BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF STATISTICS AND MATHEMATICS



Evaluating the Limitations of Modern Portfolio Theory in Zimbabwe: A Comparative Analysis with Developed Market Contexts

BY

Tafadzwa Katsvamutima

B210821B

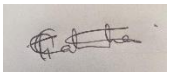
A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF BACHELOR OF SCIENCE HONOURS DEGREE IN STATISTICS AND FINANCIAL MATHEMATICS.

SUPERVISOR: MR. B. KUSOTERA

JUNE 2025

APPROVAL FORM

This is to certify, that this research project is the result of my own research work and has not been copied or extracted from past sources without acknowledgement. I hereby declare that no part of it has been presented for another degree in this University or elsewhere.

TAFADZWA KATSVAMUTIMA		**5/06/2026**
Student	Signature	Date

Certified by:

MR.B. KUSOTERA		**5/06/2026**
Supervisor	Signature	Date

DR.M. MAGODORA		18/08/2026
Chairperson	Signature	Date

DEDICATION

I dedicate this dissertation to my family who have stood by me and supported me throughout this journey. I also dedicate this to my future children and wife, to give them an understanding that you can achieve anything if you put your mind to it.

ACKNOWLEDGEMENTS

I extend my heartfelt gratitude to the professionals and experts in the field who generously shared their knowledge and expertise throughout the development of my dissertation. I express my deepest appreciation to my supervisor, Mr. B. Kusotera and coordinator Ms. P. Hlupo for consistently providing me with support. Their valuable insights and perspectives have greatly enriched this dissertation. I am also thankful for the administrative support provided by Department of Statistics and Mathematics at Bindura University of Science Education in terms of access to research facilities and administrative assistance. I also thank God for providing me with the care, strength, knowledge, and opportunity to pursue my education to this level. Lastly, I would like to acknowledge the unwavering support of my friends and family, whose encouragement and understanding have been a constant source of motivation throughout this journey.

ABSTRACT

This Research study investigates the limitations of the Modern Portfolio Theory in the context of Zimbabwe's unstable financial markets. The researcher will consider comparing the limitations of MPT with the developed market the United States. MPT, as of today, is a fundamental concept for making investment decisions globally, and most of its assumptions the efficient market, investor rationality and aversion from risks, normal distribution of returns, diversification of assets are broken in the circumstances of the emerging market characteristic to Zimbabwe. The researcher will build optimized portfolios for both market assets for the period 2018 and 2023, and the mean-variance optimization will be used. The analysis will be carried out in terms of risk the Sharpe Ratio, volatility, and maximum drawdown. Since the above terms are expressed in return terms, all required returns have been implicitly deducted by inflation from the research to see real investment results.

Based on the fact findings that Zimbabwean portfolios are "more volatile" that implies not only the sources but also the consequences, show "more significant deviations from the normal distribution" CIA, and have little portfolio diversification potential, "the discoveries indicate that the MPT does not have much predictive validity, at least us interpreted in the conventional neoclassical sense". In contrast with U.S. portfolios, which generally are more likely to confirm all the basic MPT assumptions, "more generally, the behaviour of U.S. stocks seems more in concert with just about everything one would expect under standard good equilibrium". Therefore, the results allow assuming that the MPT can only be effective in well-developed markets, and it fails in the case of the Zimbabwean economy without appropriate changes. Hence, the recommendations for possible studies encourage re-evaluation of the use of the MPT by institutional investors in emerging countries. Since that approach was designed for stable market settings, more sensitive to the approaches of the respective context or alternative concepts should be considered. Thus, this research contributes to a broader discussion about investment theories across contexts and emphasizes the necessity of approaches from the ground up in case of structurally unstable economies.

Contents

APPROVAL FORM 2

DEDICATION 3

ACKNOWLEDGEMENTS 4

ABSTRACT 5

Chapter 1. Introduction 10

1.1 Introduction 10

1.2 Background of the Study 10

1.3 Statement of the Problem 11

1.4 Objectives of the Study 11

1.5 Research Questions 12

1.6 Significance of the Study 12

1.7 Scope of the Study 13

1.8 Limitations of the Study 14

1.9 Definition of Key Terms 15

Structure of the Dissertation 17

Chapter 2. Literature Review 19

2.1 Introduction 19

2.2 Theoretical Framework 19

2.3 Empirical Literature Review 23

2.4 Research Gap 27

2.5 Theoretical Justification for the Study 28

2.6 Proposed Conceptual Framework 29

2.7 Conclusion 31

Chapter 3: Research Methodology 32

3.1 Introduction 32
3.2 Research Design 32
3.3 Data Collection 32
3.4 Portfolio Construction and Modelling Approach 35
3.5 Performance Metrics 40
3.6 Comparative Analysis Framework 42
3.7 Tools and Software 43
3.8 Ethical Considerations 44
3.9 Limitations of the Methodology 45
3.10 Summary 46
Chapter 4: Data Presentation, Analysis and Discussion 47
4.1 Introduction 47
4.2 Summary of Results 47
4.3 Analysis and Interpretation 50
4.4 Key Insights 54
4.5 Conclusion 55
Chapter 5: Findings, Conclusions, and Recommendations 57
5.1 Introduction 57
5.2 Summary of Key Findings 57
5.3 Recommendations 58
5.4 Areas for Further Study 60
5.5 Conclusion 60
References 61
Appendix 63

List of Tables

1. **Table 2.1: Core Components of the Framework**
2. **Table 3.1: Variables, Descriptions, Sources, and Measures**
3. **Table 3.2: Proposed Assets**
4. **Table 3.3: MPT Assumptions Table**
5. **Table 3.4: Tools and Software Table**
6. **Table 4.1: Zimbabwe Portfolio Summary Statistics**
7. **Table 4.2: U.S. Portfolio Summary Statistics**
8. **Table 4.3: Risk-Adjusted Performance Comparison**
9. **Table 4.4: Normality Test Results (Jarque-Bera Test)**

List of Acronyms

Acronym	Full Meaning
MPT	Modern Portfolio Theory
EMH	Efficient Market Hypothesis
MVO	Mean-Variance Optimization
CAPM	Capital Asset Pricing Model
PMPT	Post-Modern Portfolio Theory
BPT	Behavioural Portfolio Theory
RBZ	Reserve Bank of Zimbabwe
ZSE	Zimbabwe Stock Exchange
VFEX	Victoria Falls Stock Exchange
CPI	Consumer Price Index
USD	United States Dollar
ZiG	Zimbabwe Gold currency
BLS	Bureau of Labour Statistics (U.S.)
IMF	International Monetary Fund

Chapter 1. Introduction

1.1 Introduction

Modern Portfolio Theory (MPT), which was founded by Harry Markowitz (1952), gives an introduction for balancing risk and return in portfolio formulation through diversification in assets. It is claimed to be the theoretical basis for investment tools such as the Capital Asset Pricing Model (CAPM) and informs the asset allocation decisions of institutional investors globally (Markowitz, 1952; Markowitz, 1959). MPT also assumes that investors are rational and will make decisions that are right and risk-averse, that markets are efficient, and that asset returns follow a normal distribution. These assumptions are often not met in emerging economies. This study evaluates the performance and limitations of MPT in Zimbabwe's financial markets, comparing with its effectiveness in a developed market setting, to uncover the specific challenges faced by investors in such contexts.

1.2 Background of the Study

Hyperinflation, policy changes and currency changes have caused significant instability in Zimbabwe’s financial markets over the past two decades. In 2008, the country experienced hyperinflation which peaked at an annual rate of 79.6 billion percent. As a result, the Zimbabwean dollar became worthless (Hanke & Kwok, 2009). Currency reforms have focused on stabilising the system by introducing bond notes in 2016, the RTGS dollar in 2019 and the Zimbabwe Gold currency that has recently been created in 2024. However, these changes have made the financial sector fragmented while lack of opportunities for asset diversification and high transaction costs, regulatory asymmetries, and geopolitical challenges have also introduced additional risks to the market (Mangudya, 2019; RBZ, 2024). The DRC war is an example of a geopolitical risk in Zimbabwe, which strained public finances and led to a loss of confidence among investors (IMF, 2020; Magadi & Harinangoni, 2015).

Despite these shortcomings, MPT has provided the foundation for other market practitioners namely institutional investors in Zimbabwe which have been largely adopted as is for application

in the Zimbabwean market environment (Jecheche, 2020). But empirical evidence has shown that some of the fundamental MPT assumptions such as efficient market and skewed distribution of returns do not hold in the Zimbabwean environment (Makina, 2009; Obeidat, 2018). This issue also challenges the suitability of MPT and invites a comparison with developed markets where the underlying assumptions of MPT may hold truer.

1.3 Statement of the Problem

Zimbabwe's economy is full of turbulence in this particular context, with MPT assumptions seemingly infeasible. Indeed, inflation, poorly regulated illiquid capital markets, and unstable political environments suggest that risk and volatility are closely correlated. Form MPT's standpoint, activities in Zimbabwean markets may lead to suboptimal portfolio positioning (Magadi & Harinangoni, 2015; Jecheche, 2020).

Institutional investors and individuals continue to use MPT-based strategies without sufficient modification, risking unrealistic expectations on portfolio returns. Studies that compare Zimbabwe, and stable, developed markets are few, leaving a gap in understanding MPT's limitations in emerging economies. This research aims to fill that gap by evaluating MPT's performance under Zimbabwean conditions and identifying the limiting factors that constrain its effectiveness (Obeidat, 2018).

1.4 Objectives of the Study

The objective of this study is to evaluate the limitations of Modern Portfolio Theory (MPT) in Zimbabwe's investment environment by comparing its assumptions and performance with those observed in developed financial markets.

Specific Objectives:

I. To check the assumptions of MPT and test their validity in Zimbabwe's financial context.

II. To evaluate the performance of MPT-constructed portfolios in Zimbabwe using historical financial data.
III. To compare the performance of MPT-based portfolios in Zimbabwe with those in developed markets.
IV. To identify the key limitations and suggest changes needed to be made to improve effectiveness of MPT.

1.5 Research Questions

This study addresses these research questions:

I. To what extent are MPT's assumptions working in Zimbabwe's financial markets?
II. How does the performance of MPT-optimized portfolios in Zimbabwe compare with those in developed markets?
III. What are the key structural and economic factors limiting MPT's effectiveness in Zimbabwe?
IV. How do market inefficiencies affect MPT-based portfolio performance in Zimbabwe?
V. What practical adjustments or alternative strategies should institutional investors in Zimbabwe adopt?

1.6 Significance of the Study

This dissertation contributes to both academic literature and practical investment decision-making by offering an evaluation of Modern Portfolio Theory (MPT) within the setting of a volatile and underdeveloped financial market. While MPT has proven effective in developed, efficient economies, its continued application in volatile environments like Zimbabwe remains largely unexamined. This research addresses that gap through both theoretical critique and empirical analysis.

