CHAPTER VII

SUMMARY, CONCLUSION AND IMPLICATIONS

A summary of work done for the study is presented in this chapter. Salient findings are stated, hypotheses are verified and conclusions are drawn. Implications of the findings for policy and further research are also stated.

For individual investors’ decision based on information includes the value of assets and liabilities, sources of income, expenditure, taxes, family composition and employment information. However, there is another area that is subjective in nature and requires a more qualitative approach. This is related to investor’s psychology, hopes, dreams, opinions and preferences regarding investments and also their tolerance for various types of risk.

Problem Focus

In recent years, investments in stocks are picking up with the people in India. Over the few years, there has been a rapid change in the Indian Capital Market. Advance technology and online-based transactions have modernized the stock exchange. The Indian capital markets have changed vastly during the last decades and money management has undergone a concurrent evolution. There are several reasons. Economic growth, liberalization and globalization of the economy have brought in investors from other countries, explosive growth of communication facilities and information flow, high level of liquidity with the public and intensive brokerage activities have attracted people to stock market and SEBI has, with its regulatory measures, provided a source of confidence to the investors.
However, high investment returns cannot be earned without taking substantial risk; safe investments produce low returns. All publicly available information and most privately available information are factored into stock prices. The variance of stock prices is a measure of risk in returns to investment in stocks. A knowledge of the risk-return trade-off will be very useful for investors to make rational decisions for investment. However, the decision of the investors depends also on their volatility tolerance level. There are individual investors with different levels of risk tolerance. To assist their investment decisions is the purpose of this study.

Objectives

The prime objective of the study.

a) To estimate trend and volatility of SENSEX during the post-economic reform period (i.e.,) from 2001-2002
b) To study short term variation in returns on the stock prices and to bank deposits
c) To develop portfolios of efficient frontier
d) To evaluate return-risk trade-off in portfolios
e) To develop guidelines for optional portfolio selection for investment.

Methodology

This study makes use of secondary data on BSE SENSEX for daily observations for the period from April 1, 2001 to March 31, 2007 and also weekly data for prices and returns of other assets in the decision variables set. In addition, primary data are collected from a sample of investors in Coimbatore stock exchange, to identify investment objectives and to measure volatility tolerance of individual investors.
First attempt in the study was to measure volatility tolerance of individual investors with the help of primary data collected from a randomly selected sample of 200 individual investors and to post stratify them into three groups, viz., risk averters, risk accepters and risk takers.

As volatility is not a directly observable variable, large research areas have emerged, to address the problem. Six different measures were used to measure volatility. Realized Volatility (RV) was chosen as a standard measure for comparing with returns to stocks/portfolios. Stationarity of time series was tested with ADF test.

The specific allocation (asset set) that minimizes portfolio volatility for a given expected return is considered *optimal* and is said to be *efficient*. If the optimal portfolios associated with each possible level of expected return are connected, the resulting curve is the *efficient frontier*. The derivation of the frontier is done with the help of Capital Asset Pricing Model (CAPM). It was drawn by applying mean-semi variance of stock returns.

**Findings**

Salient findings of this study are stated below

**Profile of Investors**

- In the sample of 200 investors, there were 154 risk averse investors (77%); 24 (12%) risk accepters and 22 (11%) risk takers, showing that minimizing risk in returns from investment was the goal of the majority of the investors.
• The age of the investors in stocks varied from 24 years to 69 years. Age of the investors was not a factor influencing their level of volatility tolerance.

• The experience of a few years in stock market is an important factor determining the level of volatility tolerance of the investors.

• Investors knowledge of equity investment needs improvement. They require education on possible returns, causes of risk and the relationship between return and risk, to enable informed investment decisions.

