find a positive relation between average returns and profitability. The average return of the most profitable stocks (0.90%) is more than twice as high as the average return of the least profitable stock (0.43%). One dimensional sorts show that ROA leads to significant average hedge portfolio returns. The findings are robust across two equal sub periods (07/1964 to 09/1985 and 10/1985 to 12/2006). Sorts on ROA produce almost identical average hedge returns in both sub periods. However, average return loses significance in second sub period. Using multivariate regression instead of one dimensional sort, they find that ROA loses explanatory power whenever the earnings to price ratio is included in the regressions. As high profitability firms tend to have high earnings to price ratio, results support that the profitability anomaly is the earnings to price anomaly in disguise.

3.5.2. Emerging Markets

Hoffman (2012) studies stock price anomalies on Johannesburg Stock Exchange (JSE) from 1985-2010. Using market cap, book to market ratio, momentum, net share issue, yield to book equity, accruals as explanatory variables and finds that anomalous returns exists even after controlling for risk. Different types of anomalous behavior are present within different stock size categories. Using yield to book equity as proxy for profitability, the results show a weak positive relationship with future returns which remain after compensating for the effect of MC and B/M. He finds that profitability does play a role in the evaluation of larger stocks and that the effect is strong enough to be exploited.
3.6 STOCK ISSUES AND STOCK REPURCHASES ANOMALIES

3.6.1 Mature Markets

Ikenberry, Lakonishok and Vermaelen (2000) examine open market programs announced between 1989 and 1997 on Toronto stock exchange. This consists of 1060 program announcements. They find that undervaluation seems to be an important consideration for repurchasing shares in Canada. They use FF three factor model and show that Canadian firms repurchasing shares show abnormal performance of 0.59% per month over a three year period following announcement. In the year prior to announcement, abnormal returns are negative (-0.35% per month). Results are consistent with the hypothesis that a stronger case for undervaluation as a motive for repurchasing shares can be made for value stocks. Canadian value stocks which announce repurchases, experience abnormal returns of 0.76% per month whereas growth stocks experience abnormal returns of 0.28% per month. They also check performance subsequent to stock issues and find returns are high prior to SEO and subsequent abnormal performance is substantially negative. The abnormal return is less than 1% in the announcement month. The market seems to underestimate the information contained in repurchase announcements. Using three factor model abnormal performance is 7% per month. They find that undervaluation might be a more important reason for value stocks for repurchases.

Hatakeda and Isagawa (2004) examine stock price behavior around stock repurchase announcements which include both the announcement of repurchase execution and the announcement of article alteration. They study 452 Japanese firms listed at the Tokyo stock exchange from Nov1995-Nov1998. On average price declines prior to stock repurchase announcement and then goes up at the time of announcement. A firm’s decision on a stock repurchase announcement does not affect the market reaction in a timely manner. On average, an announcing firm experienced a significant stock price decline prior to its announcement and a significant stock price increase in response to its announcement. Stock prices go up in response to both announcement of repurchase execution and announcement of article alteration. While a firm makes a decision to repurchase after experiencing a larger decline in stock
prices, the firm which experiences a smaller price decline merely alters the articles of association to allow future repurchases.

**Skjeltorp (2004)** examines open market repurchase announcements and actual repurchases by Norwegian firms during 1998-2001. He finds that firms which announce a repurchase plan experience a positive excess return around announcement date. They also experience an abnormal return after the announcement meaning that market under reacts to the positive signal conveyed through the market. They find that about 60% of the firms that announce a repurchase plan execute at least one repurchase during the period. He finds support for the under reaction hypothesis as in Ikenberry et al (1995). A significant long term excess performance of 11% a year relative to FF model is seen. Portfolios consisting only of announcing firms that has not yet purchased show a significant excess performance of about 1.2% per month. The abnormal performance of announcing firms is to a large extent driven by firms that are unable to execute repurchases.

**Eckbo and Norli (2005)** study 6000 NASDAQ IPO stocks that are bought and held upto 5 years present potential risk based explanations for low IPO returns. They show that IPO stocks exhibit significant higher stock turnover and are less leveraged. The higher stock turnover is a liquidity based explanation for lower returns to IPO stocks. IPO firms have fewer assets in place and lower current earnings to support extensive borrowing as compared to more seasoned companies. Hence they have lower leverage. They find that SEO stocks also exhibit high liquidity relative to non-issuing firms matched on size and book to market. They construct a liquidity risk factor which is a portfolio that is long in low-turnover stocks and short in high turnover stocks and augment the FF three factor model. They also provide estimates based on Pastor and Stambaugh (2003). When applied to IPO portfolio the model produces statistically insignificant alphas. Thus they confirm that IPO portfolio gets an expected return commensurate with risk. The liquidity based factor model also prices SEO portfolios. Using a factor model with macroeconomic risks, they find that IPO stocks have lower exposures than matched firms to a leverage related factor like default spread. They thus find that both lower liquidity and lower leverage contribute to lower returns on IPO shares.
Fama and French (2008) explored the pervasiveness of five return anomalies viz. net stock issues, accruals, momentum, profitability and asset growth in sorts and cross section regressions estimated separately for the US using NYSE-AMEX-NASDAQ universe from 1963-2005. They examine results separately for tiny as well as small and big stocks. They find that the anomalous returns associated with net stock issues, accruals and momentum are pervasive; they show up strongly in all size groups. The asset growth and profitability anomalies are less robust. Higher profitability is associated with abnormally higher returns, but there is little evidence that unprofitable firms have unusually low returns.