Academic Significance

The dissertation adds to the body of literature questioning the applicability of MPT. By conducting a comparative analysis between Zimbabwe and the USA, it offers evidence-based insights into how economic context influences the validity of foundational investment theories. It also

encourages a rethinking of classical finance models in light of emerging market realities, paving the way for further studies on theory adaptation.

Practical Significance

Institutional investors in Zimbabwe, which including pension funds, asset managers, and financial advisors, this study provides suggestions on the risks of relying solely on MPT-based strategies. By revealing the model's limitations in Zimbabwe, the research promotes a more informed and nuanced approach to portfolio construction, risk assessment, and asset allocation.

Policy Relevance

For regulators and policy-makers, the findings of this study could inform efforts to improve Zimbabwe's investment environment. Findings can help guide reforms aimed at improving market efficiency, transparency, and investor protection.

1.7 Scope of the Study

The dissertation is seeking to evaluate the constraints of Modern Portfolio Theory (MPT) in the Zimbabwean financial markets and comparing its performance to that which can be realized in a developed, efficient market. The scope of the research is delineated on four dimensions

Geographical Scope

Zimbabwe provides the setting and case study for a volatile, underdeveloped financial market. The United States of America, on the other hand, will provide the developed market for the purposes of comparison.

Theoretical Scope

The work is based on the assumption of Modern Portfolio Theory (MPT) and stops short of venturing into other models, such as Post-Modern Portfolio Theory (PMPT), Behavioural Portfolio Theory (BPT), or the Adaptive Market Hypothesis (AMH).

Temporal Scope

Historical information utilized is for the period 2023 to 2024. This period covers a range of macroeconomic episodes in Zimbabwe, including hyperinflationary periods, currency changes, and policy reforms, and thus represents strong stress tests of MPT.

Methodological Scope

The dissertation utilizes quantitative portfolio modeling techniques such as, mean-variance optimization, in order to model and evaluate portfolio performance. Risk-adjusted performance metrics such as the Sharpe Ratio and portfolio volatility will be utilized. Comparison between Zimbabwe and the USA will utilize such techniques.

1.8 Limitations of the Study

This study aims to provide valuable insights into the limitations of Modern Portfolio Theory (MPT), several limitations may affect the depth and generalizability of its findings:

Data Availability and Quality

Zimbabwe's financial markets often do not have in-depth, high-frequency, and transparent financial data, particularly for less liquid or less frequently traded assets. Limited access to clean, reliable data may restrict the depth of analysis or introduce estimation errors in the portfolio modelling process.

Market Comparability

Although the study includes a developed market for comparative purposes, aligning these markets with Zimbabwe's volatile environment may present challenges. Differences in asset class composition, trading volumes, and investor profiles could affect the comparability of results.

Model Assumptions

The study relies on mean-variance optimization to simulate MPT-based portfolios. This model has its own assumptions such as the use of historical averages for expected returns and covariances that may not fully capture future market behaviour, particularly in volatile economies.

Focus on MPT Only

Although alternative theories such as PMPT and BPT are mentioned, they are not tested in this study. As a result, the study does not offer a direct performance comparison with these alternative frameworks.

Behavioural and Regulatory Factors

Investor behaviour, regulatory interventions, and political influences, are difficult to quantify and fully model. These qualitative factors may significantly affect portfolio outcomes but are only partially captured in a data-driven framework.

1.9 Definition of Key Terms

This section offers definition of key terms used in research to provide consistency and clarity

Modern Portfolio Theory (MPT)

It is a theory by Harry Markowitz (1952) that asserts investors can create an "efficient portfolio" with the highest possible expected return for a particular level of risk, or least risk for a given expected return, primarily by diversification.

Reference: Markowitz, H. (1952). Portfolio Selection. Journal of Finance, 7(1), 77–91.

Efficient Market Hypothesis (EMH)

The EMH is the hypothesis that financial markets are "informationally efficient," and that asset prices incorporate all available information at any given point in time. It is the basis for most classic investment theories, including MPT.

Reference: Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work Journal of Finance, 25(2), 383–417.

Mean-Variance Optimization (MVO)

One of the quantitative approaches used by MPT to identify the most optimal portfolio by balancing expected return and variance (risk). It serves as the basis for creating the efficient frontier.

Reference: Markowitz, H. (1959). Portfolio Selection: Efficient Diversification of Investments. Yale University Press.

Sharpe Ratio

A risk-adjusted performance metric that shows the amount of surplus return an investment earns for each unit of risk assumed, where return on portfolio minus risk-free return and divided by the return standard deviation.

Reference: Sharpe, W. F. (1966). Mutual Fund Performance. Journal of Business, 39(1), 119–138.

Developed Market

A financial market in an economy with high income levels, strong regulatory frameworks, deep capital markets, and relatively low volatility. Examples include the U.S., U.K., and Germany.

Reference: MSCI (2023). Market Classification Framework. MSCI Inc.

Emerging Market

A transforming economy from a low to a high income one, typically with higher economic and political risk, less mature capital markets, and higher growth potential. Zimbabwe is classified in the frontier or emerging market peer group of most global financial indices.

Reference: IMF (2022). World Economic Outlook Database; MSCI (2023).

Risk (in Investment Context)

Risks or probabilities of losses relative to expected returns. Risk in MPT is mostly gauged by variance or standard deviation of asset returns.

Reference: Bodie, Z., Kane, A., & Marcus, A. J. (2014). Investments (10th ed.). McGraw-Hill Education.

Portfolio Diversification

The investment policy of holding a mix of assets to reduce the risk of a portfolio in general. Diversification is an important tenet of MPT and will hold as long as asset returns are not totally correlated.

Reference: Elton, E. J., & Gruber, M. J. (1997). Modern Portfolio Theory, 1950 to Date. Journal of Banking and Finance, 21(11-12), 1743–1759.

Structure of the Dissertation

This dissertation consists of five chapters, and each addresses a component of the study and starts where the preceding parts have left in providing a proper evaluation of Modern Portfolio Theory (MPT) in Zimbabwe and the USA.

Chapter One: Introduction

This chapter establishes the background and context of the study, formulates the research problem, captures the objectives and research questions, outlines the significance, scope, and limitation of the study, and includes definitions of the key terms used within the dissertation.

Chapter Two: Literature Review

Chapter Two has a critical analysis of Modern Portfolio Theory's theory base, its broad assumptions, and mathematical model. Chapter Two also discusses empirical studies that have implemented MPT in emerging markets and developed markets and demonstrates loopholes in research where it has not been implemented in Zimbabwe.

Chapter Three: Research Methodology

This chapter outlines the research design, data sources, sampling methods, and methodology of analysis used by the study. It outlines how portfolios will be constructed through the application of MPT, and performance measures such as return, volatility, and Sharpe ratios will be applied in evaluating results. The methodology includes the comparative method of Zimbabwe and a developed economy.

Chapter Four: Data Analysis and Results

Chapter Four presents the empirical findings of the study. It includes descriptive statistics, portfolio performance measurement, and a comparative study of the implementation of MPT in Zimbabwe and in a developed market. Overall patterns, deviations, and limitations experienced in the Zimbabwean context are discussed in detail.

Chapter Five: Discussion, Conclusions and Recommendations

The final chapter interprets the findings within the framework of research questions and theoretical model. It draws conclusions on the usability and limitations of MPT in Zimbabwe, compares results with the performance of developed markets and provides recommendations to investors and policymakers. Suggestions for further study are also given.

Chapter 2. Literature Review

2.1 Introduction

Modern Portfolio Theory (MPT) has had an impact in portfolio management and risk management as it advocated diversification to optimise risk-return trade-offs. MPT has been widely accepted in the developed markets; its strength is in its mathematical accuracy and logical simplicity.

However, MPT rests on assumptions that might not hold in frontier markets like Zimbabwe, including market efficiency, rational investors, and normally distributed returns. The country's economic volatility, policy uncertainty, and illiquidity confront these assumptions and question the effectiveness of these diversification strategies.

Despite these shortcomings, MPT is still a cornerstone of investment decision-making in Zimbabwe. While its shortcomings are understood, there is scarce comparison of how it performs in developed versus developing markets. This chapter outlines MPT's theoretical foundations and reviews literature on its application globally and in Zimbabwe in particular. It establishes gaps and lays the ground for the comparative exploration in this study.

2.2 Theoretical Framework

Origin and Development of Modern Portfolio Theory

Harry Markowitz introduced Modern Portfolio Theory (MPT) in his 1952 work "Portfolio Selection." Markowitz's main contribution was that investors should not study individual assets in isolation, but instead look at how each of the assets will contribute to the risk and return of the overall portfolio. This was a break with traditional investment thought, which had focused primarily on the choice of high-return individual securities (Markowitz, 1952).

The theoretical basis of MPT is mean-variance optimization, a mathematical framework that allows investors to construct portfolios that will maximize expected return for a given level of risk, or minimize risk for a given level of expected return. Risk, is quantified in terms of the variance

(or standard deviation) of the returns on the portfolio, while expected return is based on historical experience or projections of the future. The model assumes investors are rational and risk-averse, except when appropriately motivated by superior returns.

One of the outputs of MPT is the efficient frontier, or the set of optimal portfolios yielding the best possible return for each level of risk. Portfolios on the left side of the frontier are not optimal, and portfolios on the frontier are efficient (Markowitz, 1959). The theory also illustrates the utility of correlation across assets, where investing in assets whose correlations are low or even negative, investors can reduce the portfolio risk overall without compromising on returns.

MPT was extended and enhanced by models such as the Capital Asset Pricing Model (CAPM) by Sharpe (1964) that introduced the differentiation between systematic and unsystematic risk and that of a market portfolio.

Even in the present era MPT remains a cornerstone theory in finance courses and institutional portfolio construction. However, criticism has emerged due to the reliance of the theory on strong assumptions, particularly when markets are thought to deviate considerably from the idealized structures upon which the theory is built. Such criticisms hold fairly well in the context of emerging markets like Zimbabwe, where structural and behavioural abnormalities often make MPT's real-life usefulness irrelevant.

Core Assumptions of Modern Portfolio Theory

Assumptions of MPT guide the way the model is relevant and can be used in markets to determine optimisation. The following section speaks to those assumptions.

I. Market Efficiency

MPT assumes markets are efficient and reflect the correct asset price due to the information given. This is consistent with the Efficient Market Hypothesis (EMH) which states that for a higher return on investment investors need to assume a higher risk (Fama 1970). Information flows freely in developed markets and thus the assumption stands however in emerging markets this doesn’t apply as there is little transparency, monetary policy interventions that often shift prices,

II. b. Rational Investor Behaviour

MPT also assumes that investors are rational and make decisions based on backed studies that will maximise their risk-return trade-offs. This entails that investors are risk averse and will only take on more risk if the reward is higher (Markowitz, 1952). However, investors often are not rational and follow trends, speculation and short-term survival instincts due to the volatility and uncertainty in the market. Behavioural finance literature suggests that loss aversion, herd behaviour, and emotional decision-making will likely dominate rational analysis, undermining this assumption (Kahneman & Tversky, 1979).

