

**UNIVERSITI TEKNOLOGI MARA**

**EFFECTIVENESS OF FUZZY APPROACH IN  
MAXIMIZING PORTFOLIO DIVERSIFICATION  
BENEFIT**

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**PhD**

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**ZULKIFLI MOHAMED**

Thesis submitted in fulfillment of the requirements  
for the degree of  
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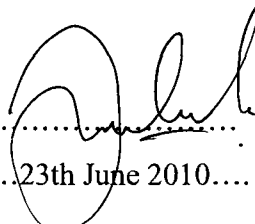
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I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

In the event that my thesis be found to violate the condition mentioned above, I voluntarily waive the right of conferment of my degree and agree to be subjected to the disciplinary rules and regulations of Universiti Teknologi MARA.

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## ABSTRACT

Uncertainty in stock market investing is remaining unsolved. Investment in portfolio is one of the solutions to minimize the uncertainty effect. Hence, unit trusts become one of the best investment alternatives for the public investors. However, many researchers discovered that unit trusts' performances are not as good as expected. Therefore, fund managers need a new vigorous portfolio selection model in order to maximize the portfolio's diversification benefit. In solving uncertainty issues, fuzzy approaches are widely applied in engineering, computing and management sciences, but in finance, it is still at an infancy stage. Therefore, the study has investigated the effectiveness of the fuzzy approach in solving the uncertainty issues in stock market investing. Using data sample from Bursa Malaysia for the period of January 1998 to June 2009, the study has examined the VBS fuzzy model and the MV model in constructing various types of portfolios in different market trends. Linear programming optimization tool was used to construct the portfolios' efficient frontier. The study discovered that in the whole period, rising and sideways market trends, 70% of the MV portfolios are having higher diversification benefit compared to the VBS fuzzy portfolios. In the falling market trend, the result shows that 90% of the VBS fuzzy portfolios are performing better. Upon the finding, the study has extended the asset return variable in the MV model using fuzzy approach. The effectiveness of the extended MV model then has been tested for portfolio the diversification benefit and the ability to generate cumulative abnormal return. The result revealed that 80% of the extended MV model portfolios in the whole period and 100% of the portfolios in the falling market trend period have higher diversification benefit compared to the other models. Investigation on the models effectiveness in generating portfolios' cumulative abnormal return ( $CAR_t$ ) discovered that the extended MV model has slightly higher ability compared to the other models. These show that the fuzzy approach is efficient to model the uncertainty in stock market investing. The study has successfully provides an empirical evidence on the effectiveness of the fuzzy approach along with a new robust extended MV portfolio selection model.

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