

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**COMPARISON OF MALAYSIAN AND SINGAPOREAN
ASSETS BY USING MARKOWITZ MEAN-RISK MODEL**

**EZZA NATASHA BINTI NORASHAID – 2020853644
(P13M23) (1)**

**Report submitted in partial fulfillment of the requirement
for the degree of
Bachelor of Science (Hons.) (Mathematics Managements)
College of Computing, Informatics and Media**

FEBRUARY 2024

ACKNOWLEDGEMENTS

IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

Firstly, I am grateful to Allah S.W.T for giving me the strength to complete this project successfully.

I would like to express my gratitude to my supervisor, Encik Azdi Bin Maasar and MSP lecturer, Dr. Noorehan Binti Awang for their invaluable guidance, support, and unwavering commitment throughout the entire duration of this project. Their insightful feedback, constructive criticism, and wealth of knowledge have been instrumental in shaping the direction and quality of this research.

I would like to thank my friends and classmates for their moral support and for sharing their viewpoints, which fostered a cooperative and intellectually stimulating environment. This academic adventure has been made more pleasurable and rewarding by your support and companionship. My sincere gratitude is extended to my family for their patience, understanding, and continuous support during this difficult attempt. Their confidence in my ability has been an ongoing source of inspiration, and their support has been invaluable.

I have gained a great deal of knowledge from working on this project, and I sincerely appreciate everyone's efforts. No matter how big or small, every contribution has been crucial in determining how this project turns out.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
LIST OF TABLES	iv
LIST OF FIGURES	iv
ABSTRACT	vi
CHAPTER 1	1
1.1. Motivation	1
1.2. Problem Statement	3
1.3. Objectives	3
1.4. Significant and Benefit of Study	3
1.5. Scope and Limitation of Study	4
1.6. Definition of Terms	5
CHAPTER 2	6
2.1. Background Theory	6
2.2. Literature Review/ Related Research	6
2.3. Summary	8
CHAPTER 3	10
3.1. Introduction	10
3.2. Data collection and data setting	10
3.3. Model Selection.	10
3.3.1. Variance	10
3.3.2. Mean-variance model.	12
3.4. Construction of In-sample portfolio	12
3.5. In-sample analysis	13
3.6. Validate using out-of-sample analysis.	13
3.7. Compare the performance and risk behavior between these two countries. ...	13
3.8. Summary.	14
CHAPTER 4	15
4.1. Introduction	15
4.2. In-sample analysis	15
4.3. Out-of-sample analysis	22
4.3.1. Before Covid-19	23
4.3.2. During Covid-19	29
4.3.3. Comparison of Malaysian and Singaporean	36
4.4. Summary.	37
CHAPTER 5	39
REFERENCES	42
APPENDIX A	44

LIST OF TABLES

Table 1: Definition of Terms.....	5
-----------------------------------	---

LIST OF FIGURES

Figure 1. Number of assets selected in in-sample portfolios for each target returns before Covid-19 (KLCI).....	12
Figure 2. Number of assets selected in in-sample portfolios for each target returns during Covid-19 (KLCI).....	13
Figure 3. Number of assets selected in in-sample portfolios for each target returns before Covid-19 (STI).....	14
Figure 4. Number of assets selected in in-sample portfolios for each target returns during Covid-19 (STI).....	14
Figure 5. Standard Deviation of in-sample portfolios for each target returns d before Covid-19 (KLCI).....	15
Figure 6. Standard Deviation of in-sample portfolios for each target returns d during Covid-19 (KLCI).....	16
Figure 7. Standard Deviation of in-sample portfolios for each target returns d before Covid-19 (STI).....	17
Figure 8. Standard Deviation of in-sample portfolios for each target returns d during Covid-19 (STI).....	17
Figure 9. Comparison of Malaysian and Singaporean assets in terms of risk (standard deviation) for low target return.....	18
Figure 10. Comparison of Malaysian and Singaporean assets in terms of risk (standard deviation) for medium target return.....	18
Figure 11. Comparison of Malaysian and Singaporean assets in terms of risk (standard deviation) for high target return.	18
Figure 12. KLCI realized return for in-sample portfolio with a low target return (0.280%) before Covid-19.....	20
Figure 13. KLCI realized return for in-sample portfolio with a medium target return (0.390%) before Covid-19.....	21
Figure 14. KLCI realized return for in-sample portfolio with a high target return (0.560%) before Covid-19.....	21
Figure 15. STI realized return for in-sample portfolio with a low target return (0.300%) before Covid-19.....	22
Figure 16. STI realized return for in-sample portfolio with a medium target return (0.600%) before Covid-19.....	22
Figure 17. STI realized return for in-sample portfolio with a high target return (1.000%) before Covid-19.....	23
Figure 18. KLCI realized standard deviation for in-sample portfolio with a low target return (0.280%) before Covid-19.....	23
Figure 19. KLCI realized standard deviation for in-sample portfolio with a medium target return (0.390%) before Covid-19.....	24
Figure 20. KLCI realized standard deviation for in-sample portfolio with a high target return (0.560%) before Covid-19.....	24
Figure 21. STI realized standard deviation for in-sample portfolio with a low target return (0.300%) before Covid-19.....	25

ABSTRACT

The global Covid-19 pandemic has affected the Malaysian and Singaporean stock markets significantly in many industries. This study aims to reduce the risk associated with investment portfolios from the top 30 firms in Singapore and Malaysia by using the Markowitz Mean-Risk Model. This technique is employed because it is simple to apply, understand, and work with tiny sample sizes and investors that have low-risk tolerance. We also compare the risk behaviours of these portfolios over two different time periods which are before and during Covid-19 using variance as a risk indicator during the Covid-19 pandemic. The unpredictability of return distributions for each asset is determined by simulating the weekly scenario returns of 27 assets in the Kuala Lumpur Composite Index (KLCI) and 25 assets in the Straits Time Index (STI) from January 2012 to December 2022. The Markowitz Mean-Risk Model is utilized to reduce risk and generate ten optimal (in-sample) portfolios. Three level target returns (d) are set which is low (0.280%), medium (0.390%) and high (0.560%) for Malaysia and Singapore, the target return is low (0.300%), medium (0.600%) and high (1.000%). The in-sample portfolio is validated using out-of-sample analysis obtained in terms of realized return and realized standard deviation. This analysis concludes that the in-sample portfolios follow the low return-low risk, medium return-medium risk, and high return-high risk tendencies.