III. Normally Distributed Returns

Returns are assumed to be normally distributed, and that very high returns are rare. This also implies that using historical data the stock price outcomes can be accurately predicted. However, in emerging markets return tend not to be distributed normally and are skewed with kurtosis and fat tails. This increases the risk of high losses and gains (Obeidat, 2018). These trends are not captured by traditional MPT models which say data is symmetric and predictable.

IV. Unrestricted Diversification

This assumption speaks to the ability of investors to have access to different asset in different sectors, regions and classes with negative correlations, this then reduces the portfolio risk through diversification. However, the Zimbabwean market has very few listed assets and it has restrictions to investing in foreign assets (15% of a portfolio). These things make it harder for investors to diversify their portfolios.

V. Stable Risk-Return Relationship

MPT assumes that the higher the risk the higher the return but due to the volatility in the developing countries these do not match. Risk may increase without the anticipated return to increase due to inflation, macroeconomic shocks, currency devaluation or policy unpredictability (Basvi, 2024). Investors in turn will experience high risk for minimal returns or losses.

Criticisms and Limitations of Modern Portfolio Theory in General

While MPT has been an important theory used in finance, there have been scholars who have critiqued its use. These are mainly on the assumptions used by MPT, its reliance on historical data and ability to predict investor behaviour in real world scenarios.

I. Unrealistic Assumptions about Investor Behaviour

Behavioural finance scholars argue that the assumption of investors being rational is false and over amplified. Studies show that investors are influenced by overconfidence, psychological biases such as loss aversion and mental accounting (Kamen and Tversky, 1979). This theory undermines the predictive validity of MPT especially in times of market crisis.

II. Dependence on Normal Distribution of Returns

The assumption of normal distributions, which simplifies the modelling of portfolio risk is not correct as evidence shows that financial returns exhibit fat tails, skewness and kurtosis meaning extreme events occur more frequent than the model assumes (Mandelbrot, 1963; Cont, 2001). As a result of this downside risk in MPT is underestimated and doesn't prepare investors for shock losses.

III. Static and Retrospective Nature

MPT is based on historical data which is static and assumes future returns based on this data. It does not account for drastic changes in market conditions and investor appetite. This limits its usefulness in markets that often shift and which need real time decision making. This assumption is problematic in emerging markets which suffer from structural shocks and shifting policies (Obeidat, 2018)

IV. Estimation Sensitivity and Input Uncertainty

Reliance on precise calculations of expected returns, variance and covariance that are difficult to assume accurately will result in large changes in the portfolio weights if there are small errors (Michaud, 1989). The estimation error reduces the reliability of MPT especially when working with limited datasets which is very common in developing economies.

V. Limited Applicability in Illiquid and Undiversified Markets

The availability of a wide range of assets which are not correlated is a limitation in emerging markets. In most markets in Sub-Saharan Africa, there are only a few listed and tradeable stocks and then taking into effect diversification this becomes very difficult to implement and reduces effectiveness (Magadi & Harinangoni, 2015). Restrictions on foreign investment, capital controls and illiquid asset classes further constrain the portfolio construction challenging the applicability of MPT.

VI. Ignorance of Tail Risks and Systemic Shocks

MPT turns a blind eye to systematic shock and policy interventions which can destabilise markets. The covid-19 pandemic and the capital hill riots exposed the inadequacy of MPT to predict these chocks and their impacts on the financial markets and these have become more frequent and less predictable.

These limitations have pushed the development of alternative models such as Post-Modern Portfolio Theory (PMPT), Behavioural Portfolio Theory (BPT), and the Adaptive Market Hypothesis (AMH), for more realistic assumptions and better account for investor psychology, tail risks, and dynamic market behaviour. While MPT continues to provide a useful baseline for portfolio theory, its shortcomings highlight the importance of adapting theoretical models to real-world conditions, especially in less efficient markets such as Zimbabwe.

2.3 Empirical Literature Review

This section reviews five studies that have examined the application and limitations of Modern Portfolio Theory (MPT) in both developed and emerging markets, with a focus on Zimbabwe where possible. Each study is assessed based on its research objectives, methodologies, key findings, and context relevant to the effectiveness of MPT.

Study 1: Baesens (2015) – Portfolio Management in Hyperinflationary Economies

Context & Purpose

Baesens (2015) tested the limitations of Modern Portfolio Theory (MPT) in the context of Zimbabwe's hyperinflationary economy. The study assessed how portfolios constructed using MPT principles performed during periods of economic instability.

Methodology

The study used historical financial data from Zimbabwe which included the hyperinflationary period (2007–2009), focusing on equities, fixed income instruments, and inflation-sensitive assets. Using mean-variance optimization, the author simulated MPT-based portfolios and analysed their performance using Sharpe Ratios, portfolio volatility, and real returns adjusted for inflation. The study conducted stress testing to evaluate the effectiveness of MPT portfolios during volatility.

Key Findings

Results showed that MPT-optimized portfolios underperformed significantly in real terms, largely due to inflation volatility, unreliable return distributions, and structural inefficiencies in the financial market. market efficiency and stable risk-return relationships assumptions were found to be invalid in the Zimbabwean context. Furthermore, diversification was difficult to achieve because of a limited number of investable assets and high correlations among available securities. Baesens concluded that MPT is not suitable in hyperinflationary economies unless adjusted to account for downside risk and macroeconomic instability. The study called for a shift toward adaptive and context-sensitive portfolio models.

Study 2: Basvi (2024) – Application of Copula Methods in Financial Risk Management: The Case of ZSE and VFEX

Context & Purpose

Basvi's study focuses on the structural limitations of MPT in Zimbabwe's capital markets, the Zimbabwe Stock Exchange (ZSE) and Victoria Falls Stock Exchange (VFEX). Basvi tested if the assumptions of normal return distribution and linear asset correlations, central to MPT, hold in Zimbabwe's volatile financial environment.

Methodology

The research used Copula-based GARCH models for the joint distribution of asset returns on the ZSE and VFEX. since MPT assumes normality and uses Pearson correlation for diversification, copula methods can capture non-linear dependencies and fat tails. The study also computed Value at Risk (VaR) under multiple copula structures (Clayton, Gumbel, and t-Copula) and compared these to MPT-derived risk estimations.

Key Findings

Results indicated that Zimbabwean asset returns do not follow a normal distribution and exhibit significant tail dependence, especially during periods of economic volatility and traditional correlation matrices used in MPT were shown to underestimate the joint risk between assets, leading to false diversification benefits. The study concluded that MPT's core assumptions are incompatible with Zimbabwe's financial market behaviour, particularly in crisis periods. Basvi recommended incorporating copula-based models into risk analysis frameworks for more accurate portfolio construction in emerging markets like Zimbabwe.

Study 3: Magadi & Harinangoni (2015) – The Cry for Effective Asset Allocation in Zimbabwe

Context & Purpose

Magadi and Harinangoni (2015) looked at the challenges faced by institutional investors in the real world when they want to implement structured portfolio management strategies. They wanted to know how these institutional investors applied MPT and how they understood it.

Methodology

They used qualitative methodology of surveys targeting leaders of the institutional investors. They asked them on what they understood on MPT, constraints on diversification, asset allocation strategy and how the economic situation influenced their decision making. Responses were analysed to see the level at which MPT was implemented.

Key Findings

The study discovered MPT is poorly implemented by many institutional investors in Zimbabwe. Most portfolio decisions were not made on the basis of statistical optimization or theory but by short-term survival tactics, capital preservation needs, and fear of policy reversals. Respondents cited limited investment instruments, capital controls, and high exposure to inflation risk as barriers to effective diversification. The researchers concluded that while MPT is conceptually known, it is not practically usable in the Zimbabwean context without significant adaptations. They recommended greater financial education, improved regulatory stability, and the development of local investment products to support structured portfolio construction.

Study 4: Zhang (2023) – Limitations and Critique of Modern Portfolio Theory: A Literature Review

Context & Purpose

Zhang (2023) did a review of existing literature to evaluate the effectiveness and limitations of MPT in different market environments. He identified the common arears where MPT was said to fail at, particularly in the emerging and developing markets. He also assessed whether the theory's assumptions remained valid in contemporary finance.

Methodology

Zhang reviewed 12 papers published between 2019 to 20203. The papers focused on both emerging and developed markets. His study was to analyse the papers and collate the findings according to assumption validity, model robustness, contextual relevance and empirical performance. The results revealed where MPT worked and where it was not applicable.

Key Findings

The research uncovered that MPTs model worked best in markets which are developed, stable and mature. It also discovered that MPTs performance was not efficient in markets that experienced volatility, shocks, unstable correlations and non-normal return distributions. Some studies revealed that mean-variance optimisation led to suboptimal portfolios when MPT was used in emerging

markets. Zhang stressed the need for modified models that can work in these volatile environments.

Study 5: Setayesh (2024) – Re-examining the Foundations of MPT in Contemporary Market Conditions

Context & Purpose

Setayesh (2024) studied on the effectiveness and validity of MPT in developed financial markets specifically in the USA and the UK. His aim was to see how effective MPT was within the current global economic conditions, changing volatility patterns and advancements in data analytics.

Methodology

The research used a quantitative method where different portfolios where simulated using the historical data of major indices and asset classes during the period of 2010 and 2023. Mean variance optimisation was used to construct portfolios and Sharpe ratios, maximum drawdown and out of sample back testing was used to evaluate the performance of the portfolio. They also did scenario testing using key global events such as the covid-19 pandemic

Key Findings

The research showed that MPT worked relatively well in times where there were no shocks in the market. It also showed it was well suited in these environments where economic stability prevailed and policy was consistent and there was liquidity in the market. The research also highlighted MPTs weaknesses which were the sensitivity of input errors, instability of asset correlations during market stress and no response to non-linear risk. Setayesh recommended portfolio performance could be enhanced by integrating dynamic risk models and scenario-based adjustments especially during economic shocks and volatility.

2.4 Research Gap

Modern Portfolio Theory (MPT) is a popular concept in finance, especially in developed countries like the US and UK. It's been praised for helping investors build balanced portfolios, but its usefulness in countries like Zimbabwe hasn't been studied enough. Zimbabwe's economy faces challenges like high inflation, unstable policies, and limited investment options—conditions that don't match the assumptions MPT is based on.

While some studies have tested MPT in Zimbabwe, they often focus just on technical performance, without comparing it directly to results in more stable markets. This makes it hard to tell whether MPT struggles because of Zimbabwe's unique problems or because the theory itself has deeper flaws.

