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Khoza, Nomathamsanqa

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South African retirement fund reforms to investment parameters and the resultant impact on the financial objectives of investors

Applied Research Project submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration (MBA)

By

Nomathamsanqa Khoza

Student number: 475970

Email: *Nomathamsanqa.Khoza@students.wits.ac.za*

Supervisor:
Dr Euphemia Godspower-Akpomiemie

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CHAPTER 1: INTRODUCTION

1.1. Background to the Study

The South African retirement fund industry plays a critical role in securing the financial well-being of individuals and contributing to the country's broader economic stability. Over the years, the regulatory framework governing retirement funds has evolved significantly to align with global best practices, enhance governance and to promote investment diversification. Among these regulations, Regulation 28 of the Pension Funds Act (No. 24 of 1956) (Regulation 28) is a cornerstone for guiding how retirement funds allocate assets to mitigate risks and ensure long-term sustainability (Moleko & Ikhide, 2017).

Regulation 28 establishes prudential limits on the asset classes in which retirement funds may invest and seeks to protect fund members from undue risk exposure. It includes provisions regarding equity, property, debt instruments and notably, offshore investments. The offshore allowance, which dictates the extent to which retirement funds may invest in foreign assets, has been a dynamic area of focus in light of South Africa's economic challenges, currency fluctuations and the imperative to align with global investment trends (National Treasury of South Africa, 2022). In the 2022 National Budget Speech by the South African Minister of Finance, Enoch Godongwana, an amendment to Regulation 28 of the Pension Funds Act was announced to increase the maximum offshore investment limit for retirement funds from 30% to 45% of assets (Parliament of South Africa, 2022).

Reforms to the offshore allowance have sparked debates within the financial and retirement sectors. Proponents argue that increasing offshore exposure provides access to diversified and high-growth opportunities in global markets which helps to enhance returns and mitigate domestic economic risks (Morina & Grima, 2022). Conversely, critics highlight concerns about the potential impact on local investment markets and the economy (Mhanda, 2020). These discussions are further influenced by global transitions towards the liberalisation of retirement fund investment regulations, increased awareness of environmental, social and governance (ESG) considerations and South Africa's unique socio-economic context (Kariseb, 2024).

1.2. Research Problem

The South African retirement system serves as an important mechanism for ensuring the financial security of individuals post-retirement while contributing to the broader economic landscape. Regulation 28 therefore has a central role in guiding retirement fund investments which includes setting limits on offshore allocations to balance risk diversification and domestic economic priorities (Stewart & Yermo, 2009). However, the reforms to increase offshore allocation limits ought to be assessed in terms of their impact on the investment outcomes for individuals within the retirement system.

Mhanda (2020) determines that while a higher offshore allocation provides opportunities for diversification and access to potentially higher returns in global markets, it also exposes individuals to risks such as currency volatility, geopolitical instability and the opportunity cost of reduced local investment. The long-term sustainability and adequacy of retirement benefits for South African individuals depends on striking a balance between these global opportunities and the developmental needs of the domestic economy.

Limited research exists on the practical implications of higher offshore allocations on retirement fund performance and the ultimate financial outcomes for individual members. This gap in knowledge creates uncertainty regarding the effectiveness of investment reforms in achieving their intended objectives.

As retirement funds increasingly shift investments offshore, it is critical to understand how these changes influence the growth, stability, and adequacy of retirement savings for members, particularly within South Africa's complex socio-economic landscape. The country faces persistent structural inequality, high unemployment, and chronically low domestic savings rates, all of which constrain individuals' ability to accumulate sufficient retirement wealth and expose the broader economy to imbalances in capital formation and income distribution (Alexis et al., 2022; Brixiová et al., 2015).

In this context, reforms to Regulation 28 that allow for higher offshore allocations present both opportunities and tensions. On one hand, increased global diversification can improve portfolio performance and risk-adjusted returns, thereby enhancing the long-term sustainability of pension assets. On the other hand, greater capital outflows may reduce

the pool of funds available for domestic investment in infrastructure, industrial development and employment-generating sectors. In turn, this would negatively impact the very socio-economic stability that retirement systems aim to secure (Stewart & Yermo, 2009).

Moreover, inequality in income and access to formal retirement savings means that the benefits of offshore diversification may disproportionately accrue to higher-income groups with established pension coverage, while lower-income workers remain excluded from the system altogether (Beck et al., 2018). This duality underscores the importance of assessing not only whether offshore allocations enhance returns, but also whether such reforms advance or hinder retirement adequacy and equity across socio-economic groups.

Therefore, understanding the impact of offshore investment reforms under Regulation 28 requires a multidimensional approach, one that considers financial efficiency alongside socio-economic equity and national development imperatives. Evaluating how global diversification interacts with domestic economic realities is central to determining whether South Africa's retirement fund reforms ultimately strengthen the long-term financial security of its citizens or exacerbate existing inequalities.

1.3. Purpose of the Study

This study seeks to address the need for empirical insights into how an increased offshore allocation under Regulation 28 affects individual investment outcomes within the South African retirement system. By analysing the benefits and potential risks, the research aims to provide an understanding of whether these reforms enhance or undermine retirement fund performance and the long-term financial well-being of fund members.

1.4. Research Objectives

This research aims to critically explore the implications of South African retirement fund reforms, with a particular emphasis on the offshore allowance under Regulation 28. By examining the drivers, challenges and potential consequences of these reforms, the study seeks to provide insights into how they influence retirement fund performance, member benefits and broader economic outcomes. Additionally, the research will assess how

these changes align with South Africa's developmental priorities, such as fostering financial inclusion, economic growth and sustainable development.

1.5. Research Questions

This research aims to address the implications of the offshore allowance reforms by focusing on quantitative investment outcomes and broader economic and social impact in South Africa. To achieve this aim, the following research questions are addressed.

Primary Research Question:

- How does a higher offshore allocation (under Regulation 28) impact the investment outcomes for individuals in the South African retirement system?

Secondary Research Question:

- What are the potential benefits and risks of increased offshore allocation for retirement fund performance?

1.6. Delimitations of the Study

This study focuses on the rationale for increasing offshore allocations in investment portfolios and the associated risks. The following delimitations define the scope and boundaries of the research.

1.6.1. **Geographical Scope**: The study primarily examines offshore investment strategies from a global perspective but places emphasis on South African investment practices in relation to offshore allocations.

1.6.2. **Conceptual Scope**: The research is limited to portfolio diversification strategies and does not include country-specific tax implications or legal frameworks beyond general regulatory considerations.

1.6.3. **Theoretical Framework**: The study is grounded in Modern Portfolio Theory (Markowitz, 1952), Capital Market Theory (Sharpe, 1964), Efficient Market Hypothesis (Farma, 1970) and Behavioural Finance Theory (Kahneman & Tversky, 1979).

1.6.4. **Investment Types Considered**: The research considers equities, bonds, real estate property, cash and alternative investments as part of offshore asset allocations.

1.6.5. **Cryptocurrencies, Speculative assets and Derivatives**: Special asset classes are excluded. These asset classes exhibit extreme price fluctuations and tail risks that makes them unsuitable for long-term retirement portfolios focused on stability and capital preservation. Global and South African regulatory frameworks for these assets remain underdeveloped which creates uncertainty, limits investor protection and heightens governance risks for investors. Cryptocurrencies predominantly lack intrinsic cash flows or tangible underlying value, being driven primarily by speculation rather than productive economic activity, which contradicts retirement funds' prudential investment principles. Derivative instruments introduce high leverage, counterparty and liquidity risks. Their misuse can amplify losses and create systemic instability. Trustees of retirement funds are legally obligated to pursue prudent, transparent and well-regulated investments aligned with members' long-term objectives. Cryptocurrencies and speculative assets therefore fail to meet these fiduciary criteria under Regulation 28 standards (Hermans et al., 2022).

1.6.6. **ESG Considerations**: Although ESG factors have become increasingly relevant in global investment management, this study excludes ESG considerations to maintain a focused analysis on the financial, regulatory and behavioural implications of South Africa's retirement fund reforms, specifically those affecting offshore investment allocations under Regulation 28. Scope Alignment and Research Focus. Integrating ESG analysis would significantly broaden the conceptual scope of the study by introducing additional non-financial performance metrics, ethical dimensions and sustainability frameworks that diverge from the study's primary aim of assessing risk–return trade-offs within a regulatory context. As noted by Gillan et al. (2021), ESG investing requires distinct analytical tools and long-term assessment horizons that differ from traditional performance measurement frameworks. Reliable and standardised ESG data for South African and emerging market portfolios

remains limited and inconsistent across reporting entities, which undermines the comparability and empirical validity of results (Eccles & Stroehle, 2018). Incorporating ESG indicators would therefore introduce methodological complexity and potential bias not aligned with the study's quantitative and regulatory focus. Regulation 28 is primarily designed to ensure prudential risk management, diversification and member protection rather than to enforce sustainability standards. While ESG principles are increasingly discussed in policy dialogues, they are not yet central to the statutory limits governing offshore asset allocations (National Treasury, 2022).

1.6.7. **Risk Considerations:** The study examines currency risk, market volatility, political/regulatory risks and liquidity risks associated with offshore investing. However, detailed risk mitigation techniques such as complex hedging strategies or algorithmic trading approaches are outside the scope.

1.6.8. **Timeframe:** The research focuses on post the 2008 financial crisis offshore investing and places a particular emphasis on the period from 2010 to 2024 Historical data before this period will only be referenced where necessary in order to provide context.

1.6.9. **Behavioural Finance:** The study focuses on cognitive and emotional biases that influence investor decisions including home bias, overconfidence, herding behaviour and loss aversion (Kahneman & Tversky, 1979). This is achieved by acknowledging that such biases are particularly pronounced in emerging markets and note that some evidence supports globally diversified portfolios (Wallmeier & Iseli, 2022). The study does not extend to deep psychological profiling or experimental behavioural modelling beyond these identified constructs.

1.7. Definition of Terms

Asset Class refers to a group of investments that exhibit similar characteristics and behave similarly in financial markets. The primary asset classes include equities (stocks), fixed-income securities (bonds), real estate (property), cash equivalents and alternative investments. Each asset class has different risk-return profiles and reacts differently to

market fluctuations, making asset allocation a critical component of portfolio management (Bodie et al., 2020).

Investment Portfolio is a collection of financial assets held by an individual or institutional investor to achieve specific financial goals. Portfolios include a mix of asset classes such as stocks, bonds, real estate property, cash equivalents and alternative investments to diversify risk and optimise returns (Markowitz, 1952).

