UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

PORTFOLIO OPTIMIZATION OF RISKY AND RISK FREE ASSETS USING MEAN-VARIANCE APPROACH

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ABSTRACT

The purpose of this study is to apply the mean-variance model as our risk measure in the problem of portfolio selection. We are therefore driven to compare the behavior of two types of portfolios which are A-portfolio (combination of the risky and risk-free assets) and B-portfolio (risky asset) when a portfolio's expected returns vary between a low return to a high target return. In order to create the best possible asset portfolio, we minimize the risks using mean-variance models. Stocks from a data collection for the FTSE Bursa Malaysia are utilized to create our scenario returns. Solvers in Microsoft Excel and Datastream are used to implement the models and the dataset. We compared the variance of both portfolios in terms of risk measures. Numerical works show that the objective that we want has been achieved in this study which are: 1) To analyze the variance for both portfolios, A-portfolios (combination of risky and risk-free assets) and B-portfolio (risky assets). 2) To analyze the composition of assets in each target return for both portfolios, A-portfolio (combination of risky and risk-free assets) and B-portfolio (risky assets). According to the in-sample findings, we gain 2 results which are: 1) We can say that the B-portfolio gives a high variance compared to the A-portfolio at low and medium target returns. However, at the high-level target return, both portfolio variances are the same. 2) For the asset composition in A-portfolio, we find that risk-free assets will decrease when the target return is increased and it is found that there is no risk-free asset at the high-level target return. For the B-portfolio, Although there is no risk-free asset, we get to the conclusion that when the target is raised, the asset composition is decreased. This study is important to make sure that the audience will get knowledge on how to use the mean-variance model as one of the risk measures in solving portfolio optimization problems. Besides, the audience can see what will happen to the risk of that portfolio if 2 types of assets, namely risk and risk-free assets, are combined into one portfolio.