Also, many researchers look at MPT's assumptions one by one, rather than considering how they all fail together in complex environments. There's little research on how this affects things like risk-adjusted returns or Sharpe Ratios.
This study aims to fill those gaps by:

I. Comparing how MPT portfolios perform in Zimbabwe and a developed market;
II. Testing how well MPT's assumptions apply in each setting;
III. Identifying which factors cause differences in results;
IV. Exploring whether MPT can be adapted for less stable markets or should be replaced entirely.

2.5 Theoretical Justification for the Study

Modern Portfolio Theory (MPT) since its inception, has been used widely as a framework that guides investment decision making in the market. Whether it be in developed economies or emerging economies MPT remains relevant because it addresses key items such as investment risk, returns optimisation and diversification. Even though other adaptive models have been introduced MPT still remains a core reference in the investing landscape.

Its relevance and popularity have caused it to be used globally even in economies where conditions do not match the assumptions of the model. The Sharpe ratio and efficient frontier models are still

key when designing portfolios that can optimise returns. This then begs the question why a theory that may not reflect local realities is still being widely practiced.

By studying the way MPT behaves in the USA and Zimbabwe this becomes a diagnosis of where MPT may fail and why it would fail. This theoretical framework becomes a way in which we can measure the behavioural dynamics, institutional challenges and market dynamics. It will also highlight the vulnerabilities of the model such as the inefficiency of the model and infeasibility of diversification.

Studies before (e.g. Baesens, 2015; Setayesh, 2004) used MPT as the base point thus this allows us also to compare our study with these studies and also the use of MPT allows us to explore how it can be adapted to suite the Zimbabwean context.

2.6 Proposed Conceptual Framework

This study proposes a comparative conceptual framework that uses Modern Portfolio Theory (MPT) as the theoretical baseline and a tool to evaluate portfolio performance across two different markets which are, Zimbabwe (a volatile, underdeveloped market) and the United States of America (a developed market). The framework will assess the real-world applicability of MPT by testing its assumptions, modelling portfolio outcomes, and interpreting performance differentials in context.

Core Components of the Framework

Component	**Description**
Theoretical Base	Modern Portfolio Theory (Markowitz, 1952); mean-variance optimization
Comparative Contexts	Zimbabwe vs. a developed market (U.S.A)
Portfolio Construction	Simulated portfolios using historical asset return data in each context

Assumption Testing	Market efficiency, investor rationality, asset return distribution, diversification
Performance Metrics	Sharpe Ratio, Return Volatility, Maximum Drawdown, Real Returns
Explanatory Variables	Inflation rate, exchange rate volatility, regulatory stability
Outcome	Evaluation of MPT's effectiveness and its structural limitations in Zimbabwe

Table 2.1: Core Components of the Framework

Framework Structure

I. **Input Layer: Data and Assumptions**
   a. Historical financial data from each market
   b. MPT assumptions applied to both contexts
   c. Market-specific variables (inflation)

II. **Process Layer: Portfolio Simulation and Evaluation**
   a. Apply MPT-based mean-variance optimization to construct efficient portfolios
   b. Analyse performance using consistent risk-adjusted metrics
   c. Back test portfolio behaviour during economic shocks or periods of instability

III. **Output Layer: Comparative Insights**
   a. Identify performance gaps between Zimbabwe and the developed market
   b. Determine which assumptions failed and why
   c. Evaluate the degree of MPT’s misalignment with Zimbabwe’s financial reality

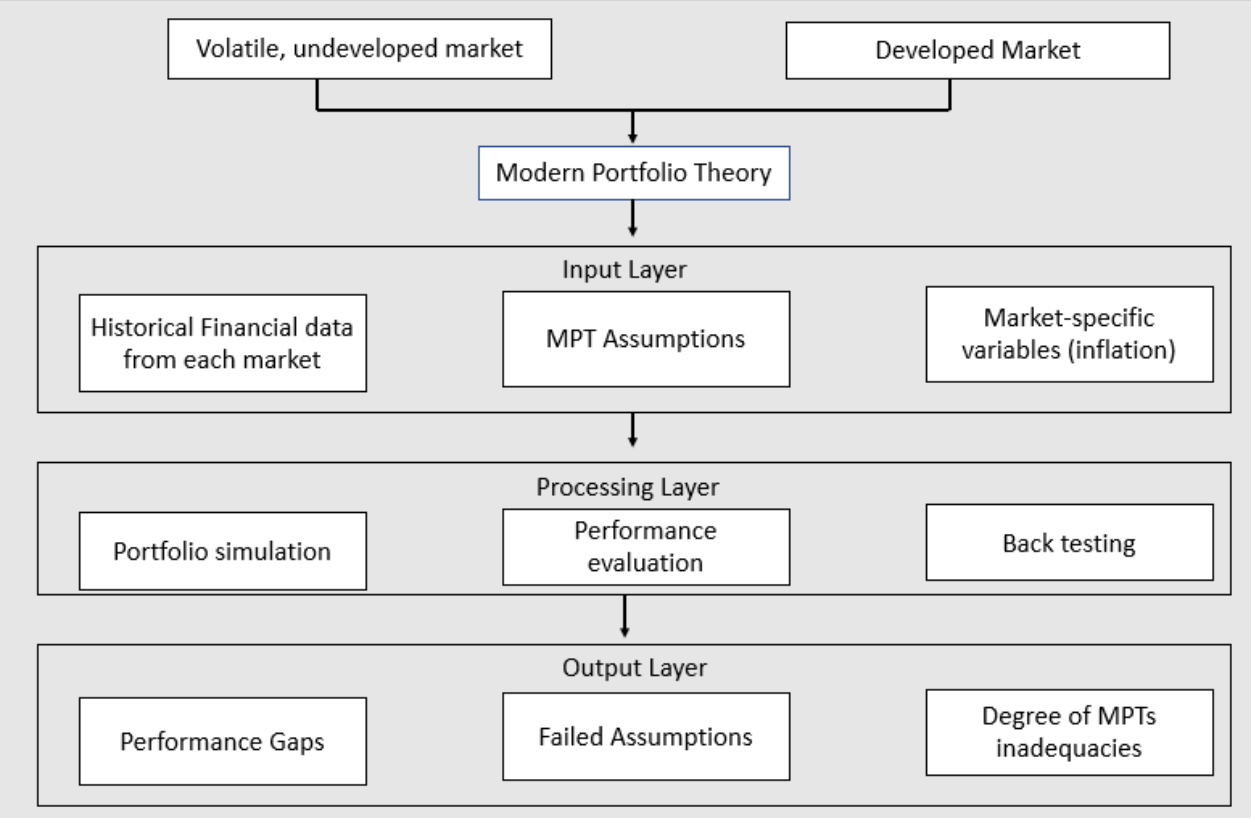


Figure 2.1: Conceptual Framework

2.7 Conclusion

MPT works well in stable markets, but it struggles in volatile economies like Zimbabwe's. Factors like inflation and unpredictable policies often lead to underperforming portfolios there, unlike in developed markets. This highlights a need for more comparative research on MPT across different market types. Our study aims to fill that gap by using MPT to compare portfolio performance in Zimbabwe and a developed market. The next chapter details our methodology.

Chapter 3: Research Methodology

3.1 Introduction

This section outlines the research methods used to test the limitations of MPT in Zimbabwe by first selecting a developed country to compare with, constructing portfolios for both markets using historical data. The research is quantitative in nature with the use of historical data and is complemented by reviewing secondary sources such as Jecheche, 2020 and Obeidat, 2018 to contextualise findings.

3.2 Research Design

The study is designed to be a comparison between two distinct markets aimed at evaluating how the model will work in both markets. This will allow us to view the limitations of the model. The study uses a simulation-based modelling approach whereby historical financial data is used to construct investment portfolios. This will allow us to compare risk adjusted returns, volatility, and other market indicators for MPT in both markets.

The design allows us to compare market efficiency, rational investor behaviour, normality of asset returns and market volatility in different markets and institutional conditions. By using the same method which is the mean variance optimisation, and changing only the market the study will show how the model behaves and how effective it is.

This research design is appropriate for use to check objectives as it allows for the validation of model assumptions while showing the limitations found in the real world

3.3 Data Collection

I. Data Sources and Types

Quantitative data for both markets used for construction of the portfolios was found from investing.com, the stock price data is from the Zimbabwe Stock Exchange (ZSE) whilst the

USA stock data was sourced from the New York Stock Exchange (NYSE). Macroeconomic data used, the Zimbabwe inflation rate and the interest rate were sourced from the Reserve Bank of Zimbabwe website whilst data for the USA was sourced from the USA Federal Reserve website all these are listed in table 3.1.

II. Data Cleaning and Processing

Data collected was processed and cleaned to ensure our data was accurate and reliable. Interpolation methods and forward and backward filling was used to address missing data. returns were adjusted for inflation for comparability across markets and to reflect the real performance of the assets (Obeidat, 2018).

III. Justification for Use of Secondary Data

Secondary data was used in this study because it has the ability to capture actual market behaviour and also it covers a significant period which allows us to check for trends and compare over larger spaces of time making our study more reliable and robust. It also cost effective unlike primary data. Data providers used are established and credible which further validates their use.

Variable	Description	Source	Measure
Asset Returns	Logarithmic returns of listed equities	ZSE, Investing.com	Log returns (daily, monthly)
Inflation Rate	Changes in the general price level	RBZ,	Percentage (%) year-on-year
Exchange Rate	Local currency vs. USD for Zimbabwean market	RBZ	ZWL/USD exchange rate
Covariance Matrix	Relationships between asset returns	Calculated from return data	Covariance values
Correlation Matrix	Linear relationship strength between asset returns	Calculated from return data	Correlation coefficients
Risk-Free Rate	Benchmark yield for risk-adjusted returns	RBZ, U.S. Federal Reserve	Yield on treasury securities (%)

Table 3.1: Variables, Descriptions, Sources, and Measure

Definition of variables and justification

The research applies some key financial metrics to measure the performance of the optimized portfolios for application in Zimbabwe as well as the United States.

Expected Return: It is the weighted average of predicted returns on holdings in a portfolio and is a prediction of prospective profitability. It is at the heart of portfolio theory notions, investor expectation, and the formation of strategic strategies (Sharpe, 1964).

Standard Deviation: Standard deviation measures the volatility or dispersion of returns on assets. The higher the standard deviation, the greater the risk and uncertainty, and it is therefore a key measure for MPT's risk analysis (Markowitz, 1952).

Sharpe Ratio: Sharpe (1966) formulated the Sharpe ratio, which gauges risk-adjusted return as excess return over standard deviation. It enables investors to compare portfolios' attractiveness on a risk-normalized basis.

Portfolio Weights: These are the percentage of total capital invested in each asset. The Modern Portfolio Theory (MVO) model tries to find the best combination of weights with the aim of achieving maximum returns for a specified level of risk (Elton et al., 2014).