Investment Return refers to the gain or loss generated by an asset over time and is expressed as a percentage of the initial investment. Investment returns can be derived from capital appreciation, dividends or interest payments and are influenced by factors such as market performance, economic conditions and investment strategy (Damodaran, 2021).

Investment Risk refers to the possibility of losing some or all of an investment due to factors such as market volatility, economic downturns, inflation and interest rate fluctuations. Different types of investment risk include market risk, credit risk, liquidity risk and geopolitical risk (Reilly & Brown, 2011).

Offshore Allocation is the proportion of an investment portfolio allocated to foreign markets outside an investor's home country. Offshore investing is used to diversify assets, reduce domestic market risk and gain exposure to international economic growth (Solnik, 1974).

Regulation 28 of the Pension Funds Act (No. 24 of 1956) is a regulatory framework within South Africa's Pension Funds Act that sets limits on the types and extent of investments that retirement funds can hold to ensure diversification and to mitigate excessive risk exposure. Amendments to 2022 have increased the offshore investment cap from 30% to 45% to allow greater international diversification (Financial Sector Conduct Authority (FSCA), 2022).

South African Retirement Funds are legally recognised financial vehicles that provide individuals with savings for retirement. These funds include pension funds, provident funds and retirement annuities, which are regulated by the FSCA and subject to laws such as the Pension Funds Act (Van Zyl, 2019).

Retirement Fund Members are individuals who contribute to a pension, provident or retirement annuity fund, either through their employer or privately. Members accumulate savings during their working years, which are then disbursed upon retirement as lump sums, annuities or other payout structures (National Treasury of South Africa, 2021).

Retirement Fund Reforms refer to policy changes and regulatory adjustments aimed at improving the efficiency, sustainability and inclusivity of retirement savings systems. In South Africa, notable reforms include adjustments to Regulation 28, the introduction of a two-pot retirement system and measures to enhance post-retirement income security (World Bank, 2022).

The 2008 Global Financial Crisis was a severe worldwide economic crisis triggered by the collapse of the United States (US) housing bubble and subsequent failures of major financial institutions. The crisis led to global economic downturns, bailouts from central banks and reforms in financial regulations (Reinhart & Rogoff, 2009).

1.8. Thesis Outline

The introductory chapter of this study explores the research purpose and presents the key research questions. Additionally, it highlights the significance of the anticipated findings, outlines the study's scope and limitations and provides definitions of essential terms. In Chapter 2, the literature review provides justification for an increased offshore allowance in relation to retirement funds as promulgated in Regulation 28. It further highlights that constraints imposed on the investment portfolios of South African investors have had a negative impact on investment outcomes. However, such evaluations also factor the contagion impact that capital outflows from the country will have on strategic initiatives. Chapter 3: This chapter explains the method adopted in achieving the research objective. A quantitative approach is adopted as the basis for analysing shifts in asset allocation before and after regulatory changes. In Chapter 4, drawing on secondary data collection, the research conducts tests to evaluate portfolio efficiency and risk-adjusted returns and presents the research results accordingly. Chapter 5 connects results with the research problem by discussing the implications of the empirical results presented in Chapter 4. Chapter 6 discusses the significance and implications of the findings and provides suggestions for future research on retirement fund reforms.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

This chapter details the literature review which examines the evolution of Regulation 28's offshore allowance, its implications for investment returns, risks and its broader effects on the financial objectives of South African retirement fund investors. Subsequent to discussing the evolution of Regulation 28, this chapter provides the justification for higher offshore investment by leveraging off theoretical frameworks. The impact of a higher offshore allowance on economic development and national objectives is also detailed in this literature review. Prior to concluding, this chapter details the hypothesis testing that was done.

2.2. The Evolution of Regulation 28 Offshore Limits

Regulation 28 of the Pension Funds Act, 1956, is a key legislative framework that governs the asset allocation of retirement funds in South Africa. It is designed to protect retirement savings by ensuring prudent investment practices and preventing excessive exposure to high-risk asset classes. A critical component of Regulation 28 is the offshore investment allowance, which stipulates the proportion of assets that retirement funds can allocate to foreign investments (National Treasury of South Africa, 2022).

The offshore allowance under Regulation 28 has undergone various changes over the past few decades which were influenced by global market dynamics and domestic economic priorities. Initially, the South African Government imposed strict capital controls to prevent excessive capital outflows and to ensure sufficient domestic investment. However, as global financial markets evolved and investors sought greater diversification, policymakers gradually increased the offshore investment cap (Moleko & Ikhide, 2017).

A key milestone occurred in 2018, when the offshore limit was raised from 25% to 30% and reflected a growing recognition of the benefits of international diversification (National Treasury of South Africa, 2018). In 2022, the South African government increased the offshore investment limit from 30% to 45%, marking a significant shift in retirement fund investment policies. This reform reflected broader efforts to enhance portfolio diversification and improve long-term returns for investors while balancing national

economic objectives (Parliament of South Africa, 2022). The 2022 amendment to the offshore allowance included a 10% allocation specifically for investments in Africa (Parliament of South Africa, 2022). This policy change aligned with global trends in pension fund management, where institutional investors increasingly sought exposure to developed and emerging markets in order to optimise returns and hedge against local economic risks (Willows, Burgers, & West, 2018).

Several studies have analysed the rationale for increasing offshore allowances, emphasising that a more flexible investment framework allows retirement funds to access a broader range of assets, reduce home bias and mitigate local economic risks (Bradfield & Munro, 2015). South Africa's relatively small and volatile financial market, coupled with concerns over local economic performance has further justified the need for greater offshore exposure (Wepener, 2014).

2.3. Theoretical Justifications for Offshore Investment by Retirement Funds

The theoretical foundation of this study is rooted in a synthesis of established financial and economic models that explain investor behavior and portfolio construction within regulated environments. A number of investment theories have provided a strong basis for the strategic rationale behind offshore diversification by retirement funds.

Modern Portfolio Theory: Originally developed by Harry Markowitz (1952), Modern Portfolio Theory offers critical insights into how changes in investment parameters influence both diversification and risk-adjusted returns. The theory posits that allocating capital across a broad spectrum of asset classes and geographical regions can optimise portfolio performance while concurrently reducing overall risk. Within the context of South African retirement funds, increasing the permissible limits on offshore investments has enabled a broader dispersion of risk across international markets, thereby mitigating the adverse effects of domestic economic volatility.

While Modern Portfolio Theory provides a foundational argument for diversification and risk reduction through international asset allocation, its practical application in emerging markets remains debated. Empirical studies indicate that the assumptions of normal return distributions and frictionless markets that are central to Modern Portfolio Theory

are often violated in emerging economies where market liquidity is limited, transaction costs are higher and volatility is structurally elevated. In the South African context, diversification through offshore investment offers a means to mitigate country-specific risks such as currency instability, political uncertainty and limited domestic sectoral diversity (Bekaert & Harvey, 2003).

While the full efficiency frontier proposed by Modern Portfolio Theory may be difficult to attain in structurally imperfect markets, the theory's core principle that diversification across geographies enhances risk-adjusted returns remains empirically and conceptually relevant. Thus, Modern Portfolio Theory continues to serve as a valid foundation for this study's analysis of offshore investment allocations.

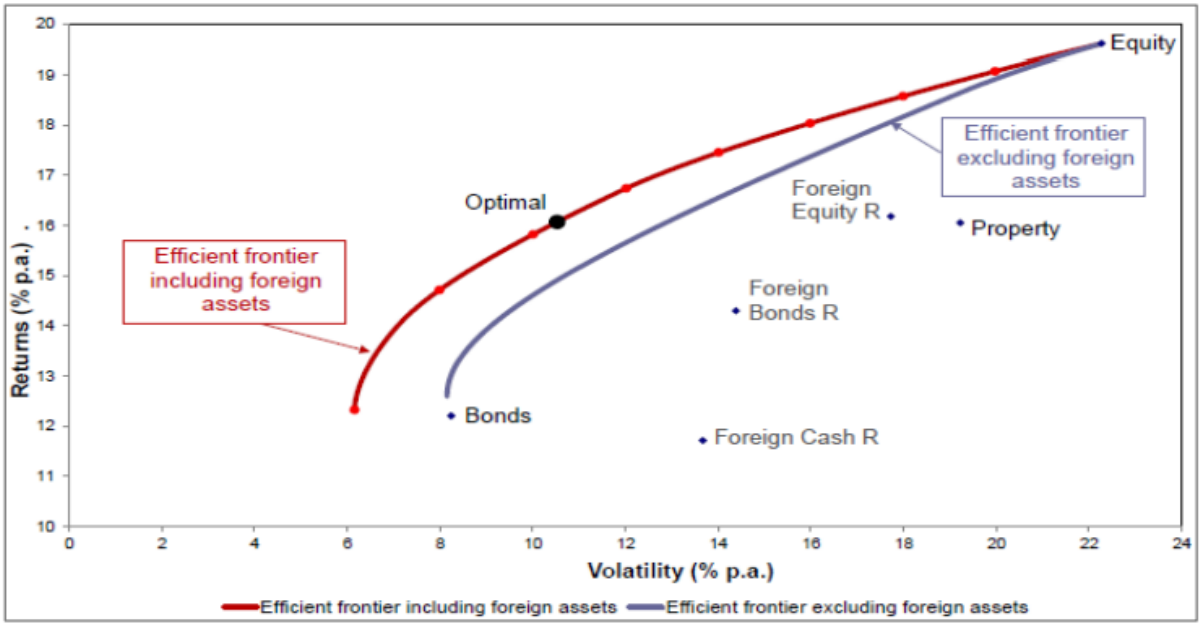
Capital Market Theory: William F. Sharpe's seminal work, *"Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk"* (1964), contributed to the theoretical underpinnings by articulating the advantages of engaging with offshore capital markets. His Capital Asset Pricing Model emphasises that global markets often present opportunities with either superior returns or lower levels of volatility compared to local markets. In alignment with this framework, the revisions made to Regulation 28, which allowed for increased offshore exposure, have enabled South African retirement funds to access a wider array of global asset classes including equities, fixed income instruments, cash and alternative investments. This diversification has not only expanded the investment universe but also enhanced portfolio efficiency by improving risk-adjusted returns.

Sharpe's (1964) Capital Asset Pricing Model assumes that investors have homogeneous expectations and unrestricted access to global capital markets. In practice, emerging market investors are exposed to specific risks such as regulatory barriers, capital controls and exchange rate constraints that distort equilibrium pricing and reduce market efficiency. Studies by Estrada (2007) and Marozva (2015) demonstrate that the traditional Capital Asset Pricing Model often fails to explain asset returns in emerging markets with higher beta (market) instability, currency volatility and time-varying risk premiums that reflect volatile macroeconomic environments.