• Mobilization of resources for other businesses, to have insurance, not to keep fund idle and to make quick gain were not objectives of investors in group-1. Their objectives were all to get future income and to build assets-again to yield future flow of income. Their objectives reflected their risk averse attitude and they would never go for speculative investment in stocks. For the second group of risk acceptors also the objectives of finding resources for other businesses and to provide for insurance protection were not present. However a small number of them (37.5%) desired to do speculative business in stocks. To earn income for meeting future needs was the dominating objectives for the third group of investors who were risk takers, by their high level of volatility tolerance. Most of the investors had more than one objectives. So there were different types of investments.

• Any effort to increase the level of volatility tolerance would improve the satisfaction level of investors.
The knowledge of investors on stock prices was fairly high and the intergroup differences were not significant.

Formal education had little influence on the volatility tolerance of the investors.

Investors were guided by the nominal value of returns and they lack knowledge of real returns. The Investors have a positive preference to equity investments. The expectation of the investors on returns from investment in stocks was large inspite of volatility, but the impact of inflation was largely ignored.

High income, which would be a good proxy for large wealth was associated with risk accepters and risk takers, while small income investors, were risk averse. Therefore, the inference is that income level and volatility tolerance are positively correlated.

The market sentiment of the investors was high in the sense that they had good knowledge of the functioning of the stock market, its growth and technical advances.

All the investors prefer portfolio investment, only the composition of portfolio differs.

All their expectations relied on the performance of the stocks in the recent past.

Investors’ strategies show that they are rational decision makers.

For investors with low volatility tolerance, equity investments had a small share, reflecting their aversion to take risk and preference to be
safe, even though it would reduce the possible returns to the investment. This group of conservative investors (154) dominated the sample (200), randomly selected from among investors in stocks.

- The second group of investors were those with moderate level of volatility tolerance. With them, there was sign of hedging equity investments with less risky fixed return yielding other instruments.
- The reasons for reservation in making equity investments reported by the investors in the three groups were consistent with their level of volatility tolerance.
- The investors identified as risk takers with high level of volatility tolerance preferred to invest in the stocks of companies knowing well the high volatility in their prices.
- Thus, the choice of instruments of investment was consistent with the level of volatility tolerance of the investors. A combination of fixed return yielding investments with equity investments characterized by volatile returns was a rational act of the investors. The proportion of the two category of investments varied with the level of volatility tolerance of the investors.
- There were multiple investments in all the three groups of investors, revealing the practice of ‘portfolio investment’.

**Dynamics of Stock Prices**

- Market capitalization of stocks, is a measure of health of the financial system in general and of the stock market in particular. The net domestic capital formation was seen to have a significant and positive
influence on SENSEX, but not on market capitalization of SENSEX. The FII had no influence on both SENSEX and its market capitalization.

- Economic growth of the country, foreign institutional investment and net domestic capital formation had a positive influence on SENSEX, while inflation had a negative influence. The foreign institutional investment had been well above Rs.40,000/- crores, yet it had not made any significant impact on the stock prices. These are the macro variables beyond the control of investors and define the market environment. The investors can, however, take advantage when the environment is favourable to make investment.

- The distribution weekly return of SENSEX, is seen to be mean reverting, non-symmetric, and leptokurtic. There is serial correlation in the series and also clustering of variance and first order auto correlation. The hypothesis of normal distribution is rejected for SENSEX.

- Then, rate of economic growth (GDP) and rate of inflation emerged to be important macro economic variables to have significant impact on SENSEX and its market capitalization. High rate of inflation is a cause of risk as it reduces the real value of returns, especially for stocks held for long periods. The data on these variables are readily available every month and quarter of the year. The investors in stocks can make use of these indicators of financial health of the economy to make their investment decisions.

- Trend would explain about 60% variations in SENSEX and Dividend yield. A rising (up) trend in it, would show a positive and rising trend in
returns, which is normally associated with increasing volatility also. A positive and significant trend coefficient of P/E shows that investors expect higher earnings. The ratio of market price per share to the book value per share has a positive (rising) trend during the period of 15 years ending 2006-07.

- The expected mean weekly return of SENSEX is close to zero. The index number of stock prices has been used around the world for measuring volatility of stock returns. The inter-day and intra-day volatility moved in tandem.