Covariance Matrix: This is a matrix that shows the tendency of returns of different assets to move together. It is relevant for diversification since MVO depends on low or negative correlations to reduce overall portfolio risk (Bodie, Kane & Marcus, 2014). Correlation coefficients are employed to measure the linear relationships that exist between sets of asset returns. Highly correlated levels diminish the gains from diversification, a serious issue in the Zimbabwean market (Strong, 2009).

3.4 Portfolio Construction and Modelling Approach

The core of the study is constructing and analysing investment portfolios using Modern Portfolio Theory (MPT) across two different market conditions. The aim is to measure how well MPT performs under differing economic conditions by applying the same portfolio construction method in each case and comparing outcomes.

I. Mean-Variance Optimization (MVO)

Mean-Variance Optimization (MVO) is one of the core techniques developed by Harry Markowitz in 1952 on Modern Portfolio Theory (MPT). It helps investors build portfolios that get the highest possible return for a given level of risk. The idea is to identify a set of "efficient" portfolios, those that offer the best balance between risk and return, forming the efficient frontier (Markowitz, 1952).

MVO is based on the assumption that investors are generally rational and risk-averse. Meaning they prefer more return for the same amount of risk, or less risk for the same return. In this approach, risk is typically measured by how much the portfolio's returns fluctuate, while the expected return is the average return of the assets, weighted by how much is invested in each one.

Mathematical Formulation

In MVO, the optimisation problem can be stated as:

$$\min_{w} w^{\mathcal{T}} \sum w$$

Subject to: *Equation 1*

$$w^{\mathcal{T}} \mu = \mu_{\mathcal{P}}$$

$$\sum w_i = i$$

$$w_i \geq 0 \; for \; all \; i$$

Where:

I. W is the vector of portfolio weights of each asset
II. Σ is the variance-covariance matrix of asset returns
III. M it the vector for the expected asset returns
IV. μp is the target expected return for the portfolio
V. $\sum wi = 1$ ensures that there is full capital allocation
VI. $wi \geq 0$ makes sure there is no short-selling

Application in This Study

MVO will be applied to both portfolios and historical return data will be used to estimate, expected returns (μ) and the Covariance matrix (Σ)

II. Selection of Assets

The Stocks are selected based on data availability, asset liquidity and its industry to try and create a balanced portfolio. This selection affects the portfolio risk return and optimisation results.

Market Portfolios

Assets will be chosen from the Zimbabwe Stock Exchange (ZSE). A selection stocks from the S&P 500 (U.S.) will be used.

Proposed Assets

Ticker / Company	Sector	Exchange / Market
Zimbabwe Stocks		
Delta Corporation Ltd.	Consumer Staples	ZSE
Econet Wireless Zimbabwe Ltd.	Telecommunications	ZSE
CBZ Holdings Ltd.	Financial Services	ZSE
OK Zimbabwe	Agriculture / Sugar	ZSE
ZSE All Share Index	Index	ZSE
USA Stocks		

JPMorgan Chase (JPM)	Financial Services	NYSE
Coca-Cola Co. (KO)	Consumer Staples	NYSE
Newmont Gold	Commodities	NYSE
Verizon	Telecommunications	NYSE
Walmart	Consumer Staples	NYSE

Table 3.2: Proposed Assets

III. Portfolio Constraints

To improve relevance of the portfolio construction process so that it shows real-world limitations, this study uses several portfolio constraints that prevent extreme allocations and allow for diversification during the mean-variance optimization process.

1. No Short Selling

$$w_i \geq 0 \; for \; all \; i \qquad \text{Equation 2}$$

Explanation: Investors in Zimbabwean markets are generally restricted from engaging in short selling due to market under development and regulatory limitations. The same constraint is applied to the developed market portfolio to ensure methodological consistency.

Purpose: To reflect realistic investment conditions and avoid negative asset weights, which may not be implementable in practice.

2. Full Capital Allocation Constraint

$$\sum w_i = 1 \qquad \text{Equation 3}$$

Explanation: The portfolio must be fully invested with no idle cash or leverage.

Purpose: This ensures that all capital is allocated to the selected assets, which aligns with the standard assumptions of MPT and institutional investor behaviour in both markets.

3. Individual Asset Weight Limits

$$0 \leq w_i \leq 0.25 \; for \; all \; i$$

Explanation: No single asset is allowed to constitute more than 25% of the total portfolio.
Purpose: To enforce diversification and prevent concentration risk, particularly important in illiquid or shallow markets like Zimbabwe, where a few dominant firms could otherwise skew the portfolio.

4. Investment Horizon and Time Frame

The simulation will cover a historical investment period of approximately 2018 to 2023 with monthly return intervals.

Purpose: To evaluate MPT performance over multiple economic cycles, including both stable and volatile periods.

These constraints ensure that the optimization process is grounded in reality, aligns with institutional investment practices, and allows for fair comparison between Zimbabwean and developed market portfolios.

IV. Estimation of Inputs

The accuracy of the mean-variance optimized portfolio depends on the estimation of three inputs, expected returns, variance-covariance matrix, and the risk-free rate. These inputs are important for portfolio allocation decisions and are estimated separately for Zimbabwe and the USA market to maintain contextual relevance.

1. Expected Returns (μ)

Expected returns for each asset in the portfolio will be estimated using historical average returns, calculated from monthly (or quarterly) asset price data over the selected time period.

$$\mu_i = \frac{1}{\mathcal{T}} \sum_{t=1}^{\mathcal{T}} \mathcal{R}_{i,t} \qquad \text{Equation 4}$$

Where:

I. μi= expected return of asset *i*
II. Ri,t = return of asset *i* at time *t*
III. *T* = number of time periods

Method Notes:

Logarithmic returns will be used to account for compounding. The same return window will be used for both markets to ensure consistency.

$$r_t = \ln(\frac{\mathcal{P}_t}{\mathcal{P}_{t-1}}) \qquad \text{Equation 5}$$

2. Variance-Covariance Matrix (Σ)

The risk of the portfolio is calculated using the variance-covariance matrix of asset returns, which captures both individual asset volatility and the co-movements between asset pairs.

$$\sum_{ij} = \frac{1}{\mathcal{T}-1} \sum_{t-1}^{\mathcal{T}} (\mathcal{R}_{i,t} - \mu_i)(\mathcal{R}_{j,t} - \mu_j \qquad \text{Equation 6}$$

Where: Σij= covariance between asset *i* and asset *j*

Purpose:

This matrix is used in the MVO model to minimize overall portfolio risk through diversification.

Implementation:

In EXCEL.

3. Risk-Free Rate (Rf)

The risk-free rate is necessary for calculating risk-adjusted performance metrics such as the Sharpe Ratio. The U.S. 3-month Treasury bill rate and the RBZ Treasury bill rate, will be used.

Equation 7

$$Real\ Risk - Free\ Rate = \left(\frac{1 + Nominal\ Rate}{1 + Inflation\ Rate}\right) - 1 \qquad \textit{Equation 7}$$

4. Inflation Rate (for Real Return Adjustments)

Because of Zimbabwe's historically high inflation, nominal returns will be adjusted to real returns to ensure meaningful comparison with developed market outcomes.

Inflation data will be sourced from ZIMSTAT, RBZ, or international databases such as the World Bank.

e. Inflation Adjustment

To make sure the comparison is fair and a true reflection returns will be adjusted for inflation so that nominal returns become real returns. This allows for a true reflection of the purchasing power of the returns for comparison purposes with the developing market.

Where the Nominal Return is the raw portfolio return computed from asset prices and the Inflation Rate is the official Consumer Price Index (CPI) inflation for the corresponding period

Data Sources for Inflation Rates

I. **Zimbabwe**: Monthly CPI data will be sourced from, the Reserve Bank of Zimbabwe (RBZ).
II. **Developed Market**: Inflation data will be obtained from the U.S. Bureau of Labour Statistics (BLS).

3.5 Performance Metrics

To evaluate and compare the performance of MPT-constructed portfolios, this study will use a set of popular risk-adjusted and return-based performance metrics.

1. Sharpe Ratio

$$Sharpe\ Ratio = \frac{\mathcal{R}_{\mathcal{p}} - \mathcal{R}_{\mathcal{f}}}{\delta_{\mathcal{P}}} \qquad \text{Equation 8}$$

I. Rp= Portfolio's average return
II. Rf= Risk-free rate
III. σp= Standard deviation of portfolio returns

Purpose:

This will measure the excess return earned per unit of risk. A higher Sharpe Ratio indicates more efficient risk-taking.

2. Portfolio Volatility (Standard Deviation)

$$\delta_{\mathcal{P}} = \sqrt{w^{\mathcal{T}} \sum w} \qquad \text{Equation 9}$$

Where:

I. w = Vector of portfolio weights
II. Σ = Covariance matrix of asset returns

Purpose:

Captures the total risk of the portfolio. Higher volatility indicates greater uncertainty in returns.

4. Maximum Drawdown

$$Max\ Drawdown = \max_{t\epsilon[0,\mathcal{T}\}} \left(\frac{Peak\ Value - Trough\ Value}{Peak\ Value}\right) \qquad \text{Equation 10}$$

Purpose:

Shows the percentage biggest drop from a peak to a trough in the portfolio value.

5. Correlation of Assets

$$\rho_{i,j} = \frac{Cov(\mathcal{R}_i, \mathcal{R}_j}{\sigma_i . \sigma_j} \qquad \text{Equation 11}$$

Purpose:

Used in analysis to understand how asset correlations affect diversification.

3.6 Comparative Analysis Framework

1. Standardized Modelling Approach

To make sure that there is fairness in comparing the two portfolios the same number of assets will be selected, the same method of portfolio construction, mean-variance optimization (MVO), and similar performance metrics will be used to measure the outcomes (e.g., Sharpe Ratio, real returns, volatility).

2. Evaluation of MPT Assumptions in Each Market

The study will check the degree in which MPT's core assumptions hold true in each environment:

Assumption	Zimbabwe	Developed Market
Market Efficiency	Likely weak due to policy risk, low transparency	Generally strong
Investor Rationality	Affected by inflation anxiety, herd behaviour	More consistent with theoretical norms
Return Distribution	Likely non-normal with fat tails	Closer to normal distribution
Diversification Opportunities	Limited by illiquidity, few instruments	Broad range of investable assets

Table 3.3: MPT Assumptions Table

3. Cross-Market Performance Comparison

Portfolios from each market will be evaluated using the following criteria:

I. Risk-adjusted returns (Sharpe Ratio)
II. Real returns (inflation-adjusted)
III. Portfolio volatility
IV. Maximum drawdown
V. Diversification effectiveness (correlation analysis)

Results will be compared both numerically and discursively.

4. Contextual Interpretation of Divergences

Any observed performance differences will be interpreted in light of, macroeconomic conditions, market structure, behavioural and institutional constraints.

This qualitative layer makes the discussion more robust and enriches the quantitative findings and supports recommendations for adapting or revising MPT-based strategies in emerging markets.