Within South Africa's retirement fund context, the increase in offshore allocation limits under Regulation 28 allows funds to approximate the global market portfolio and thereby improves their position along the risk-return spectrum. Nonetheless, structural inefficiencies in emerging markets such as limited market depth and liquidity constraints ought to be flagged.

Efficient Markey Hypothesis: The theoretical rationale is also grounded in the principle that increasing foreign (offshore) asset allocation within an investment portfolio does not inherently yield superior returns. Instead, it enhances diversification by mitigating risk exposure and reducing reliance on the performance of a single market or economy (Fama, 1970). Drawing on this framework, Mhanda (2020) applied Eugene F. Fama's Efficient Market Hypothesis to demonstrate that, historically, the constraints imposed by Regulation 28 had limited the efficiency of investment portfolios. The study concluded that an optimal portfolio was one that incorporated a higher offshore allocation. This, in turn, supported the rationale for the revised Regulation 28, which allowed for increased offshore exposure. The findings, covering the review period from 1971 to 2010 are illustrated in Figure 1.

Figure 1: Efficient Market Hypothesis and the impact of including foreign assets



(Mhanda, 2020)

Eugene Fama's (1970) Efficient Markey Hypothesis asserts that asset prices fully reflect all available information which leaves no room for systematic outperformance through active management. However, evidence from emerging markets consistently challenges this assumption. Studies such as Magnusson & Wydick (2002) and Appiah-Kusi & Menyah (2003) found that African and frontier markets exhibit weak-form inefficiencies, that are driven by low liquidity, information asymmetry and limited investor sophistication.

In the South African setting, Mhanda (2020) suggests that offshore diversification partially compensates for these inefficiencies by granting investors access to more liquid and transparent global markets. Nevertheless, information irregularities, such as delayed price adjustments and regulatory opacity, persist domestically which indicates that Efficient Market Hypothesis may hold only in partial form. Thus, Regulation 28 reforms expanding offshore exposure can be interpreted as a policy instrument to enhance systemic efficiency through global integration.

Behavioural Finance Theories provide a resonant framework for emerging markets, where investor psychology often amplifies deviations from rational decision-making. Kahneman and Tversky's (1979) Prospect Theory introduced behavioural biases such as loss aversion, home bias and overconfidence that are particularly pronounced in less mature markets with lower financial literacy and institutional trust. Emerging market research supports these behavioural frictions. Chui et al. (2010) show that cultural and institutional factors magnify herding and familiarity biases, leading investors to prefer local equities even when foreign options offer superior risk-adjusted returns. This preference is known as home bias. In this context, the revised offshore investment allowance under Regulation 28 serves as a mechanism to address home bias by incentivising more globally diversified portfolios. Wallmeier and Iseli (2022) expanded upon this theoretical framework by analysing the influence of home bias on international asset pricing and exploring the benefits associated with diversifying into foreign markets. Their findings underscored that, among South African investors, portfolios remained significantly skewed towards domestic holdings, with allocations ranging between 65% and 80%.

This pronounced domestic orientation curtailed exposure to international markets and thereby limited the potential gains associated with global diversification.

By adhering to a predominantly domestic investment strategy, investors often overlook opportunities to enhance portfolio performance and reduce systemic risk through international diversification.

Addressing home bias therefore requires a deliberate and structured approach to asset allocation; one that acknowledges the benefits of global exposure and seeks to minimise vulnerability to localised economic disruptions. Wallmeier and Iseli (2022) have emphasised that overcoming this bias involves adopting a more balanced allocation strategy that incorporates both domestic and offshore assets. Consequently, behavioural finance complements the rationalist models discussed in this literature review, namely: Modern Portfolio Theory, Capital Asset Pricing Model and Efficient Market Hypothesis by explaining why South African investors and retirement funds have been slow to implement offshore diversification opportunities despite clear theoretical justification.

2.4. Impact of Increased Offshore Allowances on Investment Returns and Risks

The increase in the offshore allowance under Regulation 28 has had significant implications for investment returns, volatility and risk management within retirement fund portfolios. For South African investors, allocating capital to offshore markets, particularly those in more developed and stable economies, has been shown to offer higher return prospects and a reduced degree of risk (Godi & Sibindi, 2014). The following subsections examine these two dimensions in detail.

2.4.1. Expected Higher Returns

Research has consistently indicated that international diversification enhances long-term returns for retirement funds. Compared to the South African market, offshore investments provide access to a broader array of opportunities across countries, sectors and financial instruments. Godi and Sibindi (2014) argued that these expanded opportunities improved the overall performance potential of retirement portfolios. Similarly, Afanador et al. (2021) found that incorporating international assets allowed retirement funds to achieve superior returns while concurrently reducing risk.

South African financial markets have, during certain periods, underperformed relative to global benchmarks. Between 2011 and 2021, the Johannesburg Stock Exchange (JSE) exhibited relative stagnation when compared to the S&P 500, with earnings on the JSE remaining subdued in U.S. dollar terms over the decade (Biggs, 2022). The revised Regulation 28 limits, which permits a 45% allocation to offshore investments, has enabled retirement funds to access high-growth sectors such as technology, healthcare, and renewable energy; areas underrepresented in the domestic market. This shift aligns with global investment trends and positions retirement portfolios for enhanced long-term performance (Satrix Investments, 2024).

While Godi and Sibindi (2014) acknowledged the potential for domestic markets to outperform offshore markets in the short-term depending on macroeconomic conditions, they presented compelling evidence that portfolios with offshore allocations delivered superior returns over the long run. Mhanda (2020) reinforced this view by arguing that the structure of South Africa's retirement industry had historically placed undue emphasis on short-term objectives. He contended that a more balanced approach that incorporated greater offshore exposure would ultimately enhance long-term portfolio growth.

While Godi and Sibindi (2014) acknowledged that domestic markets could outperform offshore markets in the short term, depending on macroeconomic conditions, they also presented compelling evidence that, over the long term, portfolios with offshore allocations delivered superior returns relative to those invested exclusively in domestic assets. Mhanda (2020) reinforced this view by arguing that the structure of South Africa's retirement industry had historically placed undue emphasis on short-term objectives. He contended that regulatory bodies and market participants should strike a balance between short-term prudence and long-term growth. This balance, he suggested, could be achieved through greater offshore exposure, which would ultimately improve the long-term performance of retirement portfolios.

2.4.2. Reduced Exposure to Domestic Market Risks

South Africa's economy has been characterised by structural challenges, including persistent energy supply constraints, high fiscal deficits, elevated unemployment, and

currency volatility (World Bank, 2024). As an emerging market, South Africa's financial system has exhibited higher systemic risk and greater market volatility compared to developed economies (International Trade Administration, 2024). Investment opportunities in such environments also tend to show higher inter-market correlations which amplifies risk at the portfolio level.

Du Toit (2009) emphasised the importance of incorporating developed market assets due to their lower correlation with emerging markets. This approach aimed to reduce volatility and preserve long-term objectives by diversifying across multiple geographies. These insights have been echoed in the South African Reserve Bank's Financial Stability Review (2024), which concluded that offshore diversification serves as an effective hedge against country-specific risk. Investments in developed markets offer lower volatility and more stable conditions that reduce overreliance on domestic macroeconomic performance.

However, offshore investments also introduce currency risk. The South African Rand (ZAR) has historically exhibited sharp fluctuations relative to major international currencies such as the U.S. Dollar, Euro, and Pound Sterling. While currency devaluation can enhance offshore returns upon repatriation, it also exposes investors to significant exchange rate volatility. Seymour et al. (2015) highlighted the importance of managing this exposure through hedging strategies and structured asset allocation models.

2.5. Integrating Financial and Socio-Economic Theories

While financial theories such as Modern Portfolio Theory (Markowitz, 1952) and the Capital Asset Pricing Model (Sharpe, 1964) provide the analytical foundation for assessing offshore diversification and portfolio efficiency, their relevance in emerging markets such as South Africa extends beyond individual investment optimisation. In these contexts, the implications of portfolio allocation intersect with macroeconomic and socio-economic dimensions that influence national development outcomes, inequality and financial inclusion.

In South Africa, where retirement funds collectively represent a significant share of domestic capital formation, shifts toward offshore allocations can influence domestic investment flows, employment and infrastructure financing. There ought to be a link

between the diversification rationale articulated in Modern Portfolio Theory and broader developmental economics frameworks. According to Stewart and Yermo (2009), the balance between domestic and offshore investment directly affects a country's capacity for productive capital accumulation and economic growth. Similarly, Brixiová et al. (2015) argue that emerging markets must navigate the trade-off between capital market liberalisation and domestic development priorities, illustrating how financial integration shapes socio-economic outcomes.

Furthermore, integrating behavioural and socio-economic theories helps explain why, despite theoretical efficiency under Modern Portfolio Theory, investors often maintain a home bias or display risk-averse tendencies in response to social and economic uncertainty. This is particularly evident in emerging markets, where investment behaviour is influenced by inequality, financial literacy gaps and trust in institutions (Beck et al., 2018; Wallmeier & Iseli, 2022). These factors anchor behavioural finance within the socio-economic realities of South Africa's dual economy where concentrated wealth, limited savings capacity and policy-driven investment mandates shape investor behaviour and regulatory responses.

Thus, while Modern Portfolio Theory (Markowitz, 1952) and the Capital Asset Pricing Model (Sharpe, 1964) remain the theoretical cornerstones of this study's quantitative analysis, their interpretation within South Africa's retirement fund context requires transdisciplinary integration with socio-economic theories of development, inequality and behavioural decision-making. This approach recognises that offshore diversification reforms are not purely financial adjustments but also part of a broader socio-economic narrative that links investment policy, social equity and national development priorities.

2.6. Hypothesis Testing

This study formulates and empirically tests three key hypotheses concerning retirement fund reforms and offshore investment exposure under Regulation 28.

- H1: Increasing offshore investment leads to higher portfolio returns.
- H2: Portfolio risk, measured by standard deviation, decreases due to diversification benefits associated with offshore exposure.

- H3: Efficiency ratios reflecting risk-adjusted returns improve with broader geographic allocation.

These hypotheses are examined using historical market data and statistical models designed to evaluate changes in returns, risk, and efficiency before and after revisions to offshore investment limits.

2.7. Conclusion

The relaxation of offshore investment limits under Regulation 28 represents a pivotal shift in South Africa's retirement fund regulatory framework. By expanding permissible offshore allocation to 45%, policymakers have aimed to enhance diversification, reduce systemic (country-specific) risk and strengthen long-term return prospects (Parliament of South Africa, 2022).

