CHAPTER 8
SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

8.1 SUMMARY OF RESEARCH

“Anomalies are empirical results that seem to be inconsistent with maintained theories of asset pricing behavior and indicate market inefficiency or inadequacies in the asset pricing model” (Schwert, 2003). Stock market anomalies that have gained attention in the literature over the past few years are size (Banz, 1981), value (Stattman, 1980), momentum (Jegadeesh & Titman, 1993), liquidity (Brennan & Subrahmanyam, 1996), accruals (Sloan, 1996), profitability (Haugen & Baker, 1996) and net stock issues (Ikenberry, Lakonishok & Vermaelen, 1995 and Loughran & Ritter, 1995). Asset pricing anomalies on the one hand are a challenge to researchers and are resistant to efficient market explanations. Investigating the incidence, generalizability, and reason(s) for these anomalies worldwide should provide additional insight into the nature of this challenge to capital market efficiency. On the other hand these anomalies present opportunities to investors to earn abnormal profits. This would hold true for mature as well as emerging markets.

World Bank economist Antoine van Aytmael was the first to define emerging markets as nations undergoing rapid economic growth and industrialization. Goldman Sachs gave the acronym BRIC to the emerging markets of Brazil, Russia, Indian and China in 2001. More recently the investment banking industry has expanded the emerging markets basket to include the countries of South Africa, South Korea and Indonesia.

In recent years emerging markets have attracted considerable attention from investors due to their rising share of global economic output and stock market capitalization. This was possible due the financial liberalization measures introduced in these markets over the past few years which gave foreign investors the opportunity to invest in domestic equity securities. As emerging market stocks became more accessible, it was possible for fund management houses to create various investment funds which focus on this region. Also easing of administrative and legislative barriers and...
adoption of strict regulations boosted the confidence of investors in emerging markets. Due to their strong growth potential and increasing global presence these emerging markets are one of the most promising investment destinations in the world. These markets are on the radar of investment analysts and fund managers who are continuously on the lookout for trading strategies that can exploit observable market inefficiencies and generate extra normal returns. Since emerging markets exhibit low degrees of correlation with mature markets, these markets perform the dual role of providing high returns while ensuring risk diversification in a global portfolio. The international investor would thus like to diversify his portfolio across emerging and developed markets.

With huge inflows of foreign investment into these markets there is a need to analyze several stock characteristics and return patterns in each individual market and search for a universal asset pricing model explaining expected returns from various characteristic sorted portfolios. This will help in decisions regarding portfolio allocations to the domestic investor and in portfolio diversification across markets for the global investor.

A thorough review of prior literature on asset pricing anomalies for both mature and emerging markets showed that prominent stock market anomalies exist and provide abnormal returns to investors in mature markets. The role of additional factor(s) in explaining cross section of stock returns to improve the explanatory power of the Fama and French three factors has also been examined for developed markets. An in depth study of the accruals anomaly by incorporating the perception of investor towards contribution of accruals in future earnings and subsequent effect of this on stock prices has also been dealt with. The relationship between profitability and returns has been examined from the firm’s point of view for mature markets.

The research gap in the literature on asset pricing anomalies for emerging markets with emphasis on India was identified and the objectives of the study were determined. The empirical structure of the study was divided into four phases. In phase 1, prominent stock market anomalies were tested for the Indian stock market. It was examined if additional risk factor(s) could improve the ability of the three factor
Fama French model in explaining returns. In phase 2, a detailed study of accruals anomaly for the Indian stock market was undertaken. The profitability anomaly was investigated for Indian stock market in phase 3 where relationship between profitability and returns was explained from the perspective of the investor. In phase 4, a test of prominent asset pricing anomalies was conducted for select emerging markets. It was also examined if liquidity augmented Fama French model could provide a better framework to explain returns over the three factor Fama French model.

