

UNIVERSITI TEKNOLOGI MARA

**OPTIMIZATION WITH STOCKS AND BONDS
USING MEAN ABSOLUTE DEVIATION (MAD)**

**MUHAMMAD EMIR IQBAR BIN ABD WAHI
NUR AYUNI SYAHIRAH BINTI MOHAMAD
SHAHRIZAN**

**Bachelor of Science (Hons.) Management
Mathematics**

UNIVERSITI TEKNOLOGI MARA

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ABSTRACT

This study aims to optimize portfolios containing both stocks portfolios and stocks-bond portfolios using MAD model, focusing on minimizing investment risk while achieving a target return. The importance of this research is offering an alternative model by using MAD, which is simpler, easier to compute, and practical for real-world applications. Specifically, this study has three objectives: (a) to construct portfolios by minimizing MAD for both stocks and bonds, (b) to compare the risk and return trade-offs of these optimized portfolios through in-sample analysis, and (c) to validate the in-sample results using out-of-sample analysis. The study applies linear programming to optimize portfolios using historical monthly data of selected Malaysian stocks and a government bond from 2011-2020, retrieved from LSEG Workspace. The methodology involves the construction of MAD and Mean-MAD optimization model. It also includes the construction of in-sample portfolios using the MAD model, followed by validating their performance through out-of-sample analyses. These steps ensure both accuracy during the optimization process and reliability in market conditions. The findings indicate that portfolios combining stocks and bonds have better risk-return trade off, especially at low and medium target return levels. This is evidenced by lower MAD values which reflect reduced risk. Out-of-sample results confirm that the optimized portfolios maintain the low-risk to validate the in-sample portfolios. This study demonstrates the MAD model in construction stable and efficient investment portfolios. Practically, the MAD model can be applied by investors and financial analysts who seek a user-friendly yet effective approach to managing risk in dynamic market environments.

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