While this reform offers clear benefits such as, reduced domestic volatility and access to global growth sectors, it also raises challenges. Chief among these are currency risk and the potential displacement of capital that could otherwise support inclusive growth and infrastructure development (Morina & Grima, 2022).

Ultimately, the success of this reform depends on achieving a balance between global investment flexibility and domestic economic development. This goal requires ongoing coordination among regulators, institutional investors and policymakers to ensure that offshore diversification complements rather than compromises national objectives.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. Introduction

This study examined the impact of South Africa's retirement fund reforms on investment parameters and investor financial objectives. Using a quantitative approach, it employed portfolio construction techniques such as Modern Portfolio Theory and Mean-Variance Optimisation to analyse shifts in asset allocation before and after regulatory changes. Drawing on secondary financial data, the research applied historical performance analysis and scenario testing to evaluate portfolio efficiency and risk-adjusted returns.

3.2. Research Design

A quantitative research design was adopted to assess the impact of South Africa's retirement fund reforms on investment parameters and their resultant effect on the financial objectives of investors**.** The research design (quantitative) enabled the systematic measurement, statistical analysis and objective evaluation of the impact of retirement fund reforms on investors' financial outcomes, in order to ensure replicable and generalisable findings. The study employed portfolio construction techniques to test the impact of different asset allocations and investment restrictions arising from the reforms.

In contrast, a qualitative approach such as interviews with fund managers or thematic analysis of policy documents would provide valuable contextual insights into perceptions of reform, behavioural responses or governance challenges but would not yield the numerical precision or replicability required to evaluate financial outcomes. Qualitative inquiry may therefore complement but could not substitute for the statistical evidence necessary to assess whether reforms improved risk-adjusted performance. Therefore, a quantitative paradigm that was grounded in established financial modelling techniques was justified as the most suitable means of addressing the study's objectives.

3.3. Population

The population for this study comprised of retirement funds in South Africa, including pension funds, provident funds, preservation funds and retirement annuities. These funds occupied a crucial role in securing financial stability for investors by managing long-term savings under regulatory guidelines. Therefore, the population consisted of all investment portfolios constructed from local and offshore indices that were impacted by retirement fund reforms (Regulation 28).

3.4. Sample Strategy

To ensure a representative dataset, a purposive sampling technique was used to select retirement funds with diverse portfolio compositions. The study sampled multiple retirement funds in South Africa, including pension funds, provident funds, preservation funds and retirement annuities (Van Zyl, 2019).

The study included funds that met specific criteria to ensure the relevance and reliability of the analysis. It focused on funds with publicly available statements and investment returns, as well as those that disclosed detailed asset allocation breakdowns. Additionally, only funds that operated both before and after the reform period were considered. The sample comprised a set of portfolios representing asset allocation strategies that aligned with the constraints and opportunities introduced by the Regulation 28 offshore reforms.

3.5. Data Collection Method

A secondary data collection method was followed and data was collected from the following market data and financial sources: JSE, Bloomberg and Refinitiv. In employing secondary data, this study assumed that the datasets obtained from these platforms were accurate, reliable and representative of market conditions during the period under review. These sources were selected based on their credibility, institutional reputation and widespread use in academic and professional investment research. It was assumed that the data provided by these platforms adhered to established standards of financial reporting, verification and periodic auditing to ensure internal consistency and comparability across asset classes and timeframes. The study also assumed that data

coverage and frequency were sufficient to capture market movements and reflect true economic conditions relevant to South African and offshore investment exposures.

3.6. Variables Description

The study analysed the following variables:

3.6.1. Independent Variable

The independent variable was in relation to retirement fund reforms and portfolio characteristics. Regulatory changes (Regulation 28 reforms) were the main independent factor. Within regulatory changes, there were asset allocation constraints such as limits on offshore investments and portfolio composition such as local and offshore asset classes.

3.6.2. Dependent Variables

The dependent variables were grouped into three main categories: portfolio performance metrics, asset allocation shifts and investor financial objectives. Portfolio performance metrics include annualised return (mean return), risk (standard deviation), Sharpe ratio, Sortino ratio, and maximum drawdown (Cheklov et al., 2005). Asset allocation shifts were analysed based on the percentage allocation to equities, fixed income, real estate property and cash (Bodie et al., 2020).

Additionally, investor financial objectives were categorised into three groups: wealth accumulation, representing growth-focused and aggressive funds; balanced, which positioned itself between growth-focused and conservative funds; and capital preservation, which encompassed conservative funds focused on minimising risk (Elton et al., 2014).

3.7. Data Analysis

The first step in the data analysis process was defining the investable universe, followed by the definition of constraints based on South African retirement fund regulations (Regulation 28 asset limits). Portfolio construction followed by using an efficient frontier that contained asset classes commonly found in retirement funds. Portfolios under

different investment restrictions were simulated, followed by the last step where the pre and post portfolio performance was compared.

3.7.1. Identification of Investable Universe

The investable universe was identified to ensure the sample included investment portfolios that were constructed from specific local and offshore indices (Wepener, 2014). Therefore, the following benchmark indices represented local and offshore investment portfolios.

- Local Indices: FTSE/JSE All Share Index (ALSI), FTSE/JSE All Bond Index (ALBI), FTSE/JSE All Property Index (ALPI) and Short-term Fixed Interest Composite Index (SteFI)
- Offshore Indices: MSCI All Countries World Index (MSCI ACWI), Citigroup World Government Bond Index (WGBI), FTSE NAREIT Composite (NAREIT) and ICE LIBOR 1 Month (LIBOR)

These indices were selected based on their liquidity, market representativeness and relevance to portfolio construction. Each index represented an asset class or investment proxy which is summarised in Table 1.

Table 1: Local and Offshore Investment Proxies

Asset Class	Local Proxy	Offshore Proxy
Equities	ALSI	MSCI ACWI
Fixed Income	ALBI	WGBI
Real Estate Property	ALPI	NAREIT
Cash	SteFI	LIBOR

3.7.2. Definition of Constraints

The investment parameters employed in this study were informed by the regulatory framework established under South Africa's Regulation 28, which governs the prudent allocation of retirement fund assets with the objective of safeguarding the long-term financial interests of investors. Regulation 28 prescribed specific limits on the proportion of assets that retirement funds could allocate to various asset classes, thereby promoting

portfolio diversification, managing systemic risk and supporting the overall stability of the financial system (Parliament of South Africa, 2022).

The study incorporated the following key regulatory constraints. Equity Exposure: Retirement funds were permitted to allocate up to a maximum of 75% of their total portfolio to equity investments, balancing the potential for enhanced returns offered by equities against the necessity of containing market volatility and risk exposure (Parliament of South Africa, 2022). Aggregate Property Limit: The cumulative limit on property holdings, encompassing both domestic and global markets, was capped at 75% of the total portfolio, ensuring that funds maintained prudent levels of exposure to this asset class (Parliament of South Africa, 2022). Global Asset Exposure: With respect to international diversification, funds were allowed to allocate up to 45% of the portfolio to global asset classes, reflecting regulatory efforts to provide access to broader investment opportunities while mitigating the risks associated with excessive offshore exposure (Parliament of South Africa, 2022).

By integrating these regulatory constraints into the analytical framework, the study ensured that the simulated and observed portfolio strategies adhered to the operational boundaries within which South African retirement funds function. This approach enhanced the validity, applicability and robustness of the empirical findings.

3.7.3. Portfolio Construction Process

By utilising Markowitz's Modern Portfolio Theory and Mean-Variance Optimisation, five investment portfolios were constructed to test the impact of investment restrictions arising from the Regulation 28 offshore limits. In addition, the theoretical justifications in Section 2.3 of the literature review, namely: Capital Market Theory, Efficient Market Hypothesis and Behavioral Finance Theories were taken into account.

Strategic Asset Allocation (SAA) is the process of setting a long-term portfolio allocation that aligns with an investor's financial goals, risk tolerance, time horizons and market conditions (Eychenne & Ronchalli, 2011). The portfolios' optimal SAA was derived using Modern Portfolio Theory which is widely regarded as the best method for its emphasis on

diversification, risk management and return optimisation (Markowitz, 1952). The different portfolios were constructed and tested under both pre and post-reform regulations during a review period from January 2010 to September 2024. A back-testing approach was followed, where historical performance and scenario analysis were carried out. In the historical analysis, asset allocations and different market conditions were tested, while in scenario analysis, scenarios under different regulatory reforms were created.

3.7.4. Investment Portfolios

Based on the above investment universe, constraints and portfolio construction process, the following allocations were derived for each investment portfolio.

Table 2: Allocations for Investment Portfolios

	Portfolio A: 0% Offshore	**Portfolio B: 26% Offshore**	**Portfolio C: 30% Offshore**	**Portfolio D: 38% Offshore**	**Portfolio E: 45% Offshore**
Local Asset Classes					
Local Equities	50.0%	37.0%	35.0%	31.0%	27.5%
Local Fixed Income	30.0%	22.2%	21.0%	18.6%	16.5%
Real Estate Property	10.0%	7.4%	7.0%	6.2%	5.5%
Local Cash	10.0%	7.4%	7.0%	6.2%	5.5%
Global Asset Classes					
Global Equities	0.0%	13.0%	15.0%	19.0%	22.5%
Global Fixed Local Income	0.0%	7.8%	9.0%	11.4%	13.5%
Global Real Estate Property	0.0%	2.6%	3.0%	3.8%	4.5%
Global Cash	0.0%	2.6%	3.0%	3.8%	4.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Total Local Exposure	100.0%	74.0%	70.0%	62.0%	55.0%
Total Offshore Exposure	0.0%	26.0%	30.0%	38.0%	45.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

In line with regulatory reforms, the offshore allocation was adjusted upwards while the local allocation was decreased in each respective portfolio from A to E. The transition into each portfolio indicated an increase in portfolio diversification from an asset allocation perspective.

3.7.5. Data Interpretation Process

In the final phase of the analysis, the study employed a range of data interpretation techniques that included descriptive statistics, comparative analysis and optimisation techniques. Descriptive statistics were used to analyse investment returns, portfolio diversification and risk metrics pre and post the regulatory reforms. Comparative analysis was conducted to evaluate financial outcomes for different investor groups in the pre and post reform periods. Additionally, optimisation techniques, particularly mean-variance optimisation was utilised to examine shifts in the efficient frontier, providing insights into changes in portfolio efficiency due to the reforms. Annexure A contains supplementary information on the process followed.

3.8. Limitations of the Study

Despite the comprehensive approach of this research, several limitations affected the study's findings and interpretations.