**Research Design and Findings**

In the first phase, the study tested prominent asset pricing anomalies viz. size, value, momentum, liquidity, accruals, profitability, stock issues and stock repurchases for the Indian stock market. Single sorted portfolios were formed based on each stylized characteristic and short term prior return patterns. The 12 month/12month investment strategy was evaluated for all characteristic sorted and prior returns sorted portfolios and an additional 6 month/6month for prior returns sorted portfolios. The time period for study was Jan 1996-Dec 2010. All variables were measured in INR and data was obtained from Thomson One database of Thomson Reuters and RBI website. First unadjusted excess returns were evaluated for single sorted portfolios. Next, it was tested if asset pricing models viz. CAPM and Fama French three factor models could explain returns on the various characteristic sorted portfolios. Liquidity factor was used as an additional explanatory variable in the Fama French regression to form the four factor liquidity augmented Fama French model. Augmentation of the four factor model was done with a sector momentum factor and earnings momentum factor one at a time to account whether these additional factors could capture the cross section of stock returns unexplained by prior models.

Empirical results confirmed the presence of asset pricing anomalies for the Indian market. A negative relation was obtained between size and returns and between price to book value and returns. Strong momentum profits were observed on both 6/6 and 12/12 strategy in conformity with results for mature markets. Relationship between liquidity and returns was negative and between share repurchases and returns was
positive in conformity with results for mature markets. In contrast to mature market results, a positive relationship between accruals and returns, stock issues and returns and a negative relationship between profitability and returns was observed. On an unadjusted returns basis, size effect was strongest followed by momentum. CAPM could explain cross section of returns on only stock issues and stock repurchases sorted portfolios. Returns on value, accruals and profitability sorted portfolio were captured by Fama French model. The liquidity augmented Fama French model could absorb all the extra normal returns on liquidity sorted portfolios but only 40% of returns on size sorted portfolios which were unexplained by CAPM. Sector momentum factor as an additional variable in the four factor model failed to explain the residual size effect and momentum. Earnings momentum factor did not provide any additional explanatory power in explaining residual size effect and momentum. In sum, the four factor liquidity augmented Fama French model seems to be a better descriptor of asset pricing compared to one factor CAPM and three factor FF model. The persistence of size and momentum anomalies suggests that there may be a role for additional risk factors in returns. Alternatively one might require a behavioral explanation.

It would be valuable to compare the results obtained in this study on the Indian stock market with that of Fama and French (2008) which has been a motivation for undertaking this research. When comparing the results of the study representing stock return behavior on the Bombay stock exchange with that of Fama and French (2008) as observed on NYSE, it can be stated that momentum emerges as the premier anomaly in Indian market in line with that observed for the US market. However the relationship between stock returns and accruals, stock returns and profitability and stock returns and stock issues respectively, is in contrast to that obtained by Fama and French (2008). Fama and French (2008) found accruals and net stock issues to provide pervasive anomalous returns in the US market, which was not found for the Indian market.
In phase 2 of the study, an in depth evaluation of accruals and cash flows anomalies in Indian market was conducted. The intention was to test the persistence of current earnings on future earnings and persistence of accruals and cash flows in next year’s earnings. Next it was tested whether stock prices correctly anticipate average persistence of earnings performance and whether implications of accruals and cash flows for persistence of earnings are reflected in share returns. For tests of persistence, the study followed Sloan (1996) and panel OLS regressions were estimated for the purpose. Mishkin tests as discussed in Sloan (1996) were adopted. The systems of equations were estimated using nonlinear GLS. Market efficiency was tested using LR test statistic. To examine the economic significance of accruals anomaly, asset pricing tests viz. CAPM and three factor FF model were conducted.

A negative relation between accruals and cash flows was found. Earnings were found to be positively related with accruals and cash flows. Results showed a high level of earnings persistence and it was observed that stock prices correctly reflect the information contained in current annual earnings about future annual earnings. It was found that accruals are less persistent than cash flows in shaping future earnings. It was observed that the Indian investor under prices information in accruals component of earnings and overprices the information in cash flow component of earnings in contrast to his mature market counterparts. The accruals anomaly not captured by CAPM was fully explained by three factor Fama French model due to risk premiums on size factor. A negative relation was established between cash flows and returns which is in contrast to results obtained for mature markets. Cash flows anomaly missed by CAPM could be absorbed by combination of both size and value factors in the FF model. Hence both accruals and cash flows anomalies do not pose serious challenge to asset pricing in the Indian context if one uses a multifactor framework.