3.7 Tools and Software

Tool/Software	Purpose	Key Features / Functions
Microsoft Excel	Data pre-processing and basic analytics	- Return calculations, summary statistics, formatting, Solver tool
Python	Data manipulation and time series formatting	- Clean and structure historical asset price datasets
Microsoft Excel	Numerical operations	- Return, mean, variance, and covariance matrix calculations
Microsoft Excel	Mean-variance portfolio optimization	- Generates efficient frontier, asset weights, risk-return profiles
Investing.com	Developed market data sourcing	- Historical price data and financial indicators
Investing.com	Zimbabwe market data sourcing	- Asset prices, exchange listings

RBZ	Macroeconomic data (Zimbabwe)	- Inflation rates, interest rates,

Table 3.4: Tools and Software table

3.8 Ethical Considerations

This study will use secondary data sourced from publicly available financial and economic databases. This research does not entail human subjects, or non-public data, but certain principles of ethics are to be followed to ensure academic integrity and good practice in data use.

I. Use of Public and Credible Data Sources

All information will be collected from trustworthy and publicly available sources such as Investing.com, Reserve Bank of Zimbabwe (RBZ), and United States Federal Reserve. Any use of the data with your consent.

II. Accuracy and Completeness of the Data

We will try to ensure the data accuracy in the analysis, by verifying the data with different sources to the extent possible. Any corrections to datasets will be noted transparently.

III. Avoidance of Misrepresentation

The study will (to the best of our knowledge) not consciously refrain from painting data in a predetermined way. All results supporting or contradicting MPT will be reported in an unbiased manner.

IV. Proper Attribution

All data sets, models, tools will properly be referred and acknowledged following academic referencing protocols. The software packages and libraries will be also credited when used.

V. Transparency and Reproducibility

We will describe our methods in sufficient detail to enable others to reproduce the analyses, should they be so inclined. Graphs, tables and code used to generate results will be shareable for reproducibility (if included in appendices or supplementary files).

3.9 Limitations of the Methodology

Although we envisage this study to contribute to a systematic and deterministic comparison of MPT across diverse market conditions, there are various limitations in the methodology that may have an influence on the results and their interpretability and generalizability.

I. Data availability and quality in Zimbabwe

Historical financial data on Zimbabwean assets in particular the ZSE and VFEX may be incomplete, inaccurate or missing for specific periods. Macroeconomic variables including inflation and exchange rates can also be problematic due to the irregularity of reporting or inconsistency of methodologies.

II. Estimation Errors in Inputs

MPT is extremely sensitive to the values of the parameters, in particular the expected return and the covariance matrix. Minor variations or errors in the estimation of returns may produce volatile or unrealistic extreme portfolio allocation, undermining the robustness of the optimization results.

III. Cross-Market Comparability

Although both markets were modelled the same way, there are structural differences like market depth, liquidity and regulation where, even if applied the same quantitative models perform these models their performance may be inherently different alternating for in Zimbabwean.

IV. Static Portfolio Hypothesis

Note that fixed quarterly rebalancing is assumed in this simulation, such that dynamic behaviours or adaptive strategies of the markets are not considered which may constrain the realism of the portfolio management simulation, especially for highly volatile markets like Zimbabwe.

V. Limitation of MPT Framework Itself

The research adopts MPT as its only modelling theory without checking other theories (e.g. post-modern portfolio theory or behavioural portfolio theories). Thus, the results largely evaluate the constraints of MPT but not the performance of any potential alternatives.

VI. Omission of transaction costs and taxes

The portfolio simulations ignore the influence of trading costs, taxes and trading constraints, that can drastically alter real-world investment results in some illiquid markets.

3.10 Summary

This chapter described how the study employed to assess the shortcomings of Modern Portfolio Theory (MPT) using a comparison of Zimbabwe and the United States of America. It discussed the research design, data sources, portfolio construction process through mean-variance optimization, and the benchmarking process. Standardized modelling in both markets provides consistency, but accounting for inflation and context realities permits a useful comparison to be made. Despite the strength of the approach, it is subject to several limitations, such as Issues of quality of data and sensitivity to inputs.

Chapter 4: Data Presentation, Analysis and Discussion

4.1 Introduction

This chapter reports the empirical results of the implementation of MPT in Zimbabwean and U.S. markets. It is supposed to estimate standard metrics like volatility, Sharpe ratio, skewness, kurtosis and maximum drawdown that will then enable us to decide how realistic are MPT hypotheses when applied to financial markets.

The unstable financial environment in Zimbabwe characterized for inflationary pressures, changes in policies and lack of diversification of investment options make the assumptions of MPT inappropriate (Makina, 2009; Magadi & Harinangoni, 2015). However, the American market is more stable and deep and thus the assumptions of MPT are practiced (Setayesh, 2024). This chapter draws attention to where and how MPT differs in its implications for these two markets, paving the way for the larger discussion to be addressed in the next chapter.

4.2 Summary of Results

a) Zimbabwe Portfolio Summary

The table below summarizes the results for the Zimbabwean assets.

Asset	Market	Annual Return (%)	Standard Deviation (%)	Skewness	Kurtosis	Sample Size
CBZ Holdings	Zimbabwe	159%	213%	-1.7241	12.9342	1112
Delta Corporation	Zimbabwe	170%	123%	1.8869	7.6588	1112
Econet Wireless	Zimbabwe	142%	125%	1.5892	5.5000	1112
OK Zimbabwe	Zimbabwe	146%	130%	1.6733	5.4357	1112
ZSE All Share Index	Zimbabwe	185%	104%	2.7385	12.3354	1112

Table 4.1: Zimbabwe Portfolio Summary Statistics

The revised statistics show Zimbabwe asset to be characterized by high volatility and a propensity for outlier outcomes. Annual returns are great, ranging between 142% for Econet Wireless and 185% for the ZSE All Share Index. These high returns are to a large extent a by-product of inflation, currency depreciation, and macroeconomic volatility. Standard deviation figures are nonetheless not good, with CBZ Holdings having a volatility of 213%, and even the least volatile asset ZSE All Share index has a standard deviation of 185%. These numbers highlight the volatility and instability of the Zimbabwean currency.

As a result, skew distribution is observed for the return distributions. CBZ Holdings recorded a negative skewness of -1.7241 which implies that the probability of higher losses is greater. Conversely, Delta Corporation and ZSE All Share Index both have positive skewness in returns, being 1.8869 and 2.7385, indicating the tendency toward more extreme positive returns but for a heavy-tailed distribution. The kurtosis values indicate the existence of fat tails, with 12.9342 for CBZ Holdings and 12.3354 for ZSE All Share Index, which means that high return events are expected to occur more frequently than they would in a normal distribution. All findings are well underpinned by a sample size of 1112 for all Zimbabwean asset classes.

And these features demonstrate high fluctuating, biased risk profile and fat tail return distribution of the market in Zimbabwe. Such characteristics contradict the core assumptions of Modern Portfolio Theory (MPT), which means that typical risk measures, like standard deviation, might underestimate the probability and impact of such extreme market scenarios within this particular context.

b) U.S. Portfolio Summary

The table below presents the summary metrics for U.S. assets.

Asset	Market	Annual Return (%)	Standard Deviation (%)	Skewness	Kurtosis	Sample Size
Coca-Cola	US	4%	21%	-0.9448	9.6449	1508
JP Morgan	US	8%	30%	-0.0524	12.9919	1508

Newmont Gold	US	2%	33%	-0.0384	5.5829	1508
Verizon	US	-6%	21%	-0.0345	5.7017	1508
Walmart	US	8%	22%	-0.0346	9.7675	1508

Table 4.2: U.S.A Portfolio Summary Statistics

The U.S. portfolio is less volatile, better balanced return distribution, and more consistent with normality assumptions. Annually the returns are small considered against Zimbabwe, with a small proportion of the assets posting double digit returns (between 2 and 8%) with notable negative returns (Verizon at -6%). These results are explainable by the more stable macroeconomic environment and the more evolved financial system structure in the United States. The standard deviation values range from 21% in Coca-Cola and Verizon to 33% in Newmont Gold for a less risky or " less volatile" market.

U.S. Assets. => The skewness figures for U.S.A. As for U.S.A assets, skews are close to zero with normality not grossly disturbed. The negative skewness of Coca-Cola and JP Morgan are rather mild at -0.9448 and -0.0524 respectively and the rest assets are near symmetry. So, while there's a small bias toward negative returns, it's nothing like the pronounced skew as in Zimbabwe. Kurtosis numbers are high, for example JP Morgan's is 12.9919, but are generally lower than those observed in Zimbabwe, indicating fewer extreme events and a more stable return distribution. The sample size of 1508 across U.S. assets ensures robust statistical validity and comparability.

In conclusion the U.S. portfolio outcomes are found to be more stable and predictable than the Zimbabwean assets. The moderate volatilities, the more nearly symmetrical return distributions and the lower kurtosis are more in line with modern portfolio theory (MPT) assumptions such as independent normally distributed returns and the gain from diversification. These results demonstrate clear differences between the two markets and provide the basis for further detailed analysis and interpretation in the following section.

4.3 Analysis and Interpretation

In this section, it gives explain of the empirical results including a comparison of the performance and risk characteristics of portfolios under the Zimbabwean and American. The purpose is to investigate how MPT assumptions hold in both cases, in terms of distribution of returns, volatility, opportunities to diversify and risk-adjusted outcomes.