1. **Data Availability and Quality**: The study relied on publicly available financial statements and investment returns. However, some funds provided limited disclosure or exhibited inconsistencies in reporting, which may have impacted the completeness and accuracy of the dataset.
2. **Regulatory and Market Changes**: This study examined portfolio performance before and after the implementation of retirement fund reforms. However**,** external market factors such as economic downturns, interest rate fluctuations and geopolitical events also influenced portfolio performance, making it difficult to isolate the impact of regulatory reforms alone.
3. **Purposive Sampling Bias**: The use of purposive sampling ensured the inclusion of funds with diverse portfolio compositions, but it may not have fully represented the entire South African retirement fund industry. Some funds, particularly smaller or less transparent ones, were excluded, which limited the generalisability of the findings.
4. **Historical Performance as a Predictor**: The study employed historical data analysis to assess investment outcomes. However, past performance is not always a reliable

predictor of future results and portfolio behaviour may change under evolving economic and regulatory conditions.

5. **Assumptions in Portfolio Modeling**: The portfolio construction techniques used in this study, such as Modern Portfolio Theory and Mean-Variance Optimisation rely on assumptions about risk, return and market efficiency. Real-world constraints, such as liquidity concerns and behavioral finance factors were not fully captured in the models.
6. **Limited Time Frame for Post-Reform Analysis**: Since regulatory changes take time to influence investment strategies and financial outcomes, the post-reform period analysed in this study was too short to fully capture the long-term effects on investor financial objectives.

3.9. Ethical Considerations

This research paper applied for and obtained ethics approval from Wits University which ensured that all aspects of the study adhered to the institution's ethical guidelines and requirements. The approval process confirmed that the research met the necessary standards for data confidentiality and responsible handling of information. This study adhered to South African financial data protection laws by ensuring compliance with regulatory requirements governing the handling and use of financial information. Transparency was a key ethical principle in this study, and as such, the methodology, assumptions and analytical processes were clearly documented and disclosed in the final analysis to allow for replication and validation. By adhering to Wits University's ethical requirements, the research maintained credibility, protected data integrity and upheld the principles of responsible financial research.

CHAPTER 4: RESULTS & ANALYSIS

4.1. Introduction

This section provides a comprehensive overview of the descriptive statistics used to evaluate the impact of offshore exposure on portfolio performance over the review period from January 2010 to September 2024. The analysis covers both risk and return metrics by offering insights into how increasing offshore allocations influenced key performance indicators such as annualised returns, volatility, drawdowns and risk-adjusted ratios. Additionally, a correlation analysis explores the relationships between the portfolios and major South African economic indicators, including GDP, CPI and the USD/ZAR exchange rate. Together, these descriptive statistics lay the foundation for understanding the performance dynamics of the portfolios under study and inform the subsequent comparative analysis and hypothesis testing. Detailed data summaries are provided in Annexures B and C to support the interpretation of these findings.

The comparative analysis and optimisation techniques in this section present an evaluation which focuses on cumulative and rolling returns across portfolios with varying offshore allocations. By evaluating cumulative returns, the long-term growth trajectories and compounding effects of offshore investments were assessed. The rolling returns analysis further explores performance consistency, volatility patterns and resilience across different market environments, with particular attention to periods of market stress, such as the 2020 COVID-19 crisis. Together, these analyses provide valuable insights into how offshore exposure influences the stability, growth and risk management characteristics of investment portfolios.

In concluding this section, the results from hypothesis testing derived from the descriptive statistics and comparative analyses are discussed. Three research hypotheses are evaluated: whether greater offshore exposure leads to higher portfolio returns, whether diversification benefits reduce portfolio risk and whether efficiency ratios improve with offshore investment.

4.2. Descriptive Statistics

The descriptive statistics below included risk and return statistics as well as a correlation analysis. Annexure B provides the data summary.

4.2.1. Risk and Return Statistics

Table 3 presents the impact of increasing offshore exposure on portfolio risk and return metrics during a review period from January 2010 to September 2024.

Table 3: Risk and Return Statistics

	Portfolio A: 0% Offshore	Portfolio B: 26% Offshore	Portfolio C: 30% Offshore	Portfolio D: 38% Offshore	Portfolio E: 45% Offshore
Annualised Return	6.6%	7.4%	7.5%	7.7%	7.8%
Annualised Standard Deviation	9.3%	7.8%	7.7%	7.7%	7.8%
Maximum Drawdown	-18.5%	-12.4%	-11.6%	-9.9%	-9.6%
Gain Deviation	1.8%	1.6%	1.6%	1.6%	1.7%
Down Deviation (0%)	1.5%	1.1%	1.1%	1.1%	1.1%
Sharpe Ratio	0.38	0.53	0.54	0.57	0.58
Sortino Ratio	(0.06)	0.07	0.09	0.13	0.17
% Negative Months	36%	34%	34%	31%	31%
% Positive Months	64%	66%	66%	69%	69%

Key Observations

Based on the risk and return statistics, the increase in offshore allocations improved the investment outcomes of portfolios. The results were higher returns, reduced risks and superior risk-adjusted performance in the portfolios with higher offshore allocations. The detailed results from the descriptive statistics are contained in Annexure C.

4.2.2. Correlation Analysis

To examine the relationships between investment portfolios with varying offshore allocations and key economic indicators, a correlation analysis was conducted. This analysis assessed the strength and direction of the linear relationships among the five constructed investment portfolios (Portfolio A to E), South African GDP, South African Consumer Price Inflation (CPI) and the USD/ZAR exchange rate. In addition to calculating the correlation coefficients, statistical significance was assessed for each relationship by

computing p-values. The final correlation matrix presents both the correlation coefficients and their corresponding significance levels, helping to distinguish meaningful relationships from those that are not statistically significant. This approach enhanced the interpretability and rigor of the analysis by ensuring that observed correlations were not due to random chance.

Table 4: Correlation Matrix

	Portfolio A: 0% Offshore	Portfolio B: 26% Offshore	Portfolio C: 30% Offshore	Portfolio D: 32% Offshore	Portfolio E: 45% Offshore	SA GDP	SA CPI	USDZAR Exchange Rate
Portfolio A: 0% Offshore	1							
Portfolio B: 26% Offshore	0.92**	1						
Portfolio C: 30% Offshore	0.89**	1.00**	1					
Portfolio D: 38% Offshore	0.80**	0.97**	0.99**	1				
Portfolio E: 45% Offshore	0.71**	0.93**	0.95**	0.99**	1			
SA GDP	0.33*	0.21 ns	0.19 ns	0.13 ns	0.07 ns	1		
SA CPI	-0.04 ns	-0.08 ns	-0.08 ns	-0.10 ns	-0.11 ns	0.37*	1	
USDZAR Exchange Rate	-0.48**	-0.17 ns	-0.11 ns	0.03 ns	0.15 ns	-0.22 ns	0.21 ns	1

** p < 0.05, ** p < 0.01, ns = not significant*

Key Observations

The correlation matrix highlighted the direction and strength of relationships which are summarised were follows: A positive correlation with SA GDP decreased as offshore allocation increased. A negative correlation with SA CPI increased as offshore allocation increased. A negative correlation with USD/ZAR exchange rate shifted to positive as offshore allocation increased.

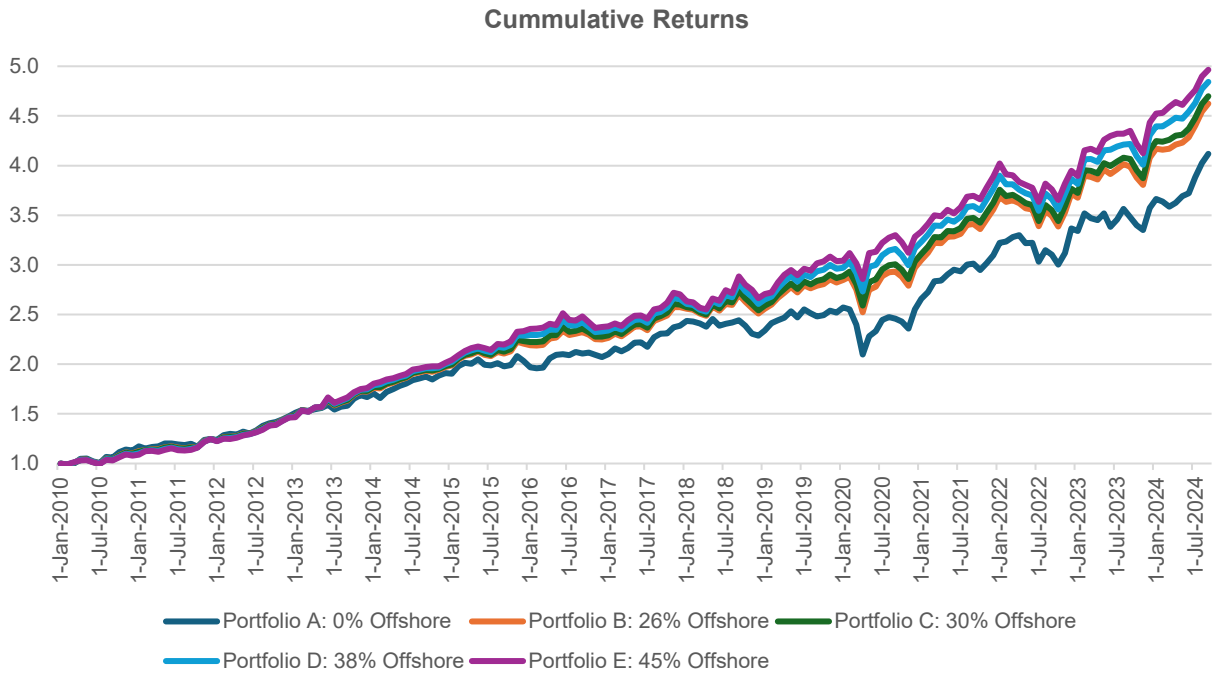
4.3. Comparative Analysis and Optimisation Techniques

In proceeding section, cumulative and rolling returns are analysed separately.

4.3.1. Cumulative Returns

The cumulative returns chart in Figure 2 demonstrates the performance of investment portfolios with varying offshore allocations (0% to 45% offshore) over time. This performance was directly linked to how well these portfolios aligned with investor objectives such as capital growth, risk management and diversification.