Rasbrant (2013) studies the behaviour of stock prices surrounding the initiation announcements of the repurchase programs, the price impact of the repurchase trading and long run abnormal stock performance after the initiation announcements. The data is from March 2000 to March 2010 on Stockholm stock exchange. Results show a two day abnormal return of 1.94%. Using RATS methodology he finds a positive twelve month abnormal stock performance subsequent to the initiation announcement that is positively associated with the fraction of shares bought in the program. The results indicate that repurchase trading provides price support and that the market participants detect and perceive the repurchase announcement and the first repurchase days in a repurchase program as a signal of undervaluation.

Calado and Garcia study 75 issuing companies in the Lisbon stock market from 1987-2000. The authors construct equally weighted portfolio for issuing firms and for matching firms. For issuing firms, returns were found to be higher during each of the periods under analysis after issuing them on their size matched non issuing firms. However there is no underperformance relative to non issuing firms. So there is no overreaction phenomenon in Portuguese capital market in study period.

3.6.2 Emerging Markets

Liangyi and Tse (2006) study Chinese stock market from 1996 to 2000. Evaluating both IPO and SEO in China they record long term underperformance in post issue period for both types of issuers. They attribute the determinants of issuers profitability
to earnings management. They study 642 IPOs and 499 SEOs at Shanghai and Shenzhen stock exchange and find that ROA and ROE decrease substantially for issuers after their offerings although they have excellent pre issue performance. They find that most of the abnormal returns on earnings announcements are significantly negative. Investor optimism combined with poor operating performance of issuers is the main reason for new issues puzzle in China. It also implies that information asymmetry may be responsible for poor post issue stock returns.

**McLean, Pontiff and Watanabe (2009)** study effects of share issuance in 41 different countries (including both mature and emerging markets). They test if issuance effect is present among non-US firms and if proxies for equity market development, investor protection and other country characteristics can explain cross country differences in issuance effects. They use a one year issuance measure as in Pontiff and Woodgate (2008) and run Fama and Mcbeth (1973) regressions to calculate linear relation between holding period returns and independent variables. Results show that share issuance effect is related to the ease with which firms can issue and buyback their shares. The issuance effect is stronger in countries in which there is more frequent issuance activity, more developed stock markets and stronger investor protection laws. Issuance predictability has greater statistical significance than either size or momentum and is similar to book to market.

### 3.7 RESEARCH GAP

The survey of literature covered in this chapter shows that extensive study of equity market anomalies has been conducted for developed markets. A similar analysis for emerging markets is thin. Existing literature on stock market anomalies in these emerging markets has focused on size, value, prior return patterns and accruals (Bonomo & Dall' Agnol, 2003; Braga & Leal, 2000; Cupertino, Martinez & Costa Jr, 2012; Machado & Mediros, 2012 for Brazil, Chen, Kim, Yao & Yu, 2010; Naughton, Truong, & Veeraraghavan, 2008; Wang & Chin, 2004, Wang & Xu, 2004, for China, Chui, Titman, & Wei, 2010; De Groot & Verchoor, 2002; Hameed & Kusnadi, 2002 and Kho & Kim, 2007 for South Korea, Chen & Fang, 2009; Pasaribu, 2009 for
Indonesia, Sehgal & Balakrishnan, 2011; Sehgal & Jain, 2011; Sehgal & Tripathi, 2005, 2006 for India and Hoffman, 2012 for South Africa.)

Thus the research gap identified in the equity markets anomalies literature for emerging markets with emphasis on India is as follows.

- The relationship between stock returns and other prominent anomalies viz. liquidity, profitability, stock issues and stock repurchases in emerging markets has not received much attention.

- Literature on mature markets has examined the role of additional risk factors in Fama French three factor model in explaining returns viz. liquidity factor, sector momentum factor and earnings momentum factor (Miralles & Miralles, 2006; Bali & Cakici, 2004; Moskowitz & Grinblatt, 1999; Liu & Zhang, 2008; Chordia & Shivkumar, 2006). Study on the ability of these additional factors to explain cross section of returns in emerging markets especially India is relatively thin.

- In addition the relationship between accruals and returns and profitability and returns has not been studied for the Indian market by incorporating the perspective of the investor.

The present study attempts to fill this lacuna. To this end the relationship between stock returns and prominent asset pricing anomalies will be examined for sample emerging markets including India. The role of additional factor(s) in improving the ability of Fama French model in explaining returns will be explored. Further a detailed analysis of accruals anomaly will be conducted for Indian market by taking into account the perception of investor regarding contribution of accruals to future earnings and how it gets reflected in stock prices. The profitability anomaly will be studied from the perspective of the investor for the Indian stock market. All these research issues would be addressed in the subsequent chapters.