

CHAPTER 5

CONCLUSION

5.1 Conclusion

In the financial markets is a very high volatility, which results of the implementation of effective risk management. Extreme value theory is a strong appliance to predict the effects of extreme events in risky markets based on general statistical methodology. This study displays how extreme value theory can be used to model tail-related risk measures such as Value at Risk and Expected Shortfall by making practical use it to the daily returns of Asian Emerging Market stock prices in the Morgan Stanley Capital International market. Application of the paper captures the heavy-tailed behavior in daily returns and the asymmetric characteristics in distributions, proposing the paper to maintain the only negative returns. Observation of study is during the period from January 1, 2002 to December 31, 2011. Extreme value theory can be used to quantify the size of extreme events, with the help of the two major approaches to application. First, the approach is block minima method (BMM) that is based on the generalized extreme values. Second, the approach is peak over threshold (POT) that is based on generalized pareto distribution. The applicability of both the methods depends on the availability of data, the requisite time horizon and the kind of risk measures to forecast. For fairly large data sets with non overlapping block periods BMM method can be a useful technique as it is simple to achievement and provides return level and return period forecasts which are useful for stress testing purposes. The peak over threshold (POT) method has its advantages in modeling the available data more efficiently than block minima method (BMM) as it uses excesses over a threshold and can be more effective if we have limited data sets. The techniques give point as well as interval estimates of the risk measures which are useful in risk assessment in financial risk management.

This paper examines the approximation of Value at Risk of Asia Emerging Market stock return in the Morgan Stanley Capital International market. First,

empirical research reveals that value of stock price return when modeled after generalized extreme value (GEV) by minima annual block is 0.0620%, 0.0757%, and 0.0895% in next 5, 10, and 20 years, successively. This indicates that, the extreme loss in every day will exceed to 0.0895% with 1% risk and within 20 years of forecasting. It means that if investors invest US\$1 million in the stock, investors are 99% confident that the daily loss at worst will not exceed US\$895 within the next 20 years. On the other hand, investors are 1% confident that the loss return will exceed 0.0895% or US\$895 if investors have an investment of US\$1 million in the Morgan Stanley Capital International market within the next 20 years.

Second, value of stock price return when modeled after generalized extreme value (GEV) by minima monthly block is 0.0307%, 0.0404%, and 0.0514% in the next 5, 10, and 20 years, successively. This indicates that, the extreme loss in every day will exceed to 0.0514% with 1% risk and within 20 years of forecasting. It means that if investors invest US\$1 million in the stock, investors are 99% confident that the daily loss at worst will not exceed US\$514 within the next 20 years. On the other hand, investors are 1% confident that our loss return will exceed 0.0514% or US\$514 if investors have an investment of US\$1 million in the Morgan Stanley Capital International market within the next 20 years.

Last, it is demonstrate the result the generalized pareto distributions (GPD) corresponds to the tails of the return distributions well. Estimation of left tails at 0.999 percentile with 99% confidence interval show that it is possible to observe over 0.3054 % loss in one day within the next 20 years and an expected shortfall is 0.3708% in a single day within the next 20 years. It means that if we invest US\$1 million in the stock, investors are 99% confident that the daily loss in 1-day period will not exceed US\$3,054. On the other hand, investors are 1% confident that their daily loss will exceed US\$3,054 during one trade days. Expected shortfall is 0.3708% in a single day. As well as if investors invest US\$1 in the stock, investors are 99% confident that the daily average amount loss over the 99th percentile of the loss distribution is US\$3,708.

Christopher Nemeth (2011), The GEV distribution is the limiting distribution for the minimum or maximum return of observations. The drawback of the block maxima application extreme value theory is that if the study record data over a period

of several years and then take the maximum value for each month researcher may potentially lose extreme data. The benefit of using a threshold exceedance application is that researcher can include more data into our parameter estimations and thus with more data researcher will have small standard errors and be more confident of our parameter estimates. However, there is not set statue for choosing the threshold level and this originate subjectivity in what should be taken as a reasonable threshold. If the threshold is too high then we reduce our sample of extreme data, whereas if it is set too low then researcher include more data which may not be extreme data.

The conclusion is that extreme value theory can be useful for assessing the size of extreme events. From a practical point of view this problem can be approached in different ways, depending on data availability and frequency, the desired time horizon and the level of complexity one is willing to introduce in the model. One can choose to use a conditional or an unconditional approach, the BMM or the POT method, and finally rely on point or interval estimates. In application, the POT method proved superior as it better exploits the information in the data sample. Being interested in long term behavior rather than in short term forecasting, we favored an unconditional approach. Our extreme value theory based Value at Risk approach provides quantitative information for analyzing the extent of potential extreme risks in the emerging markets, particularly Asian markets. Interested organizations and corporations could employ this technique as one of the means of risk management. For those who are interested in investment in the emerging market, the paper estimates of Value at Risk and expected shortfall provide quantitative indicators for their investment decisions.

5.2 Recommendation

Further research will be divided into two parts: prior to the financial crisis in 2008 (Leman Brother) and post 2008 following crisis estimate Value at Risk of Asian Emerging Market stock prices in the Morgan Stanley Capital International market index. Also, the study will focus in both negative and positive return to compare the results.