Figure 2: Cumulative Returns



(Bloomberg Terminal, January 16, 2025)

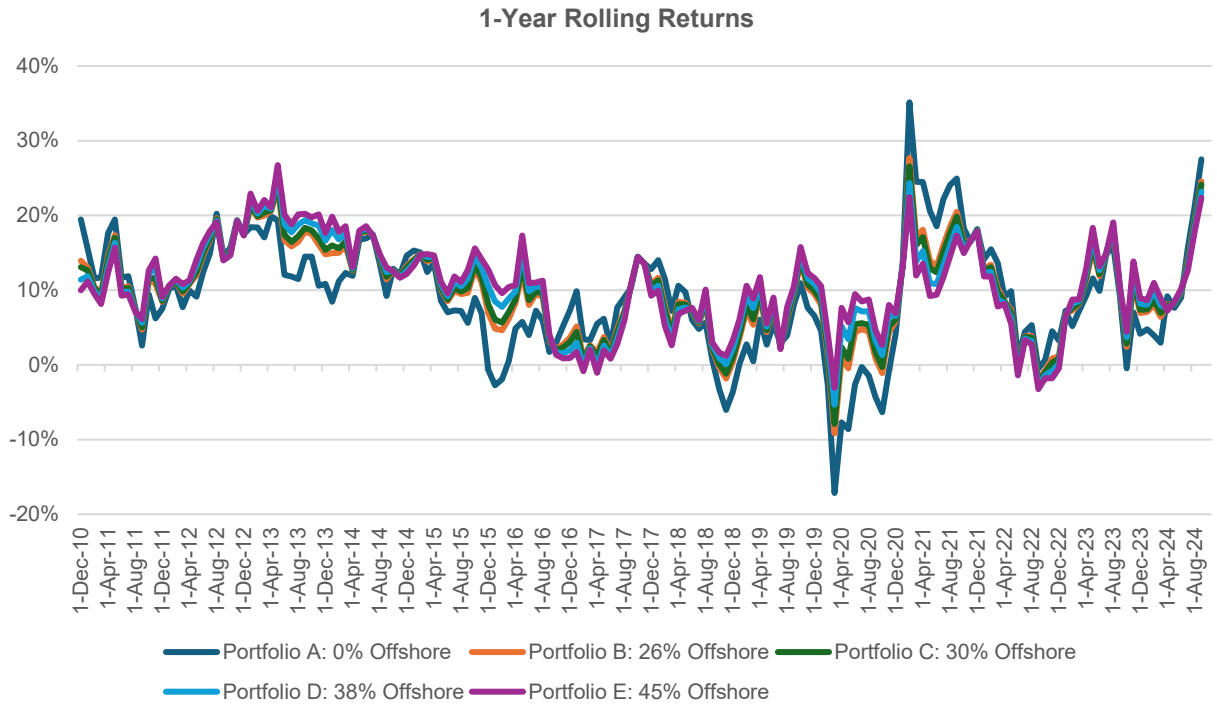
Key Observations

Portfolios with higher offshore allocations consistently outperformed portfolios with lower or no offshore allocations.

4.3.2. Rolling Returns

The 1-year rolling returns chart illustrates portfolios with varying offshore allocations (0% to 45%) over time. It provides insights into the volatility, performance dynamics and consistency of the portfolios.

Figure 3: Rolling Returns



(Bloomberg Terminal, January 16, 2025)

4.4. Hypothesis Testing Results

In the proceeding section, the results from the above descriptive statistics are utilised to test the research hypothesis.

H1: Retirement fund reforms allowing greater offshore investment led to higher portfolio returns

During the review period, annualised returns increased from 6.6% (Portfolio A, 0% offshore) to 7.8% (Portfolio E, 45% offshore). A greater allocation to offshore investments led to higher portfolio returns, due to access to more diversified and higher-growth global markets. Increasing the offshore allocation improved portfolio returns.

H2: Portfolio risk (measured by standard deviation) decreased due to diversification benefits from exposure to offshore markets

Annualised standard deviation decreased from 9.3% (Portfolio A) to 7.7%-7.8% (Portfolios C-E). Maximum drawdown (worst portfolio loss) declined significantly from -18.5% (Portfolio A) to -9.6% (Portfolio E).

A higher offshore exposure reduced downside risk (lower standard deviation and smaller drawdowns). This indicated that the diversification benefits provided by offshore markets reduced overall portfolio risk and provided better downside protection.

H3: Efficiency ratios improved due to higher offshore investment, indicating better risk-adjusted returns

The Sharpe Ratio (reward per unit of total risk) improved from 0.38 (Portfolio A) to 0.58 (Portfolio E) and the Sortino Ratio (reward per unit of downside risk) improved from negative (-0.06) in Portfolio A to positive (0.17) in Portfolio E.

Higher offshore allocations improved risk-adjusted returns and resulted in more efficient portfolios. The Sortino Ratio turning positive also suggested that offshore investments reduced downside risk, making returns more predictable.

Conclusion

The statistical evidence presented supports the hypotheses, demonstrating that increased offshore allocations enhance portfolio performance by improving returns, lowering risk and boosting risk-adjusted efficiency. These findings provide empirical support for the role of offshore diversification in enhancing investment outcomes and inform the broader discussion on retirement fund reforms.

CHAPTER 5: INTERPRETATION AND DISCUSSION OF RESULTS

5.1. Introduction

This chapter connects the study's findings to the research problem by interpreting how the results align with the theoretical foundations established in Chapter 2. The empirical evidence presented in Chapter 4 demonstrated that higher offshore allocations significantly enhanced portfolio performance, improving both diversification efficiency and risk-adjusted returns for South African retirement funds.

The interpretation of these findings is primarily grounded in Modern Portfolio Theory (Markowitz, 1952) and the Capital Asset Pricing Model (Sharpe, 1964**)** which are the two core frameworks that underpin this study's analytical approach. While the literature review considered additional perspectives such as the Efficient Market Hypothesis and Behavioural Finance Theory to provide contextual breadth, the quantitative results and interpretation most directly corroborate the principles of Modern Portfolio Theory and Capital Asset Pricing Model.

5.2. Descriptive Statistics

Based on the results and analysis in Section 4.2, the portfolio implications are discussed as follows.

5.2.1. Risk and Return Statistics

The results from the risk and returns statistics in Chapter 4 underscored the benefits of global diversification, not only in theory but in practical portfolio construction. There was an improvement in a significant number of metrics from return to volatility, drawdown and risk-adjusted measures. This indicates that offshore allocations were instrumental in creating more robust portfolios over the studied period.

The evidence suggests that the risk-return efficiency of domestic-only portfolios was inherently limited by geographic concentration risk. By incorporating international assets, investors accessed broader economic cycles, different interest rate environments and sectors that were underrepresented in domestic markets.

Notably, the results also indicate that after a certain threshold (approximately 30–38% offshore allocation), the marginal improvement in risk metrics began to taper, which pointed towards an optimal range for offshore exposure. Beyond this range, while returns continued to increase, the incremental gains in risk reduction were modest.

The data indicates a positive relationship between offshore allocations and portfolio returns. Portfolio A, which had no offshore allocations, delivered the lowest annualised return of 6.6%. Conversely, Portfolio E, with the highest offshore allocation at 45%, achieved an annualised return of 7.8%. This upward trajectory in returns, which was increasingly evident as offshore exposure increased was an indicator that international diversification contributed in enhancing portfolio performance. This finding aligns with modern portfolio theory (Markowitz, 1952), which advocates that combining assets from different markets can lead to more efficient portfolios.

A notable finding from the risk and return statistics was the significant reduction in portfolio risk, particularly between Portfolio A and Portfolio B. Annualised standard deviation declined from 9.3% in Portfolio A to 7.8% in Portfolio B which indicated improved volatility control with even modest offshore exposure (26%). Portfolios C through E maintained this lower level of volatility which suggested diminishing marginal improvements beyond a certain level of diversification. These findings are consistent with Capital Market Theory, which states that investing in offshore capital markets creates investment opportunities by offering higher returns or lower volatility compared to domestic markets (Sharpe, 1964).

Further supporting the case for offshore diversification, maximum drawdown (a key measure of downside risk) improved markedly across the portfolios. Portfolio A recorded a maximum drawdown of -18.5%, while Portfolio E's drawdown was limited to -9.6%. These findings indicated that portfolios with offshore exposures were better positioned to weather market downturns and further align with the assertions of Capital Market Theory on reduced portfolio volatility (Sharpe, 1964). The improvement in downside deviation, from 1.5% in Portfolio A to 1.1% in Portfolios B through E, further validated this assessment. Lower downside deviation implied that offshore portfolios experienced fewer and less severe negative return periods which enhanced capital preservation.

Risk-adjusted returns were enhanced. Both the Sharpe and Sortino Ratios improved progressively as offshore exposure increased. Portfolio A posted the weakest Sharpe Ratio of 0.38, while Portfolio E posted the strongest at 0.58. Similarly, the Sortino Ratio moved from a negative value (-0.06) in the domestic-only Portfolio A to a significantly positive value (0.17) in Portfolio E. These enhancements indicated that not only did offshore portfolios achieve higher returns, but they did so with superior compensation for the risk assumed; particularly downside risk, as evidenced by the Sortino Ratio.

Portfolios with higher offshore exposure also demonstrated a higher percentage of positive months, rising from 64% in Portfolio A to 69% in Portfolios D and E. The percentage of negative months correspondingly decreased which showed a more consistent performance pattern in globally diversified portfolios. This consistency would be attractive to long-term investors seeking smoother return profiles and less volatility in performance.

In summary, increasing offshore allocations over the review period consistently improved portfolio performance. The enhancement was most evident in higher annualised returns, lower drawdowns and superior risk-adjusted metrics. These findings supported the hypothesis that global diversification is a powerful tool for optimising portfolio outcomes and should be a key consideration in strategic asset allocation.

5.2.2. Correlation Analysis

Relationship Between Portfolios and SA GDP

Portfolios with higher offshore allocations were less influenced by domestic economic growth (SA GDP). This indicated that offshore investments had reduced dependency on the performance of the local economy.

Relationship Between Portfolios and SA CPI

The finding that portfolios with higher offshore exposure were less sensitive to domestic inflation trends was consistent with the study by Jefferis and Okeahalam (2000), who highlight that offshore investments act as an effective hedge against local inflation risks. Their research emphasises that exposure to global markets insulates portfolios from the effects of SA CPI, which in turn aligns with the evidence observed in this study.

Relationship Between Portfolios and USD/ZAR Exchange Rate

The results showed that portfolios with no offshore allocation (Portfolio A) were negatively affected by a weakening rand (USD/ZAR exchange rate), whereas portfolios with higher offshore exposure benefited as the rand depreciated. As the local currency lost value, offshore investments appreciated and underscored the currency diversification advantage of offshore allocations. This finding is consistent with Giddy and Dufy (1994), who emphasise that international diversification provides a natural hedge against currency risk and enhances portfolio resilience during periods of local currency weakness.