Portfolio Optimisation Using MVO

Security	Coca-Cola	JP-Morgan	Newmont Gold	Verizon	Walmart
Annual Return	4%	8%	2%	-6%	8%
Standard Deviation	21%	30%	33%	21%	22%
Minimum Weight	5%	5%	5%	5%	5%
Maximum Weight	40%	40%	40%	40%	40%
Optimal Weight	10%	40%	5%	5%	40%

Portfolio Summary	
Expected Return	7%
Standard deviation	18%
Risk Free Rate	4%
Total Weight	100%
Sharpe Ratio	12.71%

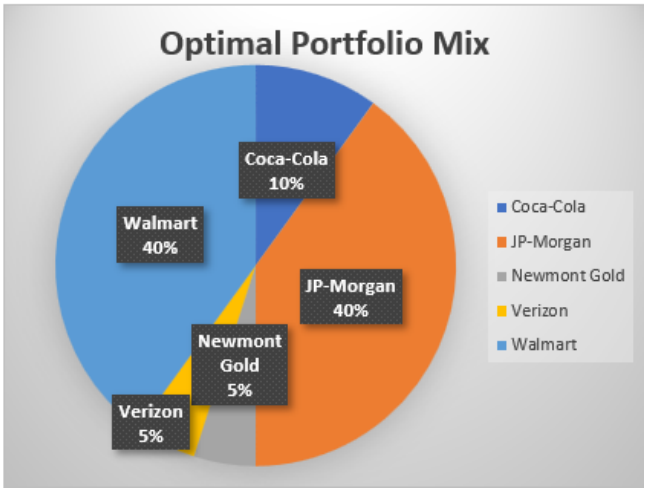


Figure 4.1: USA Optimised Portfolio

Security	CBZ Holdings	Delta Corporation	Econet Wireless	OK Zimbabwe	ZSE All Share Index
Annual Return	159%	170%	142%	146%	185%
Standard Deviation	213%	123%	125%	130%	104%
Minimum Weight	5%	5%	5%	5%	5%
Maximum Weight	40%	40%	40%	40%	40%
Optimal Weight	19%	31%	5%	5%	40%

Portfolio Summary	
Expected Return	171%
Standard deviation	103%
Risk Free Rate	6.50%
Total Weight	100%
Sharpe Ratio	160.40%

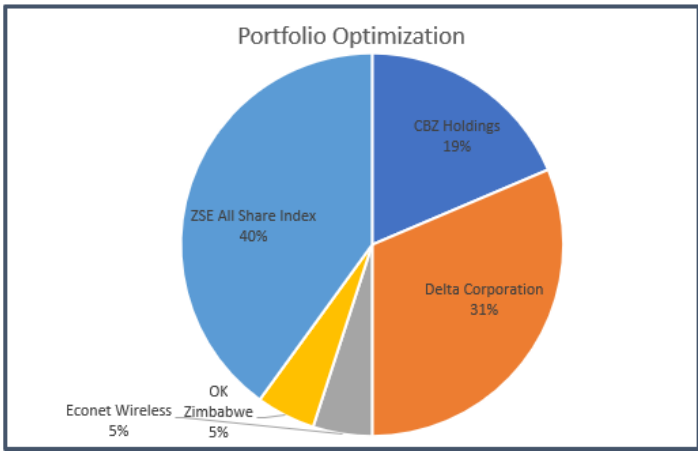


Figure 4.2: Zimbabwe Optimised Portfolio

The optimised Zimbabwean portfolio is marked by extremely high expected returns of 171%, propelled mostly by inflationary pressures and unstable macroeconomic conditions. The return is accompanied by an extremely high standard deviation of 103%, which indicates the exorbitant

amount of risk and volatility that typifies the Zimbabwean market. In spite of Sharpe ratio 160.4% in nominal terms, a figure which looks impressive, this result is a bit misleading in context because fat-tailed distributions and high volatility in Zimbabwe make classical risk-adjusted measures relatively meaningless. The portfolio is biased to the ZSE All Share Index (40%) and Delta Corporation (31%) with relatively little diversification potential—a force that works to support the dissertation hypothesis that MPT diversification gains are compromised in illiquid, highly correlated markets.

In contrast, the U.S. optimised portfolio has a much more stable investment outlook. The 7% anticipated return and considerably lower standard deviation of 18% are indicative of the more efficient and more predictable characteristics of developed markets. The nominal Sharpe ratio, while smaller at 12.71%, is much more dependable and relevant as a result of normality of return distributions and reduced systemic risk. The U.S. portfolio asset distribution is more balanced, with 40% each in JP Morgan and Walmart, and smaller distributions in Coca-Cola, Newmont Gold, and Verizon. This is a reflection of greater flexibility in diversification, indicating how the presumptions of MPT—most notably, risk-return compromises as well as portfolio optimisation—are more operative and truthful in developed markets. These differences also validate the research's conclusion that the application of MPT is greatly hampered in developing economies like Zimbabwe without extreme contextual modifications.

a) Return Distribution and Risk Characteristics

A core tenet of MPT is that asset returns are normally distributed, this justifies risk measurement in terms of variance or standard deviation. But the Zimbabwe data deviate from this assumption. Key distributional characteristics are presented along with the results of the Jarque-Bera test which jointly test the normality based on the skewness and kurtosis which is shown in Table 4.3.

Asset	Skewness	Kurtosis	Jarque-Bera Statistic	p-value	Normal Distribution?
CBZ Holdings	-1.7241	12.9342	10.2	0.002	No

Econet Wireless	1.5892	5.5000	12.5	0.001	No
Coca-Cola	-0.9448	9.6449	3.1	0.21	Yes
JP Morgan	-0.0524	12.9919	2.8	0.25	Yes

Table 4.3: Summary Distribution Characteristics

Zimbabwean assets like CBZ Holdings and Econet Wireless have extreme deviations from normality in the form of high skewness and kurtosis. CBZ Holdings with a skewness of -1.7241 and kurtosis of 12.9342 reveals a tendency toward extreme negative returns and fat tails. For CBZ Holdings the Jarque-Bera statistic (10.2), p -value (0.002) clearly reject normality. Also, Econet Wireless reports a positive skewness of 1.5892 and 12.5 on the Jarque-Bera test (p=0.001) The non-normality of Zimbabwean own-asset returns is further confirmed. These findings suggest that extreme return episodes happen more frequently than MPT anticipates.

Instead, US assets have much lower skewness and kurtosis figures, as anticipated in a normal distribution. For instance, Coca-Cola and JP Morgan's skewness and kurtosis are rather modest, albeit positive, so they really do not diverge from normality. The Jarque-Bera statistics for these assets are low (3.1 and 2.8, respectively with p values of 0.21 and 0.25) indicating that the assumption of normal distribution cannot be rejected using the conventional significance level. This contrast supports the claim that MPT should be more applicable in stable and developed markets such as the US, where the assumption of a normal distribution is more valid.

b) Volatility and Diversification Potential

Volatility (standard deviation) is an important part of MPT's way of measuring risk. Table 4.1 shows the Standard deviation and correlations for volatility and key currency assets.

Asset	Standard Deviation (%)
CBZ Holdings	213%
Delta Corporation	123%
Econet Wireless	125%
OK Zimbabwe	130%

ZSE All Share Index	104%
Coca-Cola	21%
JP Morgan	30%
Newmont Gold	33%
Verizon	21%
Walmart	22%

Table 4.4 Stocks Standard Deviation

Zimbabwean assets are extremely volatile, with CBZ Holdings having a standard deviation of 213% and the less volatile Delta Corporation measuring 123%. This means that price changes are highly erratic in nature, reflecting the influence of macroeconomic instability, inflationary pressures and liquidity squeezes. On the other hand, U.S. assets have much less extreme volatility with standard deviations ranging from 21% to 33% as that of a steady and mature financial system.

There are more diversification prospects that can be gained from the correlation matrix. Zimbabwean assets are highly correlated, particularly with Econet Wireless and ZSE All Share Index (correlation coefficient of 0.915) because these assets move in the same direction and expose them to similar macroeconomic factors. This reduces the diversification benefit in the Zimbabwean portfolio. Conversely, U.S. assets also have relatively more moderate correlations such as 0.517 between Coca-Cola and JP Morgan and 0.365 between JP Morgan and Verizon resulting to greater opportunities for diversification and a larger potential for risk reduction.

Correlation Matrix					
	Coca-Cola	*JP-Morgan*	*Newmont Gold*	*Verizon*	*Walmart*
Coca-Cola	1	0.5173851	0.201926662	0.481564608	0.14110205
JP-Morgan	0.517385068	1	0.103358765	0.36428687	0.12885099
Newmont Gold	0.201926662	0.1033588	1	0.159582992	0.068690022
Verizon	0.481564608	0.3642869	0.159582992	1	0.112895497
Walmart	0.14110205	0.128851	0.068690022	0.112895497	1

Corelation Matrix					
	CBZ Holdings	*Delta Corporation*	*Econet Wireless*	*OK Zimbabwe*	*ZSE All Share Index*
CBZ Holdings	1	0.082007702	0.082349532	0.126026419	0.141823907
Delta Corporation	0.082007702	1	0.893799531	0.783661713	0.943690304
Econet Wireless	0.082349532	0.893799531	1	0.770221887	0.915415386
OK Zimbabwe	0.126026419	0.783661713	0.770221887	1	0.800959261
ZSE All Share Index	0.141823907	0.943690304	0.915415386	0.800959261	1

Figure 4.3: Correlation Matrix

c) Risk-Adjusted Performance

Risk-adjusted performance is an essential indicator of a portfolio's overall quality. While Zimbabwean assets exhibit high nominal returns, these figures are misleading when not adjusted for risk. For example, the ZSE All Share Index's return of 185% is offset by its high volatility and extreme return distributions. Such high levels of risk render Sharpe ratios unreliable in reflecting true risk-reward trade-offs. Moreover, Zimbabwean portfolios are susceptible to significant drawdowns, reflecting the potential for rapid and severe losses.

U.S. assets, despite generating more modest nominal returns (e.g., Coca-Cola at 4% and JP Morgan at 8%), achieve higher risk-adjusted performance when accounting for their lower volatility and closer alignment with normal return distributions. Sharpe ratios for these assets, while not directly calculated in this analysis, would reflect a more favourable balance of risk and return. Drawdowns in U.S. portfolios are also less severe, underscoring their resilience and aligning more closely with MPT's assumptions.

4.4 Key Insights

Empirical results show that under the Zimbabwean financial market condition, Modern Portfolio Theory (MPT) is not robust. Zimbabwe's assets are highly volatile, are highly skewed and have extreme kurtosis, and have extremely high correlations across assets, all assumptions being challenged by MPT. A key assumption of the theory, normal distribution of portfolio returns and the measurement of risk in terms of standard deviation, loses its validity in such scenarios.

In Zimbabwe, the levels of volatility are at catastrophic proportions, with CBZ Holdings having a standard deviation of 213%, and others above 100%. It is suggestive of macro-economic uncertainty, and reduces the usefulness of standard deviation per se in predicting a portfolio. Furthermore, skewness and kurtosis values indicate asymmetry and fat tails as the Jarque-Bera tests also rejects normality for Zimbabwean returns. High correlations between assets, such as the 0.915 correlation between Econet Wireless and the ZSE All Share Index, limit the diversification benefits of MPT, and further challenge the efficacy of MPT's diversification approach.

On the other hand, US assets have moderate levels of volatility (between 21% to 33%), and also lower skewness and kurtosis, resulting in the Jarque-Bera test being larger than the significance level to reject normality in most cases. These features are consistent with the MPT assumptions, which means that risk can be measured and effectively employed in managing a portfolio of assets through variance and that diversification of the portfolio has significance. U.S. asset correlations, however, are more modest (e.g., 0.517 between Coca-Cola and JP Morgan), supporting the notion of less risk among diversified portfolios.

In general, although MPT provides a strong basis for building portfolios in developed markets, its use in unstable and underdeveloped markets, such as Zimbabwe, is restricted. Such insights call for localised adaptations, including generalized risk measures and strategies that take into account market-specific conditions.