The profitability anomaly in Indian stock market was examined in phase 3 of the study. First unadjusted excess returns on profitability sorted portfolios were estimated. Then relationship between dividend payouts and profitability was ascertained by estimating a panel OLS regression. CAPM regressions were run on profitability sorted portfolios. Beta value was obtained for each firm over the sample period and relation between beta and payouts was estimated with panel OLS. The three factor model of
Fama and French (1993) was used to evaluate if it could explain cross section of returns on profitability sorted portfolios unexplained by CAPM. Next a panel OLS regression was estimated between dividend payouts and size and dividend payouts and value factor.

In contrast to results for mature markets, the study found a negative relation between profitability and returns for Indian stock market. This result was obtained using both definitions of profitability viz. ROE and ROA. This relationship between profitability and returns was explained from the perspective of the investor. A positive relationship was obtained between profitability and dividend payments, which is consistent with mature market results. CAPM was unable to explain returns on profitability sorted portfolios. Market beta for less profitable stocks was higher than for more profitable stocks. The results showed that beta and dividend payouts are negatively related. The size and value factors of FF model could explain the profitability anomaly. Less profitable firms were found to be relatively distressed and small in size. Size and value factors of Fama French model however do not bear significant relationship with payout ratios.

In the last phase of the study, prominent equity market anomalies were tested for select emerging markets. Single sorted portfolios were formed on various company attributes and short term prior return patterns. Next asset pricing tests viz. single factor CAPM, three factor FF model and liquidity augmented FF model were conducted. The time period for study was from Jan 1994 to Dec 2011. All variables were measured in USD and data was obtained from Thomson One database of Thomson Reuters and Federal Reserve Bank of St. Louis website.

Using Fama French model as performance benchmark, results showed the presence of size anomaly in India, South Korea and Brazil, value anomaly in South Korea and South Africa, momentum in India and South Africa, mild reversals in Brazil, liquidity anomaly in South Korea and South Africa, profitability anomaly in Brazil and South Africa, accruals anomaly in South Africa and stock repurchases anomaly in India and South Africa. Stock issues anomaly does not pose a challenge to asset pricing for sample markets. The four factor liquidity augmented FFM proved to be a better
descriptor of asset pricing compared to CAPM and FFM only in the Indian context. The Fama French model was found to be an appropriate performance benchmark for other sample emerging markets. Results showed South Africa to be the most exciting destination for portfolio managers followed by Brazil, South Korea and India. China and Indonesia do not display any anomalous returns and hence would not be of interest to global portfolio managers.

In this study a test of the equity market anomalies was done for the Indian stock market by using two currencies viz. INR (phase1) and USD (phase 4) to measure variables used in the study. It is noted that a change in currency does not change the essence of the relationships between various characteristic sorted portfolios and stock returns and short term prior return patterns and stock returns. The results demonstrated the superiority of the liquidity augmented FF model over the FF in explaining cross section of stock returns in both cases. To explain the cross section of stock returns on the various characteristic sorted portfolios using asset pricing models viz. CAPM, Fama French and Liquidity augmented FF model, it was found that the results were similar using both currencies except in case of stock repurchases and size sorted portfolios. When returns were measured in USD, it was observed that higher stock repurchases provide significant abnormal return of 1% per month even after adjusting for size and value factors of Fama French model. However the liquidity augmented FF model could explain this anomaly. On the other hand, the stock repurchases anomaly could be explained at the level of the CAPM itself when returns were denominated in INR. The size anomaly could be explained by the liquidity augmented FF model at only 1% level of significance in the INR case whereas the same could be done at 5% level of significance when stock prices were denominated in USD. These minor differences could be attributed to differences in individual currency fluctuations over the years, variations in t-bill rates and other macro economic factors in the two countries.
8.2 POLICY IMPLICATIONS

Some important implications of the study are as follows.

- The research has implications for utility firms and public sector organisations. They can use the liquidity augmented Fama French model (Fama French model) to estimate a fair rate of return on their investment in India (other sample emerging markets).

- Mutual fund managers can benefit from the study as they can use the liquidity augmented model (Fama French model) to evaluate mutual fund performance in India (other sample emerging markets).

- Investment analysts while conducting event study analysis should use the liquidity augmented Fama French model (Fama French model) to compute abnormal returns for the CAR model in India (other sample emerging markets).

- Investment and equity analysts will benefit from the results on stock market anomalies. They can use this information to develop trading systems to earn extra normal returns on various characteristic sorted portfolios.

