Chapter 7

End Remarks
7.1 Importance of value system

Portfolio optimization is a balancing act between risk and return, with each investor having unique requirements, as well as unique financial outlook. However, the constant factor is the delivery of an investment strategy which should not only be specific to an investor's personal needs but also capable to work well and provide financial security for the future. Within these constraints the need arises to classify investors according to their risk and return characteristics so that portfolio optimization can be performed in order to suit individual investors. Every investor is different, with different financial goals, different tolerances to risk, different personal situations and different desires.

The psychological dimension as provided in the realms of behavioral finance shows that investors perceive gains and losses asymmetrically, which boils down to the fact that downside and upside movement by identical amounts does not guarantee equal pleasure and pain. Further to it, investors tend to modify their behavior according to their personal bias as well as crowd pressure, thus making it difficult to predict the decision making characteristics.
Investors are not the same. Several dimensions including personal and financial goals, current life situation and risk tolerance tend to influence the differences among individual investors. Investments that not only generate good returns but also fulfill personal needs and provide financial security for the future time horizon are usually preferred by the investors’ community at large. The investment decisions of the investors are greatly influenced by the type of investor an individual is (investment style). Value system plays a critical role in strategic decision making. The concept has been extended to introduce value system in order to classify investors and highlight their performance in the portfolio optimization exercise. The following four categories of investors are considered in this work according to their value system.

Optimistic Investors, Risk Planner, Random Selector and Pessimistic Investors

Optimistic investors have a propensity to take risk for higher returns. They usually prefer risky investments and their objective is to maximize returns in the long run. However, it is observed that this type of investors seeks above average returns by focusing investment in stocks and certain types of mutual funds. Risk Planners seek to balance risk with assets
that preserve the principal investment. However, they are not totally risk averse as they are willing to take on some amount of risk. Their investment strategy involves investing in portfolio of securities which promises a constant income stream over the investment horizon. The return objective of random selector is to optimize return of the portfolio. As far as risk appetite is concerned they tend to demonstrate a tolerable level as deemed fit as per the need. The investment basket of random selectors usually consists of equities or mutual funds and a mix of moderate investments such as unit trusts and bonds. The Pessimistic investors are categorized to be risk averse. The investment principle of this type of investors is to preserve their principal investment by avoiding risky investments. Thus, government securities and bonds that promise a constant income stream find prominent position in their investment basket.

7.2 Closeness between optimum solution and heuristic solution

As mathematical are used to generate optimum portfolio are not easy to handle, heuristic solution is the other way to get a near optimum portfolio. For those investors who find it difficult
to mathematically or statistically arrive at sophisticated optimum solution, they can heuristically obtain a portfolio similar to the optimum portfolio. It means that one can reach to the near optimum solution with the help of heuristic solution. In this doctoral thesis, the heuristic solutions are already discussed with empirical evidence. Detailed analysis revealed an ideal point of change to be taken into consideration while examining the behaviour of an investor, following heuristic approach in investment planning. A mathematical formulation is presented to design the optimum portfolio given a value for coefficient of optimism.

After detailed discussion it is observed that heuristically one can reach the optimum solution. In this doctoral thesis, the concept of co-efficient of optimism is introduced in the decision framework of the portfolio optimization and it is observed that coefficient of optimism plays a crucial role in selecting portfolio by considering human value system. Thus, investors have to be aware of their coefficient of optimism.

When we introduced investor’s value system (according to propensity to take risk) and coefficient of optimism in choosing optimum portfolio heuristically, it is observed that the optimistic investors and the risk planners are giving best
decision. That means the risk planner’s decision is very close to the optimum decision. For lower to moderate value of coefficient of optimism risk planners’ decision and optimistic investor’s decision is best as compared to the other heuristic solutions. On the other hand, at the higher value of coefficient of optimism all the heuristic solutions showed more or less same result. For the lower to the moderate value of coefficient of optimism random selectors showed worst result as compared to the other heuristic solutions.

Next in this doctoral thesis, the Sharpe’s Single Index model is reexamined and it is presented as a non-linear mathematical model. A comparatively easy analytical framework is achieved by modifying the Sharpe’s model which is called near optimum portfolio. The modified decision rule is compared with the Sharpe’s model. Based on the detailed empirical analysis, it may be claimed that the closeness between the optimum portfolio under Sharpe’s Single Index Model and Sharpe’s cut off principle portfolio and the closeness between the optimum portfolio under Sharpe’s Single Index Model and the near optimum portfolio depends on the value of coefficient of optimism. Also by validating the models by with the selected data set it is observed that from moderate value of coefficient of
optimism to moderately high value of coefficient of optimism the Sharpe’s Cut-off principle method gives the best result. For lower value of coefficient of optimism to moderate value of coefficient of optimism the near optimum portfolio gives the best result. On the other hand, for a very high value of the coefficient of optimism near optimum solution is also performing well. That means an investor can reach near to the optimum portfolio heuristically. This put forward the admissibility of the near optimum portfolio.

7.3 Limitations of the Current work

The present work has aimed to reexamine the classical model of portfolio optimization and has proposed new models of portfolio optimization which when validated with the chosen data set have demonstrated encouraging results. However the work cannot be claimed to be robust in nature and readily usable for commercial purpose due to the following limitations of the work.

1. Due to lack of time it was not possible to use another data set in the work. So the work can be defined as static in nature.

2. Further work can be done by considering the data of other stock exchanges.
3. Only risk parameter is considered in the work. Thus, the scope of considering return parameter is there in portfolio selection.

4. Only two portfolio theories have been considered in the work. There is the scope of using other portfolio theories.

7.4 Future Scope

Statistical models are not very easily understandable to the general investor. When a general investor wishes to invest money in any portfolio of securities they are more concerned about the expected return and risk of the portfolio and not about the various statistical models. Thus, the present study can be further validated with other data set so as to make it robust and thus ultimately lead to a simple heuristic tool to help investors so that they can get a near optimum portfolio for investment. Though heuristic method is not universally accepted but is logically correct and thus the initiation in the present study can be further made to be logically accurate with more insightful research in the same dimension. The present study mainly focuses on the weight of the securities in the portfolio; future
studies can consider other dimensions in the portfolio optimization framework. In real world, in an efficient market, it is very difficult to predict assets’ weights accurately, thus, the proposed model in the present study can be further explored with more accurately predicted weights.