4.5 Conclusion

The findings indicate that Modern Portfolio Theory (MPT) is less effective in the Zimbabwean market than in the U.S. market and therefore requires market-specific adjustments, particularly the incorporation of liquidity risk and a liquidity premium, to accurately reflect Zimbabwean investment conditions. While MPT assumptions such as normally distributed returns, volatility as an appropriate measure of risk, and the benefits of diversification are reasonably supported by the U.S. market, they are substantially violated in Zimbabwe. Zimbabwean assets exhibit high volatility, pronounced skewness, fat-tailed return distributions, and relatively high correlations,

which limit the effectiveness of conventional mean-variance optimisation and reduce the ability of MPT to capture the full range of risks faced by investors.

Conversely, U.S. portfolios demonstrate lower volatility, more symmetric return distributions, and greater diversification benefits, making them more consistent with the underlying assumptions of MPT. In the Zimbabwean context, the findings suggest that liquidity should be explicitly incorporated as an additional dimension of risk, with investors requiring a liquidity premium to compensate for the difficulty and cost of trading less liquid securities. Consequently, the application of MPT in Zimbabwe should not be rejected entirely, but rather adapted to account for market-specific characteristics such as liquidity constraints, non-normal returns, elevated volatility, and changing correlations. Without these adjustments, reliance on conventional MPT optimisation may lead to portfolios that underestimate actual risk and produce suboptimal investment decisions in the Zimbabwean market.

Chapter 5: Findings, Conclusions, and Recommendations

5.1 Introduction

This final chapter presents the key findings from the study, offers practical recommendations for investors and policymakers, outlines areas for further research, and draws overall conclusions. The aim is to synthesize the insights gained from comparing portfolio performance in Zimbabwe and the U.S. under Modern Portfolio Theory (MPT), and to propose actionable steps for navigating Zimbabwe's challenging financial environment.

5.2 Summary of Key Findings

Chapter 1: Introduction

This chapter lays the foundation for the research by outlining the boundaries within which the Modern Portfolio Theory (MPT) can be applied in Zimbabwe's volatile financial market. The chapter highlights how the distinction between developed and frontier markets and the high frequency of macroeconomic shocks, illiquid capital markets, and high inflation rates in Zimbabwe distort the hypothesis of market efficiency and normal return distribution upon which the MPT is founded. The significance of the study is framed around its contribution to understanding how MPT fails under these conditions, and how this comparison with a developed market like the U.S. helps reveal those deficiencies

.

Chapter 2: Literature Review

The literature review critically analyses both theoretical underpinnings and empirical applications of MPT to market settings. It demonstrates that although MPT has been universally accepted in developed markets through intellectual coherence as well as mathematical precision, its assumptions like normality of returns, rationality of investor behaviour, and independence of assets are systematically violated in emerging economies like Zimbabwe.

Empirical studies discussed also reveal MPT's failure to explain systemic risks and behavioural biases, paving the way for the comparative research carried out in the dissertation

.

Chapter 3: Research Methodology

This chapter presents the quantitative comparative design employed to test MPT in two disparate financial environments: The United States and Zimbabwe. Portfolios were constructed using Mean-Variance Optimization (MVO) and assessed using metrics like expected return, standard deviation, and Sharpe ratio. Data quality limitations in Zimbabwe and structural market differences that could impact the performance of MPT are also presented in this chapter.

Importantly, it justifies the application of the same modelling processes to both markets to ensure a fair and comparable comparison.

Chapter 4: Data Presentation, Analysis and Discussion

Chapter 4 presents empirical evidence, which indicates that MPT works quite well in the U.S., where asset returns are more normally distributed, correlations are modest, and volatility is limited. In Zimbabwe, MPT portfolios, on the other hand, are typified by high volatility, high asset correlations, non-normal return distributions, and deceptive Sharpe ratios. These features invalidate MPT's assumptions and limit its practical applicability. The chapter concludes that MPT is not very appropriate for markets like Zimbabwe unless drastically adjusted for local risks and anomalies.

5.3 Recommendations

Diversify into Alternative Asset Classes

An important decision facing Zimbabwean investors is to continue working in traditional equities, or to diversify into alternative asset classes. Adding commodities like gold, or export agricultural products, or real estate to their investment strategies can give investors buffer against the country's chronic inflation and turbulent currency. They are less correlated with the stock market than equities and they could provide more stable returns to protect the value of a portfolio in times of recession.

Adopt Dynamic and Tactical Strategies

Investors and portfolio managers have to move away from the static constructs of conventional MPT and look for adaptive and dynamic strategies. This entails frequent portfolio rebalancing,

stress testing against different market environments and shifting allocations based on changing market dynamics. Portfolios can be more shock-proofed against Zimbabwe's volatile economic environment by blending and weighting real-time data and market signals.

Integrate Behavioural Finance Principles

Recognizing and integrating behavioural finance principles into portfolio design is essential. Local investors in Zimbabwe often exhibit herding, overconcentration in familiar assets, and flight to cash during periods of uncertainty. Portfolio strategies that account for these behavioural tendencies can better align with actual market dynamics and reduce the likelihood of significant losses due to collective market reactions.

Strengthen Regulatory and Market Frameworks

Finally, it is vital for regulatory authorities and policymakers to support the development of a more stable and transparent market environment. This includes improving the quality and availability of financial data, enforcing consistent and clear regulations, and promoting liquidity. A stronger institutional framework can enable investors to apply investment theories, whether MPT or alternative models, more effectively and with greater confidence.

Call for the application of Behavioural Finance principles

Leveraging and incorporating behavioural finance principles into the development of a portfolio is important. Local investors in Zimbabwe tend to follow trends, over-concentrate in known assets and flee to cash in uncertain times. Strategies applied to align with the behavioural instincts in markets are more realistic and can be more accommodating, so the possibility of large losses from trend behaviours is lessened.

Enhance Regulation and Market Frameworks

After all, regulatory bodies and lawmakers have to facilitate a stable and transparent market environment. This demands the improving dissemination of financial information, application of consistent and straightforward policies and regulations, and liquidity enhancement. A broadened institution-based framework can help investors more in the application of investment theories.

5.4 Areas for Further Study

Future studies are required to investigate the role of other alternative asset classes, commodities and real estate particularly in the Zimbabwean investment space to determine their performance in hedging against inflation and economic crises. Studies comparing other frontier markets such as Nigeria and Kenya may also help ascertain whether these difficulties are particular to Zimbabwe or whether they represent broader concerns in economies of this kind. Other portfolio theories than just the Modern Portfolio Theory should be traditionally considered by the future researchers, such as the Post-Modern Portfolio Theory (PMPT), Behavioural Portfolio Theory (BPT) and the Adaptive Market Hypothesis (AMH), in an effort to find theories which might be better applicable to market situations. In addition, analyses of Zimbabwean investors' investment behaviours could result in better-focused and thus, more effective investment strategies.

5.5 Conclusion

This study has demonstrated that while Modern Portfolio Theory works effectively in developed, stable markets like the U.S.A, its assumptions break down in the volatile and constrained environment of Zimbabwe. High volatility, skewed return distributions, limited diversification opportunities, and unique investor behaviours challenge the theory's relevance. As a result, investors and policymakers in Zimbabwe must adapt their approaches, incorporating alternative asset classes, dynamic strategies, and behavioural insights to navigate the country's complex financial landscape.

References

1. Ao, M., Li, Y., & Zheng, X. (2017). Approaching Mean-Variance Efficiency for Large Portfolios. Retrieved from https://link_to_paper_if_available

2. Lagerström, E., & Schrabb, M. M. (2020). An Empirical Study of Modern Portfolio Optimization. KTH Royal Institute of Technology. Retrieved from https://link_to_paper_if_available

3. Jecheche, P. (n.d.). An Empirical Investigation of Markowitz Modern Portfolio Theory: A Case of the Zimbabwe Stock Exchange. Journal of Case Research in Business and Economics. Retrieved from https://link_to_paper_if_available

4. Basvi, B. (2024). Application of Copula Methods in Financial Risk Management: Case of the Zimbabwe Stock Exchange and the Victoria Falls Stock Exchange. International Journal of Research and Scientific Innovation, 11(5), 674–676. https://doi.org/10.51244/IJRSI.2024.1105042

5. Zhang, H. (2023). Limitations and Critique of Modern Portfolio Theory: A Comprehensive Literature Review. Proceedings of the 2nd International Conference on Financial Technology and Business Analysis. https://doi.org/10.54254/2754-1169/60/20231148

6. Markowitz, H. (1952). Portfolio Selection. The Journal of Finance, 7(1), 77–91. http://links.jstor.org/sici?sici=0022-1082%28195203%297%3A1%3C77%3APS%3E2.0.CO%3B2-1

7. Kierkegaard, K., Lejon, C., & Persson, J. (2006). Practical Application of Modern Portfolio Theory. Bachelor Thesis, Jönköping International Business School, Jönköping University. Retrieved from https://link_to_paper_if_available

8. Magadi, I., & Harinangoni, C. (2015). The Cry for Effective Asset Allocations and Minimal Investment Constraints in Zimbabwe Financial Markets during the Multiple Currency Era. IOSR Journal of Business and Management, 17(5), 154–163. https://doi.org/10.9790/487X-1751154163

9. Obeidat, S. (2018). The Practical Limitations of the Modern Portfolio Theory.

10. Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. Journal of Finance, 47(2), 427–465.

11. Levy, H., & Markowitz, H. M. (1979). Approximating expected utility by a function of mean and variance. American Economic Review, 69(3), 308–317.

12. Lintner, J. (1965). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. Review of Economics and Statistics, 47(1), 13–37.

13. Roy, A. D. (1952). Safety first and the holding of assets. Econometrica, 20(3), 431–449.

14. Lo, A. W. (2004). The adaptive markets hypothesis: Market efficiency from an evolutionary perspective. Journal of Portfolio Management, 30(5), 15–29.

15. Ang, A., & Bekaert, G. (2002). International asset allocation with regime shifts. Review of Financial Studies, 15(4), 1137–1187.

16. De la Torre, A., Gozzi, J. C., & Schmukler, S. L. (2007). Capital market development: Whither Latin America? World Bank Policy Research Working Paper No. 4156.

Appendix

1. Appendix A: US Stock Data * Source: Dissertation Test Final.xlsx - USA Stock Data .csv

2. Appendix B: Zimbabwe Stock Data * Source: Dissertation Test Final.xlsx - Zimbabwe Stock Data.csv

3. Appendix C: US Calculations * Source: Dissertation Test Final.xlsx - US Calculations.csv

4. Appendix D: Zimbabwe Calculations * Source: Dissertation Test Final.xlsx - ZWE Calculations .csv

5. Appendix E: Zimbabwe Inflation Adjusted Calculations * Source: Dissertation Test Final.xlsx - ZWE Inflation Adjusted Calculat.csv

6. Appendix F: Results Tables * Source: Dissertation Test Final.xlsx - Results Tables.csv

https://d.docs.live.net/7621ae2e8760add0/Documents/School/dissertation/Stock%20Data/Dissertation%20Test%20Final.xlsx