- The findings will be useful to global portfolio managers, investment analysts as well as institutional investors in decisions regarding international portfolio construction and diversification.

- Policy makers whose aim is to achieve stock market efficiency will find the results of the various stock market anomalies important. Policy makers in the emerging markets should take into consideration the results obtained on anomalies as they make efforts for long term economic cooperation and greater financial integration.

- The study has implications for researchers. The results highlight the important role played by multifactor models in explaining stock returns. Explaining relationship between profitability and returns from the perspective of the investor provides an alternative theory to the prevalent risk taking hypothesis.
Understanding the behaviour of the Indian investor towards accruals, which is in contrast to his mature markets counterpart contributes to the behavioural finance literature for the Indian market. These results can be incorporated at different stages of the research and also extended further.

- Academicians should expose the students to the significance of multifactor models viz. Fama French three factor model and the augmented Fama French models and its implications for asset returns in addition to teaching CAPM as an asset pricing theory.

### 8.3 DIRECTIONS FOR FURTHER RESEARCH

- It will be important to study if earnings surprises and revenue surprises lead to a pattern in stock returns which differ across fundamentally strong (positive earnings and revenue surprises) and weak (negative earnings and revenue surprises) companies.

- It could be investigated whether size and value factors of the Fama French model proxy for higher order moments i.e co-skewness and co-kurtosis.

- It would be important to explore if the Fama and French factors proxy for investor sentiment in explaining stock returns.

- The asset growth anomaly could be studied in the Indian context.

- The relationship between stock returns and cross sectional volatility could be explored.

- It could be investigated if there are prior return patterns in commodity markets, bond markets.

- The interaction between value glamour, accruals and net stock issues anomalies could be investigated as has been done for mature markets.
• The profitability of a combined value-momentum strategy could be examined for emerging markets including India.

• Accruals anomaly could be tested by using alternative definitions used in the literature viz. cash flow statement based (Hribar and Collins (2002) and broad definition of accruals (Richardson et al (2005)). Accruals could be divided into discretionary and non-discretionary accruals and it could be investigated as to which component contributes to the abnormal returns. There is a need to look into the information content in the Indian accounting disclosures due to which investors do not overestimate the persistence of accruals component of earnings in contrast to their mature market counterparts.

• Momentum and size are anomalous in the Indian case. A search for additional risk factors to improve the explanatory power of the Fama French model is required. Alternatively a search for behavioural explanations for size and momentum anomalies is warranted.

• It would be motivating to extend the single sorted returns analysis to different stock size categories to ascertain whether the set of explanatory variables retain their explanatory power within each respective size categories. This could be done by double sort of portfolios on the basis of size into micro, small and big (Fama & French, 2008) and the company characteristic.

• The present study uses time series sorting technique to construct portfolios. A cross sectional technique (Fama & McBeth,1973) methodology could also be used to test the existence of the above anomalies and see if existing results are supported as has been done by Fama and French (2008).

• The study used the Lee and Swaminathan (2000) definition of turnover as proxy for liquidity. However other definitions of liquidity viz. Amihud (2002), Hwang and Lu (2011) could be used and their role examined in the liquidity augmented FF model.

• Net stock issues have been measured as per definition in Fama and French (2008). However as the authors observe there are other methods to raise issues
viz. executive options grants, rights issues, direct purchase plans, conversion of debt and preferred stock. The stock issues anomaly could be studied by these alternative definitions.

- As short selling constraints are imposed in emerging markets, the profitability of trading strategies should be evaluated in the light of these constraints.

- The effect of exchange rate, inflation and other macro economic variables could be observed on these results.

- A comparative analysis could be conducted for other emerging markets viz. emerging markets of Europe, emerging markets of Asia and also countries which form part of a trade block.

- It would be exciting to study the relationship between company characteristics and stock returns separately in the pre liberalisation and post liberalisation phases. In addition as the liberalisation policies differ among the emerging markets, it would be interesting to examine if difference in policies account for difference in anomaly results.

The present study contributes to asset pricing and behavioral finance literature for emerging markets with special focus on India. Further research on the above mentioned research issues should be undertaken to strengthen the existing literature as it will be highly useful for academicians, investment managers and policy makers.