Sufficient Insights from Correlation

The correlation matrix highlighted the direction and strength of relationships which are summarised were follows: A positive correlation with SA GDP decreased as offshore allocation increased. A negative correlation with SA CPI increased as offshore allocation increased. A negative correlation with USD/ZAR exchange rate shifted to positive as offshore allocation increased. Strong predictive relationships were not evident from the correlation analysis. Therefore, there was limited justification to conduct inferential statistics such as a regression analysis in order to model the relationships further.

Key Findings

The summary of key findings from the correlation analysis showed that diversification benefits became more pronounced as offshore allocations increased, reducing reliance on domestic economic conditions such as SA GDP, SA CPI, and the USD/ZAR exchange rate. This outcome is consistent with Markowitz (1952), who argues that diversification across international assets reduces portfolio risk by lowering dependence on any single economy.

5.3. Comparative Analysis and Optimisation Techniques

Based on the results and analysis in Section 4.3, the portfolio implications are discussed as follows.

5.3.1. Cumulative Returns

The analysis showed that a higher offshore allocation drove superior portfolio growth. Portfolios with greater offshore exposure, such as Portfolio E (45%), were better suited for growth-focused, long-term investors who prioritised capital appreciation, inflation protection and diversification. In contrast, portfolios with lower or no offshore exposure, such as Portfolio A, were less effective at achieving these objectives, particularly during volatile or inflationary periods. This finding aligns with Markowitz (1952), who emphasises that diversification across international assets improves portfolio efficiency.

The results further indicated that offshore diversification enhanced portfolio stability and mitigated risk. Portfolios with offshore exposure delivered diversification benefits that reduced the impact of localised economic shocks and currency depreciation. For risk-averse investors, these portfolios offered more consistent performance by minimising the risk of significant capital losses during turbulent periods. Similarly, this observation is consistent with Markowitz (1952), who argues that combining uncorrelated assets reduces overall portfolio risk.

Additionally, the study found that higher offshore allocations produced a pronounced long-term compounding effect. Long-term investors seeking substantial wealth accumulation benefited more from these portfolios, as the compounding of superior returns over extended horizons amplified portfolio growth. This outcome aligns further with Markowitz (1952), who highlights the importance of diversification in enhancing long-term investment outcomes.

The findings also showed that portfolios with higher offshore exposure were more effective in meeting inflation-adjusted objectives. Investors aiming to preserve purchasing power or achieve positive real returns, such as SA CPI plus a target margin, were better positioned with portfolios that included significant offshore allocations, which provided greater growth potential to counter inflationary pressures. Markowitz (1952) supports this view by noting that diversified portfolios are better equipped to achieve inflation-beating returns.

Finally, the study demonstrated that investors concerned about currency risk, particularly in the context of a weakening rand, benefited from offshore allocations. Offshore portfolios effectively hedged against local currency fluctuations by enhancing the global purchasing power of investors. This conclusion aligns with Markowitz's (1952) principle that international diversification provides protection against country-specific risks, including currency depreciation.

5.3.2. Rolling Returns

The analysis revealed that portfolios with higher offshore allocations (Portfolios B to E) delivered more consistent rolling returns with reduced volatility, meeting the objectives of both growth-focused and risk-averse investors. This finding is consistent with Sharpe (1964), who argues that accessing offshore capital markets offers the potential for higher returns or lower volatility compared to domestic markets. In contrast, portfolios with no offshore allocation (Portfolio A, 0%) experienced greater volatility and were more exposed to local market-specific risks. Further discussion of these results is presented below.

Offshore Allocations Reduced Volatility Over Time

The study showed that offshore allocations contributed to more stable portfolio performance by diversifying away from local market-specific risks, which in turn smoothed out performance fluctuations over time.

Higher Offshore Allocations Delivered Competitive Performance

Higher offshore exposure enhanced growth potential while maintaining portfolio stability, making these portfolios well-suited for investors aiming to achieve capital growth with reduced dependence on domestic markets.

Resilience During Market Stress

The results indicated that offshore investments acted as a buffer during domestic market downturns, reducing downside risk for investors during periods of economic stress and uncertainty.

Similar Trends with Diverging Magnitude

While all portfolios were influenced by global market cycles, offshore allocations mitigated the magnitude of extreme local market fluctuations. This outcome further supported the case for diversifying across international financial markets and economies to enhance portfolio resilience.

5.4. Policy and Investment Strategy Implications

This section analyses how policy changes specifically the Regulation 28 reforms enacted in 2022 influenced strategic asset allocation decisions across the South African retirement fund industry. By relaxing the offshore investment limit from 30% to 45%, the reforms prompted a measurable shift in how retirement funds approached portfolio diversification and risk management. To illustrate the tangible effects of this policy change, this section incorporated both macro-level data and fund-specific allocation trends. Drawing on insights from various industry reports, the analysis began with an overview of industry-wide asset allocation transitions, followed by granular illustrations from the following prominent investment managers: Allan Gray, Coronation Fund Managers, Ninety One, Old Mutual Investment Group and Sanlam Investments. These data-driven insights provided empirical evidence of the strategic rebalancing that followed the reforms, particularly the move toward increased offshore exposure, reduced JSE holdings as well as diversification into global fixed income and alternative assets.

Retirement Fund Outcomes Pre and Post-Reforms

An assessment conducted by Alexander Forbes (2022) on the factors that changed pre and post the Regulation 28 reforms identified that the actual offshore allocation increased from a prior range of between 26% and 30% to a new range between 38% and 45%. Additionally, Coronation Fund Managers (2023) discovered that the JSE (local equities) allocation reduced by approximately 10% to 15% post the reforms while the bond (fixed income) allocation had a recorded increase to offshore opportunities. The complete results from the assessments are presented in table 5.

Table 5: Comparison of Offshore Allocation Transitions

Factor	Pre-Regulation 28 (Before February 2022)	Post-Regulation 28 (After February 2022)
Maximum Offshore Allocation	30%	45%
Actual Offshore Allocation (Average)	26% – 30% (most funds maxed out the cap)	38% – 45% (many funds transitioned gradually to the new cap)
African Market Allocation	5% – 10%	Up to 10% (but limited adoption due to regional risks)
JSE Exposure (Local equity)	~65% of total portfolio	Reduced to ~50%-55%
Preferred Offshore Regions	U.S., Europe, Asia	U.S., Europe, Asia (no major change)
Investment Vehicles	Mutual funds, direct equities	ETFs, global mutual funds, alternative assets
Currency Diversification Focus	Limited to Rand-hedged stocks	Increased exposure to USD, EUR, GBP and JPY

Note. Data compiled from multiple sources: Parliament of South Africa (2022), Alexander Forbes (2022), Ninety One (2023), Coronation Fund Managers (2023), Old Mutual Investment Group (2023), and Seymour et al. (2015).

The proceeding section discusses the key findings in further detail.

Immediate Offshore Expansion

The majority of retirement funds immediately adjusted allocations after the rule change in 2022 by shifting an additional 10%-15% of capital offshore. A focus on diversification away from South African market risks (political instability, weak economic growth, Eskom issues) was the rationale for this transition (Alexander Forbes, 2022).

Decline in Local Equity Holdings

JSE-listed stocks experienced capital outflows as retirement funds reallocated towards global markets. Local asset managers restructured multi-asset funds by increasing their offshore components (Coronation Fund Managers, 2023).

Increased U.S. and Developed Market Exposure

The S&P 500 and Nasdaq 100 exchange traded funds were among the most prevalent offshore investments. European and Asian markets also received significant allocations (Old Mutual Investment Group, 2023).

Cautious Approach to African Markets

Despite the 10% African investment cap, few funds have significantly expanded into African equities and bonds due to higher risks and limited market liquidity (Ninety One, 2023).

Growth in Global Alternative Investments

Funds are now allocating more to global private equity, real estate investment trusts (REITs), and infrastructure funds (Sanlam Investments, 2023).

Fund Level Illustrations

Table 6 depicts how the major South African retirement funds have reportedly adjusted their allocations.

Table 6: Pre and Post-Regulation 28 Allocations

Fund/Institution	Pre-Reg 28 Offshore Allocation	Post-Reg 28 Offshore Allocation
Allan Gray Balanced Fund	~30%	42% – 45%
Coronation Balanced Plus Fund	27%	41%
Ninety One Absolute Balanced Fund	28%	40%
Old Mutual Balanced Fund	29%	43%
Sanlam Balanced Fund	~30%	41%

Note. Data compiled from publicly available factsheets and quarterly updates: Allan Gray (2024), Coronation Fund Managers (2024), Ninety One (2024), Old Mutual Investment Group (2024), Sanlam Investments (2024).

The Regulation 28 reforms have had a significant impact on the strategic asset allocation of South African retirement funds. The shift in policy enabled a broader global investment mandate which prompted funds to reduce local equity exposure and expand into offshore markets, particularly developed economies.

The assessment and the fund-level data confirmed a clear transition toward diversified, globally oriented portfolios that were aimed at mitigating domestic risks and enhancing long-term returns. These findings underscored the significant role of regulatory policy in shaping institutional investment strategies within a dynamic economic landscape.

CHAPTER 6: CONCLUSION

6.1. Introduction

This chapter draws together the main findings of the research by synthesising their implications for theory, policy and investment practice. It reflects on how the results address the research objectives and hypotheses, highlights the contributions made to both academic and practical knowledge, acknowledges the study's limitations and suggests directions for future research. The chapter concludes with a reflection on the broader significance of the Regulation 28 reforms for South Africa's retirement fund landscape.

6.2. Summary of Key Findings

The research demonstrated that increasing offshore allocations under the Regulation 28 reforms significantly enhanced retirement fund portfolio performance. Portfolios with higher offshore exposure achieved superior annualised returns, lower volatility and improved risk-adjusted metrics compared to domestic-only portfolios. Specifically, Portfolio E, with a 45% offshore allocation, consistently outperformed the lower offshore portfolios in terms of returns and downside protection. The reduction in standard deviation and maximum drawdown confirmed that offshore diversification effectively mitigated risks. Additionally, the analysis of cumulative and rolling returns revealed that offshore-diversified portfolios delivered more stable and resilient performance over time, particularly during periods of market stress such as the COVID-19 crisis. The correlation analysis further indicated that offshore allocations reduced the dependence of portfolio outcomes on South African economic variables such as GDP, CPI and the exchange rate, thereby strengthening the case for geographic diversification.