- Most investors are in stock market for long run and rely on compounding effects. This means that negative skewness and high kurtosis are extremely undesirable features as one big loss may destroy years of careful compounding. However, the results of this study showed that this possibility had a low probability.

- The realized volatility measure was the choice to measure volatility in SENSEX.

- By any model, the estimated volatility was small with small skewness and kurtosis showing that the distribution of returns of SENSEX was close to normal and the stock market was stable with small volatility. This was in contrast to the non-normal distribution of daily prices and index of prices. When return was measured by first difference of log values of prices and expressed as a percentage, normality in distribution was seen.
The β may be compared with average return for the scrips to select one with higher return to risk (β) trade-off. SENSEX represents the market. So β₁ shows risk of scrip ‘i’ *vis-à-vis* the market risk.

One simple, yet scientific method of expressing this risk-return trade-off is the value at risk denoted: VaR. The near normal distribution of VaR would imply that VaR could be used for the selection of securities for portfolios.

**Investment Decisions**

- Most individual investors have a limited investment budget and small investment horizon and they limit their scope for diversification. They can use Risk - anchor balances (risk free assets) to reduce portfolio risks. Another option is to invest a proportion of the portfolio in liquid assets.

- Risk averters (Group-I) find returns to be larger than risk in interest earning investment, while risk was seen to be larger than returns for equity investment. This reflected their aversion to risk and low level of volatility tolerance.

- The perception of risk accepters (Group-II) was similar, but the smaller mean differences showed that they were less risk averse.

- For the risk takers (of Group-III) mean differences were all positive and statistically significant.

- The returns to portfolio increase along with the increase in the portfolio risk. In fact, the coefficient of correlation between expected returns and risk was
positive and it was statistically significant. The implication is investors can earn higher returns only if they are ready to take higher risk. That is the real fact in any investment especially in equity investment.

- The diversible risk increased as the number of assets in the portfolio increased, slowly for up to 18 assets and steeply for larger number of assets. It was largest for portfolio-10 with 30 assets. Therefore, portfolio investment with more than 20 assets would be a rational investment decision.

**Verification of Hypotheses**

The salient findings of the study were the inferences drawn from analysis and statistical tests. They are used to verify the hypotheses.

A sample of 200 small investors who had made some investment in stocks (equity investment) and had some experience in stock market, was selected for this study. Their volatility tolerance was quantified and measured. This measure was used to classify them into three groups: viz., risk averters, risk accepters and risk takers. In the sample of 200 investors 154 were risk averters, only a small segment (11%) of the investors could be classified as risk takers.

Further, the share of equity investment in total investment was less than 20 percent for the majority of investors. Thus, the volatility in stock prices/returns was a source of conservative investment decisions of retail investors. This was, in fact, the first hypothesis of the study and it is proved to be true.
In estimating returns and risk, inter and intra-day daily data on prices of scrips included in SENSEX and SENSEX (1979-80=100) itself were used. Investment decisions of the investors were seen to be guided by the return/volatility trade-off, with no attention to the rate of inflation. Returns were measured only in nominal values of stock prices. Thus investors, even risk takers among them, had paid little attention to the rate of inflation. Inflation is in any way a risk in long term as it erodes into the real value of returns. Most investors in stocks had short time horizon and for them volatility was a more important source of risk than inflation. So the second hypothesis is verified to be true. (vide Table:5.12 also) It states that, “the real return from long term investment is ignored, investors who are concerned mostly above short term volatility in share prices”. It is shown to be true.

A portfolio that takes care of return-risk trade-off is the best choice as an investment strategy. This is the third hypothesis of the study. Return-risk trade-off was studied for 10 different portfolios with assets, varying from 5 to 30 in them. In every case, the portfolio risk ($\beta$) for the (optimal) efficient portfolio was smaller than the sample weighted aggregate of risks ($\beta_p$) and the difference was explained by diversification effect and non-market risk – the latter had to be borne any way by the investors who could not do anything to avoid it. Thus, portfolio reduces risks by diversification effect. The portfolio increased returns, bringing better return-risk trade-off. This proves the third hypothesis to be true.

The weekly market efficiency hypothesis was put to empirical test, with the help of random walk model applied to intra-day daily prices. The results showed that the stock market (a fair proxy for capital market) is not efficient. An investor with
experience and attention to stock price movement has opportunity to earn above normal return in the short run. By this, the investor can offset at least a part of the risk in investment. So capital market is not perfectly efficient and that is the fourth hypothesis of the study.

Thus all the four hypotheses of the study are verified to be true.

**Conclusion**

The salient findings of the study listed above and the four hypotheses verified to be true are used to draw specific conclusions. They are stated below:

- Majority of the investors are risk averse.
- More than formal education or age of the investors, it is their experience in the stock market that help improving their volatility tolerance.
- Individual and Small size of investment, limited time horizon limit the scope for diversification of portfolio in addition to the level of their volatility tolerance. Therefore, small investors need more efforts to understand movement of stock prices and to include risk-anchor balances in their portfolio.
- Portfolio investment with more than 20 assets was seen to be a rational decision, but risk averse investors have little chance to diversify than much.
- Investors are rational decision makers since higher benefit higher risk
- The distribution of stock prices were non-formal, mean reverting, non-symmetric and leptokurtic but the returns measured as first difference of log
values of successive period prices and expressed as a percentage had a normal distribution.

- High income and positive market sentiment are sources of confidence building in investors and they improve their volatility tolerance.

- Investors ignore inflation and so they are guided by nominal rather than real returns.

- The efficient frontier of investment portfolios provide a guideline for investors to identify an optimal portfolio consistent with his volatility tolerance level.

- Most of the investors have more than one objectives, but earning a specified income at a future date dominated their goals.

- The level of volatility tolerance largely determined the composition of portfolio, so the choice differed among the investors.

- VaR is a simple measure of return risk trade-off. Even small investors can use it to select assets to be included in the portfolio of his choice.

- There is a positive and significant correlation between return and risk of any investment instrument, especially stocks and other equity investments. Therefore any investor desiring to earn higher returns must accept larger risk. This is the fact of the real world investment.

**Implications**

Above conclusions have some implications for policy and future research. They are presented below:
1. Day by day nowadays individual investors are increasingly coming to stock market for higher return with lesser risk. They succeed their objective by their experience comes from access to understanding of stock market behavior. With e-trading in stocks, it is possible to reach out distant investors with required information. It should be a policy investment to mobilize domestic savings from rural household.

2. There is a strong positive impact on returns to stock for the macro variables such as growth of the economy (GDP) and Net Domestic Capital Formation, P/E Ratio and Dividend yield. Therefore, investors, especially small and new investors can invest when these variables are in growing phase.

3. Government efforts to control inflation and the effective regulation and control by SEBI have protected investors during the past six years; they have to continue. Inflation has a strong negative impact on stock prices. They need to be educated by brokers, investment consultants and banks so that success of small investors will bring more investors. Inflation erodes real value of stocks. But most investors are indifferent to it and prefer to target short time gains. It should be a policy in national savings scheme and mutual funds.

4. Portfolio investment, that too with large number of assets (> 20) was seen to be a rational investment strategy. To encourage this policy makers can office ‘package scheme’ in financial market to the public.
For Research

Efficiency frontier is an effective tool for optimizing return-risk relationship. It requires use of mean-variance or mean semi variance models and the use of Quadratic programming method of estimation. More simpler methods such as Minimization of Total Absolute Deviation (MOTAD) models may be tested for more convenient application.

The estimation volatility by realized volatility measure is shown in this study to be simple, scientific and adequately reliable. This was done by using daily intra-day and inter-day data on returns. However, in the literature, there is strong preference to use ‘high-frequency data’. The relative merits of the two deserves further study.