6.3. Alignment with Investment Theories

The findings aligned strongly with key theoretical frameworks in finance. Modern Portfolio Theory (Markowitz, 1952) was validated by the observation that combining international assets improved portfolio efficiency through diversification. Capital Market Theory (Sharpe, 1964) supported the evidence that offshore markets offered either higher returns or lower risk compared to the domestic market, enhancing portfolio performance. The

study confirmed the assertions by Farma (1970) that investments in offshore markets enhance diversification by mitigating risk exposure and reducing reliance on the performance of a single market or economy. Furthermore, insights from Behavioural Finance Theory highlighted how regulatory reforms help investors overcome home bias, allowing them to capture the benefits of global diversification. Collectively, these theoretical alignments not only strengthened the empirical results but also contributed to the broader academic discourse on investment diversification.

6.4. Policy and Investment Implications

The study offers important implications for policymakers, institutional investors and individual retirement savers. For policymakers, the results affirm the value of increasing offshore allowances, as these reforms align South African regulations with global best practices and enhance the financial security of retirement savers. Institutional investors and fund managers can use these findings to inform strategic asset allocation by recognising the importance of balancing local and global exposures to optimise returns and manage risks. For individual retirement fund members, offshore diversification offers meaningful benefits, including improved inflation protection, better long-term growth potential and resilience against local economic shocks. These insights underscore the critical role of regulatory frameworks in shaping investment outcomes and achieving financial objectives.

6.5. Limitations of the Study

While the study provided robust and meaningful insights, it is important to acknowledge its limitations. The short timeframe following the 2022 Regulation 28 reforms limited the ability to assess long-term outcomes fully. The reliance on secondary data introduced potential challenges related to the accuracy and consistency of reported information. Additionally, the focus on traditional asset classes excluded newer and alternative investments, such as private equity and ESG-focused assets, which are increasingly relevant in modern portfolio construction. These limitations suggest that while the findings are significant, they should be interpreted within the context of these boundaries.

6.6. Recommendations for Future Research

Future studies should adopt a longer-term analytical horizon to test the sustained effectiveness of offshore allocation reforms, particularly in relation to the adequacy of retirement savings and members' financial well-being over time. Incorporating a wider range of asset classes, including alternative assets and ESG investments, would enrich the understanding of portfolio dynamics under the new regulatory regime. Although this study engaged with Behavioural Finance Theory at a conceptual level; primarily in relation to *home bias, loss aversion,* and *familiarity bias*; future research could employ empirical testing and experimental methods to measure these behavioural effects more directly. For example, longitudinal surveys or behavioural modelling could examine how trustees' and members' decision-making patterns evolve in response to expanded offshore flexibility, fluctuating market conditions and changing perceptions of risk and return. Such inquiry would deepen understanding of how cognitive biases and financial literacy influence asset allocation decisions within the post-reform environment. Additionally, future studies should investigate the broader macroeconomic impacts of increased offshore allocations on South Africa's economic development, capital markets and employment outcomes by providing a more holistic assessment of the reform's implications.

6.7. Final Reflections

In conclusion, this study demonstrated that increasing offshore allocations under Regulation 28 has materially improved the performance, stability and resilience of South African retirement fund portfolios. The findings provided empirical support for the diversification benefits of offshore investing and highlighted the importance of striking a balance between global investment opportunities and domestic economic priorities. As South Africa's retirement savings industry continues to evolve, policymakers, fund managers and investors must work collaboratively to harness the advantages of international diversification while safeguarding national development goals. This research makes an important contribution to the understanding of these dynamics and lays the groundwork for further exploration.

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ANNEXURE A: SAA AND PORTFOLIO CONSTRUCTION PROCESS

A1. Steps for SAA

The steps for SAA were based on investment objectives and the selection of asset classes (Wepener, 2014).

Investment Objectives

The investment objectives were aligned with the overarching goal of retirement savings within a registered South African retirement fund. Investors displayed varying risk tolerance levels that ranged from low to moderate and high, depending on their financial profiles and investment strategies. The investment time horizons spanned across short-term (less than 3 years), medium-term (3 to 10 years) and long-term (beyond 10 years) durations that reflected diverse planning needs. Liquidity requirements were inversely related to both risk tolerance and investment horizon. Investors with lower risk appetite and shorter horizons demanded higher liquidity, while those with higher risk tolerance and longer-term goals demonstrated a greater capacity to withstand illiquidity (Bodie et al., 2020).

Selection of Asset Classes

Following from the above investment objectives, the selection of asset classes was guided by a strategic balance between growth, income, diversification and liquidity. Equities were included for their strong growth potential that offered capital appreciation over the long term. Fixed income instruments, such as bonds, were selected for their role in providing portfolio stability and a reliable income stream. Real estate property was incorporated to enhance diversification while also contributing to long-term growth. Lastly, cash and cash equivalents were chosen for liquidity and capital preservation, serving as a buffer against market volatility and facilitating short-term funding needs (Bodie et al., 2020).

A2. Portfolio Construction Techniques

The portfolio construction process was refined to account for real-world constraints, including regulatory restrictions (Regulation 28 limits on offshore investments) to ensure

that the final portfolios were compliant with retirement fund legislation. This process involved a systematic application of modern investment principles, beginning with constructing the Efficient Frontier using Modern Portfolio Theory. This enabled the visualisation of all feasible portfolio combinations along a risk-return spectrum, with a particular focus on identifying those portfolios that delivered the highest expected return for a given level of risk and referred to as the Efficient Frontier (Markowitz, 1952).

An optimisation technique, particularly mean-variance optimisation was applied to refine these combinations. Once the frontier was established, the focus shifted to selecting asset mixes that aligned with investors' risk preferences by using tools such as Sharpe and Sortino Ratios to determine the most efficient portfolios (Farma, 1970).

SAA Framework

Asset Class	**Conservative Fund (%)**	**Balanced Fund (%)**	**Growth Fund (%)**
Equities	30	50	80
Fixed Income	50	30	10
Real Estate Property	10	10	10
Alternative Assets	-	-	-
Cash	10	10	-

Various balanced funds were constructed in the data analysis of this report. The above process provided a robust and academically supported foundation for constructing efficient portfolios that were tailored to specific investor goals.

ANNEXURE B: DATA SUMMARY TABLE

Market Index	Asset Class	1 months	3 months	6 months	9 months	1 years	2 years	3 years	4 years	5 years	6 years	7 years	10 years
FTSE/JSE All-Share Index (ALSI)	Local Equities	4.04%	9.61%	18.58%	15.91%	23.93%	20.76%	14.73%	16.79%	13.67%	11.61%	10.39%	9.41%
FTSE/JSE All Bond Index (ALBI)	Local Fixed Income	3.86%	10.54%	18.81%	16.68%	26.14%	16.30%	11.14%	11.47%	9.84%	10.10%	9.67%	9.06%
FTSE/JSE All Property Index (ALPI)	Local Real Estate Property	5.16%	19.14%	25.93%	30.30%	50.97%	30.56%	15.33%	24.79%	5.05%	2.82%	0.22%	3.07%
Short-term Fixed Interest Composite Index (SteFI)	Local Cash	0.67%	2.07%	4.17%	6.33%	8.57%	8.03%	6.87%	6.09%	6.12%	6.32%	6.46%	6.63%
MSCI All Countries World Index (Converted to ZAR)	Offshore Equities	-0.65%	0.71%	-0.16%	11.91%	21.02%	24.10%	13.62%	14.06%	15.63%	14.54%	14.70%	14.73%
Citigroup World Government Bond Index (Converted to ZAR)	Offshore Fixed Income	-1.35%	0.93%	-4.40%	-3.46%	1.52%	3.69%	0.00%	-3.37%	0.47%	2.90%	2.94%	4.20%
FTSE NAREIT Composite Index (Converted to ZAR)	Offshore Real Estate Property	0.11%	9.78%	3.38%	5.86%	19.05%	13.21%	6.05%	8.91%	5.01%	7.71%	7.98%	9.61%
ICE LIBOR 1 Month (Converted to ZAR)	Offshore Cash	-2.53%	-4.33%	-6.47%	-1.81%	-3.35%	3.11%	8.64%	3.73%	5.16%	5.91%	6.02%	6.21%

ANNEXURE C: DESCRIPTIVE STATISTICS

	Portfolio A: 0% Offshore	Portfolio B: 26% Offshore	Portfolio C: 30% Offshore	Portfolio D: 38% Offshore	Portfolio E: 45% Offshore
Cumulative Return	157.2%	184.7%	188.8%	197.0%	204.0%
Compound Average Monthly Return	0.5%	0.6%	0.6%	0.6%	0.6%
Annualised Return	6.6%	7.4%	7.5%	7.7%	7.8%
Average Monthly Return	0.9%	0.9%	0.9%	0.9%	0.9%
Average Loss Mean	-1.8%	-1.4%	-1.4%	-1.5%	-1.6%
Average Gain Mean	2.3%	2.1%	2.1%	2.0%	2.1%
Minimum Monthly Return	-12.6%	-8.4%	-7.7%	-6.4%	-5.3%
Maximum Monthly Return	8.8%	9.0%	9.0%	9.1%	9.1%
Monthly Standard Deviation	2.7%	2.2%	2.2%	2.2%	2.3%
Annualised Standard Deviation	9.3%	7.8%	7.7%	7.7%	7.8%
Maximum Drawdown	-18.5%	-12.4%	-11.6%	-9.9%	-9.6%
Gain Deviation	1.8%	1.6%	1.6%	1.6%	1.7%
Loss Deviation	1.8%	1.4%	1.3%	1.2%	1.1%
Semi Deviation	3.0%	2.4%	2.4%	2.5%	2.5%
Down Deviation (0%)	1.5%	1.1%	1.1%	1.1%	1.1%
Down Deviation (RFR)	1.8%	1.4%	1.4%	1.3%	1.3%
Down Deviation (MAR)	1.9%	1.5%	1.5%	1.5%	1.5%
Sharpe (RFR)	0.38	0.53	0.54	0.57	0.58
Sortino (0%)	1.21	1.80	1.88	2.00	2.06
Sortino (RFR)	(0.06)	0.07	0.09	0.13	0.17
Sortino (MAR)	(0.48)	(0.47)	(0.46)	(0.43)	(0.40)
% Negative Months	36%	34%	34%	31%	31%
% Positive Months	64%	66%	66%	69%	69%
Months to Recovery from Drawdown	9	3	3	3	7

Input Information	
Risk-Free Rate	RFR
Minimum Acceptable Rate	MAR
RFR	7.00%
MAR	10.00%
RFR - Monthly	0.57%
MAR - Monthly	0.80%
RFR - Monthly	0.05%
MAR - Monthly	0.07%